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Fort Point

Historic Data Section

FORT POINT NATIONAL HISTORIC SITE / CALIFORNIA

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HISTORIC PRESERVATION TEAM

DENVER SERVICE CENTER
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR
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FOREWORD

This report has been prepared to satisfy the research needs as enumerated in Historical Resource Study Proposal FOPO-H-1, Historic Structure Report, Fort Point, and to meet other needs of the Service as indicated by the Superintendent, Fort Point National Historic Site. In addition to a structural history of the casemated masonry work, this report details the construction history of Batteries East and West, the De Russy and Elliot Seawalls, and no longer extant structures associated with Fort Point. Also found in this report is detailed data on the armament of these works for the years 1861-1900.

To secure documentary information to assist restoration architects to restore or stabilize Fort Point, Battery East, and the De Russy and Elliot Seawalls several hundred feet of manuscript materials on file in Record Groups 77 and 92 at the National Archives and the San Francisco Records Center were examined. Other pertinent record groups at the former institution were consulted. On a field trip to California, visits were made to the California State Library in Sacramento, the Bancroft Library in Berkeley, and the following institutions in San Francisco: The Sixth Army Reference Library, the California Historical Society, the Society of California Pioneers, and the San Francisco Maritime Museum. From the newspaper, iconographic, and manuscript files of these institutions came a number of nuggets valuable to an understanding of the structural history of Fort Point.

Many persons assisted in preparation of this report, and without their aid it might never have been completed. Particular thanks are due: Park Superintendent David B. Ames, Park Technican Charles Hawkins, and members of the staff of Fort Point National Historic Site for their assistance in and around the area and their prompt response to my many requests. Dr. John Hussey, a colleague steeped in Western History, introduced me to California repositories and their curators. Mrs. Glennie Murray, then assigned to the National Park Service's Western Regional Office, went out of her way to insure that my trip to San Francisco was profitable. Mr. John Barr Tompkins of the Bancroft Library, Mrs. Miriam T. Pike of the California State Library, and Mr. George Goldfine and the staff of the Sixth Army Reference Library took a special interest in my project, and, besides securing requested files, made suggestions which opened new vistas.

My friend Elmer O. Parker, assistant chief of the National Archives' Old Military Records Branch, gave generously of his time

and counsel to insure the successful completion of this project. Archivist Jack Best and Technicans John Matias and Anthony Warren cheerfully searched the stacks in response to my numerous requests and arranged to have hundreds of documents copied. At the San Francisco Records Center of the National Archives, Mrs. Robin D. Gottfried handled my requests.

Members of the Denver Service Center of the National Park Service to whom I am indebted are Merrill Mattes and F. Ross Holland. The former now Chief, Historic Preservation Team, was captain of the Park Service teams which made the studies pioneering the way for establishment of the National Historic Site. Besides sharing his sources, Mr. Mattes went out of his way to expedite the completion of this report. Mr. Holland, my long-time colleague and lighthouse authority, made available his notes and an advance copy of his Fort Point Lighthouse Study.

Architectural Historians Louis Koue and Henry Judd of the National Park Service toured the fort, made suggestions as to what interested the restoration specialists, and examined the fabric. By sharing their vast knowledge of the builders' arts, they enabled me to understand and explain details of the structural history of the fort on which the documents were vague or silent.

Mr. George M. Dean and members of the Fort Point Museum Association were a source of encouragement. A special debt of gratitude is owed Dr. Ray Lewis of Washington, D. C., and author of Seacoast Fortifications of the United States for sharing his encyclopedic knowledge of seacoast fortifications.

My colleague Dave Clary read the manuscript in draft and made a number of valuable suggestions, saving me from future embarrassments. Last but not least, I wish to thank and express my appreciation to Mrs. Judy Sprouse and Miss Patricia Zbel for the hours they spent converting my scrawl into a typed manuscript.

Edwin C. Bearss

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I. ADMINISTRATIVE DATA

A. Name and Number of Structures

Fort Point, Structure No. 1, Fort Point National Historic Site, The Presidio, San Francisco, California. Fort Point is classified as a structure of 1st Order of Significance.

De Russy's and Elliot's Seawalls, Structure No. 2, Fort Point National Historic Site, are classified as structures of 3d Order of Significance.

Battery East, Structure No. 3, Fort Point National Historic Site, is classified as a structure of 3d Order of Significance.

B. Proposed Use of Structures

Fort Point will be stabilized and partially restored, refurnished, and armed to interpret the construction, occupation, and defense of a Third System masonry fort. A secondary theme will be the defense of San Francisco Bay and the Presidio as a military command post and base.

Battery East will be stabilized and one of the emplacements armed.

C. Justification for Such Use as Shown in the Master Plan

The approved master plan calls for stabilization and partial restoration of Fort Point to its appearance 1861-1914. The subject plan proposes to refurnish certain of the gorge casemates of the 1st, 2d, and 3d Tiers. A number of guns and carriages will be secured and selected 1st, 2d, 3d Tier and Barbette Tier emplacements armed.

D. Provision for Operating the Structures

Fort Point and Battery East will be used as historic structure museums and exhibits in place.

E. Cooperative Agreement, if any, Executed or Proposed for Operating the Structures

The Fort Point Museum Association operated Fort Point for 11 years under a special use permit from the Department of Defense.

Since enactment of legislation establishing Fort Point National Historic Site, the Association has changed its functions. In April 1972 the Association operated the fort's sutler's store and assisted the Service in acquisition of objects for refurnishing the fort and preparation of exhibits.

F. Brief Description of Proposed Construction Activity

From 1861 until 1913 structural changes to Fort Point were minimal. In 1914 the interior of the masonry fort was greatly altered to prepare facilities for establishment of a detention barracks. After this work was done, the plan to use the fort as a disciplinary barracks was dropped.

It is proposed to restore the fort to its appearance 1861-1913. To accomplish this the following projects will be undertaken: (a) one of the shot furnaces will be reconstructed; (b) iron window guards and brickwork will be removed from the embrasures; (c) traverse rails will be relaid in the casemates scheduled to be rearmed; (d) the iron railings facing the parade will be restored; (e) toilet facilities and kitchens dating to 1914 will be removed; (f) in the casemates to be rearmed and interpreted the concrete flooring will be removed and the flagstone exposed; (g) the concrete will be removed from the superior slope of the barbette tier and replaced with an earthen fill and sod; (h) the walls and windows in the four casemates west of the sally port on the 1st Tier will be restored to their appearance before conversion into a "guard dormitory"; and (i) on the 2d and 3d Tiers certain casemates will be restored and refurnished as proposed in the Interpretive Prospectus.

In rearming the fort, it is recommended that the following armament be mounted: five 42-pounders in Casemates Nos. 10-19 bearing on the Golden Gate and two 24-pounder guns in Casemates Nos. 4 and 5 of the 1st Tier; on the 2d Tier two 24-pounders in Casemates Nos. 34 and 35; on the 3d Tier two 24-pounders in Casemates Nos. 64 and 65; and on the barbette tier two 10-inch columbiads in Emplacements Nos. 96 and 108, eight 8-inch columbiads in positions 99-106, and 11 32-pounders in Emplacements Nos. 116-126.

Battery East will be stabilized and Emplacements Nos. 17 and 18 restored to their appearance, circa 1900. The smoothbore 10-inch Rodman and iron carriage currently at the Park will be mounted in Emplacement No. 18.

II. CONSTRUCTION BEGINS AT FORT POINT

A. California Enters the Union

The Treaty of Guadalupe Hidalgo ended the Mexican War and confirmed the conquest of California by the United States. On January 24, 1848, ten days before the treaty was signed, gold was discovered on the American River. Efforts to suppress the information failed, and by late spring a stampede was in progress. On June 28, 1848, Thomas O. Larkin wrote the Secretary of State James Buchanan, "Three-fourths of the houses in the town on the Bay of San Francisco are deserted."

News that Eldorado had been found reached the eastern states, and thousands deserted families, jobs, and farms to join hastily organized companies of adventurers. For the next 18 months there was a flood of emigrants, the 49ers, into California. Great numbers came overland across the Great American Desert, braving the Rocky Mountains and the mighty Sierras, while thousands came by ship. These vessels, after rounding the Horn, plied the sea lanes between the Isthmus of Panama and San Francisco Bay, landing gold hungry passengers at San Francisco. As these ships entered the Bay, they passed to their starboards the deserted battlements of Castillo de San Joaquín and the all but abandoned military post of the Presidio.

The Presidio, the old Spanish and Mexican cantonment, was garrisoned at this time by Company M, 3d U.S. Artillery, commanded by Capt. Erasmus D. Keyes. Mounted in the Castillo were four 32-pounders and two 8-inch siege howitzers emplaced there in the summer of 1848. Such defenses would be no protection in event of war with a European power.

In the years 1849 and 50 more than 1,200 vessels entered the Golden Gate, the first steamship California arriving on February 28, 1849. Although San Francisco had been almost deserted during the first weeks of the stampede, its streets were soon crowded with disillusioned prospectors who had abandoned efforts to strike it rich at the diggings. They were joined by many newcomers who had come by sea, and had decided that business opportunities in the boomtown were more attractive than the hardships of the mining camps. By February 1849 there were an estimated 2,000 people in San Francisco, 6,000 by August, and as winter threatened and hundreds of miners left the diggings, the population climbed to about 20,000.

The population explosion and the region's economic importance resulted in the admission of California to the Union as the 31st

state in 1850. With two senators and one representative in Congress, Californians were better able to press for appropriations to provide for defense of San Francisco Bay by up-to-date masonry fortifications such as guarded the approaches to Atlantic and Gulf Coast ports and harbors.[1]

B. The Constitution of the Board of Engineers for Fortifications on the Pacific Coast

1. The Joint-Commission Acts

Within ten months of the end of the war with Mexico, the Secretaries of War and Navy took steps to provide for the defense of the recently acquired Pacific Coast territory. On November 30, 1848, by joint-action they constituted a Commission charged with exploring the "whole extent of the Pacific Coast" to ascertain "what harbors, roadsteads, rivers, sounds, &c., will need defense by fortifications and other means." The Commission was to specify which of these should be occupied and fortified by the military to afford security and to protect the nation's Pacific commerce and trade.

Chief Engineer Joseph Totten on December 12 selected three members of his Corps to represent the army on the Commission. They were Bvt. Lt. Col. John L. Smith, Maj. Cornelius A. Ogden, and Lt. Danville Leadbetter. The officers designated by the Secretary of Navy were Commanders Lewis M. Goldsborough and G. J. Van Brunt, and Lt. Simon F. Blunt.[2]

The Joint Commission held its organizational meeting in San Francisco Bay on April 2, 1849, aboard the sloop-of-war St. Marys. Present were Commanders Goldsborough and Van Brunt, and Lieutenant Blunt of the navy and Colonel Smith and Major Ogden of the army. Gold fever and high wages paid at the diggings had frustrated efforts to obtain sailors to man the small boats necessary for making soundings. It was therefore decided to await the arrival of Massachusetts, known to be en route from the Atlantic coast, before beginning the surveys. While awaiting Massachusetts the commission, though hampered by fogs, undertook "a general survey of the ground between" Sausalito Cove and the Pacific.[3]

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1. Lawrence Kinnaird, "History of the Golden Gate and its Headlands," Ms. prepared for the NPS, Vol. II, pp. 183-207. Copy located in the Division of History, National Park Service, Washington, D. C.

2. Totten to Smith, Dec. 12, 1848, NA, RG 77, Ltrs. Sent, Chief Engineer.

3. Smith to Totten, April 9, June 19, and Aug. 1, 1849, NA, RG 77, Ltrs. Recd., Chief Engineer. Lieutenant Leadbetter had stopped off in Monterey.

Massachusetts, having proceeded first to the mouth of the Columbia, finally anchored off Benicia in the fourth week of June. While discharging her cargo, she was deserted by most of the crew. The Commission, while waiting for a new crew to be recruited, continued its survey of the Bay. To obtain enough men to enable the Commission to discharge successfully its mission and to have the vessel reconditioned, the Commissioners sailed for the Hawaiian Islands on November 1. Although they hoped to be back in California in ten to twelve weeks, it was March 17, 1850, before they returned. In Honolulu, they had shipped a sufficient crew of good men to relieve those on loan from U.S.S. Preble.[4]

It had been hoped that on its return to San Francisco the Commission could speedily complete its surveys there and to the south before sailing for the Columbia. But with the coming of spring, it was decided to revise the schedule. As considerable time would be occupied in the Oregon survey, the Commission determined to complete its work in San Francisco Bay, because it was of

> paramont importance that an examination here should be made to the extent necessary to enable us to report our opinion without delay, respecting the minute surveys, levellings, and soundings required to be made to afford the detailed information upon which works of defense and a site for a naval depot would be decided upon.

By March 31, 1850, the Commission was able to recommend that detailed surveys were required from a point 800 yards south of Point José to the southern boundary of the Presidio, along its southern boundary to its western extremity and then in a straight line to the Pacific, passing by the southern extremity of a pond flowing into "the channel between Fort point & Point Lobos"; the area on the north side of the Golden Gate to include Points Cavallo and Diablo; an area to include Yerba Buena, Alcatraz, and Angel islands, and the straits and channels thereabout; and finally the Mare Island area.

The Commissioners also recommended that the United States reserve for public use all land embraced by these surveys.

There was a strong possibility, the Commission would recommend "strong works near Fort point on the south side of the channel and also on the north side of the channel nearly opposite to Fort point. These would be works of chief importance for the defense of the en-

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4. Smith to Totten, Sept. 25, 1850, NA, RG77, Ltrs. Recd., Chief Engineer.

trance to the harbor." Batteries at Point José and on Alcatraz would support these works. Temporary batteries on Angel Island would command Raccoon Strait and the channel toward Alcatraz.

In their reconnaissances the Commissioners had seen no limestone, though they understood there were deposits on Monte Diablo. No good building stone had been encountered. Bricks were scarce and costly, and lumber could be bought for $30 a thousand. Labor was more plentiful than it had been in 1849, but wages were greatly inflated. While in the Hawaiian Islands, the Commissioners had investigated the possibility of hiring labor for work on the projected fortifications and navy yard. They had received little encouragement. The subject of bringing in Chinese was rejected, because "they would scarcely be strong enough for such work as we would have to employ them upon." Colonel Smith believed the answer was the enlistment of 2,000 men in two regiments of sappers and miners for duty on the Pacific Coast. Enlistments could be encouraged by promise of two to three months leave to work in the goldfields.[5]

2. The Board is Constituted

The Commission had completed its surveys of the Columbia and the California coast south of San Francisco to San Diego by winter, and the members returned to the Atlantic seaboard. To implement the recommendations of the Commission, Chief Engineer Totten on June 17, 1851, issued a General Order, constituting a Board of Engineers for the Pacific Coast. Members of the Board included Colonel Smith, Major Ogden, Lieutenant Leadbetter, and Bvt. Lt. Col. James L. Mason and Capt. F. A. Smith.

Seventeen days later, Chief Engineer Totten called upon the Board to provide him with "a statement showing what points will . . . require defensive works." The class of the several works would be given, along with an estimate of its cost. The report would also specify "the works for which appropriations should be asked immediately, and the amount of appropriations required."[6]

3. The Board Makes a Preliminary Report to the Chief Engineer

Colonel Smith replied for the Board on October 28, informing General Totten that it had been restricting its activities to an

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5. Smith to Totten, March 31, 1850, NA, RG77, Ltrs. Recd., Chief Engineer.

6. Chief Engineer to Smith, Oct. 27, 1851, NA, RG77, Ltrs. Sent, Chief Engineer.

examination of papers and drawings furnished for their information and to discussions relative to a project for Fort Point which in their estimation is entitled to precedence. Not until receipt from the Coast Survey of a map of the Fort Point area, with soundings, would the Board be able "to prosecute their duties with more confidence than at present." But to answer the Department's request, the best Smith could do was to refer Totten to the Commission's report of November 1, 1850, in which estimates had been prepared for construction of works required for "defence of harbors, roadsteads, rivers, sounds, &c upon the coast of the United States on the Pacific." Under first class fortifications to be commenced without delay were:

Sites of Fortifications	Type	Approximate Estimate of Cost On the Atlantic	On the Pacific
South Shore San Francisco Bay	Battery	$ 400,000	$1,600,000
North Shore San Francisco Bay	Battery	400,000	1,600,000
Alcatraz Island	Battery	150,000	600,000
Cape Disappointment	Redoubt with Batteries	200,000	800,000
Point Adams	Fort with Batteries	300,000	1,200,000
San Diego	Batteries with Coverface	400,000	1,600,000
		$1,850,000	$7,400,000

Though the Board had "not sufficiently advanced" in its study of the Fort Point site to present specific plans, Smith wrote, it could recommend that "Congress be asked at the coming session to appropriate liberally, but not less than $500,000 for commencement of fortifications at the entrance to San Francisco Bay."[7]

4. Totten Reports to Congress

Before the War Department could forward this information to Congress, the Senate on February 4, 1852, prodded by the gentlemen from

7. Leadbetter to Totten, Oct. 2, Totten to Board, Oct. 27, and Smith to Totten, Oct. 28, 1851, NA, RG77, Ltrs. Recd. & Sent, Chief Engineer.

California, called on Secretary of War Charles M. Conrad for a report on the amount of money recommended by the Board of Engineer Officers "to be appropriated at the present session of Congress, for immediate commencement" of fortifications for defense of San Francisco Bay.[8]

Secretary Conrad turned to Chief Engineer Totten for the desired information. Totten on the 5th reported that the Board had recommended that Congress be "asked to appropriate not less than $500,000 for the commencement of fortifications at San Francisco."[9]

5. The Final Report

a. Background Information and Rationale

In the following months, the Board of Engineers for Fortifications on the Pacific Coast expanded the scope of its operations. Plans and estimates were prepared. The majority report, signed by four of the five members of the Board, was submitted to General Totten on August 4, 1853.[10]

It was pointed out by the Board that there were only "three harbors on the coast south of Puget Sound" accessible to large warships. These were the mouth of the Columbia River and San Francisco and San Diego bays. The Board, in urging prompt action, observed that in the five years since the acquisition of California from Mexico, the foreign commerce of the United States had nearly doubled. This factor alone warrented "extensive preparations" to close these harbors to hostile fleets and to secure them to ourselves. Another vital factor were the "immense interest in the fisheries, immense in capital, in the tonnage, in the number of seamen, and above all in the quality of those seamen." In event of war, the whaling fleets plying the Pacific could find refuge in these harbors, along with the clipper ships engaged in the Asiatic trade.

At present, most of the harbors on the Pacific coast of the western hemisphere were in possession of Latin American countries. Recalling the cruise of Essex in 1813-14, the Board pointed out

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8. Executive Documents, Printed by Order of the Senate of the United States, during the 1st Session of the 32d Congress, 1851-52 (Washington, 1852), Serial 618, Vol. VII, Doc. 29, p. 1.

9. Ibid.

10. Board of Engineers for the Pacific Coast to Totten, Aug. 4, 1852, NA, RG 77, Ltrs. Recd., Chief Engineer. Members of the Board signing the majority report were Colonel Mason, Major Ogden, Captain Smith, and Lieutenant Leadbetter.

that the British to secure her destruction had violated the neutrality of Valparaiso harbor. This was a lesson as to the "shelter and hospitality that we may hope to meet so long as we shall not have demonstrated our naval superiority."

All circumstances argued "with great stress in favor of an early and thorough defence of San Francisco & San Diego harbors," the Board reported.

After discussing the geography and oceanography of the San Francisco Bay area, the Board reported that the principal objects to be accomplished in its defense were: (a) to prevent entrance of a hostile fleet into the harbor; (b) to presume that one or more ships had effected an entrance to perfect "batteries for the near defence, as to deter an enemy from approaching or lying near enough to destroy" San Francisco; and (c) to present an interior line of batteries to command the three passages into San Pablo Bay, i.e., that between Alcatraz and San Francisco, that between Alcatraz and Angel Island, and the Raccoon Strait.

To accomplish the first and most vital object, it was proposed to construct two works commanding the Golden Gate, one on the south side at Fort Point and the other on the north shore at Lime Point Bluff. The subject works would be a little more than a mile apart, and a hostile fleet compelled to pass within one-half mile of one of these forts. Heavy ordnance currently had a range of two miles, and at a mile and one-half was "quite effective."

The battery at Fort Point, the Board held, would occupy the best position of the two, as its fire would be "more direct upon all vessels coming in, and after they have passed rakes them as far as its fire extends, if they attempt the direct passage to San Francisco." Under no circumstance could hostile ships entering the Golden Gate, even if they hugged the north shore, "escape for 2¼ miles of their course the fire of Fort Point at a range of 1½ miles." It was there that the "first work for the defence of the passage should be placed, and nothing should be allowed to interfere with bringing this battery as rapidly as possible to a state of efficiency."[11]

With batteries such as those proposed commanding the Golden Gate, "it would require an object of very considerable importance to induce a fleet to risk a passage open to view."[12]

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11. Ibid. A battery of heavy guns would be emplaced at Lime Point Bluff, from where they would "have a good fire" upon the direct approaches to the Golden Gate.

12. Ibid. It was pointed out by the Board that the Golden Gate was

East of the Golden Gate, the Bay expands into a wide sheet of water, "where all the navies of the world could ride in safety," beyond reach of the guns of the outer batteries. To guard against passage of the Golden Gate by a hostile fleet in a thick fog or on a dark night, Alcatraz Island would be fortified. Situated as it was abreast the entrance to the inner harbor, the guns of Alcatraz could sweep the waters north to Angel Island and south to San Francisco. The proposed Alcatraz batteries, in conjunction with the two recommended for Angel Island (one facing Raccoon Strait and the other Point Blunt) would close the subject straits to enemy shipping.[13]

b. The Fort--A Description

Several factors, the width of the Golden Gate and its great depths enabling vessels to hug the north shore, decided the Board to locate the proposed work at Fort Point at the tip of the promontory. The limited area required a work of "four tiers of guns to afford a suitable number," so that they could be brought within "a reasonable proximity to passing vessels."

To establish the axis of the fort, the engineers took the short line from shore to shore. Next they drew two lines, making on either side of it angles of 60°, thus providing the direction of the two water fronts, "the casemate guns of which were to have as their extreme traverse fire parallel to the shortest breadth of the entrance." Laying off 171 feet on the western line, provided them with the magistral of Front No. 5, at the extremity of which (with an angle of 120°) would be Front No. 2, intersecting Front No. 1, and making their lengths respectively 95 and 76 feet. A pan coupé, 18 feet in length, would be formed at each angle, except the southeast. The dimensions and directions of the fronts determined, the site of the fort would be "fixed by sliding it along the axis to the position recommended by facility of construction."

There would be four tiers of guns, placed on each face, except Front No. 3, where only a barbette tier was retained, the casemates of that front to be used as quarters, magazines, postern, etc.

The floor of the 1st Tier was to be at reference (16'), because of "the enormous rise and dash of the sea in storm tides." To provide suitable height to the three tiers and an adequate tickness of floor arches and bombproofs raised the reference of the rear of the

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too wide and the tides too strong to permit the construction of a boom to control ingress and egress.

13. Ibid.

terreplein to (60'3") and the crest of the parapet on the four water fronts to (66'6"). The rear of the terreplein on the land front would be at the same reference, giving to it "a certain defilement that will secure a narrow passage along its rear, and give some protection to the gunners (with a little stooping) from the . . . commanding heights in front." The crest of the parapet on the land front would be (70'6") and of earth, whereas the others were stone.

The width of the ditch on the land front was to be 31 feet, and at its western extremity would be a casemated battery of four guns to flank the ditch and scarp, and a "small battery" of two guns to flank the seawall. These cannon should be 24-pounder howitzers. The remainder of the armament of the fort 101 guns, along with those to be emplaced in the 10-gun open battery south of the fort, were to be 8- and 10-inch columbiads. Fort Point would be as "powerful in its fire on the water as . . . the largest of our fortifications on the Atlantic."

Its power to resist land attacks would not be great, as two of the fronts could be breached by distant batteries, but its paramount function would be to resist the passage of a fleet. The fort would, however, have some "power of endurance against land attack." It could serve as a point d'appui for an army covering San Francisco against a hostile force landing south of Point Lobos, and in conjunction with the works at Lime Point it could act as a tête de pont to protect passage of troops from one side of the Golden Gate to the other.

The Board was satisfied that essential details of the fort were "sufficiently shown" in the attached drawing prepared by Lieutenant Leadbetter. The garrison for the work was to number 550 officers and men.

Information available to the Board was insufficient to enable it "to fix accurately either the dimension or direction of the sea wall that may be necessary to prevent the wasting of the neck of land back of the Fort."[14]

Accompanying the report and Leadbetter's drawing were estimates of the cost of construction (see Appendix A for these estimates). The fifth member of the Board and its ranking member, Col. John L. Smith, filed a minority report and submitted plans and estimates for a huge enclosed casemated work to cost $1,400,000. The subject work had many features twentieth century Americans would associate with Rube Goldburg.[15]

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14. Ibid.

15. Smith to Totten, Sept. 17, 1852, NA, RG 77, Ltrs. Recd., Chief Engineer.

c. Conrad's 1853 Report to the Senate

The Senate, having given the War Department one year to perfect its plans, called on Secretary Conrad on February 7, 1853, for details as to

> the shortest practicable time and the annual and total appropriations required to place the harbor to San Francisco in a good condition for defence, and also the shortest practicable time and the appropriations required to fabricate, transport, and place in secure depots and magazines, the necessary armaments and munitions.[16]

The War Department referred the request to Col. J. L. Smith, chairman of the Board of Engineers for Fortifications on the Pacific Coast and author of its minority report. Colonel Smith answered on the 8th, "Plans and estimates of all the permanent works embraced in the general project for the defence of San Francisco bay have been prepared." The majority of the Board had recommended:

location	armament	cost
Fort Point	107 guns	$1,000,000
Lime Bluff Point	80 guns	600,000
Alcatraz Island	43 guns	300,000
	230 guns	$1,900,000

;while the minority urged:

Fort Point	205 guns	$1,400,000
Lime Bluff Point	80 guns	600,000
Alcatraz Island	120 guns	340,000
	405 guns	$2,340,000

Included in the comprehensive program were temporary batteries which could be erected on short notice and at small cost. No specifications as to their size or cost estimates had been formulated.

The permanent works could be completed in five years at the estimated cost, or if construction were accelerated they "might

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16. Executive Documents, Printed by Order of the Senate of the United States, 2d Session, 32d Congress, 1852-53 (Washington, 1854), Serial 665, Vol. 7, No. 3, p. 1.

be finished in four, or even three, or two years, but at enhanced costs, increased as the time . . . diminished."

To illustrate the problem, Colonel Smith observed that to complete the works on an accelerated schedule would require:

	Five Years	Four Years	Three Years	Two Years
For 1854	$ 300,000	$ 500,000	$ 800,000	$1,500,000
For 1855	400,000	600,000	1,000,000	2,000,000
For 1856	500,000	750,000	1,200,000	
For 1857	555,000	750,000		
For 1858	555,000			
	$2,300,000	$2,600,000	$3,000,000	$3,500,000[17]

Chief Engineer Totten, after reviewing the Board's report and before forwarding it to Congress, made one change. In the five-year program, he juggled the figures to provide for an appropriation of $500,000 annually. He also called the attention of the lawmakers to the probability that there would be an increase of cost by "an extension of time" beyond five years, because of an inflation in cost of materials and wages and additional charges for supervision.[18]

Chief of Ordnance Col. Henry K. Craig provided the information pertaining to heavy ordnance required for the projected fortifications. He advised Congress that 200 cannon, of a weight not less than 32-pounders, "with such temporary fortifications as may be made of earth at short notice, would furnish quite a reputable means of defence for the harbor of San Francisco." This heavy ordnance, all of which could be cast within two years of the date the appropriation became available, could be stored in secure depots near the city. Such a suggestion was merely a temporary expedient to be resorted to in emergencies, and "not as a regular proposed mode of defence" for such a vital harbor.

To arm the permanent fortifications projected by the Corps of Engineers required either 405 or 230 heavy 10- and 8-inch columbiads. As the first step, his department needed an appropriation of $100,000 for construction of secure depots and magazines. The "temporary expedient" for defense of San Francisco Bay required "a single immediate appropriation of $200,000, or two annual ones of $100,000 each."

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17. Ibid.

18. Ibid., p. 2.

The permanent plan for 230 cannon required an appropriation of $372,000, in four equal annual allotments, and five years' time. The 405-gun plan required an appropriation of $655,300, and a six year program.

Figures cited by Colonel Craig included cost of cannon, carriages, implements, and equipments, complete, and 100 rounds of ammunition per gun. It did not include cost of transportation from eastern foundries to San Francisco, which would be the responsibility of the Quartermaster Department.[19]

C. Totten Selects a Project Engineer

1. Colonel Mansfield Gets His Orders

Before adjourning on March 3, 1853, the 2d Session of the 32d Congress enacted and lame duck President Millard Fillmore signed into law legislation appropriating $500,000 for "defence of San Francisco Bay." The next day Franklin Pierce was inaugurated 14th President of the United States. In selecting his cabinet, Pierce picked the Mexican War hero Jefferson Davis of Mississippi as his Secretary of War.

Davis was made aware of plans for the Pacific coast fortifications in early April, when Chief Engineer Totten forwarded to him Lieutenant Leadbetter's drawing of the "Fort at Fort Point," with the recommendation that it be approved. Such details as might require additional study, along with any changes necessitated by a "more minute survey of the site," could be made by the project engineer with the concurrence of the Department, Totten assured Secretary Davis. Accepting the advise of his staff, Davis approved the plan.[20]

Chief Engineer Totten, aware of the strategic significance of the area and the interest of Congress, chose one of his senior and most experienced officers, Bvt. Col. Joseph K. F. Mansfield, to supervise construction of the work at Fort Point. Born in New Haven, Connecticut, in December 1803, Mansfield had entered the U. S. Military Academy two months before his 14th birthday, and was graduated five years later, ranking second in the class of 1822. As a young engineer officer he was principally engaged in construction of sea coast defenses until the Mexican War. He then served as Maj. Gen. Zachary Taylor's chief engineer, and won brevets for gallantry as major, lieutenant colonel, and colonel.[21]

19. Ibid., pp. 4-5.

20. "Plan of Fort at Fort Point by the Board of Engineers for the Pacific Coast," NA, RG 77, Dr. 94-5.

21. Ezra J. Warner, Generals in Blue: Lives of the Union Commanders (Baton Rouge, 1964), p. 309.

On April 11, 1853, Colonel Mansfield, then supervising improvements to navigation on tidewater rivers of Virginia, was directed to turn over these projects to Lt. Col. René E. De Russy, and proceed to San Francisco Bay "without any unnecessary delay." Before leaving for California, he would, if possible, be provided with traced plans for the works at Fort Point, along "with memoirs and estimates appertaining thereto." The Fort Point project "having been presented by the Board of Engineers for the Pacific Coast, recommended by this Department, and sanctioned by the Secretary of War" would be "executed without any variation," except such as may be hereafter approved by the chief engineer.

Mansfield was admonished that the $500,000 appropriated by Congress "for the defence of San Francisco Bay" makes it "imperative that the works, besides being commenced at the earliest day possible, shall be pressed forward with the utmost vigor." With "ample funds" available, any delays would be exclusively the "fault" of the Corps of Engineers.

Because of the great distance involved and absence of "personal knowledge of the locality, the Department" would not "run the risk of hampering you with minute instructions." General Totten was aware that "a more precise survey of the site . . . may necessarily involve some modifications of the project." Mansfield would accordingly give such a survey first priority, and submit it, along with the drawings, to the Board of Engineers for the Pacific Coast. The Board was empowered to recommend "such modifications . . . as shall be found necessary to adapt the project to the local features." All changes recommended were to be submitted to the Chief Engineer for consideration and approval.[22]

Pending completion of the survey, Colonel Mansfield was to proceed with preparations to begin construction. He was to investigate sources of building materials and labor, open roads, erect temporary structures for storehouses and workshops, and begin moving earth and rock.

As senior Engineer on the Pacific Coast, Mansfield would wear a second hat. He would have "general supervision of all works of fortification that may be undertaken there, and will make occasional inspection of the same, reporting the results to the Chief Engineer." He was notified that Bvt. Lt. Col. James L. Mason had been placed in charge of the works to be erected on Alcatraz Island, and that one or two officers would be ordered to report to him at Fort Point as assistants.

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22. Totten to Mansfield, April 11, 1853, NA, RG 77, Ltrs. Sent, Chief Engineer. The subject Board had been reorganized and would included in addition to Colonel Mansfield, Bvt. Lt. Col. James L. Mason and Capt. Henry W. Halleck.

Tests scheduled for the near future at West Point would provide details for construction of embrasures and the thickness of the scarp. These tests need not cause any delay.[23]

The $500,000 appropriated by Congress for "defence of San Francisco Bay" would not become available until July 1. But desirous of expediting preparations, General Totten determined to make available $20,000 from his contingency fund to be repaid. Mansfield was notified of this on April 23. Turning to another financial matter, Totten advised his project engineer that he was not prepared to say how the $500,000 should be apportioned between Fort Point and Alcatraz Island. Mansfield, to be on the safe side, was to confer with Colonel Mason on this subject, and "be careful that your preparations do not exceed the work that may be accomplished with the existing means."[24]

2. Colonel Mason Succeeds Colonel Mansfield

Secretary of War Davis, who had known Colonel Mansfield favorably in Mexico, now intervened. Upon his recommendation, Mansfield was assigned to the prestigeous Inspector-General's Department. This compelled Chief Engineer Totten to pick a new project engineer, and he decided to change Colonel Mason's assignment from Alcatraz to Fort Point. Notifying Colonel Mason of his reassignment on June 1, 1853, Totten informed him that as senior officer he would also have general supervision of all fortifications under construction on the Pacific Coast.

Bvt. Maj. Zealous B. Tower, a 34-year-old Mexican War hero, was designated to replace Mason as superintending engineer for the Alcatraz fortifications. Colonel Mansfield was directed to turn over to Mason all papers he had received relating to Fort Point.[25]

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23. Ibid.

24. Totten to Mansfield, April 23, 1853, NA, RG 77, Ltrs. Sent, Chief Engineer. Ten thousand dollars would be forwarded to Bvt. Maj. William D. Frazer, the officer in charge of the Engineer Depot in New York City, subject to Mansfield's call, and the remainder would be deposited with the Assistant U.S. Treasurer in San Francisco. Totten to Mason, May 15, 1853, NA, RG 77, Ltrs. Sent, Chief Engineer.

25. Totten to Mason, June 1, 1853, NA, RG 77, Ltrs. Recd., Chief Engineer; Warner, Generals in Blue, p. 510. Tower was born in Cohasset, Massachusetts, on January 12, 1819. Young Tower entered the Military Academy in 1837 and was graduated in 1841, ranking first in the class. Tower was commissioned a 2d lieutenant of engineers and during the Mexican War won brevets of 1st lieutenant,

3. Colonel Mason Gets Two Assistants

General Totten meanwhile had selected two promising young officers to serve as assistant engineers at Fort Point. On April 14 he had issued orders for Lt. William H. C. Whiting, stationed at Galveston, Texas, to transfer his duties to Lt. H. L. Smith and travel to San Francisco. There he would report to Colonel Mansfield. Whiting was 29 years old, a native of Mississippi, and had graduated from the U.S. Military Academy in 1845, with the highest scholastic average attained up to that year.[26] The other officer assigned to this duty would be Lt. N. F. Alexander.

Colonel Mason, on June 1, was advised by the Department that Lieutenant Whiting was en route to California and would be his assistant. Lieutenant Alexander, as soon as he could be "spared from the Military Academy," would join him.[27]

D. Colonel Mason as Project Engineer

1. The Trip to the Pacific Coast

Colonel Mason, having served as a member of the Board of Engineers for the Pacific, was familiar with the scope of the undertaking. While serving in that capacity, he had taken advantage of permission granted by Secretary of War Conrad to select his own station. He was residing in Providence, Rhode Island, when notified on April 25 that he was to proceed to California and take charge of the works planned for Alcatraz Island. Consequently, the orders changing his assignment caused no personal inconvenience.

One problem, however, had developed. Totten, in issuing instructions to advance money from his Contingency Fund, had failed to clear the matter with Secretary of War Davis, a stickler for rules and regulations as many a politican, officer, and bureaucrat was to learn in the years ahead. Davis was horrified to learn of General Totten's scheme to advance $20,000 from the subject fund to enable the superintending engineer to purchase "indispensible articles

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captain, and major for gallantry while serving on the staff of Lt. Gen. Winfield Scott.

26. Totten to Whiting, April 14, 1853, NA, RG 77, Ltrs. Sent, Chief Engineer; Ezra J. Warner, Generals in Gray: Lives of the Confederate Commanders (Baton Rouge, 1959), p. 334.

27. Totten to Mason, June 1, 1853, NA, RG 77, Ltrs. Sent, Chief Engineer.

of Machinery &c," prior to his departure for the Pacific Coast.[28] Totten was told that this was illegal.

Colonel Mason, in view of Davis' decision, called on Totten to make available on July 1, "the earliest day at which the appropriation for fortifications at the entrance to San Francisco Bay will become available," $20,000. One-half of this was to be remitted to Maj. W. D. Frazer at the New York depot, subject to his call, and the balance to be deposited to his credit with the United States Assistant Treasurer in San Francisco. Totten was agreeable, and on July 1 the requested funds were forwarded.[29]

On June 14 at New York City, Colonel Mason boarded the U.S. Mail Steamer Georgia, bound for Aspinall. Crossing the Isthmus to take a ship for San Francisco, Mason was felled with "Panama fever." In his "zeal" to discharge his duties, Mason continued his journey, reaching San Francisco early in July. There he found his two assistants, Lieutenants Whiting and Alexander. A work force of carpenters, teamsters, and laborers were recruited and turned to--the carpenters, assisted by the laborers, erecting shops, offices, and stables at the site, and the teamsters hauling lumber, water, and supplies out from the city to Fort Point.[30]

2. Colonel Mason has a Short Tenure

While his two young assistants made a detailed topographic survey of the area, Colonel Mason took legal steps to implement President Fillmore's executive order of December 31, 1851, reserving certain lands for fortifications. To assure himself that "the Government's title to the lands in question" was clear and that there were no private claims, Mason worked closely with the Surveyor General of California and Capt. Henry W. Halleck.[31]

Colonel Mason by mid-August reported that "the surveys and drawings are nearly sufficiently advanced to enable the Board of Engineers to judge what changes (if any) may be necessary." But

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28. Mason to Totten, March 22 & April 25, 1853, NA, RG 77, Ltrs. Recd., Chief Engineer.

29. Mason to Totten, May 12, 1853, NA, RG 77, Ltrs. Recd., Chief Engineer.

30. Mason to Totten, June 14 & Aug. 1, 1853, NA, RG 77, Ltrs. Recd., Chief Engineer.

31. Totten to Mason, June 4, 1853, NA, RG 77, Ltrs. Sent, Chief Engineer.

before this occurred, Colonel Mason suffered a relapse. His fever returned, and on September 5 he died. As senior officer, it became Lieutenant Whiting's duty to report his passing. Writing Chief Engineer Totten on the 9th, Whiting announced that it is with "great sorrow that I have to report . . . the untimely death of my commanding officer Bvt. Lieut. Col. James L. Mason." Briefing Totten on the history of Mason's fatal illness, Whiting pointed out that on "his arrival here his extreme anxiety for the rapid prosecution of the important public interest, with which he was charged, aggravated his disease and it took a firm hold." Just when it appeared that the crisis had passed, Mason's condition worsened.

Colonel Mason's remains had been interred with honors on the 8th, six years after he had gallantly led the forlorn hope at Molino de Rey. Mason's passing, Whiting eulogized, was

> lamented by his brother officers here, not only as an ornament to his profession & the Corps which his actions have so much contributed to distinguish, but as an attached friend & companion: and which the council of the Engineers will long miss the far seeing judgment & prompt & energetic action for which he was noted. We shall as long remember the kindly winning manners which completed his character.[32]

E. Lieutenant Whiting as Acting Project Engineer

1. The Relocation of the Fort Point Light

Until such time as a replacement to be appointed by Chief Engineer Totten reached San Francisco, Lieutenant Whiting would be in charge of the Fort Point project. On September 9, the day after he helped bury his friend, Whiting assumed his responsibilities. Several important letters addressed to Colonel Mason by the Chief Engineer were opened and studied. Enclosed with the first was a request from the Secretary of the Treasury for authority to relocate the Fort Point light. The subject lighthouse, located atop the bluff, was scheduled to be demolished along with Castillo de San Joaquín.[33] Whiting promised to present the Secretary's request at the next meeting of the Board of Engineers for the Pacific.[34]

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32. Whiting to Totten, Sept. 9, 1853, NA, RG 77, Ltrs. Recd., Chief Engineer.

33. Totten to Mason, July 26, 1853, NA, RG 77, Ltrs. Sent, Chief Engineer.

34. Whiting to Totten, Sept. 10, 1853, NA, RG 77, Ltrs. Recd., Chief Engineer.

This request had been triggered by a letter from General Totten to Secretary Davis, dated June 21, pointing out that a lighthouse had been recently erected on Fort Point, and the lighting apparatus would soon be on-site and positioned. Plans showed that the lighthouse occupied ground that would "interfer with, if not prevent, the commencement of the most important fortification in the system" of defense for San Francisco Bay. Totten had recommended that Davis contact Secretary of the Treasury James Guthrie, and ask him to authorize the Lighthouse Board to relocate the light. Such action was made contingent on there being another site available satisfactory to the safety of vessels navagating the Golden Gate.[35]

The unlighted lighthouse was razed in late September by Lieutenant Whiting's men, and the Lighthouse Board called on the army to rebuild the structure. Captain Halleck, who was serving as Lighthouse inspector, advised against this action, stating that it would be too expensive. He recommended that the Board rebuild the lighthouse at Point Lobos. The Board, however, called for a light at Fort Point, and selected a site between the fort and the surf.[36]

2. Work Accomplished under Whiting's Supervision

Lieutenant Whiting, responding to a request from the Chief Engineer on progress of site preparation, reported in mid-September that: (a) the topographic survey had been completed; (b) the carpenters and their helpers had erected for the accommodation of workmen barracks for 40 men, a mess hall, a stables, and blacksmith shop; and (c) the laborers had razed Castillo de San Joaquín, salvaging the brick and cannon, and had commenced leveling the northern extension of the promontory.[37]

Lieutenant Whiting during the autumn of 1853 added to the government's payroll several masons, blacksmiths, blasters, and quarrymen,

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35. Totten to Davis, June 21, 1853, NA, RG 77, Ltrs. Sent, Chief Engineer. The Fort Point Lighthouse, on which work was commenced in December 1852, was located within the confines of the Castillo. The contract had called for the builders to erect only the tower and keepers' quarters; the lighting apparatus was to be supplied by the government. A. Lewis Koue & F. Ross Holland, "Historic Structure Report, Fort Point Light," Fort Point NHS, Ms. (NPS, 1972) pp. 5-6.

36. Koue & Holland, "Historic Structure Report, Fort Point Light," pp. 6-8.

37. Whiting to Totten, Sept. 15, 1853, NA, RG 77, Ltrs. Recd., Chief Engineer. As of September 15, 4,200 cubic yards of rubble had been removed.

besides increasing the number of laborers and teamsters. In September the lighthouse was removed, and hundreds of tons of rock and dirt excavated as the bluff was cut away.[38] By late October, Whiting concluded that the vast amount of excavation required, along with the high cost of labor, necessitated a change in operations.[39] At first, Whiting, to economize, toyed with the idea of employing "a single blast of six tons of powder arranged in three different shafts" to shatter the rock formations that had to be removed. But when he took account of the configuration of the promontory ("the weight of the masses to be removed being an opposing instead of an assisting force"), he decided such an undertaking would neither save time nor money. He accordingly determined to employ a two-man steam drill, the only one in California. With this equipment, the team was able to drill daily two seven-inch shafts to a depth of 26 feet in the rock constituting Fort Point.[40]

The task of leveling the bluff was accelerated during the autumn, as additional laborers were added to the payroll. The efficiency of the quarrymen and blasters increased, and by mid-December between 35 and 40,000 cubic yards of earth and rock had been removed. When Whiting discovered that the cost of excavating had been greatly reduced from his previous estimate of one dollar a cubic yard, he cancelled his contract with the steam-drillers.[41]

Whiting on November 15 forwarded to Chief Engineer Totten the topographical map of Fort Point, on which were shown the location of the temporary buildings. Two of these structures (the blacksmith shop and magazine) were on the neck of the promontory, and the others (two barracks, the mess hall, stable, office, and sink) were on the high ground, southwest of where the wharf was subsequently located.

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38. Monthly Report of Operations, Sept. 1853, NA, RG 77, Ltrs. Recd., Chief Engineer. The masons had been hired to build forges for the workshops and chimneys in the barracks, and the smiths to sharpen and repair drills and other tools employed in leveling the bluff.

39. Whiting to Totten, Oct. 31, 1853, NA, RG 77, Ltrs. Recd., Chief Engineer. The Board of Engineers had estimated the cost of leveling the bluff to reference (16') at 28 cents per cubic yard. This would have been cheap on the Atlantic Seaboard, but in California, with its high wage rates, it was difficult to do this work for less than $1 per cubic yard.

40. Ibid. With manual labor, "two men could sink a drill 3½" in diameter & 12' deep in one day."

41. Whiting to Totten, Nov. 14 & Dec. 15, 1853, NA, RG 77, Ltrs. Recd., Chief Engineer. Disbursements by Lieutenant Whiting in October were $9,080.12, in November $11,038.29, and in December $12,303.89, while in September they had been $5,620.67.

This map provided the Board of Engineers and General Totten with a valuable and necessary tool in deciding what, if any, modifications should be made to the plan.[42]

Meanwhile Lieutenant Whiting had been notified by General Totten that Bvt. Maj. John G. Barnard had been named as Colonel Mason's replacement. Pending his arrival on the Pacific Coast, Whiting was "to conduct the operations with which Col. Mason was charged."[43]

3. Financial Problems Plague Whiting

Colonel Mason's sudden relapse and death had caused unexpected financial complications. Soon after his arrival in San Francisco, Mason had deposited the public funds in his possession in a bank in his own name and not to the credit of the United States. Lieutenant Whiting and Maj. Henry S. Turner, a former army officer, had been present in the sickroom on September 5, and, seeing that he was weakening, urged Mason to make "some temporary arrangement of his affairs until he should recover." Dr. Charles Tripler entered, and, after examining Mason, informed him that his case was hopeless.

"How long do I have?" he gasped.

"Perhaps half an hour--perhaps several hours," the doctor answered.

Whereupon Mason sent Turner to get his personal papers, but before Turner returned, Mason was dead.[44]

To assist Lieutenant Whiting to get access to these public funds, Brig. Gen. E. A. Hitchcock (the Division commander) took steps to have the courts name Whiting an administrator of the deceased's estate. For funds needed to continue preparation of the site pending settlement of the estate, Lieutenant Whiting called on Major Frazer for $10,000 deposited with him for "defence of San Francisco Bay."[45]

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42. Whiting to Totten, Nov. 15, 1853, NA, RG 77, Ltrs. Recd., Chief Engineer; "Sketch Showing Position and Plans of Temporary Buildings at Fort Point," drawn by Lt. N. F. Alexander, NA, RG 77, Dr. 94-9.

43. Totten to Whiting, Oct. 15, 1853, NA, RG 77, Ltrs. Sent, Chief Engineer.

44. Whiting to Totten, Nov. 30, 1853, NA, RG 77, Ltrs. Recd., Chief Engineer.

45. Whiting to Totten, Sept. 10, 1853, NA, RG 77, Ltrs. Recd., Chief Engineer. Charles Mason, the late colonel's brother and Secretary of Washington Territory, had also requested that Whiting take out letters of administration.

Lieutenant Whiting on October 10 advised General Totten that, as yet, he had been unable to obtain from the probate court the entire amount due the United States from Colonel Mason's estate. There had been "certain accounts for funeral expenses, legal charges &c., which as administrator" he had been obliged to pay. In the near future, his accounts would be audited by the court, and an order issued for him "to take possession of the funds left, as the military successor of Col. Mason & acting agent for the government."[46]

Another five weeks passed, and the probate court continued to drag its feet, refusing to release the $11,267.80 in public funds in possession of the deceased. Lieutenant Whiting to fund his operations called on Major Frazer for another $10,000 to meet December expenditures. A complaint to the district attorney had elicted a response that the court at its next session, on November 21, would take up the case. If it were decided according to California statutes, the government would have "to wait until the executor by will--Mr. Lewis Mason of Providence, R.I., files his petition before this court." Courthouse gossip, however, caused Whiting to hope the judge of the probate court might be induced to dispense with many of the customary formalities, and permit the federal money "to be applied to its legitimate purposes." If this did not occur and his successor not arrive by mid-December with additional funds, Whiting would be compelled to call for another $10,000.

Of the $20,000 receipted for by Colonel Mason, Whiting explained, only $8,732.20 had been available for site preparation. To this sum he had added the $10,000 received in response to his first call on Major Frazer. Total expenses to the end of the third quarter had been $14,352.87, which left him on October 1 with a balance of $4,729.33. Expenses for October had been $9,080.12, "and were incurred, not only in the confident expectation . . . of receiving, before the end of this month, the sum left by Col. Mason, but because it would have been of very serious detriment and expense to the Government to have discontinued the important works."[47]

In late November, Lieutenant Whiting received a letter from Chief Engineer Totten, advising him that Colonel Mason at his death had been accountable to the Treasury, according to the Department's books, for $52,125 in public funds. Of this sum $21,416 were credited to Major Frazer, and there would remain in his hands, after Whiting's September draft for $10,000 was honored, $11,416.

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46. Whiting to Totten, Oct. 10, 1853, NA, RG 77, Ltrs. Recd., Chief Engineer.

47. Whiting to Totten, Nov. 14 & 15, 1853, NA, RG 77, Ltrs. Recd., Chief Engineer.

Whiting was cautioned that any draft from the Treasury in favor of Colonel Mason must be returned to the Treasury, through General Totten's office, to be credited to his account. Whiting was to take possession of any public money credited to the deceased and forward his receipt for the same to the Department.[48]

The probate court failed to act on November 21, and Whiting submitted Totten's letter, but "the opinion of the Comptroller of the Treasury" seemed to have no influence. Only after Whiting produced "satisfactory evidence" that the money in question belonged to the United States did the judge issue an order empowering him to take possession.[49]

On December 30, 1853, Lieutenant Whiting wrote Chief Engineer Totten, advising him that Major Barnard had not arrived. If he had left New York, as expected on the 5th by steamer for the isthmus, the foundering of the mail steamer Winfield Scott would probably delay his arrival until mid-January.

More important, a review of his books revealed to Whiting that his disbursements to date totaled $31,163, balanced against drafts received of $31,267.80, leaving a surplus of $104.13. To add to his embarrassment, his debits for December--including wages--had not been paid. As money in California commanded a rate of three per cent per month, the merchants complained bitterly. Whiting, to meet his obligations, again called on Major Frazer for a draft of $10,000. This action of Whiting's had been approved by General Hitchcock and members of the Pacific Board of Engineers.[50]

There were other financial problems besides the delayed drafts and impounded funds. During Colonel Mason's fatal illness, Lieutenant Whiting at his superior's request had signed a number of vouchers, as well as attending to his business. When he forwarded these vouchers to the Department, Whiting desired it understood that

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48. Totten to Whiting, Oct. 15, 1853, NA, RG 77, Ltrs. Sent, Chief Engineer.

49. Whiting to Totten, Nov. 30, 1853, NA, RG 77, Ltrs. Recd., Chief Engineer.

50. Whiting to Totten, Dec. 30, 1853, NA, RG 77, Ltrs. Recd., Chief Engineer. The Winfield Scott had left San Francisco for Panama on December 1, 1853, and had been wrecked on Anacapa Island with loss of part of the mail, including Lieutenant Whiting's report for November. Whiting to Totten, Dec. 15, 1853, NA, RG 77, Ltrs. Recd., Chief Engineer.

he conceived himself as "in no wise responsible for these accounts except as far as to certify that the 'articles were received & the services charged for performed.'"

All obligations contracted for previous to Mason's death had been placed on his abstract of disbursements, and all occruing thereafter had been assumed by Whiting.[51]

As was to be expected under these circumstances, Lieutenant Whiting had at least one of the vouchers he had signed for Colonel Mason rejected by the Department. The subject document was for $326.67 and covered travel expenses for Charles D. Wierden, a clerk and draftsman, from Newport, Rhode Island, to San Francisco. Unknown to Whiting, Colonel Mason had been notified prior to his departure for the west that no charges for expenses for "any persons as clerk, or in any such capacity, from the Atlantic cities to California, would be allowed."[52]

There were other embarrassments caused by Mason's failure to keep his subordinates informed. Late in November, Whiting received from M. W. Woodward, agent for the Lawrence Cement & Manufacturing Co., of New York City, invoices and bills of lading for 1,300 barrels of cement consigned to Colonel Mason. This purchase and delivery he considered premature, and he feared other vouchers might be outstanding. He had also received from Major Frazer three vouchers signed by the deceased--one for $455.56 for instruments, another for $28.18 for stationery, and a third for $42.88 for transportation from Savannah to New York. Whiting had receipted for the first two but had declined the third as not chargeable against the "appropriation for defence of San Francisco Bay."[53]

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51. Whiting to Totten, Oct. 10, 1853, NA, RG 77, Ltrs. Recd., Chief Engineer.

52. Totten to Whiting, Jan. 17, 1854, NA, RG 77, Ltrs. Sent, Chief Engineer.

53. Whiting to Totten, Nov. 30, 1853, NA, RG 77, Ltrs. Recd., Chief Engineer.

III. MAJOR JOHN G. BARNARD AS PROJECT ENGINEER

A. Barnard Goes West

1. Major Barnard Gets His Orders

Chief Engineer Totten was understandably dismayed to receive Lieutenant Whiting's September 9, 1853, letter reporting the death of Colonel Mason. Cognizant of the importance of the project, General Totten lost no time in selecting Mason's replacement. He chose Bvt. Maj. John G. Barnard.

Born at Sheffield, Massachusetts, on May 19, 1815, Barnard graduated from the U.S. Military Academy as No. 2 in the class of 1833 and was commissioned a brevet 2d lieutenant in the Corps of Engineers. The next six years were spent as assistant engineer in the construction of Fort Schuyler, New York, the fortifications guarding Pensacola Harbor, and supervising the improvement for navigation of the Pascagoula River and Mobile Bay. In 1839 he was named superintending engineer for the defenses of Governor's Island, and from 1840 to 46 he was superintendent of construction for three Louisiana forts--Livingston, Jackson, and St. Philip. Barnard during the Mexican War oversaw construction of defenses for Tampico, and surveyed the battlefields about Mexico City.

He served as chief engineer for the exploration and survey of the projected Tehuantepec Railroad in Mexico in 1850-51.[1]

When contacted by General Totten and notified of his new assignment, Major Barnard was superintending engineer for the Delaware Breakwater, for harbor improvements at Cape Malabar, Massachusetts, the defenses of Portland, Maine, and other minor projects. Barnard, in orders dated October 12, was directed to secure his current projects and be ready to start for California between November 1 and 15. On arrival in San Francisco, Barnard was to receive from the administrator of Colonel Mason's estate or Lieutenant Whiting the "funds, property and papers" for which the deceased was responsible as member of the Pacific Board of Engineers, and as superintending engineer of the defenses of Fort Point. He would "proceed to carry out . . . the instructions" furnished Colonel Mason, and such others as might be

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1. G.O. 4, Headquarters, Corps of Engineers, May 20, 1882, NA, RG 94.

received from the Department. Lieutenants Whiting and Alexander were to report to him and serve as his assistants.[2]

General Totten's letter reached Major Barnard at Niagara Falls on October 18. Acknowledging its receipt, he cautioned that it would be impossible for him to start for California before December 1, because of the "press of private and public business."[3] This was agreeable to Totten. On advising Barnard thereof, Totten forwarded a copy of Lieutenant Whiting's letter of September 30, regarding relocation and reconstruction of the Fort Point Lighthouse and the proposal to erect a battery in rear of the principal work.[4]

As General Totten planned to be absent from Washington most of November, there was no necessity for Major Barnard to come in for a conference prior to his departure. In view of Lieutenant Whiting's monthly calls for funds, Totten on November 25 remitted $10,000 to Major Frazer's account, subject to Barnard's draft.[5]

2. His Departure

On December 5 Major Barnard was in Philadelphia, where he boarded a ship for Central America. Crossing the Isthmus of Panama, he caught a fast northbound steamer and landed in San Francisco on the evening of the last day of 1853, two weeks before he was expected. He im-

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2. Totten to Barnard, Oct. 12, 1853, NA, RG 77, Ltrs. Sent, Chief Engineer. Before departing from the Atlantic Seaboard, Barnard was to transfer to Maj. Cornelius Ogden responsibility for repair of the Kennebunk piers, the Richmond Island and Portland breakwaters, the Marblehead seawall, and the fortifications entrusted to his care; to Lt. Charles E. Blunt responsibility for repair of the works at Plymouth beach; and to Maj. John Sanders responsibility for the Delaware Breakwater, the Philadelphia buoys, and repair of the public works at Egg Harbor.

3. Barnard to Totten, Oct. 18, 1853, NA, RG 77, Ltrs. Recd., Chief Engineer.

4. Totten to Whiting, Nov. 3, 1853, NA, RG 77, Ltrs. Sent, Chief Engineer. Both the subject letter and the copy thereof are missing from RG 77, Ltrs. Recd., Chief Engineer.

5. Totten to Barnard, Nov. 25, 1853, NA, RG 77, Ltrs. Sent, Chief Engineer. General Totten traveled to West Point to observe the firing experiments that were to provide data on future construction of embrasures in the nation's masonry forts.

mediately assumed from Lieutenant Whiting responsibility for construction of the works at Fort Point.[6]

B. The Approval and Disapproval of Change Orders

1. Proposed Changes

a. The Plans are Reviewed

Major Barnard was a forceful and innovative individual. No time was lost in taking charge. With Major Tower and Captain Halleck, the other two members of the reconstituted Board of Engineers for Fortifications on the Pacific Coast, Barnard spent the first two weeks of 1854 reviewing plans for Fort Point and Alcatraz. Studying the topographical surveys prepared by Lieutenants Whiting and Alexander in the summer of 1853, which had not been available to the Board when it had prepared plans for the fort, Major Barnard found that no allowance had been made for defense of the area between the crestline of the precipice and "the high water line." The subject ground, unknown to the original Board, more than doubled the area available for the fort.

When he forwarded this information to Chief Engineer Totten on January 12, Barnard, calling his attention to the approved plan, pointed out that the Board had "confined themselves rigidly within the first named line, and had not dared to pass it, lest they should plunge into unfathomable depths of water." Although the fort could be built as designed, so much "varation in the site," made a change in the trace advisable. Such a change required additional study, and after it was undertaken, Barnard promised to submit a report and recommendations.[7]

b. The Need for Tower Bastions

On January 30 the Board (Majors Barnard and Tower, and Captain Halleck) reported that to provide for defense of the ground fronting the scarps of the four water fronts, it was "essential that some flanking arrangement should be provided." The Board accordingly recommended the "addition of a tower bastion at the angle of fronts Nos. 4 & 5 and of another at the angle of fronts Nos. 1 & 2." By

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6. Barnard to Totten, Jan. 12, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

7. Ibid.

means of these bastions and "the reversed counterscarp casemates for flanking the ditch every face of the work" would be flanked. The Tower Bastions were to be so arranged as "to contain in the salient of the three upper tiers the heavy guns which are now placed at the Salient angles of the main work thereby causing the loss of but one gun by their addition." Their flanks would contain two carronades, each, and loopholes for small-arms in the 1st tier and musketry loopholes in the flanks, and heavy guns in the salients of the barbette tier.

c. Changes to the Ditch and Counterscarp

The Board saw no reason for the "steep grade given to the ditch on the land front, which injuries the lower tier of casemates, making it impossible to keep the magazines dry." It was therefore recommended that the ditch be "cut down to the reference (16') at the lower, and (19'6") at the upper extremities," accommodating the counterscarp gallery to the altered level. It was also recommended that as the counterscarp will "be cut in rock of consistency enough to maintain a steep slope, that it be given a slope of 3 upon 2, instead of 2 upon 3."

d. Modification of the Foundation

The few sections given in the Leadbetter plan represented the scarp of the water fronts reaching the low water line, the idea being that the foundations must be laid below low water. As the fort would be built on a rock foundation, there was no necessity of sinking the foundation "more than may be necessary to give sufficient height of scarp below the lower tier of embrasures." This object could be obtained by excavating a "cunette or narrow ditch down to reference (8') and slanting the scarp from that level."[8]

e. Additional Refinements

On February 16 Major Barnard forwarded to the Department drawings of the modifications proposed by the Pacific Board. He would arm the left flank of the Tower Bastion, covering Fronts Nos. 4 and 5, with

> four carrondes or howitzers--the two lower ones being intended to flank face No. 4, & the three of the 2d Tier to flank the shore approach--and . . . thus dispensed with the battery attached to the end of the ditch, in the old plan--which was only accessible by a stair case from the upper end of the ditch.

8. Pacific Board to Totten, Jan. 30, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

There being no necessity for giving the ditch such an inclination, he had "cut it down--merely giving slope enough for drainage," and had adapted the counterscarp gallery to the altered level.[9]

Major Barnard, on reviewing the plan, had seen that the scarp walls of the water fronts, as drawn, had a uniform thickness of five feet. Reports reaching him about recent firing tests at West Point had raised doubts whether that was enough. If true, he should know at once.[10]

2. General Totten Approves some Changes

a. As it Effects the Thickness of the Water Front Scarp

Chief Engineer Totten carefully studied the drawings and supporting correspondence before making a decision regarding the requested changes. On April 18, 1854, he wrote Major Barnard that he had been at West Point and watched as heavy projectiles from the big shell guns were fired into masonry fortifications. Though many of the tests had not been evaluated, it was apparent that a thickness of five feet for "the scarp was not enough against the heavy guns now mounted in ships--seven feet was the least thickness admissible." Barnard would alter his drawings accordingly, "taking off the two feet from the depth of the gun casemates, which will be still deep enough. Within the recesses the thickness must remain as heretofore, five feet."[11]

b. For Construction of the Tower Bastions

Barnard's proposal to "introduce two tower bastions into the project for flanking fires" was approved, subject to a slight modification, whereby five 8-inch columbiads would be mounted in each tier of each tower, "giving an augmentation of 30 guns besides 4 in barbette of which 24 will be added to the channel fires of the fort." To accomplish this, "the flanks were to project seven feet beyond

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9. Barnard to Totten, Feb. 16, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer. Barnard was of the opinion that each Tower Bastion was capable of covering the two contigious faces, "thus requiring the addition of two small towers to the work & suppressing only the fire of three guns, upon the water."

10. Barnard to Totten, Jan. 31, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

11. Totten to Barnard, April 18, 1854, NA, RG 77, Ltrs. Sent, Chief Engineer.

those in Barnard's sketch, and the salient part of the tower was to project a like distance beyond that shown in Barnard's drawing." The three casemated tiers of the bastions were to be identical, and on the terreplein of each would be emplaced two 10-inch columbiads.

Details of the embrasures for the towers had not been prepared by the Department and under no circumstance was Barnard to begin their construction, even if he had to leave holes in the scarp.

At Fort Sumter, when the big guns were fired, Totten cautioned, there had been an adverse effect on the platform arches. He was satified that the "arch of communication between casemates should be groined into the platform arch, and that there should be as much as one brick's length of key below the impost of the latter."

It was proposed to place two 10-inch columbiads on each tower, providing "an earthen parapet, except immediately at the salient." The exterior of the scarp had not been drawn, as Totten's draftsmen did not know what slope it should have, but they had given the dimensions with respect to the magistral.[12]

c. Details for Roof Surfaces and Drainage

In making his study leading to approval of the Tower Bastion proposal, General Totten's attention had been focused on details of the roof surfaces and drainage. Barnard was therefore directed on April 18 to regulate all roof surfaces, before beginning the walls and piers, "to bring down the water in the best way into the conduits and cisterns." The vertical pipes embedded in the piers were to be either of English stoneware, 12 inches in diameter, or thin cast iron pipes, 6 inches in diameter. The latter were recommended.

To show Barnard how the roof surfaces were to be handled, Totten forwarded a tracing of Fort Richmond, New York. As Barnard would see, the roof surfaces were covered with "mastic laid in the best manner--a row of strong slates" would be laid to receive the side walls of the gutter arch, and all end joints in the brick of this wall left without mortar. There would be no mortar under or upon the slates, and at every two feet, open end joints, would be left through the arch. Upon the rest of the roof surfaces, rows of brick, one-half brick apart, would be laid flat without mortar. On these, there was to be an entire surface of brick (also without mortar).

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12. Ibid.

Parallel with all vertical surfaces above the roof would be a half-brick wall, without mortar, with here and there a header reaching back to the vertical face of the wall. The surface of this wall must be covered with mastic applied with a mop. After the roof surfaces were formed, ready to be plastered but previous to receiving asphalt, a little slope, with 12-inch base and 6-inch rise, would be formed at the foot of all vertical surfaces, to cast off water from the bottom of the walls.

Upon the roofs, thus covered, there would be laid a bed of clean gravel, "or something not less effectual in keeping earth from being washed down to the true surface of the roof," thereby stopping the numerous channels for leading rainwater into the gutters, conduits, and cisterns.[13]

3. Barnard Proposes Additional Changes

Barnard, on reading Totten's letter, did not find any comments on the Board's recommendation to reduce the slope of the ditch. This change, he argued, would constitute a great improvement to the casemates on the land front at little or no additional cost.

a. To the Cisterns

In revising the construction drawings, Barnard had found it necessary to make further changes. Two of these he called to Totten's attention. He proposed to place the cisterns entirely below the first floor of the casemates, and add a fifth. This would permit the casemates above the cisterns to be used for storage. The subject cisterns, along with the spring on the escarpment 90 feet above the site, would be sufficient for a 550-man garrison.

b. To the 3d Tier Drainage

This change would eliminate the necessity of "carrying the gutters from the arches along the floor of the 3d Tier, where there is not space to give a proper fall." He proposed to carry the water in 8- or 10-inch iron pipes down a recess in the floor of the piers to the banquette.

c. To the Terreplein

He wanted the terreplein paved, because it would be impossible to grow grass on it. If this change were approved, the surface drainage would have to be gathered by an open "surface drain around the cordon of the parade wall."

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13. Ibid.

d. The Addition of an Earthen Parapet

He also proposed to erect an earthen parapet on the water fronts, 10 or 12 feet thick, and "to provide the necessary additional width to the terreplein by a projecting wooden platform with iron balustrade."[14]

4. The Chief Engineer Acts on the Proposals

a. To Reduce the Slope of the Ditch and Change the Cisterns

General Totten on July 29, 1854, approved the Board's proposal, made six months before, "to carry down the excavation of the ditch to references (16') and (19'6")," and Barnard's to sink the "cisterns entirely below the first floors of the casemates, adding a fifth."[15]

b. To Adjust the 3d Tier Drainage

Barnard was cautioned to give high priority to location of the water conduits and discharges in relation to the roof surfaces, cisterns, and sewers. Experience with casemate roofs had demonstrated that they could be made waterproof "only by peculiar precautions, none of which should be omitted." With his letter, Totten forwarded a sketch of Fort Sumter, illustrating certain principles: (a) the roof surfaces of the casemate should be built as steep as feasible; (b) the roof gutters were to be large, and, while covered to keep out sand and earth, permit water to enter freely through end joints in the brick wall; (c) the floor of the gutter to be rather steep; (d) a small slope should unite the roof with the vertical surfaces; (e) an open work brick to be interposed between the vertical surfaces and the earth; (f) the walls of the large gutter to rest on stout slates without mortar; (g) the inclined roof surfaces to be covered with two courses of brick, providing open and covered channels for water; (h) the roof surfaces, vertical and inclined, to be covered was mastic; (i) at the point of discharge into the vertical pipes, a capping of thick sheet lead to underline for a short space the mastic, and be so formed as to deliver the roof water vertically into the middle of the subject pipe; (j) this pipe to go down into the body of the pier at a distance from the parade wall, or in a recess to be faced up with a half-brick wall; (k) the pipe to be of cast

14. Barnard to Totten, June 30, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

15. Totten to Barnard, July 29, 1854, NA, RG 77, Ltrs. Sent, Chief Engineer.

iron, 6 inches clear diameter, strongly secured in a vertical position and made watertight at the junction; (l) a "well" to be brought up over the pipe nearly to the terreplein, and covered with a stone slab and an iron plate; (m) the slope in some cases to be covered with a small arch, laid dry; (n) after the roofs were covered, as directed, there should be "carefully placed there on a layer of clear gravel or stone chips, which may be quite thick over the main gutters; and (o) an earthen terreplein, from which all stones and shells had been screened, should then be spread.[16]

c. To Pave the Terreplein

Under no circumstances would the fort's terreplein be paved.[17]

d. To Add an Earthen Parapet

Barnard's proposal "to make an earthen parapet on the water fronts" would have to be supported with drawings, if it were to be approved.

C. The Search for Construction Materials

1. California Sources Appear Bleak

Next to securing the Chief Engineer's approval of the necessary change orders, the most important and immediate problem facing Major Barnard was to locate sources of building stone and brick for construction materials. Because of the high priority given to preparation and submission of requests for architectural changes in the plans, several weeks passed before Major Barnard found time to personally investigate sources of building stone. Lieutenant Whiting had told him that high quality stone was quarried on Angel Island, about 15 miles from Fort Point. But "whether it was fit for facings & scarps," Whiting was not prepared to say.[18]

This information disconcerted Barnard, and on January 12 he wrote the Department, urging that arrangements be made to secure building materials from the Atlantic Seaboard. Cement would have to be purchased there, and probably brick. The San Francisco brickyards, he found,

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16. Ibid.

17. Ibid.

18. Barnard to Totten, Jan. 12, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

kilned bricks that were too soft for facing arches or bearing heavy pressures, and, because of high labor costs, he believed brick could be secured almost as cheaply in the east as here. It also might be necessary to import granite for the facings. To facilitate making these arrangements, Barnard requested permission to return to the Atlantic coast during the spring or summer.[19]

Major Barnard by the end of January 1854 had satisfied himself that the Bay quarries were small operations. Although the stone appeared to be of good quality and of volcanic origin, it was so shattered by quarrying that he doubted "the practicability of getting stone of such sizes as we wish."

Some distance from the Bay, but convenient to the ocean, he had located good granite at Monterey and Point Reyes. To capitalize on this situation, Barnard proposed to offer "such inducements" as will cause contractors to open quarries at these points and furnish stone at reasonable rates. This could not be done on a small scale, because everything had to be "commenced new & even vessels have to be purchased for transportation; for the ordinary rates of freight are so high as to make dependence upon the ordinary coasting craft out of the question."

Barnard had accordingly advertised in the local newspapers for 10,000 tons of stone, "to square to a length of not less than 3½ feet, and a depth of not less than 18 inches, and rises of 15, 18, 21, and 24 inches." If he received satisfactory proposals, he would sign a contract.[20]

On February 16 Major Barnard, checking his books, found that if the current appropriation was apportioned equally between Fort Point and Alcatraz it would leave him with only $50,000 in unobigated funds. This sum, he believed, was insufficient to induce contractors to undertake the expense of opening quarries, constructing wharves, and buying vessels. At least $100,000 was needed to interest reputable contractors. The only way he could budget this amount was for the Department to allot to Fort Point two-thirds of the $500,000 appropriation.[21]

Although no proposals had been received by the end of February, Barnard heard that several contractors were interested in supplying

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19. Ibid.

20. Barnard to Totten, Jan. 31, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

21. Barnard to Totten, Feb. 16, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

stone for the facings. According to his informants, these bids, when submitted, would average $20 per ton, a figure too high to be considered. The cost of cutting the granite would raise the cost to $25 or $30 per ton, and with the cost of laying the stone, boost the price of masonry to $60 a cubic yard.

Barnard therefore was glad to learn that it might be possible to contract for cut Chinese granite (of excellent quality) for $18 to $20 per ton. If this proved correct, he proposed to face the fort with cut granite and "built the backing & piers" of Bay blue stone, which would be secured for $5 to $10 a ton.[22] He had also been told that bricks kilned in China could be delivered at Fort Point for $35 per thousand. If true, he could use them for the piers and scarp backing.[23]

If he found it feasible to execute a contract for Chinese granite for $50,000, he would do so. Should the Department, as requested, apportion more than $250,000 from the current appropriation to Fort Point, he would apply the excess to procurement of either brick or blue stone for the piers and backing.[24]

For the next 60 days, until mid-April, Barnard continued to solicit proposals, locally, for building stone, while anxiously awaiting General Totten's reaction to the suggestion about using Chinese granite. During this period, he received countless proposals and had either personally reconnoitered or caused to be examined "every locality which held forth any hopes." Monterey and Point Reyes granite, of which there was an abundance, was found to be so "shattered & divided by seams that no dependence can be placed upon getting it in blocks fit for the work." The owner of the land (Dr. A. Rundall), where these outcroppings were found, seemed unwilling to spend a few thousand dollars to explore the strata to ascertain whether the quality

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22. Barnard to Totten, Feb. 27, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer. The blue stone had been examined by a local geologist, who concluded that "it was a recent sedimentary rock," crystalized by great pressure combined with heat. He had told Barnard that the stone was "likely to be durable," but it could not be quarried in blocks of sufficient size for the coursed masonry of the scarp wall. Barnard, after studying the geologist's report, notified General Totten that he would be afraid to risk the blue stone in a work so "exposed to violent winds, fogs, and salt spray as Fort Point." Barnard to Totten, March 15, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

23. Barnard to Totten, Feb. 27, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

24. Ibid.

of the stone improved as the quarry deepened. He desired a contract before investing any capital.

2. Barnard Orders a Shipment of Chinese Granite

Barnard was becoming increasingly interested in Chinese granite. After the masonry was started, he "must have material in unlimited quantities." On April 15 he wrote Chief Engineer Totten that he would "order through commission houses the China granite at probable cost of about $25 per ton . . . dressed ready for laying." Before the week was over, Barnard placed an order with John Parrott for 2,000 tons of dressed Chinese granite to cost $17,844 for facing the scarp.[25]

He, however, was hesitant about the future of this source, because if Congress appropriated the $750,000 requested for Fiscal Year 1855, the large resulting contracts for Chinese stone would enable shippers to boost freight rates. To cope with this situation, Barnard proposed to employ all available funds to contract for Chinese granite. A considerable proportion of next year's appropriation, if construction were to proceed as programmed, should therefore be employed to stockpile a huge quantity of brick from the Atlantic Seaboard.[26]

3. Major Barnard's Proposal to Return is Rejected

Desirous of promoting for himself a trip home, Major Barnard wrote General Totten that the current appropriation would be exhausted before the end of the fiscal year. Work would then be suspended until the new appropriation became available and the Chinese granite was received. Barnard proposed to take advantage of this hiatus to return to the east coast, and personally make arrangements for supplying granite and brick for construction of Fort Point. During his absence, Lieutenant Whiting would again assume charge of the project.[27]

On May 1, 1854, Barnard repeated his application for authority to return to the Atlantic Coast and make arrangements for building materials. He buttressed his case on the need for his presence whenever the new appropriation became available. If he remained in

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25. Barnard to Totten, April 16, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer. The Chinese granite was in blocks 1'16" x 1'6" x 3'6".

26. Ibid.

27. Ibid.

California, he argued, "three months would be lost in the arrangements after the appropriation is made, and they cannot be properly made by proxy." To insure completion of the project on scheduled, he must be "allowed liberty to carry out my own measures."[28]

General Totten vetoed Barnard's request for authority to return to the east coast "to attend in person to the procurement of supplies." Employing uncharacteristic language, the gentlemanly Totten chided, the "interests of the Government in your hands will be best served by your remaining on your side of the Continent instead of coming to this coast for the purpose of procuring stone bricks &c, for your works." With the aid of the New York Engineer Agency such purchases can be made on your written instructions.

Indeed, Totten continued, "I am of opinion that your continued presence there, is of the first necessity." This had become vital because Congress might make no appropriation in this session. Consequently, it became the duty of the Corps "to bring the fortifications promptly as far forward as is possible with the means at our command; having done this, we shall have no consequences to answer for, in case Congress withholds a further grant." While it might be "ultimate economy" in first collecting large amounts of materials to facilitate construction, the "theory of congressional appropriation is that every year shall consume its means." In regard to the works under construction at San Francisco, it was vital that "we shall be able at all times to show that our actual work is fully up to the means afforded us."[29]

4. Totten Advises His Project Engineer

a. On Exercising Economy in Choice of Materials

Major Barnard's letters regarding the high cost of and difficulty in locating stone and brick had been carefully studied by General Totten. On April 18 the Chief Engineer cautioned Barnard, in view of the probable high cost of stone, he was to exercise his "best judgement in deciding upon the materials to be used. A great many thousands of dollars--a sum indeed large enough to build a considerable fort on the Atlantic Coast--" could depend on his choice. He was to select the cheapest durable material, and "to expend the least labor upon it that will be consistant with strong work."

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28. Barnard to Totten, May 1, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

29. Totten to Barnard, April 18, May 18, 1854, NA, RG 77, Ltrs. Sent, Chief Engineer.

Experience had taught Totten that "if durable bricks cannot be had for the face of the scarp at a lower price than stone, the latter should be preferred." If coursed stone work in the face of the scarp would be but little more costly than rubble, it should be used, "because it will make stronger work--not because it is thought to look better." In coursed stone work there was no advantage in having very large stones, and there "is general economy in having variety of heights in the courses, which may range from 10" to 24"." It was sufficient for a stretcher to vary from 3 or 4, to 6 or 8 times the height, and one header to two stretchers was sufficient. Headers were to be about as broad as high. In coursed work the beds and tops, and the sides and ends coming in contact were to be hammered "so as to be reduced to proper planes."

For interior facings of the gun casemates, brick was a better and cheaper material than cut granite. The numerous corners and faces, some at oblique angles in the casemates, made rubble work expensive, and could be executed with scarcely any extra cost with brick. Where these surfaces were exposed to sight and weather, "handsome and good brick" were to be used. In many of "the interior faces of the walls and piers of quarters, storehouses, magazines, &c--afterwards to be furred, ceiled or planked, 'common' brick," would suffice.

Cheap bricks and stones, not admissible of themselves as building materials, could be used as aggregate in lieu of shells and gravel.[30]

b. On Mixing Mortar

Totten urged Barnard to investigate local sources for hydraulic lime. In mixing mortar he was to be guided by these rules: (a) below the watertable a mixture of cement and sand without lime; (b) between low water and high water of flood tides but not gust tides--1 barrel of cement in powder to ½ barrel of lime in a rather stiff paste; (c) above flood tides, except in great masses of masonry (such as between casemate arches and roof surfaces), 1 barrel of cement in powder to one barrel of lime in rather stiff paste; and (d) in the subject masses 1 barrel of cement in powder to two barrels of lime in rather stiff paste.

To mix mortar in small quantities, a plank platform with shovels and hoes was preferred. When large quantities were to be mixed, a large circular trough and heavy wheel pulled by a single horse would suffice, but where the amount of mortar was sufficient to require several circular troughs, a steam-powered "pug mill" was the answer.[31]

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30. Totten to Barnard, April 18, 1854, NA, RG 77, Ltrs. Sent, Chief Engineer.

31. Ibid.

5. Major Barnard Finds a Local Contractor

a. The Farwell Agreement

Totten's "stone and mortar letter" caused the short-tempered Barnard to fume. On May 30, 1854, he assured the Department that the "choice of a material for Fort Point" had occupied his mind constantly since his arrival in California. If good brick had been available, there would have been little cause for hesitation. An examination of the best of those kilned in San Francisco had satisfied him that they were "utterly unfit for a fortification." The blue stone was overlaid by masses of worthless materials, and when quarried required "expensive cutting even to make rubble masonry." The best quarry for this stone was on Yerba Buena Island, but the owners lack capital and their title to the property was in litigation.[32]

The California stone situation now looked better, Barnard continued. Dr. Rundall, the owner of large tracts of land at Monterey and Point Reyes where granite was found, was anxious to have quarries opened. Tests made by a state geologist rated the Point Reyes granite superior. Several men had submitted proposals, which had been rejected because they were too high, in expectation of obtaining stone from Rundall's land. Finally, Dr. Rundall brought in W. B. Farwell, remarking, "I do not wish to appear as principal in this matter myself--I have not time to attend to it, but I will guarantee the faithfull performance of Mr. Farwell." As the doctor enjoyed a good reputation, Major Barnard on May 23 contracted with Farwell for delivery of 2,000 tons of granite at the United State wharf, near Fort Point. Delivery was to commence on or before July 8, 1854, and to be continued at the rate of 250 tons per week, the entire quantity to be delivered by or before September 2. The government was to pay Farwell $15 per ton for stone delivered under the contract.[33]

As it was vital that "the experiment should be made at once" to enable the Department to know whether the subject stone was satisfactory, Barnard assumed responsibility for authorizing Farwell to commence

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32. Barnard to Totten, May 30, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

33. Ibid.; Barnard to Totten, June 1, 1854, & Jan. 13, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer. Each stone delivered "must square to a length of not less than three feet, and a depth of not less than fifteen inches, and a rise of not less than ten inches." Where possible Farwell was to split the stones to rises of 12, 15, 18, 21, and 24 inches.

execution.[34] If the stone could not be obtained from Point Reyes, the contractor could supply Monterey granite, although the former quarry was only 20 miles from the Golden Gate. Farwell had been told that if he succeeded in fulfilling his current contract, he would be permitted to provide all granite required as soon as the new appropriation became available.[35]

Chief Engineer Totten was satisfied with the agreement, and approved the contract on June 29.[36]

b. Barnard Gets a Displeasing Order

While awaiting Totten's approval of the Farwell Contract, Major Barnard was displeased to receive a letter signed by the Chief Engineer on May 18, five days before he had accepted Farwell's proposal. Totten had been encouraged to hope that the Bay area "would, after all, supply a stone, that, if not all that could be desired, would justify our abstaining from distant or exorbitantly expensive resorts." The use made by the Quartermaster and Ordnance Departments and Major Tower of local stone had so raised his hopes that General Totten had referred the subject to Secretary of War Davis.

With the Secretary's backing, Totten now directed Barnard to use local stone "with all proper care in the selection, in the facings of the fort." This decision would relieve Barnard of the responsibility. By employing Bay stone, Barnard would be able to "keep the actual progress of the fort close up to the money at command."[37]

The "order to use Bay stone," Barnard considered somewhat extraordinary, as the Department could have no knowledge whatever of the Bay stone other than that contained in his and Major Tower's correspondence.

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34. Barnard to Totten, June 1, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer. There had been two other proposals. Lockwood & Richards had quoted a price of $20 per ton for Point Reyes or Monterey granite, and A. P. Bouton $14 per ton for Petaluma basaltic stone. The latter proposal was rejected by Barnard, who considered the subject stone unfit for our use.

35. Barnard to Totten, May 30, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

36. Totten to Barnard, June 29, 1854, NA, RG 77, Ltrs. Sent, Chief Engineer.

37. Totten to Barnard, May 18, 1854, NA, RG 77, Ltrs. Sent, Chief Engineer.

The Chief Engineer should be the last person, Barnard protested, to justify an officer in using a material in construction merely because the "Ordnance and Quarter Master Depts. used it." Stone employed by those departments for construction at Benicia, Barnard wrote, was a soft and friable sandstone, which is everywhere seen in a decaying state in San Francisco buildings.

He and Major Tower had already vetoed it as unfit for the works under their supervision. The blue stone used on Alcatraz by Major Tower was durable, strong, and handsome, but he had been unable "to procure it in adequate quantities for even the limited amount of work" he was doing. In addition, Major Tower had been unable to procure it in anything approaching the desired dimensions, and the cost of shaping it for ashlar was excessive.[38]

This, Barnard wrote, was the

> only bay stone which is fit for a fortification, yet as a comment upon the propriety of issuing an order from Washington on the subject, I must remark that to this day, though I advertised 5 months ago and it is well known that I am willing to receive this stone if it can be got out in a shape at all suitable for the facing of a fortification . . ., I have not received one single bid for this stone.[39]

c. The Contract is Voided

When June 30 came and Farwell made no deliveries on his contract, Major Barnard began to fret. Information from Point Reyes indicated that Farwell was having trouble opening quarries and might have to secure his granite from Monterey.[40]

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38. Barnard to Totten, June 15, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer. Major Tower had received about 1000 tons of Bay blue stone, which had been cut into ashlar. His master mason, Mr. Pratt, had told Major Barnard that, because of the high cost of dressing, granite at $30 per ton would be cheaper. There were only three localities where the subject stone was found in commercial quantities--at the State Prison, and on Yerba Buena and Angel islands. Title to the islands was in dispute, so Major Tower had to rely on the prison quarry. Barnard to Totten, June 30, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

39. Barnard to Totten, June 15, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

40. Barnard to Totten, June 30, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer. The Monterey granite was from a recently opened quarry, free of seams.

Farwell was short of capital. In an effort to insure his success, Dr. Rundall advanced him money, loaned him oxen, and gave him timber to build a wharf. This enabled him to make a few deliveries of Monterey granite in July. But, because of poor management at the quarry, only superficial stone, three-fourths of which had to be rejected, was unloaded at the Fort Point wharf. Major Barnard, having a vested interest in the project, sent Master Mason S. J. Ashley to Monterey to supervise operations. Relaying this information to General Totten on July 31, Barnard warned that although Farwell was honest, conditions at the quarry might be such that he could not fulfill his agreement.[41]

Major Barnard in mid-August visited the Monterey quarry. He found that Farwell had hired a new superintendent. Satisfied that the contractor had acted in good faith and now had the quarry under capable management, Barnard gave him a three-month extension. In justification of his decision, Barnard assured General Totten that were the contract annulled, "it is hardly possible that the stone could be got from other quarters in less time."[42]

If the contract were cancelled and it was impossible to secure local granite, Barnard, despite Totten's order of May 18, still favored use of east coast or Chinese stone. An informant in Boston had written that "granite dressed & boxed" could be furnished alongside a ship at 50¢ per foot, with the freight to California adding a cost of a dollar a foot, making $21 per ton of 14 cubic feet. It was stated that 250 to 500 tons could be shipped weekly. The 2,000 tons of Chinese granite ordered in April would cost $14 to $20 per ton.

Barnard was certain New England or Chinese granite could be had cheaper than California stone of equal quality.

What are the alternatives?, he inquired. Brick of tolerable quality could be kilned at Sacramento, but brick was a "deceitful" material, and it was difficult "to get them made in this country." He accordingly was reluctant "to have recourse to them."[43]

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41. Barnard to Totten, July 31, & Sept. 13, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer. The man hired by Rundall and Farwell to operate the quarry, despite high recommendations, had deceived them "most grossly," and had contented himself with breaking off the superficial stone.

42. Barnard to Totten, Sept. 13, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

43. Barnard to Totten, July 12 & 31, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

Several months before Barnard had had occasion to examine bricks kilned on the opposite side of the Bay in Contra Costa County and at Sacramento, and had found them superior to those kilned in San Francisco. Specimens of these (as well as the Bay blue stone, the Point Reyes granite, and the Benicia sandstone) were forwarded to General Totten. The Sacramento bricks, which were of large size and could be purchased at $18.50 per thousand delivered, he was considering for use in the casemate piers, arches, and inside facings of the scarp.[44]

Barnard had visited Sacramento in mid-July to inspect the kilns. While there, he was disappointed to discover that most of the bricks were inferior to the ones forwarded as specimens on June 15.

As for constructing the fort of brick, Barnard wished to know the Department's desires. In "the contingency" of a failure to procure suitable stone in California, his recommendation was that either Chinese or Quincy granite be purchased for the exterior of the scarp, employing bricks of good quality for the piers and other facings.[45]

By October 9, 1854, when he turned over to Lieutenant Whiting the papers and superintendence of the project, preparatory to accepting a new assignment on the Atlantic coast, Major Barnard reported that he had paid for about one-half the stone delivered by Farwell. The rest had been rejected. All stone received had been weathered, and none would have been accepted but for Barnard's "desire not to crush the enterprize." It was suspected that instead of quarrying, the contractor had been splitting into fragments stone found on the surface.[46]

Lieutenant Whiting, unlike Barnard, did not have a vested interest in the contract. He annulled it on the 16th, because of Farwell's failure to deliver two-fifths of the granite by October 15 as specified in the amended agreement. Three days after the contract was voided, Farwell transferred to Degraw and Blake his rights and interest in the Monterey quarry, to include the stone already quarried. Deliveries were resumed.[47]

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44. Barnard to Totten, June 15, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

45. Barnard to Totten, July 31, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

46. Barnard to Totten, Jan. 13, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer.

47. Whiting to Totten, Oct. 16 & 31, 1854; De Russy to Barnard, Feb. 27, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer. Blake was a long-time

Colonel De Russy (Barnard's successor) reached Fort Point on November 7 and soon afterwards inspected and rejected the granite unloaded at the wharf by Degraw and Blake. Degraw complained that the stone refused had been quarried in good faith. Learning that Whiting had encouraged him in this belief, De Russy agreed to purchase all stone quarried, which on inspection, could be used. The quantity on hand was found to be 215 tons, for which Degraw and Blake were paid $3,225.[48]

Thus ended Barnard's ambitious program to secure stone in large quantities for construction of Fort Point. The Farwell contract had been a fiasco, and it was apparent to the Department, if not to Barnard, that the shipping costs would make the expense of importing additional granite from China prohibitive. The fort, except for a few key features, would be built of brick.

D. Military Construction under Barnard, January 1-October 9, 1854

1. Leveling the Promontory and Building Support Facilities

Major Barnard, accompanied by Lieutenants Whiting and Alexander, spent several days in early January, following his arrival, inspecting the site. He found the work "had advanced advantageously though not as rapidly, owing to the sickness & death of Col. Mason, as could have been wished." Lieutenant Whiting nevertheless had pushed his people hard, and 100 men were currently employed. Considerable progress had been made in leveling the promontory 120 yards wide at its base, "with an elevation of about 100 feet with precipitous terminations," to a height of 16 feet above ebb tide. This operation, he was told by Whiting, involved removal of enormous masses of serpentine rock. The subject rock was of a "soft talcy character," and was utterly unfit for building stone. Like Whiting, Barnard planned to experiment with a steam drill in hopes of "expediting and economizing the work."

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government employee, having worked many years on fortifications, first at Fort Adams and then Fort Jackson. At the latter he had been master mason. Blake had advanced Farwell $3,000, an action characterized by Major Barnard as foolish. Dr. Rundall was agreeable to refunding the money out of the proceeds realized from sale of the stone to the government. Barnard to Totten, Jan. 13, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer.

48. De Russy to Barnard, Feb. 27, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer.

For some unexplained reason, Major Barnard did not "experiment" with the steam drill and the blasting continued. On January 31 he complained to General Totten that the "blasting away of 30,000 cub. yds. of rock is a heavy operation. The expense of which was not . . . adequately estimated for by the Board."

Orders were issued by Barnard for Whiting to have erected barracks for another 100 laborers and 50 to 100 mechanics, whom Barnard wanted to add to the payroll, once the site had been cleared.[49]

Following Major Barnard's decision to construct additional support facilities, masons and carpenters were turned to putting up quarters and storehouses and building chimneys. The blasters, quarrymen, and laborers continued to cut down the promontory and wheel away debris. In February a labor force was given the task of building a plank road, along the foot of the escarpment, from the site of the fort to the projected wharf. The roadway, two-fifths of a mile long, was completed in April.[50]

By late June, the leveling of the promontory had progressed far enough to enable Major Barnard to cut his work force. The "present diminished force would be retained until the masonry was commenced."[51] In July most of the men continued to blast and drill, while the artisans commenced building a mortar mill and cement storehouse, and erecting cranes at the wharf to unload ships and a steam derrick for setting stone at the fort.[52]

When he filed his annual report on September 30, 1854, Major Barnard wrote, "the excavation of the site may be said to have been completed."[53] It is apparent that Barnard was boasting. On November 8

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49. Barnard to Totten, Jan. 12 & 31, 1854, and "Memoir of the History and Progress of the Fort at Fort Point, Calif., for the year ending Sept. 30, 1854," NA, RG 77, Ltrs. Recd., Chief Engineer.

50. Barnard to Totten, Feb. 16 & 27, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

51. Barnard to Totten, June 30 & July 12, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

52. Monthly Reports of Operations for July & August 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

53. "Memoir of the History and Progress of the Fort at Fort Point, Calif., for the year ending Sept. 30, 1854," NA, RG 77, Ltrs. Recd., Chief Engineer.

Lieutenant Whiting announced that, during the past month, the arduous task of leveling the promontory had been nearly finished. The mortar mill had been completed and several stone sheds begun.[54]

2. Construction of the Fort Point Wharf

Plans to ship 2,000,000 bricks and 10,000 barrels of cement from the Atlantic Seaboard caused Major Barnard in January to call for construction of a wharf of sufficient length to handle ocean-going vessels. If these materials were landed at San Francisco and lightered to the construction site, it would add to the cost an estimated $10 per thousand for bricks and one dollar per barrel for cement, totalling from $20,000 to $30,000. A wharf, Barnard assured Totten, could be built for $15,000.[55]

Because of the time involved, Barnard in March, without having received a reply from the Department, began construction of a 500-foot wharf. His desire to locate it near Fort Point was frustrated by discovery that a constant swell, doubling around the headland, rolled violently into the cove. The site selected for the wharf, 2,400 yards southeast of the point, was "in a great measure free from this swell," and was sheltered against all winds except those blowing across the Bay.

Barnard had intended to extend the wharf out to where vessels drawing 18 feet could come alongside at ebb tide. But soundings indicated that to reach this depth required the wharf to be extended 150 feet farther than planned. Rather than assume this added expense, the wharf was designed to handle ships drawing 15 feet at low water. A study had shown it to be impractical to drive piles to support the structure, so cribs would be used. While cribs were more expensive, they were more durable.

Plans to have the wharf built under contract were junked, when Major Barnard rejected the bids as exorbitant. He then prepared estimates, and, satisfied that his men could build the wharf for $40,000, put a crew to work.[56] It should be observed that this figure was $25,000 above Barnard's preliminary estimate, a practice still common in today's government.

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54. Whiting to Totten, Nov. 8, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer. Whiting was acting superintendent from October 9-November 9, 1854.

55. Barnard to Totten, Jan. 31, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

56. Barnard to Totten, March 15 & 31, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer. Barnard's estimates were as follows: 4,000 running

Major Barnard in April, after construction had started, took cognizance of the great quantities of heavy materials that would have to be imported. He accordingly determined to extend the wharf, as originally planned, to 18 feet at low tide, thus allowing vessels drawing more than 15 feet to come alongside, rather than discharging their cargoes into lighters.[57] Progress was rapid. By the end of April all the cribs of the bridge, as well as the first crib of the T-head, were positioned.[58]

About the time that the wharf was completed in June, Major Barnard received a letter from General Totten, dated May 18, approving its construction. But as the Department had vetoed Barnard's proposal to ship in granite from China and New England, there was no need to extend the wharf to "18 feet below tide."[59] This communication arrived too late, because the head of the wharf had been extended to that depth. In justification of his action, Barnard wrote that the bottom to "15 feet was extremely rocky," and moreover it was probable "that the building of the cribs would cause a shoaling near the shore where the tide was weak."[60]

3. Labor Costs

Wages paid by Major Barnard to his supervisory personnel and clerks were high by east and gulf coast standards, but reasonable in comparison with rates prevailing in the Bay area. Jeremiah Peabody, the overseer, received $300 per month and the sub-overseers (D. Hunt, J. Gogal, and G. J. Addie) $5 a day. Master Mason S. J. Ashley was paid $300 a month; Master Carpenter John Peabody and Master Blacksmith A. Graham, each,

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feet of piles for cribs at 35¢ $14,000; 77,760 feet b.m. timbers & planks for platform at 50¢ $3,888; carpentry, labor, & ironwork $10,000; stone, 5,000 tons at $1.50, $7,500; and contingencies $4,612.

57. Barnard to Totten, April 15, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

58. Barnard to Totten, May 16, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

59. Totten to Barnard, May 18, 1854, NA, RG 77, Ltrs. Sent, Chief Engineer.

60. Barnard to Totten, June 30, & July 12, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer. The wharf had been built at a cost of $36,687.96, about $3,300 under the estimate. It was similar to the plans submitted, except that the extension into 18 feet of water had required five more cribs.

$7 per day; and Chief Clerk H. P. Andrews $250 a month. Men of Jeremiah Peabody's and Ashley's experience commanded $15 per day in the city, while $250 to $300 per month were the wages drawn by experienced bookkeepers and confidential clerks in the San Francisco banking houses.

In justification of the wages paid these men, Barnard wrote that "persons possessing the qualifications and experience of those filling the offices named cannot be found here at any price, and . . . must be brought from the Atlantic at expense to themselves of $300 to $400 or more, if they have families."

On his arrival in San Francisco nine months before, Barnard had found the organization as at present, except for the position of master mason which he had established. He had made some changes in the sub-overseers and adjustments in the wage rates, but had not believed it necessary to refer these matters to General Totten for approval.[61]

Major Barnard had found that he could "command as much labor as desired, at rates somewhat less than are paid" in the city. Laborers were hired at $2 per day, while mechanics received $5 to $6, depending on their trade. These rates undoubtedly seemed high when compared to those paid on the Atlantic and Gulf coast, but they were "only in proportion to the prices of everything else," and he had been informed not to expect any deflation. What he had seen had satisfied him that construction costs would be three times what they were for the Atlantic coast fortifications.[62]

4. Heavy Ordnance at Fort Point

a. Nine 32-pounders are Emplaced

Maj. Gen. John E. Wool, who in February had replaced General Hitchcock as commander of the Department of the Pacific, on May 1, 1854, directed Major Barnard to have ten guns, each, mounted at Fort Point and Alcatraz.[63]

In obedience to this order, Barnard had his laborers mount nine 32-pounders, for which he had carriages, at Fort Point. Four of these

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61. Barnard to Totten, Sept. 23, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

62. Executive Documents, Printed by Order of the Senate of the United States, 1st Session, 33d Congress, 1853-54 (Washington, 1854), Serial 698, Vol. 8, Doc. 50, p. 1.

63. Wool to Barnard, May 1, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

cannon, protected by temporary epaulments, were emplaced on the extremity of the point and the others on the site of the projected 10-Gun Battery.[64] These guns could remain where they were until the fort was ready for its armament.

b. The 10-Gun and Barbette Batteries

Although no work was done during 1854 on the 10-Gun Battery, Major Barnard received several communications about it from the Department. General Totten on February 11 notified Barnard that "all traverse circles and pintle blocks, along with the platforms" for the 8- and 10-inch barbette carriages and the 10-Gun Battery would be supplied by the Ordnance Department.[65]

Then on March 18 he forwarded to Barnard drawings prepared by the Ordnance Department, detailing the "proper arrangement of 8- and 10-inch barbette columbiads," on platforms. In mounting these guns the pieces were to be 18 feet from centre to centre.

The recesses on the interior line of the parapet were the same as that for 24-, 32-, or 42-pounders, together with their stone pintle centres and traverse circles. If practicable, the parapets were to be earthen, but if of masonry they should not be less than 6½ feet thick between the recesses. Recent tests at West Point had satisfied Totten that "five feet is the least thickness that should be given, in casemated batteries, to the scarp at the embrasure; and that it should be increased to seven feet at each side of and above the embrasure. While the horizontal dimensions of the barbette platforms were fixed, there was some latitude in certain of the vertical distances. The general surface of the terreplein should first be established, then the semi-circular brick wall built, and the earth levelled to be in readiness for the wooden platforms. A few hours would suffice to place them, after they and the guns and carriages had been received.[66]

5. The Fort Point Lighthouse

Five months had passed since the Fort Point Lighthouse had been

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64. Barnard to Totten, May 16, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer. Major Tower emplaced six 8-inch naval guns on the extremity of Alcatraz Island pointing toward the harbor, and four 32-pounders on the western side of the island bearing on the Golden Gate.

65. Totten to Barnard, Feb. 11, 1854, NA, RG 77, Ltrs. Sent, Chief Engineer.

66. Totten to Barnard, March 18, 1854, NA, RG 77, Ltrs. Sent, Chief Engineer.

dismantled. A new site had been selected, but construction was complicated by the failure of the Light House Board and General Totten's office to coordinate their activities. On February 18, 1854, Totten notified Barnard that it was "very important" that the lighthouse be reconstructed as soon as possible. The cost was to be charged to the appropriation for "defence of San Francisco Bay."[67]

Another five months elapsed before General Totten was able to advise Barnard that the Light House Board had prepared plans for placing the light on a temporary structure.[68] There were additional delays, and it was October 1854 before Lieutenant Whiting put a crew to work erecting a frame to support the fifth-order lens. Construction costs would be minimal, as most of the materials were on hand, having been left over when the wharf was built.[69]

E. Congress Appropriates $100,000 for Fiscal Year 1855

1. Barnard Submits His Program

As project engineer Major Barnard was responsible for preparing an operating program for the next fiscal year. This would be forwarded to the Department, and used as justification for obtaining an appropriation from Congress. Barnard, to strengthen his position, observed:

> It is scarcely necessary for me to dwell upon the vital importance of securing this important harbor, the key to our immensely valuable possessions on the Pacific; the depot of a commerce equalled by that of few of the Atlantic cities; the harbor of refuge in time of war of our whaling fleets, and of our whole commercial marine on the Pacific; the depot of supply of all our military and naval forces on this ocean and coast.

Although the nation was at peace, Major Barnard warned, a single enemy warship, in case of hostilities, could enter San Francisco Bay

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67. Totten to Barnard, Feb. 18, 1854, NA, RG 77, Ltrs. Sent, Chief Engineer. The Light House Board had requested that the structure be rebuilt, urging that the light be exhibited "at the earliest practicable day."

68. Totten to Barnard, July 17, 1854, NA, RG 77, Ltrs. Sent, Chief Engineer.

69. Whiting to Totten, Oct. 16, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

with impunity. It was therefore vital to the nation's security that the Fort Point defenses be completed by June 30, 1855. Congress should accordingly be asked for sufficient funds, which with those previously appropriated, would "make up the total estimated cost of the work." The cost of the project, as estimated by the Board of Engineers who designed it, was:

Masonry,	22,815 cubic yards	$ 592,473
Excavation,	136,040 cubic yards	39,463
Embankment,	4,229 cubic yards	3,219
Finishing interior of casemates, asphalting arches, laying gun platforms, embrasures, loopholes, coping, and miscellaneous		141,131
Contingencies		223,744
Total		$1,000,000

The current appropriation had been or would be obligated before the appropriation for Fiscal Year 1855 became available. Major Barnard accordingly "recommended most urgently" that Congress be asked to appropriate $750,000 for the next fiscal year.

If given these funds, Barnard pledged to get the job done. He based his hopes on favorable climatic conditions allowing the men to work the entire year, whereas on the eastern seaboard superintendents had to shut down projects for four or five months, because of inclement weather in northern latitudes and for health reasons during the sickly seasons in the south.[70]

2. Congress Appropriates

The 1st Session of the 33d Congress was in an economy mood, and was not prepared to vote large sums such as requested by Major Barnard. The Fortifications Bill, as reported from committee to the floor of the House, called for an appropriation of $100,000 each, for Fort Point and Alcatraz. As soon as Barnard's estimates had been received, General Totten had submitted them "with a recommendation, and they were" forwarded to Congress by Secretary of War Davis. No action was taken, as Congress found its energies and time engrossed by sectional issues.

General Totten, writing Barnard on April 18, expressed his belief that there would be an appropriation, and hoped it would be a liberal one, but he did not anticipate any action before September.

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70. Barnard to Totten, Jan. 12, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

Barnard was cautioned not to spend a dollar beyond that already obligated.[71] Ten weeks passed and with the Fortifications Bill still bogged down, Totten on June 29 reiterated his warning that Barnard not "enter into any engagements of any sort beyond the existing means."[72]

Congress finally acted on the Fortifications Bill, and Chief Engineer Totten notified Barnard on August 9 that $100,000 had been appropriated for the works at Fort Point in Fiscal Year 1855.[73]

Barnard was disappointed to learn of the small appropriation, which would limit operations.[74] He proposed to apply this sum, "with the balance which may remain of the first appropriation to commence the masonry" of the fort. While unprepared to "designate precisely" to what object the available funds should be applied, he believed they could be used to carry a portion of the water fronts "high enough to receive their armament."[75]

F. The Apportionment of the 1854 Appropriation

On his arrival in San Francisco, Major Barnard was surprised and concerned to learn that the fortifications at Fort Point and Alcatraz were being funded under a "common appropriation." Efficiency and economy could only be achieved, he reasoned, by delegating to him, as senior officer present, authority to apportion the appropriation. If the Department were unwilling for him to take the responsibility, it must make the apportionment. It was mandatory that he and Major Tower know how much money was available to enable them to formulate operating budgets.

Insofar as he could judge, he recommended that the current appropriation be divided in proportion to the estimated cost of the

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71. Totten to Barnard, April 18, 1854, NA, RG 77, Ltrs. Sent, Chief Engineer.

72. Totten to Barnard, June 29, 1854, NA, RG 77, Ltrs. Sent, Chief Engineer.

73. Totten to Barnard, Aug. 9, 1854, NA, RG 77, Ltrs. Sent, Chief Engineer.

74. Barnard to Totten, Sept. 13, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

75. "Memoir of the History and Progress of the Fort at Fort Point, Calif., for the year ending Sept. 30, 1854," NA, RG 77, Ltrs. Recd., Chief Engineer.

works--two-thirds to Fort Point and one-third for Alcatraz.[76] Barnard, to strengthen his hand, assured General Totten on January 31 that the works at Fort Point were "not only the most important in the whole system, but being composed entirely of masonry no considerable progress can be made until a large stock of material is secured, and to secure this supply I have to provide means by large contracts." The Alcatraz fortifications, he continued, "contain comparatively little masonry," and Major Tower can supply his needs from small Bay area quarries.[77]

Although he heard nothing from General Totten, Major Barnard predicated his expenditures on the assumption that the works at Fort Point would be allotted two-thirds of the $500,000 current appropriation. His confidence was shaken, however, when Major Tower received orders from Washington to have his Alcatraz batteries "in readiness for their guns by July 1."

When he brought this subject to the attention of his superiors, Barnard on February 16, observed that the heavy expense of site preparation, erecting quarters and storehouses, purchasing tools and animals, paying for "such materials as have been already ordered from New York," and retaining a suitable reserve for expenses falling due after July 1, required at least $200,000. This would leave him with about $50,000 for his stone contracts, and nothing at all to "commence masonry, or even continue operations of any kind." He therefore reiterated his plea to have the subject appropriation apportioned as requested.[78]

Because of the distance, it took about ten weeks to get an answer to a request from Washington. On February 14, two days before Major Barnard had forwarded his latest letter pertaining to the apportionment of the appropriation, Chief Engineer Totten wrote that of this date $100,000 for each of the works had been withdrawn from the Treasury. Of this sum, $21,416.81 had been returned to the Treasury, leaving a credit of $321,416.81. There had been no apportionment of the appropriation, but the subject would be referred to Secretary of War Davis.[79]

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76. Barnard to Totten, Jan. 12, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

77. Barnard to Totten, Jan. 31, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

78. Barnard to Totten, Feb. 16, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

79. Totten to Barnard, Feb. 14, 1854, NA, RG 77, Ltrs. Sent, Chief Engineer.

The Secretary in mid-March made his decision, doing as Barnard had recommended--$333,333.33 were allotted to the works at Fort Point and $166,666.67 to those on Alcatraz Island.[80]

G. Major Barnard Proposes a Name for the Fort

Major Barnard on January 31, 1854, recommended that for "convenience in identifying & in preparing accounts, &c., that the name of the old Spanish work San Joaquin" be given to the work under construction. This name was both "euphonous in itself," and historic. As an alternative, he suggested, that the work be named Fort Kearny, to honor that veteran soldier and hero of the Mexican War.[81]

The Department took no action on this recommendation, and the work continued to be referred to as the fort at Fort Point in official correspondence.

H. Barnard Grabs for Additional Authority

Major Barnard was ambitious, and he desired to expand his responsibilities. Twelve days after his arrival in California, he wrote Chief Engineer Totten, pointing out that he was senior officer of the Corps of Engineers on the Pacific coast, and as such he was "invested with the general supervision of the works" under construction. He wished authority to "direct & decide on all points connected with progress & construction of works on this coast, which it may not seem to me, necessary to refer to the Engineer Dept." Such a delegation of authority, he argued, would "promote unity & promptness of action, and without it the supervision is merely a nominal thing."[82]

General Totten gave no consideration to Barnard's effort to grab additional authority at Major Tower's expense. On April 18 he vetoed Barnard's suggestion that he take "direction" of the military construction on Alcatraz, besides his other duties.[83]

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80. Totten to Davis, March 14, 1854, & Totten to Barnard, March 18, 1854, NA, RG 77, Ltrs. Sent, Chief Engineer.

81. Barnard to Totten, Jan. 31, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

82. Barnard to Totten, Jan. 12, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

83. Totten to Barnard, April 18, 1854, NA, RG 77, Ltrs. Sent, Chief Engineer.

I. Major Barnard is Relieved

1. He Requests a New Assignment

Major Barnard was dissatisfied with the failure of the Department to support his contention that he should, as senior engineer, have supervision over all works under construction on the Pacific Coast; its veto of his proposal to return to the Atlantic Seaboard to make arrangements for purchase and forwarding of building materials; and by what he considered interference by General Totten with his "proper discretionary powers." Especially distressing to a man of Barnard's temperment was the latter. On several occasions he had started that if given "carte blanche" to carry on the project as he desired, it would be completed on schedule. While he desired "the views of the Department and the aid of the experience of the Chief Engineer," he "could not too strongly reiterate the fact that full discretionary powers must be given to the officer in charge . . ., if any kind of efficiency is expected of him in the discharge of his duties."[84]

Barnard asked to be reassigned, as it would be difficult for him to discharge his mission, while hampered by such orders as he had been receiving from the Department. If possible, he wished to be billeted to the U.S. Military Academy as a replacement for G.W. Cullum. Writing General Totten of his desires, he pointed out that he liked West Point and hoped to pursue for a few years "a course of new theoretical & scientific studies, which I could do there better than elsewhere."[85]

2. Barnard Gets His Orders

Secretary of War Davis was agreeable to reassigning Barnard, but it would not be to West Point. On August 17 General Totten notified Barnard that he had been relieved as project engineer at Fort Point, and would turn over to Lieutenant Whiting "all instructions, funds, papers, and other public property pertaining thereto." He would return to the Atlantic Seaboard to take "charge of all operations under the Department in the Harbor of Charleston," South Carolina. All instructions and other papers entrusted to him as senior engineer on the Board of Engineers for the Pacific Coast were to be handed over to Major Tower.[86]

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84. Barnard to Totten, July 31, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

85. Barnard to Totten, Sept. 15, & Oct. 2, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

86. Totten to Barnard, Aug. 17, 1854, NA, RG 77, Ltrs. Sent, Chief Engineer. A letter also went out to Lieutenant Whiting informing

The orders relieving Barnard reached him on September 29, 1854. Acknowledging them, he advised the Department that he would leave San Francisco on November 1. As the appropriations for the Charleston defenses were limited, he hoped the Department would permit him to take a month's leave of absence on reaching New York City to visit his children and relatives.[87]

Ten days later, on October 9, Major Barnard yielded supervision of the project to Lieutenant Whiting and left San Francisco on a "ten-day excursion into the interior of California." Returning on the 21st, he completed preparations to sail. His stateroom had been engaged and his baggage packed, when on the last day of the month he was served with a subpoena, requiring his attendance in court on November 6. There were additional delays because of eye trouble, and it was the 24th before he boarded the Nicaragua steamer. The trip back to the Atlantic Seaboard was uneventful, and Barnard landed in New York City on December 16.[88]

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him that he would be in charge at Fort Point until the receipt of further orders. Totten to Whiting, Aug. 17, 1854, NA, RG 77, Ltrs. Sent, Chief Engineer.

87. Barnard to Totten, Sept. 29, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

88. Barnard to Totten, Nov. 7, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

IV. COLONEL DE RUSSY AS PROJECT ENGINEER, 1854-57

A. Colonel De Russy Takes Charge

1. He Gets His Orders

Chief Engineer Totten learned on August 18, 1854, that Secretary of War Davis had acceded to Major Barnard's request to be relieved and transferred. Within 72 hours Totten had selected a successor. The new superintending engineer would be Lt. Col. René De Russy, one of the Corps' senior officers. The 63-year-old De Russy was the son of a French officer, who had served under John Paul Jones in the American Revolution. At the close of that conflict, the father had settled in Santo Domingo. When the blacks rose against their French masters in 1791, the senior De Russy fled with his family and found safety aboard a United States vessel anchored in the harbor of Port-au-Prince. René was born aboard the ship, which carried the family and a number of other refugees to New York City. There the family settled. René graduated from the U.S. Military Academy in June 1812 and served in the War of 1812,[1] participating in the Plattsburg Campaign under Maj. Gen. Alexander Macomb. Among his many subsequent assignments had been a five-year tour of duty as superintendent of the U.S. Military Academy.

De Russy was to proceed to San Francisco and "take charge of all the trusts and duties, under the care and direction of Major J. G. Barnard." He was to "prosecute these duties under the orders and instructions that had been given Major Barnard, all of which were to be turned over to" him, along "with all public monies, all papers or other public property by either Major Tower or Lieutenant Whiting." Capt. Henry Brewerton would relieve Colonel De Russy at Old Point Comfort and assume responsibility for removing obstacles to navigation from the rivers of tidewater Virginia.[2]

The orders sending him to the west coast reached Colonel De Russy on the 21st at Fort Monroe. Acknowledging them, he announced that he would "use his diligence in arranging his departure," and hoped to be at New York City, ready to board the steamer for Central America on September 20.

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1. Alta California, Nov. 24, 1865; GO 166, War Department, Nov. 25, 1865, NA, RG 94.

2. Totten to De Russy, Aug. 21, 1854, NA, RG 77, Ltrs. Sent, Chief Engineer.

These orders had taken him by surprise. To enable him to perfect travel plans and make arrangements for his family, he requested an advance on his pay. To facilitate his work once he reached California, it would be helpful for the Secretary of War to have $4,000 to $5,000 of the current appropriation deposited to his credit in either Norfolk or New York City.[3]

2. He Reaches San Francisco

Colonel De Russy landed in San Francisco on November 1, 1854, and eight days later he assumed his duties as superintending engineer. Lieutenant Whiting, who had been acting superintendent since October 9, resumed his role as senior assistant.[4]

3. His Quarters

During his first four months as project engineer, Colonel De Russy occupied with his family two small rooms at the Rassette House. The cost of these quarters, including board and hire of one servant, exceeded his commutation allowance. To have rented a house in the city would require more than he could afford. With work progressing rapidly, he found it necessary to spend most of his time on-site rather than in his city office. He accordingly determined to build a two-story frame house (26'6" x 30'6"), at his own expense, on the bluff overlooking the wharf. When the project was completed, this structure might be required for use of the post, in which case it could be sold to the government at a "fair evaluation."

When De Russy moved to the site, the chief clerk would remain in the city to man the office. Whenever a situation arose requiring his presence in the office, the clerk could use the telegraph, recently extended to Fort Point, to contact him.[5]

General Totten on May 25 approved De Russy's request, provided the house would not be sold to the government; that it would be removed any time the Department signified; and that it would only be sold with the approval of the War Department.[6]

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3. De Russy to Totten, Aug. 25, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

4. De Russy to Totten, Nov. 15, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

5. De Russy to Totten, March 9, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer. The estimated cost of the house was $2,300, and it would be erected by a master builder, who was to provide the materials.

6. Totten to De Russy, May 25, 1855, NA, RG 77, Ltrs. Sent, Chief Engineer.

Two weeks before Totten approved his request, Colonel De Russy, the contractor having completed his house, moved from the city to Fort Point.[7]

B. The Government Gets into the Brick Business

1. Totten Gets Some Good News Regarding Bay Area Brick

On September 15, 1854, three weeks before he was relieved as superintendent, Major Barnard had favorable news for the Department. Within the past several months, the quality of bricks kilned in the Bay area had improved to an extent that had this situation been anticipated, he would have recommended their use rather than stone in the scarp walls. It was now possible to get brick, equal to those manufactured at Pensacola, for $18 per thousand, while no stone could be had, either Bay blue stone or Monterey granite, for less than $40 per ton.

With Totten's approval, Barnard proposed to use the Monterey granite for which he had contracted for the foundations, the Chinese stone for facing the scarp, and "brick in all other parts, except where concrete can be used more cheaply."[8]

General Totten was delighted to receive this information. On October 26 he wrote Colonel De Russy advising him of his previous concern over the "enormous cost of masonry," and of his letters urging upon Barnard "the necessity for the utmost possible economy."

If the granite contracted for by Major Barnard had not been delivered, De Russy was to abrogate these agreements, and employ brick exclusively in the facings of the scarp, as well as all other facings.[9]

2. De Russy's Proposals

This message reached De Russy on December 7. He replied, assuring his superiors that he had already considered the "subject and had examined the Bricks made in this part of the Country, with a view to an extensive use of them at Fort Point." He proposed to use granite

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7. De Russy to Totten, May 14, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer.

8. Barnard to Totten, Sept. 15, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

9. Totten to De Russy, Oct. 26, 1854, NA, RG 77, Ltrs. Sent, Chief Engineer.

of good quality for the facings of the scarp and for the piers of the arches. Rubble stone and concrete would be employed in the foundations, with the remainder of the masonry brick and concrete.

The 2,000 tons of Chinese granite contracted for by Major Barnard would be used for the scarp revetment. Since his arrival, Colonel De Russy had reviewed proposals received by Lieutenant Whiting for high quality Monterey granite at $15 a ton, which he proposed to "use in connection with concrete for the piers sustaining the arches."[10]

3. Totten Limits the Use of Granite

General Totten studied De Russy's proposals in the second week of January 1855. Replying, he pointed out that if "good brick at a reasonable cost" could be secured, there was no reason to construct the casemate piers of granite. Experience had demonstrated that brick could be "used with success, not only for the piers of casemates, but for all parts of fortifications." De Russy was to employ brickwork wherever it was the cheaper material, as there "is no advantage in the use of stone, none at any rate that will justify more than a very small excess of cost." Moreover, between coursed stone and rubble masonry, the superiority of the former did not "warrant a material augmentation of expense."

To support this contention, Totten wrote that he had recently received detailed drawings of the newest Russian casemated battery at Kronstadt, Fort Tsar Alexander I, and, although there was excellent granite available, the Russians had only used that material in the exterior facings. The piers, arches, and interior facings of the scarp were brick.

> Colonel De Russy must keep in mind that the Department's desire that while the fortifications at San Francisco are to be erected in a strong and durable manner as to workmanship and materials, and in conformity to plans, the materials as to their nature and style of their application, are to be as little costly as they can be made to be, consistent with the necessary fitness, strength and durability; and that the utmost economy is to be practiced also, in all that relates to the administration of affairs and prosecution of operations.

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10. De Russy to Totten, Dec. 7, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

Totten agreed that the government must in good faith honor Barnard's contract for 2,000 tons of Chinese granite. When it was received, it could be used for the scarp revetment.[11]

4. De Russy Establishes a Brickyard

De Russy agreed that quality bricks were an excellent material for construction of masonry coastal defenses. Aware of this, he had sought in the four months since his arrival to procure quality bricks, "but the very few good ones made in this section of the country, cannot be bought" for less than $20 to $30 per thousand, and these were "generally small, of unequal sizes, and irregularly burnt."

To cope with this situation, De Russy determined to open a brickyard on the bluff, near Fort Point, and burn his own. He had found "an excellent clay" and had engaged a force of brickmakers. Estimates satisfied him that he could kiln brick, moulded and burnt to any desired hardness and size, for $14 to $15 per thousand.[12]

Efforts to establish the brickyard were delayed by late winter rains, and when the dry season commenced it was found that "the clay was too stiff, and that the moulded Bricks would crack when drying." After a number of experiments, clay suitable for brickmaking was found, and by mid-May De Russy was prepared to burn his first kiln.[13] It was a success. Operations were accelerated in early July, as more brickmakers were hired and preparations made to supply Major Tower on Alcatraz with some of the brick he required.[14]

Bricks kilned on-site were first used to build the cisterns, and were superior to the average California brick, but inferior to those found on the Atlantic coast. By September 1, 1855, more than one million bricks had been burned on-site.[15]

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11. Totten to De Russy, Jan. 9, 1855, NA, RG 77, Ltrs. Sent, Chief Engineer.

12. De Russy to Totten, Feb. 27, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer. His master brickmaker claimed to have made more than one million bricks in 1855 with a 12-man crew.

13. De Russy to Totten, May 14, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer.

14. De Russy to Totten, July 14, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer.

15. "Memoir of the History and Progress of the Fort at Fort Point for the year ending Sept. 1, 1855," NA, RG 77, Ltrs. Recd., Chief Engineer.

C. Construction at Fort Point, November 8, 1854-September 1, 1855

1. De Russy Submits His Program

Colonel De Russy, upon assuming duties as superintending engineer, prepared and forwarded to Chief Engineer Totten for approval, a program "for the application" of the current appropriation. With the promontory leveled and the site cleared, he planned to begin excavating immediately for the foundations of the cisterns, the scarp wall, and cross walls. After these projects had been completed, the men would build the cisterns and the foundation walls of the main work. He estimated the cost of these undertakings at $162,889, which would leave a balance in the Fort Point account on June 30, 1855, of $11,271.66. Expenditures were budgeted to average $20,000 per month for the next eight months.[16]

Many weeks would pass before De Russy learned General Totten's reaction to his program, and meanwhile he put the masons to work dressing stone; the carpenters continued construction of the lighthouse; and the large labor force began excavating for the foundations.[17]

The absence of detailed drawings and working plans caused a delay in mid-January in beginning the foundations, although good progress had been made on the excavations. As soon as the subject drawings (along with those for the cisterns and positioning of the conduit for drainage of the roof surfaces) had been completed, the foundations would be started.[18]

2. The Bastion Foundations & Width of the Recesses

Soil tests had shown that a portion of the right bastion and the entire left one would be erected "on new made ground." To ensure a solid foundation, De Russy had caused the excavation at those points to go to bedrock. He would have their foundations laid three feet below, "making such horizontal offsets in the foundations as will connect with the general foundation of the work," at reference (8'), the terreplein being at (16'). Care would be exercised to keep all foun-

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16. De Russy to Totten, Nov. 15, 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

17. Monthly Report of Operations for December 1854, NA, RG 77, Ltrs. Recd., Chief Engineer.

18. De Russy to Totten, Jan. 15, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer.

dations three feet below the rock formations, "and to increase their base on the exterior, in proportion to the slope required to meet the superstructure of the scarp at reference (8') on the ditch points."

The scarp would be given a six-inch slope, from the terreplein to the cordon, making the scarp wall 7'6" thick at the offset.[19]

General Totten, on being advised of De Russy's actions, approved his decision to rest the foundations of the Tower Bastions on bedrock.

De Russy's statement about the width of the scarp wall at the offset triggered a long letter from the Department. Totten cautioned that if the scarp wall were to be 7'6" at the level of the parade, giving it a talus on the face of 6 inches, it would be 7 feet thick at the cordon. If the same talus were carried down to the top of the foundation, the piers would project into the casemates 2'6", and the recesses must be 11 feet in width at the inside of the embrasures and 12'6" on the inner plane of the scarp wall.

The corners of the gun carriage chassis next the scarp must be received in a recess, near, and on each side of the embrasure. If there were a roof, the arch of the communication should be 12'6"wide, because some chassis were 21'6½" in length. But, if pressed for space as he would be in the tower bastions, they could be constructed to a radius of 20 feet, thus providing a passage 10'6" wide. It was important that the inner face of the scarp wall be vertical to the roof surface, and that the casemate piers be tied into it, but separated by a joint. The arches over the recesses would be carried through the scarp wall to within one foot of the outer face.

While the recesses might be less in width, as well as depth, for the upper tiers, because of the diminishing thickness of the scarp, Totten recommended that they all be of the same width, next the scarp and casemates, as in the 1st Tier, 11' and 12'6" respectively.[20]

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19. De Russy to Totten, Jan. 15, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer. The coupé of the East Bastion, the west salient, the entire West Bastion, and a portion of the west face adjacent to the latter Bastion would be on fill.

20. Totten to De Russy, Feb. 23, 1855, NA, RG 77, Ltrs. Sent, Chief Engineer.

3. Building the Foundation

By February 6, two weeks before Totten posted his lengthy letter, De Russy and his two capable assistants--Lieutenants Whiting and Alexander--had prepared their final drawings, and the masons began laying stone and the laborers pouring concrete for the foundation of the scarp.[21] At several points, the bastions and sea fronts between, laborers excavating for the foundation to reach bedrock had to go down five or six feet below ebb tide. To keep water from flooding the excavations, round-the-clock pumping was resorted to. This slowed progress, and increased substantially the cost of the foundations. Where water was a problem, De Russy used for the face of the foundation, the Chinese granite, "dovetailed and put together with iron clamps and dowels," backing the wall with the largest blocks of Monterey stone, all laid in cement mortar. As this section of the foundation must resist the violent action of the sea, orders were given that it was to be constructed in "the same manner and of the same materials, as high as the terreplein of the parade."[22]

De Russy was dismayed to discover that the cement purchased by Colonel Mason from Lawrence Cement & Manufacturing Co. in 1853 had deteriorated and could not be used below water. Unfortunately, there were between 800 and 900 casks on hand. Confronted by this emergency, De Russy had purchased 650 casks of cement locally.[23] Subsequently, it was determined that the Lawrence cement could be used to bind materials where water was no problem.[24]

In mid-March a correspondent for the Daily Alta California visited the site. He found a large force at work. Near the surf, where the bluff had been leveled, he inspected the excavations for the foundations--a trench 18 or 20 feet deep by 9 feet across. One of the foremen explained that a strong foundation was needed, because the rock constituting the point was "too porous and frail to trust" it to support the heavy masonry walls. If they had, odds were that within a few years, the rock would erode and "the Gibraltar would come tumbling down about the ears of the garrison a victim to its ponderousness."

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21. De Russy to Totten, Jan. 30, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer.

22. De Russy to Totten, March 15, & May 14, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer.

23. Ibid. The cement had cost six dollars a cask, considerably less than its sale's price in mid-January.

24. De Russy to Totten, July 14, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer.

Within the trench were workmen positioning and cementing slabs of granite. It was said that the foundation, alone, would cost more than the city's celebrated custom house. On the land front laborers were excavating for five cisterns. From their appearance, it seemed to the reporter that if the garrison were besieged, "an army would have time to march across the plains to its relief before they could drink them dry."

At the base of the escarpment, the correspondent was shown where a moat was to be dug, separating the fort from the mainland.

At the stone sheds, the correspondent stopped to watch stone cutters working with mallets, chisels, and squares, as they shaped the Chinese and Monterey granite. On the wharf, he inspected eight big columbiads recently landed from the clipper Phantom. Nearby were piled round shot and shell, case shot and canister, "sufficient it would seem . . . for the taking of Sebastopol, itself, scattered around."[25]

4. Work Accomplished, September 30, 1854-September 1, 1855

By September 1, 1855, the labor force had laid stone and poured concrete for foundations of the scarp wall and piers; constructed the brick and concrete foundations of the five cisterns; laid the stone masonry of the privies and the foundations of the magazines; erected part of the magazine at the extremity of the Ten-Gun Battery; and raised the greater part of the scarp and cross-walls of the foundations to the level of the parade, while turning the arch of one of the cisterns.

There had been used in construction of these foundations 3,723 cubic yards of concrete and stone, 4,251 cubic yards of concrete and brick; and in the 10-Gun Battery 152.5 cubic yards of brick masonry.

The excavations, mostly in rock formations, consisted of the blasting and removal of 9,540.4 cubic yards for the foundation of the scarp wall and cisterns; 8,592.5 cubic yards on the land front and ditch; and 1,665.2 cubic yards for the 10-Gun Battery and its magazine.[26]

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25. Daily Alta California, March 14, 1855.

26. Executive Documents, Printed by Order of the House of Representatives, during the 1st Session of the 34th Congress, 1855-56 (Washington, 1856), Serial 841, Vol. 1, pt. 2, p. 207; "Memoir of the History and Progress of the Fort at Fort Point, for the Year

5. Paring the Payroll

General Totten was concerned about the high wage scales prevailing in California, and the tendency of his project engineers to employ too many clerks and master craftsmen. On October 31, 1854, he urged on Colonel De Russy "the necessity of keeping the number" of persons employed as clerks and master craftsmen and their wages as low as possible. The rule was to "employ no one not indispensable; and none for a longer period than is absolutely necessary (a master workman is not necessary except when there are several journeymen.)" De Russy was "to unite" in one able man as many supervisory functions as feasible.[27]

On receipt of Totten's directive, De Russy implemented a number of economies. Several foremen were downgraded or discharged, and the supervisory personnel cut to the minimum.

6. Deposit of Funds with the New York Engineer Depot

De Russy, like his predecessors, was plagued by delays in receiving funds to meet payrolls and to pay for purchase of "materials of every description required for rapid progress." In reporting this difficulty to General Totten on January 30, De Russy warned of the high cost of cement in San Francisco. It was selling for eight to ten dollars a barrel. As the supply stockpiled in 1853 would soon be exhausted, he asked that $5,000 be deposited to his credit with the New York Engineer Depot. Such action would enable him to have his cement shipped directly from the east coast.[28]

On February 1, assuming that the requested funds had been deposited with Capt. George Dutton, De Russy ordered 1,000 casks of cement.[29] He was disappointed on March 31 to learn that Secretary

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Ending Sept. 1, 1855," NA, RG 77, Ltrs. Recd., Chief Engineer. Aggregate used in the cement consisted of superior quality pebbles, ranging in size from a pea to an egg, procured from the beaches of Angel Island; broken serpentine rock from the excavations; and sand from the site. A shortage of freshwater compelled the use of sea water in mixing cement.

27. Totten to De Russy, Oct. 31, 1854, NA, RG 77, Ltrs. Sent, Chief Engineer.

28. De Russy to Totten, Jan. 30, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer.

29. De Russy to Totten, March 15, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer. Captain Dutton had replaced Major Frazer as officer in charge of the depot.

of War Davis had vetoed his request. To relieve himself of an embarrassing situation, De Russy asked the Department to transmit to Captain Dutton, as soon as the appropriation for Fiscal Year 1856 became available, $2,015 to pay for a hoisting engine and sufficient funds to pay for 500 barrels of cement immediately, and an equal number by April 30.[30] This was done, and De Russy escaped temporarily from his financial difficulties.

7. General Wool's 1855 Visit to Fort Point

General Wool, the department commander, was in San Francisco in mid-May, and Colonel De Russy invited him to visit the construction site. Wool was agreeable and was at Fort Point on the 15th. Colonel De Russy, Major Tower, and their assistants welcomed the general.

Before returning to the city, Wool announced that he planned to leave on the 17th for a four-week tour of the Oregon Country, and would like to have two of the junior engineers accompany him. Major Tower announced that he could spare Lt. Frederick E. Prime, and Colonel De Russy acceded to his desire by giving Lieutenant Whiting permission to go. While traveling with Wool, the two officers were to "collect all information that can be useful in the future operations of the Department in that quarter."[31]

D. Construction at Fort Point in F.Y. 1856

1. The Department Asks for $650,000 for F.Y. 1856

Major Barnard on September 30, 1854, had urged Chief Engineer Totten to request for Fiscal Year 1856 an appropriation "sufficient to complete the work." To reinforce this request, he called attention to "the immense importance of having . . . the sole commercial port, and key to our possessions on the Pacific, in a state of defensibility." With the preparations already made, and knowing the whereabouts of building materials, he had not the "slightest doubt of the practicability of applying the appropriation asked for, and completing the work in the ensuing fiscal year." Experience gained during his nine months on-site had enabled him to revise the final estimates of the Board of Engineers. He believed the fort could be

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30. De Russy to Totten, March 31, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer.

31. De Russy to Totten, May 15, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer.

completed for an additional $836,950, of which there was currently available $186,950, leaving $650,000 to be appropriated by the 2d Session of the 33d Congress.[32]

On November 29 Chief Engineer Totten, having studied Barnard's Memoir, wrote Secretary of War Jefferson Davis that the works at Fort Point under construction and designed for defense of

> San Francisco, the great centre of our interest on . . . [the Pacific] coast, and occupying an undoubted pre-eminence in all respects, is being pressed forward to a condition of security as fast as the means allotted to it by Congress will admit. Should that body see fit to assign to it, at any time, a sufficient sum of money to complete the work now in progress, the energetic officers conducting them give every assurance that they will complete them within twelve months from the date of the appropriations. When these works are completed, the harbor of San Francisco will be in a respectable state of defence, although one other important work [at Lime Point], to give a cross-fire at the entrance, and some minor defences, will still remain to be constructed.[33]

The Senate on January 15, 1855, called on Secretary of War Davis for a report on the progress "made in fortifying the entrance" to San Francisco Bay, "and the present condition of said work." Davis turned to Chief Engineer Totten for the information. After reviewing the Alcatraz Island situation, he reported that at Fort Point "the requisite temporary buildings, wharf, and road have been constructed, and 150,000 cubic yards of rock have been excavated from the site." Stone for the foundations had been received, and the masonry was "expected to be begun this month."

Major Barnard had reported that "the work may be finished in

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32. "Memoir of the History and Progress of the Fort at Fort Point, Calif., for the year ending Sept. 30, 1854," NA, RG 77, Ltrs. Recd., Chief Engineer.

33. Executive Documents, Printed by Order of the House of Representatives, During the 2d Session of the 33d Congress (Washington, 1855), Serial 778, Vol. 1, pt. 2, p. 97.

another fiscal year without difficulty," provided Congress appropriated $650,000, the sum estimated by him as adequate for the purpose.

The amounts heretofore appropriated had been two-thirds of the grant of March 3, 1853, $333,000, and the $100,000 appropriated by the Act of August 3, 1854. Out of this $433,000, there remained to be obligated $55,000.[34]

2. Congress Appropriates $300,000 for F.Y. 1856

The 2d Session of the 33d Congress, like the 1st Session, found most of its energy and time devoted to debating sectional issues. When General Totten wrote Colonel De Russy on February 13, transmitting a draft for $54,500 (the balance of the current appropriation), he cautioned him "to be careful not to incur any debt or liability of any sort beyond existing means," because of this situation.[35]

Totten, however, had misjudged Congress. Before adjourning on March 3, 1855, it appropriated for the fiscal year ending June 30, 1856, $300,000 for fortifications at Fort Point. Notifying De Russy of this, General Totten requested him to submit for approval by the Department, "a project for the application of this sum specifying the parts of the work . . . to which you propose applying it, and giving the rate of expenditure per month."[36]

Secretary of War Davis, on March 22, strengthened De Russy's position, when he ruled that the recent appropriation might be "applied at once to such work as have been commenced."[37]

3. De Russy Formulates an Operating Program

Colonel De Russy accordingly prepared and forwarded a program for expenditure of the subject appropriation. He proposed to apply

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34. Executive Documents, Printed by Order of the Senate of the United States, 2d Session, 33d Congress, 1854-1855 (Washington, 1855), Serial 751, Vol. 24, Sen. Doc. 24, pp. 1-2.

35. Totten to De Russy, Feb. 13, 1855, NA, RG 77, Ltrs. Sent, Chief Engineer.

36. Totten to De Russy, March 7, 1855, NA, RG 77, Ltrs. Sent, Chief Engineer.

37. Totten to De Russy, March 22, 1855, NA, RG 77, Ltrs. Sent, Chief Engineer.

the $300,000 to

> construction of the Scarp wall from the foundations of the Fort to the Terreplein of Parade, and to construct the 1st Tier of the work including the Scarp, Embrazurers, Piers and Arches. To lay the floor of the 2d Tier and to progress in the 2d Tier, as far as to include the Embrazures and Piers, which will probably at the present rates of Labor and Materials absorb the Appropriation for the year, with the exception of the sum set aside to maintain a proper watch over the property until 30th June 1857.[38]

On May 25 the Chief Engineer approved De Russy's program for Fiscal Year 1856.[39]

4. Work Accomplished, September 1, 1855-September 30, 1856

During the subject 13 months, De Russy's people on the land front built: (a) the arches over the remaining four cisterns; (b) the entire 1st Tier of storerooms; (c) the gorge magazines, including their arches; and (d) the sally port. The spaces between the subject arches were brought up with concrete to the level of the arch keys.

All stone piers on the water fronts, including those in the tower bastions, had been constructed to the spring line of the communication arches. The two service magazines, on the 1st Tier, had been built and arched. The main staircases had been raised to the height of seven steps.

The foundation of the scarp wall at the southwest angle, left unfinished in Fiscal Year 1855, had been excavated and raised to its required level. The superstructure of the entire length of the scarp wall, on the sea fronts, had been commenced, and had reached an average height of one foot six inches. The pintle-stones and tongue-holes for the 1st Tier embrasures had been laid.

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38. De Russy to Totten, April 14, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer.

39. Totten to De Russy, May 25, 1855, NA, RG 77, Ltrs. Sent, Chief Engineer.

A service magazine for the Ten-Gun Battery had been completed, and "an area wall constructed to protect its entrance."[40]

E. Construction of the 10-Gun Battery

1. The Ostend Manifesto Sparks Construction of the Battery

The Ostend Manifesto of October 1854, declaring that "if Spain, dead to the voice of her own interests, and actuated by stubborn pride and a false sense of honor, should refuse to sell Cuba to the United States . . . then, by every law, human and divine, we shall be justified in wresting it from Spain if we possess the power," had repercussions at Fort Point.[41]

General Totten, taking cognizance of the implications, alerted Colonel De Russy in mid-November to be prepared for war with Spain. Arrangements must be made to mount the 33 8- and 10-inch columbiads en route from east coast ordnance depots to San Francisco Bay. An examination of the monthly reports submitted by the project engineers satisfied Totten that, except for the south battery on Alcatraz Island, there were no permanent works ready for these big guns. Totten urged Colonel De Russy and Major Tower "to accomplish as much as possible by pressing forward portions of the regular projects," where the heavy guns might be most advantageously emplaced.

If the international situation continued to deteriorate, De Russy and Tower were authorized to employ part of the appropriation to erect temporary works in which to mount the columbiads. Such action, however, would not constitute an excuse to reduce the number of men employed on the defences guarding the entrance to the bay.[42]

Colonel De Russy, on receipt of Totten's confidential message in mid-January, put a large force of masons and laborers to work on the 10-Gun Battery, on the escarpment south of the casemated fort. Rapid

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40. Executive Documents, Printed by Order of the House of Representatives during the 3d Session of the 34th Congress, 1856-57 (Washington, 1857), Serial 894, Vol. 1, pt. 2, p. 290; "Fort at Fort Point, Plan, Sections & Elevations, showing its State of Completion on the 30th of September 1856," NA, RG 77, Dr. 94-28.

41. Edward S. Wallace, Destiny and Glory (New York, 1957) p. 137.

42. Totten to De Russy, Nov. 18, 1854, NA, RG 77, Ltrs. Sent, Chief Engineer.

progress was made in excavating earth and rock, and by the end of the month masonry of the breast-height walls had been commenced. The five 32-pounders, formerly occupying the site of the battery, remained on the bluff. In an emergency, they could be placed in battery behind sandbags south of the 10-Gun Battery, to register on the Golden Gate.[43]

Noting General Totten's remarks about mounting additional guns, De Russy concluded to give high priority to construction of that portion of the scarp wall on the sea fronts between the Tower Bastions, "taking in the flank and face of the right Bastion (Fronts Nos. 1 & 2) to the height of the 1st Tier." Such action would provide the army at an early date with "an efficient Battery of Thirteen guns in Embrasures easily covered on the flanks by earthen traverses or temporary batteries."[44]

Although the crisis had eased with the repudiation by the State Department of the Ostend Manifesto, General Totten on February 23 commended De Russy for his decision "to commence at once the ten gun battery on the hill," and "to construct as soon as possible that portion of the scarp wall on the sea fronts which is included between the two tower bastions; taking in the flanks and face of the right bastion . . . to the height of the first tier."

Totten, however, cautioned De Russy not to begin work on the embrasures until he was provided with details of the results of the November 1853 tests which were still being evaluated. This would not preclude raising "the scarp considerably between the embrasures, and also the casemate piers."[45]

2. The Armament Board Reports

A board convened by Secretary of War Davis determined in March 1855 that the armament of the fort should consist of: 1st Tier 26 42-pounders; 2d Tier 28 8-inch columbiads; 3d Tier 28 8-inch columbiads; right flank of northeast bastion, three tiers, 6 24-pounder howitzers; reverse of ditch four 24-pounders; Tower Bastions 2 10-inch columbiads en barbette; north salient 3 10-inch columbiads en barbette; south salient 2 10-inch columbiads en barbette; curtains of water fronts 17 8-inch columbiads en barbette; land front 11 32-pounders en barbette; and the advanced battery 10 42-pounders en barbette.

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43. De Russy to Totten, Jan. 15, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer.

44. Ibid.

45. Totten to De Russy, Feb. 23, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer.

The 42-pounders had been introduced in lieu of columbiads at certain positions, because the latter were not adapted to the use of hot shot.[46]

The Board's decision about the armament of the fort raised no problems for De Russy, but the mounting of 42-pounders in the 10-Gun Battery instead of 8- and 10-inch columbiads, as projected, would. Work had progressed during the last few weeks. The masonry of the breast-height walls had been completed, and the battery was ready to receive its platforms. To implement Totten's instructions of November 18, eight 8- and two 10-inch columbiads, with all their equipments, had been landed at the Fort Point wharf.[47]

Rather than make the necessary changes at a time when there was no 42-pounders available, Lieutenant Whiting would continue with construction of the columbiad platforms. He would be ready to mount them in an emergency.

As an alternative to the Board's plan, De Russy proposed to build two shot furnaces on the parade to provide hot shot for the 42-pounders of the 1st Tier. It seemed to him that the commanding position of the 10-Gun Battery was better suited to columbiads than a hot shot battery. The 1st Tier guns, only a few feet above water, could deliver a ricochet fire.[48]

Chief Engineer Totten on May 25 agreed to arming the 10-Gun Battery with columbiads, with the understanding that when the fort was finished, the battery was to be fitted for 42-pounders.[49] The ten 32-pounders on hand were to be mounted in temporary batteries.[50]

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46. Totten to De Russy, March 19, 1855, NA, RG 77, Ltrs. Sent, Chief Engineer.

47. Daily Alta California, March 14, 1855. A correspondent for the Alta California had reported in mid-March that masons were laying brick in the breast-height walls in "a most smooth and workman-like manner. This battery was to command the approaches to the Golden Gate from the west."

48. De Russy to Totten, April 13, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer.

49. Totten to De Russy, May 25, 1855, NA, RG 77, Ltrs. Sent, Chief Engineer. Meanwhile, Totten had directed Captain Dutton of the New York Depot to forward to De Russy a set of 15-foot irons for a shot furnace.

50. Totten to De Russy, June 19, 1855, NA, RG 77, Ltrs. Sent, Chief Engineer.

3. The Battery is Armed

In mid-May 1855 Colonel De Russy notified General Totten that the Ten-Gun Battery was ready for its armament. A delay of several days was occasioned by the painting of the traverse circles and carriages, and lacquering of the guns. De Russy called on Capt. Charles P. Stone at Benicia for the paints.[51]

The columbiads had been mounted by July 14, and on that date four 32-pounders were still emplaced in the small earthen battery at the point. If there were an emergency, the other six 32-pounders could be positioned on the esplanade of the 10-Gun Battery.[52]

4. The Ordnance Department's Shipment of Additional Guns is Premature

Documents reviewed by General Totten in the spring of 1855 revealed that the Ordnance Department either had or was going to ship a number of cannon (ten 10-inch columbiads, 33 8-inch columbiads, and 20 42-pounders) for the defenses of San Francisco Bay. As yet, there was no word about the 15 24-pounder flanking howitzers. Until the recent decision by the Armament Board, Colonel De Russy and Major Tower had been preparing their works for an initial shipment of 10 10-inch columbiads, 49 8-inch columbiads, 4 42-pounders, and 15 flanking howitzers. The excess 16 42-pounders could be mounted in the 1st Tier at Fort Point.[53]

Information regarding shipment of these guns from New York City and Watertown, Massachusetts, to San Francisco distressed Colonel De Russy, because the works at Fort Point and Alcatraz were in no condition to receive them. The subject ordnance stores, along with

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51. De Russy to Totten, May 14, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer.

52. De Russy to Totten, July 14, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer. The ten 32-pounders, which De Russy had found at Fort Point, were said to be the responsibility of Capt. E. D. Keyes, whose company of artillery was stationed at the Presidio. The carriages were in such bad condition that De Russy had taken it upon himself to have them repaired and repainted at the time the columbiads were accorded this care. De Russy to Totten, July 14, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer.

53. Totten to Craig, June 4, 1855, NA, RG 77, Ltrs. Sent, Chief Engineer.

those already on hand, required construction of storehouses at Fort Point and Alcatraz. Because of its exposed location, the guns stored at the former required a guard from the Presidio artillery company.[54]

More than a year was to pass before all this heavy ordnance arrived on the Pacific coast. When he inspected the 20 42-pounders in the autumn of 1856, De Russy saw they were equipped with barbette carriages. As these would not answer for the 1st Tier, De Russy requested the Ordnance Department to supply him with casemate carriages for these pieces.[55]

F. The Counterscarp Gallery

1. Totten Rejects De Russy's Proposal

One of the most vexing problems associated with construction of the fort was designing a counterscarp gallery to provide for defense of the approaches to the land front. Colonel De Russy, dissatisfied with Major Barnard's plan to cope with this problem, came up with a different answer. Previous changes approved by the Department, he wrote General Totten on August 31, 1855, made "the counterscarp defences at this angle [the southwest] less important, so far as detached reverse defences are concerned."

De Russy proposed to build a half bastion at the southwest angle. He would place two 24-pounder howitzers in each of the 1st and 2d Tiers to flank the land front; loop-hole the 3d Tier; mount two 8-inch columbiads on centre-pintles in the Barbette Battery; and provide for the face of the half bastion to be defended by small-arms fire from the 1st, 2d, and 3d Tiers.

The plan (a copy of which is on file at Fort Point NHS) had been submitted to and approved by the Board of Engineers for the Pacific. In forwarding it to the Chief Engineer for his concurrence, De Russy pointed out that "the foundations of this small portion of the work must remain untouched, until I can receive an answer from the Department."[56]

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54. De Russy to Totten, July 14, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer.

55. De Russy to Totten, Nov. 3, 1856, NA, RG 77, Ltrs. Recd., Chief Engineer.

56. De Russy to Totten, Aug. 31, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer; "Sketch of Fort at Fort Point, Cal., Showing a Plan and Section of the Flank Defense of the Ditch," NA, RG 77, Dr. 94, Sheet 16.

General Totten was unimpressed with De Russy's alternative. On November 24 he notified De Russy that it was wrong to deviate from the "sketch of modification of the plans of the Fort at Fort Point" transmitted by Major Barnard on February 15, 1854, "so far as regards the ditch on the land side, the counterscarp slope, and the casemates of reverse fire." He was satisfied that in the reverse casemates there was enough room for three flanking howitzers, "from positions not to be counterbattered from the land." These casemates, Totten observed, need not be as deep as shown on the tracings, if that depth would add to the expense, and they could be restricted in number east of the ditch.

For De Russy's guidence, Totten forwarded a sketch of the howitzer embrasure at Fort Knox. In preparing his plans for submission to the Department, De Russy was to show the sill of these embrasures, which was to be three feet above the casemate floor, not less than seven feet from the surface of the ditch. This could be accomplished by making the ditch eight feet wide and four feet deep immediately in front of the casemates, or by raising the floor of these casemates four feet above the ditch. Access to the door of these reverse casemates was to be by single plank or ladder.

Walls of the reverse casemates, against which the earth was to rest, were to be double walls. The preferred construction was a narrow space "in the heart of the wall," crossed frequently by single bricks or stones, "so as to secure a joint action in resisting pressure." A dry wall could be raised against the back or rear wall, so that neither "water nor wet earth" touched that wall, and a blind drain from the bottom of the foundation would carry away any water that seeped down.[57]

2. De Russy Revises His Plans

In a final effort to get General Totten to change his mind, Colonel De Russy in February 1856 asked Lieutenant Whiting to call at the Department on his arrival in Washington. Whiting, having served as principal assistant at Fort Point since July 1853, was being reassigned to duty on the east coast. On reaching the nation's capital, Whiting explained to General Totten the reasons De Russy favored a half bastion to a reverse defense of the counterscarp. Although Totten listened attentively, he did not change his mind.[58]

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57. Totten to De Russy, Nov. 24, 1855, NA, RG 77, Ltrs. Sent, Chief Engineer.

58. De Russy to Totten, Feb. 4, 1856, NA, RG 77, Ltrs. Recd., Chief Engineer.

De Russy, after studying Totten's instructions, went back to the drafting table. On September 3, 1856, he submitted "for the action of the Dept. the Plans and Sections of the Counter-Scarp defences." In a covering letter, he called General Totten's attention to the placing of the floors of the casemates level with the ditch on the land front, thus providing coverage of the ditch by a low raking fire. Fronting the principal ditch would be "a sub-ditch 8' wide by 4' deep."

Totten's suggestion in regard to construction of the rear wall had been adopted, and the sections revealed the "mode . . . recommended for drainage of the roofing," a covering of asphaltum, topped with from 6 to 12 inches of broken bricks laid dry.

The two embrasures nearest the proposed seawall would be positioned to command the ditch and slope of the counterscarp.[59]

3. General Totten Provides Construction Details--Chiefly Relating to Magazines

General Totten on November 25 approved the plans for the counterscarp gallery, subject to some changes.[60] Most of the changes involved the magazines. He agreed that the proposal to have a ventilator run under the doorway and vestibule into the cellars of the magazines was a good arrangement, though the channel must not be less than 12 inches in width, and be protected by a strong copper or brass
The floors of the cellars were to be "as low as the bottoms of the foundations of the surrounding walls and piers." Thus the ventilators would be arranged to drain the cellars.

To ventilate the upper sections of the magazines, there would be "ventilating windows, 1'6" wide by 3' high, with closed shutter at the outer end and a light and very open wooden grated shutter at the inner end, and also a composition grating, with wire gauze attached to it, out of reach, midway." In addition, there would be two or three narrow 1'6" x 3" ventilators, provided with wire gauze. A suitable wire gauze was 1/12 to 1/15-inch copper mesh.

Composition hooks would be introduced into the jambs of the doors and windows of the magazines for support of the hinges. Doors and windows were to shut into masonry rebates. There would be an

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59. De Russy to Totten, Sept. 3, 1856, NA, RG 77, Ltrs. Recd., Chief Engineer. The subject embrasures obliqued 6" from the perpendicular.

60. Totten to De Russy, Nov. 26, 1856, NA, RG 77, Ltrs. Sent, Chief Engineer.

outside and inside door at the entrance into each casemate. Each door would be three inches thick. At each entrance to the magazines there would be an outside door of the same thickness and an inside grated door, similar to those at Fort Barrancas. The shutters would be two inches thick. All hinges and fastenings would be brass or composition, except the inside fastenings of the entrance doors to the casemates, which would be iron bars. A large brass padlock, with composition hasp and staples, would secure the outside doors.

The preferred method of constructing magazine floors "was to cover as deep a cellar as can safely (as regards drainage) be made, with wooden joists (10" or 12" by 3") eight inches apart in the clear, resting on off-sets in the walls or piers; and to lay there on 1½ inch planks, tongue and groove, and nailed in the joints." Where there was no cellar, the earthen fill was to be solidly tamped between the foundations of the piers and walls. Over this was to be laid a bed of hydraulic concrete, three inches thick, and rammed. Next there would be laid thereon, "in mortar, a single layer of hard burned bricks, 8 inches apart in rows under the joists." Upon these would be positioned joists, "scantling 3 or 4 inches square, 8 inches apart in the clear," and thereon would be nailed board flooring. If the magazines were lined with boards, the board flooring would not reach the face of the side-boarding by one-half inch, so that water running down the face of the lining wall would drop between the joist and not seep upon the floor.

Where possible there should be one or more conduits rising out of the top of the magazine space, and carried as high as practicable in the heart of an adjoining wall. A draught was always secured by this difference in elevation.

In the magazines of the main work, air chimneys should be carried up to the top of the scarp or parade walls. These outlets to be just "under the coping." To keep out rain, a hood of sheet copper should be fastened to the wall, while to combat rats and birds a copper grating, covered with wire gauze, should be placed just within the inlet.[61]

4. De Russy Makes a Few Revisions

After examining the drawing forwarded by General Totten with his letter, Colonel De Russy and his assistant--Lieutenant Alexander--revised their plans. The modification of the roofing made it necessary to raise the front wall of the gallery 18 inches, placing the top of the coping at reference (31') above ebb tide. The foundations of the walls, enclosing the magazines, were lowered 15 inches. This arrangement allowed "six feet clear space in the magazines, and a well ventilated cellar below the floors."

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61. Totten to De Russy, Nov. 25, 1856, NA, RG 77, Ltrs. Sent, Chief Engineer.

Some alterations had been made in the wall at the east elevation of the gallery, and in the slope of the earth covering that part. This wall would be kept at the same height as the front wall, until its face intersected the "great counterscarp slope"; beyond which it would be lowered by offsets until it had only "the height necessary to support the arch that abuts against it, and to afford a suitable arrangment for the roof of that part."[62]

General Totten approved of the manner by which Colonel De Russy had implemented his suggestions for modifying the counterscarp gallery. He, however, did not want the earthen crowned slopes, and the top finish of the front and end walls programmed until he had had an opportunity to study "the arrangement of the glacis slopes."

In regard to the undetermined hardness of the asphaltic mastic, and considering the great weight of earth to be superimposed on it, Totten believed they should "lay the rows of bricks only about the width of a finger apart, instead of 2 inches as before directed." If slates were to be had at reasonable rates, the entire mastic surface would be first covered with them. The bricks could then be laid in rows about one inch apart.[63]

G. The Embrasures

1. For the Heavy Ordnance

a. De Russy Requests Plans

Like the counterscarp gallery, work on the embrasures had to be delayed because there were no approved plans. On February 4, 1856, Colonel De Russy requested the Department to send such plans as would enable him to "commence the embrazures of the Lower Tier of Guns." If assured there would be no changes in design and position of the tongue and pintle holes, he could proceed at once with the scarp walls on the sea fronts.[64]

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62. Alexander to Totten, Feb. 19, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer; "Fort at Fort Point, Plan & Section of Counterscarp Gallery, Submitted Feb. 16, 1857," NA, RG 77, Dr. 94, Sheet 30.

63. Totten to De Russy, March 18, 1857, NA, RG 77, Ltrs. Sent, Chief Engineer.

64. De Russy to Totten, Feb. 4, 1856, NA, RG 77, Ltrs. Recd., Chief Engineer.

b. Details of Tongue Holes and Casemate Recesses

De Russy need not have made this inquiry. Chief Engineer Totten, from the monthly reports, knew that work on the sea fronts had proceeded to a point, where he must make a decision on construction of the embrasures. He had accordingly written De Russy a lengthy letter on this subject on February 23, before the arrival of the inquiry.

The West Point tests of November 1853 had finally been evaluated, Totten wrote, and they had demonstrated "the expendiency, where not otherwise forbidden, of making the recesses in the scarp wall, immediately around the inside of the casemate embrasure, somewhat less than heretofore prescribed." If the scarp on the channel fronts, including the scarp of the tower bastions, was 7'6" at the bottom, the recesses were to be 9'4" and 12'8". If any significant work had been done on the recesses, in accordance with the sketches forwarded 12 months before, De Russy was to have them completed as planned. The alterations of embrasures from the old plan would include the size of the tongue hole, and of the little recess made to receive the corner of the gun carriage, as well as the embrasure proper.[65]

c. The Embrasure Irons

Two weeks later, Totten mailed De Russy a sheet of "drawings of a gun embrasure in plans, sections, and elevations for the fort on Fort Point." The embrasures would be "formed chiefly of brick and wrought iron."[66] The iron parts were to be cast under a special contract, and would be forwarded when ready for mounting, with all holes drilled. Hinges, bolts, and washers were to be provided by the project engineer.

Tests had demonstrated that the arrangement of wrought iron about the throat, as shown in the plans, backed by masonry would resist an 8-inch solid shot fired from a columbiad at 200 yards; and the shutter would resist without being dismounted or made unserviceable, the largest grape shot from the same piece fired at a similar distance. But to do so, the iron had to be backed by "solid and well bonded masonry."

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65. Totten to De Russy, Feb. 23, 1856, NA, RG 77, Ltrs. Sent, Chief Engineer.

66. The principal pieces of wrought iron were the left and right throat jambs, two of each, having right and left auxiliary jamb pieces; sill throat iron; lintel throat iron; right and left shutters; and tongue hole iron.

It was necessary to protect the exterior facings of the embrasure with plates of one-half inch boiler iron, nine inches in width. There would be a space of one-half inch between the edge of the boiler iron and brickwork to alleviate fears of the side plates being loosened by muzzle blasts. Also shielded by plates of boiler iron, to be supplied by the project engineer, would be the sole of the embrasure and lintel, the throat of the embrasure, and the upper ends of the throat jambs.

d. The Embrasure Stones

A few stones had been introduced into the embrasure. They were: (a) one 1'6" x 1'6" x 1' stone to receive the lower end of the carriage pintle; (b) a stone 5'3" long, 1'11 1/8" wide, and 6" high placed over the inside of the tongue-hole; (c) a sole stone 8' long, 1'3" wide, and 2'2" high to bridge part of the tongue-hole, its top notched to receive the pintle and pintle-head, and its upper and outer edges rebated to receive the lower end of the throat jambs. "No fine cutting" was to be applied to any part of these stones, except the pintle-hole and rebate, "both of which should be well executed not for the sake of smoothness but for the sake of the precision that is indispensible."

e. Embrasure Brickwork

"Every brick laid" in these walls and around the embrasures "must be a hard burned brick." They were to be well laid, as were the stones connected with the embrasure, in the strongest cement mortar composed of "energetic cement and sand without admixture of lime."

f. An Order for 28 Sets of Embrasure Irons

De Russy was to retain sufficient funds from his current appropriation to pay for the 28 sets of irons required for the 1st Tier. Contract price for the iron was 7½ cents per pound, and weight of each set, without shutters, was 4,586 pounds or $343.95 per set, to which would have to be added shipping charges from east coast foundries to San Francisco.[67]

2. For the Flanking Howitzers

a. The Plans

Totten on March 14 posted to De Russy drawings of "plans, sections,

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67. Totten to De Russy, March 11, 1855, NA, RG 77, Ltrs. Sent, Chief Engineer.

elevations, and details of embrasures for 32 pdr. or 24 pdr. casemate howitzers." These plans showed the principal horizontal dimensions, where the wall was three feet thick. The interior of the sole of the embrasure was to be 2'4½" above the floor of the casemate. Inside the wall would be constructed an independent mass of masonry 6 feet long, 2 feet wide, and 2 feet high, affording a lower interior sole on which the forward end of the chassis would rest. It would be built symmetrically with rest to the embrasure, be faced on the three exposed sides with a 9-inch brick wall, filled in with concrete, and covered with a slab of flagging stone about 3 inches thick.

b. The Ironwork

In placing the ironwork of the embrasure and regulating dimensions, precision was vital. The throat was so small that there was no room for any variance. The axis of the pintle was the vertical line about which all parts of the embrasure must be arranged.

The sill and lintel of the embrasure were to be bars of wrought iron, each 4 feet long, 6 inches wide, and 2 inches thick. Each was to be pierced by three holes, 1½ inches in diameter, into which would be fitted four hinge sockets, the stop, and the bolt catch. The leaves of the shutter were to be flat pieces of 3/8-inch boiler iron. The hinges of boiler iron, ¼-inch thick, were to be bent around a one-inch bolt, and each fastened by three rivets to the shutters. The fastening bolt, one to each leaf of the shutter, was to be connected with the shutter in the same manner as the hinge bolt. A handle would be screwed on once the bolt was emplaced.

To protect the brick throat jambs of the embrasure, a piece of 3/8-inch boiler iron, bent into proper form, would "face the throat and be anchored into the brick cheeks."

Colonel De Russy was to supply and fit the metal parts for the subject embrasures.

c. The Brickwork

Brickwork surrounding these embrasures was to be laid in the best manner, using only the best cement and hard bricks.

Wherever one of the howitzer embrasures was exposed to grape and canister, the outer margin would be covered by plates of boiler iron, as with the gun embrasures. The subject embrasures would give the full traverse of 60 degrees.

The arch over the interior of the embrasure would be cylindrical and spring from the imposts, the span being 2'6" and the rise 2"; and the oblique cheeks being covered till they meet the under surface of the arch.

Where the wall was three feet in thickness or less, there would be a single pair of inner cheeks to each embrasure. If the wall were 4 feet thick, there would be a second pair of inner cheeks, "formed in the increase of 1 foot given to the thickness of the wall."[68]

3. Construction of the Gun Embrasures Begins

Delays in receiving materials, especially large blocks of stone, compelled Colonel De Russy to postpone construction of the 1st Tier embrasures. By late October 1856 he was finally provided with necessary items, and on November 3 he notified the Chief Engineer that "two or three of the embrasures are being constructed with great care, agreeable to your instructions."[69]

H. Change Orders and Construction Details

1. The Sally Port

Colonel De Russy, on reviewing plans and correspondence between the Department and Major Barnard, found those changing the grade of the ditch on the land front of the fort of special interest. Because of this change there was now no need to locate the sally port between two of the magazines.

On August 31, 1855, he forwarded to Chief Engineer Totten a revised plan, placing the sally port at the mid-point on the land front, "leaving the four main magazines connected by a gallery, and the gateway, where it can be defended by loop-holes from adjacent casemates."[70] The Department on November 24 approved this change.[71]

2. Principal Magazines

Absence of detailed drawings left De Russy at a loss whether the principal magazines were to have "the usual doors and windows on the parade, or whether the openings indicated on the plan are to be blind ones, or walled up; depending altogether on the dark gallery for" en-

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68. Totten to De Russy, March 14, 1856, NA, RG 77, Ltrs. Sent, Chief Engineer.

69. De Russy to Totten, Nov. 3, 1856, NA, RG 77, Ltrs. Recd., Chief Engineer.

70. De Russy to Totten, Aug. 31, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer.

71. Totten to De Russy, Nov. 24, 1855, NA, RG 77, Ltrs. Sent, Chief Engineer.

trances to all magazines. Because of the extreme dampness, the magazines should have all possible ventilation, which made doors and windows indispensible. Would it not be wise to invert the openings? De Russy inquired. Then, if necessity demanded it in wartime, they could be walled up.

He had adopted the Fort Monroe plan for the foundations of his magazines, and would await a reply to his questions regarding the openings before proceeding with the superstructure of the parade wall in front of the magazines.[72]

General Totten, on studying the drawings, found a defect in details. If the magazine windows opened directly on the parade, there was nothing to prevent a shot, which had passed through an embrasure of the main channel front, from plunging through a window and exploding among the powder barrels.[73] To guide De Russy in the treatment to be accorded the openings, Totten forwarded a plan of the Fort Jefferson magazines.

By the time De Russy received the "sketch of the magazines lately constructed at Fort Jefferson," his brickmasons had raised the masonry of that section of the work to a height of four feet. He was pleased to see that with very few changes, the Fort Jefferson plan could be implemented. Indeed, he wrote Totten on February 4, "the necessity of going on with the brickwork on that front, has induced me to adopt it."[74]

Totten on April 21 approved De Russy's plans for the four gorge magazines.[75]

3. The Ditch on the Land (Gorge) Front

De Russy had observed on Barnard's plan of January 30, 1854, that the ditch on the land front was three feet higher in front of the magazines than it was at the east end of that front. If Barnard's object was to improve drainage, De Russy believed it could be done "more naturally" at the foot of the bank which was constantly sloughing. But

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72. De Russy to Totten, Sept. 19, 1855, NA, RG 77, Ltrs. Recd., Chief Engineer.

73. Totten to De Russy, Nov. 24, 1855, NA, RG 77, Ltrs. Sent, Chief Engineer.

74. De Russy to Totten, Feb. 4, 1856, NA, RG 77, Ltrs. Recd., Chief Engineer.

75. Totten to De Russy, April 21, 1856, NA, RG 77, Ltrs. Sent, Chief Engineer.

if it were to free the scarp wall in front of the magazines of moisture it was an error. Three feet of embankment against the scarp, above the floors of the magazines, would "saturate" the brick masonry of the scarp in front of the subject magazines to a height of perhaps six feet.

He therefore recommended to the Chief Engineer on February 4, 1856, that: (a) the ditch on the land front be left at reference (15'6") to give it a slope toward the bank of 1'6"; (b) a drain be positioned at the foot of the bank, with sufficient inclination toward the west to keep the ditch dry; and (c) the drain to be wide enough to receive debris from the bank. Satisfied that General Totten would agree with him, he had his brickmasons begin construction of the sally port and loop-holes of the 1st Tier.[76]

On April 21 General Totten approved, without comment, De Russy's proposed treatment of the ditch.[77]

4. Glacis & Covered Way

a. De Russy's Proposals

General Totten on April 21, 1856, directed Colonel De Russy to undertake a study to determine the feasibility of providing a glacis and covered-way, "subject to the control of the parapet of the work."[78] Three months later, De Russy, having developed his ideas on the subject, forwarded to the Department drawings of the proposed glacis and covered-way. The drawings also showed "the seawall and slope from its top, the slope on the east side of the neck in rear of the advanced ten-gun battery, the counterscarp slope &c."

The glacis plane in rear of the Ten-Gun Battery, as proposed by the Board of Engineers, was to have "a rise of 1 in 12 and its horizontals were perpendicular to the general direction of the ten-gun battery." Such an arrangement made the crest of the counterscarp higher at one end than at the other, the higher end being at a greater distance from the land front of the principal work. The results would "make the defense of the glacis unequal and unnecessarily weak." This had been done so as not to expose the slope of the glacis to fire of men posted at the loopholes of the 3d Tier.

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76. De Russy to Totten, Feb. 14, 1856, NA, RG 77, Ltrs. Recd., Chief Engineer.

77. Totten to De Russy, April 21, 1856, NA, RG 77, Ltrs. Sent, Chief Engineer.

78. Totten to De Russy, April 21, 1856, NA, RG 77, Ltrs. Sent, Chief Engineer.

To correct the former, De Russy proposed to make the "horizontals parallel to the interior crest of the land front," and to remedy the latter he would make "the plane pass through the loopholes of the third tier." To preserve a sufficient height of the counterscarp, he would give the plane a slope of 1 in 10. The height of the counterscarp would be determined by the "condition that its crest shall be defended by the fire of the barbette guns and musketry."[79]

The area left for the covered-way would now be so small that it could constitute nothing more than "a place-of-arms." Its terreplein would be 6½ feet below the glacis plane and would be connected with the 10-Gun Battery by a ramp.[80]

b. Totten Rejects the Proposals

General Totten vetoed De Russy's plan for construction of a glacis and covered-way, because it exposed "so much of the scarp to distant batteries," and involved the removal of too large a quantity of earth.

Assuming that the surveys made by Lieutenants Whiting and Alexander were correct, Totten requested De Russy to have them extended "to exhibit the surface as it now is, out to low water mark, for a distance of at least 300 yards in each direction from the middle of the scarp of the gorge." It was unnecessary to determine "the horizontals on the very steep slopes, on the sides of the neck . . ., where they were too steep to be easily climbed."

When the new surveys were completed, De Russy was to forward them, giving "the line of the scarp, and . . . the crest line of the parapet." Construction exterior to the fort would be shown, along with the seawall, indicating the proposed locations of the glacis, counterscarp, and covered-way. No construction on these projects would be undertaken until they had been approved by the Department.[81]

De Russy had been relieved as project engineer before work on the new topographical survey was commenced, and the responsibility of wrestling with defenses for the land front would confront him when he returned to Fort Point in the winter of 1861-62.

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79. De Russy to Totten, July 31, 1856, NA, RG 77, Ltrs. Recd., Chief Engineer; "Fort at Fort Point, Plan of the Glacis & Covered-Way, July 31, 1856," NA, RG 77, Dr. 94, Sheet 20.

80. Ibid.

81. Totten to De Russy, Nov. 15, 1856, NA, RG 77, Ltrs. Sent, Chief Engineer.

5. The Spring of the Sea Front Arches

An early decision by the Chief Engineer was required in reference to construction of the arches on the sea fronts. On one plan, the main arches and those of the cross walls sprang from the same height and formed a "system of quoin arches," while on the plan forwarded by the Department for the Tower Bastions, the arches sprang from different heights--"the main arches resting on the cross" arches. If it were left to De Russy, he would recommend the latter type of construction, "believing it to be stronger."[82]

On April 21, 1856, General Totten advised De Russy that the communication arches should be turned, and the imposts of the casemate arches should be "one brick above the key of the former."[83]

Seven months later, in November, the Chief Engineer suggested that the casemate arches be changed to a rise of four feet instead of six feet, which would give an arch of about 110 degrees.[84]

6. Stone Facings for Casemate Arches, Piers, etc.

a. De Russy's Proposal

Colonel De Russy on September 4 and 18, 1856, sent to the Department for inspection and approval detailed drawings of the fort. General Totten's particular attention was called to details of the casemate arches found in Plan No. 20. These were to be faced with stone in courses alternating 16" and 20" in depth. The decision to resort to this form of construction had been dictated by a desire: (a) to reduce the number of brick that would have to be dressed for facing the arches; and (b) the realization that cut brick, exposed to weather, "became very soon defaced."

He also proposed to use stone in all the piers and parade walls of the battery. It would be more expensive, but it would be more durable and substantial.

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82. De Russy to Totten, Feb. 4, 1856, NA, RG 77, Ltrs. Recd., Chief Engineer.

83. Totten to De Russy, April 21, 1856, NA, RG 77, Ltrs. Sent, Chief Engineer.

84. Totten to De Russy, Nov. 26, 1856, NA, RG 77, Ltrs. Sent, Chief Engineer.

On the gorge, the only stone to be used would be for the sills, lintels, and watertable. The scarp wall on the sea fronts would be brick and concrete, protected at the angles by stone quoins.[85]

b. Totten's Veto

Replying to De Russy's letter of September 18, General Totten rejected his proposal to "face the arches with stone voussoirs, alternating from 16" to 20" in depth," and "to use stone in all the piers and interior or parade walls of the battery." Totten believed it would be a mistake to employ stone "in lieu of the cheaper brick."

If they could commit the exterior of the scarp, with its brick facing, to the elements (which experience had taught was possible), the Department had no fears for the less exposed interior surfaces of the same material. De Russy was directed to restrict the use of

> stone closely to the lower tier, with the exceptions that it might be employed for the sills of doors and windows, and the lintels of both, whenever the spaces could not be better spanned with brick arches of a small rise; the coping of the parade walls; the cordon proper; and the quoins in the exterior salient angles.[86]

7. Paving the Casemate Floors

Colonel De Russy wished guidance on paving the floors of the casemates. General Totten, as always, was ready with the desired instructions.

In paving the subject floors, he wrote on April 21, 1856, the

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85. De Russy to Totten, Sept. 4 & 18, 1856, NA, RG 77, Ltrs. Recd., Chief Engineer. The Plans forwarded included: No. 16, The Ground Plan of the Tower Bastion, Service Magazine, and Stair Case; No. 17, The Arrangement of the Magazine, Guardroom, Gateway and Storerooms, with Detailed Sections of First Floor; No. 18, The Second and Third Gorge Tiers as Arranged for Quarters; No. 19, A Section of Plan No. 17 Through I-J and also Through A-B; No. 20, The Elevations and Sections on G, H, I, & J of Plan No. 16; and No. 21, The Sections on A, B, C, D, E, & F of Plan No. 16.

86. Totten to De Russy, Nov. 26, 1856, NA, RG 77, Ltrs. Sent, Chief Engineer.

flagging, on which the "gun circles" were to be laid, was to be six inches thick, while the others could be thinner. If flagging were expensive, the floors could be paved with hard brick, except a strip 2 feet wide next the parade, which should be six inches thick. The portion of the flooring behind the rear traverse stones would be laid in "two warped surfaces, regulated by a horizontal line at the piers, and a line falling about 1 inch in descending along the middle of the floor, from the traverse stone to the rear of the casemate." This was to prevent rain from accumulating on the floors.[87]

8. The Quarters & Barracks

The Chief Engineer in April 1856 urged De Russy in his planning to devote particular attention to the gorge, "where all the accommodations for the garrison, including store rooms, is to be." Among details to be considered were

> the kitchens with their fireplaces, sinks, pipes for discharging foul water, pumps for drawing cistern water, closets, coal holes, &c.; mess rooms and sleeping quarters for soldiers, noncommissioned officers, and officers, each with fireplaces, sinks for washing, closets, &c.; flights of stairs, partitions, &c.[88]

During the next four months, Colonel De Russy and his staff prepared detailed plans of the 2d and 3d Tiers of the gorge, which he forwarded to the Department on September 4. He proposed to place the officers' quarters on the 2d Tier and the enlisted men's on the 3d Tier. The principal partitions were to be of brick, while the subdivisions of the bedrooms were to be of laths and plaster.

By making the bunks large enough for two men, and two tiers high, there would be space for 12 bunks, to accommodate 24 men, in each room.[89]

9. Stairways

By mid-November 1856, Colonel De Russy had procured from the Folsom quarry all the granite required for the 1st Tier of the

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87. Totten to De Russy, April 21, 1856, NA, RG 77, Ltrs. Sent, Chief Engineer.

88. Totten to De Russy, April 21, 1856, NA, RG 77, Ltrs. Sent, Chief Engineer.

89. De Russy to Totten, Sept. 4, 1856, NA, RG 77, Ltrs. Recd., Chief Engineer.

three stairways. Because of several factors (the extra cost, difficulty in shaping the stone, and transportation), he now requested authority to substitute for the stone steps of the 2d and 3d Tiers, cast iron steps. The ironwork could be cast in San Francisco at less cost, and by adding "a wrought stay (2½" x 1") under each tread," it would give added strength and security to the stairways.[90]

On December 17, 1856, Totten approved the change order, and to assist De Russy in designing his stairs, forwarded "a tracing of a simple and good stair of the sort erected at one of the great English naval establishments." If he were in charge, Totten would carry the "face of the risers to the axis of the column," rather than making it tangent thereto, as shown in De Russy's drawing. The top of the tread should be "closely and deeply (not widely grooved)," and the top of the lip slightly elevated.[91]

Subsequently, it was decided, on further study, to construct the steps of the 2d and 3d Tiers of granite rather than iron.

10. Roof Surfaces

General Totten in April 1856 called De Russy's attention to the fact that after "each of the tiers under the main arch had been arranged," there would be the surfaces of the roofs to consider, and the position of the pipes for drainage. When the time for applying the mastic was at hand, De Russy was to notify the Engineer Agency in New York to secure the raw materials and an "applicateur."[92]

I. Storms and the Proposed Seawall

1. The Storm of January 1856

Wild winds and heavy seas during certain years slowed construction, as workmen were diverted to salvaging materials and repairing damage. The New Year of 1856 brought gales to the California coast. For a fortnight mountainous waves crashed against the exposed beaches on either side of Fort Point. Colonel De Russy was compelled to divert his labor force to protecting public property. First to go into the

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90. De Russy to Totten, Nov. 18, 1856; Sketch of Cast Iron Stairs, Nov. 18, 1856, NA, RG 77, Ltrs. Recd., Chief Engineer.

91. Totten to De Russy, Dec. 17, 1856, NA, RG 77, Ltrs. Sent, Chief Engineer.

92. Totten to De Russy, April 21, 1856, NA, RG 77, Ltrs. Sent, Chief Engineer.

boiling sea was a section of the plank road leading to the wharf. More serious was the erosion of the beach in front of the West Bastion. Here the sea at flood tide lashed the foot of the scarp wall. By January 16 the sea was threatening the embankment in front of the East Bastion, only boulders now shielded that foundation. Fears were voiced that the lime houses, carpenter's shop, blacksmith shop, and mortar mill, on the cove south of the construction site, might be swept away by the encroaching seas.

Just as the situation was looking bleakest, the winds on the 20th began to abate and the sea decreased in fury. Crews were turned to reopening the road to traffic. (It also served as a barrier to protect the endangered structures.) Plans were made to build a jetty, with piling left over from construction of the wharf, and to establish an apron of heavy stones to protect the site.[93]

2. Construction of the Dry Stone Apron

During the next six weeks laborers built a dry stone apron to protect the buildings on the cove, using large boulders. Some of these were secured by blasting rock of sufficient hardness loose from the bluff overhanging the road, while 45 tons of large blocks of condemned Monterey granite were purchased by De Russy for five dollars a ton. It was hoped that these boulders and blocks would suffice to protect the roadway and site until such time as a comprehensive plan for construction of an extensive seawall could be formulated and funded.[94]

3. Advanced Seawall Planning

In planning for the seawall, the project engineer had to consider its relation to the fort. By the end of July 1856, De Russy's planning had reached the point where he could report, the position of the projected seawall, on the ocean side of the Golden Gate, is such that every foot can be swept by fire from the West Bastion. The slope connecting its "top with the foot of the exterior slope of the ten-gun battery" was steep enough to be difficult of access. The height of the seawall would be 15½ feet above low water, an elevation sufficient to afford protection against the ocean. The point where the seawall joined the counterscarp gallery would be of the same height. This would avoid having "a dead space behind

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93. De Russy to Totten, Jan. 16, 1856, NA, RG 77, Ltrs. Recd., Chief Engineer.

94. De Russy to Totten, March 10, 1856; "Fort at Fort Point, Plan of Glacis & Covered Way, July 31, 1856," NA, RG 77, Ltrs. Recd., Chief Engineer.

the gallery and to provide the gallery wall with a shot-proof covering of earth." To avoid masking the fire of the West Bastion, the earth covering on part of the counterscarp gallery would not exceed six feet.[95]

General Totten in November instructed De Russy to hold in abeyance planning for the seawall until a new topographical survey of the area had been made and the fort had been completed. Measures to protect the site from encroachments by the sea must continue to be emergency in character.[96]

J. The Fort Point Lighthouse Becomes Operational

By mid-March 1855 carpenters had completed the tower, and the lantern and lighting apparatus of the Fort Point Light had been installed, and the light tested. The keeper told a correspondent for the Alta California that the light would become operational on the 21st.[97]

The following month, a visitor to Fort Point was invited to visit the light, as well as the keepers' quarters. He found that the lantern was displayed from a 52-foot tower. The illuminating apparatus was a 5th order Fresnel Lens, an invention of the Parisian astronomer. The lantern was about two feet by two feet, and reminded the visitor of "a glass barrel, the staves of which, instead of standing perpendicular, ran tolerably round the circumfrance. The lens framing the center of this barrel is of the most beautiful and clear glass with strong magnifying powers." Above and below the lens were hoops.[98] The 1,100-pound fog bell was operated by machinery which struck every ten seconds, five taps, followed by a 34-second intermission.[99]

The Fort Point Light was visible 12 miles, and it was hailed "as an important addition to the mercantile interests of California," although complaints were heard that its fifth order lens was the "smallest on the coast." Two men were assigned to the light.

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95. De Russy to Totten, July 31, 1856, NA, RG 77, Ltrs. Recd., Chief Engineer.

96. Totten to De Russy, Nov. 15, 1856, NA, RG 77, Ltrs. Recd., Chief Engineer.

97. Daily Alta California, March 14, 1855.

98. Ibid., April 16, 1855.

99. Sacramento Daily Union, June 15, 1859.

K. The F.Y. 1857 Construction Program

1. Congress Appropriates $350,000 for F.Y. 1857

Colonel De Russy on September 1, 1855, estimated that to expedite the construction program at the site required an appropriation of $350,000 in Fiscal Year 1857. This sum was requested by the Department.

The 3d Session of the 34th Congress proved receptive, and on August 20, 1856, De Russy was notified that Congress had appropriated $350,000 for fortifications at Fort Point for the fiscal year ending June 30, 1857. De Russy was to submit a budget, "specifying the parts of the work respectively to which he proposed applying the appropriation." He was to give "the rate of expenditure per month, after setting aside a sum sufficient to maintain a proper watch over the public property from the close of operations until June 30, 1858."[100]

2. The Program

Preparing an operating program, De Russy proposed to expend the new appropriation, plus the $25,971.53 on hand from the former appropriation, to: (a) continue the construction of the embrasures and scarp wall, to include the 2d Tier and the arches over the gun casemates of that tier; (b) construct the 2d Tier quarters on the gorge front with their respective arches; (c) construct the three stair cases and the service magazines on the 2d Tier; (d) set the traverse circles and pave with flagging the floors of the 1st and 2d Tier Casemates; and (e) construct the iron galleries and balustrades in front of the quarters on the 2d and 3d Tiers.[101]

On reviewing De Russy's program, Chief Engineer Totten directed him to drop from his work program for the current fiscal year: (a) construction of the 2d Tier of quarters on the gorge with respect to the arches; and (b) the iron galleries and balustrades in front of the quarters on the 2d and 3d Tiers.[102]

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100. Wright to De Russy, Aug. 20, 1856, NA, RG 77, Ltrs. Sent, Chief Engineer. Capt. Horatio G. Wright was on duty in the office of the Chief Engineer.

101. De Russy to Totten, Oct. 8, 1856, NA, RG 77, Ltrs. Recd., Chief Engineer.

102. Totten to De Russy, Nov. 27, 1856, NA, RG 77, Ltrs. Sent, Chief Engineer.

The decision by the Department to postpone the latter project, De Russy complained, "gives rise to considerable embarrassment and probably some expense," because the gallery and balustrade for the 2d Tier had been ordered and many parts cast.[103]

L. De Russy's Final Months as Project Engineer

1. De Russy Becomes Seriously Ill

Colonel De Russy would not oversee completion of the program he had formulated. In October 1856 he was stricken with a severe cough. His condition worsened, and he began to first spit blood and then hemorrhage. By the end of the year, Dr. Robert Murray having voiced fears for his life, De Russy forwarded a communication to General Totten, requesting that he be transferred to an area with a more agreeable climate. He hoped the Department would authorize him to leave San Francisco by the steamer of March 20, or sooner if possible.

Enclosed with his application was a certificate signed by Dr. Murray, stating that he had examined De Russy and found his life endangered by a serious disease of the lungs. To support De Russy's plea for a new assignment, the surgeon pointed out that "the cold damp winds and fogs of this portion of the Pacific coast, and the great exposure consequent upon the nature of his duties at Fort Point are so seriously affecting him that he should at once be transferred to a moderate climate."[104]

2. Totten Agrees to De Russy's Reassignment

De Russy's letter reached Washington in the first week of February 1857, and General Totten determined on his recall and reassignment as project engineer at Fort Delaware. Upon receipt of his orders, De Russy was to turn over to Major Tower "the charge of the fort at Fort Point . . ., with all funds and property belonging thereto, and any funds in your charge pertaining to operations on the Pacific Coast under this Department."[105]

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103. De Russy to Totten, Jan. 3, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer.

104. De Russy to Totten, Jan. 4, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer.

105. Totten to De Russy, Feb. 4, 1857, NA, RG 77, Ltrs. Sent, Chief Engineer.

The next day Totten issued orders for Major Tower to relieve De Russy. He was to "continue the operations at Fort Point under the instructions heretofore given and such as you may hereafter receive" from the Chief Engineer. Tower was to turn over the position of project superintendent at Alcatraz to Lt. Frederick Prime.[106]

3. De Russy Leaves the West Coast

Because of the communications lag, four weeks passed before Colonel De Russy learned that the Department had acceded to his plea. Writing General Totten on February 18, he had reported that during the last two months he had been confined to his quarters by sickness, and Lieutenant Alexander was overseeing construction.[107]

Totten's orders directing him to transfer superintendency of the Fort Point project to Major Tower were received by De Russy on March 5. Acknowledging them, De Russy wrote, "Your kind & prompt attention to my request is gratefully appreciated and if no change in the present condition of my health takes place . . ., I will leave" San Francisco by steamer on the 20th.

As the weather in New York City, on his arrival, was likely to be "damp and changeable," De Russy requested permission to take "advantage of the first steamer for Norfolk, where the climate at that season of the year is milder and more settled."[108]

Once again, General Totten was agreeable. When De Russy reached New York City on April 13, he found orders awaiting him to proceed to Washington, D. C., by way of Norfolk. His "health had greatly benefitted from the sea voyage," and De Russy boarded the Norfolk steamer on the 14th.[109]

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106. Totten to Tower, Feb. 5, 1857, NA, RG 77, Ltrs. Sent, Chief Engineer.

107. De Russy to Totten, Feb. 18, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer.

108. De Russy to Totten, March 5, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer.

109. De Russy to Totten, April 13, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer.

V. MAJOR TOWER AS PROJECT ENGINEER, 1857-58

A. Military Construction--Fiscal Year 1857

1. Major Tower take Charge

Maj. Zealous B. Tower, at 38, was much younger than the three previous superintending engineers. He also enjoyed several advantages. Arrangements had been perfected for receiving materials; a large work force had been recruited and trained; construction had progressed to the point where there would be few opportunities for delays, while waiting for the Department to act on proposed change orders; Congress was favorably disposed toward the project; and Major Tower, having been project engineer at Alcatraz since 1853, was familiar with the area, its people, and problems.

In accordance with General Totten's orders of February 5, 1857, Major Tower on March 18 turned over his Alcatraz Island project to Lieutenant Prime and assumed charge of operations at Fort Point. On discussing the situation with Lieutenant Alexander, who had been an assistant project engineer since July 1853, he was disturbed to learn that until the Chief Engineer approved plans for the counterscarp defenses and the gorge quarters, progress would be slowed. The latter, as they were an intregal part of the casemated fort, required prompt action. In addition, "the want of irons for embrasures," which were the responsibility of the Department, was proving embarrassing.[1]

2. The Arrival of Lieutenant Elliot

Major Tower was delighted in late March to gain the services of a second assistant. Lt. George H. Elliot, an officer destined to be intimately associated with Fort Point for years, reported for duty on April 1. For the first time since the departure of Lieutenant Whiting more than a year before, there would be two assistant engineers assigned to the project.[2]

Lieutenant Elliot, a native of Massachusetts, had graduated from the U.S. Military Academy on July 1, 1855. Commissioned a 2d lieutenant, he was assigned to the 1st U.S. Artillery, joining his

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1. Tower to Totten, March 19, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer.

2. Tower to Totten, April 4, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer.

regiment in Texas in September. He remained there until August 1856, when he was ordered to Fort McHenry. His stay there was brief, as he was transferred to the Corps of Engineers and ordered to California in January.[3]

3. Work Force and Projects--March 1857

At the time Major Tower took charge, there were 132 men on the public payroll, not counting him and Lieutenant Alexander. Included were: 1 clerk, 1 overseer, 2 surveyors, 1 suboverseer, 1 orderly, 4 carpenters, 2 blacksmiths, 1 master mason, 1 foreman (stone cutter), 16 stone cutters, 1 stonemason, 18 brickmasons, 54 laborers, 5 boatmen, 2 blacksmith strikers, 14 teamsters, 1 stone cutter driller, 1 master brickmaker, 2 kiln builders, and 3 moulders. Except for certain supervisory personnel, all men were boarded by the government.

The masons (brick and stone) were building the scarp wall, turning the arches of the 1st Tier, setting embrasure irons and plates, and building the staircases; the stone cutters were cutting stone for arches, piers, steps, and quoins; the carpenters making and fitting centres, and repairing the wharf and machinery; the blacksmiths repairing the wharf, making and repairing the stone cutters' tools, and shoeing horses and oxen; the brickmakers preparing clay, dressing yard, building kilns, and moulding bricks; and the laborers assisting the mechanics, making and ramming concrete, assisting surveyors, repairing the wharf, and receiving materials.[4]

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3. George H. Elliot, NA, RG 94, ACP File.

4. Report of Operations for March 1857, NA, RG 77, Ltrs. Recd., Chief Engineer. The 98 men boarded by John Richardson in March were: R. B. Boyd, Robt. Cockrane, Thomas Morison, Henry Feed, George W. Oden, J. W. Pollard, P. J. Richers, Patrick Haley, John Rankin, Thomas Cassedy, Michael Lonigan, S. A. Wood, Daniel Sweeny, Alexander Robertson, Michael Brady, John Germatz, James Fitzgerald, Daniel Lynch, C. Hays, James Landrey, John Linus, James Clarke, Ashley Garland, James Howard, Patrick Mulloney, Michael Heverin, Samuel Dorsey, John R. Dennis, Owens Byrne, Henry Connley, John Kelly, John Breslin, Peter Brennan, D. Deblois, Michael Holland, Joseph Carpeaux, Henry A. Fager, W. C. Harbison, Thomas Carey, James McDonald, William Loony, John Gately, Patrick Desmond, Patrick Mulrey, Joseph Bannon, William White, Daniel Cronin, John McAlister, Edward Brown, John G. Seibert, Edmond Carpeaux, S. Getzendaner, Peter Carey, Thomas McMahon, Jesse Hart, John Hughes, Wm. H. Wooden, Wm. McGlency, Jacob Rudolph, John Boozane, John Murphy, John Winlers, Henry Hammond, Michael H. Hession, Miles Swift, Nicholas Hanly, Daniel Dalton, Con Sullivan, Patrick Delehenty, Timothy Collins, Richard Sullivan,

4. Progress in April and May

By the end of May considerable progress had been recorded. The brickmasons were raising the scarp wall above the 2d Tier, setting embrasure irons on the west face, and turning arches; the stone masons setting stone around the stairways, the granite steps, and the stone facings of the arches, and laying sole stones and embrasure lintels, and quoins; the stone cutters were dressing stones; the carpenters keeping carts, wagons, and machinery in repair, building centres for arches, and scaffolding for the scarp; the blacksmiths fitting embrasure plates; the brickmakers moulding and firing bricks; and the laborers assisting the masons and excavating for the counterscarp gallery.[5]

5. Work Accomplished on the Fort, October 1, 1856-June 30, 1857

The Department during the year changed its procedures to make its operating year and the fiscal year coincide. Accordingly the annual report and drawing filed by Major Tower would cover the period October 1, 1856, to June 30, 1857. In these nine months, the scarp wall on all sea fronts had been "raised to about the sills" of the 2d Tier embrasures. The piers of the 1st Tier had been raised to their full height; the communication arches between the casemates of this tier, and the arches supporting the floor of the 2d Tier turned, and the spaces between the arches filled with concrete; the three stair towers had been raised about ten feet above the parade, and the steps set to that height; the excavations for the counterscarp gallery, defences, and for the seawall at the west end of the same completed; and the excavation at the south end of the Ten-Gun Battery (exterior to the main work) finished, the arch of its magazine covered with asphalt, and the slopes formed and sodded.

John Carter, Anthony Sylvia, Philip Rossom, Patrick Dalton, Patrick Laigh, John Howard, Bartholomey Wren, Thomas O'Brian, Edmond Sullivan, Michael Hem, John Hamill, Patrick Kelly, Thomas Ryan, James Dempsey, Patrick Roach, Con Connolley, M. Kelly, James Haley, James Driscoll, Michael O'Mara, Thomas D. Troy, J. Lynch, Richard Cox, Dennis Carey, Edward Gillright, William O'Breil, and B. Eden. Statement of Days' Board to Accompany Voucher No. 16, March 31, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer.

5. Report of Operations at Fort Point for May 1857, NA, RG 77, Ltrs. Recd., Chief Engineer.

During the year the wharf had been repaired, as its piles had been weakened by teredoes.[6]

B. Military Construction--Fiscal Year 1858

1. The Funding of the Project

a. The Appropriation for F.Y. 1858

On March 10, 1857, Chief Engineer Totten notified Major Tower that the recent session of the 34th Congress had appropriated for the fiscal year ending June 30, 1858, $350,000 for construction at Fort Point. He would prepare and submit for approval by the Department an operating budget, specifying projects on which the money was to be spent, and giving the rate of expenditure per month.[7]

b. Tower's Program

The failure of the Department and the superintending engineer to agree on details of the counterscarp defenses and gorge quarters, along with delayed deliveries of the embrasure irons, had slowed progress in Fiscal Year 1857. Major Tower accordingly advised General Totten on May 4 that from "May 1, 1857, to July 1, 1858, there will be available of the new appropriation and the balance of the former appropriation $600,000." With this sum, he proposed "to build the work to its full height." He vouched that "it will not be possible to expend the total sum within the time specified, 14 months," because of difficulty in obtaining materials. Nevertheless, he promised to do all possible to expedite the work.[8] Totten approved Tower's program without comment.

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6. Executive Documents, Printed by Order of the House of Representatives, During the 1st Session of the 35th Congress, 1857-58 (Washington, 1858), Serial 943, vol. 2, pt. 2, p. 187; Tower to Totten, Sept. 15, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer. The heads of the arches of the gun casemates on the parade front, as well as the spandrel courses, were dressed granite. During the period embraced in this report, the following work had been done: brick 46,795 cubic feet, concrete 34,568 cubic feet, dressed stone 3,392 cubic feet, superficial feet of stone cut 18,894, rock excavated 33,838 cubic feet, and 23,346 cubic feet of earth removed.

7. Totten to Tower, March 10, 1857, NA, RG 77, Ltrs. Sent, Chief Engineer.

8. Tower to Totten, May 4, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer.

2. Rapid Progress Entitles Major Tower to "Great Credit"

a. Major Tower Increases the Labor Force

By the end of August 1857, Major Tower had increased his payroll from 132 to 324, and the sum disbursed per month for wages to $25,711.40, as work was accelerated. During the month, his two stonemasons had been setting quoins, sole stones, and door lintels, besides working on the seawall at west end of the counterscarp gallery; 17 stone cutters were dressing granite for the seawall, quoins, sole stones, sills, lintels, and steps for the circular stairs; 67 brickmasons were raising the scarp wall and arches of the main work and counterscarp gallery; 13 carpenters were building centres for the counterscarp gallery and for the main work, and scaffolding; six blacksmiths were shoeing animals, sharpening tools, and fitting embrasure irons; the 105 men employed in the brickyard (moulders, firemen, teamsters, temperers, and laborers) were manufacturing pressed and common brick; and 97 laborers were assisting the artisans, making concrete and mortar, and receiving and removing materials.

Keeping 23 animals shod, sharpening tools for 17 stone cutters, and repairing carts, wheelbarrows and derricks, and positioning embrasure irons had called for long hours on the part of the blacksmiths and their helpers. To provide more space and facilities, a 15-foot addition was built onto the blacksmith shop and another forge constructed.[9]

b. A Correspondent's October 1857 Visit to the Site

A reporter for the Alta California visited the construction site in mid-October. At the corner of Washington and Pacific streets, he boarded one of Bowman & Gardner's four-horse omnibuses. A 40-minute ride through Spring Valley, past the toll-gate, along the marge of Washerwoman Bay, and by a number of ranches, brought the conveyance to the end of its route at Presidio House. Disembarking, the reporter continued on foot, passing to the north of the Presidio. Only a few of the old adobe structures were occupied by the army. Nearby were the new wooden buildings. To the south, the traveler caught a glimpse of the "famed Mountain Lake Water Co.," and a road leading over the hills to Lone Mountain Cemetery.

A 20-minute walk along a "fair road" built by the military brought the reporter to the wharf. Tied-up to it was a vessel

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9. Tower to Totten, Aug. 18, 1857; Report of Operations at Fort Point for August & September 1857, NA, RG 77, Ltrs. Recd., Chief Engineer.

discharging timber. To his left was a row of "20 unmounted" 42-pounders and a large pile of shot, while to the right were blocks of Folsom granite, waiting to be dressed. This stone had been supplied to the government by the California Granite Co. A stone cutter told the correspondent that the granite possessed "remarkably fine properities." It was composed of mica, quartz, and feldspar, and was superior "to any granite quarried in the state." Nearby were specimens from other quarries, and to even a casual observer the superiority of the Folsom stone was apparent.[10]

Walking up the plank road toward the fort, the reporter passed storehouses, the mortar mill, smithy, and shops. By passing the stone cutters, he reached the east bastion. Not having visited the site since the wreck of Chateau Palmer, on May 1,1856, he was surprised to see the progress made by Major Tower and his workmen. The walls of the 2d Tier were "fast riding the arch, whilst the counterscarp battery on the southwest is rapidly advancing toward connecting with the 10-gun battery on the hights above."

He walked to the north of the work, viewing the lighthouse and fog bell, and entered the fort through the sally port. On entering the quadrangle, "solid masonry of more than ordinary artistic skill meets the eye at every point, and the visitor is at a loss to determine what he admires most--the granite or brickwork." Arches were seen springing from "granite walls and . . . faced with the same stone in a manner calculated to reflect the greatest credit on the skill of those who fashioned it." To the east and northwest were granite towers, enclosing circular stairs of granite, providing access to the 2d Tier. Here the masons were laboring, and one could get "an insight into the great labor attendant upon the completion of such a work." Everything was conducted on a "strictly scientific plan--each brick laid with care and skill one is not prepared to concede to the art of masonry, after viewing the haste with which dwellings and storehouses are hurried to completion in the city."

Each arch, he wrote, was a study, and each wall "as much an object of art as a statue. Science has invested each of the works with interest; and as a monument of mechanical skill the fort is destined to be the cynosure of all who take pride in the dignity of labor and the advance of art. We cannot do justice to the subject in an ephemeral article." To accord it its full measure, required a familiarity with "engineering and other terms we are ignorant of." When completed, "we venture to predict it will be the admiration and pride of the Pacific."[11]

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10. Daily Alta California, Oct. 10, 1857.

11. Ibid.

The scarp walls, the reporter wrote, were being built of pressed brick kilned in the brickyards, managed by C. D. Nagle for the government, on the hills to the south. Each brick was impressed with Nagle's name, and he had reason to be proud of his handiwork.

To his readers, who delighted in the mechanical arts, the correspondent recommended a tour of the site. For himself he could find but one term to describe it, "Mosaic."[12]

c. Major Tower Weathers a Financial Crisis

A failure of the Department to forward on time the $20,000 requisitioned to meet his December payroll embarrassed Major Tower. Funds were so short that he did not have money to pay the men discharged on the 31st. Relaying this news to Chief Engineer Totten, on January 19, 1858, he warned that unless money arrived soon, it "may be necessary to stop work as the debts at the end of Jan. will probably exceed $60,000."[13] The mail steamer arrived before the end of the month, and with it a draft for $20,000, which enabled Tower to withstand the financial crisis.[14]

The winter of 1857-58 found the brickmasons raising the 3d Tier of the gorge, and finishing the arches adjoining the stairways; the stonemasons setting quoins, sole stones, tongue holes, stairs and lintels; the stone cutters dressing quoin stones, steps for the circular stairs, platforms for the same, sole stones, and tongue holes; the carpenters getting out centres for the arches of the 3d Tier, putting up staging, and repairing carts and machinery; the blacksmiths getting out irons for the 3d Tier embrasures; the laborers assisting the artisans; and the brickmakers burning their remaining kilns.[15]

d. The Brickyard Shuts Down

By the spring of 1858 the brickyard, sufficient brick having been burned, was closed down, and in April and May Major Tower employed

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12. Ibid.

13. Tower to Totten, Jan. 19, 1858, NA, RG 77, Ltrs. Recd., Chief Engineer.

14. Tower to Totten, Feb. 18, 1858, NA, RG 77, Ltrs. Recd., Chief Engineer.

15. Report of Operations at Fort Point for Dec. 1857 & Jan. 1858, NA, RG 77, Ltrs. Recd., Chief Engineer.

his force as follows: 53 brickmasons continued to raise the scarp and parade walls, the arches on the 3d Tier, and the stairways; two stonemasons were setting quoins, cordon, steps, and stone for support of the colonnade; 19 stone cutters were dressing the granite being set by the masons, along with coping and traverse circle stones; five carpenters were making and erecting centres for the arches of the 3d Tier; six smiths were "getting out iron stairs for the gorge quarters," setting up colonnade, sharpening tools, and shoeing animals; 104 laborers were assisting the mechanics, making mortar, ramming concrete, breaking stone and brick for aggregate, and receiving materials.[16]

e. A Second Correspondent Visits Fort Point

Another correspondent for the Alta California was at the fort in mid-June. He was also impressed with what he saw, and informed his readers that the work under construction was a first-class casemated fort, with two tower bastions. On the 1st Tier would be emplaced guns of "large caliber for throwing hot shot and shell." The fort, he continued, was designed for 120 guns, most of which will be "42-pounders," and it will command the Golden Gate "so effectively that 50 guns could be brought to bear on an object the size of a hogshead."

To subsist the garrison, he reported, there were five great cisterns under the gorge, capable of holding at least 200,000 gallons of water. The foundation walls, of Chinese granite and concrete, were 10 feet thick, while the scarp walls of brick and concrete, with quoins of Folsom granite, rose 55 feet above the foundations. The embrasures for the cannon were of wrought iron and lead, and built so substantially that an 8-inch projectile could not damage them.

The three circular stairways, giving access from the parade to the barbette tier, were master pieces of workmanship. The blocks were of Folsom granite, and "fitted into each other with mathematical percision." The stone arches of the 1st Tier casemates were of the same material, and according to the correspondent, "as a speciman of ingenious masonry, . . . are equal if not superior to any similar works erected on the Atlantic seaboard," while the brickwork, "for strength and beauty, will far surpass anything heretofore seen on the Pacific coast."[17]

Major Tower told the correspondent that the fort could, in event of war, be placed "in a state of defense in three months." But,

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16. Report of Operations at Fort Point for April, May & June, 1858, NA, RG 77, Ltrs. Recd., Chief Engineer.

17. Alta California, June 21, 1858.

barring such an emergency, two or three years would pass before it was armed and garrisoned.

The labor force numbered about 200, with the mechanics receiving an average wage of $5 a day and the laborers $2.60. One-third of the employees roomed in San Francisco, and for their convenience Bowman & Gardner had added three omnibuses to their Fort Point run. These left the plaza at 5 a.m. and the fort at 6 p.m., daily.

"The Federal government," the correspondent extolled:

> may well be proud of this monument to its sagacity, foresight, prudence and liberality. Our citizens my rest assured that the fortifications at the entrance of the Golden Gate and the city of San Francisco in the event of an assault by a foreign foe, will contribute in no slight degree towards defending the homes and property of her citizens.[18]

f. Tower's Annual Report for F.Y. 1858

Major Tower was reassigned to duty on the Atlantic Coast in the summer of 1858. Before turning over responsibility for Fort Point to his successor, he prepared his annual report of operations for Fiscal Year 1858. During the year the scarp of the principal work had been "generally" raised two tiers, with exception of turning the 3d Tier of gorge arches. The scarp throughout its entire length had been raised up to an average of 27 feet, including construction of 60 embrasures. Piers of the 2d Tier had been carried up 10½ feet; upon them had been turned the arches and communication arches, and the sprandrels filled with concrete. Iron pipes, both horizontal and vertical, for conducting rainwater from the roof surfaces of the upper tier of arches to the cisterns below, had been built in the masonry.

Piers of the 3d Tier, excepting those next to the parade gorge, had been carried up--those of the water fronts 6½ feet and those of the gorge 7½ feet. The arches and communication arches of the water fronts had been turned, and upon the arches had been built the parade retaining wall of the terreplein to the proper height to receive its coping. Masonry of the four service magazines for the 2d and 3d Tiers had been completed; and the three stairway towers carried up, including the setting of "the stone steps--one of them 22 feet, another 32½ feet, and the third 24 feet." The ironwork of the gallery in front of the officers' quarters, including the stone bases, colonnade, girders, and entablature, had been positioned.

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18. Ibid.

The masonry of the counterscarp gallery, including construction of five howitzer embrasures, had been "commenced, and finished to receive the covering of asphaltic mastic, except the pavement, pointing of arches, and coping."[19]

In addition to the annual drawing, exhibiting conditions at the fort on June 30, 1858, Tower forwarded an estimate of the cost of work required to complete the project (See Appendix B).

C. Construction Details and Change Orders

1. The Plans for the Gorge Quarters are Approved

a. General Totten Orders a Number of Modifications

The report submitted by Major Tower on March 19, 1857, that a failure of the Chief Engineer to approve plans for the "gorge quarters" retarded progress had immediate repercussions. General Totten responded on May 28. Referring to the "Drawings, Profiles, and Elevations for the 2d and 3d Tiers of Gorge Casemates," forwarded by Colonel De Russy on September 4, 1856, Totten noted that, although approving them in principle, certain modifications were required: (a) The parade wall had been reduced to a thickness of 1'6". (b) The openings through the piers from casemate to casemate had been enlarged, providing additional space. (c) The loop-hole windows had been "much enlarged and modified." To assist Major Tower in making the necessary adjustments, he was transmitting a plan of the subject windows at Fort Delaware. These windows would provide during years of peace, "good ventilation and light, and allow of being speedily built up" in case of war.

(d) The galleries had been widened, and on each tier would consist of a gallery, supported by cast iron columns, resting on stone bases. (e) Details of the roof would be left to Major Tower, but it should be of "iron in frame, and covered with galvanized iron, and as light as it can be made to keep its place in the wind, having no weight but its own to carry."

(f) The arches from girder to girder were to be built "with the thickness of one brick, till the extrados reaches the bottom of the

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19. Tower to Thayer, Sept. 30, 1858, NA, RG 77, Ltrs. Recd., Chief Engineer; Executive Documents, Printed by Order of the House of Representatives, during the 2d Session of the 35th Congress, 1858-59 (Washington, 1859), Serial 999, vol. 2, pt. 3, pp. 829-30. The brick masonry was faced with pressed brick, and the stone cutting was of the "most expensive kind."

3-inch pavement; and thence of half a brick thickness; and be built in a careful manner," of the hardest brick and best cement mortar. Upon the arches, and between them, the best cement concrete would be rammed up to the bottom of the pavement, which would be formed of the best brick, laid flatwise in mortar, and in rectangular spaces. After the pavement had been finished, pure bitumen would be "poured nearly to fullness, and covered with hot sand." The iron girders of the galleries were to enter the parade wall far enough to have a sound bearing, and be strongly anchored therein.

(g) The ½-inch cast iron entablature, forming the parade facing of the scarp, was to be secured to the socket immediately under the column by several wrought iron ears, rivetted at each end on the inside. If these entablatures had to be cast in two pieces, Major Tower was to devise "some thing pretty to cover the midway joint." The lower pavement could be of brick laid in sand.

(h) Bunks would not be built. (i) What was shown as the "washing room" on the 3d Tier of the De Russy drawing would be "appropriated as quarters." The "washing places" were to be located in "several rooms in the recesses marked x." (j) On the 2d Tier convenient places would be found for the "wash-hand sinks in the recesses of the windows." These would be better than in the corners of rooms, already too small. (k) In the thin partitions of the 2d Tier casemates, doorways were to be made as "convenience may seem to demand."

(l) In those fireplaces on the piers next the scarp, the flues were to lead up through the parapet; for those in the middle piers, the escape could be into the breast-height wall.

(m) The cast iron brackets secured by Colonel De Russy were to be employed "in supplying a gallery and garde-fou immediately behind the terreplein, and one step below it, thereby giving a well covered augmentation of terreplein space."

(n) In no case were the casemate piers to be bonded into the scarp wall. There would be a joint between, so that the greater motion of the one would not disturb the other.

(o) Major Tower was to "pay particular attention" to the problem of introducing drinking water into the quarters from the bombproof cisterns. Lead pipes could not be used.

(p) Floors of the 2d Tier officers' quarters were to be of plank, like those above, resting on concrete leveled up to receive the battens. In all circumstances provision must be made for free circulation of air between the floor battens and behind the furrings and casings of rooms.

(q) Window lights were to be smaller than shown on Colonel De Russy's drawings, and must not be larger than 12 x 14".

(r) An additional stairway at the eastern end of the colonnade was required for accommodation of troops garrisoned in the gorge casemates. There should be an open flight for each tier, and it be formed of cast iron treds and risers, supported by wrought iron carriages. A "clear width" of four feet would suffice. To support the narrow portion of the gallery, between the stairway and parade wall, "a long cast iron girder should be carried from the casemate floor arch to the gallery girder."

(s) The space marked "servants' room" could be subdivided with advantage.[20]

b. Tower Suggests a Change

When he studied the letter and drawings forwarded by General Totten, detailing the required changes, Major Tower found an error. He questioned the decision to place a column in front of the exit from the sally port onto the parade. He accordingly proposed to relocate the colonnade.[21]

General Totten on July 28 authorized doubling the columns flanking the sally port, and widening of the intercolumniation next to carry the couplings of these columns up through the three tiers.[22]

Plans for the gorge quarters finally approved, Major Tower saw that work on this section of the fort was expedited.

2. Construction of Certain Counterscarp Defenses are Deferred

a. General Totten Orders the Subject Work Deferred

Major Tower, on assuming duties as superintending engineer,

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20. Totten to Tower, May 28, 1857, NA, RG 77, Ltrs. Sent, Chief Engineer.

21. Tower to Totten, July 2, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer. With his letter of May 28, General Totten had transmitted plans of the "Details of Ironwork of Colonade [sic] and Scarp windows," and "Plans, Profiles and Elevations of 2d & 3d Floors of Gorge Casemates."

22. Totten to Tower, July 28, 1857, NA, RG 77, Ltrs. Sent, Chief Engineer.

learned that the Department was holding in abeyance development and approval of plans for the glacis and covered-way until a new topographical survey of the promontory had been completed and studied. The subject survey was completed by two contract surveyors in April 1857.

Reviewing the map, before forwarding it to Washington, Major Tower saw that it would be possible for hostile artillery to batter the Tower Bastions from several points, unless the counterscarp defenses as planned by Colonel De Russy were redesigned. The flank contigious to the East Bastion was also exposed and should be covered. If the gorges of the bastions were closed, an investing force, although it destroyed them by bombardment, would encounter difficulties in mounting an assault.[23]

General Totten, after studying the survey and the plans in the Department files, notified Major Tower in September 1857 that no proposals were to be programmed "beyond the ditch, as a project for the better protection of the scarps of the body of the fort." Plans were to be prepared which would involve considerable changes in the ground beyond the ditch on the land front.[24]

Six weeks later, he called on Tower for sketches of any works erected beyond the scarp, counterscarp wall, and seawall.[25]

b. Major Tower Reports on the Counterscarp Gallery

Major Tower in reply reported that the "only work done on the exterior is the counterscarp gallery." This structure, except for the roofing and coping, had been completed. To protect it from the elements, a temporary shed-roof had been positioned. As soon as the coping was received, the gallery's asphalt covering would be added.[26]

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23. Tower to Totten, May 4, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer.

24. Totten to Tower, Sept. 16, 1857, NA, RG 77, Ltrs. Sent, Chief Engineer.

25. Totten to Tower, Oct. 31, 1857, NA, RG 77, Ltrs. Sent, Chief Engineer.

26. Tower to Totten, Dec. 4, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer.

3. Plans for Doors, Windows, etc.

Major Tower on April 3, 1857, asked the Department for instructions or drawings pertaining to doors, windows, etc., for the gorge casemates. He needed information as to size, thickness, style, paneling of the doors; arrangement of studs, framing and ceiling of the casemates, particularly the finish for the windows. This information was required immediately, to enable carpenters to get "out the stuff in readiness when the casemates are sufficiently dried."

Information pertaining to heavy doors for the magazines and sally port should also be forwarded. If necessary instructions were forthcoming, the drawings could be made on-site.[27]

On May 29 General Totten replied in part to Tower's request. For construction details pertaining to solid doors, lattice doors, shutters, and wire gauze for the magazines of the fort and counterscarp gallery, he was referred to the Department's letter of November 26, 1856, to Colonel De Russy.[28]

No instructions on construction details of the doors, windows, etc., for the gorge casemates were provided by the Department. To the project engineer was delegated responsibility for their design, subject to the limitation that no light be larger than 12 x 14".[29]

4. Embrasure Irons for the 3d Tier

Major Tower, on his arrival at Fort Point, learned from Lieutenant Alexander that no embrasure irons had been ordered for the 3d Tier. He accordingly wrote General Totten on April 4, 1857, that the embrasure irons for the 3d Tier (30 sets) would be required as soon as they could be forwarded.[30]

In May he wrote the Department that only 25 sets, not 30, were needed. The reason was that in August two sets of irons had been ordered by Colonel De Russy to complete the number required for the 1st Tier, along with five sets for "the 24-pdr howitzer Casemate

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27. Tower to Totten, April 3, 1858, NA, RG 77, Ltrs. Recd., Chief Engineer.

28. Totten to Tower, May 29, 1857, NA, RG 77, Ltrs. Sent, Chief Engineer.

29. Ibid.

30. Tower to Totten, April 4, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer.

Embrasures for flanking the ditch." The latter were a different pattern. The sets received, however, were of the type used in the main work.[31] An investigation had shown that the embrasure irons for the flanking howitzers could be frabricated in San Francisco.[32]

General Totten accordingly directed Lt. Quincy Gillmore, officer in charge of the New York Engineer Depot, to ship to Major Tower 25 sets of embrasure irons for the 3d Tier.[33] Before these arrived, it was discovered that five extra sole pieces for the sets received the previous year must be forwarded from New York, as they were too costly to manufacture locally.[34]

5. Major Tower Orders 90 Sets of Traverse Irons

Major Tower on January 4, 1858, forwarded a sketch showing "the arrangement of the iron traverse circles of the three tiers of each bastion," with the dimensions thereon. The distance of the guns from centre to centre, 19 feet, determined the length of the arcs. "By construction this length was 1'8" beyond the radius of traverse of 30° on each side," and he presumed this would be sufficient. At points where the circles did not meet, they could be made a few inches longer.

The two bastions required 30 sets of traverse circles, while three sets were needed for the pan coupé battery.[35] Drawing No. 1, accompanying the sketch, showed a "traverse circle which meets that on either side." Fifty-four sets of irons of this pattern were required. Of these, 18 could be prolonged to the right, if necessary, and nine to the left, because the subject circles touched the one

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31. Each set was short one part--a solid piece of wrought iron, weighing about 300 pounds, designed to be placed in front of the pintle-hole.

32. Tower to Totten, May 4, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer.

33. Totten to Tower, May 30, 1857, NA, RG 77, Ltrs. Sent, Chief Engineer.

34. Tower to Totten, June 18, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer. The sole pieces were 18" long x 10" wide x 6" thick.

35. Tower to Totten, Jan. 4, 1858, NA, RG 77, Ltrs. Recd., Chief Engineer. Drawing No. 3 depicted the traverse circles of the pan coupé battery.

contiguous on one side only. Drawing No. 2, of which three sets were needed, was of the position occupied by the right hand traverse of the east face gun next to the gorge.

Tower urged the Chief Engineer to order the 90 sets of traverse circles as soon as possible, because the "casemates can be gotten ready for them."[36]

General Totten was absent from his office when the subject request was received, and Captain Wright, as his deputy, directed Lieutenant Gillmore to procure and ship "as early as practicable" the requisitioned traverse irons.[37]

6. Major Tower Calls for the Heavy Ordnance

By the end of Fiscal Year 1858 construction had progressed sufficiently to enable Major Tower to notify the Department that the fort would be ready to receive its armament by the time the big guns could be shipped to San Francisco from east coast ordnance depots. There were on hand, he reported, eight 8-inch and two 10-inch columbiads, and 20 42-pounders, of which the columbiads were emplaced in the 10-Gun Battery.

The work, he informed his superiors, was designed for:

1st Tier	28	42-pounder smoothbores
	2	24-pounder smoothbores
2d Tier	28	8-inch columbiads
	2	24-pounder smoothbores
3d Tier	28	8-inch columbiads
	2	24-pounder smoothbores
Barbette Tier	4	10-inch columbiads for two bastions
	3	10-inch columbiads for north salient
	2	10-inch columbiads for south salient
	17	8-inch columbiads for curtains of water fronts
	11	32-pounder smoothbores for curtain of land front

36. Ibid.; "Fort at Fort Point," sketch accompanying Major Tower's letter of January 4, 1856, NA, RG 77, Drawer 94, Sheet 36.

37. Wright to Tower, April 21, 1858, NA, RG 77, Ltrs. Sent, Chief Engineer.

His studies had demonstrated that 16, not 17, 8-inch columbiads were needed for the curtains of the water fronts, because the seventeenth gun would be entirely in the re-entering angle, and, having no traverse, would be useless.

The 10-Gun Battery, he reminded the Department, was to be rearmed with 42-pounders and the counterscarp gallery with five 24-pounder flank howitzers.[38]

Captain Wright, as requested, called on the Ordnance Department to make available and forward the requested number of tubes, along with gun carriages, equipment, and projectiles. The peacetime military has never been noted for speed, and it was fortunate that Major Tower made his requisition early, because many months were to pass before the first guns arrived and were unloaded at the Fort Point wharf.

D. Major Tower Defends His Decisions

1. General Totten Cautions Against Excessive Use of Pressed Brick

By late summer of 1857 work had progressed to a point where Major Tower was ready to investigate possible sources of stone for coping. He accordingly applied to the Department for orders to visit the granite quarries at Monterey and Folsom, the blue sandstone quarries at Salt Point, and the light colored sandstone quarries near Benicia. He hoped to use the bluestone for coping.[39]

When he approved Tower's travel request, General Totten, having reviewed the monthly progress reports, cautioned about what he considered to be excessive reliance on pressed brick. Tower was reminded that use of pressed brick in the facings of masonry, exposed to weathering, was allowable only on "supposition that pressed bricks are more solid and durable than others." At Fort Point "these qualities" were deemed of sufficient importance "to justify the additional cost of pressed brick . . .; but the expense of laying these bricks should be no greater than the laying of common bricks, and in no case should either pressed or common bricks be cut into voussoir forms for arches."[40]

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38. Tower to Wright, July 3, 1858, NA, RG 77, Ltrs. Recd., Chief Engineer.

39. Tower to Totten, Sept. 19, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer.

40. Totten to Tower, Oct. 31, 1857, NA, RG 77, Ltrs. Sent, Chief Engineer.

Replying to the Chief Engineer's communication, Major Tower wrote that the "use of stone except when necessary has been dispensed with." The quoins, however, had been carried up with granite, and would "be finished in that style as all the stone for that purpose is on the ground, with the exception of two courses & part of it is dressed."

Faced bricks, he continued, were presumed to be more durable than common brick, but difficulty in obtaining them in large numbers "would probably make it expedient to use common bricks." Faced brick in nearly sufficient quantities had been secured, and the facings would be "continued as thus far finished."[41]

2. Tower Justifies the Higher Cost of the Brick Kilned On-Site

The Department in the spring of 1858 called on Major Tower for cost data on the brick kilned at Fort Point compared to those purchased. Inadequate records maintained by Colonel De Russy prevented Tower from including those manufactured prior to March 18, 1857, when he took charge of the project. As he was ill, Lieutenant Elliot undertook the study. In preparing his figures, Elliot did not include the cost of tools purchased for the public brickyard nor the drayage from the yard to the fort.[42]

Lieutenant Elliot estimated the cost of bricks burned at Fort Point from January 1, 1857, to January 31, 1858, as:

Estimated cost of bricks kilned		$85,258.58
On hand 300,000 light bricks valued at	$1,800	
On hand 66,000 dark bricks, suitable for backing certain parts of the work	660	
Hard broken bricks already used and to be used for concrete 640 yards	2,560	5,020.00
		$85,278.58
3,202,000 bricks made & delivered at the work or to be delivered		$48,020.00
860,000 pressed bricks		32,235.58
		$80,275.58

41. Tower to Totten, Dec. 4, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer.

42. Tower to Wright, April 18, 1858, NA, RG 77, Ltrs. Recd., Chief Engineer.

By the above, common brick had cost $15 per thousand and pressed brick $37.50 per thousand.

Bricks had been purchased as follows:

284,689	pressed brick mostly from the State Prison at	$30.00 per thousand
87,568	rough brick from the State Prison at	$14.00 per thousand
12,474	pressed brick from Mr. McClay at	$30.50 per theusand
629,297	rough brick from Mr. Fisher at	$15.00 per thousand

The largest brickyard in California was that operated by the State Prison, and it had supplied the pressed brick used at Mare Island for $33 per thousand. These, however, were smaller than those moulded at Fort Point. On two occasions, Major Tower had contracted for common brick from the penitentiary, and in both cases they were found substandard.

Fisher's bricks were the largest and cheapest in the Bay area, and Major Tower had purchased all that he could burn.

There was no pressed brick on the market, when the government began burning brick, and to obtain the requisite supply, it had been necessary to begin operations during the rainy season. This, in conjunction with the building of large permanent kilns, had added to the cost of the brick. If it were necessary to resume burning brick, Major Tower believed that pressed brick could be manufactured for $30 per thousand and common brick for $13 per thousand. It was not his intention, however, to continue the project, as he preferred to purchase in the open market.

Although it appeared that the pressed brick manufactured on-site were more costly, it should be borne in mind that brick of this type obtained from the prison were "somewhat irregular in size and a good deal broken." Had the brick kilned at Fort Point averaged $5 more per thousand than the market price, it was necessary to manufacture them to "insure the progress of the work." A uniform dark-burned brick had thus been secured for the arches and scarp, "and the work has not been delayed."[43]

Satisfied with this report, the Department dropped the subject. Washington had won its point, however, because neither Major Tower nor his successor burned any more brick on-site.

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43. Ibid.

E. Labor Problems Confronted by Major Tower

1. The Labor Force Protests

Major Tower, on taking charge at Fort Point in March 1857, discovered that he had inherited a nasty dispute with his labor force. During the late winter, the workers had organized to protest the "miserable" quality of the food fed them by the government contractor, John Richardson. They complained that Richardson, who had a virtual monopoly, had been supplying them "with unwholesome food, odds and ends collected from every direction and wherever they could be purchased the cheapest without any regard to the taste or comfort of the boarders."

A five-man grievance committee was organized, and, when Major Tower took no action to improve the situation, the laborers asked permission to furnish their own mess. This he refused. As a final resort, they announced that they would strike, until some satisfactory arrangement was perfected.[44]

Before a strike was resorted to, General Totten, having been apprised of the dispute, intervened. Writing Major Tower on May 2, he questioned whether the government should continue to provide boarding facilities.[45]

Major Tower accordingly notified Richardson that the mess hall would be discontinued June 30. The mechanics and laborers were also alerted, to enable them to make arrangements for boarding themselves before that date.

George Nagle, who was in charge of the brickyard, had been allowed by Colonel De Russy to board his employees at one dollar per working day. Although Major Tower could likewise nullify this agreement, he was hesitant, because the brickyard would probably be shut down by mid-September. In addition, no complaints had been leveled against Nagle.[46]

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44. Weekly Bulletin, April 25, 1857. The contract for feeding the labor force was worth $6,000 to $7,000 per year.

45. Totten to Tower, May 2, 1857, NA, RG 77, Ltrs. Sent, Chief Engineer.

46. Tower to Totten, June 18, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer.

2. Tabor Seeks to Establish Boarding Facilities

The discontinuance of the Richardson contract satisfied the protestors, and the threat to strike was withdrawn. The protest, however, led to another problem. Mr. Tabor and another enterprising local businessman, having learned of the difficulties, applied to Major Tower for permission to moor a hulk off-shore to provide board for the workmen. Tower refused, because: (a) such an establishment would be a nuisance; and (b) he did not have authority to grant the franchise. There the matter rested until autumn, when Tabor had his hulk anchored near the reservation. Discovering that he could not induce the men to come aboard while the craft was anchored so far from shore, he had her hauled onto the flats and grounded about 2,500 feet east of Fort Point. A "temporary bridge" was erected to connect the craft with the shore. Soon a number of workers were taking their meals with Tabor.

When Captain Keyes, the commander at the Presidio, failed to take action, Major Tower protested to the Chief Engineer. While the hulk did not constitute "a particular injury," it could establish a precedent. In addition, the craft might become "so embedded in land as to be a fixture on the government property." There was no need for such accommodations, Tower reported, because the labor force already had ample messing facilities on-site.[47]

To rid the government of the nuisance caused by the grounded brig, Major Tower was directed by the Department to issue regulations prohibiting his workers from taking their meals on the hulk. He would also dismantle the bridge connection with the shore and interdict, as far as practicable, "all communications and intercourse between the vessel and persons on shore."[48]

The action recommended by the Department was implemented by Major Tower in late March 1858, with the desired effect. Tabor closed down his restaurant and abandoned the hulk. Reporting this development, Tower observed, perhaps Tabor can be induced to remove the vessel, as "there is no chance of the property in its present position being remunerative."[49]

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47. Tower to Totten, Jan. 18, 1858, NA, RG 77, Ltrs. Recd., Chief Engineer.

48. Thayer to Tower, Feb. 19, 1858, NA, RG 77, Ltrs. Sent, Chief Engineer. Col. Sylvanus Thayer, with General Totten on leave, was acting Chief Engineer.

49. Tower to Totten, April 3, 1858, NA, RG 77, Ltrs. Recd., Chief Engineer.

3. The Department Asks for a Cut in Wage Rates

Chief Engineer Totten in May 1857 called Major Tower's attention to what the Department considered an excessively high wage scale. It seemed to him that it could be reduced below that required when the project commenced, when "the character and amount of population of California were very different from what they now are." The pay of the employees was to be kept as low as practicable. It was desireable that "a revision of wages of all employees should be occasionally made with care, and the number employed on contingent duty as clerks, overseers &c., considered, with a view to make every practicable reduction in wages and numbers."[50]

4. Major Tower's Counter Arguments

Replying on June 18, Tower reported that in the three months since he had replaced Colonel De Russy, steps had been taken to modify wage rates. He believed any further reduction would be a mistake. On the contrary, it might become necessary to boost the wages of the laborers in the brickyard. Although low, they reflected those paid in other yards at the time they were employed. Recently, there had been a strike at the Sacramento brickyards, ending with management agreeing to an increase in wages. No trouble had yet occurred at the Fort Point brickyard, beyond a rapid turnover in employees, brought about by the complaint that the work was too hard for the pay.

Fort Point, Major Tower cautioned General Totten, was the "most disagreeable" place for workmen, of which he had knowledge. They were obliged to "work three fourths of the days in a cloud of dust & sand which must be painful & injurious to the eyes." He accordingly did not believe wages should be reduced below those paid in San Francisco.

The master mason, for example, was paid $275 per month. Though this seemed high, Tower did not "advise reduction feeling that it would be prejudicial to the work." The principal overseer was "an intelligent man in whom much confidence must necessarily be placed," as he was responsible for "the time rolls, for the care of the stables & of all property & more particularly for the weight & measurement of everything received upon the work." It was mandatory that the individual occupying this position "shall be a man of integrity, accuracy & intelligence--one person above suspicion." The wages of the principal

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50. Totten to Tower, May 2, 1857, NA, RG 77, Ltrs. Sent, Chief Engineer.

overseer and clerk had been pegged at $200 per month, each. Brickmasons, stonemasons, and stone cutters were paid $5 per day; the master carpenter $5 and carpenters $4; the principal blacksmith $5 and second smith $4.50; master stone cutter $5.50; and laborers $2.60. The stable keeper received $3 per day for week days only, although he was obliged to pull duty on Sundays. In addition, he had to keep the harness in repair, and drove teams when not otherwise employed.[51]

In mid-April 1857, Major Tower had been compelled to fire the sub-overseer. But by mid-August, despite the pleas of the Department to reduce the payroll, Tower was compelled to hire a replacement at $4 a day. To justify this measure, Tower observed that he had recently increased the number of brickmasons, as work accelerated, and would probably recruit more next month.

With a force of between 70 and 80 brickmasons, it was necessary to have more foremen. These must be selected with care; must be regularly appointed; and must be paid from one to two dollars a day more than the journeymen. He therefore wished authority to appoint three foremen, to be paid six to seven dollars a day.[52] The necessary authority was reluctantly given.

F. Miscellaneous Matters

1. The Aqueduct

Secretary of War Jefferson Davis in February 1857 approved a request by Bensley von Schmidt to construct an aqueduct across the reservation. Von Schmidt's special use permit provided: (a) the government could cancel it at any time; (b) after completion of the section of the aqueduct between Lobos Creek and the fort, the remainder must be finished in a reasonable time to be determined by an agent of the United States; and (c) the sections of the aqueduct not commanded by the guns of Fort Point were to be buried.[53]

Papers relating to construction of the aqueduct, along with the Secretary's approval, were received by Major Tower soon after

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51. Tower to Totten, June 18, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer.

52. Tower to Totten, Aug. 18, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer.

53. Totten to Tower, Feb. 24, 1857, NA, RG 77, Ltrs. Sent, Chief Engineer.

he took charge at Fort Point.[54] During the ensuing months, a large labor force constructed the aqueduct across the reservation. A tunnel carried the aqueduct through the escarpment south of the fort.

2. The Project Engineer Acquires a Second Boat

Major Tower on May 19, 1857, requested authority to purchase another vessel. The whale boat, which had been in use since 1853, had taken a heavy pounding, and had to be laid up frequently for repairs. Fears had been voiced that these might not suffice to keep it seaworthy.[55]

General Totten approved the purchase of a second boat in July.[56]

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54. Tower to Totten, April 14, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer.

55. Tower to Totten, May 19, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer.

56. Totten to Tower, July 3, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer.

VI. CAPTAIN GILMER AS PROJECT ENGINEER, 1858-60

A. Lieutenant Lee as Acting Superintending Engineer

1. Major Tower Gets His Orders

Maj. Zealous Tower had been on the Pacific coast for five years, and with construction proceeding at Fort Point as scheduled, the Department decided that he was entitled to a less arduous duty station. Acting Chief Engineer Sylvanus Thayer on June 21, 1858, accordingly wrote Tower that Capt. Jeremy F. Gilmer had been ordered to California to relieve him as project engineer. On receipt of this order, without waiting for the arrival of Captain Gilmer, Tower was to turn over the papers and funds belonging to Fort Point to his ranking assistant, and repair without delay to Boston.[1]

Colonel Thayer's message was received by Major Tower on July 31. He immediately yielded supervision of the project and funds to Lt. George W. C. Lee, and five days later boarded the Nicaragua-bound mail steamer.[2]

2. Custis Lee Comes to California

George Washington Custis Lee, known as Custis, was the eldest son of Lt. Col. Robert E. and Mary Custis Lee. Born at Fort Monroe, September 16, 1832, he had attended the U.S. Military Academy, graduating at the head of his class in 1854. Like his father before him, Custis was commissioned a 2d lieutenant and assigned to the Corps of Engineers. The spring of 1857 found Custis posted at Savannah, Georgia, overseeing various engineering projects on the Atlantic coasts of South Carolina, Georgia, and Florida. Learning that Lieutenant Alexander was due to be recalled from California, Custis forwarded a request to the Department, asking that he be assigned as assistant engineer at Fort Point.

General Totten, an old and trusted friend of the family, looked with favor on Lee's request, and on June 24 he notified Custis that

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1. Thayer to Tower, June 21, 1858, NA, RG 77, Ltrs. Sent, Chief Engineer.

2. Tower to Thayer, July 31, 1858, NA, RG 77, Ltrs. Recd., Chief Engineer.

Secretary of War John B. Floyd had approved the transfer. Lieutenant Lee was to leave for California on the mail steamer, which sailed from New York on July 5.[3]

The orders announcing his reassignment reached Lieutenant Lee at Fort Clinch, Florida, and he returned to Savannah on July 3. The next day he boarded a ship for New York. On his arrival there, he learned that it would be the 20th before the next mail steamer cleared for Nicaragua. Custis accordingly applied for and secured authority from General Totten to visit his family and friends, provided he started for California on the 20th.[4]

On July 15 Custis reached Berkeley Springs, Virginia, where his mother was spending the month away from the hot, humid Arlington House summers. Mrs. Lee was distressed to see that her eldest son was suffering from rheumatism. Unknown to him, she wrote General Totten, explaining the situation and requesting that Custis be given several weeks at home to enable him to "recruit his health."

Totten was sympathic. On July 16 he telegraphed Custis authority to delay his departure for California until August 5. Acknowledging the message, Custis announced that he would remain at Berkeley Springs until the 28th, when he would return to Arlington House, preparatory for taking the train to New York City.[5]

Lieutenant Lee sailed as scheduled. The trip was uneventful, and he reported to Major Tower, as his principal assistant on September 1, 1857.[6] Lieutenant Alexander in June had been ordered to duty at West Point, as Acting Assistant Professor of Engineering.

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3. Totten to Lee, June 24, 1857, NA, RG 77, Ltrs. Sent, Chief Engineer; Warner, Generals in Gray, p. 179. John Floyd had been selected by President James Buchanan to serve as his Secretary of War. Buchanan had been inaugurated as 15th President on March 4, 1857.

4. Lee to Totten, July 4, 1857, and Totten to Lee, July 9, 1857, NA, RG 77, Ltrs. Recd. and Ltrs. Sent, Chief Engineer.

5. Mary Lee to Totten, July 15, 1857; Custis Lee to Totten, July 16 & 18, 1857; Totten to Custis Lee, July 16, 1857, NA, RG 77, Ltrs. Recd. and Ltrs. Sent, Chief Engineer. Custis' father at this time was stationed in Texas, where he was lieutenant colonel of the 2d U.S. Cavalry.

6. Tower to Totten, Sept. 19, 1857, NA, RG 77, Ltrs. Recd., Chief Engineer.

3. He Prepares the Construction Program for F.Y. 1859

Because of the failure of Congress to act promptly on the bill appropriating funds for fortifications in Fiscal Year 1859, Lieutenant Lee found himself saddled with added administrative duties. Captain Wright had cautioned Major Tower on April 30, 1858, that the 2d Session of the 35th Congress might fail to pass the "regular fortification bill." Consequently, Tower should apply his remaining funds to "placing magazines and cisterns in an efficient state, and to preparations for mounting as many as possible of the guns of the armament, leaving the finish of casemates, quarters &c., to a later period."[7]

Despite the Department's fears, Congress in June passed and sent to President James Buchanan a fortifications bill, which included $112,500 for construction at Fort Point in Fiscal Year 1859. With the unexpended balance from previous appropriations, this made $272,444.16 available for the project. Captain Gilmer was directed to prepare and submit for approval an operating program for the subject fiscal year.[8]

Gilmer having been authorized to delay his departure for California until December, Custis Lee was given the responsibility of preparing the program. Lee proposed to employ the available funds in completing: (a) the 3d Tier of arches and forming the roof surfaces upon them; (b) the parade wall and stairway towers; (c) the gallery in front of the gorge; and (d) the balcony along the gorge. The masons would: (e) set the cordon and carry the scarp of the water fronts to reference (63'4") and the land front to (64'8"); (f) set traverse stones, coping, and flagging of gun casemates; and (g) coping of parade wall on land and water fronts. (h) Asphalt would be applied to the roof surfaces of the main work and counterscarp gallery; (i) "dry work" would be constructed over the asphaltum; and (j) a terreplein formed on the water fronts, sufficient to permit use of the guns. By this means, nearly all cannon on the water fronts would "be more or less efficient against a hostile fleet, while the land front will be unprotected."[9]

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7. Wright to Tower, April 30, 1858, NA, RG 77, Ltrs. Sent, Chief Engineer.

8. Wright to Gilmer, July 1, 1858; Tower to Thayer, Sept. 30, 1858, NA, RG 77, Ltrs. Recd. and Ltrs. Sent, Chief Engineer.

9. Lee to Wright, Dec. 18, 1858, NA, RG 77, Ltrs. Recd., Chief Engineer.

Lee's program was reviewed and approved by the Department without comment.

4. Work Forges Ahead

a. Lee Employs a Large Force

Lieutenant Lee had been at Fort Point 11 months when he became acting superintending engineer. He would discharge his new responsibilities for six months. On August 2, two days after he had relieved Major Tower, Custis Lee forwarded a requisition for $40,000 to enable him to meet his August payroll and expenses.[10]

In August, Lieutenant Lee kept 47 brickmasons employed turning and pointing the arches of the 3d Tier, raising the parade wall of the gorge and adjoining piers, and building stairways and the scarp above the cordon; 3 stonemasons set steps, cordon, and traverse stones for the 2d Tier, window sills and lintels for the quarters, and quoins; 29 stone cutters dressed traverse stones, coping for the casemates, and sills and lintels; 5 carpenters built centres and erected scaffolding, and repaired tools and machinery; 9 blacksmiths set up and fitted iron colonnades, shoed animals, and sharpened tools; and 146 laborers assisted the artisans, mixed and rammed mortar, and received supplies.[11]

b. The Department Makes a Decision on Details of the Barbette Tier

Lieutenant Lee by mid-November found himself confronted by a major problem. Reviewing the correspondence on file, he learned that Chief Engineer Totten had directed that "no operations, outside the main work . . . should be undertaken, until the receipt of further instructions on the subject." The General had also written, "I have not shown the parapet and terreplein on the drawings now sent, as they ought not to be absolutely fixed till we determine also the glacis &c."

Referring this problem to the Department, Custis Lee complained, "I have carried the scarp of the main work as high as it can go, until reference of the interior crest is fixed, and the general arrangement of the barbette tier determined."

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10. Lee to Wright, Aug. 2, 1858, NA, RG 77, Ltrs. Recd., Chief Engineer.

11. Report of Operations for August 1858, NA, RG 77, Ltrs. Recd., Chief Engineer.

Available correspondence had led to the conclusion that General Totten desired to have these details resolved in Washington. If so, they had not been. To complicate matters, the asphalting of the roof surfaces could not be completed until the scarp was raised to its full height and the coping positioned. With the applicateur at the fort, Lee needed a decision.[12]

Acting Chief Engineer Thayer on December 17 referred the subject to Colonel De Russy, who was familiar with the site. After reviewing the correspondence and drawings, De Russy on the 28th directed Lieutenant Lee "to proceed with the completion of the main work according to the plans now in your possession, leaving the esplanade on the hill in rear of the gorge for future arrangements."[13]

B. Captain Gilmer Reports for Duty

1. The Department Selects a Replacement for Major Tower

The decision to replace Major Tower made, the Adjutant General in mid-June 1857 issued orders for Capt. Jeremy F. Gilmer to turn over the projects under his supervision to Lieutenant Whiting. Upon being relieved, Captain Gilmer was to proceed to Boston to meet with Acting Chief Engineer Thayer, preparatory to sailing for the Pacific coast.[14]

Captain Gilmer was 39 years old, having been born in Guilford County, North Carolina, in 1818. A graduate of the U.S. Military Academy in the Class of 1839, he had ranked No. 4 behind Henry W. Halleck. Commissioned a 2d lieutenant in the Corps of Engineers, Gilmer remained at the academy until June 28, 1840, as assistant professor of Engineering. He was then ordered to Fort Schuyler as assistant engineer. In 1844-46 Gilmer served in the Chief Engineer's Office in Washington, and in 1847 was in the field with the Army of the West, where he supervised the construction of Fort Marcy, New Mexico. He then proceeded to Mexico City to assist in mapping the battlefields in and around that city. From 1848 until his assignment to Fort Point, Gilmer was on the east coast of Florida and Georgia,

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12. Lee to Wright, Nov. 17, 1858, NA, RG 77, Ltrs. Recd., Chief Engineer.

13. De Russy to Lee, Dec. 28, 1858, NA, RG 77, Ltrs. Sent, Chief Engineer.

14. Thayer to Gilmer, June 17, 1858, NA, RG 77, Ltrs. Sent, Chief Engineer.

where he supervised improvements to navigation on the Savannah River and construction and repairs to Forts Marion, Clinch, Pulaski, and Jackson.[15]

2. Lieutenant Elliot Has a Change of Heart

Six months passed before Captain Gilmer completed preparations for his departure. Meanwhile, he had learned that Lt. E. Porter Alexander wanted to be assigned to duty at Fort Point as his assistant, provided "such assignment be consistant with the public interest, and the rights of others." Word had also reached Gilmer that Lieutenant Elliot was desirous of returning to the Atlantic Seaboard. Relaying this information to the Department, Gilmer hoped it would be "able to make such exchanges as will assign Lt. Alexander to duty with me." He had been induced to make the application, because he desired to have Alexander "under my instruction when he first enters on the regular duties of his profession."[16]

Acknowledging Gilmer's request, Colonel De Russy, as acting chief engineer, pointed out that there were already too many officers of Engineers assigned to San Francisco Bay projects. But if on his arrival, Gilmer ascertained that Elliot desired to return to the east coast his wishes would be gratified.[17]

Several days later, Major Tower stopped in at the War Department, and discussed with De Russy Elliot's career plans. Tower explained that Elliot's wishes to be relieved at San Francisco were predicated on his reassignment as assistant engineer under Major Tower at some northern station. When he saw Elliot, Gilmer was notified to tell him that no assurance could be given as to the post to which he might be assigned on his return from Fort Point.[18] When advised of this by Captain Gilmer, Elliot determined to remain on the Pacific coast.

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15. Warner, Generals in Gray, p. 105; George W. Cullum, Biographical Register of the Officers and Graduates of the U.S. Military Academy, from 1802 to 1867 (New York, 1879), vol. 1, p. 574.

16. Gilmer to De Russy, Jan. 3, 1859, NA, RG 77, Ltrs. Recd., Chief Engineer. Lieutenant Alexander was a recent graduate from West Point.

17. De Russy to Gilmer, Jan. 7, 1859, NA, RG 77, Ltrs. Sent, Chief Engineer.

18. De Russy to Gilmer, Jan. 18, 1859, NA, RG 77, Ltrs. Sent, Chief Engineer.

3. Captain Gilmer takes Charge

Captain Gilmer finally sailed from New York City on January 20, 1859, on the steamer Moses Taylor for Aspinwall.[19] Crossing the isthmus on the railroad, Gilmer boarded a fast mail steamer, and landed in San Francisco on February 12. He immediately relieved Lieutenant Lee of responsibility for Fort Point.

Accompanied by Lieutenants Lee and Elliot, Gilmer inspected the site, and found seven brickmasons building foundation walls for the columbiad platforms and the breast-height walls of the bastions, turning the arches of the gallery along the parade front of the gorge, pointing the casemate arches, and preparing the roof surfaces over the same for asphaltic covering. Three stonemasons were setting traverse stones for the casemate guns of the 1st and 3d Tiers, and laying flagging in gunrooms of the 2d and 3d Tiers. Twenty-six stone cutters were cutting stones for the traverse circles, and dressing flagging for paving the gun casemates. Four blacksmiths were sharpening tools, shoeing animals, and repairing tools; two carpenters were erecting and taking down centres for arches, and repairing the plank road and workmen's quarters; two plumbers were covering the gallery with galvanized iron; eight teamsters were receiving and transporting materials; and 64 laborers were assisting the artisans, and making and applying concrete.[20]

C. Gilmer's Construction Program, February-June 1859

1. The Division of Labor

Captain Gilmer in the spring of 1859 employed the brickmasons to raise the parade wall along the land front, turn the arches of the gallery along the parade front of the gorge, point and plaster the casemate arches, prepare the roof surfaces over the same for asphaltic covering, and to set coping. The stonemasons set the traverse stones of the casemate guns of the 1st and 3d Tiers; laid flagging in the gunrooms of the 1st, 2d, and 3d Tiers; put down traverse irons for the guns of the 2d and 3d Tiers; and set coping

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19. Gilmer to De Russy, Jan. 17, 1859, NA, RG 77, Ltrs. Recd., Chief Engineer.

20. Gilmer to De Russy, March 18, 1859, NA, RG 77, Ltrs. Recd., Chief Engineer. The pressed brick being layed by the masons was purchased from J. P. Clay, and the rough brick from the California State Prison, Lubbersmier, and J. P. Clay. Clay's bricks were hauled to the site in wagons, and those from the prison and Lubbersmier in schooners. Granite for the traverse stones and quoins was landed at the wharf by C. Griffith, while the scotch flagging was supplied by McKenzie.

on the parade walls. The stone cutters cut stone for the traverse platforms and the parade coping, and dressed flagging stones for pavement of the gunrooms, including the curbstones for the 1st Tier. The carpenters laid flooring in the service magazines, prepared linings for the same and larger magazines, made doors for the same and sally port, and tools and machinery. The blacksmiths secured traverse irons to the stone platforms, made irons for the sally port doors, sharpened tools, and repaired machinery. The applicateur applied mastic to the surfaces over the gun casemate arches; the teamsters received and transported supplies; and the laborers assisted the mechanics, made and rammed cement, cleared out cellars of large magazines preparatory to laying flooring, applied concrete to foundations of flagging in 1st Tier casemates, and received materials.[21]

During this period, Gilmer established his wage scale as follows: the master mason was paid $250 per month; the masons, stone cutters, carpenters, and blacksmiths $4 per day; laborers $2.60 a day; and foremen $5 to $5.50 per day, depending on their trades.[22]

2. The Annual Report for Fiscal Year 1859

Captain Gilmer on August 4, 1859, mailed to the Department the Annual Report of Operations at Fort Point for the year ending June 30, along with the Annual Drawing, "setting forth, by general plan and sections, the condition of the work."

The year's program had been directed toward such objects "as were necessary to place the main battery in a state of efficiency." The labor force had made and poured the concrete forming the foundations of the stone platforms and pavements of the gun casements; set the platforms and flagging; put down iron traverse circles; built the remaining piers of the 3d Tier of casemates, turning 15 of the bombproof arches; completed the brick masonry of the parade wall of the land front; laid the granite cordon entirely around the work; raised the parapet walls thereon to within ten inches of the superior

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21. Gilmer to De Russy, April 16, May 3, June 3, & July 5, 1859, NA, RG 77, Ltrs. Recd., Chief Engineer. To build the magazine doors, flooring, and linings, the Department purchased from J. T. Pennell 2,057 feet 3½" oak planking, 408 feet 1½" oak planking, 460 feet 2" oak planking, 1,942 feet 2 x 12 pine planking, 1,704 feet 3 x 12 pine planking, 4,623 feet 3 x 10 pine planking, 4,800 feet redwood flooring, and 3,334 feet 1½" pine flooring. To build doors for the sally port, the Department purchased from J. C. Ayers 1,180 feet 2½" oak planking.

22. Gilmer to De Russy, May 3, 1859, NA, RG 77, Ltrs. Recd., Chief Engineer.

slope along the water fronts, and on the land front to reference (64'9") above low water level; formed the concrete backing over the main arches; laid the foundations for the barbette gun platforms; covered a portion of the arches with asphaltum; and built the breast-height walls on the bastions.

The iron colonnade in front of the quarters had been carried up two stories and the roof finished; the iron brackets for the narrow gallery along the parade wall of the gorge had been installed; the granite coping for the parade wall cut, and one-half of it set; the granite for the gun platforms, curbstones, steps, and pavement cut; iron pipes for conveying water from the arches to the cisterns placed; the magazines floored; masonry of the casemates pointed; much of the ironwork painted; and the three stair towers completed, except for the large stones forming the upper landings.[23]

D. Military Construction--Fiscal Year 1860

1. Funding the Undertaking

a. The Appropriation

On March 18, 1859, Acting Chief Engineer De Russy notified Captain Gilmer that the 2d Session of the 35th Congress had appropriated $50,000 for Fort Point in the fiscal year ending June 30, 1860. He would prepare and forward an operating budget, specifying the projects to which he proposed applying this sum, and giving the rate of expenditure per month.[24]

b. Gilmer's Program

Captain Gilmer, after reviewing the situation with Lieutenants Lee and Elliot, informed the Department on April 19 that during the next fiscal year he proposed to: (a) finish the asphaltic roofing

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23. Gilmer to De Russy, Aug. 4, 1859, NA, RG 77, Ltrs. Recd., Chief Engineer; The Executive Documents, printed by Order of the Senate of the United States, 1st Session of the 36th Congress, 1859-60 (Washington, 1860), Serial 1024, vol. 2, pp. 653-54. In Fiscal Year 1859, the labor force had laid 3,319½ cubic yards of brick masonry; poured 1,752 cubic yards of cement; cut 24,237 superficial feet of stone; dressed 26,219 superficial feet of flagging; set 9,330 cubic feet of dressed granite for cordon, coping, curbing, quoins, steps, sills, lintels, and gun platforms; and applied 4,932 superficial feet of asphaltic covering over arch surfaces.

24. De Russy to Gilmer, March 18, 1859, NA, RG 77, Ltrs. Sent, Chief Engineer.

over the casemate arches; (b) construct the dry brickwork over the asphaltum and place gravel thereon; (c) embank the terreplein; (d) construct the barbette gun platforms; (e) finish the masonry of the scarp, including the coping, and the parade walls and coping; (f) build the breast-height walls of the land front and bastions; (g) finish the magazines of the main work and of the counterscarp gallery; (h) build the wall across the west end of the ditch, and excavate the small ditch of the counterscarp gallery; (i) construct sewers and drains and one more cistern; (j) erect one shot furnace; (k) grade the ditch and parade; (l) finish pointing the arches; and (m) construct the heavy doors for the sally port.

The projected operations would "place the main work in a pretty good condition for defense, as all the guns" could then be mounted. The many items "essential to a proper accommodation" of the garrison would be provided for by a future appropriation.[25]

Colonel De Russy reviewed and approved Captain Gilmer's program on May 17.[26]

2. Lieutenant Lee's Departure

On September 19, 1859, Captain Gilmer learned that his senior assistant, Lieutenant Lee, had been relieved of duty at Fort Point. He was to proceed to Washington, D. C., for duty with the Engineer Bureau.[27] At the end of the month, Custis Lee said his goodbyes to the many friends he had made during his 25 months in the Bay area, and embarked on a Nicaragua-bound mail steamer. With construction in its final stages and a reduced appropriation, the Department did not fill the billet left vacant by Lee's transfer. Hereafter, until the fort was completed, only two army engineers would be assigned to Fort Point.

3. The First Six Months of the Fiscal Year

During the six months ending December 31, 1859, Captain Gilmer employed from seven to 11 brickmasons building parapet walls on the water fronts and the breast-height wall of the land front, completing

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25. Gilmer to De Russy, April 19, 1859, NA, RG 77, Ltrs. Recd., Chief Engineer.

26. De Russy to Gilmer, May 17, 1859, NA, RG 77, Ltrs. Sent, Chief Engineer.

27. Gilmer to De Russy, Sept. 19, 1859, NA, RG 77, Ltrs. Recd., Chief Engineer.

the scarp wall of the land front, setting coping thereon, pointing masonry, constructing drains from the cisterns and sewers, and building the large culvert leading from the fort "to highwater mark." Three stonemasons laid flagging in the gunrooms; set granite quoins at the angles, stone coping on the parade walls, and the upper platform stones in the tower stairways and along the gallery to the quarters; put down the iron traverse circles of the 1st Tier gun platforms; and positioned granite for the barbette gun platforms. Eleven to 31 stone cutters dressed stone for the gun platforms, for the coping of parade walls and stairways, for the curbstones of the gallery pavement in front of the quarters, and dressed flagging for paving gunrooms. Two carpenters made and hung doors for the magazines and sally port, laid wooden shot beds, built arches for the culvert, put up a bridge across the ditch to facilitate wheeling in earth for the terreplein, and repaired the plank roadway and machinery. Four blacksmiths secured the iron traverse circles to the stone platforms, sharpened and repaired tools, and shoed animals.

Two applicateurs and their assistant were applying asphaltic mastic on the casemate arches. Three to five teamsters were receiving and hauling supplies; and the 35 to 74 laborers were assisting the artisans, making and applying concrete, receiving supplies, excavating for sewers, repairing the roadway, and removing earth from the top of the counterscarp gallery.[28]

Throughout the second half of 1859, Captain Gilmer continued to receive by schooner from C. Griffith California granite. In July, Eben Morrill delivered 6,156 pressed brick to the fort, along with a number of odd-shaped bricks, and in August 14,644 pressed brick and 1,400 odd-shaped. Large deliveries of pressed brick were received from during the remaining four months of the year.[29]

4. The November 23 Storm

A gale hammered the area on the night of November 23, causing severe damage to the plank roadway and carrying away "a large part" of the wharf. Captain Gilmer, in repairing the wharf, used piles sheathed in iron, to replace the stone-filled cribs.[30] The cost of

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28. Gilmer to De Russy, Aug. 4, Sept. 3, Oct. 18, Nov. 3, & Dec. 3, 1859, and Jan. 18, 1860, NA, RG 77, Ltrs. Recd., Chief Engineer.

29. Register of Materials Received 1858-1863, SFRC, RG 77, Entry 1927.

30. Gilmer to De Russy, Dec. 1, 1859, NA, RG 77, Ltrs. Recd., Chief Engineer. Gilmer estimated damage to government property at Fort Point from the storm at not less than $5,000.

effecting these repairs, more than $6,000, reduced the money budgeted to other projects, including construction of a wall across the west end of the ditch. As rebuilt, the wharf would last several years.[31]

5. General Totten at Fort Point

In November 1859 General Totten, having secured necessary authority from Secretary of War John B. Floyd, sailed from New York for Central America. His destination was the Pacific coast, and his mission was inspection of the forts under construction and those sites recommended to be fortified by the Joint-Commission in 1851.[32]

General Totten spent most of January 1860 in the San Francisco Bay area, and was at Fort Point on the 20th. He was delighted to see that the project engineers, judiciously employing the liberal appropriations made by Congress, had made rapid progress. The fort, he found, was "nearly ready for 120 guns of the heaviest caliber." Except for the counterscarp gallery no effort had been made to provide for defense against a force landing on the peninsula to the south.

To cope with this deficiency, fortifications would have to be designed to cover the land approaches to the Golden Gate from the south, as well as to "augment the fire upon the channel." But the "exact extent and nature of these additions" could not be resolved until detailed reconnaissances had been made of possible landing sites for hostile forces on the beaches to the south.[33]

While at Fort Point, Totten also discussed a number of construction problems with Superintending Engineer Gilmer. Among these were certain modifications to the Officers' Quarters, the priority for construction of a seawall to protect the site from the surf, and methods of guarding the pointing from ravages of wind and salt spray. Unfortunately, no minutes were kept, and we can only speculate on what was said and certain of the decisions reached.

Before returning to the Atlantic seaboard in May, General Totten visited all the sites reconnoitered by the Joint-Commission in 1849-51, plus several others.

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31. Gilmer to De Russy, July 31, 1860, NA, RG 77, Ltrs. Recd., Chief Engineer.

32. Totten to Floyd, May 28, 1860, NA, RG 77, Ltrs. Sent, Chief Engineer.

33. Ibid.

6. The Second Six Months of the Fiscal Year

Captain Gilmer, in the second half of the fiscal year, employed his brickmasons building "the drainage arches in the valleys between the casemate arches and the masonry of the manholes leading to same"; laying dry brick over the asphaltic roofing; constructing culverts for conveying water from the parade and cisterns, walls connected with the cistern pumps, circular sustaining walls around the barbette gun platforms, and breast-height walls of the land front; raising the chimneys of the quarters and barracks to their desired height; pointing the interior of the parapet walls; and erecting a 15-foot shot furnace. Stonemasons were setting barbette gun platforms, stone caps of the quarters flues, and steps leading to the ramp on the land front; paving the quarters galleries; and finishing the coping of the parade wall at head of the iron stairway. Stone cutters were dressing granite for gun platforms, for tops of the quarters flues, coping, stairways, curbs, and shot furnace.

Carpenters had completed the bridge across the ditch, made and hung doors for magazines and passageways and shutters for windows, and repaired the roadway, wharf and machinery. Blacksmiths had fabricated iron parts for repair of the wharf, erected the iron stairway at east end of the quarters gallery, secured iron traverse circles and pintles to gun platforms, and sharpened tools. The applicateurs, until completing their assignment in March and returning to New York City, had continued to apply mastic roofing to the casemate arches.

The teamsters, besides receiving and transporting supplies, hauled earth to form the terreplein and earthen parapets of the fort. The laborers assisted the artisans, excavated for drains, graded the parade, wheeled earth for and embanked the terreplein, sodded the parapets of the bastions and terreplein, applied an asphaltic wash to the interior scarp wall of the land front, and made and rammed concrete.[34]

7. The Labor Force is Drastically Reduced

It was late in the session before the 36th Congress passed and sent to President Buchanan the fortifications bill, making an appropriation for Fort Point for Fiscal Year 1861. With most of the funds obligated and no relief in sight, Captain Gilmer on June 30 laid off most of his force. The only men retained were the master mason, who

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34. Gilmer to De Russy, Feb. 4, March 3, April 14, May 3, June 4, & July 7, 1860, NA, RG 77, Ltrs. Recd., Chief Engineer. In the winter of 1859-60, Griffith continued to land granite at the Fort Point wharf, while in February and March 136,000 rough bricks were received from Callahan & Co. Calvin Nutting sold the government the ironwork used in the quarters gallery stairway.

assisted by one stonemason, was engaged to set the remainder of the stone platforms for the guns of the barbette tier bearing on the land front, and to work on the shot furnace. One blacksmith was retained to fit and secure traverse circles and pintles; one carpenter to hang magazine doors and shutters, and build centres for the furnace arches; and seven laborers to sod the terreplein and ramparts, and assist the mechanics.[35]

8. The Annual Report for the Fiscal Year

Captain Gilmer, in submitting his second Annual Report and Drawing, wrote that during Fiscal Year 1860, "operations had been so directed as to bring the defensive portions of this work to a degree of efficiency as great as could be attained with the means available." An asphalt mastic covering had been applied to the casemate arches; dry brickwork had been positioned on the asphaltum for drainage and covered with six inches of gravel. The arches in the valleys had been turned and manholes connecting with the same constructed. Barbette platforms for the columbiads to bear on the water fronts had been laid, while work was far along on the 11 32-pounder platforms on the land front. Masonry of the scarpwall, including the coping, had been finished. The breast-height wall on the land front had been completed, along with the walls for sustaining the rampart along this and the east and west fronts. Stone steps giving access to the rampart had been set, and the terreplein and parapets embanked and sodded.

The parade had been graded, and a shot furnace erected in the northeast corner of the quadrangle. The principal sewer, leading from the interior of the fort to its outlet in the bay, had been built. Pipes connecting with the cisterns, and a pump for supplying water to the parade had been located. Heavy doors for the outer end of the sally port had been fashioned and hung, while the main and service magazines (including doors, windows, shutters, and grating) had been finished. An iron stairway at the east end of the gallery fronting the quarters had been assembled. Pavement had been laid on the gorge gallerys and in the main casemates. The upper platforms of the tower stairways had been set, and the upper course of masonry completed. Iron railings along the 2d and 3d Tiers of the Gorge had been positioned.[36]

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35. Gilmer to De Russy, July 7 & Aug. 2, 1860, NA, RG 77, Ltrs. Recd., Chief Engineer.

36. Gilmer to De Russy, July 31, 1860, NA, RG 77, Ltrs. Recd., Chief Engineer; Executive Documents, printed by Order of the Senate of the United States for the 2d Session of the 36th Congress (Washington, 1861), Serial 1079, vol. 2, p. 270. Davis & Jordon sold the government the fire brick used in the shot furnace.

E. Military Construction--July 1-December 31, 1860

1. Funding the Operation

a. Gilmer's Estimates

On July 19, 1859, Captain Gilmer, as requested, forwarded to the Department estimates of construction funds required in Fiscal Year 1861. To enable him to complete the main work $50,000 was required. Another $95,000 was needed to revet the counterscarp with walls of concrete faced with brick and for construction of an outwork, "which will give a good cover to the masonry of the body of the place and afford a reasonable amount of room for covering bodies of men for sorting & other purposes." Another $205,000 was included for beginning the redoubts on the heights south of Fort Point recommended by the Board of Engineers for the Pacific Coast. This brought the total request for the next fiscal year to $350,000.

Gilmer also warned that before closing down operations at the site, it would be necessary to build a seawall to shield the fort and a permanent wharf. Cost of these items was not included in his estimates.[37]

b. The Appropriation

Congress, its attention focused on the sectional crisis convulsing the nation, moved slowly. It was late June 1860 before the legislators of the 2d Session, 36th Congress, passed and sent to the President a fortifications bill, appropriating $50,000 for construction at Fort Point in the fiscal year ending June 30, 1861. Acting Chief Engineer De Russy on June 28 relayed this news to Captain Gilmer.[38]

c. Gilmer Prepares His Program

In accordance with procedures, Captain Gilmer on July 28, 1860, submitted his program for Fiscal Year 1861. He proposed to use the appropriation to: (a) finish the Quarters and Barracks, including water tanks, cisterns, pumps, pipes, and all other necessary fixtures; (b) finish interior storerooms, guardrooms and prisons; (c) pave the

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37. Gilmer to De Russy, July 19, 1859, NA, RG 77, Ltrs. Recd., Chief Engineer.

38. De Russy to Gilmer, June 28, 1860, NA, RG 77, Ltrs. Sent, Chief Engineer.

sally port; (d) make and hang interior doors for same; (e) finish the small gallery along top of the parade wall of the land front; (f) build the cross-wall at west end of the ditch; (g) construct remainder of drains; (h) build a second shot furnace inside the fort; (i) point a large part of the masonry of the scarp and arches; (j) lay the gun platforms in the counterscarp gallery; (k) finish the roofing and drainage over the counterscarp gallery; (l) fit up the magazines in the counterscarp gallery; and (m) make "such adjustments and alterations to the Ten-Gun Battery as may be necessary for full efficiency."

He did not consider it judicious to apply to the outworks a greater portion of the appropriation than indicated, as he believed "the whole amount . . . will be absorbed in providing the requisite accommodations for the garrison."

To fund operations in Fiscal Year 1862, Gilmer requested an appropriation of $400,000, with $95,000 allotted to construction of necessary outworks, $100,000 to construction of a seawall, and $205,000 to commencing the advance works.[39]

2. Gilmer Steps up the Pace

Captain Gilmer with $50,000 to spend increased his force of artisans and laborers in the late summer of 1860. During five months, August 1-December 31, four to seven brickmasons completed the shot furnace in the northeast corner of the quadrangle and commenced construction of a second in the opposite corner; set the 32-pounder gun platforms along the land front; prepared the masonry of the quarters and barracks for introduction of water pipes; pointed masonry; constructed culverts for draining the parade and privy vaults; and built prison walls. A blacksmith secured traverse irons, adjusted embrasure shutters, sharpened tools, made fastening for the force pump employed in raising water to water tank, and irons to secure the flagstaff.

Two to 13 carpenters made and hung doors for the stairway towers and inner sally port, put up furring and finishing in the quarters and barracks, constructed a timber bulkhead in advance of the east bastion to guard against encroachments by the sea, and built "light frame penthouses" for covering the tower stairways. Two plumbers were "introducing pipes into the Quarters and Barracks," putting up a force pump to raise water from the cisterns to the iron tank on the 3d Tier, and making "connexions with wash sinks, privies, &c."

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39. Gilmer to De Russy, July 28, 1860, NA, RG 77, Ltrs. Recd., Chief Engineer.

One to seven plasterers were lathing and plastering the quarters and barracks; one painter was painting the iron- and woodwork of the fort, and priming the interior finish of the quarters and barracks; one stable keeper and a teamster were hauling supplies, caring for the public stock, and assisting the artisans; while seven to 17 laborers were helping the mechanics, mixing concrete, filling earth on the terreplein of the land front, and watering the sodded surfaces of the fort.[40]

F. Special Construction Problems and Change Orders

1. The Application of Mastic to the Arch Roof Surfaces

a. The Department Vetoes Use of California Tar

Major Tower on January 4, 1858, seven months before he was reassigned, advised the Department that 32,067 square feet of the main work and 3,514 square feet of the counterscarp gallery needed to be covered with asphaltum. Although asphaltic cement such as used in France and on east coast public works was not manufactured in San Francisco, there was an abundance of pure asphalt. He saw no reason why "the pure asphalt may not be used, or asphalt mixed with sand as it will never be subjected to extremes of heat & cold."

If, however, General Totten decided it was necessary to employ the asphaltic cement supplied by the Engineer Agency, Tower wanted the amount required shipped as soon as convenient. Whenever the arches were ready to receive the asphaltic covering, notice would be given to enable the Chief Engineer to detail a man to apply it.[41]

Captain Wright, after checking with Cols. Sylvanus Thayer and John S. Smith and Lt. Quincy Gillmore, notified Tower that they considered it unsafe to rely on a mixture of pure asphalt or mineral tar with sand. He was authorized to requisition from the New York Depot, the "quantity of asphaltic material necessary for roofing Fort Point." It was left to Tower's discretion whether it would be most "advantageous to require the prepared mastic or only the asphaltic stone and a mill for grinding it."[42]

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40. Gilmer to De Russy, Sept. 4, Oct. 5, Nov. 9, Dec. 5, 1860, & Jan. 10, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer.

41. Tower to Totten, Jan. 4, 1858, NA, RG 77, Ltrs. Recd., Chief Engineer. Pure asphalt cost $20 per ton in the Bay area.

42. Wright to Tower, Feb. 16, 1858, NA, RG 77, Ltrs. Sent, Chief Engineer. Colonel Smith was familiar with the pure asphalt. It

On receipt of Captain Wright's letter, Major Tower, dissatisfied with its contents, forwarded to Lieutenant Gillmore a box containing California asphaltum. Perhaps, he reasoned, an analysis and trial may prove its superiority.

Gillmore could then see that it melted "without the aid of any mixture but cools very rapidly." In San Francisco coal tar was added to increase its fluidity, and it was used on house tops and would soon be given a trial as paving. If tests proved it unsatisfactory, Tower wished Gillmore to forward, without delay, the required quantity of prepared mastic and a mill.[43]

The tests, if made, were unsatisfactory. On May 4 Acting Chief Engineer Thayer directed Lieutenant Gillmore to ship to Fort Point the "requisite quantity of ordinary mastic."[44]

b. The Applicateurs

Major Tower on June 19, 1858, notified the Department that the craftsman (applicateur), who was to apply the mastic, should leave New York City on September 15. His wages would be pegged at $5 a day before sailing, and "everything pertaining to his expenses in coming" arranged.[45]

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was a mineral tar found in abundance on the coast of California, especially at Santa Barbara. In appearance it was similar to "Gandron Mineralo," and was a bitumen like that found in the West Indies and called Trinidad tar. The Corps' applicateur had told Smith that it might be used with "Grandron, when asphaltic stone could not be got."

Lieutenant Gillmore had calculated that 100 tons of mastic would be required by Major Tower. It would cost $5,000 at New York City, with shipping charges another $1,000. If the bitumen found on the Pacific coast were unsatisfactory, Gillmore could forward asphaltic stone in lumps, as imported, or ground to the state required for mixing with tar. A mill or grinding apparatus could be shipped. Smith to Thayer, Feb. 8, 1858, & Thayer to Smith, Feb. 10, 1858, NA, RG 77, Ltrs. Recd., Chief Engineer.

43. Tower to Totten, March 21, 1858, NA, RG 77, Ltrs. Recd., Chief Engineer.

44. Ibid.

45. Tower to Wright, June 19, 1858, NA, RG 77, Ltrs. Recd., Chief Engineer.

The applicateur was at Fort Point in the autumn of 1858. In view of General Totten's directive to discontinue all operations exterior to the scarp of the main work, Acting Superintendent Lee desired instructions whether it was permissible to have him apply asphaltic mastic to the arches of the counterscarp gallery.[46]

Acting Chief Engineer Thayer on November 6 resolved Lee's dilemma. Before returning to the Atlantic coast, the applicateur (Levavasseur) was to treat the roof surfaces of the subject work.[47] Progress, however, was slow, and on June 3, 1859, Captain Gilmer called on the Department for a second applicateur. To support his plea, Gilmer complained that "the earth cannot be filled in to form the terreplein for the barbette guns until the asphaltic work is done." It was important, he added, that the arches be covered before the next rainy season, which began in November.[48]

Colonel De Russy, having replaced Thayer as Acting Chief Engineer, saw the logic in Gilmer's request. On June 28 he recorded that Lieutenant Gillmore, at the New York Depot, had been directed to dispatch a second applicateur, "provided it can be done with a due regard to the wants of fortifications on the Atlantic Coast." If Gillmore were unable to honor this request, Colonel De Russy believed Gilmer could employ in San Francisco applicateurs sufficiently skillful for the purpose.[49]

When mid-August came and the promised second applicateur failed to arrive, Captain Gilmer became alarmed, because without him the arches would be "left exposed to the rains of another wet season." Efforts to hire locally men for this specialized occupation had been unsuccessful.[50] Gilmer's worries were premature. Before the end of

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46. Lee to Wright, Oct. 2, 1858, NA, RG 77, Ltrs. Recd., Chief Engineer.

47. Thayer to Lee, Nov. 6, 1858, NA, RG 77, Ltrs. Sent, Chief Engineer.

48. Gilmer to De Russy, June 3, 1859, NA, RG 77, Ltrs. Recd., Chief Engineer. As Levavasseur was being paid $5 per day, whereas he had drawn $3 per day on the east coast, there was a temptation on his part to work as slowly as possible.

49. De Russy to Gilmer, June 28, 1859, NA, RG 77, Ltrs. Sent, Chief Engineer.

50. Gilmer to De Russy, Aug. 19, 1859, NA, RG 77, Ltrs. Recd., Chief Engineer.

the month, Thomas Shea, the applicateur sent by Lieutenant Gillmore, landed in San Francisco and commenced work.[51]

Captain Gilmer's desire that two applicateurs and their assistants finish applying mastic to the casemate arches of the fort and counterscarp gallery before the beginning of the rainy season was doomed. It was March 1860 before they completed their work and Levavasseur and Shea returned to New York City.[52]

2. Changes Made to Interior Arrangement of Quarters

By late summer of 1860 construction crews were ready to finish the interiors of the quarters and barracks and install fixtures. Examining the drawings forwarded by the Department on May 28, 1857, Captain Gilmer saw that "no special provision" had been made for "a Privy for the families of married officers." To correct this situation, he forwarded for approval "a sketch of the eastern half of the quarters," showing "a proposed arrangement, which can be made at small expense," provided certain changes in the floor plans were admissible.[53]

By reference to the subject drawing, it could be seen that "the first regular casemate at the left is appropriated to dining room and kitchen for the unmarried officers," and the next one is divided into a parlor and "two very small bed rooms." The next, or third casemate from "the left, was arranged, like all the succeeding ones, for a parlor and two bed rooms."

The change advocated by Gilmer, and approved by the Department, was the addition of a partition in the third casemate, separating the west one-third of the parlor, to be outfitted as a privy for families. There would be space for two seats. The "soil pipe" would be led back to the scarp wall

> under the floor of the bedroom in the rear, then through the scarp and down the outer face, by cutting a groove or opening first

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51. Gilmer to De Russy, Aug. 19, 1859, NA, RG 77, Ltrs. Recd., Chief Engineer.

52. Gilmer to De Russy, April 14, 1860, NA, RG 77, Ltrs. Recd., Chief Engineer.

53. "Fort at Fort Point, Sketch Showing in blue ink a proposed arrangement for a Privy for Officers' Families with consequent changes in Quarters," NA, RG 77, Drawer 94, Sheet 44.

> in the backing of the arch, then through the wall and finally in the outer face of the scarp, at the base of which the pipe will deliver into a culvert to the main outlet from the privy vault.

The top light over the door leading onto the gallery would provide sufficient light for the hall leading to the proposed privy.

Other changes proposed and approved were the elimination of the partition in Casemate 2, creating two small bedrooms. This would make one good chamber with doorway giving access to the parlor. In Casemate 3 the partition separating the two small bedrooms would be eliminated, along with a doorway leading into the parlor of Casemate 2; and the space remaining, after construction of the married officers' privy, would become "a third good chamber for a bachelor officer." The doorways, indicated by the letters (d) and (e), were to be closed, and possibly the one marked (f). The opening through the pier into Casemate 4 was to be converted into a closet for the adjoining parlor.

These changes would provide three bachelor officers with individual chambers and a large parlor in common. Moreover, families of married officers would not have to pass through the bachelor quarters to gain access to a privy. To provide additional privacy, a screen of slats would be placed across the gallery, with a doorway.

A privy of similar construction, without the necessity of effecting changes in the adjacent rooms, would be "introduced in connexion with the hospital, west of the quarters," as directed by General Totten on his January 1860 visit to the site.[54]

3. The Decision to Construct Three Shot Furnaces

Captain Gilmer on September 3, 1859, notified the Department that he proposed to construct two 15-foot shot furnaces on the parade of the main work, and another of similar dimensions at the 10-Gun Battery. If this project were endorsed by his superiors, they should order the necessary irons shipped to San Francisco from the Engineer Agency in New York City.[55]

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54. Gilmer to De Russy, Aug. 20, 1860, NA, RG 77, Ltrs. Recd., Chief Engineer.

55. Gilmer to De Russy, Sept 3, 1859, NA, RG 77, Ltrs. Recd., Chief Engineer.

The Department on October 6 signified approval of Gilmer's action by directing Lieutenant Gillmore to supply him with three sets of furnace irons.[56]

By the time the irons reached Fort Point in April 1860 considerable progress had been made on the shot furnace located in the northeast corner of the quadrangle. By the end of the fiscal year this furnace had been finished, and work was commenced on the furnace on the opposite side of the parade.[57]

G. The Quest for Armament

1. An Ordnance Sergeant is Detailed to Fort Point

The armament ordered transferred from east coast depots to Fort Point in July 1858 began to arrive in the spring of 1859. The schooners M. A. Evans and F. W. Crawford in April landed a shipment of ordnance stores (28 chassis, 26 gun carriages, 26 pintles, 52 small solid wheels, 52 large solid wheels, 52 large pierced wheels, and 18 cases of smaller items). The receipt of these parts, along with other ordnance equipment on hand, caused Captain Gilmer to call for assistance in providing for its preservation. It was vital, he wrote the Department, for an ordnance sergeant to be stationed at the fort. Prompt action was taken. On July 5 Gilmer was advised that Ord. Sergt. William Campbell, currently posted at San Diego, had been ordered to Fort Point.[58]

2. Guns, Ammunition, and Ordnance Supplies

Captain Gilmer on August 4 reported that, although the fort "is essentially ready for mounting all the casemate guns," only a portion of these were on hand. Included were 28 42-pounder smoothbores, with 26 carriages and chassis, for the 1st Tier; ten 42-pounder smoothbores for the 10-Gun Battery, with carriages and chassis; two 10-inch columbiads and eight 8-inch columbiads, with carriages and chassis, emplaced in the 10-Gun Battery. There were also available ten 32-pounder smoothbores, which had been turned over to the project engineer by the officer commanding the Presidio. The 32-pounders,

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56. De Russy to Gilmer, Oct. 7, 1859, NA, RG 77, Ltrs. Sent, Chief Engineer.

57. Gilmer to De Russy, July 31, 1860, NA, RG 77, Ltrs. Recd., Chief Engineer.

58. Gilmer to De Russy, May 4 & July 5, 1859, NA, RG 77, Ltrs. Recd., Chief Engineer.

however, must be inspected by an officer of the Ordnance Department to determine if they were still serviceable. For the 32-pounders there was on hand one carriage (barbette). There were eight extra 42-pounder smoothbores, five of which were equipped with barbette carriages and chassis, stored at the ordnance yard.

The importance of forwarding the 8-inch columbiads (with their carriages and chassis) to be mounted in the 2d and 3d Tier Casemates was called to the Department's attention. In addition, Gilmer was certain the barbette platforms would be ready to receive their armament by the time the guns were to be shipped.[59]

Gilmer was advised by Colonel De Russy on October 22, 1859, that the Ordnance Department had provided for the entire armament, except for the columbiads, which would be furnished as soon as a supply of the new pattern could be procured from the foundries. As the other cannon and carriages had been shipped early in the year, it had been presumed that they had already arrived in San Francisco Bay.

Orders had been forwarded by the Chief of Ordnance for Capt. Franklin D. Callender, stationed at Benicia, to inspect the 32-pounders and to receive the 42-pounders.[60]

In the ten months following July 1, 1859, a number of vessels docked at the Fort Point wharf and landed big guns and ordnance stores. On July the brig Floyd put ashore six mortar beds, four 42-pounder guns, and 18 mortar platforms. Twelve days later, a lighter landed 22 guns and 4 bundles of mortar platforms. The schooner Jane Nelson on August 5 delivered six 10-inch mortars, and on September 8 the schooner Mary unloaded a cargo of projectiles (67 10-inch solid shot, 500 8-inch solid shot, 400 10-inch shells, 699 8-inch shells, 1,995 42-pounder shot, 48 boxes of 24-pounder shells, 23 boxes of 24-pounder grape, and 12 boxes of 24-pounder canister). A shipment of 1,559 8-inch shells were received from the schooner Bishop on February 8, 1860, and another 1,294 projectiles of the same description two days later.

The schooner Jane on March 13 landed six 42-pounder carriages, chassis, tongues, and pintles, along with 124 carriage wheels. In late March and early April, a large shipment of ordnance stores, including irons for the shot furnaces, was put ashore from the schooner Maggie Bowers.[61]

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59. Gilmer to De Russy, Aug. 4, 1859, NA, RG 77, Ltrs. Recd., Chief Engineer.

60. De Russy to Gilmer, Oct. 22, 1859, NA, RG 77, Ltrs. Sent, Chief Engineer.

61. Register of Materials Received 1858-1863, SFRC, RG 77, Entry 1927.

H. Labor Relations

On May 1, 1859, Captain Gilmer, taking cognizance of the large labor force currently available in San Francisco, reduced the wages of his artisans and laborers by 20 per cent. If there were no serious repercussion, he proposed additional reductions before the end of the year.[62] The workers, resistance to this action was mostly verbal, though there is reason to believe that a slowdown ensued. In any event, Gilmer decided against a further reduction.[63]

From time immemorial, men have sought to employ political influence to secure positions of trust and advancement. Fort Point was no exception. In the spring of 1860 John White called on Captain Gilmer, with a letter from Secretary of War Floyd. The Secretary had written that White was "a highly respected man, who desires to make his living by labor, and I shall be gratified if you can find in your power to give him employment."[64]

Although "a want of funds" would soon make it necessary to lay off most of the labor force, Captain Gilmer, to please the Secretary, determined to hire White. But before White reported for duty, Lieutenant Elliot cautioned that he had been employed during Colonel De Russy superintendency, and the overseers had complained that "he was one of the worst laborers" on the job, and that De Russy had fired him.

Gilmer accordingly decided not to employ White, and so informed the Secretary of War. The Secretary, on reviewing the correspondence, sanctioned Gilmer's decision.[65]

I. The Need for a Seawall Becomes Critical

1. The 1860 Survey

General Totten, while at San Francisco in January 1860, told Captain Gilmer to make a survey of "the ground immediately in the

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62. Gilmer to De Russy, May 3, 1859, NA, RG 77, Ltrs. Recd., Chief Engineer.

63. Gilmer to De Russy, June 3, 1859, NA, RG 77, Ltrs. Recd., Chief Engineer.

64. Floyd to Gilmer, March 3, 1860, NA, RG 77, Ltrs. Recd., Chief Engineer.

65. Gilmer to Floyd, May 4, 1860, & De Russy to Gilmer, July 21, 1860, NA, RG 77, Ltrs. Recd. & Sent, Chief Engineer.

vicinity" of the fort. This project was commenced immediately, and by the first week of April, it had been "nearly completed from the outline of the work seaward to the zero curve, or low water mark." Unfavorable weather (winds and waves) made it impossible "to prosecute the hydrographic portion of the survey," which was to be carried out to 12 feet of water at ebb tide.

When he studied his survey and compared it with the one made in 1857 by Colonel De Russy, Gilmer saw that "serious encroachments" had been made by the sea, "indicating . . . that the early construction of a seawall, around the whole point, is a necessity for the protection and preservation of the site." He accordingly urged the Department to seek an appropriation by Congress at its current session of "not less than $100,000" for beginning the immediate construction of a seawall.[66]

On July 19 Captain Gilmer, having completed his survey, mailed the map on which it was plotted to the Department. Great care had been taken to correctly locate man-made features, and a few discrepencies would be found in comparison with the locations on the 1857 map.

To assist the Department in formulating plans for the seawall, Gilmer sent "a plan and section of the foundations of the scarp walls of the fort, showing the depth to which it was thought prudent to carry them at different points." At the east end of the land front, it could be seen that the foundations were carried to the depth of four feet below (0'), but this had been dictated by a need to get sufficient depth for the privy vaults, located at this angle.[67]

2. Gilmer Sinks Several Test Excavations

Gilmer, in the late summer of 1860, had occasion to have an excavation made in front of the East Bastion. He found bedrock at reference (0'). In advance of the West Bastion bedrock was several feet below (0'). The exact depth for the foundation of the seawall, along that front, could best be determined when excavations were made preparatory to beginning construction.[68]

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66. Gilmer to De Russy, April 5, 1860, NA, RG 77, Ltrs. Recd., Chief Engineer.

67. Gilmer to De Russy, July 19, 1860, NA, RG 77, Ltrs. Recd., Chief Engineer.

68. Gilmer to De Russy, Sept. 20, 1860, NA, RG 77, Ltrs. Recd., Chief Engineer.

J. Miscellaneous

1. The Public Animals

The closing down of the brickyard and the rapid progress made during the superintendency of Major Tower left the project with a number of surplus livestock. Lieutenant Lee in September 1858 reported he was charged with 4 horses, 13 mules, and 4 oxen, of which he would like authority to survey 3 horses, 6 mules, and 2 oxen. One of the oxen was so old and feeble that he could be worked very little, and he was too thin to butcher. If no buyer were found, this beast should be shot. The horses and mules marked for sale could be profitably employed, but there was insufficient work to justify their retention, as most of the materials needed for the winter's operations had been stockpiled.[69]

Captain Wright on October 25 approved Lieutenant Lee's request for authority to dispose of the subject stock.[70]

This sale of the public stock proved ill-advised, because in mid-November 1859 Captain Gilmer found that he required additional animals for hauling materials and embankment for the terreplein. To tide him through the emergency, Gilmer secured the loan of two horses and a mule from Lt. James B. McPherson, project superintendent at Alcatraz. As these animals would be needed for some time, Gilmer requested authority to purchase them.[71] The Department was agreeable. On December 15 Gilmer was authorized to purchase the animals, and to sell them when they were surplus to his requirements.[72]

2. Survey and Sale of Excess Property

Captain Gilmer, soon after his arrival, had requested authority from the Department to sell by private sale or public auction, "a quantity of old property on the returns for Fort Point, of little value to the Government." Included were refuse bricks, old tools, old iron, and other materials of inferior character.[73]

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69. Lee to Wright, Sept. 18, 1858, NA, RG 77, Ltrs. Recd., Chief Engineer.

70. Wright to Lee, Oct. 25, 1858, NA, RG 77, Ltrs. Sent, Chief Engineer.

71. Gilmer to De Russy, Nov. 19, 1859, NA, RG 77, Ltrs. Recd., Chief Engineer.

72. De Russy to Gilmer, Dec. 15, 1859, NA, RG 77, Ltrs. Sent, Chief Engineer.

73. Gilmer to De Russy, April 19, 1859, NA, RG 77, Ltrs. Recd., Chief Engineer.

Acting Chief Engineer De Russy on May 17, 1859, gave the necessary authority.[74]

3. The Proposal to Reconstitute the Board of Engineers for the Pacific

In March 1859 Captain Gilmer notified the Department that with the assistance of Lieutenant Lee, he would "prepare projects for the outworks." Lieutenant McPherson, assistant engineer on Alcatraz Island, had volunteered his assistance.[75]

Acting Chief Engineer De Russy believed that Gilmer's proposal was presumptious, because the Engineer Order establishing the Board of Engineers for the Pacific was still in effect. But, he continued, it would be necessary to reconstitute the Board, which had been "practically dissolved in consequence of the removal of all its members from the Pacific Coast." Such a reorganization would be proposed to Secretary of War Floyd. If he approved, plans for Lime Point and projects for the outworks and advance batteries at Fort Point would be referred to it.[76] Secretary Floyd apparently saw no reason to reconstitute the Board, and a number of years passed before it was revived.

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74. De Russy to Gilmer, May 17, 1859, NA, RG 77, Ltrs. Sent, Chief Engineer.

75. Gilmer to De Russy, April 19, 1859, NA, RG 77, Ltrs. Recd., Chief Engineer.

76. De Russy to Gilmer, May 17, 1859, NA, RG 77, Ltrs. Sent, Chief Engineer.

VII. FORT POINT DURING THE CIVIL WAR

A. Captain Gilmer Completes the Fort

1. A Financial Crisis Stops Construction

November 1860 saw the election of Abraham Lincoln as 16th President of the United States. With Southern fire-eaters threatening secession, the United States Treasury found itself in an embarrassing situation with calls for appropriated funds exceeding income from taxes and duties. To alleviate this situation, it became necessary to curb momentarily the rate of expenditures until sufficient revenue was accumulated to tide the Treasury through the emergency.

Capt. Jeremy Gilmer therefore was both embarrassed and surprised to receive a letter from the Department, dated December 3, notifying him that "the convenience of the Treasury does not admit of the credit" with the Assistant Treasurer at San Francisco for which he had applied. He was advised to delay issuing checks for any portion of the requested remittance, until informed that it had been credited to his account.

Not knowing how long this might be, Gilmer had notified his labor force that "there might be a delay" in meeting the monthly payroll. A few of the men dependent on regular salaries for support of their families had found it necessary to seek employment elsewhere. The majority, however, decided to continue on the Fort Point roll until the end of January.

With funds already deposited to his credit in San Francisco, Gilmer had been able to pay for all services performed up to December 31, 1860, and for the greater part of the materials purchased. For the present, he was determined to push construction, and to trust that necessary funds would be forthcoming to "save the mechanics and laborers from injuries of a protracted delay" in their wages. Firms could be found willing to supply the government with materials on credit.[1]

General Totten, who had returned to duty as Chief Engineer, decided that the course of action being followed by Captain Gilmer was unwise. Orders were issued by the Department on January 14, directing that all construction activities be discontinued, and that "no further

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1. Gilmer to De Russy, Jan. 10, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer.

liabilities be contracted except for objects necessary to the preservation of the government property." Gilmer was called on for a report on all outstanding obligations, their amounts, and the dates they were due.[2]

Captain Gilmer, anticipating the Department's instructions, on January 31 had carried out Totten's orders. The labor force, except for a few men, was discharged.

2. General Johnston Orders the Fort Garrisoned

Before the end of February, the secession of seven states of the Lower South and the organization at Montgomery, Alabama, of the Confederacy had far-reaching repercussions on the nation, as well as the construction history of Fort Point. General-in-Chief Winfield Scott, the initial efforts to reinforce Fort Sumter rebuffed, had taken precautions. On January 19, 1861, he issued orders for his commander of the Department of the Pacific, Brig. Gen. Albert Sidney Johnston, to call down from Fort Vancouver, Washington Territory, two companies of artillerists to take post near San Francisco. Another company was to occupy Fort Point "with as little delay as possible."[3]

This message reached General Johnston's Presidio headquarters on February 15, and orders were issued for Company I, 3d U.S. Artillery, "to take post" at Fort Point. Johnston also issued instructions for Companies A and B, 3d U.S. Artillery, to embark on the steamer Oregon, at Fort Vancouver or Portland, and proceed to the Presidio and occupy the barracks vacated by Company I.[4]

Captain Gilmer was notified by General Johnston that he was to ignore the instructions of January 14 "to discontinue all construction . . . at Fort Point and to contract no further liabilities." In view of the orders to occupy Fort Point, Johnston directed Gilmer to make "the occupation secure and the place inhabitable."[5]

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2. Gilmer to Totten, Feb. 20, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer.

3. War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies (73 vols., 128 parts; Washington, 1880-1901), Ser. I, Vol. L, pt. 1, p. 434; cited hereafter as O.R.

4. Ibid., p. 443.

5. Ibid., p. 444.

Acknowledging Johnston's orders, Captain Gilmer announced, it will give "me pleasure to aid you to the extent of my ability in rendering occupation of the Fort secure, and putting the Quarters in a condition for a small Garrison." This could be done, provided the mechanics and laborers were assured that every effort would be made "to have funds sent, at an early day from Washington to pay them for their services."

Currently, he had some carpenters busy "fitting doors and laying flooring" in the gorge quarters. He had felt "authorized to transcend" his orders to this extent.[6]

General Johnston was a man of action. On the 18th he assured Gilmer that besides pressing Washington for release of the appropriated funds, he was directing his Quartermaster to pay the workmen from the first money received by him.[7] Relaying this information to General-in-Chief Scott, General Johnston asked him "to have a remittance made to Captain Gilmer," as the labor force had been re-employed on credit, and would soon suffer. This should not be difficult, because the appropriations for the fort had not been exhausted, and there were funds in the San Francisco sub-treasury.[8]

To clear himself of possible charges of disobedience of orders, Captain Gilmer on February 20 forwarded copies of this correspondence to Chief Engineer Totten. Because of the distance involved, it had been impossible to refer the matter to Washington, and he felt "authorized to transcend his instructions to the extent of hanging the doors and laying the flooring in the portion of the Barracks and Quarters essential to the accommodation of a garrison, and doing such other work as might be required to render the occupation of the fort secure."

To meet past and current obligations $16,000 was needed. He trusted the Department would promptly deposit this sum to his account, with the assistant treasurer in San Francisco.[9]

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6. Gilmer to Mackall, Feb. 16, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer. Maj. W. W. Mackall was General Johnston's Assistant Adjutant-General.

7. Mackall to Gilmer, Feb. 18, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer.

8. O.R., Ser. I, Vol. L, pt. I, p. 447.

9. Gilmer to Totten, Feb. 20, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer.

3. The Troops Arrive

Company I, 3d U.S. Artillery, Capt. John H. Landrum commanding, in accordance with General Johnston's instructions, occupied Fort Point on February 15, 1861. On doing so, Captain Landrum saw that: (a) there were two sentries constantly on duty, one at the sally port and the other on the barbette tier; (b) when the gates were closed and opened the officer-of-the-day was present, and entrusted with the keys; (c) the postern gate was never opened in the morning until the sentry on the barbette tier had made a circuit of the works, nor the main gate opened until the grounds within musket range of the fort had been reconnoitered by a patrol; (d) during the absence of the patrol the guard remained underarms; (e) the fastenings of the lower shutters were examined by the officer-of-the-day at retreat; (f) while a fatigue party removed powder and stores from the outer storehouse, the remainder of the garrison was underarms and at their posts; (g) there was no smoking on the parade ground; (h) no men, except those on duty, were permitted on the barbette battery; (i) no public property belonging to the Engineer Department was destroyed; (j) a supply of cartridges for the guns of the counterscarp battery were prepared and placed in the service magazines; (k) the main magazine was not opened or entered except in the presence of a commissioned officer; (l) until all cannon were mounted for defense of the ditch, loaded shells were kept on the land face of the barbette over the sally port; (m) the quartermaster prepared rough gun-racks; and (n) the regimental quartermaster was placed on duty at the fort until the place was put in order.[10]

Companies A and B, 3d United States Artillery, in accordance with General Johnston's orders, embarked on February 28 at Fort Vancouver, on the steamboat Oregon. Oregon entered the Golden Gate on the 4th, and orders were issued for the two companies to take post at Fort Point, relieving Company I. The next day they moved into the fort's quarters and barracks and Company I returned to the Presidio.[11] Maj. William Austine, as senior officer, assumed command of the garrison.

A number of laundresses had accompanied the artillerists to their new station and moved into the barracks on the bluff formerly housing the mechanics and laborers. In the rooms occupied by the women stoves were placed. To guard these structures against fire,

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10. O.R., Ser. I, Vol. L, pt. 1, p. 446.

11. Ibid., p. 450; NA, Returns from U.S. Posts, 1800-1916, Microcopy 617.

Captain Gilmer had "spark catchers" placed over the chimneys and sheet iron collars around the stove pipes, where they passed through the roofs.[12]

Capt. J. B. Moore of the California State Militia in April volunteered his unit to serve as a garrison at Fort Point. Brig. Gen. Edwin V. Sumner, who had reached San Francisco on April 24 and had relieved General Johnston the next day as commander of the Department of the Pacific, thanked Captain Moore for his "patriotic offer," but declined it on grounds that there were sufficient Federal troops "to guard all the property of the United States on this coast."[13]

General Sumner proposed to garrison Fort Point with 150 regulars. These troops, along with those at Alcatraz and Benicia, were to be supplied with six-months' rations. Arrangements were made to provide them water, so they would be independent and secure for six months.[14] Keeping this plan in mind, Sumner on May 13, one month after the surrender of Fort Sumter, redeployed several units of his command. Company G, 3d United States Artillery, recently arrived at the Presidio from Fort Vancouver, was transferred to Fort Point, replacing Company A which boarded a boat for Alcatraz.[15]

Major Austine in mid-May requested permission to use part of the building erected by the Engineer Department as a storehouse and quarters for the battalion sutler. Captain Gilmer, after inspecting the structure, acceded to Austine's request, provided the rear 12 feet of the building was partitioned off for his Department's use. In addition, the sutler was required to build "a close board fence between his store & the adjacent building now used as a carpenter's shop." This was to dimish danger arising from the soldiers' habits of throwing down butts of lighted cigars.[16]

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12. Gilmer to Austine, April 10, 1861, SFRC, RG 77, Ltr. Book, Entry 1922.

13. O.R., Ser. I, Vol. L, pt. 1, p. 471. General Johnston had resigned his commission to cast his lot with the Confederacy. Appointed by President Jefferson Davis to command of Department No. 2, Johnston was killed at Shiloh on April 6, 1862.

14. Ibid., p. 472.

15. Ibid., p. 484.

16. Gilmer to Austine, May 15, 1861, SFRC, RG 77, Ltr. Book, Entry 1922.

4. General Totten Releases the Remainder of the Appropriation

Four weeks before Captain Gilmer's plea for funds reached the Chief Engineer's desk, General Totten on February 27, 1861, had taken steps to relieve his subordinate's financial distress. On that date $10,000 was remitted to the assistant treasurer at San Francisco to be credited to the Fort Point account. With this action, the balance of the subject appropriation remaining in the Treasury was reduced to $3,000.[17] On March 19 General Totten forwarded this sum, and cautioned that all means currently available in the Treasury for benefit of Fort Point had been exhausted. The Department could not authorize Gilmer "to make any expenditures, or to incur any liability of any sort beyond the means already supplied."

Because of the current "embarrassed condition of the Treasury," it was impossible to authorize expenditure of the $50,000 appropriated for the next fiscal year.[18]

It was March 25 before Gilmer's letter of February 20 was read and answered by General Totten. Gilmer was directed "to confine yourself strictly to instructions heretofore given in regard to the arrangement and finish of quarters, barracks and other parts of the work." Under no circumstances was he to apply any funds at his command for "construction of the work to matters not embraced in your instructions."

Should General Johnston desire additional measures for comfort of the garrison, there were no objections to it being done under Gilmer's supervision, but the cost would have to be borne by the appropriation for barracks, which was under control of the Quartermaster General.[19]

5. Construction at Fort Point, January-June 1861

a. The Fort is "Essentially" Completed

Captain Gilmer, because of the financial difficulties in which

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17. Totten to Gilmer, Feb. 27, 1861, NA, RG 77, Ltrs. Sent, Chief Engineer.

18. Totten to Gilmer, March 19, 1861, NA, RG 77, Ltrs. Sent, Chief Engineer.

19. Totten to Gilmer, March 25, 1861, NA, RG 77, Ltrs. Sent, Chief Engineer.

his government found itself, had on two occasions in the first six months of 1861 to shut down the project. The first time was during the first 15 days of February and the second occasion was in April. When the hands worked, one to nine masons set coping along the centre of the scarp wall of the land front, left unfinished to facilitate communication with the Barbette Tier; finished the breast-height wall in the same area; built the sustaining wall across west end of the small ditch to the counterscarp gallery and culverts for the privy outlets; paved entrances to the tower stairways and sally port; and pointed masonry of the fort and shot furnaces.

Seven to 13 carpenters finished the octagonal shelters over the tower stairways; finished interiors of the barracks and quarters; layed the flooring and hung doors in the counterscarp magazine; fitted up the store- and guardrooms; finished the woodwork of the privies; made and hung doors in the fort and entrance to the counterscarp gallery; removed the temporary bridge from the fort's land front; put up casings in doors and windows in the quarters; laid floors and hung windows in the same; made and hung doors for store- and guardrooms, stairways, and sally port; and finished carpentry for the wash sinks in quarters and barracks.

Four plumbers installed pumps, pipes, and other fixtures for supplying water to the privies and other portions of the fort; adjusted the pan basins; put up a second pump for supplying water to the parade; and made connections with the sinks and tanks. Three to seven plasterers lathed and plastered the quarters, barracks, and hospital, and put on a hard finish coat. Two to five painters painted the iron- and woodwork of the fort, quarters, and barracks. Two blacksmiths secured traverse irons to the barbette platforms on the land front, and in the counterscarp gallery; made and fitted fastening for doors to storerooms; hung embrasure shutters in the counterscarp gallery; fabricated ironwork for the quarters, privies, etc.; and made bolts and other ironwork for heavy doors.

Two stone cutters dressed and fitted stone platforms for the counterscarp gallery howitzers; and set pavement connected with the privies and sally port. The stable-keeper and a teamster were kept employed hauling supplies, caring for the animals, and assisting the mechanics. Six to 20 laborers, besides assisting the artisans, excavated for the culvert at the west end of the ditch and for the small culvert leading from the quarters to the privy vaults; built a timber revetment to protect the plank road from encroachments by the sea; embanked and sodded the centre portion of the land front; and stored part of the machinery and implements to provide space for the garrison.[20]

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20. Gilmer to Totten, Feb. 9, March 9, April 10, May 9, June 10, & July 8, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer.

The construction force in March completed the operations deemed "most essential for the accommodation of a small garrison, and the safe occupation of the fort." Gilmer suspended all work involving much outlay. The stable keeper was retained on the public payroll as fort keeper to care for the public property, along with one mason to complete work connected with the barbette battery on the land front.[21]

Captain Gilmer on April 19 notified General Totten that in the two months since February 20, he had received sufficient funds to enable him to complete the interior finish of the quarters and barracks, including the painting; to introduce all water pipes and fixtures for the same and privies; to fit up the store-, guardrooms, and prison; and hang the inner postern, stairway towers, and counterscarp gallery doors.[22]

b. Finishing the Quarters, Barracks, etc.

In May, Captain Gilmer, on his own responsibility, employed a crew. To justify this action, he notified the Department it was desirable that

> the remainder of the permanent finish to the quarters and barracks . . . be completed, including the interior painting of the same; also, that proper doors and fastenings be put to store rooms, the guard rooms and prisons; pavements laid in them; the water pipe connexions, the water tanks, and the quarters & barracks be finished; and other minor operations of a like nature.[23]

As the work would be done with unobligated funds from the appropriation for the current fiscal year, General Totten raised no objection.

6. Morris' Proposal to Erect a Building for Public Entertainment

In May 1859, A. W. Morris had petitioned Secretary of War Floyd

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21. Gilmer to Totten, April 10, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer.

22. Gilmer to Totten, April 19, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer.

23. Gilmer to Totten, May 9, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer.

for authority to erect a building on the military reservation, at the terminus of the Presidio Stage Route. When asked for his comments by the Department, Captain Gilmer stated his opposition to the grant of the franchise.

Secretary Floyd, however, ignored Gilmer's recommendations, and on December 15, 1859, Morris was granted permission to erect a small house on the Fort Point Reservation. This authority had limitations: (a) the structure not to interfere with construction; (b) that it not be converted to uses "contrary to existing or future regulations for preservation of good order and discipline at the fortifications"; (c) if it should at any time be deemed a public nuisance, it was to be removed from the reservation on 30 days' notice, without cost to the government; and (d) the structure would not be disposed of without consent of the superintending engineer.[24]

Gilmer swallowed his pride, and Morris signed an agreement that the subject building would "not be converted to uses contrary to existing or future regulations for the preservation of good order & discipline at the fortifications now in course of construction . . . at Fort Point." Morris was reminded of regulations in effect that "no spirituous or intoxicating drink should be brought on the Reserve & offered for sale."[25]

On March 15, 1860, Gilmer was advised by the Department that it had been the intention of the Secretary to allow Morris "all the privileges enjoyed by the proprietor of the Hygenia Hotel at Old Point Comfort," among which was vending liquors to all persons, except soldiers and employees at the fort.[26]

Gilmer was never informed what "all the priviledges enjoyed by the proprietor of the Hygenia House" embraced, but he feared the worst. If built, Morris' inn would become "a common tavern for the sale of liquors to people frequenting the post, many of whom" would thereby become disorderly and interfere with good order and discipline. General Johnston's order throwing a garrison into Fort Point, and Floyd's resignation as Secretary of War gave Gilmer the opportunity he desired. He wrote General Totten on February 28, urging that

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24. De Russy to Gilmer, Dec. 17, 1859, NA, RG 77, Ltrs. Sent, Chief Engineer.

25. Gilmer to Totten, Feb. 28, 1861, SFRC, RG 77, Ltr. Book, Entry 1922.

26. De Russy to Gilmer, March 15, 1860, NA, RG 77, Ltrs. Sent, Chief Engineer.

authority for Morris to build and operate a hotel be withdrawn, because with soldiers at the fort the inducement to open a grog shop would be great.[27]

The Secretary of War approved Gilmer's request, and authority for Morris to erect a building for public entertainment was withdrawn.[28]

7. The Light House Board Asks Authority to Relocate the Light

The Light House Board and shipping interests were dissatisfied with the location of the Fort Point Light. With the completion and occupation of the fort, the Board requested authority to relocate the light from its position on the fill between the sea front and the surf, and establish it on some part of the fort. When General Totten was advised of this, he called on Captain Gilmer for information whether it would be "practicable and proper to place the light over the most salient stairway of the work, directly in rear of its present location."[29]

After making a study of the situation, Captain Gilmer reported, "it would be practicable to relocate the light" as suggested. Moreover, it would offer less obstruction to the guns in this location than at its present site. The keeper, however, would have to live outside the fort, "unless someone connected with the garrison" was appointed to attend the light.[30]

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27. Gilmer to Totten, Feb. 28, 1861, SFRC, RG 77, Ltr. Book, Entry 1922. Gilmer at the same time called the Department's attention to the building on Redoubt Hill, one mile south of the fort. It had been erected as a telegraph house to be occupied by lookouts reporting the approach of ships. The station had been removed to Point Lobos, and the house was no longer in use. As the site was needed for a redoubt, Gilmer feared its occupation by others could interfere with arrangements that "must be entered into between the City of San Francisco and the Government for title to this part of the Reserve."

28. Totten to Gilmer, April 12, 1861, NA, RG 77, Ltrs. Sent, Chief Engineer.

29. Totten to Gilmer, May 15, 1861, NA, RG 77, Ltrs. Sent, Chief Engineer.

30. Gilmer to Totten, June 20, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer.

The structure for the new light, Gilmer cautioned, must be of such "character that it could be removed without much delay should the necessity of a vigorous defense require such removal."[31]

The Civil War soon engrossed the nation's attention, calling for a readjustment of priorities. Several years would pass before steps were taken to relocate the Fort Point Light, which by that time would be endangered by encroaching surf.

8. Gilmer's Last Weeks at Fort Point

a. Captain Gilmer Resigns from the U.S. Army

The bombardment and surrender of Fort Sumter on April 13, 1861, followed two days later by President Lincoln's call for 75,000 volunteers to suppress "combinations" in seven states "too powerful to be suppressed by the ordinary course of judicial proceedings," led to the secession of four states of the Upper South. The withdrawal of North Carolina, his native state, from the Union was a traumatic experience for Captain Gilmer. On June 11 he made his decision. He wrote the Adjutant General, resigning his commission in the Army of the United States, with a request for its early acceptance.[32]

Informing General Totten of his decision, Gilmer requested that "the Department assign an officer to relieve me of my present duties . . ., and of my money and property responsibilities, to the Government, at as early as day as possible." Such action would constitute a great personal convenience.[33]

General Totten on July 2 acknowledged receipt of Gilmer's letter of resignation. Taking cognizance of Gilmer's request, it was agreed that it was to take effect on June 29.[34]

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31. Gilmer to Michler, June 10, 1861, SFRC, RG 77, Ltr. Book, Entry 1922. Lt. N. Michler was engineer in charge of lighthouse construction on the Pacific coast.

32. Gilmer to Thomas, June 11, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer.

33. Gilmer to Totten, June 11, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer.

34. Totten to Gilmer, July 2 & 3, 1861, NA, RG 77, Ltrs. Sent, Chief Engineer.

b. Work Accomplished in F.Y. 1861

On July 20 Captain Gilmer turned over to his long-time assistant, Lieutenant Elliot, responsibility for the project, along with the money and property for which he was charged. In relaying this information to Chief Engineer Totten, Elliot reported that by the end of the month, the workmen "will have finished all that is necessary for the defence of the place, as far as the fort proper & its counterscarp gallery is concerned."[35]

Lieutenant Elliot on August 10 mailed to the Department the annual report describing construction activities at the fort in Fiscal Year 1861. Operations during the year, carried out under Captain Gilmer's supervision, had embraced: (a) filling in the earthwork of gorge rampart, and placing thereon platforms for 11 32-pounders and 2 columbiads; (b) fitting the iron traverse rails to the columbiad and gun platforms of the barbette tier; (c) construction of a second 15-foot shot furnace on the parade; (d) finishing the interior of the main and service magazines, and hanging the doors of same; (e) finishing the interior of the barracks, quarters, privies, guard-, prison-, and storerooms, including plasterers', carpenters', painters', and plumbers' work; (f) placing of a large iron tank in the 3d Tier; (g) providing a force pump for its supply, and another on the parade; (h) building the interior culverts; (i) constructing penthouses over the tower stairways; (j) sodding the terreplein of the barbette tier; (k) erecting a flagstaff; (l) paving stairway towers, guard-, prison-, and storerooms, the sally port and ramp; (m) setting traverse stones of counterscarp gallery and putting the iron rails thereon; (n) building a wooden bulkhead for protection against the sea, 174 feet long, around the East Bastion; (o) erecting a 4-foot wall at west end of ditch, between pan coupé and the counterscarp gallery; and (p) painting the penthouses and ironwork of colonnade and embrasures.[36]

c. Elliot Comes to Gilmer's Defense

Despite the accomplishments made during his superintendency, including the completion of the fort and its garrisoning, Captain Gilmer's resignation was viewed with suspicion by certain elements in and around San Francisco. Lieutenant Elliot was disgusted to hear stories that certain persons were determined to cause Captain Gilmer trouble. They were rumored to have forwarded dispatches by

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35. Elliot to Totten, July 23, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer.

36. Elliot to Totten, Aug. 12, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer; Executive Documents, printed by Order of the Senate of the United States for the 2d Session of the 37th Congress, 1861-62 (Washington, 1862), Serial 1118, vol. 1, pt. 2, pp. 104-105.

pony express, stating that he was disloyal to the United States; that he had espoused the cause of the Confederacy; and that he had taken with him on his departure "copies of the drawings" of Fort Point and Alcatraz.

Writing General Totten on September 16, Elliot assured his superior, I know the last charge to be false, and "I believe the others are." He trusted Totten would have an opportunity to befriend Gilmer on his arrival in New York City, should there be any difficultly because of these unfounded stories.[37]

Although the North had fought and lost 1st Manassas, Gilmer, on landing in New York City, was allowed to pass through the lines. Reaching Richmond, he cast his lot with the Confederacy and was commissioned lieutenant colonel of Engineers by President Davis on September 1, 1861, and ordered to report to the commander of Department No. 2, Gen. Albert Sidney Johnston.

B. Lieutenant Elliot as Acting Project Engineer, July-November 1861

1. The Formulation of the Program for F.Y. 1862

a. Congress Appropriates

Chief Engineer Totten on March 9, 1861, had notified Captain Gilmer that Congress by an act approved by President Buchanan on the 2d had appropriated $50,000 for Fort Point and its outworks for the fiscal year ending June 30, 1862.[38]

b. Captain Gilmer's Program

Gilmer, on receipt of this information, prepared and submitted an operating program. He proposed to: (a) finish the carpentry work of the officers' quarters and of the washing sinks in the barracks; (b) apply three coats of paint to the interior work of the quarters and two additional coats on "the greater part of the finish of barracks"; (c) plaster one coat (hard finish) in the officers quarters; (d) finish the storerooms, prison, and the tank room; (e) hang the doors to the stairway towers, in the counterscarp gallery, and the inner doors of the sally port; (f) pave the sally port

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37. Elliot to Totten, Sept. 16, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer.

38. Totten to Gilmer, March 9, 1861, NA, RG 77, Ltrs. Sent, Chief Engineer.

and counterscarp gallery; (g) set the remaining traverse stones (3 circles) in the counterscarp gallery; (h) lay the flooring in one of the magazines of same and hang the doors; (i) set the coping on the walls, cover the tops of the arches with asphaltum and place the dry brickwork, gravel & earth, thereon; (j) grade the main ditch; (k) provide means for conducting water from the aqueduct of the San Francisco Water Company into the fort cisterns; (l) extend the culvert from the privy vaults to low water mark; (m) repaint the fort ironwork; (n) cover the parade with clear gravel or pave it with washed stones; (o) finish the plumbing of the quarters and barracks; and (p) execute the many minor details.[39]

c. The Program as Approved

On May 7 General Totten approved Gilmer's program, except for "asphalting the tops of the counterscarp gallery arches, and placing the dry bricks, gravel and earth, thereon, and covering the parade with washed stones."

The subject arches must remain uncovered at present, as their superstructure was liable to be modified by the project for the exterior works. If Gilmer put anything on the parade, it was to be "very fine gravel, so as not to increase the trouble from exploding shells."[40]

2. Elliot Seeks Approval of Additional Projects

The casemated fort was all but completed by July 1, 1861. All that remained to be accomplished was the hanging and painting of a few doors; paving the parade; and placing a garde-fou on the coping of the parade walls, to prevent accidents to men crowded on the narrow terreplein. The counterscarp gallery, however, required more work. Its gun platforms were down, one magazine was finished, and it was ready to receive its armament. The gallery, because of the high cost of cement, had not been paved, but this would not interfere with the defense. Its roof was in the same condition as it had been at the time of General Totten's January 1860 visit. (The surfaces were formed and cemented, so that they were watertight, but the mastic had not been applied.)

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39. Gilmer to Totten, April 10, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer.

40. Totten to Gilmer, May 7, 1861, NA, RG 77, Ltrs. Sent, Chief Engineer.

Relaying this information to General Totten, Lieutenant Elliot suggested that: (a) "an underground communication between the main work & the gallery" be constructed; and (b) there were insufficient storage facilities within the fort. To correct the latter, he recommended the erection of a "copious storehouse in the re-entrant in rear of the workshops, or else a storeroom should be provided in rear of the counterscarp wall." The two storerooms in the fort were each 16' x 10' x 26', and could hold about 75,000 rations or rations for 600 men for 120 days. There was, at present, no room for quartermaster and ordnance stores.[41]

Although funds were available for positioning the garde-fou and paving the parade, Elliot believed they might be better applied to construction of outworks on the crest of the bluff south of the fort, or replacement of the columbiad platforms in the 10-Gun Battery with 42-pounder platforms to accommodate tubes stored in the ordnance yard. Major Austine had appropriated the columbiads formerly mounted in this work for the barbette tier of the fort. The wooden columbiad platforms, it had been discovered, were badly warped, because of unequal settlement. Platforms for ten 42-pounders would cost about $4,000, thus absorbing all but $3,500 of the current Fort Point appropriation.[42]

General Totten on September 6 ordered Elliot not to pave the parade. The garde-fou need not be placed until the receipt of further instructions, and the cemented roofs of the counterscarp gallery to remain as they were. As soon as the opportunity occurred, the Department would prepare and forward instructions "relative to storage and barracks casemates," which could be provided for in the coverfaces.[43] Nothing was said about the proposal to fortify the bluffs or to replace the platforms in the 10-Gun Battery.

3. Work Accomplished, July-October 1861

In July and August, 1861, seven carpenters were employed finishing the quarters and privies; making and hanging doors for the guard-, prison- and storerooms, and tower stairways; and doors and shutters for the counterscarp gallery magazines. Two blacksmiths

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41. Elliot to Totten, July 23 & Aug. 12, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer. The brackets for the garde-fou were in position.

42. Elliot to Totten, July 23, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer.

43. Totten to Elliot, Sept. 6, 1861, NA, RG 77, Ltrs. Sent, Chief Engineer.

shoed animals, fabricated bolts and hinges for the heavy doors, and repaired tools. A stone cutter set traverse stones in the counterscarp gallery, made blocks for lock bolts of storeroom doors, and cut steps for the outer doors to tower stairways. Four painters painted interiors of quarters and barracks, penthouses, privies, colonnade, doors and shutters of storerooms, prison, etc. A plumber was completing "the arrangement for water supply of barracks, quarters, and privies"; while an applicateur was applying asphaltic floors in the storerooms. Six laborers assisted the artisans laying pipe for continuation of the fort's main drain, cutting brickwork for bolt blocks, excavating ditch of counterscarp gallery, and cleaning out cellar magazine. One stable-keeper and a teamster were caring for the public animals and transporting supplies. One overseer was replacing the wire gauze in the magazine ventilators and laying bricks.[44]

During the first week of September, the programmed work was completed so Lieutenant Elliot discharged the labor force, except for the mastermason, a blacksmith, and several laborers. They would be retained on the payroll until such time as the wall of the counterscarp ditch had been finished; the rests for the sally port doors, and the hooks and bolts for other doors set; and the dry stone apron in front of the shops repaired. The blacksmith continued to fabricate hooks and bolts for doors, traverse irons for the counterscarp gallery, and ventilators. The laborers, besides assisting the mechancis, hauled and stored materials in the engineer storehouse, and set four Spanish cannon for "fenders" at the entrance and exist to the sally port.[45]

C. Colonel De Russy Returns to California

1. General Totten Selects De Russy to Replace Gilmer

The resignation of Captain Gilmer, along with several other officers of the Engineer Corps, confronted General Totten with the problem of finding replacements. Expansion of the army from a few thousand to hundreds of thousands had necessitated the assignment of other senior or promising young engineers to staff duties with the armies. In selecting a replacement for Gilmer, Totten on September 5, 1861, chose Colonel De Russy. He was to transfer operations for which he was responsible to Capt. C. S. Stewart, preparatory to departing for San Francisco early in October, where he would take

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44. Elliot to Totten, Aug. 5 & Sept. 6, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer.

45. Elliot to Totten, Sept. 12, and Elliot's Reports of Operations for September & October 1861, NA, RG 77, Ltrs. Recd., Chief Engineer.

charge of "all Engineer operations there." The resignation of Captain Gilmer and the recall of Lieutenant McPherson, "together with the early probable commencement of active construction at Lime Point Bluff, as well as the general condition of affairs," made it important to have a ranking Engineer officer on the Pacific coast.[46]

General Totten, on the following day, wrote Lieutenant Elliot, informing him of Colonel De Russy's reassignment. Upon De Russy's arrival, Elliot would turn over to him responsibility for operations of the Department in San Francisco Bay and serve as his assistant.[47]

2. De Russy Takes Charge

His orders found Colonel De Russy at Fort Monroe. He had been stationed there since leaving Washington, and the position of Acting Chief Engineer on General Totten's return to the Department from his extended inspection tour. Colonel De Russy had packed his gear and transferred the papers and funds for which he was responsible to Captain Stewart by September 23, when he boarded a Chesapeake Bay steamer for Baltimore. He planned to call on General Totten in Washington, before continuing on to New Brunswick, New Jersey, where his family had been living since his assignment to Fort Monroe. But, at the time he disembarked, he was suffering from a high fever, and he determined to catch the train for his family's home. It was the 29th before De Russy was able to report his whereabouts. On doing so, he informed Totten that he was confined to his house with what his physician diagnosed as catarrh fever. He was beginning to recover, and he hoped to be ready to start for California on October 11.[48]

De Russy sailed from New York City as scheduled, and, reaching San Francisco on November 7, he took charge from Lieutenant Elliot. He found on the public payroll at Fort Point four employees--a stable-keeper, overseer, clerk, and orderly. The overseer was pointing masonry and the stable-keeper was caring for the animals and working on the road. Notifying General Totten of his arrival, De Russy requested that $10,000 from the Fort Point appropriation be credited to his account with the Assistant Treasurer in San Francisco.[49]

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46. Totten to De Russy, Sept. 5, 1861, NA, RG 77, Ltrs. Sent, Chief Engineer.

47. Totten to Elliot, Sept. 6, 1861, NA, RG 77, Ltrs. Sent, Chief Engineer.

48. De Russy to Totten, Sept. 29, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer.

49. De Russy to Totten, Nov. 20, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer.

3. The December 1861 Storms

It was fortunate that De Russy had called for this money, because in December a series of violent storms hammered the area, and the temporary bulkhead shielding the East Bastion was partially destroyed by the surf. To effect repairs 19 laborers were added to the payroll and turned to under supervision of the overseer. This crew worked throughout the winter of 1861-62 shoring up and extending the bulkhead.[50]

4. Lieutenant Elliot is Transferred

Colonel De Russy in late January 1862, in accordance with instructions from Chief Engineer Totten, assigned to Lieutenant Elliot supervision of operations at Alcatraz, "with the funds, property, and all responsibility pertaining to the works of construction on that island."[51] Thus De Russy was deprived of the services of his capable assistant. Initially, De Russy experienced no difficulty wearing two hats. Besides his Fort Point duties, he was senior engineer on the Pacific coast. But before many months, he found that infirmities associated with old age, compounded by an increasingly heavy work load, was sapping his vigor and he was compelled to call on the Department for help.

D. Military Construction at Fort Point, February 1862-June 30, 1863

1. The Approved Program

Chief Engineer Totten on February 22, 1862, notified Colonel De Russy that Congress by an act approved by President Lincoln on the 20th had appropriated $300,000 for Fort Point in the fiscal year ending June 30, 1863.[52] The mail pouch with this important message was delivered to De Russy on April 14.

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50. Reports of Operations at Fort Point for Dec. 1861, and Jan.-April 1862, NA, RG 77, Ltrs. Recd., Chief Engineer. To protect the East Bastion from the surf, a heavy timbered bulkhead, 174 feet in length, had been built. Where the distance was not too great, the bulkhead was connected to the foundations of the scarp by iron rods.

51. Totten to De Russy, Jan. 27, 1862, NA, RG 77, Ltrs. Sent; De Russy to Totten, Jan. 29, 1862, NA, RG 77, Ltrs. Recd., Chief Engineer.

52. Totten to De Russy, Feb. 22, 1862, NA, RG 77, Ltrs. Sent, Chief Engineer.

Replying, he promised to forward within a few days a program for expenditure of this sum.[53] More than six months, however, passed before De Russy submitted an operating program. During Fiscal Year 1863 he proposed to: (a) position the garde-fou on the terreplein of the land front. The subject railings, he continued, should be continued on the coping of the sea fronts, as the terreplein was narrow and in an engagement there was danger of men falling to their death. (b) The rear of the casemates of the 2d and 3d Tiers would also be protected by railings of lighter iron, constructed to be removed or opened if necessary. (c) As the parade was dusty in dry weather and muddy in the rainy season, it would be coated with several inches of asphaltum. (d) There was much pointing to be done on the 2d and 3d Tiers, where some of the brickwork had begun to disintegrate near the joints; (e) In firing the barbette guns, some of the brick masonry atop the scarp had been shattered. This would be replaced. (f) The floor of the casemates in the counterscarp gallery should be filled to the proper level and paved with brick; the coping over this gallery required coping; the wall connecting it with the main work should be built; and the arches covered with asphalt. (g) The service magazines and one of the main magazines in the fort needed to be lined. The estimated cost of these projects was $22,571.84.[54]

The remainder of the appropriation would be used to begin construction of the seawall for protection of the site.

General Totten vetoed much of De Russy's program. In addition to beginning construction of the seawall, De Russy was to build permanent platforms for 42-pounder smoothbores in the 10-Gun Battery; point and repair brickwork where required; pave the counterscarp gallery; and alter the recesses for the gun carriages on the 1st and 2d Tiers.

2. Work Accomplished

a. Repair of Flood Damage

Torrential rains followed by floods, in the late winter of 1861-62, caused heavy damage to cities and villages in the Bay area. These floods played havoc with the reservation roads. The plank road leading to the wharf was washed away in places and covered with tons of stone and earth at others from landslides. The road connecting the wharf with the Presidio was eroded.

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53. De Russy to Totten, April 14, 1862, NA, RG 77, Ltrs. Recd., Chief Engineer.

54. De Russy to Totten, Oct. 1862, NA, RG 77, Ltrs. Recd., Chief Engineer.

With the end of the rainy season in April, Colonel De Russy diverted his labor force, which had increased to 22, from repair of the bulkhead to the roads. Landslides were cleared, roads widened, and the one from the fort to the wharf macadamized with stone from "the sea beach."[55]

b. New Platforms for the 10-Gun Battery

De Russy in April 1862 employed ten stone cutters to dress traverse stones and a blacksmith to fabricate irons for the 10-Gun Battery. The warped wooden columbiad traverse circles were taken up, concrete poured, and the masons put down "new permanent pintles-blocks and traverse circles" for ten 42-pounders. The parapet and terreplein eroded by the winter's rains were repaired and resodded. By September 30, when he made his report for the period July 1, 1861-to September 30, 1862, Colonel De Russy announced that as soon as the iron pintles were inserted in the blocks, the battery would be turned over to the garrison to receive its armament, which had been on hand for years.[56]

The work, however, dragged. It was January 1863 before the pintle blocks were positioned, and the ten 42-pounder smoothbores mounted. Next, the banks behind the battery were graded and sodded.[57]

c. Lining the Magazines, Paving the Counterscarp Gallery, Altering the Recesses, etc.

Other projects undertaken in the period, April-September 1862, included whitewashing of fences and the mechanics' and laborers' quarters; repair of tools, wagons, and carts; and routine maintenance activities.[58]

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55. Monthly Reports of Operations for April-Aug. 1862, NA, RG 77, Ltrs. Recd., Chief Engineer.

56. Ibid.; De Russy to Totten, Annual Report 1862, NA, RG 77, Ltrs. Recd., Chief Engineer.

57. De Russy to Totten, Feb. 14, 1863, NA, RG 77, Ltrs. Recd., Chief Engineer.

58. Monthly Reports of Operations for April-Sept. 1862; De Russy to Totten, Annual Report 1862, NA, RG 77, Ltrs. Recd., Chief Engineer.

De Russy in the late summer of 1862 suffered terribly from rheumatism, which he attributed to the damp Bay weather and the Fort Point winds. This affliction delayed preparation of his annual report, due September 30, and on October 10 he requested of General Totten an "indulgence of a few days."[59]

A number of artisans and laborers were employed at the fort in the autumn and winter of 1862-63. The six service magazines in rear of the stairway towers, along with the filling room adjoining the main magazine, were lined and the inner doors (with proper metal fastenings) hung. Laborers in their spare time filled in the spaces between the traverse circles in the counterscarp gallery with clay and sand, preparatory to paving with brick. The masons altered the recesses for the gun carriages in the 1st and 2d Tiers.[60]

De Russy in 1863 employed a large force, most of which worked on the seawall. But from time to time a few artisans and laborers undertook projects connected with the fort. The recently lined magazines were painted; the 10-Gun Battery fenced; the quarters whitewashed; and a number of arches repointed and embrasures altered.[61]

E. Military Construction at Fort Point, Fiscal Year 1864

1. The Program

On April 15, 1863, General Totten wrote Colonel De Russy that Congress by an act signed by President Lincoln on February 20 had appropriated $200,000 for the works at Fort Point for Fiscal Year 1864. Secretary of War Edwin M. Stanton had decided that "this appropriation may be considered available at once."

De Russy would prepare and forward for approval an operating program. It was to include the unexpended balance of $192,000 currently credited to the Fort Point account.[62]

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59. De Russy to Totten, Oct. 10, 1862, NA, RG 77, Ltrs. Recd., Chief Engineer.

60. Monthly Reports of Operations for Oct.-Dec. 1862; De Russy to Totten, Feb. 14, 1863, NA, RG 77, Ltrs. Recd., Chief Engineer.

61. Monthly Reports of Operations for Feb.-Aug. 1863, NA, RG 77, Ltrs. Recd., Chief Engineer.

62. Totten to De Russy, April 15, 1863, NA, RG 77, Ltrs. Sent, Chief Engineer.

The inflation, daily fluctuations in value of Treasury notes, and refusal of businessmen and laborers to accept them at par proved embarrassing. In preparing estimates for his program, De Russy made them in gold, rather than adding from "one-third to one-half the amount to meet the value in gold of the articles to be purchased and the labor to be paid." This was done in hopes the authorities would authorize use of gold instead of greenbacks on the Pacific coast.[63]

De Russy proposed to employ the funds appropriated for Fort Point to: (a) add garde-fous to the terreplein and sea fronts and in rear of the casemates of the 2d and 3d Tiers; (b) adjust and widen the traverse circles in the casemates; (c) asphalt the parade ground and the roof of the counterscarp gallery; (d) add coping to the counterscarp gallery and pave its floor with brick; (e) build a shot furnace for the 10-Gun Battery; and (f) repoint the fort masonry where needed. These improvements would cost $22,396.54.

Two-hundred sixty thousand dollars would be programmed for construction of the seawall in Fiscal Year 1864.[64]

The Department once again vetoed certain of De Russy's proposals. The ones relating to the counterscarp gallery, the asphalting of the parade, and construction of a third shot furnace would be deferred.

2. Work Accomplished

During the ten months, October 1863-July 1864, the construction force put down traverse irons for iron carriages and pintle-blocks in 90 casemates. Garde-fous were positioned on the coping of the terreplein of the barbette tier; wooden flooring of the coping of the terreplein of the barbette tier; and of the barbette balcony were laid; brickwork pointed; and the ironwork painted.[65]

F. The Construction of the Seawall

1. Totten Advises on the Mode of Construction

Congress in February 1862 had appropriated $300,000 for construction at Fort Point. Most of this sum would be allotted to

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63. De Russy to Totten, July 26, 1863, NA, RG 77, Ltrs. Recd., Chief Engineer.

64. Ibid.

65. Monthly Reports of Operations for Nov. 1863-July 1864; De Russy to Delafield, Sept. 22, 1864, NA, RG 77, Ltrs. Recd., Chief Engineer.

building a seawall to protect the site against the encroaching sea. The project superintendents for several years had been warning of this danger. By 1860-61 Captain Gilmer had become so alarmed by the eroding away of the fill that he had had a timber bulkhead, 174 feet in length, erected to shield the East Bastion. In the summer of 1861 it was discovered that the surf was "gradually undermining" the bluff crowned by the 10-Gun Battery, and Lieutenant Elliot had urged the Department to give high priority to construction of "a permanent seawall from the counterscarp gallery southward."

With funds now available, General Totten on March 11, 1862, issued instructions for Colonel De Russy "to begin work as soon as practicable; and with as large force and means as can be advantageous applied" on the seawall. Sections of the wall to be commenced immediately were those in advance of the East Bastion, including both "branches meeting at angle C [on the attached drawing] and such portions of the next two branches as may be necessary at once to commence." This was ordered without reference to Gilmer's bulkhead.

The seawall would serve two functions: to protect the fort from the sea; and to underlay "a superstructure more or less lofty" exposed to "the shock of the waves." This required three modes of construction. Topography would govern whether Mode I or II was employed, while location of the casemated coverfaces would dictate the use of Mode III.

a. Mode I

This type of construction would be employed where the ground behind the projected wall was level. The backing would be raised to the height of the face of the wall, and in Form II the earth would be embanked to a greater height. Form I would extend from Angle C around the channel side of the fort. Generally, it would begin at reference (0). The foundations, whether commenced at zero or below, would be concrete up to reference (2'). It was recommended that the stone facings of the upper four courses be two feet thick, leaving those below 1½-foot thick. The coping course would be 2-foot thick at the back, even if it increased the cost. If necessary to pare costs, the courses below the coping could be as thin as 12 inches.

The upper outer edges of the facing stones were to be broken away to leave only 2 or 3 inches of the top surface projecting beyond the lower outer edge of the stone next down. No attempt would be made to hammer these faces or to place even a drift around the edges. The bond would be alternate headers and stretchers--the headers in lengths of 3, 4½, and 6 feet in about equal proportions, and the stretchers with beds not less in width than the height of the course plus the projection of its bed beyond that of the course above. Ends of the stretchers would be connected with the headers by a dove tail.

Strips of iron would be forced into the joint in several places to secure actual contact independent of the mortar of the joint.

Experience had demonstrated that cement pointing of the best grade would be dislodged by the surf. As a substitute for cement pointing, De Russy was to take strips of course bagging, about ten inches wide, and, after saturating them with pure bitumen, fold them twice into a strip 2½ inches wide, and lay them "in a manner to occupy for its full length the place of cement pointing under and against the sides of every stone." The rounded edge of the strip would be pointed outward, a little within the edges of "the stone to save it from violence." The layer of cement mortar underneath the stone and against its side must not be too thick to keep the stone from bearing fully upon and against the pointing strip.

The coping course was to consist of "through headers, connected on each side with stretchers 5 or 6 feet long, two or three stretchers making up, in their united width, the whole breadth (6 feet) of the top of the wall." Before the headers were laid, they would be drilled to take a 1½-inch iron bolt. Two such holes would be drilled through each front stretcher. After the stones were laid and secured, the holes would be continued downward into the face stones below.

Each bolt was to have two or three saw cuts made into its lower end, near the outside, and for a depth of about one inch. Into each of these cuts, a thin wedge would be stuck as the bolt was dropped and driven through the coping stone into the course below. Several similar cuts in the top of the bolt would receive similar wedges. Before being driven into position, the bolts should be heated in boiling water and smeared with hot bitumen. After being seated a little pine bitumen would be poured on top, and the hole sealed with cement mortar.

After the coping had been laid and secured by the bolts, iron strips were to be forced into the joints. Earth was to be packed between the wall and counterforts as the courses of stone were laid.[66]

b. Mode II

This mode of construction was called for where there was a steep slope behind the projected wall. The face would be similar to that of Mode I. Its foundation would be founded on and backed by concrete. Its coping would be like that of Form I. Wherever it abutted against rock, it was to be stepped into it. The counterforts were to be connected with the rock, and be of concrete (four feet thick and six feet

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66. Totten to De Russy, March 11, 1862, NA, RG 77, Ltrs. Sent, Chief Engineer.

long) to the impost of the vertical arches resting against them. Beyond these imposts, they would be extended to a length of ten feet. At a height of 10 feet (reference 12), they were to receive an arch 1½-brick thick, the skewbacks of which would carry up the top of the counterfort to reference (13). The vertical arch was to be two bricks in thickness laid flatwise, as in straight walls, and carried up to the soffit of the arch with horizontal imposts.

The front wall, counterforts, and vertical arch raised to the requisite height, the interstices would be filled with earth rammed "in thin horizontal layers."

When about to be covered, the entire breadth of ten feet behind the front wall would be shaped to receive a 1½-brick arch, of 2-foot rise, resting on the counterforts, as heretofore described at reference (12).

These arches being turned and covered, sand would be piled between and upon them, raising "in a plane from reference (15') at the back of the coping to reference (16') 10 feet farther back."

The sand layer would be covered by stone paving about one-foot thick, the stretchers 12 or 18 inches wide, embedded in the sand. The paving stone would neither be cut nor hammered.

Earthenware drainage pipes of one and one-half inch diameter would be built into the wall, with a slight descent. Their outlets would be above high tide.[67]

c. Mode III

The seawall designed to serve as a foundation for a coverface would be four feet wider than Mode II and have no counterforts. Instead of a course of coping, the top course would be like those below, made up on the face of alternate headers and stretchers, and be no thicker than other courses. Its top surface would be level, at reference (16'), with concrete backing. The foundations and curve of the front talus would be similar to Mode I.[68]

d. Special Instructions

In building Mode I, near front Z, a ditch similar to that fronting the counterscarp gallery must be extended to the seawall. The rear

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67. Ibid.

68. Ibid.

of the seawall corresponding to and closing the ditch must be faced on both sides with stone, and provision made to permit discharge of drains and sewers into the sea. From Z to G to serve as a scarp to this ditch, there would be built a wall ten feet thick, vertical on both sides, faced with brick on the ditch side, but backed by concrete. This wall would rise with the seawall, and be jammed against the foundations of the counterscarp gallery.[69]

2. Work Begins

a. Griffith Gets the First Stone Contract

Colonel De Russy on May 2, 1862, acknowledged receipt of Totten's instructions and a drawing of the projected seawall. These had been studied and preparations made "to establish lines of the wall with a view to a speedy commencement of operations." Should any difficulty be encountered in tracing the lines, it would be reported to the Department.[70]

Recently received instructions from the War Department troubled Colonel De Russy, and he hesitated to enter into any contracts until they were resolved. If he understood correctly, the $25,000 deposited to his credit with the Sub-Treasury in San Francisco could only be used for wages. If so, he wrote Chief Engineer Totten, he could not "progress far with the Sea Wall until I get funds to purchase the materials required to build it." He accordingly requested "a remittance of $20,000 for materials for construction" of the Fort Point seawall.[71]

Before a reply was received, De Russy sailed for the mouth of the Columbia River to make a study of fortifications proposed for that area. On his return to San Francisco on June 9, he was handed a telegram from Totten, dated the 2d, directing him "to begin work on the seawall, drawing on funds recently appropriated by Congress for defenses at Fort Point."[72]

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69. Ibid.; "Sketch of Fort Point, Showing in Black the Outline of the New Sea Wall," March 11, 1862, NA, RG 77, Drawer 94, Sheet 46.

70. De Russy to Totten, May 2, 1862, NA, RG 77, Ltrs. Recd., Chief Engineer.

71. De Russy to Totten, May 3, 1862, NA, RG 77, Ltrs. Recd., Chief Engineer.

72. Totten to De Russy, June 2, 1862, NA, RG 77, Ltrs. Sent, Chief Engineer. The trans-continental telegraph linking Washington, D. C., with San Francisco had commenced operating in the winter of 1861-62.

To calm fears in the Department that he might have "the slows," De Russy reported he was currently examining quarries, looking for stone of suitable quality and size for his seawall. To encourage owners, he had announced his intention of receiving proposals for delivery of the three sizes of stone referred to in the Chief Engineer's instructions--2-foot, 1½-foot, and 1-foot. By calling for stone of these dimensions, he hoped to procure it at a lower cost and in such quantities as to insure rapid construction.[73]

More than two months, however, passed before De Russy on August 20 mailed to the Department for approval the contract for granite he had signed with G. Griffith of Folsom. Griffith proposed to supply the dimensional stone enumerated for $1.62 per foot for coping and $1.16 for the face of the wall. In explanation of the relative high cost, De Russy wrote that he had sought to obtain local sandstone, but found it impossible to secure it in "sufficient dimensions to carry on the wall with even one foot courses." When he had advertised, the lowest bid for granite had been submitted by a Mr. Dana, also of Folsom. But on ascertaining the high cost of transportation from his quarry to the Fort Point wharf, Dana had withdrawn his proposal.

With the nation fighting for its life, a new procedure had been introduced into government contracts. Along with a performance bond, the contractor was compelled to take the oath of allegiance, and the contracting officer to certify that he was "a firm Union man."[74] Griffith experienced no difficulty in meeting this standard.

b. Griffith has Trouble Making Deliveries

General Totten on November 25, 1862, approved the contract, by which time Griffith had already commenced delivery.[75] Griffith, however, was unable to keep pace with the 14 stone cutters hired by Colonel De Russy. When pressed by De Russy to accelerate deliveries, the contractor explained that the railroad would not provide him with the necessary rolling stock. De Russy accordingly contacted the superintendent of the railroad. To prevent Griffith from defaulting on his contract and to facilitate construction of the seawall, the railroad

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73. De Russy to Totten, June 10, 1862, NA, RG 77, Ltrs. Recd., Chief Engineer.

74. De Russy to Totten, Aug. 20, 1862, NA, RG 77, Ltrs. Recd., Chief Engineer.

75. Totten to De Russy, Nov. 25, 1862, NA, RG 77, Ltrs. Sent, Chief Engineer.

was asked to place one or two cars exclusively at his command. The railroad was agreeable.[76]

When the situation failed to improve, Colonel De Russy dispatched Master-Mason Ashley to Folsom to examine and report on the prospect of the government obtaining the granite in quantities required. If Griffith were unable to meet the army's delivery schedule, Ashley was to make agreements with other quarrymen for a "partial supply of the best kind and proper dimensions of granite at the same price now allowed."[77]

Ashley's report was verbal. Apparently, he found no "supplemental suppliers" for stone at the contract price, because on March 16, 1863, De Russy reported that Griffith had stepped up deliveries. If this continued, the work would progress more favorably. Heretofore on several occasions, De Russy had been compelled to furlough stone cutters for want of granite.[78]

c. De Russy Reports Good Progress

Before any stone was delivered, there were several maintenance projects that had to be undertaken. The wharf had been declared unsafe, because of rotten planking, for the passage of teams. By August 1862 it had been repaired, and was ready to receive granite and other heavy materials to be used in building the seawall.

To support construction of the seawall, the engineering facilities were expanded. A stoneshed 110 feet long was erected to shelter stone cutters during the rainy season. Next, a boathouse and new blacksmith shop and forge were built.

In October 1862 a large force of laborers were hired and commenced excavating for the seawall's foundation, receiving materials at the wharf, and breaking and making concrete. The excavating was slowed by the need to blast away huge boulders. Concrete for the foundations was then poured, and in November the first courses of granite laid. By January 31, 1863, 6,510 cubic feet of granite had

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76. De Russy to Robinson, Dec. 8, 1862, SFRC, RG 77, Ltr. Book, Entry 1922.

77. De Russy to Ashley, Dec. 17, 1862, SFRC, RG 77, Ltr. Book, Entry 1922.

78. De Russy to Totten, March 16, 1863, NA, RG 77, Ltrs. Recd., Chief Engineer.

been received and 1,874 cubic feet laid on the wall. One-hundred and seventy-five feet of wall had been raised to reference 6'6". At its base the wall was 13 feet thick.[79]

3. A Necessary Change Order

Colonel De Russy in mid-March 1863 discovered that he had made an error which persisted in could be serious. He had presumed that reference (0) on the plan forwarded with General Totten's letter of March 11, 1862, had been taken from the tide gauge established in 1854, and the one from which the fort was traced. The foundation of the seawall had been commenced accordingly, and if carried to a height of 16 feet would reach the top of the watertable.

On discussing the seawall with Lieutenant Elliot, De Russy had learned that Captain Gilmer's topographical survey of 1859 superseded his of 1857. Elliot at that time had discovered a difference of 1'07" between the (0) of the fort references and the (0) of the tidal references. Re-examining Totten's sketch of March 1862, De Russy was unable to determine which of the references had been adopted. He did observe, however, that the tracing had been made from a map with which he was unfamiliar, presumably the Gilmer Map.

If the Gilmer Map was the one to which Totten's sketch referred, De Russy had commenced his seawall one foot above Gilmer's (0) reference line. Fortunately, the wall as constructed had its foundation on "a rocky strata and by laying a course of one foot instead of two feet under the coping, the remaining portions of the Sea Wall" could be made to correspond with Totten's directions.

To demonstrate graphically what was intended, De Russy forwarded a sketch showing two sections of the seawall as projected. Section No. 1 depicted the wall as commenced on the (0) line established for the fort. By reducing the course under the coping from 2' to 1', he would reach reference (15'), and by adding a course of one-foot on the concrete foundation, as shown in Section No. 2, he could secure the height required in Totten's sections (16'), and have the foundations at reference (0) as shown on Gilmer's Map. The connection would be perfect, and there would be no necessity to alter the sections of the seawall already constructed, as they rested on bedrock.

As the workmen would reach in several days the height where De Russy proposed to lay his one-foot course, he would discontinue laying stone, while awaiting General Totten's decision.[80]

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79. Monthly Reports of Operations for Oct.-Dec. 1862; De Russy to Totten, Feb. 14, & March 16, 1863, NA, RG 77, Ltrs. Recd., Chief Engineer.

80. De Russy to Totten, March 16, 1863, NA, RG 77, Ltrs. Recd., Chief Engineer.

De Russy's apprehensions were relieved in mid-April when he received a telegram sent by General Totten, directing him to continue to use "the zero by which the fort was constructed . . ., 16 feet below the top of the watertable, and 15 feet below the top of the wall."[81]

Acknowledging this message, De Russy found that the only difference made by this change order was that the course of granite under the copingwould be one-foot rather than two feet thick. It would be secured to the coping and the course below by inch and a half bolts, inserted in the coping, thus making the two courses "almost equal to a three-feet course."[82]

4. Nine Difficult Months

a. The May 1863 Storm

In May 1863 there was a storm, and part of the bulkhead shielding sections of seawall under construction was wrecked. Laborers and carpenters were diverted and it was rebuilt. Pumps and bailing were resorted to in a ceaseless struggle to keep water out of the excavations and away from the foundations, while concrete was being poured.[83]

b. The Stone Contractor Falls Behind

During the summer of 1863 deliveries of stone again lagged and ceased entirely for several weeks. Plans to begin laying granite for the wall southeast of the East Bastion and at Point G had to be held in abeyance until the last week of August.[84]

Advising the Department of this situation, De Russy complained that Griffith had been compelled to shut down operations because many of his quarrymen, attracted by high wages paid at the mines, had left his employment. The sickly season had felled the rest. He had resumed quarrying in late August, and stone was again being unloaded at Fort Point. As Griffith's contract was about to expire,

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81. Totten to De Russy, April 14, 1863, NA, RG 77, Ltrs. Sent, Chief Engineer.

82. De Russy to Totten, April 20, 1863, NA, RG 77, Ltrs. Recd., Chief Engineer.

83. Monthly Reports of Operations for Feb.-Aug. 1863, NA, RG 77, Ltrs. Recd., Chief Engineer.

84. De Russy to Totten, Aug. 24, 1863, NA, RG 77, Ltrs. Recd., Chief Engineer.

De Russy was preparing to invite new proposals, "with a hope of inducing competition among the few Quarrymen who are able to deliver the size stone we need."[85]

On September 4 De Russy employed local newspapers to solicit proposals for supplying the government with "36,312 cubic feet of the best kind of Folsom granite to be delivered on the wharf at Fort Point." He hoped to close a new contract before Griffith's terminated. This time Griffith had competition, and the low bid was submitted by C. B. Grant. On December 1 De Russy forwarded for approval by the Department Grant's contract.[86]

With the government in dire financial straits, General Totten on January 19, 1864, telegraphed that the quarrymen must be paid in legal tender notes (greenbacks). They would therefore quote their prices in that medium.[87] Replying, De Russy wired that Griffith's figure in greenbacks was $1.90 per cubic foot and Grant's $1.89.[88] Whereupon, Totten directed him to accept Grant's proposal "on condition that he will enter into a written contract" and give a satisfactory bond for its execution.[89]

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85. De Russy to Chief Engineer, undated, NA, RG 77, Ltrs. Recd., Chief Engineer.

86. De Russy to Totten, Dec. 1, 1863, NA, RG 77, Ltrs. Recd., Chief Engineer. The contract called for:

pieces	dimensions	cubic feet
424	73 x 20 x 16	9,084
424	50 x 20 x 16	6,360
259	73 x 20 x 20	7,511
259	50 x 20 x 20	5,180
106	73 x 20 x 10	1,537
106	50 x 20 x 10	1,060
52 coping	60 x 23 x 20	1,404
52 coping	73 x 20 x 20	2,088
48 coping	73 x 30 x 20	2,088

87. Totten to De Russy, Jan. 19, 1864, NA, RG 77, Ltrs. Sent, Chief Engineer.

88. De Russy to Totten, Feb. 1, 1864, NA, RG 77, Ltrs. Recd., Chief Engineer.

89. Totten to De Russy, Feb. 1, 1864, NA, RG 77, Ltrs. Sent, Chief Engineer.

c. Three Stormy Months

With Griffith again getting out granite, De Russy added to his labor force. The tempo accelerated in October, but slowed in November 1863 when a howling gale on the 15th and 16th sent surf crashing into the shoreline. Damages were extensive. The temporary bulkhead was carried away, excavations for the seawall flooded, and the road opened for construction purposes north of the fort washed away. East of Fort Point, heavy seas breaking over the plank road wrecked its protective retaining wall and timber bulkheads at numerous points. The wharf was seriously damaged. Mechanics and laborers were diverted from their assignments to effecting repairs, salvaging lumber washed ashore, and securing the wharf during the height of the storm.[90]

The storms continued. In December gales on two occasions wrecked temporary bulkheads, filling in excavations and covering up foundations. Reporting these set backs, De Russy warned that these bulkheads could not withstand the pounding surf unless built at excessive costs. Sea tides sweeping across the rapidly eroding ground fronting the West Bastion had twice destroyed the road used by his construction people. A January storm damaged the bulkheads, and more time was lost in effecting repairs and pumping out the excavations with a rotary pump.[91]

Even before the winter storms all but stopped construction, General Totten was complaining that he was "greatly disappointed" to learn that no work had been undertaken on the seawall west of Point Z. He did not desire to discuss the difficulties that had plagued the project. That they had been great, he had no doubt; and great, he was certain, had been De Russy's "anxiety to urge onward military works of such vast importance." But in studying the results, he found that in 18 months little had been accomplished, and he was "constrained" to reiterate his plea for De Russy to introduce "a course of proceedings that shall come nearly up to the necessities of the times."

From a distance it appeared to Totten that De Russy's reliance on a single contractor (Griffith) was what had held him back, and he questioned whether "such important matters should depend on the private

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90. De Russy to Totten, Monthly Report of Operations for November 1863, NA, RG 77, Ltrs. Recd., Chief Engineer. The labor force at this time included 1 master mason, 1 master stone cutter, 4 masons, 15 stone cutters, 1 carpenter, 3 blacksmiths, 1 stable-keeper, 44 laborers, 1 foreman, and 1 receiver of materials.

91. Monthly Reports of Operations, Nov. 1863-Feb., 1864, NA, RG 77, Ltrs. Recd., Chief Engineer.

resources, perhaps loyalty, of one individual." Such contracts should never bind the United States a moment after failure to meet important conditions.

Totten also wanted De Russy to suspend work on the seawall southeast of the East Bastion, and to employ his entire force on the area between Point Z and the counterscarp gallery. In issuing this order, Totten had shown a keen appreciation of the situation, because the ground fronting the West Bastion suffered the greatest damage during the forthcoming storms.[92]

5. The Seawall takes Shape

In February 1864 the weather finally moderated, and work on the seawall began to progress more rapidly. By June 30 there had been cut and laid 22,581 cubic feet of granite, and the wall about 60 per cent completed.[93]

In Fiscal Year 1865 construction of the wall was given high priority. The Chief Engineer in February 1865 inquired about the possibility of employing military prisoners as laborers. Colonel De Russy opposed the plan, because the prisoners could easily give their guards the slip while on working parties, and there would be no place to confine them at night, as the facilities of the guardhouse were already taxed by the garrison.[94]

De Russy in the spring of 1865 worked 1 mastermason, 1 foreman, 12 stone cutters, 2 stonemasons, 40 laborers, 1 carpenter, and 2 blacksmiths. The end of the fiscal year found the seawall fronting the east coverface and the sections shielding the fort between Points C and F completed. Between Points F and G a foundation had been poured and several courses of granite laid. Fronting the west coverface, the foundation had been extended several hundred feet and a large quantity of granite laid.[95]

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92. Totten to De Russy, Nov. 9, 1863, NA, RG 77, Ltrs. Sent, Chief Engineer.

93. De Russy to Delafield, Sept. 22, 1864, NA, RG 77, Ltrs. Recd., Chief Engineer.

94. De Russy to Delafield, Feb. 21, 1865, NA, RG 77, Ltrs. Recd., Chief Engineer.

95. "Fort at Fort Point, Annual Drawing, Plan, Elevation & Sections of the Sea Wall, Showing the Condition of the Work, July 1, 1865," NA, RG 77, Drawer 94, Sheet 89.

At De Russy's death in November 1865 work was continuing on the seawall. The stone cutters were dressing granite, and the masons (assisted by laborers) setting it. The blacksmiths were sharpening tools, making horseshoes, shoeing animals, and repairing wagons, carts, derricks, and pick axes. Carpenters were building crib work for concrete, wedges for the masons, and repairing equipment. The laborers were mixing, wheeling and ramming concrete, receiving and hauling materials, and helping the mechanics. The stable-keeper was caring for the public animals and hauling supplies from the city.[96]

G. The Fort Point Coverface

1. Drawings are Received, Studied, and Changed

The Department, after many months, by mid-summer of 1863 had nearly completed drawings of the coverface to be erected on the land front at Fort Point. To prepare De Russy for its reception, General Totten informed him that the coverface with its covered way, place of arms, approaches, profile slopes of the ground, etc., would be "exhibited in a general manner, leaving some slight details to be . . . added." When construction was started, the 10-Gun Battery was to be retained until the last moment, particular care being exercised to keep it battle ready. Fearful lest Colonel De Russy become engrossed with the coverface, Chief Engineer Totten cautioned that the Department considered the rapid completion of the seawall of first importance.[97]

Acknowledging Totten's letter, De Russy promised that on receipt of the drawing, he would "take early steps to trace the work and commence upon it."[98] Meanwhile, the Department on August 19 posted a drawing titled, "General Plan of the Coverface and Outworks of the Fort." De Russy was urged to press the operations contemplated in his program for the current fiscal year, with such modifications as the enclosed drawings required.[99]

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96. Monthly Report of Operations for Oct. 1865, NA, RG 77, Ltrs. Recd., Chief Engineer.

97. Totten to De Russy, July 25, 1863, NA, RG 77, Ltrs. Sent, Chief Engineer.

98. De Russy to Totten, Aug. 24, 1863, NA, RG 77, Ltrs. Recd., Chief Engineer.

99. Woodruff to De Russy, Aug. 19, 1863, NA, RG 77, Ltrs. Sent, Chief Engineer. Twelve days later, a second drawing titled, "First Floor and Foundation of Coverface . . ., with Sections and Elevations," was mailed.

When Colonel De Russy compared the drawings of the east cover-face with those of the seawall, he saw that there was a difference of five feet in length of the gorge coverface between C and G. This five feet, De Russy informed the Department, could be eliminated by "reducing the five large casemates in the cover-face from 25' to 24' each without disturbing materially any other portion of the structure."

He also found that in construction of the seawall the line extending eastward from C formed an angle of 73½° with the magistral of the gorge, rather than 75° as planned. This wall, which was ten feet thick, had been completed for a distance of 75 feet, slightly more than half the proposed 145 feet. At 75 feet, the seawall was "1'9" within the line which it ought to occupy agreeable" to the plans. If it were extended the required distance of 145 feet, "the distance between it and the line which should have been followed will be nearly 3 feet 6 inches at its termination." Other sections of the seawall, he reported, were in their "true position."[100]

General Totten was understandably dismayed by this information. After checking the drawings, he wrote De Russy on November 12, confessing that he had inadvertently located Point C too far north. But his error had been compounded by De Russy in constructing the wall southeast of C at an angle of 73°40' instead of 75°, with the line of the gorge, as required by Totten's instructions of March 11.

To correct this error, De Russy was to extend the section of the seawall southeast of Point G from 145 to 187 feet. The next section would retain the same direction as heretofore, forming an angle of 166°41' with C-B. The remaining sections of the seawall, extending east, would have the same lengths and angles as shown in the original plan.

The crest line of the parapet, along with the "line of the rear of the casemates of the first branch," having been thrown inward by this change, made a modification in the casemate arrangement of the left demi-bastion mandatory.[101]

General Totten on December 7 forwarded to De Russy two sheets of drawings, showing corrections to be made to the one forwarded September 1. In appropriating as soldiers' barracks the two large casemates to the left of the postern in the east demi-bastion, it had been expedient to provide privies in the adjacent salient. On

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100. De Russy to Totten, Oct. 2, 1863, NA, RG 77, Ltrs. Recd., Chief Engineer.

101. Totten to De Russy, Nov. 12, 1863, NA, RG 77, Ltrs. Sent, Chief Engineer.

the sheet entitled, "Plan and Sections of Lower Floor and Privy Vaults in the Salient of East Demi-Bastion of Coverface," were provided details of the lower or vault portion of these privies. The small corner casemate, which had two sections, would be used for this purpose.

As the rise and fall of the tides would not provide sufficient scouring action to flush the privy vaults, a "reservior" was provided in the lower portion of the corner casemate and in the casemate adjoining on the north.[102]

2. Construction Begins

In November 1863 work on the coverface started. Laborers began drilling, blasting, and excavating, and by March several brickmasons had been added to the payroll, facing the dry ditch and piers, while stone cutters dressed granite for the privy vaults.[103]

There was a momentary crisis in mid-March, when Colonel De Russy discovered that the reference employed in drawings for the floor of the lower tier of the coverface was (17'), whereas the reference for the fort was (16'). If 17 feet were used for the coverface reference, its embrasures would be one-foot above those of the fort. He also wished to know if the coverface were to be constructed of the same materials at the principal work. If the embrasure irons were to come by sea, they must be shipped immediately.[104]

De Russy's telegram went astray, and it was April 18 before the Department notified him that 17 feet was the correct reference for the lower floors of the coverface.[105] This enabled him to increase the force working on this project. By July 1864 stone cutters were dressing granite for the piers, privy vaults, and cisterns; stonemasons were setting granite for the privy vaults and cisterns; brickmasons building piers and the scarpwall; and the blacksmiths laying pipes for drainage.[106]

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102. Totten to De Russy, Dec. 7, 1863, NA, RG 77, Ltrs. Sent, Chief Engineer.

103. Monthly Reports of Operations for Nov. 1863-March 1864, NA, RG 77, Ltrs. Recd., Chief Engineer.

104. De Russy to Totten, March 19, 1864, NA, RG 77, Ltrs. Recd., Chief Engineer.

105. Kurtz to De Russy, April 18, 1864, NA, RG 77, Ltrs. Sent, Chief Engineer.

106. Monthly Report of Operations for July 1864, NA, RG 77, Ltrs. Recd., Chief Engineer.

On July 27 De Russy mailed to the Department a drawing of the coverface. There were, he observed, several slight differences in the dimensions between the work as done and the drawings forwarded to him on September 1, 1863.

He needed to know whether any privies and vaults were to be built for the West Coverface, similar to those in the East. The drawings showed conduit pipes in the foundations, but no outlets. He called the Department's attention to its failure to reply to his question about embrasure irons, as he was about ready to commence the embrasures.[107]

3. Work on the Coverface is Suspended

Unknown to De Russy, Secretary of War Stanton had convened a Board of Engineers to make a study of masonry fortifications under construction. Civil War experiences at Fort Pulaski where rifled guns had breached the scarp after a short bombardment, and at Fort Jackson where projectiles from XIII-inch mortars had battered the defenses caused many officers to question the value of expensive masonry fortifications. A technical revolution in heavy ordnance had apparently made the handsome and costly third system forts obsolete.

The Board, on meeting, recommended that no more casemated works of more than one tier be built. Favored were barbette batteries, with service magazines in the traverses between each pair of guns. Under no circumstances would works under construction have stone parapets.

Relaying this information to De Russy on July 24, 1864, Brig. Gen. Richard Delafield (who had replaced Totten as Chief Engineer) warned that the Board was very critical of the Fort Point coverface and casemated batteries. De Russy was urged to make a study aimed at modifying the subject battery, without necessitating "pulling down existing work, and finishing the work in progress to conform most nearly to the views of the Board, so far as you may be enabled to graft them upon the existing plans."[108]

Work on the coverface was accordingly suspended to enable De Russy to make the required studies. Expenditures already made in furtherance of this project would not be wasted, Colonel De Russy

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107. De Russy to Delafield, July 27, 1864, NA, RG 77, Ltrs. Recd., Chief Engineer.

108. Delafield to De Russy, July 24, 1864, NA, RG 77, Ltrs. Sent, Chief Engineer.

reported, because "it was so intimately connected with that on the Sea Wall as to be in reality one and the same work." Most of the labor expended consisted of extensive excavations, resulting in removal of 7,608 cubic yards of rock.[109]

H. Labor Difficulties Confronted by De Russy

1. Those Brought on by Inflation

The War Department, as an emergency measure in the winter of 1862-63, began paying its employees in legal tender notes. This had immediate and serious repercussions at Fort Point. A number walked off the job, and the rest planned to leave, provided they were given no relief. When Colonel De Russy investigated, he found that legal tender notes were being discounted in San Francisco for 50¢ on the dollar, and all mechanics and laborers, except those on the government payroll, were paid in gold.

Telegraphing this information to General Totten, De Russy on March 1 warned, "We shall not be able to carry on the work under charge without an increase [in] salary of from 33 to 50%."[110]

Totten, after securing approval of Secretary of War Stanton, on March 16 wired De Russy that arrangements were being made to provide him with "specie" to meet his payroll.[111] The next day $25,000 was credited to the Fort Point account with the San Francisco Sub-Treasury, "payable in coin."[112]

De Russy, on receipt of these messages, promised his workmen "the market value of their wages whether paid in gold or notes." This had the desired effect, and he easily increased his force to 4 masons, 25 stone cutters, 3 carpenters, 1 painter, 3 blacksmiths, 1 stable-keeper, 1 master mason, 1 clerk, and 44 laborers. This situation was not allowed to last. In mid-April, Secretary of War Stanton gave warning of worse to come. He ordered that the Engineer Officers in charge of the fortifications at San Francisco be instructed

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109. De Russy to Delafield, Sept. 22, 1864, NA, RG 77, Ltrs. Recd., Chief Engineer.

110. De Russy to Totten, March 1, 1863, NA, RG 77, Ltrs. Recd., Chief Engineer.

111. Totten to De Russy, March 16, 1863, NA, RG 77, Ltrs. Sent, Chief Engineer.

112. Totten to De Russy, March 17, 1863, NA, RG 77, Ltrs. Sent, Chief Engineer.

that "for payment of mechanics and laborers employed thereon, coin will be supplied to them to the extent of half their requisitions for money," not to exceed $15,000 per month for the forts under construction.[113]

There was some grumbling, but no strike until June 17 when De Russy received a telegram from the Department, dated 48 hours before. He was advised that "arrangements made by the War Department" on April 16 with the Secretary of the Treasury "for payment of your employees" in coin were rescinded. To "obviate the embarrassment" leading to this arrangement, De Russy and Elliot were authorized by Secretary Stanton "to increase the current wages" of their mechanics and laborers by 25 per cent, provided this rule was not applied to employees whose compensation was fixed by law.[114]

De Russy protested that to pay the men a 25 per cent premium in notes would be "breaking faith with them, as the market rates require" an addition of 50 per cent. "Shall we pay the market rates for amount now due for wages as we promised?" he inquired.[115]

Responding, Totten authorized De Russy "to pay the wages now past due to your mechanics and laborers, according to the value of gold in each past pay day." In the future he could pay "an advance of 25 percentum on gold rates."[116]

The telegram was a bombshell. When it was read to the mechanics and laborers at Fort Point and Alcatraz, they dropped their tools and walked out. Their spokesmen protested that the government must honor its previous commitments in regard to wages. Telegraphing this to the Department, De Russy warned, "This puts a stop to fortifications in this harbor."[117]

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113. Totten to De Russy, April 22, 1863, NA, RG 77, Ltrs. Sent, Chief Engineer.

114. Totten to De Russy, June 16, 1863, NA, RG 77, Ltrs. Sent, Chief Engineer.

115. De Russy to Totten, June 17, 1863, NA, RG 77, Ltrs. Recd., Chief Engineer.

116. Totten to De Russy, June 20, 1863, NA, RG 77, Ltrs. Sent, Chief Engineer.

117. De Russy to Totten, June 24, 1863, NA, RG 77, Ltrs. Recd., Chief Engineer.

General Totten was compelled by the mass walkout to throw in the sponge. De Russy was authorized "to pay the market rate of wages" to his labor force, but cautioned to guard against actions contributing to the inflationary spiral.[118]

Confounded by daily fluctuations in the value of the Treasury notes, Colonel De Russy now paid in gold, procuring it at its current market value. To protect himself, he had a broker submit affidavits explaining "the difference in value on each day between Legal Tender notes and gold."[119]

2. The Stone Cutters Demand Higher Wages

There were no further labor difficulties until May 1864, when the stone cutters petitioned Colonel De Russy for an increase in their daily wages. Before replying, De Russy made a survey of wages paid to members of that trade in San Francisco. He found that at most city stone yards, the craftsmen were paid 50¢ an hour or $5 for a ten-hour day. But, in rejecting the petition, he pointed out that in the city work was "far from . . . constant, the mass of the stone cutters there can hardly find steady employment for many days or weeks at a time." Accordingly the men at the fort, as they had steady employment, took home more money, although their daily wage was $4 a day.

Since he did not propose to increase their wages, any men that wished to do so were free to leave. He would, however, grant their request to cut the working day on Saturday from 10 to 9 hours, with no reduction in the daily wage.[120] This concession satisfied the stone cutters, and they tabled their petition.

I. Fort Point's Armament

1. The First Guns are Mounted

Orders were issued by General Johnston in mid-February 1861 to mount the heavy ordnance. Boasts made by pro-secessionists in San Francisco saloons had raised fears that an assault would be made on the defenseless fort. Since such an attack would be made from the

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118. Totten to De Russy, June 25 & 26, 1863, NA, RG 77, Ltrs. Sent, Chief Engineer.

119. De Russy to Totten, July 11, 1863, NA, RG 77, Ltrs. Recd., Chief Engineer.

120. De Russy to Stone Cutters, May 11, 1864, SFRC, RG 77, Fort Point Ltr. Book, Entry 1922.

south, it was deemed vital to provide for the defense of the land approaches.

On the 18th Captain Gilmer notified General Johnston that to complete the armament of the barbette battery on the gorge, he needed one 32-pounder smoothbore gun and ten 32-pounder barbette carriages, with implements and equipments. To arm the counterscarp gallery four 24-pounder howitzers, with carriages and implements and equipments, were required. The only ammunition on hand for guns of this caliber were 245 rounds of 32-pounder flannel cartridge bags, with powder to fill them, and 222 projectiles. For the 24-pounders there were in the fort's magazine 108 rounds.[121]

General Johnston located the necessary ordnance and equipment for the land front. By June 30, 11 32-pounders were positioned on the barbette tier and 28 42-pounders in the casemates of the 1st Tier. Two months earlier, Captain Gilmer had acknowledged a message from the Chief of Ordnance, reporting that six 24-pounder howitzers for flank defense had been shipped, along with their carriages and 200 rounds of ammunition per gun, from the Watertown Arsenal. On their arrival two of the guns and carriages were to be forwarded to Benicia.[122]

2. Lieutenant Elliot's October 14, 1861, Report

By mid-October 1861 the 24-pounder flank howitzers were in position, and on the 14th Lieutenant Elliot reported that there were mounted at Fort Point:

In the 1st Tier of Casemates

28 42-pounder smoothbores in the curtains of the water fronts and in the bastions.
2 24-pounder guns in the right flank of East Bastion.

In the 2d Tier of Casemates

2 24-pounder guns in the right flank of East Bastion.

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121. Gilmer to Mackall, Feb. 18, 1861, SFRC, RG 77, Ltr. Book, Entry 1922.

122. Gilmer to Craig, April 30, 1861, SFRC, RG 77, Ltr. Book, Entry 1922; Elliot to Totten, Aug. 12, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer.

In the 3d Tier of Casemates

2 24-pounder guns in the right flank of East Bastion.

On the Barbette Tier

2 10-inch columbiads in the Bastion Salients.
8 8-inch columbiads on the Channel Fronts.
11 32-pounders on the Land Front.

In the Counterscarp Gallery

4 24-pounder flank howitzers.

There were on hand in the Fort Point Ordnance Yard, not mounted, but equipped with carriages and ready for mounting:

15 42-pounder smoothbores with barbette carriages.
6 10-inch mortars with beds and platforms.
5 24-pounder Coehorn mortars with beds and platforms.

It was proposed to emplace 10 of the 42-pounders, with barbette carriages, in the 10-Gun Battery, when the columbiad platforms were replaced.

There was no place provided in the plans for the other five 42-pounders.

There were on hand without carriages:

3 42-pounder guns.

There were available platforms, centres, and circles for:

56 8-inch columbiad platforms (complete) on the 2d and 3d Casemate Tiers.
10 8-inch barbette platforms (complete) on the barbette tier.
5 10-inch barbette platforms (complete) on the barbette tier.
1 24-pounder flank howitzer platform in the counterscarp gallery.

Neither the guns nor the carriages for these were on hand.

The ten columbiads emplaced on the barbette tier were "not serviceable," as the Ordnance Department had directed that they be "used

only for shell and with reduced charges." One of this lot of columbiads had recently burst on Alcatraz.[123]

3. General Totten Calms Elliot's Concern About Location of the 32-pounder Pintles

When the 11 32-pounder smoothbores were mounted on the land front, Lieutenant Elliot discovered what he presumed to be an error in the lithographic sheet of "Details of Barbette Gun & Columbiad Platforms." On the subject drawing, the gun was presumed to be traversed 60° and was "in battery." If so, "the parts shaded . . . must first have been cut away to have got the gun into this position." The centre of the pintle accordingly had been placed 15 inches from the face of the parapet. Had it been placed 18 inches and had the recesses been as shown in the plan, there would have been no obstructions to a traverse of 60° on each side of the axis of the platform. As constructed, however, about 25° of traverse had been lost.

The platforms at Fort Point being fixed, this difficulty could be eliminated by cutting away part of the interior crest of the parapet and relocating the pintles.[124]

General Totten was unperturbed by Elliot's complaint. After studying his letter, he informed the young engineer that the principal reason for placing the pintles of the subject guns so near the parapet was to guard against an enemy approach. In this eventuality merlons could be positioned between the guns, forming embrasures. With 32-pounders mounted on old model wooden carriages there was interference, but there would be none with 24-pounders on wooden carriages, nor with 32s, 42s, or 8-inch columbiads emplaced on new iron carriages. It would be easy to make corrections in an emergency.[125]

4. The Armament on September 2, 1863

No changes in armament were made during 1862-63, except for mounting 11 mortars. Brig Gen. George Wright (who had succeeded General Sumner as departmental commander in September 1861) in August 1863 called on Capt. Joseph Stewart, the post commander, for a report on the fort's armament. Stewart replied on September 2 that it con-

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123. Elliot to Totten, Oct. 14, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer.

124. Elliot to Totten, Oct. 28, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer.

125. Totten to Elliot, Feb. 3, 1862, NA, RG 77, Ltrs. Sent, Chief Engineer.

sisted of: (a) six 24-pounder guns, mounted on casemate carriages, in the East Bastion and commanding the plank road. (b) Eleven 32-pounder seacoast guns, mounted on barbette carriages, on the land front of the fort and commanding the escarpment opposite and the wharf and water contiguous thereto, and also the 10-Gun Battery. (c) Twenty-eight 42-pounder seacoast guns, mounted on casemate carriages, in the 1st Tier of casemates and commanding together the entrance to the Bay. (d) Eight 8-inch columbiads, mounted on barbette carriages, on the northwest face and also commanding the Golden Gate. (e) Two 10-inch columbiads, mounted on barbette columbiad carriages, in the East and West Bastions, commanding the plank road to the fort and the harbor and outer bay within range. (f) Four 24-pounder howitzers, mounted on flank casemate carriages, in the counterscarp gallery and commanding the ditch. (g) Five 24-pounder Coehorn mortars and six 10-inch siege mortars. (h) Ten 42-pounder seacoast guns, mounted in barbette, in the Ten-Gun Battery and commanding the approaches to the Golden Gate.

In addition, there were eight 42-pounders not mounted and five barbette carriages. The latter could not be used except to replace disabled guns and carriages, as all the unoccupied positions for barbette guns were outfitted for columbiad carriages.

The armament was "in good and serviceable condition." Many of the carriages needed scraping and painting, and fatigue parties were attending to this as rapidly as possible. The columbiad carriages had been repainted, and the artificers were now working on the casemate carriages.

There were at the post a large number of shot and shell requiring beds. In their present condition (unpiled) they were in the way. Requisitions had been made for material for shot beds, but had not been filled.

There were no "suitable provisions for firing hot shot," and with the limited force available, Captain Stewart had been hesitant about the propriety of making such arrangements. Several days before, he, after considerable thought, had prepared and forwarded requisitions for "the stores necessary for this purpose."[126]

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126. O.R., Ser. I, Vol. L, pt. II, pp. 600-02. On November 11, 1863, De Russy, in accordance with instructions from the Department, made a survey and reported that there were mounted en barbette at Fort Point 2 10-inch columbiads on centre-pintle carriages, 8 8-inch columbiads on front-pintle carriages, 10 42-pounders on front-pintle carriages, and 11 32-pounders on front-pintle carriages; there were mounted in the casemates 28 42-pounders on front-pintle carriages, 6 24-pounders

5. General Wright Calls for Additional Armament

General Wright, upon learning from Captain Stewart that many of the casemates were vacant, called this to the attention of the War Department. Action was promised. On October 8, 1863, the Chief Engineer alerted Colonel De Russy that the Ordnance Department had been ordered to forward: eight 8-inch, ten 10-inch and two 15-inch Rodman guns, and 12 42-pounder rifled guns, with carriages, implements, equipments, and ammunition, to Fort Point.[127]

This information caused misgivings on De Russy's part, because these guns would require iron carriages. Currently, he informed the Department, he had 56 front-pintle concrete casemate platforms not supplied with tubes, 15 centre-pintle barbette platforms without tubes, and one centre-pintle concrete platform for which there was no flanking howitzer. The subject platforms were ready to receive wooden carriages, but the extra circles for iron carriages were only now being fabricated and none had been positioned.[128]

To expedite the laying of traverse irons in the casemates and construction of pintle blocks, De Russy called on the commander of the Benicia Arsenal for boiler iron in two sizes--6 inches x ½-inch and 6 inches x 5/8-inch.[129] The iron was sent, and during the winter of 1863-64 the traverse circles for iron carriages were laid in the casemates.[130]

There was no need to hurry, because it would be autumn of 1865 before the first of the requisitioned modern guns were landed at the Fort Point wharf. By that time the Civil War was over and General Wright had been drowned in the sinking of Brother Jonathan off Crescent City, California.

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on front-pintle carriages, and 4 flanking howitzers on front-pintle carriages. De Russy to Totten, Nov. 11, 1863, NA, RG 77, Ltrs. Recd., Chief Engineer.

127. Woodruff to De Russy, Oct. 8, 1863, NA, RG 77, Ltrs. Sent, Chief Engineer.

128. De Russy to Totten, Nov. 11, 1863, NA, RG 77, Ltrs. Recd., Chief Engineer.

129. De Russy to McAllister, Oct. 27, 1863, SFRC, RG 77, Fort Point Letter Book, Entry 1922.

130. Monthly Reports, Jan.-March 1864, NA, RG 77, Ltrs. Recd., Chief Engineer.

The thought that the guns might arrive at any moment, however, was constantly with Colonel De Russy. In the period August 16, 1864-July 17, 1865, Chief Engineer Delafield notified him that the Ordnance Department was shipping a number of modern rifled-guns and 10- and 15-inch Rodmans to San Francisco Bay. On August 16 it was announced that the Ordnance Department had been requested to forward five 100-pounders, with centre-pintle carriages; on February 20, 1865, the Ordnance Department had been asked to send three 15-inch Rodmans, with front-pintle carriages; on March 10 application had been made for six 200-pounder Parrotts, with centre-pintle carriages; on June 5 it was announced that the Ordnance Department was forwarding one 300 pounder Parrott, with centre-pintle carriage, and 100 projectiles; on July 17 the Ordnance Department was directed to ship two 10-inch Rodmans, with casemate carriages, implements, equipments, and 200 rounds of ammunition; and on July 27 the Ordnance people were ordered to forward eight 10-inch Rodmans, with casemate carriages, implements, equipments, and 800 projectiles.[131]

J. Lighthouse No. 3

Had the Second Fort Point Light been in a favorable location, the rapid erosion of the earthen fill north of the fort would have doomed it. When plans for the seawall to protect the site were reduced to drawings, it was seen that it intruded on ground occupied by the light tower. Consequently, on April 6, 1863, the Department instructed Colonel De Russy to assist officers of the Lighthouse Board in relocating the Fort Point Light. The preferred site was atop one of the stairway towers.[132]

Three months later, the Lighthouse Board selected the north stairway. To provide maximum visibility, the lantern would be displayed from a metal tower. District Engineer R. S. Williamson was given authority to arrange for construction of a nine-sided light tower, with watchroom of boiler iron.[133]

With parts for the tower being fabricated, Lighthouse No. 2 on two occasions was threatened with destruction. In August 1863 Colonel De Russy had his laborers shore up the lighthouse and frame

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131. Delafield to De Russy, Aug. 16, 1864, Feb. 20, March 10, June 5, July 17 & 27, 1865, NA, RG 77, Ltrs. Sent, Chief Engineer.

132. Totten to De Russy, April 6, 1863, NA, RG 77, Ltrs. Sent, Chief Engineer.

133. Holland & Koue, "Historic Structure Report, Fort Point Light," p. 11. For details regarding construction of Lighthouse No. 3, see the excellent aforementioned report.

of the fog bell, their foundations having been weakened by construction of the seawall. Three months later, during the mid-November storm, surf surging across the beach swept away hundreds of cubic yards of fill, and threatened to undermine and topple the lighthouse. Once again, De Russy's workmen effected temporary repairs. The old tower, however, had served its purpose, and in January 1864 the Third Fort Point Light was lit. Five months later, the tower of Lighthouse No. 2 was dismantled.[134]

The fog signal structure was relocated at the same time. After some discussion, the Lighthouse Board determined to "hang the bell outside the walls of the Fort--the striking machinery being placed inside within a reasonable distance where there is sufficient drop for the motive weight." A contemporary drawing shows the fog signal house on the exterior scarp of the West Bastion and the machinery house also positioned on the scarp, around the angle from the bell.[135]

K. The Army Gets a New Chief Engineer

General Totten, who had been in failing health for several months, died of pneumonia on April 22, 1864, having been Chief Engineer for 26 years. The death of his friend of more than 50 years distressed Colonel De Russy. Writing the Department on May 19, he observed, "I have reason to know his great energy of character and to appreciate his many virtues." The Corps would feel his loss; the army would miss his wise councils; and the nation his "remarkable skill as a great Engineer." De Russy had hoped that his friend would live long enough to see the end of the Civil War, and "to receive from a grateful people the honors that he has so well earned during a long life of usefulness, and more recently, in these trying times; but his name and eminent services will, I trust adorn many a page in the future history of our great country."[136]

Totten's successor as Chief Engineer was Richard Delafield, a West Point graduate of the class of 1818, and a senior officer in the

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134. Ibid.; Monthly Reports of Operations for Aug. & Nov., 1863, NA, RG 77, Ltrs. Recd., Chief Engineer; "Fort at Fort Point, Monthly Drawings," Progress to January 1, May 1, and June 30, 1864, Drawer 94, Sheets 64-69.

135. Holland & Koue, "Historic Structure Report, Fort Point Light," p. 17.

136. De Russy to Woodruff, May 19, 1864, NA, RG 77, Ltrs. Recd., Chief Engineer. Maj. J. C. Woodruff was temporarily in charge of the Engineer Bureau.

Corps. Promoted from colonel to brigadier general, he assumed his new duties on May 19.[137]

L. Colonel De Russy's Last Months

1. De Russy Gets an Assistant

Colonel De Russy on July 27, 1864, advised the Department that constant exposure to heavy seas and cold winds during the past six months had broken his health. By direction of his physician he was confined to his home. To enable him to continue with the important work entrusted to him, he needed an assistant. Heretofore, he had relied on Maj. R. L. Williamson for help, but the major was also in poor health and now found his duties as Lighthouse Inspector engrossing most of his time.[138]

General Delafield was sorry to learn that De Russy was in feeable health, but it was impossible, because of the war, to detail an assistant from the Corps. He would, however, allow De Russy to hire a civilian assistant, and promised to send the first officer to become available.[139] Before the year was over, the Department fulfilled its promise and ordered Lt. O. H. Ernst to San Francisco. Ernst reported for duty on December 1, and was informed by De Russy that his duty station would be Fort Point. But as there were no quarters for Engineers there, he was to live in San Francisco.[140]

2. De Russy Dies

Colonel De Russy, although he was wasting away, spent another winter on the Bay. On May 29, 1865, he notified General Delafield that his health had been impaired by exposure. Compelled to take a vacation, he left Lieutenant Ernst in charge at Fort Point and took a trip up the Sacramento Valley.[141] The Department three weeks later approved De Russy's action.[142]

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137. Warner, Generals in Blue, pp. 117-18.

138. De Russy to Delafield, July 27, 1864, NA, RG 77, Ltrs. Recd., Chief Engineer.

139. Delafield to De Russy, Sept. 13, 1864, NA, RG 77, Ltrs. Sent, Chief Engineer.

140. De Russy to Ernst, Dec. 1, 1864, SFRC, RG 77, Ft. Point Ltr. Book, Entry 1922.

141. De Russy to Delafield, May 29, 1865, NA, RG 77, Ltrs. Recd., Chief Engineer.

142. Delafield to De Russy, June 17, 1865, NA, RG 77, Ltrs. Sent, Chief Engineer.

Before the end of summer, De Russy returned to duty, but his days were numbered. On November 23, 1865, he died at his San Francisco home, 41 South Park. The Alta California, in reporting his death, noted that the deceased was 75 and had been ill for months. Having superintendented construction of many of the Pacific Coast defenses, he "was beloved and esteemed by all who knew him for his . . . qualities as a soldier, gentleman, scholar, husband, father, and friend."[143]

3. Major Elliot Proposes an Honor for De Russy

Colonel De Russy's replacement was Major Elliot. To honor the dead officer, Elliot proposed to the Department on December 8 that the fort at Fort Point be named Fort De Russy, as the late officer "was, more than any other officer, connected with its construction and it will be gratifying to the citizens of this coast if it can be so named."[144]

The Department was not ready to act on such a request, and General Delafield filed it with a notation, to "keep the name in mind whenever the occasion presents."[145]

4. Other Proposals for Naming the Fort

a. To Honor Colonel Mason

This was only one of several requests that the Department received during this period to honor deceased officers in this manner. In September 1861 Major Austine, the post commander, had broached the subject of a name for the fort. Elliot, a lieutenant at that

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143. Alta California, Nov. 24, 1865. In reporting his passing, one of his brother officers wrote that he had no hesitancy in saying that De Russy's "constant exposure on the Bay of San Francisco, in visiting the several works for the defense of that harbor, contributed very largely to his death, if it did not in fact bring on the disorder which was the immediate cause of his death.

"No one could have been more active and indefatigable of the duties placed in his charge; for instead of leaving to his subordinates the examination of defenses in progress of construction, he gave his personal supervision to everything." Elliot to John K. Thomas, Feb. 25, 1884, NA, RG 94, ACP File.

144. Elliot to Delafield, Dec. 8, 1865, NA, RG 77, Ltrs. Recd., Chief Engineer.

145. Ibid.

time, had suggested that it be called Fort Mason to honor the first project engineer, who had died on the job. Referring this to General Totten, Elliot trusted that he would "suggest to the proper authorities the name you prefer."[146]

As Totten failed to reply, we do not know what he thought of Elliot's suggestion.

b. To Honor General Reno

Maj. Gen. Irwin McDowell, who succeeded to command of the Department, in April 1865 suggested to the Chief Engineer that Fort Point be named Fort Reno and the works on Alcatraz Fort McPherson, to honor Union generals killed in combat against Confederate forces. General Delafield referred McDowell's communication to Secretary of War Stanton, who took no action.[147]

M. Changes in the Garrison, October 1861-October 1, 1865

On October 21, 1861, the garrison at Fort Point was reduced to one company of the 3d Artillery, when Company G, 3d Artillery, was transferred to the Presidio, preparatory to being sent to the nation's capital as reinforcements for Maj. Gen. George B. McClellan's Army of the Potomac. Three weeks later, on November 9, Brig. Gen. George Wright, who had replaced General Sumner as commander of the Department of the Pacific, was at Fort Point to inspect the garrison, Company B, 3d U.S. Artillery. He found the redlegs in "high order," for which he commended Major Austine. The armament of the fort, although incomplete, was in "handsome condition, and ready for any emergency."[148]

On December 28, 1861, the Fort Point garrison was again increased to two companies, when Company K, 9th U.S. Infantry, was assigned to the post. Maj. James Van Voast of that infantry regiment on the same date assumed command at Fort Point.[149] The fort during the next 12

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146. Elliot to Totten, Sept. 14, 1861, NA, RG 77, Ltrs. Recd., Chief Engineer.

147. O.R., Ser. I, Vol. L, pt. II, p. 1200. Brig. Gen. Jesse L. Reno was killed on September 14, 1862, at South Mountain, Maryland, and Maj. Gen. James B. McPherson at Atlanta on July 22, 1864.

148. O.R., Ser. I, Vol. L, pt. I, pp. 659, 731. Companies C, G, H, L and M, 3d U.S. Artillery, along with regimental headquarters, sailed for the east coast. Companies A, B, and D would remain on the Pacific coast.

149. Ibid., p. 787; NA, Returns from U.S. Posts, 1800-1916, Microcopy 617. Company K had been stationed at the Cascades in Washington Territory before starting for San Francisco.

months continued to be garrisoned by these two units--Company B, 3d U.S. Artillery, and Company K, 9th U.S. Infantry. Maj. George P. Andrews during the year replaced Major Van Voast as post commander.[150]

In the late winter of 1862-63, the Presidio Quartermaster stored at Fort Point the Department of the Pacific's ponton train. On February 27, 1863, Company K, 9th U.S. Infantry, was transferred to Fort Vancouver, Company F of the same regiment replacing it.[151] Company F remained at the fort until July 10, 1863, when it and Company H, 3d U.S. Artillery, posted at the Presidio, changed stations.[152] Two months later, on September 12, Company B, 3d U.S. Artillery, which had been at Fort Point for 30 months was transferred to Angel Island. This reduced the garrison to Company H, 3d U.S. Artillery.[153] This situation was corrected in the last days of October, when Maj. A. W. Bowman of the 9th U.S. Infantry was directed to send one company from the Presidio to Fort Point, where it would report to Capt. Joseph Stewart and constitute part of the garrison.[154] Marching orders were issued to Company I, and it entered on duty at the fort on October 29.[155]

Captain Stewart commanded the garrison throughout 1864, which until November 23 consisted of two companies--H, 3d Artillery and I, 9th Infantry. On that date Company A, 8th California Volunteer Infantry, reported. The arrival at the post seven days later of 44 recruits belonging to Companies C and D, 8th California Volunteers, followed on December 7 by the officers and men of Company B of the same regiment swelled the garrison. On the 21st, Company I, 9th U.S. Infantry, which had constituted part of the garrison for the past 14 months, was detached, to be replaced by Company E of the same regiment. Thus on the last day of the year, the fort was occupied by a four-company battalion (Company H, 3d U.S. Artillery; Company E, 9th U.S.

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150. O.R., Ser. 1, Vol. L, pt. II, p. 272; NA, Returns from U.S. Military Posts, 1800-1916, Microcopy 617.

151. Monthly Report of Operations for March 1863, NA, RG 77, Ltrs. Recd., Chief Engineer; NA, Returns from U.S. Military Posts, 1800-1916, Microcopy 617.

152. NA, Returns from U.S. Military Posts, 1800-1916, Microcopy 617.

153. Ibid.

154. O.R., Ser. I, Vol. L, pt. II, p. 637.

155. NA, Returns from U.S. Military Posts, 1800-1916, Microcopy 617.

Infantry; and Companies A and B, 8th California Volunteers) and a detachment of recruits.[156]

With the increase in garrison strength, the Quartermaster Department erected additional buildings. Among these were three frame officers' quarters on the bluff above the wharf; two frame kitchens in rear of aforementioned quarters; several laundress quarters one-half mile southwest of Fort Point; and a 100 x 32-foot frame stable near the wharf.[157]

The Civil War ended in the spring of 1865. During that year there were accordingly many changes in the units posted at Fort Point. In January Companies C and D, 8th California Volunteers, were organized, thus boosting the garrison to six companies. On February 10 Company K, 8th California Volunteers, reported for duty, and Company A of that regiment departed for a new station. Two months later, Company B, 8th California Volunteers, left the fort to be replaced by Company I, 8th California Volunteers, which on April 19 had participated in the San Francisco ceremonies honoring the martyred President.[158]

Company I, 9th U.S. Infantry, returned to Fort Point, after an absence of five months, on May 13. The four companies of the 8th California Volunteers stationed at Fort Point were mustered out of Federal service in September leaving three companies of regulars at the post. On August 11 Company H, 3d U.S. Artillery, which had garrisoned the fort for 25 months, was transferred, to be followed on September 26 by Companies E and I, 9th U.S. Infantry. For the next three days, Fort Point was without a garrison. Then, on the last day of September, Company G, 2d U.S. Artillery, arrived and occupied the fort, to be followed on December 23 by Company F, 2d Artillery. Bvt. Brig. Gen. William H. French of the 2d Artillery took over as post commander.[159]

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156. O.R., Ser. I, Vol. L, pt. II, p. 1109; NA, Returns from U.S. Military Posts, 1800-1916, Microcopy 617.

157. Report of Lt. Robert James, Jan. 20 & April 1, 1865, NA, RG 92, Fort Point. The officers' quarters were two stories, one building being 42 x 32 feet and the other two 38 x 32 feet. The kitchens were 20 x 16 feet, and the laundress quarters 48 x 16½ feet.

158. O.R., Ser. 1, Vol. L, pt. II, p. 1201; NA, Returns from U.S. Military Posts, 1800-1916, Microcopy 617.

159. Post Returns, NA, Returns from U.S. Military Posts, 1800-1916, Microcopy 617.

VIII. MAJOR ELLIOT AS SUPERINTENDING ENGINEER, 1865-1870

A. Elliot Returns to Fort Point

1. Delafield Selects a Replacement

On receipt of the telegram announcing Colonel De Russy's death Chief Engineer Delafield issued orders for Bvt. Maj. George H. Elliot "to take charge of the duties confided" to the deceased. The assistant treasurer at San Francisco was "to put" in Elliot's possession the funds credited to De Russy. To enable Elliot to work out a program, the Department on November 28, 1865, advised him that the unobligated Fort Point appropriation totaled $190,000.[1]

The telegram informing Elliot of his new responsibilities found him in the Bay area, where he had been stationed since 1857. Having been assistant project engineer at Fort Point from June 1857 to July 1861 and acting superintending engineer from July to November 1861, he was familiar with the site and its construction problems.

2. Elliot Reviews the Program

Major Elliot found that De Russy during the prolonged illness preceding his death had neglected his paper work. He discovered that Chief Engineer Delafield on July 20, 1864, had notified De Russy that Congress, by an act approved by President Lincoln on the 2d, had appropriated $50,000 for the works at Fort Point in the fiscal year ending June 30, 1865.[2] Colonel De Russy had seemingly failed to submit for approval by the Department an operating program for expenditure of this sum.

Nine months later, on March 10, 1865, General Delafield had advised De Russy that President Lincoln had approved an act of Congress on February 28, appropriating $150,000 for the fort at Fort Point in Fiscal Year 1866. In programming his work, De Russy was to "limit his operations, as far as the nature of the case admits, to such parts of the work as will least conflict" with the views of the Board of Engineers, calling for construction of barbette batteries.[3]

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1. Delafield to Elliot, Nov. 21 & 28, 1865, and Elliot to Delafield, Nov. 30, 1865, NA, RG 77, Ltrs. Sent and Ltrs. Recd., Chief Engineer.

2. Delafield to De Russy, July 20, 1864, NA, RG 77, Ltrs. Sent, Chief Engineer.

3. Delafield to De Russy, March 15, 1865, NA, RG 77, Ltrs. Sent, Chief Engineer.

De Russy on May 20 had informed the Department that he proposed to expend most of the appropriation continuing work on the seawall, reserving $13,940.99 to meet contingencies.[4] General Delafield, before approving De Russy's program, telegraphed for additional information. He needed to know how much material was wanted and the cost to complete the seawall west of the fort.

When he replied on July 22, De Russy reported that to accomplish this project required 13,436.5 cubic feet of stone, 1,050 cubic yards of cement, and $87,000 in treasury notes. A work force numbering 20 stone cutters and 25 laborers would complete this section of the wall by January 1, 1866. A drawing showing the seawall as of July 1 had been forwarded.[5]

Before this information reached the Department, General Delafield had questioned De Russy's proposal to extend the seawall "to the exclusion of nearly all other parts of the work." Such action would preclude during the fiscal year mounting of additional guns at Fort Point. The Department hoped to apply the appropriation to "such part of the work as will soonest ensure additional defense."

If the fort were still in danger of being undermined by the surf, there was no question as to the necessity for continued work on the seawall. But, Delafield continued, if it had progressed "so far as to leave no longer any ground for doubt as to its security, then it would be better to apply the appropriation to constructing such part of the work as will soonest enable us to mount additional guns." He urged that attention be given to construction of one of the barbette batteries recommended by the recently reconstituted Board of Engineers for the Pacific, "placing the crest of the battery, as nearly as may be found practicable, in a reference between 45 and 50" feet.[6]

Again, on August 31, Delafield had reminded De Russy that the project of the board, over which he had presided, called for batteries on each flank of Fort Point. The Department was of the opinion that it was best "to bestow our labors upon these two batteries," first endeavoring to locate them by such modifications of the project as will lower the crests of the barbette batteries sufficiently to insure an advantageous ricochet fire from 15-inch guns. De Russy's attention was

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4. De Russy to Delafield, May 20, 1865, NA, RG 77, Ltrs. Recd., Chief Engineer.

5. De Russy to Delafield, July 22, 1865, NA, RG 77, Ltrs. Recd., Chief Engineer.

6. Delafield to De Russy, July 31, 1865, NA, RG 77, Ltrs. Sent, Chief Engineer.

called to tests demonstrating that guns mounted more than 50 feet above sea level were not as effective in this respect.

He would consult with Captain Elliot (Elliot's promotion to brevet major did not occur until November), and between them they would devise some modifications to the projected batteries ensuring an effective ricochet fire.[7]

3. The Board's Report

De Russy having been too ill to meet with him, Major Elliot next reviewed the Board's report, calling for casemated batteries. The Board of which he had been a member had been constituted by Chief Engineer Delafield on August 9, 1864, to make a study of the defenses of San Francisco Bay. It had recommended that "nothing more be done upon the construction of the Cover-face" at Fort Point. Southwest of the fort would be built a casemated water battery of two tiers, with 21 casemates in each tier, and emplacements for 16 guns on the barbette tier. Its principal face would be on the line of De Russy's Seawall, the flank beginning "at the southern extremity of the western face" of the fort. The suggested armament for the battery included 10-inch guns for the 1st tier, 200-pounder rifled guns for the 2d tier, and on the barbette tier 11 15-inch Rodmans and seven 300-pounder rifled guns. Within the casemates would be six magazines and quarters for the garrison.

The subject battery would command the approaches to the Golden Gate from Point Lobos to Point Bonita. Construction of this masonry work, estimated to cost $360.000, would involve removal of the 10-Gun Battery.

Southeast of the fort would be constructed a second casemated battery designed

> to increase the fire on the bay inside Fort Point; to follow vessels passing the Point, and seeking to reach the City or Navy Yard and Arsenal through Raccoon Strait; to close the eastern end of the ditch of the existing fort; to sweep the roadway leading to the point from . . . the City; to provide increase of storerooms for Q Mastr., Commissary and Ordnance purposes.

This work would consist of one casemate and one barbette tier of guns. The line of the scarp was broken into two faces, forming an angle of 155°.

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7. Delafield to De Russy, Aug. 31, 1865, NA, RG 77, Ltrs. Sent, Chief Engineer.

It was proposed to make a return in the seawall, currently under construction, on a line at right angles to the scarp, and utilize the seawall as foundation of the scarp to its southern extremity, and "to carry a blank wall 5 feet thick and 20 feet high from the southern end of the casemate up the slope to the inaccessible bluff."

There would be casemates for 17 guns, with space on the barbette tier for 26 guns. Three of the casemates, without embrasures, would serve as magazines and an equal number as storerooms. Cost of this battery was estimated at $225,830.[8]

4. Major Elliot Pares the Labor Force

Because of the Department's views on the subject, and unprepared to begin work on the barbette batteries, Major Elliot decided to shut-down operations pending receipt of instructions from Washington as to what projects should be undertaken with available funds. All employees, except a few retained to care for the public property, those needed to mount the heavy modern guns being received from Atlantic coast arsenals, and to maintain the fort, road, wharf, and the temporary bulkheads, were laid off. An agreement made with the garrison commander, Maj. Gen. William H. French, U.S. Volunteers, helped alleviate one of his maintenance problems. Redlegs of the 2d Artillery would scrap and paint the badly rusted embrasure irons.[9]

During the last six months of the fiscal year ending June 30, 1866, Major Elliot employed two artisans (a mastermason and blacksmith), 12 laborers, a stable keeper, clerk, and orderly. The artillerists having proved inefficient, Elliot in May and June had his laborers scrap and paint the embrasures, and remove obstructions from the main drain.[10]

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8. Board to Delafield, Nov. 29, 1864, NA, RG 77, Ltrs. Recd., Chief Engineer. Members of the Board were Colonel De Russy Capts. D.C. Houston, William P. Craighill, and George H. Elliot, and Lt. Ernst.

9. Elliot to Delafield, Nov. 30, 1865, NA, RG 77, Ltrs. Recd., Chief Engineer. Major Elliot on his arrival at Fort Point had found several carpenters and laborers enlarging the office. He retained these men on the payroll until this project was completed.

10. Monthly Reports of Operations for Jan. — June 1866, NA, RG 77, Ltrs. Recd., Chief Engineer.

B. Construction and Maintenance in Fiscal Year 1867

1. The Approved Program

a. General Humphreys Becomes Chief Engineer

Chief Engineer Delafield on June 20, 1866, notified Major Elliot that the 39th Congress had appropriated $125,000 for construction at Fort Point in Fiscal Year 1867.[11] Before working up his operating program, Elliot needed to know the unobligated sums from previous Fort Point appropriations available in the Treasury on July 1. A request for this information was forwarded to the Department on September 15. Meanwhile, Bvt. Maj. Gen. Andrew A. Humphreys, a distinguished engineer and corps commander, had replaced General Delafield as Chief Engineer on August 8. Because of this change some letters went unanswered.

b. Elliot Submits a Program

Not having received a reply from the Department to his inquiry, Major Elliot on November 12 mailed his proposed program. He would apply his funds to: (a) construction of additional batteries for channel defenses to the east and west of Fort Point; (b) the completion of the seawall in front of the casemated work; (c) repair of the casemated work, the temporary quarters for workmen, and the road from the wharf to the fort; (d) altering the barbette platforms of the main work to receive "guns of modern calibers as fast as they are received"; and (e) construction of a new wharf or repair of the old.[12]

c. Humphreys Gives His Approval

Chief Engineer Humphreys on December 6 approved Elliot's projects for Fiscal Year 1867, subject to the restrictions imposed by recent orders "to discontinue for the present construction of scarp walls of casemated" batteries.

In altering the fort's barbette platforms, it must be remembered that the 4-inch pintles should not be substituted for those of 2-inches, until the carriages adapted to the former had been received, and the traverse circles should not be lowered till the bolsters for the carriages had been checked.[13]

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11. Delafield to Elliot, June 20, 1866, NA, RG 77, Ltrs. Sent, Chief Engineer.

12. Elliot to Humphreys, Nov. 12, 1866, NA, RG 77, Ltrs. Recd., Chief Engineer.

13. Humphreys to Elliot, Dec.,6, 1866, NA, RG 77, Ltrs. Sent, Chief Engineer.

2. Maintenance, Relocations, and Seawall Related Construction

November 1866 found a few brickmasons repointing the exterior slope of the fort, and the laborers cleaning and painting 90 embrasures and traverse rails, repairing roads, and replacing the main sewer pipe.[14] In December savage gales lashed the coast, damaging the wharf, the road, and shore. Besides effecting repairs, workmen enlarged the ordnance yard, and the brickmasons continued repointing the scarp and terreplein.[15]

Plans called for the East Barbette Battery to partially occupy the shop area. Late in the winter, Major Elliot employed his men to move the buildings (storehouses, mortar mill, carpenter and blacksmith shops) to a new site near the wharf. As these buildings were frame, Elliot, to guard against fires, had the carpenters build a 20,000-gallon water tank, and his laborers dig a ditch and lay pipe to convey water from the reservoir to the tank.[16]

In preparation for construction of the east and west batteries, the wharf was extended and repaired, and tracks laid. The tracks were then extended west along the marge of the cove, through the stoneyard, and by August had reached the fort.[17]

3. Acquisition of Additional Storage Facilities

Major Elliot, with a large construction program funded, found that he needed more storage facilities. He determined to take advantage of recent legislation abolishing post sutlers. Learning that the sutler was about to vacate his building (64 x 20') at the wharf, Elliot requested permission to purchase it for $1,000 for cement storage.[18]

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14. Monthly Report of Operations for Nov. 1866, NA, RG 77, Ltrs. Recd., Chief Engineer.

15. Monthly Reports of Operations of Dec. 1866 & Jan. 1867, NA, RG 77, Ltrs. Recd., Chief Engineer. The worst gale was on Christmas Eve. The ordnance yard was enlarged by filling in the cove east of the wharf and constructing a bulkhead.

16. Monthly Reports of Operations for Feb.-April 1867, NA, RG 77, Ltrs. Recd., Chief Engineer. The shops were located on land fills reclaimed from the Bay.

17. Monthly Reports of Operations March-July 1867, NA, RG 77, Ltrs. Recd., Chief Engineer. A new crane was built onto the wharf.

18. Elliot to Humphreys, May 23, 1867, NA, RG 77, Ltrs. Recd., Chief Engineer.

On June 26 the Department approved the request, provided the medium of exchange was U.S. currency.[19] The sutler, anxious to receive some return on his investment, was agreeable.

4. Elliot Calls for More Cement

Large shipments of cement currently being received and stockpiled from the New York Engineer Agency were the reason for the acute need of additional storage facilities. Before the sutler's building became available, Major Elliot in March had telegraphed the Department that no more cement was needed.[20] General Humphreys relayed this information to Maj. Nicholas Bowen at the New York City agency.[21]

Within three months, however, Elliot found he had used up most of his stockpile, and with the sutler storehouse available, he asked the Department to have the agency "ship 300 barrels Norton or other quick setting cement per month."[22] The shipments began immediately.

5. Elliot Purchases a Schooner

To cut transportation costs, Major Elliot in February 1867 asked authority to purchase a schooner to bring supplies from the city.[23] This request was approved,[24] and in August Major Elliot bought "an excellent sloop of 75 tons for $7,939."[25]

6. The Completion of De Russy's Seawall & Its Extension

a. The Situation in November 1865

Major Elliot, on taking charge in late November 1865, had inspected De Russy's seawall. He found the section southwest of the fort, planned

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19. Humphreys to Elliot, June 26, 1867, NA, RG 77, Ltrs. Sent, Chief Engineer.

20. Elliot to Humphreys, March 6, 1867, NA, RG 77, Ltrs. Recd., Chief Engineer.

21. Humphreys to Bowen, undated, NA, RG 77, Ltrs. Sent, Chief Engineer.

22. Elliot to Humphreys, May 23, 1867, NA, RG 77, Ltrs. Recd., Chief Engineer.

23. Elliot to Humphreys, Feb. 5, 1867, NA, RG 77, Ltrs. Recd., Chief Engineer.

24. Humphreys to Elliot, March 2, 1867, NA, RG 77, Ltrs. Sent, Chief Engineer.

25. Elliot to Humphreys, Aug. 8, 1867, NA, RG 77, Ltrs. Recd., Chief Engineer.

as a foundation for a casemated battery, completed as follows: 67 feet raised to a height of two feet, 180 feet to a height of four feet, 171 feet to a height of six feet, and 62 feet to a height of eight feet. There was about 250 feet of seawall between the right flank of the projected west casemated battery and the West Bastion on which no coping had been laid. This should be given a high priority, Elliot informed the Department, because surf was breaking over the wall, and washing away the sand between the wall and the fort's scarp.[26]

b. A Crew Begins Laying Coping

Work was finally resumed on the seawall in the autumn of 1866, when a crew began laying coping on the unfinished section west of the fort and north of the proposed casemated battery. Heavy seas in November slowed progress.[27]

c. Work on the Seawall Resumes

On February 7, 1867, Major Elliot telegraphed the Department that before construction commenced on the east barbette battery, the seawall must be extended as far as the eastern end of the subject battery. The Board of Engineers agreed, and he wished authority to proceed.[28] General Humphreys replied immediately, approving the proposal.[29]

Construction then resumed on the seawall. Southwest of the fort in February progress was reported on the seawall and in excavating for the west battery. To extend the seawall farther eastward, it was first necessary to construct a cofferdam. Until April storms and heavy surf prevented work on the latter. Meanwhile, masons and laborers had been pushing ahead rapidly with the west seawall, which by June 30, was raised throughout its length to reference (14'), and the excavation into the bluff carried far enough to receive the retaining wall of the covered way. Work on the cofferdam moved more slowly. In June it came

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26. Elliot to Delafield, Nov. 30, 1865, NA, RG 77, Ltrs. Recd., Chief Engineer.

27. Monthly Report of Operations for Nov. 1866, NA, RG 77, Ltrs. Recd., Chief Engineer.

28. Elliot to Humphreys, Feb. 7, 1867, NA, RG 77, Ltrs. Recd., Chief Engineer.

29. Humphreys to Elliot, Feb. 8, 1867, NA, RG 77, Ltrs. Sent, Chief Engineer.

to a halt when the carpenters demanded an eight-hour day. To break the strike they were fired, and Major Elliot found little difficulty recruiting replacements.[30]

Contracts for granite for the seawall had been awarded to Griffith & Griffith of Placer County for $1.70 per cubic foot; S.D. Smith of Sacramento County for $1.59 per cubic foot; and P. Caduc of San Francisco for $1.78 1/2 per cubic foot.[31] Deliveries commenced in the late summer of 1867.

C. Construction and Maintenance in Fiscal Year 1868

1. The Preparation, Submission, and Approval of a Program

Chief Engineer Humphreys had notified Elliot on March 19, 1867, that President Andrew Johnson on the 2d had approved an act of Congress, appropriating $50,000 for the works at Fort Point. Elliot was also advised that the balance in the Treasury for Fort Point was $189,711.22.[32]

Elliot promptly formulated an operating program for Fiscal Year 1868. He proposed to spend the balance of the unobligated funds and one-half the $50,000 recently appropriated on: (a) the casemated battery west of Fort Point; and (b) the seawall and east barbette battery. Work would be concentrated on the latter pending receipt of further orders from the Department as to the scarp of the former.

Contracts being negotiated for granite for the seawall would require a monthly expenditure of $10,000 until fulfilled.[33]

General Humphreys on June 6 approved Elliot's program as submitted.[34]

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30. Monthly Reports of Operations for Feb.-June 1867, NA, RG 77, Ltrs. Recd., Chief Engineer; Executive Documents, Printed by Order of the House of Representatives, During the 2d Session of the 40th Congress, 1867-68 (Washington, 1868), Serial 1325, Vol. 2, pt. 2, pp. 14-15.

31. Elliot to Humphreys, Aug. 9, 1867, & Humphreys to 2d Comptroller, Oct. 15, 1867, NA, RG 77, Ltrs. Sent & Recd., Chief Engineer.

32. Humphreys to Elliot, March 19, 1867, NA, RG 77, Ltrs. Sent, Chief Engineer.

33. Elliot to Humphreys, May 6, 1867, NA, RG 77, Ltrs. Recd., Chief Engineer.

34. Humphreys to Elliot, June 6, 1867, NA, RG 77, Ltrs. Sent, Chief Engineer.

2. Construction of the Cofferdam and East Seawall

a. Elliot Reports Rapid Progress

Because of the large reserve of unobligated funds and prompt action on the program, there was no hiatus in seawall construction. Workmen in July and August 1867 added 195 feet to the cofferdam, and erected three derricks, two at the cofferdam and the other at the stoneyard. Shielded by the cofferdam, excavation for the extension to the seawall east of the fort began. By the end of November the cofferdam had been completed, including a 30-foot return, and the trench behind excavated to bedrock. It was necessary to plank over the cofferdam at the top to keep breakers from crashing down and disturbing the pudding.

Work on the seawall had started. On the first section, 126 feet, the first course had to be laid when the tide was out.[35]

December was a traditionally stormy month on the Bay, with frequent rains, and progress less than anticipated. Surf inside the cove was heavy, and huge breakers crashed against the cofferdam. Spray shot to heights of 20 to 30 feet above the fort's Barbette Tier. Fears were voiced that the cofferdam might not withstand the terrible pounding. But the only difficulty encountered was from water cascading downward and undermining the fill. To cope with this force Major Elliot had his men establish an apron by throwing undressed coping into the sea. The apron secured the sand in front of the cofferdam, but the powerful surf as it ebbed dragged the stone away from the dam. After each blow, many of them had to be dragged back against the face.[36]

b. The Project is Closed Down

Construction costs were high, and by late winter of 1868 the appropriation had been exhausted. Major Elliot secured and closed down the project on March 4, discharging all employees except three laborers retained to care for the public property. As of that date, excavation for the east seawall had been completed, and 228 feet of wall raised to 10 feet, 174 feet to 6 feet 6 inches, and 264 feet to reference 3 feet 6 inches. The foundation at all points had been carried to solid rock,

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35. Monthly Reports of Operations for Sept.-Nov. 1867, NA, RG 77, Ltrs. Recd., Chief Engineer. In October 9,368 cubic feet of concrete were poured, 168 pieces of stone set, and a new derrick positioned.

36. Elliot to Humphreys, Jan. 8, 1868, NA, RG 77, Ltrs. Recd., Chief Engineer.

and to a depth of 4 feet 6 inches below low water. In addition, the coping of the De Russy seawall had been extended 126 feet toward the barbette battery.[37]

3. Maintenance Becomes a Small Item

During Fiscal Year 1868, beyond work on the seawall, little time or effort was devoted to other projects. The bulkhead, shielding the beach road, was extended 100 feet toward the wharf and the road repaired. The Engineer buildings and quarters were repaired, a new storehouse erected, and arrangements for combating fires among the frame-structures perfected by laying pipes and positioning a force pump. From behind projected Battery East, 2,071 cubic yards of earth had been excavated and used for fill in the cofferdam.[38]

4. Conversion of Gun Casemates Nos. 60-63 into a Prison

Maj. Gen. Henry W. Halleck, the commander of the Division of the Pacific, during the winter of 1867-68 contacted Major Elliot. He was to construct a "temporary cross wall" in the 3d Tier of casemates to serve as prison facilities, as the guardhouses at Alcatraz and the Presidio were overcrowded. Quartermaster funds would finance the project. A crew was accordingly turned to walling off the three unoccupied casemates at the southwest angle.

The only changes to the structure, besides the wall and door, were gratings and windows in the embrasures. In reporting what had taken place to the Department, Elliot on March 12 wrote, these alterations "will not damage the fort and can be easily removed" whenever it is determined to arm the subject casemates.[39]

The Chief Engineer was distrubed by what had been done, and, calling the attention of Gen. Ulysses S. Grant to the matter, complained, the

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37. Elliot to Humphreys, July 7 & Aug. 12, 1868, NA, RG 77, Ltrs. Recd., Chief Engineer; Executive Documents, Printed by Order of the House of Representatives, during the 3d Session of the 40th Congress, 1868-69 (Washington, 1869), Serial 1368, vol. 3, pt. 2, pp. 19-20.

38. Elliot to Humphreys, Aug. 15, 1868, NA, RG 77, Ltrs. Recd., Chief Engineer.

39. Elliott to Humphreys, March 12, 1868, NA, RG 77, Ltrs. Recd., Chief Engineer; "Plan of part of the upper tier of Casemates showing the cross-wall D to convert the gun casemates A,A,A, and casemates B into temporary prisons," NA, RG 77, Drawer 94, Sheet 97.

casemates of a seacoast battery "should not be used for prison purposes beyond those rooms which were provided for that purpose in the plan of the work, or for keeping of prisoners other than those in the garrison." General Humphreys presumed that prisoners from other forts in the Bay area had been, or, would be, sent to the fort, "because they were easily guarded there."

It should be obvious, Humphreys remonstrated, that gun casemates of the forts were needed for defense, and if an emergency occurred, "the embarrassment for the want of them will be increased by the presence in the work of extra prisoners requiring the care of the garrison." Humphreys chided, "No seacoast fortification should be used as a depot for prisioners."[40]

Humphreys' complaint was ignored. While no prisoners were sent to Fort Point at this time, it was because the garrison was withdrawn in March 1868 and the work placed in charge of caretakers. If the fort were reoccupied, Casemates Nos. 60-63 were ready to be used as prison facilities.

D. Planning for Batteries West and East

1. The Construction of "Battery West" is Suspended

Three months before he retired as Chief Engineer, General Delafield on May 9, 1866, mailed to Major Elliot "a sheet of drawings showing plans and sections of additional batteries for channel defense at Fort Point." The west casemated battery, commanding the approaches to the Golden Gate, would be constructed southwest of the fort, while the east barbette battery, built on the marge of the cove to the southeast, would sweep the Golden Gate with its guns. The foundation for "Battery West" would be incorporated in a greatly extended seawall. Because of limited space between beach and bluff, huge quantities of rock and earth would have to be excavated to provide necessary space for both batteries.

Major Elliot was charged with responsibility of determining the drainage for the batteries and of the slopes of the bluff to their rear, and the arrangement of "a trench on the hillside for catching projectiles that might strike the slope above," and tumble into the batteries.[41]

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40. Humphreys to Grant, April 20, 1868, NA, RG 77, Ltrs. Sent, Chief Engineer.

41. Delafield to Elliot, May 9, 1865, NA, RG 77, Ltrs. Sent, Chief Engineer.

Major Elliot by the autumn of 1866 had perfected his plans and stockpiled large quantities of granite and cement to be used in construction of the casemated battery. On November 30 he reported his stonemasons preparing to lay granite as soon as the surf calmed.[42] He was accordingly amazed to receive a message from General Humphreys, who had replaced Delafield as Chief Engineer, advising him that "the results of the firings by the Experimental Board made it desirable" that construction of scarps of the water fronts of casemated forts be suspended for the present. Elliot would discontinue all work of that character, including the purchase or preparation of materials.[43]

In compliance with Humphreys' orders, Elliot suspended construction of the seawall foundation of "Battery West," because it was to double as "foundation of the scarp." Moreover, its thickness was about "the same as the scarp, and [would be] exposed to the enemy's fire."[44] This was too strict an interpretation of Humphreys' orders, and on January 12, 1867, Elliot was notified that the seawall foundation of "Battery West" could "be carried up to the original level proposed," provided this was not within one foot of the proposed casemate floors.[45]

2. Approval of Modifications to the Eastern Barbette Battery

The reconstituted Board of Engineers for the Pacific in the spring of 1867 reviewed the revised plan prepared by Major Elliot for the Eastern Barbette Battery. Originally it had been proposed to construct emplacements for 21 15-inch Rodmans, with no traverses and the magazine entrances exposed to shot and shell. No provision had been made for a seawall to shield the site from the surf, while scant attention had been given to protecting the road connecting Fort Point with the wharf.

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42. Monthly Report of Operations for Nov. 1866, NA, RG 77, Ltrs. Recd., Chief Engineer. General Delafield had notified Elliot on July 6 that Major Bowen at the New York depot had been directed to supply him "with 300 barrels of cement per/month, commencing at once." Delafield to Elliot, July 6, 1866, NA, RG 77, Ltrs. Sent, Chief Engineer.

43. Wright to Elliot, Nov. 22, 1866, NA, RG 77, Ltrs. Sent, Chief Engineer. Horatio G. Wright, like Humphreys, had led a corps in the Army of the Potomac during the Civil War. Returning to duty with the Engineers, he was serving as Humphreys' assistant.

44. Elliot to Humphreys, Dec. 17, 1866, NA, RG 77, Ltrs. Recd., Chief Engineer.

45. Humphreys to Elliot, Jan. 12, 1867, NA, RG 77, Ltrs. Sent, Chief Engineer.

The seawall currently under construction would solve two of the deficiencies, but other modifications were needed. Elliot advocated and the Board approved a slight change to the trace. The number of guns was reduced from 21 to 15, with a traverse magazine for three guns. The subject traverses were to be 12 feet thick at the top, and rise to six feet reference (41') above the interior crest. The five traverses would each cover two magazines. Those in front of the covered way would be 21 x 15', with 8 x 15' filling rooms, and those in rear would be 16 x 15', and, except during war, be used for storage of implements. The former magazines would hold 75 rounds per gun.

A covered way, 20 feet wide, would be 14 feet below the interior crest. To preclude its use by unauthorized personnel, strong gates, located at the exterior traverses, would close this route. The coping of the seawall could be used by pedestrian traffic.

The exterior slope of the parapet should be 3 on 4. If steeper there was danger of damage from erosion during the rainy seasons, following the summer droughts.[46]

On June 27 Chief Engineer Humphreys, having reviewed the plan, approved it subject to one slight modification pertaining to the width of the parapet. This had been caused by an Ordnance Department decision to increase the powder charge for 15-inch Rodmans to 100 pounds and for 10-inch shell guns to 25 pounds, and also adding to the weight of the subject projectiles. Such action might require the Corps to increase the thickness of the parapet.[47]

A refusal by Congress to appropriate any funds for construction of fortifications in three successive fiscal years, beginning in 1868, prevented any work on Battery East, except for the seawall. When money again became available the battery site was relocated.

E. Elliot Completes His Seawall

1. Congress Refuses an Appropriation

Information reaching San Francisco from the nation's capital in the autumn of 1867 disturbed Major Elliot. Congress, taking cognizance of technical lessons learned during the Civil War which made masonry

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46. Alexander to Humphreys, May 3, 1867, "Fort at Fort Point, Cal., Plan of Eastern Barbette Battery and Covered Way," NA, Drawer 94, Sheet 93. Bvt. Brig. Gen. Barton S. Alexander was President of the Board of Engineers for the Pacific.

47. Humphreys to Elliot, June 27, 1867, NA, RG 77, Ltrs. Sent, Chief Engineer.

works such as Fort Point obsolete, was not "disposed to make large expenditures for fortifications," until results of studies then in progress had been evaluated. Knowing that these tests focused on making a determination of the type of scarp "best adapted" to casemated works, Elliot wrote Chief Engineer Humphreys. These experiments, he observed, should not "prevent the active progress" of work at Fort Point.

The existing appropriation, he mistakenly believed, was sufficient to complete the 600-foot seawall, behind which was to be constructed an earthen barbette battery for 15-inch guns. The subject battery, along with the one at Lime Point, would command the Golden Gate.

If appropriations for Fiscal Year 1869 were to be limited, Elliot hoped "a special exception may be made in favor" of Fort Point.[48]

Replying, Chief Engineer Humphreys could offer little encouragement. He felt that the Congress currently in session would "probably limit appropriations for fortifications to sums sufficient merely to preserve the works from injury."[49]

Disturbed by this news, Elliot on February 14 telegraphed, "Seawall now constructing should be finished before another winter. If not great damage will be done. If the $25,000 appropriated last March could be used, $40,000 additional will enable me to finish the wall."[50]

When no reply was forthcoming, Major Elliot drafted a lengthy letter detailing his problems. The winter of 1867-68 had brought wild gales, causing construction costs to soar beyond his estimates. Normally, he would have been able with the funds appropriated to have finished the seawall designed to protect the east barbette battery up to the coping. But, although he had pressed the work and had economized in every way, he would be obliged by mid-March to suspend work for the season because of lack of funds.

Moreover, he did not believe the cofferdam would hold through another winter, as the battering it had taken had impaired its strength. Losses would be great if the wall were not finished by autumn, because: (a) surf

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48. Elliot to Humphreys, Dec. 18, 1867, NA, RG 77, Ltrs. Recd., Chief Engineer; Lewis, Seacoast Fortifications, p. 68.

49. Humphreys to Elliot, Jan. 22, 1868, NA, RG 77, Ltrs. Sent, Chief Engineer.

50. Elliot to Humphreys, Feb. 14, 1868, NA, RG 77, Ltrs. Recd., Chief Engineer. Congress, in making its appropriation to fund construction at Fort Point in Fiscal Year 1868, had provided that the sum ($25,000) was not to be obligated without its authority.

sweeping over it would "wash out everything in its rear" to the foot of the escarpment, including the road and railroad, and interrupt communications with the fort; (b) granite facing blocks already laid would be "dismounted one by one by the waves"; and (c) most of the materials (granite and cement), except the coping, was on hand.

To complete his seawall to the coping required $15,000; with $30,000 for coping; $12,500 for relieving arches; and $7,500 for filling in the same and seawall flush with top of the coping. This could be funded for $40,000, in addition to the $25,000 appropriated in 1867, but requiring consent of Congress before it could be spent.[51]

General Humphreys on April 3 forwarded to Secretary of War Stanton, Elliot's report and a suggestion that it be transmitted to Congress, with a recommendation for appropriation of $95,000 to complete the project.

If no appropriation were forthcoming, a large part of the Elliot Seawall would probably be destroyed in next winter's storms.[52]

Discouraged by this turn of events and with work closed down because of lack of funds, Major Elliot requested authority for a year's leave of absence. The **Chief** Engineer rejected the request, because of the need to complete the seawall.[53]

2. Elliot Scrounges for Construction Funds

To secure operating funds while waiting for Congress to act, Major Elliot requested permission to sell at public auction 500,000 bricks and the schooner purchased the previous year.[54] General Humphreys approved the sale, but imposed the condition that the price received for the bricks must not be less than "their cost at the casemated battery."[55]

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51. Elliot to Humphreys, March 4, 1868, NA, RG 77, Ltrs. Recd., Chief Engineer.

52. Humphreys to Stanton, April 3, 1868, NA, RG 77, Ltrs. Sent, Chief Engineer.

53. Humphreys to Elliot, May 19, 1868, NA, RG 77, Ltrs. Sent, Chief Engineer.

54. Elliot to Humphreys, May 13 & undated, 1868, NA, RG 77, Ltrs. Recd., Chief Engineer.

55. Humphreys to Elliot, May 14 & June 2, 1868, NA, RG 77, Ltrs. Sent, Chief Engineer.

Answering, Elliot urged that he be allowed to dispose of brick not needed for the west casemated battery for whatever they may bring.[56]

Public auctions were held and the schooner and 101,000 rough bricks sold. But as the high bid for the 400,000 pressed brick was $7.75 in gold per thousand, which was below the purchase price, it was rejected. Although these brick were substandard, having been supplied by an unscrupulous contractor taking advantage of Colonel De Russy's fatal illness, Elliot determined to retain them until spring of 1869, when they would command a higher price.[57]

To secure additional operating funds, Elliot on August 1 requested authority to sell two centrifugal pumps and a portable engine, no longer needed in construction of the seawall.[58] This was agreeable to the Department.[59]

3. Humphreys makes an Allotment

Congress having adjourned without acting on the request for funds to complete Elliot's seawall, General Humphreys telegraphed on June 25 that money would be made available from the appropriation for "Preservation and Repair of Fortifications." A sufficient sum would be allotted to enable Elliot "to carry the construction of the seawall . . . far enough to make it secure against damage from storms during the forthcoming winter." Elliot would provide the Department with an estimate.[60]

On July 13 Major Elliot telegraphed that $30,000 was required, and three days later the Department announced it was making the necessary allotment.[61]

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56. Elliot to Humphreys, May 31, 1868, NA, RG 77, Ltrs. Recd., Chief Engineer.

57. Elliot to Humphreys, Aug. 15, 1868, NA, RG 77, Ltrs. Recd., Chief Engineer.

58. Elliot to Humphreys, Aug. 1, 1868, NA, RG 77, Ltrs. Recd., Chief Engineer.

59. Humphreys to Elliot, Sept. 5, 1868, NA, RG 77, Ltrs. Sent, Chief Engineer.

60. Humphreys to Elliot, June 25 & 27, 1868, NA, RG 77, Ltrs. Sent, Chief Engineer.

61. Elliot to Humphreys, July 13 and Humphreys to Elliot July 16, 1868, NA, RG 77, Ltrs. Recd. & Sent, Chief Engineer.

4. Elliot Resumes Work on His Seawall

Upon receipt of the Department's telegram, Elliot re-employed his master mason and several laborers, and scheduled a resumption of operations on August 1. On that day a large force of masons and workers reported. During the month 308 face stones were set, 12,634 cubic feet of concrete masonry poured, and 266 cubic yards of earth filled in rear of the seawall.[62]

The failure to realize the sum expected from the sale of the brick plagued Major Elliot, because he had planned to use it for coping the seawall. Reporting this development to the Department, Elliot warned that if the cofferdam was broken up by the winter storms, spray from surf breaking against the seawall would wash out the fill from behind the stone. To guard against this, he would place a layer of rock on the fill. Similar action had been effective in checking erosion between the seawall and West Bastion.[63]

This letter succeeded in goading General Humphreys into releasing $20,000 from his contingency fund.[64] This enabled Elliot to order coping stone. Advising the Department of this action, he cautioned, the quarries were small, so it might be January 1, 1869, before the last stone was laid.[65]

Contracts were made and deliveries promised, but a transportation bottleneck threatened to disrupt plans. In the autumn of 1868, the Central Pacific was employing every car and locomotive to move supplies and equipment eastward, as its construction crews raced those of the Union Pacific to complete the first trans-continental railroad. To get granite transported from the quarries to tidewater, Major Elliot made a personal appeal to President Leland Stanford of the Central Pacific.

Men were also employed to recover stones thrown into the sea during the previous winter to shield the cofferdam. Those suitable for coping were sent to the stoneyard, while the other blocks, some weighing as much as three tons and previously rejected because of failure to meet

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62. Elliot to Humphreys, Aug. 1, 1868, and Monthly Report of Operations for Aug. 1868, NA, RG 77, Ltrs. Recd., Chief Engineer.

63. Elliot to Humphreys, Aug. 15, 1868, NA, RG 77, Ltrs. Recd., Chief Engineer.

64. Humphreys to Elliot, Sept. 7, 1868, NA, RG 77, Ltrs. Sent, Chief Engineer.

65. Elliot to Humphreys, Sept. 12, 1868, NA, RG 77, Ltrs. Recd., Chief Engineer.

specifications, were used for an apron at the foot of the seawall fronting the West Bastion. The concrete foundation of this section of De Russy's Seawall, not being anchored in bedrock, was exposed to the sea tides and had suffered damage.[66]

Rapid progress was made that autumn, and on January 11, 1869, Elliot reported the seawall finished to the coping course, of which 346 feet had been laid. This was fortunate, because removal of the protective apron caused about 100 feet of cofferdam to collapse during a December storm. Major Elliot had turned a crew to salvaging the cofferdam's plank roofing. With this out of the way, the surf, as it broke against the wooden bulkheads, washed out the fill, and by spring most of the structure had been claimed by the sea.

The 600-foot cofferdam, however, had served its purpose, Elliot boasted, as it had demonstrated that "expensive solid timber faces" were unnecessary to resist the heaviest surf. He had placed "the outer face of the dam . . . as far down into the bottom as the lowest spring tides will allow," knowing that any kind of a face would be undermined by the fall of the surf unless protected by an apron. A rock bottom had prevented use of piles to secure the cofferdam.[67]

5. Funds Again Run Out

Major Elliot discovered, much to his embarrassment, in February 1869 that he needed another $10,000 to complete his seawall and pay for the granite and coping. To cover himself, he reminded the Department that the previous March, he had estimated it would take $65,000 to fund the project. Of this sum, he had received $20,000 on account of contingencies and $30,000 from "Preservation and Repair of Fortifications." His books also showed that there was on deposit with the U.S. Treasury $705.57 from a previous Fort Point appropriation. This money would be helpful in seeing him through the crisis.[68]

On March 17 General Humphreys telegraphed that the Treasury Department had been requested to forward $10,000 from the "Contingency Fund" and $500 from the appropriation for Fort Point.[69]

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66. Elliot to Humphreys, Oct. 10 & Nov. 10, 1868, NA, RG 77, Ltrs. Recd., Chief Engineer. Elliot forecast that his seawall would not require an apron as it rested on bedrock.

67. Elliot to Humphreys, Jan. 11, 1869, NA, RG 77, Ltrs. Recd., Chief Engineer.

68. Elliot to Humphreys, Feb. 4, 1869, NA, RG 77, Ltrs. Recd., Chief Engineer.

69. Humphreys to Elliot, March 17, 1869, NA, RG 77, Ltrs. Sent, Chief Engineer.

6. The End of F.Y. 1869 Sees the Project Finished

Pending receipt of these funds, Elliot had reduced his labor force. Those employed laid 999 cubic feet of coping (six feet wide and two feet thick) and filled in the excavation behind the wall, paving it with stone. (This paving was 30 to 40 feet across and was designed to prevent the fill from being washed out by surf cascading over the wall during storms.) In March the 600-foot seawall, designed to support the parapet of the east barbette battery, was completed, except for pointing the upper joint of coping, and leveling and paving the area behind it.[70] These details were finished by the end of the fiscal year.[71]

7. The Kelly Patent

Major Elliot had made a major improvement in his seawall at the suggestion of one of his masons, John Kelly. Colonel De Russy, in constructing his seawall, had followed General Totten's directions by placing strips of bagging, saturated with bitumen, in front of the mortar joints. It was discovered by Major Elliot that the bagging soon rotted, exposing the joints. When he prepared to build his seawall, Elliot sought a solution to this problem. The answer was suggested by John Kelly, who had worked on docks in Great Britain before emigrating to the United States. He told how British contractors handled similar situations. They used strips of lead, 1/4-inch thick by one-inch wide, in lieu of the saturated bagging. After the mortar had been set, the "front edges" of the lead strips were used as caulking, so that the mortar was shielded from the sea air and saltwater.[72]

The experiment proved a success, and, on January 25, 1869, Major Elliot reported that, although the seawall on the western beach had been standing more than two years, the lead caulking was intact and protecting the joints. Kelly by this time had secured a patent, and told Major Elliot that he should be compensated for the use of it at Fort Point. Elliot explained that he did not have necessary authority, and he would have to refer the subject to the Department.[73]

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70. Monthly Reports of Operations for Jan.-March 1869, NA, RG 77, Ltrs. Recd., Chief Engineer.

71. Elliot to Humphreys, May 6 & Aug. 17, 1869, NA, RG 77, Ltrs. Recd., Chief Engineer.

72. Elliot to Humphreys, Dec. 23, 1868, & Jan. 25, 1869, NA, RG 77, Ltrs. Recd., Chief Engineer. In positioning the lead, "seven or eight cut patent hammers" was used, the set filling in the seam made watertight, securing the mortar behind from the action of the surf.

73. Ibid.

In his letter of application, Kelly asked that the Chief Engineer "grant him suitable compensation for the use of the invention, on this coast, and throughout the Union whenever it may be used." He would prefer a donation from the government, assigning to it right of full use, **rather "than to enforce the rights secured and guaranteed to me by Letter Patent."**[74]

The Department rejected Kelly's request for compensation, and no more was heard from him on the subject.[75]

8. Elliot Frustrates Efforts to Institute the 8-Hour Day

The War Department in the summer of 1868 issued General Order 38, establishing new conditions for pay of civilian employees. Henceforth, laborers and all mechanics, except those working on piece work, would be paid by the hour, not the day. To conform to these regulations, Major Elliot announced that after September 1, the laborers would be employed at the rate of 20 cents an hour. They were given the option of working an eight-or ten-hour day, but they must decide by majority vote which it would be. Artisans were to be paid by the hour at the same rates as their current daily wage.

When the vote was taken, the majority favored an eight-hour day. Major Elliot heard talk that the workers had taken this step in anticipation that either Congress or the Secretary would agree to paying them ten hours' pay for eight hours' work. He was certain the family men, in particular, could not afford to lose two hours out of each working day, and they would be compelled to leave the job. When this occurred, he reinstituted a ten-hour day. With labor in abundance no trouble was encountered, and Elliot pared his labor costs to what they had been previous to General Order 38.[76]

F. Positioning of an Apron in Front of **De Russy's** Seawall

1. Humphreys Approves the Program for F.Y. 1870

Once again, the 41st Congress, meeting in the winter of 1868-69, refused an appropriation for construction of fortifications. The only

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74. Kelly to Elliot, Jan. 26, 1869; Letters Patent No. 74547, Feb. 18, 1868, NA, RG 77, Ltrs. Recd., Chief Engineer.

75. Elliot to Humphreys, April 7, 1869, NA, RG 77, Ltrs. Recd., Chief Engineer.

76. Elliot to Humphreys, Aug. 29, 1868, NA, RG 77, Ltrs. Recd., Chief Engineer.

moneys available to fund operations at Fort Point in Fiscal Year 1870 would be those allotted by the Chief Engineer from the general appropriation for care and preservation of fortifications and his contingency funds.

Major Elliot, like other project engineers, accordingly prepared a program for the new fiscal year. He called for repair of quarters and barracks, the scarping and painting of ironwork, the construction of an apron for protection of the concrete foundations of **De Russy's Seawall**, and "repair of such damages as may occur to the roads, the wharf, and the temporary protection against the sea during the next winter." Besides the money already budgeted for construction of the apron, $4,075 was needed to underwrite these undertakings.[77]

Chief Engineer Humphreys on June 28 approved Elliot's program, and directed him to employ a fort keeper to look after the works.[78]

2. Elliot's Proposal

To understand the need for an apron, it is necessary to recall that Colonel **De Russy** in constructing his seawall to protect the site had faced it with granite down to reference (2') above zero mean low water. Experience had shown that this was a mistake, and the subject facing should have been commenced at (0), because concrete masonry was eroded rapidly by the storms frequenting this coast.

To illustrate what was happening and his proposed solution, Elliot on March 27, 1869, sent to the Department tracings showing: (a) General Totten's proposed construction of the wall; and (b) as constructed, the "condition of the beach, the wearing away of the concrete, and the open joints under the lowest facing stones."

On the beach were many boulders, weighing from 500 to 2,000 pounds, and during storms they were continually hurled against the concrete footings by the breakers. To protect the endangered faces, Elliot rejected construction of a sub-scarp wall of granite as too expensive.[79] If, however, the boulders could be "kept piled up in front of the wall

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77. Elliot to Humphreys, June 16, 1869, NA, RG 77, Ltrs. Recd., Chief Engineer.

78. Humphreys to Elliot, June 28, 1869, NA, RG 77, Ltrs. Sent, Chief Engineer.

79. Fronting faces 9-11, between points C and D on the drawing, the beach of "sand and shingle" intersected the wall above the concrete, and here there was no threat.

and over the exposed concrete, the shingle and sand will be deposited between them and will afford the required protection from the action of the waves." Cost of this project would be moderate.

Along faces 1-7 wave action was parallel to De Russy's Seawall, and the boulders were rolled along in front, instead of being bowled into it. To check the former action, dikes of "immovable stones" perpendicular to the seawall would be positioned, at 50-foot intervals. To be immovable, the subject stones must not weigh less then ten tons. Along faces 7-9, where the surf crashed into the wall, a footing of immovable stones should be placed, as shown on the plan, to keep the boulders from being carried out by the undertow.

As there were no quarries nearby where sandstone of the suitable size could be obtained, recourse would be made to granite quarried along the right-of-way of the Central Pacific Railroad, above Sacramento. The price of heavy stones, such as needed, delivered at the Fort Point wharf would average $10 a ton. At that figure the proposed project, to include filling joints which had reopened in the seawall with mortar, would be $18,000 in legal tender notes.

It was Major Elliot's opinion that protection of the foot of De Russy's Seawall could not be delayed longer than next July 1.[80]

On April 26 General Humphreys approved Elliot's proposal. Money equal to his estimate would be made available from contingency funds.[81]

3. The Project is Undertaken and Completed

Upon receipt of authority to proceed, Major Elliot had machinery built for moving heavy masses of rocks, and in June work was commenced and progress was satisfactory.[82] Discovery of "masses of rocks, from 10 to 15 tons," on the beach between Fort Point and Lobos Creek was welcomed news. This would alleviate the great expense of transporting granite from the quarries above Sacramento.

Hopes were expressed in early September that the apron would be finished before the rainy season began in November. Heavy surf in October

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80. Elliot to Humphreys, March 27, 1869, NA, RG 77, Ltrs. Recd., Chief Engineer.

81. Humphreys to Elliot, April 26, 1869, NA, RG 77, Ltrs. Sent, Chief Engineer.

82. Elliot to Humphreys, June 8 and undated, NA, RG 77, Ltrs. Recd., Chief Engineer.

dashed these expectations. On December 4 Elliot complained that "the nature of the work does not admit of the employment of a large force of men, but it is carried on as expeditiously as the condition of the surf will admit." During storms it "was impossible either to get heavy masses of rock . . ., or to place them properly on the apron."[83]

The winter storms caused Major Elliot to lament on January 6, 1870, that he was disappointed at "not finishing the apron according to my estimate of June 16, not in regard to expense but in regard to time." His men found it tedious to secure from the beach, which could only be done in low water, the huge boulders.

By the end of January, the outer row of stones had been positioned, and the paving of the space extending to the seawall commenced, with stones weighing from two to four tons. In April the apron was completed, and the men before being paid off, collected and stored the tools. The apron was 709 feet long, 16 feet wide, with an average depth of 6 1/2 feet, and consisted of about 3,500 tons of stone.[84]

C. Maintenance Projects, 1869-70

1. Elliot Submits a Program

The Department on January 13, 1869, asked Major Elliot for a report on repairs needed for preservation of the fort and their probable cost.[85] Responding, Elliot advised that the Officers' Quarters were in "bad condition and a good deal of the woodwork and plastering is broken." The barracks were in better shape, but both should be "painted and whitened." To fund this undertaking would require $2,500 in legal tender notes.

Ironwork of the embrasures, stairways, colonnades, and railings was rusted and required scraping and painting to cost $2,000 for labor and materials.

Fort Point, he continued, had not been garrisoned since March 1868, and providing for its security was the responsibility of the officer in command at the Presidio.[86]

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83. Elliot to Humphreys, Sept. 2, Oct. 6, Nov. 4, and Dec. 4, 1869, NA, RG 77, Ltrs. Recd., Chief Engineer.

84. Elliot to Humphreys, Jan. 6, Feb. 3, & March 4, 1870, and Stewart to Humphreys, April 30, 1870, NA, RG 77, Ltrs. Recd., Chief Engineer; Executive Documents, printed by Order of the House of Representatives, 1870-71 (Washington, 1871), Serial 1447, vol. 2, pt. 2, pp. 26-7.

85. Kurtz to Elliot, Jan. 13, 1869, NA, RG 77, Ltrs. Sent, Chief Engineer.

86. Elliot to Humphreys, Feb. 17, 1869, NA, RG 77, Ltrs. Recd., Chief Engineer.

Elliot on March 20 was authorized by the Department to execute the work proposed.[87]

2. The Quarters are Rehabilitated and the Ironwork Scraped and Painted

In May 1869, Elliot (having recruited painters, plumbers, and plasterers) commenced a thorough "clearing, repainting and whitening, and repair of wood and plumbing" in the quarters and barracks. Four months were required to complete these projects.[88]

The corrosive actions of the salt air and spray compelled Elliot, in the spring and summer of 1869, to again have a crew scrape and repaint with three coats the ironwork of the 95 embrasures, the stairways, railings, etc.[89]

Other projects undertaken at this time were enlargement of the ordnance yard, replacement of teredo-damaged piles in the wharf, and upkeep of the Engineer shops and quarters.[90] In the spring of 1870 a small force (a master mason, one teamster, and four laborers) whitewashed the Engineer buildings, policed the grounds, and repaired the floor of the stables.[91]

H. The Problem of Repointing

1. Elliot Reports on the Experiments of Nine Years Before

The winds and spray at Fort Point also damaged the pointing. On December 23, 1868, Major Elliot wrote the Department that the pointing of the exterior scarp had been "almost entirely destroyed and in some cases

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87. Humphreys to Elliot, March 20, 1869, NA, RG 77, Ltrs. Sent, Chief Engineer.

88. Elliot to Humphreys, June 8, Aug. 6, & Sept. 2, 1869, NA, RG 77, Ltrs. Recd., Chief Engineer.

89. Elliot to Humphreys, March 4 & Aug. 17, 1869, NA, RG 77, Ltrs. Recd., Chief Engineer.

90. Elliot to Humphreys, Aug. 17, 1869, NA, RG 77, Ltrs. Recd., Chief Engineer.

91. Stewart to Humphreys, June 2 & July 5, 1870, NA, RG 77, Ltrs. Recd., Chief Engineer. Lt. Col. C.S. Stewart had become project engineer on April 30, 1870.

(mostly on the sea or western faces) the joints have been disintegrated to the depth of an inch." While the entire scarp should be repointed, it would be a very expensive operation. Elliot therefore believed it could be delayed until "it is determined whether the brick scarps . . . are to remain as they are or be plated with iron."

To provide the Department with information on which it might make a decision, Major Elliot reported on an experiment conducted at Fort Point in 1859, in accordance with instructions from General Totten. Captain Gilmer had afforded different treatments to six two-foot squares on the exterior of the western scarp. These featured: diluted soft soap was repeatedly applied to square A until the brick were impregnated; the surface of B was treated in like manner with a diluted solution of caustic potash; the surface of C was treated with a diluted solution of muriate of lime; the pointing mortar of D was made with diluted soft soap instead of water; the pointing mortar of E was mixed with a diluted solution of caustic potash in lieu of water; and the pointing mortar of F was made with a diluted solution of muriate of lime substitued for water.

All of these pointings, made at the same time and under similar conditions, were disintegrating at about the same rate. At the same time, Captain Gilmer had carried out another experiment, employing pointing mortar mixed as follows: one part each of cement and sand to 1/8 part of iron filings. These were mixed in a dry state and iron water added. The iron water was made by placing scraps of wrought iron in water and leaving it there for several weeks, and then adding one-half pint of molasses to one gallon of water. The joints were wet down with iron water before pointing. Gilmer's experiment had yielded "wonderful results." Although the surface of the joints had "an ugly nasty appearance," they were as hard and smooth as nine years before.

Because of the high cost of repointing, it would be a great saving if the Department would agree to permit use of this mixture of iron and sugar with cement and sand.

If not, Elliot believed, it would be cheaper to apply a coat of stucco to the exterior of the scarp rather than repointing. The stucco would protect the brick that had disintegrated, as well as the joints.[92]

2. The Department Decides to Postpone Repointing the Scarp

The Department forwarded Elliot's letter to the Board of Engineers for Fortifications, with a request for its consideration and report. General Humphreys especially wished to know its opinion about the use of stucco.

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92. Elliot to Humphreys, Dec. 23, 1868, NA, RG 77, Ltrs. Recd., Chief Engineer.

Replying for the Board, General Barnard wrote that it was unaware of "any plaster or stucco for heavy walls that is reliable--that which answers well for thin walls of dwellings having failed when applied under circumstances like those at Fort Point." If protection was deemed necessary for the bricks, "a rough cast, of cement and mortar, dashed on and brought to a tolerable even surface by the use of the wooden 'float'" was recommended. Major Elliot, however, would be the best judge as to whether "this rough cast will stand the climate."

As it was probable that extensive changes to increase the fort's efficiency, as well as its resistance to rifled projectiles, were in the offing, the Board recommended that only such repair be made as were "actually required for its preservation."

After reviewing Barnard's letter, General Humphreys on January 26, 1869, notified Elliot that the expenditures for "preserving the faces of the masonry must be controlled by the considerations in Barnard's letter, as well as by the fact that "we cannot expect any but very reduced appropriations . . . for defensive works for the next fiscal year."

Elliot was to do what was "indispensible for the preservation of the masonry, and report at once his estimate of the cost."[93]

Elliot replied that the section of the scarp in the worse condition (the West Bastion and western curtain) were exposed to the "prevailing winds from the Pacific which are in summer charged with moisture."

Although the pointing on the other faces was also disintegrating, he did not believe that any part of the scarp was "in immediate danger of destruction." In accordance with the view expressed by the Board, he "recommended that no expense be made now in repointing but that it be delayed" until the Board had made a decision on modernizing the masonry forts.[94]

General Humphreys on March 22 concurred; there would be no repointing in the immediate future.[95]

I. The Earthquake of October 1868

A violent earthquake jolted the Bay area on October 21, 1868,

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93. Barnard to Humphreys, Jan. 22 & Humphreys to Elliot, Jan. 26, 1869, NA, RG 77, Ltrs. Sent, Chief Engineer.

94. Elliot to Humphreys, Feb. 25, 1869, NA, RG 77, Ltrs. Recd., Chief Engineer.

95. Humphreys to Elliot, March 22, 1869, NA, RG 77, Ltrs. Sent, Chief Engineer.

causing heavy damage. Inspecting the fort, Major Elliot saw a number of fractures in the masonry. On the 1st Tier a number of cracks from 1/16 to 1/8 of an inch, had appeared in the embrasure arches and jambs of Casemate Nos. 1-10, 15-18, and 20-23. It was impossible to determine if these fractures were continuous along the wall from embrasure to embrasure. The sole stones of the embrasures were unbroken, as were the main casemate arches.

When he inspected the 2d Tier, Major Elliot, on standing in the casemates and looking up, saw cracks in the soffits in Casemate Nos. 9, 11-13, 15-16, and 22-23. In one casemate, a fracture connected with the skewback of the communication arch and followed it down nearly to the spring line. Most of the cracks were not more than 1/16 of an inch **and in no case were they more than 1/8-inch. He believed** the strength of the arches was unimpaired, but the sold stones in the embrasures of Casemate Nos. 3-5, and 14 were cracked.

The only damage observed on the 3d Tier was to the floors of Casemate Nos. 15 and 16. Here cracks had opened in the scotch flagging. There was no perceivable damage to the barbette tier.

He also saw that the small piers and main arches had been separated from the scarp "on all sides of the fort from 1/10 to 1/8 of an inch." They had not been bonded together and unequal settlement had caused separations which the earthquake had accentuated.

Cracks were found in the exterior of the scarp **in front of 1st Tier Casemate Nos. 8-11. These fractures had a maximum width** of 1/16-inch and followed the mortar joints.

Major Elliot was unable to explain the whys and wherefores of the damage, and how to guard against future quakes. As the foundations rested on rock, he could not explain why the piers, magazines, and tower stairways had not cracked, and why the cracks in the 1st Tier were vertically lengthwise to the scarp, **while on the 2d Tier** the sole stones immediately over these cracks were fractured in a transverse direction.

Concluding, Elliot reported the strength of the fort for sustaining the weight of its armament and delivering its fire was unimparied. The **strength** of the scarp in withstanding a bombardment, however, was materially reduced, as the embrasures, its weakest points, had been "much shattered."[96]

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96. Elliot to Humphreys, Nov. 27, 1868, NA, RG 77, Ltrs. Recd., Chief Engineer; "Fort at Fort Point, Cal., Plan and Sections showing the damages by the Earthquake of Oct. 21st, 1868, NA, RG 77, Drawer 94, Sheet 98. **The numbers employed by Major Elliot in designating the casemates was the system used prior to the nomenclature adopted in Fiscal Year 1870.**

J. Heavy Ordnance at Fort Point, November 1865-June 1870

1. The Arrival and Storage of Big Guns, Chassis, & Carriages

In November 1865, the month of Colonel De Russy's death, three 15-inch Rodmans were landed at Fort Point. The next month, Major Elliot receipted for an impressive list of big guns, their carriages, and chassis. Included were: 17 10-inch Rodmans; 6 rifled 200-pounders, with chassis and centre-pintle barbette carriages; 10 10-inch chassis with front pintle barbette carriages; and five undesignated chassis and carriages.

To receive and store this heavy and valuable ordnance, a yard was established and fenced on the beach east of the wharf.[97]

2. The Board's Recommendations

On December 4, 1866, the Board of Engineers for the Pacific was reconstituted by Chief Engineer Humphreys. Bvt. Brig. Gen. Barton S. Alexander was named president of the Board, to include besides himself, Bvt. Lt. Cols. R.S. Williamson and G.H. Mendell, Maj. G.H. Elliot, and Lt. Charles W. Raymond.

The Board in April 1867 visited Fort Point and observed that the embrasures of the channel bearing faces had been designed to "receive 32 and 42 pounders and 8" columbiads; guns well enough in their day, and sufficient, perhaps, in a contest with wooden ships carrying no heavier armament." Lessons learned in the Civil War had shown that guns of this type were "powerless against armored vessels."

At the time of their visit, there were mounted in the fort's casemates, on wooden carriages, six 24-pounders and 28 42-pounders, and on the barbette tier registering on the Golden Gate two 10-inch columbiads and eight 8-inch columbiads. This figure did not take into consideration the 11 32-pounders, en barbette on the gorge, nor the 42-pounders in the 10-Gun Battery.[98]

The Board found the second line of defense "scarcely stronger." An enemy fleet, once it had forced the Golden Gate, could shape its course either through the passage between Alcatraz and Angel Islands or through Raccoon Strait, then, passing to the eastward of Yerba Buena Island, anchor off San Francisco.

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97. Elliot to Delafield, Nov. 30, 1865; Monthly Report of Operations for Fort Point, December 1865, NA, RG 77, Ltrs. Recd., Chief Engineer.

98. Alexander to Humphreys, April 17, 1867, NA, RG 77, Ltrs. Recd., Chief Engineer. The 10-Gun Battery was being undermined by excavations for the West Casemated Battery.

To cope with this danger, the Board urged that "the Fort at Fort Point . . . be armed at all times--at least until guns can be put in position elsewhere--in the strongest manner of which it is capable." The Board recommended that the "channel bearing casemates of the 1st and 2d tiers" be each armed with 28 10-inch Rodmans, and those of the 3d Tier with 28 200-pounder rifled guns. Of these guns, there were stored in the Fort Point ordnance yard 40 10-inch Rodmans, with wrought iron carriages. If the Board's recommendations were to be implemented, another 16 10-inch Rodmans and 28 200-pounders, with casemate carriages, would have to be shipped to the site.[99]

General Humphreys, after studying the Board's recommendations, reviewed a report from General Alexander, dated June 30, 1866. He found that at that time there were stored in the Fort Point ordnance yard four 15-inch Rodmans, with centre-pintle carriages; three 15-inch Rodmans, with front-pintle carriages; two 300-pounder rifles, with centre-pintle carriages; six 200-pounder rifles, with centre-pintle carriages; 40 10-inch Rodmans with casemate carriages; and eight 42-pounders with casemate carriages. There were, he learned, 52 casemate and 15 centre-pintle platforms in the fort that were unarmed.[100]

Having secured all the facts, General Humphreys on May 30, 1867, notified Major Elliot that the Department concurred with the Board of Engineers for the Pacific. After enumerating the types of guns and carriages known to be available, Humphreys observed, if these pieces were mounted, they would "afford a very material addition to the power of that work."

When the projected "open batteries" to the east and west of the fort were completed, the 20 15-inch Rodmans now on hand or en route could be mounted therein.[101]

3. General Alexander's Inspection and Report

Although the Department had concurred with the Board's recommendations, Major Elliot hesitated to take action without formal approval. General Alexander therefore discovered in the spring of 1868, when making an inspection, that there had been no changes in the fort's armament.

While at the fort, he saw that the embrasures of 84 of the 90 casemates bore on the channel. The only ones that did not were two in each tier of the East Bastion, which commanded the shore eastward toward the Presidio. All channel bearing casemates had two sets of traverse circles, one set for the original armament and a second for the iron casemate carriages of 10-inch Rodmans.

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99. Ibid.

100. Alexander to Humphreys, June 30, 1866, NA, RG 77, Ltrs. Recd., Chief Engineer.

101. Humphreys to Elliot, May 30, 1867, NA, RG 77, Ltrs. Sent, Chief Engineer.

In addition to the Board's recommendations of the previous year, General Alexander urged that guns (200-and 300-pounder rifles and 10-inch Rodmans) be mounted on the 15 vacant platforms on the barbette tier. He also suggested that the 10-Gun Battery be disarmed, as its 42-pounders belonged "to an era that has passed."[102]

General Alexander was dismayed by the condition of the ordnance. He pronounced it badly cared for, and doubted he had "ever seen a fort in the whole course of my experience where so little care has been taken" of it.

He found nine 15-inch Rodmans on the beach outside the ordnance yard. Three of these giants were partially buried in the sand, between flood and ebb tide, with breakers rolling over them at high water. Guns in such a situation soon became unserviceable.

The chassis and top carriages of guns emplaced in the fort needed to be cleaned and lacquered. The shot, some in piles and some lying around loose, was badly rusted.

"There must be something wrong in a military organization," Alexander complained, "which can present such carelessness." He did not know where the fault rested, but he was certain the fort "was sadly in want of a commanding officer."[103]

4. General Humphreys takes Action

Alexander's report had immediate repercussions. On July 25, 1868, Chief Engineer Humphreys ordered Major Elliot to make the following changes in the Fort Point armament: (a) he was to dismount from the 1st Tier the 28 42-pounders on wooden carriages, remounting 25 of them in the 3d Tier, "it being understood that there are only that number of casemates available, the remainder having been converted to prison rooms." (b) Forty 10-inch Rodmans with iron carriages would be mounted

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102. Alexander to Humphreys, April 8, 1868, NA, RG 77, Ltrs. Recd., Chief Engineer. The 10-Gun Battery was pronounced unserviceable by General Alexander. He found the parapet of the four right flank guns undermined by excavations for the West Casemated Battery eroded, so the security of the breast-height wall was threatened. The battery's construction had been faulty from inception, as its right flank was lower than its left, the guns being positioned as it on steps, "and as the breast-height wall was carried up to the interior crest so many angles of masonry are presented as to render service of the guns," in event of a bombardment, suicidal.

103. Ibid.

in the 1st and 2d Tiers, "thus filling up the first tier, and furnishing twelve guns for the second tier." (c) The ten 42-pounder smoothbores emplaced in the Ten-Gun Battery were to be dismounted. (d) The remainder of the armament, especially the barbette guns, was to be left alone, "until experiments now in progress shall determine the manner of strengthening the platforms."

If the post commander was unable to detail personnel to implement these changes, Elliot was to call on the ordnance officer at Benicia Arsenal, who had been directed "to furnish every facility for perfecting the armament of the forts in the harbor of San Francisco."[104]

5. Major Changes are Made to the Fort's Armament

That autumn Major Elliot changed the armament, and in doing so numbered the gun platforms from left to right on each tier, commencing at the left of "the west, or seaward, channel front." On the 1st Tier, mounted on double sets of rails, in positions Nos. 1 to 25, were 25 10-inch Rodmans on iron carriages; Nos. 26 and 27, on the right flank of East Bastion, mounted two 24-pounder guns on wooden carriages; and Nos. 28 to 30, three 10-inch Rodmans on iron carriages.

On the 2d Tier, mounted on double sets of rails, in positions Nos. 31 to 33 were three 10-inch Rodmans on iron carriages. Nos. 34 to 39 had platforms vacant; Nos. 40 to 43 four 10-inch Rodmans on iron carriages; Nos. 44 to 47 platforms vacant; Nos. 48 to 52 five 10-inch Rodmans on iron carriages; Nos. 53-55 vacant; Nos. 56 and 57, right flank of East Bastion, two 24-pounders on wooden carriages; and Nos. 58 to 60 vacant. In Casemate No. 47 were five bronze 24-pounder coehorn mortars.

On the 3d Tier, mounted on double sets of rails, in positions Nos. 64 to 85 and 88 to 90 were 25 42-pounders on wooden carriages; Nos. 86 and 87 mounted two 24-pounder guns on wooden carriages; and in Casemates Nos. 76-79 were emplaced four 10-inch siege mortars on siege platforms. Platforms Nos. 61-63 were vacant.

On the Barbette Tier platforms Nos. 91-98 were vacant; No. 99, salient of West Bastion, mounted a 10-inch columbiad, on wooden carriage with centre-pintle 3 5/8-inch platform; Nos. 100 to 107, like platforms, mounting 8-inch columbiads on wooden carriages; Nos. 108 to 110, like platforms, vacant; No. 111, salient of East Bastion, a 10-inch columbiad on wooden carriage, mounted on centre-pintle platform; Nos. 112 to 115 centre-pintle platforms vacant; and Nos. 116 to 126 11 32-pounder smoothbores on wooden carriages, mounted on front-pintle platforms. In rear of Nos. 98 and 100 were two 10-inch seige mortars on iron carriages.

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104. Humphreys to Elliot, July 25, 1868, NA, RG 77, Ltrs. Sent, Chief Engineer.

In the counterscarp gallery, position No. 127 was vacant and positions Nos. 128-131 mounted four 24-pounder flank howitzers on wooden carriages.

At the ordnance yard, not mounted, were 25 15-inch Rodmans, two 300-pounder Parrotts, six 200-pounder Parrotts, and 21 42-pounder smoothbores. There were three 42-pounder casemate carriages, and of barbette carriages there were 24 15-inch Rodman (front-pintle); six 15-inch Rodman (centre-pintle); two 300-pounder Parrott (front-pintle); six 200-pounder Parrott (front-pintle); and 15 42-pounder (front-pintle). The carriages for the 42-pounders were wood, those for the larger guns iron.[105]

Soon after the 10-inch Rodman was emplaced in position No. 33, a gimlet was broken off in the vent, and by June 30, 1870, it had not been removed. On the subject date, the inspecting officer also reported that the magazines were in good order, with powder stored in the main magazines and some fixed ammunition in the service magazines.[106]

K. Elliot Again Proposes that the Fort Honor Colonel De Russy

Major Elliot on August 11, 1869, again broached the subject of a name for the fort. His choice was Fort De Russy, which would "find favor with citizens of the west coast acquainted with the late colonel" and his long association with Fort Point and the Bay area.

Recently, his friends, as a token of their esteem, had contributed funds for erection of a handsome granite memorial to De Russy at his grave-site in Laurel Hill Cemetery. If the Department approved his suggestion, Major Elliot would make the announcement at the unveiling ceremonies.[107]

On August 19 General Humphreys acknowledged Elliot's message. The suggestion that the work be named Fort De Russy was submitted by the Chief Engineer to Secretary of War John Rawlins, and that was the last heard of it.[108]

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105. "Annual Report of Progress Made in the Construction of Fort at Fort Point," in the year ending, June 30, 1870, NA, RG 77, Ltrs. Recd., Chief Engineer.

106. Ibid.

107. Elliot to Humphreys, Aug. 11, 1869, NA, RG 77, Ltrs. Recd., Chief Engineer.

108. Humphreys to Elliot, Aug. 19, 1869, NA, RG 77, Ltrs. Sent, Chief Engineer.

L. The Garrison is Withdrawn from Fort Point

The fort in the summer of 1867 was garrisoned by 343 officers and men of Companies H and K, 2d U.S. Artillery, and Company F, 9th U.S. Infantry.[109] These units were transferred to other stations in August and September, one company of artillery (H) and the infantrymen being sent to Sitka, Alaska, and Company K to Alcatraz.[110]

They were replaced by Company D, U.S. Engineer Battalion, in September. The engineers, who had been sent to the Pacific coast from Willett's Point, New York, remained at Fort Point until March 17, 1868, when they were sent to Yerba Buena. With the departure of the engineers, the post was merged with that of the Presidio, and for the next ten years no troops were billeted in the fort.[111]

M. Fort Point Gets a New Superintending Engineer

Major Elliot, who had been stationed on the Pacific coast since 1857, received orders in March 1870, directing him to report to headquarters in the nation's capital. His replacement as superintending engineer for Fort Point, certain other San Francisco Bay fortifications, and those at San Diego would be Lt. Col. C. Seaforth Stewart.

Stewart, a son of the Rev. Charles S. and Harriet Tiffany Stewart, was born at sea on April 11, 1823, his parents being en route to the Hawaiian Islands. His parents, who were missionaries, returned to the United States in 1825, and three years later the Reverend Stewart was commissioned a chaplain in the U.S. Navy.

C. Seaforth Stewart was appointed to the U.S. Military Academy in 1842, from which he graduated No. 1 in the Class of 1846. Among his classmates were George B. McClellan, John G. Foster, D.N. Couch, Truman Seymore, Samuel D. Sturgis, and George Pickett. Commissioned a 2d lieutenant in the Corps of Engineers, young Stewart was ordered to Fort Trumbull as assistant engineer. Two years, 1847-49, were spent at Fort Warren, before he was ordered to return to the Military Academy as assistant professor of engineering.

Stewart was back at Fort Warren in 1854 as superintending engineer. In April 1861 he was ordered to Fort Monroe as assistant to Colonel De Russy. When De Russy was ordered to California in September, Stewart

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109. Elliot to Humphreys, Aug. 8, 1867, NA, RG 77, Ltrs. Recd., Chief Engineer.

110. Returns for U.S. Military Posts, 1800-1916, NA, Microcopy 617.

111. Ibid.

succeeded him as chief engineer for Fort Monroe and the Hampton Roads area. There he remained until the autumn of 1864, when he became chief engineer of the Middle Military District, with headquarters in Baltimore. After a brief tour of duty at Fort Clinch in late summer and early autumn of 1865, Stewart, now a lieutenant colonel, was placed in charge of the Delaware Bay defenses and improvements to navigation on the Delaware River. He held this position until April 9, 1870, when he was ordered to California.[112]

Major Elliot, seven weeks before Colonel Stewart arrived, turned over the papers and funds for which he was responsible to Bvt. Lt. Col. G.H. Mendell, and boarded an east-bound train. Colonel Mendell supervised the Fort Point projects from March 9 until April 30, when Colonel Stewart reported for duty.[113]

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112. C. Seaforth Stewart, NA, RG 94, ACP File.

113. "Annual Report of Progress Made in the Construction of Fort at Fort Point," in the year ending June 30, 1870, NA, RG 77, Ltrs. Recd., Chief Engineer.

IX. FORT POINT, JULY 1, 1870--NOVEMBER 30, 1882

A. Plans are Made and Approved for Earthen Barbette Batteries

1. A Technical Revolution in Weaponary has Repercussions

The Civil War triggered a technical revolution in fortifications and weaponry. The handsomely designed and costly masonry forts protecting the ports and harbors of the United States had been made obsolete by rifled artillery. Steam now propelled warships, freeing them from dependence on wind, greatly increasing their tactical mobility, and lessening the exposure of their motive power, while the addition of armor further reduced their vulnerability to fire from shore batteries.

By 1865 several European powers, having partially evaluated the technical lessons of the Civil War, had drawn up plans for construction of new--and expensive--fortifications armored with masses of iron. The United States, having just emerged from a terrible conflict, was unready to embark on construction of a new system of coastal defenses. The Corps of Engineers, mindful of the suddenness with which the "Third System" masonry fortifications (of which Fort Point was a prime example) had been rendered obsolete, was hesitant for technical reasons to return "to elaborate works that might quickly become outmoded, as there was much to suggest . . . a coming period of further rapid advances in artillery." Congress (its energy occupied with Reconstruction legislation and the struggle with the Executive Department) was in no mood to spend hugh sums on the military.[1]

The years immediately after the Civil War found the Corps of Engineers undertaking experiments to determine the feasibility of facing existing masonry works with armor-plate, while the Ordnance Department was engaged in designing and testing rifled guns of increased size and power. The armor studies were inconclusive, though such a means of preserving the utility of existing Second and Third System forts would have been prohibitively expensive. Experiments by the Ordnance people gave promise of success. Because of their great weight, the new guns could not be mounted in most existing masonry works. In addition they could be equipped with depressing carriages to permit them to be retracted below the parapet for loading and servicing. Thus, as fortification expert Dr. Raymond E. Lewis has written, "the inability of masonry to withstand modern weapons, the post war shortage of funds for military purposes, and the need for emplacements large enough to

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1. Lewis, Seacoast Fortifications of the United States, pp. 66-8.

receive the new armament combined in the closing years of the [1860s] to bring about a return to an inexpensive mode of permanent fortification in which earth once again became the principal substance of protection."[2]

The coastal fortifications erected by the United States in the 1870s were similar to the barbette batteries of the Second and Third Systems. Differences were to be found in detail, for example improved magazine placement and more space between guns. Because they were designed for larger weapons, the new emplacements would be of greater size. Facings would be of brick; gun platforms of granite or concrete; and the magazines well protected by many feet of earth over concrete.[3]

2. The Board of Engineers makes its Report

The Board of Engineers for the Pacific spent considerable time and money developing a new scheme of defense for San Francisco Bay. They were guided by these new concepts. On September 23, 1870, the Board made its report to Chief Engineer Humphreys.[4]

A careful reconnaissance of the area had satisfied members that "the best position on this shore for Barbette and Mortar Batteries to defend the approaches to the harbor were along the crest of the bluff, south of Fort Point, and that a powerful battery can be placed on the bluff East of the Fort." The latter battery would command the Golden Gate and the interior waters toward Point San Jose, Alcatraz, and Angel Island.

A detailed topographical survey of the ground to be occupied by these batteries had been prepared by Lt. Thomas H. Handbury of the Board. This accompanied the report, and by reference to it Chief Engineer Humphreys visualized the plan.

To command the approaches to San Francisco Bay, a series of gun and mortar batteries to emplace 51 guns and 28 mortars would crown the crest of the bluff from a position a few yards south of the 10-Gun Battery to Telegraph Hill. The Golden Gate and approaches to the inner harbor would be defended by a heavy six-gun battery immediately in rear of Fort Point and firing toward Gravelly Beach. To answer complaints that this battery would be firing over Fort Point, the Board observed,

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2. Ibid., pp. 68-69.

3. Ibid., p. 69.

4. The Board included Bvt. Brig. Gen. Barton Alexander, Lt. Col. C. Seaforth Stewart, Maj. George H. Mendell, and Lt. Thomas H. Handbury.

it "will take the place of the present inefficient battery on the barbette of the Fort, which with its brick parapets would be untenable in action, and the guns of which, being of small calibre, would be inefficient against modern armored vessels." Moreover, the emplacement of six 15-inch Rodmans on the barbette tier of Fort Point would be prohibitively expensive. The Board recommended that the barbette battery be dismantled and the terreplein covered with earth.

East of the aforementioned position, on the crest of the bluff, would be constructed emplacements for 16 guns and four mortars. The left face of this battery would fire tangent to the guns of Fort Point, and cover the waters to the eastward of this line for 120°. It would be positioned not to interfere with the fire of the barbette battery projected for construction behind Elliot's seawall. The right face of the subject battery would fire across the channel to Lime Point, and cover "all the available waters of the harbor on the right of this line within range." The two guns on the extreme right were to protect the shore in the direction of the Presidio and Point San Jose.

Positioned in these batteries would be two 10-inch Rodmans, one 20-inch Rodman, 46 15-inch Rodmans, 24 heavy rifled guns, and 32 mortars. The guns were to be mounted in pairs, with "the space between the foot of the slopes of the adjacent traverses" 64 feet, which would accommodate two 15-inch Rodmans or platforms of three seacoast mortars. This would permit alteration of the armament without changes to the plan.

If approved these three batteries would "probably absorb in their construction, all the appropriations that will be made for defensive works at Fort Point for several years." Meanwhile, the Board would prepare plans for field fortifications to provide for defense of these batteries against columns thrusting toward Telegraph and Presidio Hills.

The Board recommended that work on the barbette battery to be constructed behind Elliot's seawall be deferred. In fact, the Board doubted whether it should be built, "because more efficient batteries with guns en barbette can be constructed for less money, on the slope of the hill to the right and rear of the position, as how presented for approval." Experience had demonstrated that the parapet of the proposed seawall barbette battery would require constant repair of damage caused by surf breaking over it. Moreover, as the site was only a few feet above sea level, it was better suited for a casemated battery, provided agreement could be reached on type of material for the scarp.

The Board, in conclusion, urged that the Chief Engineer take affirmitive action at an early date. This would enable Colonel Stewart "to apply available appropriations within the present fiscal year." If the plan were approved, the Board recommended that the first emplacements constructed be those beginning at (1) and extending toward (4). These works, all in "Battery West," called for the emplacement of

one 20-inch gun and 14 15-inch Rodmans. With these batteries completed and armed, they, in conjunction with those at Gravelly Point (already approved), would command the approaches to the Golden Gate.

The Board also urged immediate approval for construction of the 8-gun mortar battery to the left of battery (4).[5]

3. The Projects are Approved and Priorities Established

Chief Engineer Humphreys referred the report to his final authority--the Board of Engineers for Fortifications--with a request that it make an evaluation and submit its comments as soon as practicable. The Board, on reviewing the subject report, pronounced the battery (East) proposed to command the passage through the Golden Gate and the interior waters of the Bay toward Point San Jose and Alcatraz and Angel Islands as well located and should be constructed. The batteries for 51 guns and 28 mortars south and west of Fort Point, "though unnecessarily high and too oblique in direction for the most efficient fire on hostile fleets running through mid-channel to enter the Golden Gate," were found to occupy the only available ground in that area. As the southernermost batteries would be more than two miles from mid-channel, the Board could only recommend construction of the northerly batteries, from (1) to (7) inclusive. The six-gun battery south of Fort Point and bearing on Gravelly Beach was deemed the most important in the entire group projected and should be "constructed even at the sacrifice of the barbette tier" of the fort.

The priority in construction should be: first, the six-gun battery; second, batteries from (1) to (4) and mortar battery 4-5; third, the 16-gun and two mortar emplacements east of the fort; and fourth, the gun batteries from (5) to (7) southwest of Fort Point.

Work on the barbette battery behind Elliot's Seawall would be held in abeyance.[6]

Chief Engineer Humphreys, after reviewing the Board's report, forwarded it to Secretary of War William W. Belknap, with a note that the

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5. Alexander to Humphreys, Aug. 29 & Sept. 23, 1870, NA, RG 77, Ltrs. Recd., Chief Engineer. The emplacements south of Fort Point, although never officially designated, came to be known as Battery West; and those along the crest of the bluff southeast of Fort Point as Battery East. Subsequently, the emplacement at (1) was designated No. 21 and the one designed for the 20-inch gun, No. 31.

6. Tower to Humphreys, Nov. 2, 1870, NA, RG 77, Ltrs. Recd., Chief Engineer.

"subject projects of the Board of Engineers for the Pacific, as modified by the Fortification Board," had his approval.[7] Belknap on November 9 approved the project, "subject to such changes in details by the Chief Engineer, as in the course of construction may be found advisable."[8]

General Humphreys on November 11, 1870, mailed to Colonel Stewart the comments of the Board of Engineers for Fortifications along with the accompanying endorsements. Also enclosed was a copy of the Pacific Board's recommendation for expenditure of $15,000 for mortar batteries. Copies of drawings of the earthen batteries would be mailed as soon as completed.[9] The subject drawings were posted eight days later.[10]

4. Plans to Employ Depressing Carriages in Battery West are Scrapped

Preliminary plans called for use of the revolutionary depressing carriages in the new emplacements to be constructed at Fort Point. The Department in the first week of August 1870 mailed to Superintending Engineer Stewart, copies of "Plans, Sections, and Elevations of a Barbette Battery," designed for emplacement of Maj. William R. King's depressing gun carriage.[11] Stewart was to advise the Department which batteries under construction could be adapted to this carriage.

There were no barbette batteries under construction, Stewart reported on September 19, but within the week a project for barbette batteries would be forwarded to the Chief Engineer by the Board of Engineers for the Pacific. As these batteries would be on commanding elevations, he did not believe they required depressing carriages.[12]

Stewart heard no more about this subject for nine months. By then work was well along on the emplacements south of the fort.

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7. Humphreys to Belknap, Nov. 8, 1870, NA, RG 77, Ltrs. Sent, Chief Engineer.

8. Belknap to Humphreys, Nov. 9, 1870, NA, RG 77, Ltrs. Sent, Secretary of War.

9. Humphreys to Stewart, Nov. 11, 1870, NA, RG 77, Ltrs. Sent, Chief Engineer.

10. Ibid., Nov. 19, 1870, NA, RG 77, Ltrs. Sent, Chief Engineer.

11. Humphreys to Stewart, fourth week of Aug. 1870, NA, RG 77, Ltrs. Sent, Chief Engineer.

12. Stewart to Humphreys, Sept. 19, 1870, NA, RG 77, Ltrs. Recd., Chief Engineer.

He was therefore surprised to receive a message from the Chief Engineer, dated June 5, 1871, directing that until trials with "King's counterpoise carriage for 15-inch guns" had been completed and further instructions issued, no breast-height walls, gun recesses, or platforms for barbette batteries be built. Neither should any work be done upon barbette batteries located over casemates other than the embanking of the parapets, leaving the interior slope of the parapet at the natural slope of the earth used.

In barbette batteries not over casemates, construction of the traverses and parades could continue, but the side slopes of these structures, if more than 14 feet in height, were not to be embanked with a slope steeper than three upon four.[13]

Stewart, after stopping work on the breast-height walls and masonry gun platforms, wrote the Chief Engineer. He pointed out that six months before, in December 1870, he had advised the Department that "unless otherwise ordered; it was my intention to built masonry platforms for guns" in these batteries. The site, in his opinion, was so elevated (the interior crests varying from 180 to 196 feet above sea level) and positioned as to negate the need for depressing carriages. When the Department acknowledged this letter and issued no orders to the contrary, Stewart on February 14 had ordered stone pintle-blocks and the work continued.

At the moment, 12 granite pintle-blocks were in position (six on the right of the line and six on the left of salient 1); one was on the wharf; and seven more had been quarried and probably dressed. In addition, the prop, traverse, and flagging stones for ten platforms had been quarried, dressed, and some of them received at the wharf and positioned. The breast-height wall on the right had been started.

Costs had been heavy, and it had been done with the goal, Stewart explained, "of having a few permanent platforms for heavy guns ready during the coming year, for defense of the approach" to the Golden Gate.[14]

Humphreys on June 26 acknowledged Stewart's letter and approved the action taken. While it was probable he would not be ordered to make any modifications and would be able to utilize the materials ordered, General Humphreys believed a temporary suspension of work was adviseable on those sections referred to in the Department's circular of June 5.

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13. Humphreys to Stewart, June 5, 1871, NA, RG 77, Ltrs. Sent, Chief Engineer.

14. Stewart to Humphreys, June 13, 1871, NA, RG 77, Ltrs. Recd., Chief Engineer.

This would remain in effect until it was determined whether any emplacements would have depressing carriages. Should this occur, the materials collected could be transferred to batteries where ordnance carriages would be employed.[15]

The next day the Board of Engineers for Fortifications made its report to the Chief Engineer. The Board saw the situation in the same light as Colonel Stewart--the elevation of the Fort Point bluffs was sufficient to forego use of depressing carriages. In its report the Board observed, "As it is quite exempt from enfilade fire and cannot be closely approached in front, it is believed that ordinary mounted barbette guns may be served with entire efficiency."

As the traverses were already designed with slopes of three upon four, no changes were deemed necessary.

The question of the "possible introduction" of depressing carriages into Battery East would be "considered in connection with the other works for defense of San Francisco harbor."[16]

Chief Engineer Humphreys relayed this information to Stewart, along with instructions to proceed "in accordance with approved designs for that work, and without regard to the use of the depressing carriage."[17] These messages were in Colonel Stewart's hands on July 10, and he ordered work resumed on the platforms and breast-height walls of Battery West.[18]

B. The Construction History of Battery West

1. Work Begins

Ground was broken for the barbette batteries south of Fort Point in late December 1870, their elevated positions seemingly a guarantee that they would not require depressing carriages.[19] Initial projects

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15. Humphreys to Stewart, June 26, 1871, NA, RG 77, Ltrs. Sent, Chief Engineer.

16. Barnard to Humphreys, June 27, 1871, NA, RG 77, Ltrs. Recd., Chief Engineer.

17. Humphreys to Stewart, June 27, 1871, NA, RG 77, Ltrs. Sent, Chief Engineer.

18. Stewart to Humphreys, July 10, 1871, NA, RG 77, Ltrs. Recd., Chief Engineer.

19. Stewart to Humphreys, Dec. 27, 1870, NA, RG 77, Ltrs. Recd., Chief Engineer.

undertaken were the stockpiling of materials, the opening and improving of roads to the construction site, the profiling of emplacements 21-22 of the six-gun battery on the right, and excavation and embankment of earth for the terreplein and traverse of the latter.[20]

2. Colonel Stewart Reports Rapid Progress

Colonel Stewart reported that in March 1871 his men turned the arch of No. 2 traverse magazine and backed it in part with concrete, while the backing of arch No. 3 (Salient 1) had been carried "on nearly to rear end of arch." The front and side walls of No. 4 magazine had been carried up to the spring line and backed. The arch of No. 5 had been turned and in part backed. The arch of No. 6 (left of Salient 2) had been about two-thirds turned. The front and sidewalls of No. 7 had been built up, backed, and about two-thirds of the arch turned. Two hundred and ninty-seven cubic yards of brick and concrete masonry had been laid during the month by the brickmasons.

Laborers had embanked the exterior slopes of Batteries 2-3 and 3-4 to about one-half the planned thickness. A portion of the traverse at the extreme right of Mortar Battery 4-5 had been embanked and excavations made for the magazine walls. Embankment and excavation for the month measured 5,684 cubic yards.

The exterior slope of traverse No. 1 had been sodded to reference (170'), as had the exterior slopes of Batteries 3-4. Twenty-nine hundred and seventy-eight square yards of sodding had been laid.[21]

In May about one-third of the arch of traverse magazine No. 8 (Battery 2-3) was turned and backed, and one-half of that of No. 9 (Battery 3-4). The front, side, and end walls of No. 11 (Mortar Battery 3-4) and No. 12 (Mortar Battery 4-5) had been raised to the spring lines and backed, along with the partition walls. The brick facing of the breast-height walls had been commenced.

Six pintle stones for the right flank emplacements (Nos. 21-26) had been set, along with the four (Nos. 27-30) in Battery 1-2. Concrete for these platforms and the two to the right of traverse No. 3 had been poured to the level of receiving props and traverse stones. Concrete for the platforms to the left of traverse No. 6 (Battery 2-3) had been poured to the bottom of the pintle stones.

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20. Monthly Report of Operations for Dec. 1870, NA, RG 77, Ltrs. Recd., Chief Engineer.

21. Stewart to Humphreys, April 6, 1871, NA, RG 77, Ltrs. Recd., Chief Engineer.

The solid traverse on the extreme right had been sodded to reference (197'), which was within three feet of the superior slope. This was done, because of fear that the Fort Point gales would blow most of it away. Portions of traverses Nos. 6, 7, 8, and 9 had been embanked, and sections of the parapets thickened. The parapet of Mortar Battery 4-5 had been completed, and the terreplein of the upper level graded for a distance of 80 feet from traverse No. 11, separating the two levels. A ramp connecting the two levels had been "rough graded."[22]

By June 30, 1871, the embankment of the parapets, terrepleins, traverses, etc, had been two-thirds completed for a running length of 1,324 feet. In addition, the parapets and terrepleins of the mortar batteries for a length of 369 feet had been finished and the traverses partially embanked. Altogether 29,586 cubic yards of embankment had been positioned. The exterior slopes of the barbette batteries, generally, and portions of the traverses and rampart slopes had been sodded, as had the exterior, superior, and interior slopes of the mortar battery parapets and portions of its traverses. Sodding totaled 7,180 square yards.

The breast-height wall had been begun, the masonry of two traverse magazines about completed, and that of eight others two-thirds finished. Foundations for 12 platforms for big guns had been put down, and 12 pintle-blocks positioned. Brick, stone, and concrete work totaled 1,928 cubic yards.[23]

3. Cost of Labor

In carrying out this work, Colonel Stewart charged his labor and materials to two accounts. The summer of 1871 found him debiting the Fort Point account for wages paid one overseer, one clerk, one foreman, one teamster, one messenger, one water boy, one blacksmith, one carpenter, nine brickmasons, one stonemason, and 60 laborers. Charged to the account for construction of mortar batteries were one foreman, one carpenter, two brickmasons, and ten laborers. Wages varied according to skills. The overseer, brick- and stonemasons were paid $5.68 a day; the carpenters and blacksmith $4.55; and the laborers $2.10.[24]

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22. Stewart to Humphreys, June 8, 1871, NA, RG 77, Ltrs. Recd., Chief Engineer. The pintle-blocks to the right and left of salient 1 rested on bedrock.

23. Executive Documents, Published by Order of the House of Representatives during the 2d Session of the 42d Congress, 1871-72 (Washington, 1872), Serial 1504, vol. 2, p. 24.

24. Stewart to Humphreys, Aug. 8, 1871, NA, RG 77, Ltrs. Recd., Chief Engineer.

4. Funding the Project in Fiscal Year 1872

Chief Engineer Humphreys on March 22, 1871, notified Colonel Stewart that President Ulysses S. Grant had approved an act passed by the 1st Session, 42d Congress, appropriating $50,000 for Fort Point for Fiscal Year 1872. This money would be available immediately, and Stewart would prepare and submit for approval an operating program.[25]

On reviewing his books, Stewart found that with the unexpended funds on hand, he had $104,047.22 available to complete the parapets, platforms, magazines, etc., for the 21 heavy guns in Battery West commenced in December, and terminating at Mortar Battery 4-5. If any money were left after this project was completed, it would be used to begin work on Battery East. Construction on that battery would proceed from west to east.[26]

General Humphreys reviewed and approved Stewart's program on May 15, 1871.[27]

5. Construction in Fiscal Year 1872

Torrential rains in December 1871 eroded and damaged the earthen traverses, parapets, and ramps of Battery West. Time and money better spent for other purposes had to be diverted to filling in and resodding erosions.[28]

Nevertheless rapid progress was reported for the fiscal year. When he submitted his annual report, Colonel Stewart announced that the greater part of the breast-height walls for 20 emplacements had been built, eight front-pintle stone platforms positioned, and masonry for 12 others completed. The pintle and traverse rails for one platform were down; two traverse magazines built, ten others finished; and three-quarters of the masonry of the remaining one laid. In all, 2,744 cubic yards of stone, brick, and concrete masonry had been positioned. About two-thirds of the earthwork for the parapets, traverses, and terrepleins

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25. Humphreys to Stewart, March 22, 1871, NA, RG 77, Ltrs. Sent, Chief Engineer.

26. Stewart to Humphreys, April 10, 1871, NA, RG 77, Ltrs. Recd., Chief Engineer.

27. Humphreys to Stewart, May 15, 1871, NA, RG 77, Ltrs. Sent, Chief Engineer.

28. Stewart to Humphreys, Jan. 6, 1872, NA, RG 77, Ltrs. Recd., Chief Engineer.

for 1,324 feet of barbette batteries had been embanked and sodded. The traverses of the mortar battery had been completed. This involved 18,200 cubic yards of embankment and 4,605 square yards of sodding. The outer and inner doors for 12 magazines had been fashioned and hung, and in an emergency the magazines could be used.[29]

6. Funding the Project in Fiscal Year 1873

On June 22, 1872, the Department notified Colonel Stewart that Congress on the 10th had appropriated $85,000 for fortifications at Fort Point in the fiscal year ending June 30, 1873. In formulating his operating program, Stewart was to bear in mind that a prerequisite was the "speedy construction of emplacements for the greatest number of guns with their magazines and traverses."[30]

Stewart accordingly proposed to apply this money, as well as $9,000 in unobligated funds from previous appropriations, to: (a) completion of traverse No. 1; (b) grading to the right and left of salient No. 1 and in front of Battery 1-2, to unmask the fire of these positions; (c) finishing the rear slopes; (d) small details of drainage of the line "now essentially completed"; and (e) asphalting of magazine floors and putting "pintles and rails of platforms in place."

Any funds remaining would be used to begin construction of the magazines of Battery East, beginning on the left. Work on this battery would be held in abeyance pending notification that the plans had been approved by the Board of Engineers for Fortifications.[31]

The Chief Engineer approved the program as submitted.[32]

7. Battery West is Completed and Armed

Workmen in Fiscal Year 1873 completed traverse magazine No. 1 and embanked and sodded the traverse. Ten thousand cubic yards of rock

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29. Executive Documents, Printed by Order of the House of Representatives, During the 3d Session, 42d Congress, 1872-73 (Washington, 1873), Serial 1559, vol. 2, pt. 2, p. 22.

30. Humphreys to Stewart, June 22, 1872, NA, RG 77, Ltrs. Sent, Chief Engineer.

31. Stewart to Humphreys, July 26, 1872, NA, RG 77, Ltrs. Recd., Chief Engineer.

32. Humphreys to Stewart, undated, NA, RG 77, Ltrs. Sent, Chief Engineer.

and earth were removed from in front of salient No. 1 to unmask the fire of the guns. Pintles and rails were put down for the stone platforms of Emplacements Nos. 21 to 30 and Nos. 39 and 40; timber platforms for eight 13-inch mortars had been laid and iron plated in Battery 4-5; and the ramp and covered way between Batteries West and East completed.

This enabled Colonel Stewart to report on June 30, 1873, that Battery West was "essentially completed." The magazines could be used, although the floors had not been asphalted. Twelve 15-inch Rodmans had been trucked from the ordnance yard and unloaded in rear of Emplacement Nos. 21-30 and 36-37.[33]

In Fiscal Year 1874 the floors of the magazines were covered with asphaltic mastic, and pintles and rails positioned for Emplacements 28 and 29. Guns had been mounted in Emplacements Nos. 21-30 and Nos. 36 and 37.[34]

C. The Construction History of Battery East

1. Plans are Made and Approved

The Board of Engineers for the Pacific Coast on May 18, 1872, asked the Chief Engineer for approval of several changes proposed for Battery East. They wished to elevate each pair of guns, proceeding from east to west "to a height of 4 feet above the adjacent pair on the right." As the western emplacements gradually rose, they would "become better protected" from fire of warships outside the Golden Gate. Construction costs would be reduced, as a covered way could be built without too much slope leading from the western end of Battery East to the right face of Battery West.

General Humphreys was also reminded that the question about possible introduction of depressing carriages into these positions had never been resolved. Time had now run out. With completion of Battery West, except for the traverse rails, the mortar platforms, and the platform for the 20-inch Rodman, the next project to be undertaken at Fort Point was Battery East. This work would complement the fortifications at Point Cavallo, on which construction was scheduled to commence in the near future.

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33. "Annual Report of Progress made in the Construction of Fort at Fort Point," in Fiscal Year 1873, NA, RG 77, Ltrs. Recd., Chief Engineer.

34. "Annual Report of Progress made in the construction of Fort at Fort Point," in Fiscal Year 1874, NA, RG 77, Ltrs. Recd., Chief Engineer.

The Board, after careful study, was satisfied that Battery East should be constructed without depressing carriages, because: (a) it could not be damaged by an enemy fleet steaming toward the Golden Gate, until the vessels passed Fort Point. (b) When the guns of the battery began to register on an enemy fleet, becoming exposed in turn, the warships would be inside the Golden Gate. Here they would be subjected to a converging fire, and would seek to get away as fast as possible. The vital question would be one of time for the foe, and one of number of guns for the defense. There would be no taking up of bombardment stations, with the ships churning ahead at forced draft. The question was, which could be fired more rapidly--"guns mounted in the ordinary way, or guns mounted on depressing carriages?" The Board was inclined to believe the former enjoyed the advantage.

It was their recommendation that the battery "better be arranged for XV-inch guns mounted on ordinary barbette carriages."[35]

General Humphreys on June 3 forwarded a copy of the Pacific Board's report to the Board of Engineers for **Fortifications,** asking for an "early decision as to whether the battery shall be prepared for the depressing carriage." As for the Pacific Board's belief that ordinary carriages could be served with more dispatch, he pointed out, that it had been contradicted by recent tests at Battery Hudson. These had demonstrated that Major King's depressing carriage could be "handled and the gun loaded with quite as much facility" as the present ordnance carriage.[36]

The Board of Engineers for Fortifications replied on June 6. It was of the opinion that: (a) all barbette batteries could "be more efficiently, safely, and rapidly served with guns mounted on depressing carriages"; (b) in case of barbette batteries "on low sites, especially when an extended and enveloping line of attack can be developed . . . such a carriage is indispensible to the steady and effective service of the guns"; and (c) in batteries on elevated sites, such carriages, though desirable, are not indispensible, particularly when the batteries cannot be bombarded by a large squadron.

As for Battery East, situated as it would be in a re-entrant which could not be enveloped and having a crest 112 to 132 feet above sea level, the Board was agreeable to its construction in accordance with plans submitted in May, with ordinary ordnance carriages. If, in the future, it were decided to **introduce** depressing carriages, this could

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35. Board of Engineers Pacific to Humphreys, May 18, 1872, NA, RG 77, Ltrs. Recd., Chief Engineer. Signing the letter were General Alexander, Colonel Stewart, Major Mendell, and Lieutenant Handbury.

36. Humphreys to Barnard, June 3, 1872, NA, RG 77, Ltrs. Sent, Chief Engineer.

be done. This would necessitate positioning the pintles 25 feet apart and cutting a notch in the foot of the traverse slope to permit the full lateral traverse of the carriage.[37]

General Humphreys was not ready to give up. On June 19 he tossed the subject back to the Board of Engineers for Fortifications. In his covering letter, he pointed out that an ironclad attempting to enter San Francisco Bay, at a speed of 12 miles an hour, would be exposed to the fire of the battery at a range of one mile for a period not exceeding 6 1/4 minutes. Counting the first fire, it was doubtful whether the guns could be loaded, pointed, and fired at the vessel more than twice in this period. Each gun would fire three shots against the ship, or the entire battery 48 rounds.

This was believed to be the best result obtainable, the gunners being under cover. But if the ordnance carriage were used, the gunners in loading would be exposed above the parapet to grape from the warship, as well as projectiles from gatling guns. He questioned whether the warship within the allotted time would receive more than the first round from the loaded guns of the battery. To secure a rapid fire, the guns should be in a covered position while loading.[38]

After reviewing the correspondence and plans, the Fortifications Board, although agreeing that depressing carriages were an important development ameliorating grave defects in service of barbette batteries, was influenced by considerations of economy. Because of the high cost, it was decided it would be impractical to introduce depressing carriages everywhere. This was the reasoning behind the Battery East decision. How far considerations of economy should guide the Board could not be defined. But in matters of cost, the final determination must rest with the Chief Engineer or the Secretary of War.

The Board had accordingly prepared and was forwarding a modified plan for Battery East "to admit of the introduction of depressing carriages" at a future date "by raising the crest 4 feet and sinking the counterpoise wells."[39]

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37. Barnard to Humphreys, June 6, 1872, NA, RG 77, Ltrs. Recd., Chief Engineer. Other members of the Board of Fortifications signing the letter were Cols. G.W. Cullum, Z.B. Tower, and Horatio G. Wright.

38. Humphreys to Board, June 19, 1872, NA, RG 77, Ltrs. Sent, Chief Engineer.

39. Tower to Humphreys, July 10, 1872, NA, RG 77, Ltrs. Recd., Chief Engineer.

After studying the Board's latest word, Chief Engineer Humphreys forwarded the correspondence and drawings to General Alexander, with instructions to furnish Colonel Stewart with copies for his information and guidance. Battery East was to be constructed in accordance with the enclosed drawings, as modified by the Circular of January 19, 1872.[40]

2. Construction Begins

Construction was started immediately. By June 30, 1873, Colonel Stewart could report that the mortar battery, parapets, traverses, and terreplein as far as traverse No. 5 had been built, except for gun platforms and magazine doors. Traverse No. 5 had been embanked and sodded to a level slightly higher than the floor of its magazine. The mortar battery on its right was "in shape & sodded except its interior slope." On its right, magazine traverse No. 4 was nearly embanked. Masonry of traverse magazines 2 and 3 was finished, except for wing walls and coping of entrances, while the walls of No. 1 had been raised to a height of 2'10" above the flooring. The parapet was in shape from the extreme left (west) to traverse No. 3, and the covered way in its rear as far as traverse No. 4. Portions of the parapet to the right of traverse No. 3 had been embanked. The culvert through the ravine between Batteries East and West had been built.[41]

3. Funding the Project in Fiscal Year 1874

Chief Engineer Humphreys on March 18, 1873, had advised Colonel Stewart that President Grant had approved an act passed by the 43d Congress on February 21 appropriating for Fiscal Year 1874, $65,000 for the fortifications at Fort Point. This appropriation was available for immediate use.[42]

In compliance with procedures, Stewart on April 4 wrote the Department that this sum, along with funds currently credited to the Fort Point account,

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40. Humphreys to Alexander, July 24, 1872, NA, RG 77, Ltrs. Sent, Chief Engineer; "Drawings of West End of Barbette Battery at Fort Point, San Francisco, Cal., showing the spacing of the Traverses to Permit the Introduction of King's Depressing Carriage by the Board of Engineers for Fortifications," NA, Drawer 94, Sheet 105.

41. "Annual Report of Progress Made in the Construction of Fort at Fort Point," in Fiscal Year 1873, NA, RG 77, Ltrs. Recd., Chief Engineer.

42. Humphreys to Stewart, March 18, 1873, NA, RG 77, Ltrs. Sent, Chief Engineer.

gave him $83,201. This money would be applied to: (a) completion of the magazines, traverses, parapets, terrepleins, and communications of Battery East; (b) construction of ramps connecting Batteries East and West; and (c) repair of the wharf and miscellaneous maintenance projects.[43]

General Humphreys on April 29 reviewed and approved the program.[44]

4. Construction in Fiscal Year 1874

Stewart on November 18, with work about to begin on the stone platforms, sought clarification of a technical matter. As he understood his instructions, the distance between pintles was to be 25 feet. But as it was planned the distance was 30 feet and could be increased to 34 feet, and still leave 21 feet between the centre of the pintle and foot of the traverse slope. Such an arrangement would alleviate cutting into the slopes to allow the guns to be traversed to the extent of their arcs.

He recommended that the intervals between pintles be 34 feet.[45]

The Department replied that 25 feet was not intended to govern officers where "a greater space was available."[46] Stewart was free to carry out his proposal.

During the year ending June 30, 1874, Stewart's brickmasons laid the wing walls and coping of entrances of the magazines in traverses Nos. 2 and 3; the walls, arches, passages, etc., of No. 1 from reference (2'10"); the foundations of No. 5, its walls to the spring of the arches, and the rear wall and wing walls of its entrance to the coping. Concrete foundations for platforms Nos. 11 to 18 had been poured, and the subject breast-height walls raised to the level of the pintle-block beds.

The embankment for the main line of parapets and traverses from No. 4 to the extreme right (east) had been continued and was "essentially

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43. Stewart to Humphreys, April 4, 1873, NA, RG 77, Ltrs. Recd., Chief Engineer.

44. Humphreys to Stewart, April 29, 1873, NA, RG 77, Ltrs. Sent, Chief Engineer.

45. Stewart to Humphreys, Nov. 18, 1873, NA, RG 77, Ltrs. Recd., Chief Engineer.

46. Humphreys to Stewart, Dec. 5, 1873, NA, RG 77, Ltrs. Sent, Chief Engineer.

in shape and sodded to a height along the interior crest of 7 feet above the terreplein" and the covered way in its rear excavated. From traverse No. 5 to No. 9 the parapets had been raised nearly to their full height of 11 feet, but "owing to earth thrown thereon from the excavation of foundations for breast-height wall, &c, the superior slopes" were not in shape.

To the west of Battery East, platforms for mortar emplacements Nos. 19 and 20 had been constructed and iron-plated.[47]

5. Funding the Program in Fiscal Year 1875

General Humphreys on May 12, 1874, notified Colonel Stewart that President Grant had approved on April 3, an act appropriating $30,000 for construction at Fort Point in Fiscal Year 1875.[48]

Superintending Engineer Stewart formulated a program for spending this sum. He would apply it, along with the small amount of unobligated funds, to: (a) construction of magazine No. 5 and completion of its traverse; (b) setting of pintle-blocks for Emplacements Nos. 11-18; (c) building and backing the corresponding breast-height walls, the foundations of which had been laid; (d) raising to full height and finishing the parapets thereof, and the earthworks of those from the right of the battery to traverse No. 4; and (e) sodding the slopes and the covered way.[49]

On June 4 General Humphreys telegraphed his approval of Stewart's program for Fiscal Year 1875.[50]

6. Construction in Fiscal Year 1875

During the ensuing fiscal year, the brickmasons completed the main arch of magazine No. 5 and the arches of its passage way. Breast-height

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47. "Annual Report of Progress Made in the Construction of Fort at Fort Point, Cal., During the Year Ending the 30th June 1874," NA, RG 77, Ltrs. Recd., Chief Engineer.

48. Humphreys to Stewart, May 12, 1874, NA, RG 77, Ltrs. Sent, Chief Engineer.

49. Stewart to Humphreys, May 22, 1874, NA, RG 77, Ltrs. Recd., Chief Engineer.

50. Humphreys to Stewart, June 4, 1874, NA, RG 77, Ltrs. Sent, Chief Engineer.

walls for Emplacements Nos. 11 to 18 had been laid and those for Nos. 7 and 8 nearly so. Pintle-blocks for guns 11-18 had been set, and the foundations blocks for 5-8. The concrete culvert between traverses Nos. 4 and 5 had been extended 109 feet beyond the parapet.

The parapet from traverse No. 5 to No. 9 had been raised to its planned height (11 feet) above the terreplein; the subject traverses lengthened ten feet to correspond to the increased height of the crest, and the terreplein graded. The parapet between traverses No. 2 and No. 4 was incomplete, having been raised in part to a height of seven feet above the terreplein. The ground in front and rear of the battery from traverse No. 5 to No. 10 had been graded and portions of the ground in rear of Emplacements 11-18.

About 6,743 square yards of sodding had been positioned.[51]

7. Congress Cuts its Appropriation for Fortifications

To complete Battery East, Chief Engineer Humphreys, using figures supplied by Colonel Stewart, asked for an appropriation of $90,000 for Fiscal Year 1876. He buttressed his request with a statement that the Fort Point fortifications formed "a very important element in the defense of" the Mare Island Navy Yard, as well as San Francisco Bay and the city.[52]

Congress, however, was reluctant to spend additional large sums on fortifications until the War Department could mature plans for a comprehensive scheme for defense of the nation's harbors and ports. The fortifications bill passed by the 2d Session of the 43d Congress reduced the appropriation for construction at Fort Point to $25,000, $65,000 less than the sum requested by the Department.[53]

Colonel Stewart, on receipt of this news, had to modify his planning. For Fiscal Year 1876, in addition to the $25,000, he had available $4,500 unexpended from the appropriation for Fiscal Year 1875 and $952.78 from

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51. Executive Documents, Printed by Order of the House of Representatives, 1st Session, 44th Congress, 1875-76 (Washington, 1876), Serial 1676, vol. 2, pt. 2, p. 27; "Annual Report of Progress Made in the Construction of Fort at Fort Point," in Fiscal Year Ending, June 30, 1875, NA, RG 77, Ltrs. Recd., Chief Engineer.

52. Ibid.

53. Humphreys to Stewart, March 10, 1875, NA, RG 77, Ltrs. Sent, Chief Engineer.

appropriations supposedly returned to the general fund.[54] This money would be used to: (a) continue work on Emplacements Nos. 5-6 and 6-7 to get them in condition to withstand erosion; (b) apply the balance to construction of platforms Nos. 1-8, together with the corresponding breast-height walls and raised parapets; and (c) the completion of platforms Nos. 11-18, and the drainage of the corresponding slopes.[55]

On April 2 Chief Engineer Humphreys approved Stewart's program.[56]

8. Work is Suspended before the Battery is Completed or Armed

The reduced appropriation slowed construction in Fiscal Year 1876. To add to Colonel Stewart's difficulties, heavy winter rains caused erosions and delays. In mid-June 1876, with no funds to continue the project, Stewart laid off the artisans and most of the laborers. During the year the brickmasons had laid the breast-height walls in front of platforms Nos. 3-6 and had completed those fronting platforms Nos. 7 and 8. The foundations for platforms Nos. 3 and 4 had been raised to the level of the pintle-blocks and traverse stones positioned. The parapet from the right of the battery as far as traverse No. 4 had been raised to its full height above the terreplein except in front of platforms Nos. 1 and 2. These would be filled in with earth removed in excavating for the breast-height wall and the foundations for the subject platforms. Traverses Nos. 1-4 had been extended ten feet to conform to the raised parapet, the corresponding terrepleins graded, along with the reverse slope of the covered way as far as traverse No. 5.[57]

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54. Recently, the Secretary of War, on reviewing a decision by the Comptroller in reference to Fort Mifflin, had decided that "certain balances of appropriations for Forts and Fortifications in the Treasury July 1, 1864, 'are available as no limit appropriations, and payments can be made therefrom until they are exhausted.'" In view of this decision, General Humphreys on January 9 had advised Colonel Stewart that there was credited to Fort Point $952.78, in addition to the funds appropriated for the current fiscal year. Humphreys to Stewart, Jan. 9, 1875, NA, RG 77, Ltrs. Sent, Chief Engineer.

55. Stewart to Humphreys, March 23, 1875, NA, RG 77, Ltrs. Recd., Chief Engineer.

56. Humphreys to Stewart, April 2, 1875, NA, RG 77, Ltrs. Sent, Chief Engineer.

57. Stewart to Humphreys, July 6, 1876, NA, RG 77, Ltrs. Recd., Chief Engineer; Executive Documents of the House of Representatives for the 2d Session of the 44th Congress, 1876-77 (Washington, 1877), Serial 1743, vol. 2, pt. 2, p. 28.

Before securing operations for the year, Colonel Stewart had his laborers repair the bulkhead shielding the wharf road, police the grounds, store the public property, and manure the drifting sand between Batteries East and West.[58]

Congress for the next 14 years refused to vote funds for construction of seacoast fortifications, thus preventing the completion of Battery East. With work suspended, the earthen batteries slowly deteriorated. Weasels and gophers burrowed into the traverses and parapets, and torrential rains caused some of the magazines to leak, with serious erosion wherever the works had not been sodded.[59]

D. The Purchase and Survey of Draft Animals

When work on the earthen barbette batteries was commenced in December 1870, Colonel Stewart purchased a number of work animals from the Presidio quartermaster. At the end of three years, five of these animals had broken down. Although it would be more humane "to knock them in the head," Stewart in February 1874 requested authority to sell them at public auction and to deposit the proceeds in the Treasury.[60] His request was approved by the Department, and the sale held.[61]

The closing down of construction found the Corps with five horses and seven mules on its hands. Colonel Stewart accordingly recommended that he sell three of the former and four of the latter. The two best horses and a team of mules would be retained. The other mule, said to be 37 years old, had done good service and would not bring much if sold. If the Department were agreeable, this faithful animal would be allowed run of the reservation until he died.[62]

Chief Engineer Humphreys was an understanding man and went along with his subordinate's suggestion.[63]

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58. Stewart to Humphreys, July 7, 1876, NA, RG 77, Ltrs. Recd., Chief Engineer.

59. "Annual Reports for Fiscal Years 1877 & 1878," NA, RG 77, Ltrs. Recd., Chief Engineer.

60. Stewart to Humphreys, Feb. 9, 1874, NA, RG 77, Ltrs. Recd., Chief Engineer.

61. Humphreys to Stewart, Feb. 19, 1874, NA, RG 77, Ltrs. Sent, Chief Engineer.

62. Stewart to Humphreys, June 7, 1876, NA, RG 77, Ltrs. Recd., Chief Engineer.

63. Humphreys to Stewart, June 15, 1876, NA, RG 77, Ltrs. Sent, Chief Engineer.

E. The Spy Scare

Chief Engineer Humphreys was disturbed in February 1875 to read an article, "Observations of Workings of the Marine Worms and the Remedies Applied in the Harbour of San Francisco, California," in a pamphlet distributed by the Society of Engineers of England. The author was John Blackbourn, who was said to have been employed for some time on the fortifications guarding the approaches to San Francisco Bay.

This troubled Colonel Stewart's superiors in Washington, because they did not believe it in the nation's interest to have details of the location and armament of Fort Point and its associated works, fall into the hands of foreign powers, particularly Great Britain. Humphreys desired to know if Blackbourn had held a position, where he had access to plans of Fort Point, or if he could have copied them.[64]

This called for a report. On March 8 Colonel Stewart advised that Blackbourn had been employed as overseer at Fort Point from June 1, 1872, to January 24, 1874. He was familiar with details of Batteries East and West, and could have seen all that was visible to a visitor of the casemated work.

The plans for the works formerly kept in the Fort Point Engineer Office had been transferred prior to Blackbourn's employment to the city office. So far as he knew, the overseer had no access to these. The only drawings not stored there were unimportant tracings.

Blackbourn was, as far as Stewart knew, a competent civil engineer of "respectable parentage from Dover, England." When hired, Blackbourn had agreed that any plans furnished him were confidential and to be used only for the purpose intended, and no copies were to be made for private use. As to whether he had violated these instructions, Stewart did not know. But judging from his conduct, there was no reason to believe that he had.[65]

Stewart's judgment was vindicated. There is no evidence that Blackbourn was anything but a capable civil engineer, with a flair for publishing in professional journals.

F. Maintenance of the Fort, Batteries, and Grounds, 1870-1882

1. Funding of Maintenance as a Construction Item

a. The 1870 Repair of the Wharf and General Maintenance

Until Fiscal Year 1877 maintenance expenses for which the Corps of Engineers was responsible were charged against the "Appropriation for

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64. Humphreys to Stewart, Feb. 26, 1875, NA, RG 77, Ltrs. Sent, Chief Engineer.

65. Stewart to Humphreys, March 8, 1875, NA, RG 77, Ltrs. Recd., Chief Engineer.

Fortifications at Fort Point." Colonel Stewart, with the approval of the Chief Engineer, could allot funds from these for housekeeping operations.

The first maintenance project undertaken by Colonel Stewart at Fort Point in Fiscal Year 1871 involved the wharf and beach road. On July 29, 1870, Stewart notified General Humphreys that the wharf piling must be replaced before the autumn storms or the entire structure would be lost. An inspection revealed that many piles were so teredo-eaten that they swung to and fro, supported by bolts and stringers. These piling could be replaced by removal of a small part of the superstructure. Cost of this project was estimated at $3,000, and it could be completed before the stormy season.[66]

Chief Engineer Humphreys authorized the expenditure, and in August Colonel Stewart hired several laborers. Besides replacing the damaged pilings, they repaired the road leading from the wharf to the stables, painted the government boat, policed the grounds, and tended to the upkeep of the Engineer quarters and shops. By December work on the wharf was completed.[67]

b. Scraping & Repainting the Fort's Ironwork

In April and May 1872 Colonel Stewart, observing that the fort's ironwork was becoming very rusty, employed a detail to clean and paint with two coats the 95 Totten embrasures; the ironwork of the railings, colonnade, roof trusses, and varanda stairways along the gorge, and the guard railings of the parade wall coping.[68] Workmen in January 1873 repaired the paving in rear of Elliot's seawall and the bulkhead protecting the roadway, both of which had been damaged by winter storms.[69]

c. Additional Repairs to the Wharf

Working parties in the autumn of 1873 replaced a number of worm-eaten piles in the wharf and renewed part of the superstructure. A

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66. Stewart to Humphreys, July 29, 1870, NA, RG 77, Ltrs. Recd., Chief Engineer.

67. Humphreys to Stewart, Aug. 15, 1870; Monthly Reports of Operations for July, Aug. Sept, & Oct. 1870, NA, RG 77, Ltrs. Sent & Recd., Chief Engineer.

68. Stewart to Humphreys, May 3 and June 3, 1872, NA, RG 77, Ltrs. Recd., Chief Engineer.

69. Stewart to Humphreys, Feb. 5, 1873, NA, RG 77, Ltrs. Recd., Chief Engineer.

windmill and tank were purchased and positioned, along with 1,800 feet of two-inch redwood pipe, to irrigate the sod parapets of Battery West.[70]

d. Stewart Reports a Continuing Deterioration of the Fort's Brick- and Ironwork

In April 1875 Colonel Stewart had his employees whitewash the Engineer quarters, messhall, and stables. At the end of the fiscal year, he reported the pointing of the Fort Point scarp falling out badly, and that soft bricks "in many places are being eaten away by the action of wind & water." This had been continuing for a number of years. Seepage had been found in several 3d Tier casemates.[71]

The pointing continued to deteriorate in 1876, and in that year Colonel Stewart reported the ironwork again needed repainting but there were no funds.[72] There was a continuation of this condition in Fiscal Year 1877.[73]

2. Procedures for Funding Maintenance & Protection Change

Congress in 1876, and for a number of years thereafter, refused to vote any funds for construction of coastal fortifications. But the elaborate existing system would require money for maintenance and protection. To provide the wherewithal for these needs, Congress made small annual appropriations to be administered by the Chief Engineer.

The Department accordingly on June 27, 1876, notified Colonel Stewart, who was then closing down construction at Battery East, that President Grant had approved on the 20th an act authorizing the expenditure of $100,000 for "Contingencies of Fortifications." Stewart would submit as soon as practicable an estimate of the amount from this sum required for care and preservation of each of the "defense works" under his supervision for which there was no special appropriation.[74]

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70. Stewart to Humphreys, Oct. 7 & Nov. 5, 1873, NA, RG.77, Ltrs. Recd., Chief Engineer.

71. "Annual Report of Progress Made in the Construction at Fort Point," for the fiscal year ending June 30, 1875, NA, RG 77, Ltrs. Recd., Chief Engineer.

72. Stewart to Humphreys, July 6, 1876, NA, RG 77, Ltrs. Recd., Chief Engineer.

73. Executive Documents of House of Representatives for the 2d Session of the 45th Congress, 1877-78 (Washington, 1878), Serial 1795, vol. 3, p. 23.

74. Humphreys to Stewart, June 27, 1876, NA, RG 77, Ltrs. Sent, Chief Engineer

Replying, Stewart recommended that two watchmen be employed to care for the public property at Fort Point, one at $65 and the other at $60 per month.[75] With expenditures pared to the bone, Humphreys would allow only one watchman. $886.81 was allotted for his pay in Fiscal Year 1877.[76]

Three weeks later, on August 2, 1876, the Department made an administrative change. Instead of to "Contingencies of Fortifications," allotments made under the act, approved June 20, must be charged to "the protection, preservation, and repair of fortifications and other works for defense."[77]

3. Maintenance and Protection in Fiscal Year 1878

a. The Allotment

General Humphreys on March 26, 1877, notified Colonel Stewart that President Grant on the 3d had approved an appropriation by Congress of $100,000 for "Protection, Preservation and Repair of Fortifications," and other works of defense for the fiscal year ending June 30, 1878. He would submit estimates of the amounts needed for the care and preservation of each of the works in his charge.[78]

Stewart on April 3 asked for $1,500 to pay two watchman at $125 per month, and $1,000 to enable him to repaint the Fort Point ironwork, and repair the seawall apron and the bulkhead of the wharf road.[79] The requested funds were made available on May 19.[80]

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75. Stewart to Humphreys, July 7, 1876, NA, RG 77, Ltrs. Recd., Chief Engineer.

76. Humphreys to Stewart, July 20, 1876, NA, RG 77, Ltrs. Sent, Chief Engineer.

77. Humphreys to Stewart, Aug. 2, 1876, NA, RG 77, Ltrs. Sent, Chief Engineer.

78. Humphreys to Stewart, March 26, 1877, NA, RG 77, Ltrs. Sent, Chief Engineer.

79. Stewart to Humphreys, April 3, 1877, NA, RG 77, Ltrs. Recd., Chief Engineer.

80. Humphreys to Stewart, May 18, 1877, NA, RG 77, Ltrs. Sent, Chief Engineer.

b. The Work

With $1,000 available for maintenance in the fiscal year, Colonel Stewart in the autumn and winter employed several laborers. They, along with the watchmen, were turned to scraping and painting the ironwork of the embrasures, stairways, etc., and repairing the wharf road bulkhead.[81]

c. Use of Contingency Funds

In mid-January 1878 there was a savage sou'easter. On the 15th surf breaking over the bulkhead smashed timbers and washed out the road at a number of points. Steps were taken by Stewart to prevent these gaps from enlarging, but the continuation of the gale frustrated his efforts. On the 16th several hundred feet of bulkhead and roadway were carried away.

Before abating on the 30th, the storm also damaged the seawall apron in several places, washed out earth and cobble behind the seawall to a depth of several feet, smashed a number of pilings, and nearly swept away the blacksmith shop. To effect repairs, Colonel Stewart called for $2,000, and on February 4 General Humphreys made the necessary allotment from his contingency funds.[82]

In effecting repairs, workmen started on the wharf road, because with it washed out there were no direct communications, except by foot, with the fort. In February and March a 170-foot gap at the western extension of the bulkhead was closed, and the backing along the bluff filled so a cart might pass. Heavy rains in late February slowed repairs. Before the men were paid off, 400 running feet of bulkhead, to a height of 12 feet, had been rebuilt.[83]

4. Maintenance and Protection in Fiscal Year 1879

a. The Allotment

On April 23, 1878, General Humphreys telegraphed Colonel Stewart that President Rutherford B. Hayes on March 23 had approved an act

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81. Stewart to Humphreys, Jan. 18, 1878, NA, RG 77, Ltrs. Recd., Chief Engineer.

82. Ibid.; Humphreys to Stewart, Feb. 4, 1878, NA, RG 77, Ltrs. Recd., Chief Engineer. Tides during the storm reached record heights, and the sea flooded across the point between the fort and bluff.

83. Monthly Reports of Operations for Feb. and March 1878; "Annual Report of Progress made in Repairs &c, at Fort at Fort Point," for year ending June 30, 1878, NA, RG 77, Ltrs. Recd., Chief Engineer.

appropriating $100,000 for "Preservation and Repair of Fortifications and other works of defense in Fiscal Year 1879."[84] Stewart accordingly notified the Department that to fund operations at Fort Point for the next fiscal year, he needed $3,500 to pay two watchmen, and to finance his office expenses and minor contingencies.[85]

In allocating the allotments, Chief Engineer Humphreys gave Fort Point $550 more than requested.[86]

b. Projects Undertaken

During the ensuing year, it was necessary to replace many teredo-eaten wharf pilings. The ironwork of the mortar platforms was lacquered, and the earthen slopes of Batteries East and West mowed.

After 10 years the fort was again garrisoned, and it was necessary to clean the drains and privy outlets. An insufficient allotment prevented Colonel Stewart from: (a) repointing the scarp and casemate arches, which with the passage of time was getting worse; (b) scraping and repainting the embrasure irons; and (c) repositioning apron stones disturbed by winter storms.[87]

5. Maintenance and Protection in Fiscal Year 1880

a. The Allotment

President Hayes on March 3, 1879, approved an act of Congress appropriating $100,000 for the "Preservation and Repair of Fortifications in the fiscal year ending June 30, 1880."[88] On being advised of this

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84. Humphreys to Stewart, April 23, 1878, NA, RG 77, Ltrs. Sent, Chief Engineer.

85. Stewart to Humphreys, May 6, 1878, NA, RG 77, Ltrs. Recd., Chief Engineer.

86. Humphreys to Stewart, June 27, 1878, NA, RG 77, Ltrs. Sent, Chief Engineer.

87. "Annual Report of Progress Made in the Construction of Fort at Fort Point," in Fiscal Year 1879, NA, RG 77, Ltrs. Recd., Chief Engineer. Stewart at the end of the fiscal year returned to the Treasury $150 from his allotment which he had been unable to spend. Stewart to Humphreys, May 9, 1879, NA, RG 77, Ltrs. Recd., Chief Engineer.

88. Humphreys to Stewart, undated, NA, RG 77, Ltrs. Sent, Chief Engineer.

by the Chief Engineer, Colonel Stewart reported that for the subject year, he needed $1,500 for his two watchmen and an equal sum for contingencies. This expenditure was approved.[89]

b. The Department Calls for More Work from the Fort Keepers

Stewart soon afterwards was cautioned by the Department that because of the bleak financial situation, no assistant engineers, overseers, or clerks were to be employed; nor should any vessel or boat be kept in public service; nor should any public animals be retained, except in special circumstances where their services were indispensible.

Hereafter, the cutting of grass on parapets and traverses of ungarrisoned works and the scraping and painting of embrasure irons and other parts of the works liable to rust would be done by the fort keepers, with such assistance as may be necessary. Consequently, fort keepers were to be "such handy and useful men as will by their own labor save as far as practicable the hiring of mechanics and laborers." Fort keepers were to employ themselves "in the work of preservation and in the small repairs of the works in their charge." Finally, as salaries paid the fort keepers, in certain instances, seemed higher than warranted, the superintending engineers were authorized to effect "proper reductions."[90]

c. The Repair of the Wharf

In early December 1879 the captain of a supply boat about to land commissary stores at Fort Point complained that the wharf was unsafe for docking, when as "much as a small swell was running," as the pilings were teredo-eaten. Employing funds made available by the Quartermaster Department, Colonel Stewart replaced 140 piles.[91]

6. Maintenance and Protection in Fiscal Year 1881

a. The Allotment

Congress in 1880 again appropriated $100,000 for "Protection, Preservation, and Repair of Fortifications" for the fiscal year ending

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89. Stewart to Humphreys, March 24, 1879, NA, RG 77, Ltrs. Recd., Chief Engineer.

90. Wright to Stewart, July 28, 1879, NA, RG 77, Ltrs. Sent, Chief Engineer.

91. Meigs to Saxton, March 2, 1880, NA,RG 92; "Annual Report of Progress made in the Construction of Fort at Fort Point," during the year ending June 30, 1880, NA, RG 77, Ltrs. Recd., Chief Engineer.

June 30, 1881.[92] Stewart as heretofore placed his requirements for Fort Point at $3,000, one-half of which was budgeted for his two watchmen's salaries.[93]

b. Minor Repairs to the Quarters & Maintenance of the Batteries

Minor repairs were made during the year to the quarters, "in matters of sewage, &c, tending to the welfare and comfort of the occupants, and not interfering in any way with the defense," by the Quartermaster Department, with the Chief Engineer's approval.[94]

A number of the embrasure irons had been scraped and painted, and the Engineer shops and quarters whitewashed.

Portions of the sodded slopes of the parapets and traverses of Batteries East and West had been mowed. The sod consisted of "the thin and now matted roots of weeds and grasses," and without additional labor and expense it was impossible to keep the slopes "looking well during the long dry season." Experience had shown that the sod, when exposed to "the sun and the strong, steady winds of summer," held up best when not mowed. The weeds and grasses acted as a mat, keeping the "light, dry soil, loosened and pulverized by the burrows of gophers . . ., from being blown away." Accordingly, a considerable part of such slopes was not mowed.

Colonel Stewart, taking cognizance of the climate, the lack of good sod, and the fact that no appropriation permitting more than small repairs had been made in five years, reported these batteries "in tolerable good order."[95]

7. Maintenance and Protection in Fiscal Year 1882

a. Chief Engineer Wright Institutes New Procedures

Horatio G. Wright, Civil War hero and a senior officer in the Corps of Engineers, replaced General Humphreys as Chief Engineer in

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92. Wright to Stewart, May 4, 1880, NA, RG 77, Ltrs. Sent, Chief Engineer.

93. Stewart to Wright, June 7, 1880, NA, RG 77, Ltrs. Recd., Chief Engineer.

94. General Wright had sanctioned this project on February 10, 1881, NA, RG 77, Ltrs. Sent, Chief Engineer.

95. Executive Documents of the House of Representatives for the 1st Session of the 47th Congress, 1881-82 (Washington, 1882), Serial 2011, vol. 3, pp. 52-3.

June 1879. The following year, he made an administrative change in the allocation of funds. Henceforth, requests for management and protection money would be separated from those for maintenance. Project superintendents were advised that money appropriated for "Protection, Preservation, and Repair of Fortifications" could only be used to meet monthly salaries of their employees. Whenever repairs had to be made at an installation for which they were responsible, "a special report" of the work required, along with a detailed estimate of the cost, would be forwarded to the Department for approval.[96]

Colonel Stewart's first opportunity to practice the new procedures occurred in Fiscal Year 1882. President Hayes, having approved an act, appropriating $175,000 for "Protection, Preservation, and Repair of Fortifications," Stewart on June 30, 1881, notified the Department that for Fort Point in the new fiscal year he needed:

pay of two watchmen at $125 per month	$1,500.
rent of office at $30 per month	360.
one messenger for three months	180.
fuel for office	28.
rent of post office box, stationery, and contingencies	32.
	$2,100.[97]

Chief Engineer Wright on July 12 allotted Stewart $3,000 from the appropriation for Fort Point. As the post was garrisoned, he questioned the need for two watchmen.[98] Stewart thereupon laid off one of the watchmen on August 1.[99]

b. The Corps Waits out the Quartermaster Department

With the fort garrisoned, the Quartermaster Department assumed some maintenance responsibilities. It was supposed to take care of the quarters and barracks, and the facilities used for supplying the troops. As to be expected, this caused problems.

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96. Wright to Stewart, Aug. 12, 1880, NA, RG 77, Ltrs. Sent, Chief Engineer.

97. Stewart to Wright, June 30, 1881, NA, RG 77, Ltrs. Recd., Chief Engineer.

98. Wright to Stewart, July 12, 1881, NA, RG 77, Ltrs. Sent, Chief Engineer.

99. Stewart to Wright, Aug. 1, 1881, NA, RG 77, Ltrs. Recd., Chief Engineer.

The two facilities requiring frequent repair were the wharf and the bulkhead protecting the wharf road, and they were currently being used exclusively for provisioning the garrison. With minimal funds available for maintenance and repair of structures, the Corps of Engineers and the Quartermaster Department were hesitent to spend money for these activities, which each considerable to be the primary responsibility of the other.

This problem came to a head in the first week of December 1881, when gales and flood tides damaged the bulkhead. Fears were voiced that more than 200 feet of the bulkhead was about to collapse. The storm, fortunately, abated, and Colonel Stewart, on investigating, found that costs of shoring up the bulkhead would be $1,200 to $1,500. But with the post garrisoned, he believed this expenditure should be charged to the Quartermaster Department. If, however, the Presidio quartermaster shirked his responsibility, Stewart requested the Chief Engineer to reserve $1,500 from the appropriation for "Protection, Preservation, and Repair of Fortifications" for repair of the bulkhead.[100]

General Wright promised to reserve the stipulated sum until such time as the Quartermaster General made a decision whether to fund the project.[101] When 11 weeks passed and he heard no more on the subject, Wright telegraphed on March 1, 1882, "What action, if any, has the Quartermaster General taken."[102]

Goaded by his superiors, Stewart met with the commanding general of the Division of the Pacific and the Presidio Quartermaster. They told him they would have no funds for repair of the bulkhead until after July 1. Relaying this news to Chief Engineer Wright, Stewart observed, if the bulkhead continued to hold until the end of March, it would probably last until November, when the next stormy season was due.[103]

The Corps won its gamble. The bulkhead held. In Fiscal Year 1883 the Quartermaster Department funded its repair, along with a project widening and improving the roadway.[104]

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100. Stewart to Wright, Dec. 6, 1881, NA, RG 77, Ltrs. Recd., Chief Engineer.

101. Wright to Stewart, Dec. 14, 1881, NA, RG 77, Ltrs. Sent, Chief Engineer.

102. Wright to Stewart, March 1, 1882, NA, RG 77, Ltrs. Sent, Chief Engineer.

103. Stewart to Wright, March 9, 1882, NA, RG 77, Ltrs. Recd., Chief Engineer.

104. Executive Documents of the House of Representatives for the 1st Session of the 48th Congress, 1883-84 (Washington, 1884), Serial 2183, vol. 3, pp. 47-48.

c. Maintenance Charged to the Corps

Assisted by men detailed from the garrison, the watchman had made such repairs as practicable to Batteries East and West. The magazine doors had been painted, and the ironwork of the mortar platforms lacquered. A portion of the slopes had been mowed, and some sodding renewed; drains and fences repaired; and sills of some buildings replaced and framework braced and tied to prevent spreading.

Most of the Engineer buildings were old and much decayed. Some labor had been expended on the water system, and within a year a new tank would be needed. A number of wharf piles damaged by teredos needed replacing.[105]

d. Colonel Stewart's Inspection and Report

Colonel Stewart, in preparing his annual report for Fiscal Year 1882, wrote, "The main casemated work is garrisoned. A few slight repairs had been made, and the ironworks of the embrasures kept painted by the watchman."

An inspection had disclosed a continuing disintegration of the mortar "in joints of scarps and facings of piers and soffits of arches." At some future date, the entire brickwork would have to be repointed. Many of the brick in the scarp were being eroded by wind-driven sand. "Each year makes more apparent the progress of deterioration," he wrote. The casemates were in fair condition.

Colonel Stewart found the seawall "in good order," although boulders of the apron at the foot of the wall had shifted at some points. "No great change had taken place, however, during the year, and none was likely to occur unless there was a series of extraordinary heavy gales with powerful seas."

The magazines were in good condition. "Annual wear and tear excepted, the general state of the work is essentially as it has been for the past few years."

Generally, the condition of Batteries East and West, despite being unfinished, was "as good as could be expected." Two platforms in the latter, in addition to those already armed, were ready to receive their guns. Six others had been built, "but owing to the settlement of the terreplein" two were in no condition to have guns mounted.

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105. Executive Documents of the House of Representatives for the 2d Session of the 47th Congress, 1882-83 (Washington, 1883), Serial 2092, vol. 3, pp. 51-2.

Turning to Battery East, Colonel Stewart summarized: the pintle-blocks for eight emplacements were in position and the concrete platforms for six more built. Two more emplacements were ready for platforms, while south of Battery West ground had been broken for another 14 emplacements. Twelve timber platforms for heavy mortars had been laid, but decay had commenced.

Thirteen traverse-magazines were ready for use in Batteries East and West, and 16 more could be used, if the United States went to war.

To complete the batteries for their armament, Colonel Stewart estimated, would require about $120,000. An appropriation of $100,000 had been requested for the fiscal year ending June 30, 1884. This would be applied toward finishing the 30 platforms for heavy guns, and the parapets, traverses, magazines, terrepleins, and covered ways pertaining thereto.[106]

This request was pigeon-holed, and Batteries East and West remained unfinished.

8. Maintenance and Protection in the First Three Months of F.Y. 1883

Chief Engineer Wright on June 2, 1882, notified Colonel Stewart that Congress on May 19 had appropriated $175,000 for "Protection, Preservation, and Repair of Fortifications" in Fiscal Year 1883. He would prepare estimates for projects to be undertaken.[107]

Stewart on June 13 replied that he needed $1,400 for "ordinary expenses" and $900 for repair of the wharf.[108] Three months passed before the Department telegraphed Stewart that he had been allotted $1,435 for Fort Point. Of this sum, $900 was for repair of the wharf.[109]

By this time, however, there had been an improvement in the situation. Colonel Stewart had met with the post commander and the Presidio

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106. Ibid.

107. Wright to Stewart, June 2, 1882, NA, RG 77, Ltrs. Sent, Chief Engineer.

108. Stewart to Wright, June 13, 1882, NA, RG 77, Ltrs. Recd., Chief Engineer. The breakdown of the repair estimate listed $450 for piling, $39 for lumber, and $411 for labor, ironwork, and contingencies.

109. Wright to Stewart, Sept. 19, 1882, NA, RG 77, Ltrs. Sent, Chief Engineer.

quartermaster. They had agreed with him that the wharf was presently used solely for benefit of the garrison. They would accordingly fund its repair, and during the next several months a number of teredo-damaged piles were replaced.[110]

G. The Heavy Ordnance of the Fort and Battery West

1. Changes in the Fort's Armament

a. The Heavy Ordnance, 1871-72

On June 30, 1871, Colonel Stewart reported that the chassis of the 10-inch Rodmans on platforms 14-19 of the 1st Tier were without tongues, and the wheels of Nos. 14, 16, 18 and 19 were off the rails, as a result of being fired in October 1870. He was told by the commander of the Presidio that these carriages would be repaired at an early date.

Mounted on the 2d Tier were 12 10-inch Rodmans, two 24-pounders, and five 24-pounder coehorn mortars. The vacant casemates were Nos. 34-39, 44-45, 53-55, and 58-60.

On the 3d Tier there were 25 42-pounder smoothbores, two 24-pounders, and four 10-inch seige mortars. The vacant platforms were Nos. 61-63, which had been converted into cells.

Emplaced on the Barbette Tier were two 10-inch columbiads, eight 8-inch columbiads, two 10-inch siege mortars, and 11 32-pounder navy smoothbores. Vacant platforms were Nos. 91-98, 108-110, and 112-115.[111]

By June 30, 1872, the 1st Tier carriages had been repaired, with exception of the chassis of Nos. 19 and 20, which were without their tongues.[112]

b. The Emplacement of 16 8-inch Rifled Rodmans on the 2d Tier

In Fiscal Year 1874 ordnance officers condemned all the Fort Point guns, except the 10-inch Rodmans. Despite this action, no changes were

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110. Stewart to Wright, Sept. 9, 1882, NA, RG 77, Ltrs. Recd., Chief Engineer; Executive Documents for 1st Session 48th Congress, Serial 2183, vol. 3, pp. 47-8.

111. "Annual Report for Fiscal Year 1871, filed by Col. C.S. Stewart," NA, RG 77, Ltrs. Recd., Chief Engineer.

112. "Annual Report for Fiscal Year 1872, filed by Col. C.S. Stewart," NA, RG 77, Ltrs. Recd., Chief Engineer.

made in the fort's armament until March 1881, when six 10-inch Rodmans were removed from the 2d Tier. Their positions, as well as ten vacant casemates, were filled by rifled 8-inch Rodmans, mounted on front-pintle iron carriages. Thus on June 30, 1881, platforms Nos. 31-37, 40, and 43-50 were armed with rifled guns, platforms Nos. 41-42 and 51-52 with 10-inch Rodmans, Nos. 56 and 57 with 24-pounders, and Nos. 38-39, 53-55, and 58-60 vacant.[113]

2. The Armament of Battery West

a. The Inventory of June 9, 1873

Work on Battery West had been in progress for 29 months, and on Battery East for ten months, when Colonel Stewart received from the Department in June 1873 a request for an inventory of "number and kind of barbette gun and mortar platforms" which will be ready for armament on June 30, 1874. In making his inventory, he started with the Barbette Tier of the casemated work. Here there were:

24 centre-pintle (3.63") masonry platforms
1 centre-pintle (4") masonry platform
11 front-pintle (2") masonry platforms
2 ten-inch siege mortar timber platforms

38 masonry and timber platforms

In the barbette batteries south and west of the fort there were:

12 front-pintle (6") masonry platforms for 15-inch guns
8 front-pintle (6") platforms which may be ready
8 timber platforms for 13-inch mortars ready
4 timber platforms for 13-inch mortars to be ready

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By the subject date, the 16 platforms of Battery East, currently under construction, might be ready to be armed with 15-inch Rodmans.[114] Events were to prove Stewart too optomistic.

b. Modifications Needed to Fit the Carriage Chassis to the Platforms

In September 1873 the arduous task of mounting 15-inch guns in Battery West began. On doing so, it was found that the rear traverse

113. "Annual Report of Progress made in the Construction of Fort at Fort Point," during the year ending June 30, 1881, NA, RG 77, Ltrs. Recd., Chief Engineer.

114. Stewart to Humphreys, June 9, 1873, NA, RG 77, Ltrs. Recd., Chief Engineer

wheels projected two or more inches beyond the rear curve of the traverse rail.

Reporting this to Chief Engineer Humphreys, Colonel Stewart observed that the traverse stones had been lowered 12 inches, and with the modified forks apparently bolted as heretofore, "their inclination to the chassis perhaps not altered, the wheels are thrown too far to the rear." The mid-heads of the rear traverse wheels instead of being 15'8" from the centre of pintle to correspond with mid-curve of the traverse rails, were 15'11" from the centre.

The subject carriages had been built to be employed with five-inch pintles. But the Fort Point pintles were six-inch, so the ordnance people had reamed them out.

It would be best, Stewart concluded, for the rail bearing the tread of the wheels to be uniform throughout, and that the subject guns be mounted on carriages and platforms which matched.[115]

Seven guns had been mounted by October 1. With the exception of No. 24, they traversed easily. When he examined that carriage, Stewart saw that the props under the chassis, when it was in gear, "brought up on the prop stones & prevented the rear traverse wheels from bearing on the rails." Consequently, the giant 15-inch Rodman could not be traversed. The same difficulty had occurred recently at Gravelly Point, on the opposite side of the Golden Gate, where a 15-inch Rodman was mounted on a wooden platform. In both cases the cause was the same--a warping of the chassis, giving a cant to one of the props, causing it to bear on the prop stones.[116]

To explain how this error had occurred, one had to go back 18 months. In March 1872 Colonel Stewart had examined a chassis of one of the 15-inch Rodman carriages at the ordnance yard. He found that the forks for the traverse wheels measured from the under side of the rail to the middle of the axle wheel 18 inches, with the wheel having a radius of 9 3/4 inches.

Reviewing the plans, Stewart saw that these were about the dimensions used, when the top of the traverse circle was set four inches below the top of the pintle-plate. The platforms under construction in Battery West had low traverse stones, with the vertical height of the

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115. Stewart to Humphreys, Sept. 13 & Oct. 1, 1873, NA, RG 77, Ltrs. Recd., Chief Engineer. The head of the wheel was 4 1/2" and the rails on which it turned 6".

116. Stewart to Humphreys, Oct. 1, 1873, NA, RG 77, Ltrs. Recd., Chief Engineer.

top of the pintle above that of the traverse circle of 1'4". Consequently, these forks would be too short, unless the difference could be made up by increasing the diameter of the wheels. This, however, would throw the tread of the wheel farther than 15'8" from the centre of the pintle.

If this situation were characteristic of the forks, a different inclination would have to be given them to "bring the middle tread of the wheels to their proper horizontal distance from the centre of the pintle."[117]

Three weeks later, Stewart, with one platform completed and ready to receive its pintle, rails, and gun, wrote Maj. Julian McAllister, the commander of the Benicia Arsenal. He called attention to the fork problem. All those on hand would have to be altered to fit them to the low traverse stones, with a vertical distance between the top of the pintle-plate and the outer rail of 1'4" instead of 4".[118]

Replying to Stewart's letters, Major McAllister could offer no help. "As they have not determined on any new carriage for the XV-inch Rodman," he wrote, "we will make the old one answer our purpose for the present."[119]

Stewart, to guard against such a recurrence, forwarded the McAllister correspondence to Washington, with a request that General Humphreys see if he could get the Ordnance Department to take action.[120] Humphreys acted on his subordinate's suggestion. On October 14 he notified the Chief of Ordnance of the problem with the front-pintle 15-inch gun carriages at Fort Point.[121]

Before the end of the year five more 15-inch Rodmans had been mounted in Battery West, boosting its armament to 12 guns. In numbering the new emplacements and traverses, Colonel Stewart began with the

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117. Stewart to McAllister, March 8, 1872, NA, RG 77, Ltrs. Recd., Chief Engineer.

118. Ibid., April 2, 1872, NA, RG 77, Ltrs. Recd., Chief Engineer.

119. McAllister to Stewart, April 3, 1872, NA, RG 77, Ltrs. Recd., Chief Engineer.

120. Stewart to Humphreys, Oct. 11, 1873, NA, RG 77, Ltrs. Recd., Chief Engineer.

121. Humphreys to Chief of Ordnance, Oct. 14, 1873, NA, RG 77, Ltrs., Sent, Chief Engineer.

right emplacement in Battery East and counted to the left toward Telegraph Hill. This made the right emplacement in Battery West No. 21.[122]

c. Test Firing the 15-inch Rodmans

On May 18, 1874, in accordance with orders from Maj. Gen. John M. Schofield, Guns Nos. 21-32 were fired at targets from one to two and three-quarters of a mile distant. At first 60-pound charges were used, but before the test firing ended 100-pound charges were used to hurl solid projectiles from Guns Nos. 21-24 and 26.

Guns 22 and 24 were given an elevation of 33° and traversed so their chassis were nearly parallel with the right breast-height wall, while Gun 26 was given an elevation of 0° and its axis traversed 62° to the left. When they were fired, no damage was done to the carriages, platforms, or parapets of Guns 22 and 24, but the top carriage of No. 26 on its recoil crashed into the counter-hurters and rebounded 14 inches. The counter-hurters started slightly, and the carriage was damaged.

On the 20th the gun was run into battery and the carriage repaired, while Colonel Stewart checked the pintle. He found it undamaged, but the granite to its rear "had sealed or spalled," and a small piece had detached. The pintle appeared to be plumb. To correct this situation and prevent a recurrence, Stewart had his men fill in around the pintles with molten metal to seal the voids.[123]

Chief Engineer Humphreys was pleased with Stewart's report, because the carriages and platforms had withstood shock better than anticipated Tests conducted on the Atlantic coast had demonstrated that the safety and endurance of carriages and platforms required that pneumatic buffers be secured to the carriages.[124]

H. Fort Point is Again Garrisoned

1. The Troops Return

After more than ten years soldiers returned to Fort Point as a garrison on September 16, 1878. The newcomers were Companies A and K,

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122. Stewart to Humphreys, Jan. 5, 1874, NA, RG 77, Ltrs. Recd., Chief Engineer. The first eight emplacements in Battery East were designed for 15-inch Rodmans; Emplacement Nos. 9 and 10 for 13-inch mortars; Nos. 11-18 for 15-inch Rodmans; and Nos. 19 and 20 for mortars.

123. Stewart to Humphreys, May 21 & 27, 1874, NA, RG 77, Ltrs. Recd., Chief Engineer. The muzzle blast from No. 26, as to be expected, tore sodding from the parapet.

124. Humphreys to Stewart, June 2, 1874, NA, RG 77, Ltrs. Sent, Chief Engineer.

4th U.S. Artillery. Eight days before the artillerists, who had been stationed in Washington Territory, had left Priest's Rapides aboard the steamer Spokane for Walla Walla. There they had transferred to the steamer Anne Faxon for the run down the Snake and Columbia rivers to The Dalles. From there, they were shuttled to Fort Vancouver by steamboat. On September 13 the redlegs sailed for San Francisco aboard Great Republic. The two companies traveled to the Fort Point wharf aboard McPherson, and at 1 p.m. on the 16th, Capt. John Egan, as senior officer, assumed command of the post.

Eleven days later, the fort had an important visitor--Gen. William T. Sherman, commander of the army--who inspected the post and garrison.[125]

2. Readying the Post for the Troops

Six months before arrival of the artillerists, Lt. Marvin Fuger of the Quartermaster Department had inspected the buildings at the post for which he was responsible. They were: (a) Building No. 1, the commanding officer's quarters, built in 1865, a two-story frame structure (26 x 30') with kitchen ell and pantry. Attached was a small (16 x 17') weatherboarded office. (b) Buildings Nos. 2 and 3, double sets of officers' quarters, built in 1865. Two-story frame buildings (42 x 31') with 7'6" porches, these structures had bathrooms and pantries in the rear. The officers' quarters were enclosed by wind fences and had wood and coal sheds. (c) Building No. 4 was a two-story frame commissary storehouse (20 x 40'), with pile foundation. (d) Building No. 5 was a 13 x 20-foot coal shed, built in 1862, of rough boards and battens. (e) Building No. 6, the post bakery, was a story and one-half structure, 21 x 21 feet, and dated to 1853. (f) Buildings Nos. 7 and 8 (120 x 30') and one story, had been built as barracks during the Civil War. Windows had been knocked out, and they were used for storage. (g) Buildings Nos. 9-12 were single story (48 1/2 x 16 1/2') and had been erected in 1865 as kitchens, but in 1879 served the garrison as laundress' quarters. (h) Building No. 13 (24 1/2 x 55 1/2') had been built during the war as a quartermaster stable and shed. It had a stabling capacity of 20 animals, and storage facilities for 10,000 pounds of hay, 10,000 pounds of straw, and 6,000 pounds of oats. Adjoining the stable was a 89 x 13-foot shed. (i) Building No. 14 was a 11 1/2 x 29 1/2-foot blacksmith shop. (j) Building No. 15 (26 1/2 x 25'), constructed of board and battens with shed attached, served as laundress quarters. (k) The ordnance sergeant's quarters (Building No. 16) was 26 1/2 x 25 feet. (l) Building No. 17 (60 x 30') in 1879 was used as a quartermaster storeroom and office.[126]

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125. Muster Rolls and Returns for 4th U.S. Artillery, NA, Microcopy M727.

126. Outline Descriptions of Military Posts in the Military Division of the Pacific, Maj. Gen. Irwin McDowell Commanding, 1879 (San Francisco, 1879), pp. 92-3.

Lieutenant Fuger estimated the cost of making the structures habitable at $3717.38. His breakdown showed: (a) commanding officer's quarters $1505.45; (b) adjutant's office $156,94; (c) two large officers' quarters $422; (d) eight sets of laundress quarters (four buildings 16 x 50 feet) $1,101.82; (e) quartermaster & commissary storehouse $83.85; (f) bake house $32.12; (g) blacksmith shop $57.60; (h) stable $137.10; (i) coal shed $112.30; and (j) officers' and enlisted men's quarters in the fort $108.88.[127]

As only $471.65 had been allotted for repair of quarters at Fort Point, Lieutenant Fuger's estimates were referred to General Sherman.

On May 11 he approved the expenditure of $3,717.88, as it had been determined to reoccupy Fort Point, provided the posts at the month of the Columbia were abandoned as recommended by General McDowell.[128]

3. Maintenance of the Quarters and Storehouses in 1879

This work had been completed by the time Captain Egan and his command arrived. Four months later, on January 1, 1879, Egan complained that the commissary storehouse was an ancient structure and "needed to be lined to protect the stores." When Major Holabird examined the structure on the 30th, he estimated that $50 worth of materials (siding and nails) were needed to protect the sides of the structure from the thrust of the barrels and boxes. The expenditure of this sum was authorized by Quartermaster General Meigs on February 27.[129]

Captain Egan on September 24, 1879, forwarded a requisition to headquarters, Military Division of the Pacific, "for windows and window frames for the fort," and also for materials to paint its interior.[130] For these projects he needed:

> 87 window sashes (2'5" x 2'3") with glass; 100 pieces of scantling; 87 pair hinges (3 x 2 1/2); four gross of screws; 200 pounds of white lead; 1,000 pounds of red lead; 50 gallons linseed oil, boiled; 50 gallons linseed oil . . .; 2 gallons of . . . ; and 40 gallons of turpentine.

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127. Fuger to Chief Quartermaster, Mil. Div. Pac., March 19, 1878, NA, RG 92.

128. McDowell to Chief Clerk, War Department, May 4, 1878, NA, RG 92.

129. Meigs to Holabird, Feb. 27, 1879, NA, RG 92.

130. Egan to Adjt. Gen., Mil. Div. Pac., Sept. 24, 1879, NA, RG 92.

General Meigs on October 28 approved the expenditure of $325 for these projects, provided this sum could be spared from the allotment, "due regard being had to wants of other posts in the Division of the Pacific."[131]

4. Improvements to the Dispensary

Meanwhile, Post Surgeon James L. Ord had mailed to the Surgeon General an estimate of funds required for closets and shelves for the dispensary. These were badly needed, because at present "all medicines &c" were placed on the floor, "owing to the want of proper shelves." The cost of building the closets and shelves, in accordance with plans approved by Captain Egan, would be $161.44.[132]

Quartermaster General Meigs on May 8 granted authority to spend the sum requested for shelving and closets in the post dispensary.[133]

5. The Construction of a New Road

In November 1879 Captain Egan discussed with Colonel Stewart the possibility of opening a road from the wharf to pass behind Batteries East and West. To gain access to the batteries, the road would cut through the infantry parapet covering the connecting ramp. Such a road would shorten the route for vehicular traffic from the fort to the "inside of the batteries by upwards of one-half mile."

The road, Egan continued, could be built by prison labor without cost to the Department.

Colonel Stewart, in seeking approval of his superiors for the project, reminded them of the serious inconvenience caused in January 1878, when the storm battered down the bulkhead, washed out sections of the road, and prevented vehicles from reaching the fort for several weeks. In addition, the proposed road would be in defilade and covered from the fire of ships attempting to pass through the Golden Gate.[134]

The Department on December 1 recommended to Secretary of War George W. McCrary, the construction of the road, provided: (a) it not injure

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131. Meigs to Chief QM, Mil. Div. Pac., Oct. 28, 1879, NA, RG 92.

132. Ord to Surgeon General, March 28, 1879, NA, RG 92.

133. Meigs to Holabird, May 8, 1879, NA, RG 92.

134. Stewart to Humphreys, Nov. 19, 1879, NA, RG 77, Ltrs. Recd., Chief Engineer.

or endanger the exterior slopes of Batteries East and West; and (b) that cost of construction not be charged to the Engineers. The Secretary approved the project subject to these conditions.[135]

6. Captain Egan Rehabilitates Buildings 7 & 8 as Barracks

Soon after the first of the year, Captain Egan decided to rehabilitate two storehouses near the wharf as barracks for two companies. The laundresses' quarters in rear of the storehouses would be relocated to a line much farther back, and the space between filled. To finance this project, he called on Quartermaster General Meigs for $2,594.44 to elevate, plaster, and partition these structures. The request was approved by the Secretary of War on March 26.[136]

Before beginning work, Captain Egan discovered that "a very old one story cottage belonging to the Engineer Department obstructed" the improvements. As the ground was to be elevated several feet to provide proper drainage, the old building would have to be moved or raised. If the Engineers had no use for it, he would like it transferred to the Quartermaster Department for relocation, repair, and conversion into laundress quarters.[137]

Colonel Stewart, in referring Egan's request to his superiors, pointed out that the structure might be worth $150, but it was isolated from the "other Engineer buildings and when the barracks are occupied by troops might be inconvenient for Engineer use."[138] Chief Engineer Wright in April sanctioned transfer of the cottage to the Quartermaster Department.[139]

7. The Units Come and Go

On May 7, 1880, the garrison was reinforced to three companies by the arrival of Company C, 4th U.S. Artillery. With three companies

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135. Park to Stewart, Dec. 1, 1879, NA, RG 77, Ltrs. Sent, Chief Engineer.

136. Meigs to Saxton, March 26, 1880, NA, RG 92.

137. Egan to Stewart, March 22, 1880, NA, RG 77, Ltrs. Recd., Chief Engineer. The subject structure (18 x 26') was located "under the bluff on low ground not far from the wharf," and near the barracks and laundress quarters.

138. Stewart to Chief Engineer, March 26, 1880, NA, RG 77, Ltrs. Recd., Chief Engineer.

139. Wright to Stewart, April 9, 1880, NA, RG 77, Ltrs. Sent, Chief Engineer.

on duty at Fort Point, the married officers, the comanding officer, and one company were billeted in the wooden quarters and barracks near the wharf. These units (Companies A, C, and K) remained at the post until July 6, 1881, when Company K was ordered to Fort Canby. It was replaced by Company L, 4th U.S. Artillery, transferred from Alcatraz on July 9. The garrison on October 3, 1881, was reduced to Company A, when Companies C and L were ordered to Arizona Territory. The redlegs returned to Fort Point on the 26th. Eight days later, on November 4, Companies A, C, and L, 4th U.S. Artillery, packed their gear aboard trains and left Fort Point for duty on the Atlantic Seaboard.

The fort was without a garrison for two weeks. On November 18, 1881, officers and men of Battery F, 1st U.S. Artillery, landed at the Fort Point wharf from the steamer McPherson. They had left Fort Adams, Rhode Island, by rail for their new station eight days before. The next day a second unit, Battery H, having left Fort Preble, Maine, on the 12th disembarked, and on the 22d Battery B arrived from Fort Adams. Capt. C.A. Eakin, as senior officer present, commanded the battalion, as the officers and men of the 1st Artillery settled into their new billets.[140]

I. Requests from the Lighthouse Board Affecting the Fort

1. The Wooden Footbridge

With the lighthouse positioned on the West Bastion, the Corps of Engineers during the 1870s received several requests from the Lighthouse Board affecting the fort's structure. The first of these came on March 3, 1876, when Col. R.S. Williamson, the 12th District Lighthouse Engineer, contacted Colonel Stewart concerning an accident that had recently befallen one of the lighthouse keepers. To reach the light from their quarters on the bluff, the keepers had to descend a "long and difficult flight of steps," enter the fort, and ascend to the barbette tier. This had to be done at least twice a day, and more often if there were a fog.

On Monday, February 28, there was no moon, and a keeper in hastening from his quarters to the light, lost his footing and fell. He was unconscious when found.

To alleviate this danger, Colonel Williamson requested that the Lighthouse Board be allowed to bridge the chasm separating the bluff from the fort.[141]

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140. Returns for Regular Army Artillery Regiments, June 1821-Jan. 1901, NA, Microcopy M727.

141. Williamson to Stewart, March 3, 1876, NA, RG 77, Ltrs. Recd., Chief Engineer.

Stewart's only objection to the proposal was that the bridge would be an invitation to unauthorized people to enter the fort. The fort, at present, was ungarrisoned and its sally port locked.[142] Countering Stewart's argument, Williamson noted that the bridge would have side railings and a gate in the middle. The gate would be locked and the keys entrusted to the keepers.[143]

In approving Williamson's request, Chief Engineer Humphreys insisted that the bridge be built of "lightweight" materials, so it could be thrown down in a few moments in an emergency; that it not be used for ingress by unauthorized persons; and that it be constructed with a gate provided with a lock in a manner suggested by Colonel Williamson.[144]

2. The Army Frustrates Plans to Relocate the Fog Bell

Twenty months later, on January 7, 1878, Colonel Williamson again approached Colonel Stewart with an official request. The Lighthouse Board, he explained, desired to replace the Fort Point bell with a "steam fog signal." Ship captains had complained that "in ordinary winds the bell is not heard by vessels coming in until abreast of the Fort, and . . . is of no use as a guide to such vessels." If there were no objections, Williamson wanted to position the fog signal on the seawall outside the fort, abreast the bell's present location. Besides the signal, there would be needed a boiler house (18 x 21 feet), a coalshed, and quarters for the keeper when anticipating a fog.[145]

When he forwarded Williamson's request to the Department, Stewart commented, "there is a theoretical objection to placing any structure in front of the guns of a Fort, but . . . in this case the objection amounts to nothing." The subject structures, being of light materials, could be destroyed in event of war. In recommending approval of the request, Stewart suggested the fog signal be positioned in front of "the northernmost curtain . . . near the apex of the Point."[146] Chief

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142. Stewart to Humphreys, March 3, 1876, NA, RG 77, Ltrs. Recd., Chief Engineer.

143. Williamson to Stewart, March 4, 1876, NA, RG 77, Ltrs. Recd., Chief Engineer.

144. Humphreys to Stewart, March 15, 1876, NA, RG 77, Ltrs. Sent, Chief Engineer.

145. Williamson to Stewart, Jan. 7, 1878, NA, RG 77, Ltrs. Recd., Chief Engineer.

146. Stewart to Humphreys, Jan. 11, 1878, NA, RG 77, Ltrs. Recd., Chief Engineer.

Engineer Humphreys on February 23 recommended to Secretary of War McCrary that the request be granted.[147]

After additional study, the Lighthouse Board concluded a fog whistle at Fort Point would compete with the one at Point Bonita, confusing ship captains. The project was accordingly dropped.

To solve the problem, District Engineer Williamson in 1880 recommended and the Board ordered a larger fog bell positioned at Fort Point to replace the 1090-pound bell. This was done by exchanging the large auxillary bell at Yerba Buena Island for the one at Fort Point.[148]

Before effecting the exchange, the Lighthouse Board secured Chief Engineer Wright's approval for erecting the bell tower on the fort's terreplein, as long as it did not "interfere with the serving of the barbette armament, or with the comfort of the garrison."[149]

Secretary of War Robert Todd Lincoln, before approving the request, sought the opinion of the officers on-site. The garrison commander, Lt. Col. George P. Andrews, on March 10, 1881, reported that at present the fog bell was "hung before an embrasure, generally open, in the second tier of casemates. It is under a long wooden structure framed against the brick wall, with iron struts slanting downward. The resonance of the bell appears to be somewhat diminished by the mode of hanging."

Colonel Andrews, having been at Fort Point in the 1860s, recalled that the sound of the bell "seemed fuller", when it was positioned near the old lighthouse, about 50 feet north of its current location. It was his recommendation that it be returned to this site, as positioning it on the terreplein would "mask the sound in every direction except vertically and would damage that already full locality besides becoming an almost intolerable torture to the inhabitants of the Fort."

Colonel Andrews suggested that a second bell be mounted in front of the East Bastion, on a heavy frame over the seawall.[150]

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147. Humphreys to McCrary, Feb. 23, 1878, NA, RG 77, Ltrs. Sent, Chief Engineer.

148. Holland & Koue, "Historic Structure Report--Fort Point Light," p. 19.

149. Wright to Secretary of War, Feb. 23, 1881, NA, RG 77, Ltrs. Sent, Chief Engineer.

150. Andrews to McDowell, March 10, 1881, NA, RG 77, Ltrs. Recd., Chief Engineer.

Colonel Williamson accordingly visited the fort on March 21 to discuss the situation with Colonel Andrews. Finding Andrews steadfast in his opposition, Williamson concluded that the present position was as good as any that could be "selected for guidance of incoming vessels." A change to a site on the seawall might result "in its being heard a little better by outgoing vessels but the advantage to them, if any, would be so slight that, I do not recommend that the expense necessary to remove the bell and place it at the point suggested should be incurred."[151]

Secretary of War Lincoln, on reviewing the correspondence, suggested to the Secretary of the Treasury that the officers on-site be allowed to resolve location of the bell.[152] This assured the bell would remain where it was, as the Lighthouse Board withdrew its request with unfortunate results, as in the spring of 1882 Columbia ran aground nearby. The District Inspector suggested that the accident might have been avoided if there had been a steam whistle at Fort Point.[153]

3. New Quarters for the Lighthouse Keepers

Secretary of War Lincoln on September 26, 1882, approved the request of the Secretary of the Treasury for authority to erect "two small dwellings for the keepers of the light at Fort Point."[154] These would replace the old one(s). It was 1884 before the Lighthouse Board constructed these two dwellings on the bluff in rear of the now abandoned 10-Gun Battery.[155]

J. Fort Point Becomes Fort Winfield Scott

The search for a name for the fort continued in the 1870s. On April 9, 1874, Chief Engineer Humphreys sent a circular letter to his superintending engineers, asking them to submit names of deceased

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151. Williamson to McDowell, March 23, 1881, NA, RG 77, Ltrs. Recd., Chief Engineer.

152. Lincoln to Secretary of the Treasury, April 7, 1881, Ltrs. Sent, Secretary of War.

153. Holland & Koue, "Historic Structure Report--Fort Point Light," p. 20.

154. Lincoln to Secretary of the Treasury, Sept. 26, 1883, NA, RG 92.

155. Holland & Koue, "Historic Structure Report--Fort Point Light," p. 26.

civil, army, and naval heroes, for consideration to be given to unnamed works for which they were responsible. Colonel Stewart forwarded an impressive list headed by Presidents William Henry Harrison and Abraham Lincoln. Naval figures nominated were John A.B. Dahlgren, David G. Farragut, John Paul Jones, and Samuel F. DuPont; army officers enumerated were J.K.F. Mansfield, George G. Meade, John F. Reynolds, Isaac P. Rodman, Edwin V. Sumner, René De Russy, J.G. Swift, Sylvanus Thayer, George H. Thomas, and Joseph H. Totten; Alexander D. Bache of the Coast Survey; and Joel R. Poinsett of the diplomatic corps.[156]

No action was taken by the Department to name "the Fort at Fort Point" or any other work under Colonel Stewart's supervision after any of the heroes he had listed.

Eight more years were to slip by before "the Fort at Fort Point," as it was referred to in official documents, received a name comporting with its importance and the War Department's nomenclature. On November 25, 1882, Gen. William T. Sherman, as the army's commanding officer, issued General Order 133, announcing that "by direction of the President the military post on the south side of the Golden Gate . . ., California, now known as 'Fort Point,' shall hereafter be known and designated as Fort Winfield Scott."[157]

The reservation had received a distinguished name in keeping with its importance. Winfield Scott had served his country from 1808, when he entered the United States Army, until his retirement in 1861. Hero of several War of 1812 battles, he had become the army's commander-in-chief in 1841. In 1847 Scott led the army, which landed at Veracruz and, following the route pioneered by Hernán Cortez in 1521, had captured Mexico City. In 1852 he was an unsuccessful Whig nominee for the Presidency. Scott in 1859 had visited Fort Point, while the masonry work was under construction.

It should be emphasized, however, that Fort Winfield Scott was the name applied to the entire reservation--the casemated fort, Batteries East and West, and the Engineer and Quartermaster buildings. Hereinafter the casemated work was one of the units constituting Fort Winfield Scott.

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156. Stewart to Humphreys, April 24, 1874, NA, RG 77, Ltrs. Recd., Chief Engineer.

157. GO 133, Headquarters of the Army, Nov. 25, 1882.

X. THE LAST EIGHTEEN YEARS OF THE 19TH CENTURY

A. The Endicott Board Makes its Report

1. A Technical Revolution Makes Our Nation's Coastal Defenses Obsolete

Although the area now had a name in keeping with its military significance, the freeze on funds for construction of harbor defenses continued through the 1880s. "The fortifications fell into disrepair and the defensive strength of the United States" shrank to "perhaps its lowest point since 1812." Simultaneously, great advances were being made in the design and manufacture of heavy ordnance.

One important development involved the substitution of steel for iron in the casting of guns. As the technique of forging large masses of steel improved, it enabled the ordnance people to proceed with the manufacture of the compound tube. The founding of cannon tubes in accordance with this new concept--increasing the size and strength of the tube by the successive shrinking-on of reinforcing hoops--had been practiced, it is true, in the years before 1860. Technology, however, had lagged, and it was not until the Civil War that banded and rifled guns of heavy caliber came into general use. Dr. Raymond Lewis, an authority on the subject, has written:

> Not until the late 1880s did the combined availability of good quality steel in large amounts, industrial facilities for producing heavy forgings, and machining techniques able to meet the required standards of precision make it possible to produce substantial numbers of these lighter, stronger, and, hence, more powerful weapons.[1]

Another important advance was in the perfection of breech-loading. The principle had been common knowledge for centuries, and it had been employed intermittently until 1855, when Lord Armstrong of Great Britain designed a rifled breech-loading gun that "included so many improvements as to be revolutionary."[2] During the Civil War breech-loading artillery

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1. Lewis, Seacoast Fortifications of the United States, p. 75.

2. Albert Manucy, Artillery Through the Ages: A Short Illustrated History of Cannon, Emphasizing Types Used in America (Washington, 1949), p. 4.

was employed on a limited scale by the belligerents. After 1865, breech-loading field guns replaced muzzle-loaders in the European armies as well as those of the United States. Not so rapid was the replacement of the muzzle-loading heavy ordnance mounted in coastal fortifications. The problem of developing a successful breech-loading gun was technological. To be acceptable, a breech-mechanism had to withstand the great heat given off by the detonation of the propellent, be capable of containing the gasses, and be machined to be opened and closed rapidly. It was not until the late nineteenth century that the ordnance technology was sufficiently advanced to produce the well-machined block mechanisms required by the big rifled guns needed for coastal defense.[3]

Three other developments helped speed the emergence of modern coastal artillery: (a) methods of rifling the tubes were improved, which made possible the introduction of more efficient and effective projectiles; (b) the development of disappearing carriages that utilized the firing recoil energy to return the gun to its position in battery behind a parapet, where it could be reloaded and serviced without unduly exposing its crew; and (c) the introduction of improved propellents, nitrocellulose- and nitroglycerin-based powders, to replace black powder.[4]

The effect on heavy ordnance of this technical revolution cannot be exaggerated, because it represented the greatest advance to be made in artillery from the time of its appearance in the fourteenth century until the development of the atomic cannon of the 1950s. As Dr. Lewis has written:

> Compared to the best of the smoothbore muzzle-loading cannon of the post-Civil War period, the new weapons which began to emerge from the developmental stage around 1890 could fire projectiles that, caliber for caliber, were four times as heavy as to effective ranges two to three times as great; and they could do so with remarkably increased armor-penetration ability and accuracy.[5]

During these years, the European naval powers had been embarking on ambitious and expensive construction programs--the battleship had made her appearance. News of the development of what was considered to be the ultimate weapon afloat caused ranking army and navy officers, as well as much of the public residing on the Atlantic and Pacific seacoasts, to become alarmed over the failure of Congress to authorize appropriations

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3. Lewis, Seacoast Fortifications of the United States, p. 75.

4. Ibid., p. 76; Manucy, Artillery Through the Ages, p. 28.

5. Lewis, Seacoast Fortifications of the United States, p. 76.

for coastal defenses since the mid-1870s. Pressure mounted for Congress to take action to correct a situation which had allowed the Second and Third System Forts to deteriorate to a point where the nation's security was jeopardized.

2. President Cleveland Constitutes the Endicott Board

President Grover Cleveland accordingly in 1885 constituted a board headed by Secretary of War William C. Endicott to review the coastal defenses of the United States and to submit recommendations for a program to update them to take advantage of the technical revolution in weaponry. This board was composed of officers of the army and navy, as well as civilians. Not since 1816, when the four-man board headed by Bvt. Brig. Gen. Simon Bernard had made the study leading to the Third System Forts, had the subject of fortifications, types of armament, etc., been subjected to such an exhaustive study. The Endicott Board made its report in 1886.[6]

The Board called for fortifications at 26 coastal points, plus three on the Great Lakes, as well as floating batteries, torpedo boats, and submarine mine fields. Dr. Lewis has observed:

> In terms of the cost estimate alone, the overall proposal was grossly unrealistic. Moreover, the detailed provisions concerning the types and quantities of weapons, drafted while the new ordnance was still at a fairly early stage of development, were necessarily set forth long before precise information was available regarding the actual performance of the production models.[7]

Nevertheless, on March 29, 1887, the Board of Engineers for Fortifications was directed by Secretary of War Endicott to prepare plans for the defense of the nation's more important harbors in accordance with recommendations of the Endicott Board. Operating under these guidelines, the Board "undertook a thorough revision of plans for defense of our chief ports by submarine mines and a study of the precise locations of the new armaments rendered necessary by modern modes of attack."[8]

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6. Ibid., pp. 77-8.

7. Ibid., p. 77.

8. Craighill to Lamont, Sept. 29, 1896, found in Report of the Secretary of War; being part of the Message and Documents Communicated to the Two Houses of Congress at the Beginning of the Second Session of the Fifty-Fourth Congress, 3 vols. (Washington, 1896), vol. 2, p. 7. Cited hereafter as Report of Secretary of War--1896. Brig. Gen. W.P. Craighill was Chief Engineer, while Daniel S. Lamont was Secretary of War.

During the period 1887-1896 detailed plans for defenses of 23 key harbors, including San Francisco, were prepared by the Board of Engineers and approved by the Secretary of War.[9] Besides these major undertakings, partial projects were programmed and approved for defense of the Lake Ports; Cumberland Sound; Kennebec and Penobscot Rivers, Me.; New Bedford, Mass.; and New Haven and New London, Conn. Under consideration were projects for the defense of Port Royal, S.C., and the Dry Tortugas.[10]

3. Congress Acts

Congress beginning in 1890 resumed making annual appropriations for construction of coastal defenses. In August of that year $1,221,000 was voted by Congress to be applied to the defenses guarding three harbors--San Francisco, New York, and Boston. On February 24, 1891, expenditures of $750,000 were authorized with major allotments made for the defenses of San Francisco, New York, Hampton Roads, and Washington, D.C.[11]

B. Maintenance and Protection of the Masonry Fort, 1883-1895

1. A Few Generalizations

But from 1883 until Fiscal Year 1891 there would be little money available for maintenance and protection of the government property at Fort Winfield Scott. Consequently, until the garrison was withdrawn from the post in 1886, the Corps of Engineers and Quartermaster General usually engaged in a Gaston and Alphonse act whenever there was a question as to which department was responsible for repair of the subject facility. The construction of the Endicott emplacements, however, did not mean that more attention than heretofore would be lavished on the old casemated work. The army of the 1890s did not have money to spend on obsolete fortifications, and all that the Corps of Engineers could do was to continue its small annual allotment for maintenance and repairs.

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9. In addition to San Francisco, these harbors were: Portland, Me.; Portsmouth, N.H.; Boston, Mass.; Narragansett Bay, R.I.; eastern entrance to Long Island Sound; New York, N.Y.; Philadelphia, Pa.; Baltimore, Md.; Washington,D.C.; Hampton Roads, Va.; Wilmington, N.C.; Charleston, S.C.; Savannah, Ga.; Key West and Pensacola, Fla.; Mobile, Ala.; New Orleans, La.; Galveston, Tex.; San Diego, Calif.; mouth of Columbia River; and Puget Sound, Wash. Ibid.

10. Ibid.

11. Ibid., p. 3.

2. Construction and Maintenance in Fiscal Year 1883

During Fiscal Year 1883 the Quartermaster Department made changes to the sewerage system of the gorge quarters and erected a one-story frame officers' quarters, about 250 feet southeast of the gorge and 50 feet from the seawall. A number of teredo-damaged wharf pilings were replaced, and the wharf road widened and improved by men working under Colonel Stewart's supervision.[12] The fort keeper, in his spare time, painted the ironwork of the embrasures, and the railings of the casemate and barbette tiers.

An inspection revealed to Colonel Stewart that the pointing and softer brick of the western scarp were continuing to deteriorate rapidly, while "the pointing of the soffits and piers of the casemate arches is still wearing away & dropping out though more slowly than a few years" ago.[13]

The keeper had also lacquered the ironwork of the mortar platforms of the exterior batteries, repainted magazine doors, cleaned out and repaired drains, mowed portions of the slopes, repaired fences, and maintained and whitewashed buildings.[14]

3. Maintenance and Protection in Fiscal Year 1884

a. The Appropriation and Allotment

Congress, before adjourning on March 3, 1883, had appropriated $175,000 for "Protection, Preservation, and Repair of Fortifications" in the fiscal year beginning July 1. Chief Engineer Wright accordingly on March 20 called on his project engineers for estimates of funds needed to under-write maintenance in Fiscal Year 1884.[15] Colonel Stewart on June 4 reported that for hire of a watchman and office expenses, he required $1,500.[16] In making his allotments, General Wright apportioned Stewart $2,355 for Fort Winfield Scott.[17]

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12. "Annual Report of Progress made in the Construction of Fort Winfield Scott, California, during the year ending June 30, 1883," NA, RG 77, Ltrs. Recd., Chief Engineer.

13. Ibid.

14. Ibid.

15. Wright to Stewart, March 20, 1883, NA, RG 77, Ltrs, Sent, Chief Engineer.

16. Stewart to Wright, June 4, 1883, NA, RG 77, Ltrs. Recd., Chief Engineer.

17. Wright to Stewart, June 25, 1883, NA, RG 77, Ltrs. Sent, Chief Engineer.

b. Colonel Stewart Reports on Condition of the Masonry

The Quartermaster Department, as the fort was garrisoned, made necessary repairs to the casemate quarters and the sewer system, and the fort keeper painted the embrasure ironwork.

Colonel Stewart, in reporting the continuing deterioration of the softer brick and pointing of the exterior scarp, observed, "where this occurs to the greatest extent is . . . in those parts of the work [the left face and pan coupé of the West Bastion] directly exposed to the full force of the violent summer winds driving against them for months in succession fog, sea spray & a fine sand blast."

The gun casemates, for which the Corps was responsible, were "in good order." The only problems observed were in the 3d Tier, on the north front, here there had been considerable seepage after hard rains. (In Fiscal Year 1884 rainfall at Fort Winfield Scott had been about one-third greater than normal.) In this area the parapet of the front was brick, and the concrete of the banquette had separated from the breast-height wall, and rain driven against its vertical face, ran down the wall and into the vertical joint between the back of the scarp and the head of the casemate arch. The threat of earthquakes deterred Steward from taking action to seal these vertical joints.

Stewart found the masonry of the "uncovered roof" of the counter-scarp gallery in poor condition, as it had been for years. This work, however, was of "little or no importance."[18]

c. Stewart Utilizes a Windfall

With Congress keeping a tight rein on appropriations, Chief Engineer Wright was in a habit of sending a circular letter to his superintendents in March, asking them to deposit to the credit of the Treasurer of the United States any funds from the appropriation for "Preservation and Repair of Fortifications" surplus to their needs.[19]

Colonel Stewart replied on March 12, 1884, that "no money can be spared from the current allotment for the fortifications in my charge."[20]

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18. "Annual Report of Progress made on the Construction of Fort Winfield Scott, California, during the year ending June 30, 1884," NA, RG 77, Ltrs. Recd., Chief Engineer.

19. Wright to Stewart, March 4, 1884, NA, RG 77, Ltrs. Sent, Chief Engineer.

20. Stewart to Chief Engineer, March 12, 1884, NA, RG 77, Ltrs. Recd., Chief Engineer.

As soon as all the project engineers had reported, the Department, having adjusted its figures, notified them that several thousands of dollars of unobligated funds from the current appropriation were available. To take advantage of this situation, they were to contact Chief Engineer John Newton by July 1.[21] (Horatio G. Wright had retired as Chief Engineer on March 6, 1884, his 64th birthday, and was succeeded by Brig. Gen. John Newton.) This proved a windfall, because several weeks before a "violent gale" had seriously damaged the post windmill.

To effect repairs, Colonel Stewart telegraphed on April 5, required $150.[22] General Newton approved the request and the windmill was soon back in operation.[23] Before the month was over, Stewart asked for and received funds from the Department to renew several hundred feet of redwood water pipe, to put a new cover on the water tank, and to rebuild the bulkhead of the roadway to the wagon-house.[24]

4. Maintenance and Protection in Fiscal Year 1885

a. The Appropriation and Allotment

Chief Engineer Newton on July 11, 1884, notified Colonel Stewart that Congress on the 5th had authorized and President Chester A. Arthur had approved an appropriation of $175,000 for "Protection, Preservation, and Repair of Fortifications" in Fiscal Year 1885. He would report as soon as practicable the sum needed for the fort keeper's salary, along with an estimate of funds needed for general maintenance.[25]

Stewart telegraphed on July 19 that he needed $780 to pay the Fort Winfield Scott keeper his monthly salary of $65 during the new fiscal year.[26] This answer was not entirely satisfactory, and on the 24th

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21. Newton to Stewart, March 26, 1884, NA, RG 77, Ltrs. Sent, Chief Engineer.

22. Stewart to Newton, April 5, 1884, NA, RG 77, Ltrs. Recd., Chief Engineer.

23. Newton to Stewart, April 12, 1884, NA, RG 77, Ltrs. Sent, Chief Engineer.

24. Stewart to Newton, April 24 & 25, and Newton to Stewart, May 3, 1884, NA, RG 77, Ltrs. Recd., and Sent, Chief Engineer. To effect these repairs Stewart purchased from A.M. Jewell & Co., 64 feet of Oregon pine, 240 feet of redwood, and 256 lineal feet of 2-inch redwood pipe, in length of 12 to 16 feet.

25. Newton to Stewart, July 11, 1884, NA, RG 77, Ltrs. Sent, Chief Engineer.

26. Stewart to Newton, July 19, 1884, NA, RG 77, Ltrs. Recd., Chief Engineer.

Newton wired Stewart, calling for "a definite and clear description of the parts of the various works now under your charge needing repair and preservation, omitting in such proposed repairs the portions which in your judgment would be useless after modification of the fortifications."[27]

Stewart on August 6 supplied the necessary data to enable the Department to make its allotments. Other than funds for the salary of the keeper, he needed for Fort Winfield Scott during the year $360 for office rent, $180 to pay his messenger, $28 for fuel, $6 for rent of post office box, $26 for stationery and blank books, $20 for labor and materials for repair of mechanics' quarters, $6 for 200 feet of fencing, $7.50 for paint, $2.50 for turpentine, $15 for plumbing and repair of keeper's quarters, and $99 for contingencies, for a total of $750.[28]

General Newton, after reviewing the request, allotted to Fort Winfield Scott for Fiscal Year 1885, $780 for pay of keeper and $800 for repair and maintenance of works.[29]

b. Maintenance and Repairs

The keeper, during the year, in his spare time painted the embrasure irons, and made minor repairs to the banquette and terrepléin of the barbette tier.[30]

Assisted by a laborer, he repaired the steps to his quarters and the wagon-house; replaced part of the underpining of the mechanics' quarters and framework supporting the upper water tank, and 58 lineal feet of redwood water pipe; repaired the windmill; and whitewashed the exteriors of a number of buildings.[31]

The post medical officer in the winter of 1884-85, fearful that a cholera epedemic then raging in the orient might spread to Pacific

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27. Newton to Stewart, July 24, 1884, NA, RG 77, Ltrs. Sent, Chief Engineer.

28. Stewart to Newton, Aug. 6, 1884, NA, RG 77, Ltrs. Recd., Chief Engineer.

29. Newton to Stewart, July 26 & Aug. 19, 1884, NA, RG 77, Ltrs. Sent, Chief Engineer.

30. "Annual Report of Progress made in Construction of Fort Winfield Scott, California, during the year ending June 30, 1885," NA, RG 77, Ltrs. Recd., Chief Engineer.

31. Ibid.

coast ports, inspected the quarters. He condemned sinks, bathtub, and water closet in the keeper's quarters. Repairs were called for, and a new water closet, linings for tub and sinks, proper traps and ventilating pipes, and ironstone sewer pipe installed.[32] In March the fence around the keeper's quarters was rebuilt.[33]

When Colonel Stewart inspected the fort in the first week of January 1885, there was an extremely high tide and much of the glacis was swept by the surf. This kept him from inspecting the counterscarp gallery. He was told by the ordnance sergeant that the post commander used this structure for "storing oil, &c., for which it is better adapted than for defence."[34]

Stewart also observed that the flood tides had eroded the glacis. This could be corrected by surfacing the area with heavy flagstone, but Stewart recommended against it because of the great expense.[35]

5. Maintenance and Protection in Fiscal Year 1886

a. Funding the Program

In September 1884 Chief Engineer Newton had received a request from the Quartermaster General for $8003.47 for repair of the wharf. Before taking action, Newton sought Colonel Stewart's opinion.[36] Stewart informed him that the wharf had been rebuilt in 1873 by the Corps when Batteries East and West were under construction. No construction funds had been appropriated since 1875, so the Engineers had not used the wharf in eight years. In view of the bleak prospects, it might be best to leave it to the ravages of the teredos until such time as work on the fortifications was resumed.

The garrison since 1878 had been using the wharf, and it was his recommendation that Quartermaster funds should be used for its repair.

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32. Stewart to Chief Engineer, Feb. 25, 1885, NA, RG 77, Ltrs. Recd., Chief Engineer.

33. Stewart to Chief Engineer, March 2, 1885, NA, RG 77, Ltrs. Recd., Chief Engineer.

34. Stewart to Chief Engineer, Jan. 5, 1885, NA, RG 77, Ltrs. Recd., Chief Engineer.

35. Ibid.

36. Newton to Stewart, Sept. 10, 1884, NA, RG 77, Ltrs. Sent, Chief Engineer.

This had been acceeded to by the Presidio Quartermaster, and in the past he had been very cooperative.[37] General Newton returned the request for the eight thousand dollars to the Quartermaster General, along with Stewart's comments.

No further action was taken to secure repair of the wharf for nine months, as the two Departments procrastinated, each hoping the other would be required to spend its limited funds on the decaying structure. The situation became more critical on March 3, 1885, when President Chester A. Arthur signed into law a bill appropriating $100,000 for "Protection, Preservation, and Repair of Fortifications" in the fiscal year ending June 30, 1886. This was $75,000 less than the amount previously allotted for this purpose. Chief Engineer Newton accordingly sent out a circular letter on March 30, calling on his superintending engineers to forward estimates for projects requiring immediate attention.[38]

Colonel Stewart reported that $1,350 would pay the salary of the fort keeper and fund the operations of his office during the coming 12 months. In addition, since the Quartermaster Department had failed to act, $1,500 were needed for repair of the wharf. Unless corrective action was taken, sections of it would collapse.[39] Chief Engineer Newton on June 29 telegraphed that he had approved expenditure of $1,500 for repair of the wharf.[40]

Also approved by the Chief Engineer was a $3,000 project for taking up and relaying the platforms of Battery West's Emplacements 34-36. When he studied his Fort Winfield Scott allotments for Fiscal Year 1886, Colonel Stewart was disappointed to see that all the money, $5,350, was budgeted to projects. He accordingly advised the Department that he had no money for ordinary expenses. No answer forthcoming, he requested authority to hire a clerk at $100 and a keeper-assistant at $125 per month.[41] Both requests were approved by Chief Engineer Newton.[42]

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37. Stewart to Newton, Sept. 18, 1884, NA, RG 77, Ltrs. Sent, Chief Engineer.

38. Newton to Stewart, March 30, 1885, NA, RG 77, Ltrs. Sent, Chief Engineer.

39. Stewart to Newton, May 12, 1885, NA, RG 77, Ltrs. Recd., Chief Engineer. The money for operating the office was apportioned to the various installations under Colonel Stewart's supervision--Fort's Winfield Scott and Mason, Alcatraz, Angel Island, and San Diego.

40. Newton to Stewart, June 29, 1885, NA, RG 77, Ltrs. Sent, Chief Engineer.

41. Stewart to Newton, July 14 & 22, & Aug. 3, 1885, NA, RG 77, Ltrs. Recd., Chief Engineer.

42. Newton to Stewart, July 30 & Aug. 10, 1885, NA, RG 77, Ltrs. Sent, Chief Engineer.

b. Colonel Mendell takes Charge

The Department in August 1885 determined to reduce Colonel Stewart's work load in the Bay area. In accordance with instructions, Stewart on September 6 transferred to Lt. Col. George H. Mendell responsibility for Fort Winfield Scott, the batteries at Fort Mason, and the fortifications at Angel Island. Colonel Mendell was 54 years old, having been born at Youngstown, Pennsylvania, in October 1831. He had entered West Point in July 1848 and had graduated No. 3 in the Class of 1852. Commissioned a Bvt. 2d Lieutenant of Topographical Engineers, he spent the next two years in the Great Lakes Region, and in 1854 was ordered to the Pacific coast, where he was assigned to General Wool's staff. Mendell returned to the Military Academy in 1859 as an instructor, and in the summer of 1861 he served as a division engineer in the 1st Manassas Campaign. From June 18, 1863, until August 11, 1864, Mendell commanded the Regular Engineer Battalion, and was engaged at Gettysburg, the Wilderness, and Petersburg. From August 19 to September 8, 1864, he was assistant engineer in charge of the Baltimore defenses. Mendell then returned to the U.S. Military Academy for another tour as an instructor. From July 8, 1865, until October 29, 1866, he was project engineer at New Bedford, Massachusetts. Since then he had been assigned to the Pacific coast.[43]

Colonel Mendell was familiar with the area, having been in charge of these works once before. For seven weeks in 1870, from the departure of Major Elliot until the arrival of Colonel Stewart, he had been superintending engineer at Fort Point.

c. Work Begins on Modification of Platforms 34-36

Colonel Mendell in September employed a force to take up and relay the platforms of Batteries 34-36. A pit was excavated in front of the badly cracked breast-height wall to enable Colonel Mendell to examine the fill upon which the platforms had been laid. He found it to be compressed loam. Such a foundation lacked stability to support the 50,000-pound Rodman tubes and resist the shock when they were fired. Orders were given to continue the excavation down to "the natural ground," a depth of ten feet. The breast-height walls fronting Nos. 34-35 were taken down, 1134 cubic yards of earth removed, and a drain installed.

It was apparent that the cost of putting in a good roughstone or cheap concrete foundation would exceed by several thousand dollars the $3,000 budgeted for the project. Mendell therefore recommended on January 5,

43. Col. G.H. Mendell's ACP File, NA, RG 94.

1886, that work on "old barbette batteries, requiring modification to meet the latest official project standard be deferred."[44]

d. Construction Ceases and the Remaining Funds are Reprogrammed

The Department approved Mendell's proposal and asked for recommendations for expenditure of the remaining $2,400 allotted for the project.[45] This telegram came at an opportune moment, because November had brought a succession of storms, culminating in a wild gale on January 21, 1887. In the former month, the collapse of the bulkhead east of the wharf had sent flood tides surging through the ordnance yard. Chief Engineer Newton on November 28 had vetoed Mendell's request for funds to effect repairs, because unobligated reserves in the hands of the Department were less than $4,300.[46]

Colonel Mendell seeing that the teredo-eaten piles could not survive many more blows, hired a boat and sent his laborers to salvage the wharf's superstructure. By mid-January the stringers and much of the planking had been secured and stacked on the beach. This was none too soon. The storm on the 21st battered down most of the remaining pilings, severely damaged the bulkhead protecting the wharf road, and scoured and washed out fill and pavement between the seawall and fort.[47]

To effect repairs to the bulkhead would require $560 and to regrade the area between seawall and fort another $50. This sum could be reprogrammed from the $2,400 remaining in the account for modernizing the gun platforms.[48] Chief Engineer Newton was agreeable. Mendell was

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44. Mendell to Chief Engineer, Jan. 5, 1886; "Annual Report of Progress made in the Construction of Fort Winfield Scott, California, during the year ending June 30, 1886," NA, RG 77, Ltrs. Recd., Chief Engineer.

45. Newton to Mendell, Jan. 14, 1886, NA, RG 77, Ltrs. Sent, Chief Engineer.

46. Newton to Mendell, Nov. 28, 1885, NA, RG 77, Ltrs. Sent, Chief Engineer.

47. Newton to Mendell, Dec. 29, 1885; Mendell to Chief Engineer, Dec. 21, & Jan. 11, 1886; "Annual Report of Progress made on the Construction of Fort Winfield Scott, California, during the year ending June 30, 1886," NA, RG 77, Ltrs. Sent & Recd., Chief Engineer.

48. Mendell to Newton, Feb. 6, 1886, NA, RG 77, Ltrs. Sent, Chief Engineer.

given authority to expend the requested sum for repairs, and the balance of the unobligated allotment was withdrawn and made available for other projects.[49]

Costs exceeded estimates, and on May 8 Colonel Mendell called for another $100, which could be spared from the Lime Point and Alcatraz accounts.[50] His request was approved.[51]

e. Maintenance Accomplished

The ironwork of the embrasures was scraped and painted, and some of the shutters taken off and rehung in Fiscal Year 1886. The keeper and several laborers renewed the roof and ceiling of the detached kitchen of the keeper's quarters; repaired the carpenter's and blacksmith shops and stables; cleaned drains and fixed water pipes; and whitewashed the exteriors of the blacksmith and carpenter's shops, mortar shed, two storehouses, and keeper's quarters.[52]

f. The Fort Continues to Deteriorate

By 1886 the superintending engineer observed that portions of the "parapet & terreplein have been worn considerably by the movement of the numerous visitors."[53]

6. Maintenance and Protection in Fiscal Years 1887-88

a. Congress Fails to Make an Appropriation

Congress, during the two years following completion of the Endicott study, refused to make an appropriation for protection, preservation, and

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49. Newton to Mendell, Feb. 16, 1886, NA, RG 77, Ltrs. Sent, Chief Engineer.

50. Mendell to Chief Engineer, May 8, 1886, NA, RG 77, Ltrs. Recd., Chief Engineer.

51. Newton to Mendell, May 15, 1886, NA, RG 77, Ltrs. Sent, Chief Engineer.

52. "Annual Report of Progress Made in the Construction of Fort Winfield Scott, California, during the year ending June 30, 1886," NA, RG 77, Ltrs. Recd., Chief Engineer.

53. "Annual Report of Progress made in the Construction of Fort Winfield Scott, California, during the year ending June 30, 1886," NA, RG 77, Ltrs. Recd., Chief Engineer.

repair of the obsolete fortifications guarding the nation's ports and harbors. Colonel Stewart on June 23, 1886, had resumed responsibility for Fort Winfield Scott. No money being available, he discharged Fort Keeper John Perigo and his one laborer on August 7. The task of looking after the Engineer property was assigned to the ordnance sergeant. One month later, Colonel Stewart on September 6 again surrendered his duties to Colonel Mendell and was transferred to a new post on the Atlantic coast.[54]

Several months later, on visiting the site, Colonel Mendell found that the ordnance sergeant had been discharged and had turned over his keys to one of the officers at the Presidio. Mendell was dismayed at this discovery, and contacted the ex-keeper. Perigo agreed to look after the property, provided he was permitted to live in his former quarters rent free. As this was contrary to rules and regulations, Colonel Mendell secured the Department's sanction on the principal that "occupation of the buildings is for the public interest . . . and gives the only protection . . . available for the buildings and property."[55]

b. Deterioration Accelerates

Before being laid off on August 6 Perigo and his laborer had made minor repairs to the mess hall, cesspools, and fences. When he made his annual inspection in June 1887, Colonel Mendell saw that 11 months without any maintenance had caused the embrasure irons to "show signs of ravages of rust," particularly on the north and east sides of the 1st Tier.[56]

This situation continued until June 30, 1888, with Perigo and his family living rent-free in the keeper's quarters and providing protection for the Engineer property. The garrison had been withdrawn from the fort, and a soldier's family, unable to find housing elsewhere, lived in the quarters. A 3-man guard detail from the Presidio was posted at the fort to guard the ordnance.[57] Another year of neglect had accelerated

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54. Stewart to Chief Engineer, Aug. 7, 1886, NA, RG 77, Ltrs. Recd., Chief Engineer.

55. Mendell to Chief Engineer, Jan. 15, 1887, Duane to Mendell, Jan. 28, 1887, NA, RG 77, Ltrs. Recd., and Sent, Chief Engineer. Brig. Gen. James C. Duane had replaced General Newton as Chief Engineer in October 1886.

56. Mendell to Chief Engineer, July 22, 1887, NA, RG 77, Ltrs. Recd., Chief Engineer.

57. Mendell to Chief Engineer, Jan. 8 & June 30, 1888, NA, RG 77, Ltrs. Recd., Chief Engineer.

deterioration of the embrasure irons. The sole and top pieces on the 1st Tier, originally one-half inch thick, in some cases had been reduced "to the thickness of pasteboard." A number were too rusted to be operated.[58]

c. The Gilmer Experiment at Repointing

Colonel Mendell continued to be concerned with the need to repoint the more exposed sections of the exterior scarp. Like his predecessors he was impressed with the results of Captain Gilmer's 1860 experiment. In January 1887 he notified the Department, there "is about a square yard on the most exposed part of this wall where the pointing is . . . perfectly sound. It is made with natural cement, iron filings, molasses &c., the formula which is preserved. It disfigures the wall to some extent but its power of resistance is demonstrated." This, however, was no disadvantage, especially when he observed that the repointing with "Portland Cement and Sand, one to one," done under Colonel Stewart's supervision less than a decade before was beginning to fail.[59]

With no money available for maintenance, the problem of repointing the fort and the success of Captain Gilmer's experiment became academic.

d. Removal of Certain Buildings to the Presidio

When the garrison was withdrawn from Fort Winfield Scott in 1887, a number of the quartermaster buildings near the wharf (the barracks, officers' quarters, and the commissary and quartermaster storehouse) were moved to the Presidio.

7. Maintenance and Protection in Fiscal Years 1889-95

a. Congress Resumes its Appropriations

It was the summer of 1888 before Congress again made an appropriation for the "Protection, Preservation, and Repair" of coastal fortifications. In response to the Department's circular, Colonel Mendell on October 8 listed his needs for Fiscal Year 1889 as: $552.50 for salary of fort keeper for eight and one-half months; $435 for restoration of water supply; $200 for lumber for repair of bulkhead, fences, and

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58. Ibid.

59. Mendell to Chief Engineer, Jan. 10, 1887, NA, RG 77, Ltrs. Recd., Chief Engineer.

buildings; $70 for paint of embrasures and whitewash for buildings; and $380 for labor.[60] Chief Engineer James C. Duane approved this request on November 8.[61]

b. Maintenance in Fiscal Year 1889

Colonel Mendell immediately re-employed Keeper Perigo and several laborers. When he inspected the area in mid-January 1889, Colonel Mendell found these men replacing decayed footings in the mortar shed and repairing the wharf road bulkhead.[62] Before end of the fiscal year, they had scraped and painted the embrasure irons; repaired and whitewashed a number of the Engineer buildings; relayed many feet of decayed water pipe; constructed a new 10,000-gallon water tank on the bluff, and connected it with the spring.[63]

c. Maintenance in Fiscal Year 1890

To fund maintenance and protection at the post in Fiscal Year 1890, the superintending engineer requested and was granted an allotment of $1,632.[64] With this sum, he had the keeper and several day-laborers scrap and repaint embrasure irons. On doing so, it was observed that three of the shutters had been broken during target practice. The doors, shutters, and ventilators of the counterscarp gallery were also scraped and painted.

Cavaties in the foundation of De Russy's Seawall were filled with concrete and a portion of the apron, fronting the seawall, carefully relaid. One hundred and twelve feet of the bulkhead protecting the

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60. Mendell to Chief Engineer, Oct. 8, 1888, NA, RG 77, Ltrs. Recd., Chief Engineer.

61. Duane to Mendell, Nov. 8, 1888, NA, RG 77, Ltrs. Sent, Chief Engineer.

62. Mendell to Chief Engineer, Jan. 28, 1889, NA, RG 77, Ltrs. Recd., Chief Engineer.

63. Benyaurd to Chief Engineer, July 10, 1889, NA, RG 77, Ltrs. Recd. Chief Engineer. Lt. Col. William H.H. Benyaurd had temporarily replaced Colonel Mendell as District Engineer.

64. Benyaurd to Chief Engineer, April 23 and Casey to Benyaurd June 25, 1889, NA, RG 77, Ltrs. Recd. and Sent, Chief Engineer. Brig. Gen. Thomas L. Casey had replaced General Duane as Chief Engineer in July 1888.

wharf road were torn down and rebuilt. The keeper's house was re-shingled and other Engineer buildings whitewashed. Most of these structures, Colonel Mendell observed, were "very dilapidated and not worth saving." The only exceptions were the storehouses near the wharf, which, except for their underpinings, were in fair condition.[65]

d. Condition of the Old Fort in June 1890

When he made his annual report on July 9, 1890, Colonel Mendell noted that the traverse rails in the casemates were badly rusted and needed to be scraped and repainted, as did the iron stairways and railings of the gorge. The wooden shutters and doors in the gorge required painting. Three windows were without shutters, the hinges having rusted off.

The drainage was in bad condition, many pipes leading from the barbette tier were broken and full of holes. There was an obstruction in the large pipe discharging water into the sea. Consequently, the ground between the fort and counterscarp gallery was flooded to a depth of six inches during the rainy season. Water collecting in this area could only escape by filtering through the sand, whereas formerly it had drained through a pipe connected with a pit in front of the counterscarp gallery. This pit had been filled with earth, closing off this outlet.

The concrete pavement "in the area of the fort" was considerably broken up and was "crumbling away."[66]

e. Maintenance in Fiscal Year 1891

Only limited funds were available for preservation and protection of fortifications in the subject fiscal year, and no money was allotted for work on the old masonry fort. The limited resources were employed to rehabilitate the Engineer buildings and rebuild the wharf. With construction underway at Fort Winfield Scott on the new Endicott batteries these structures had again become valuable. To supply water to the workmen and animals, a 2-inch iron water pipe was laid from the windmill to the tanks in the stable yard, a distance of 2,200 feet, replacing the decayed redwood pipe.[67]

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65. Mendell to Chief Engineer, July 7, 1890, NA, RG 77, Ltrs. Recd., Chief Engineer.

66. Mendell to Chief Engineer, July 9, 1890, NA, RG 77, Ltrs. Recd., Chief Engineer.

67. Mendell to Chief Engineer, July 9, 1891, NA, RG 77, Ltrs. Recd., Chief Engineer.

f. Maintenance in Fiscal Years 1892-93

Although construction of the reinforced concrete batteries engrossed the attention of Colonel Mendell and his staff, they had the fort keeper undertake several projects at the fort in Fiscal Years 1892-93. He scraped and painted the embrasure irons. Besides checking the water system, he cleaned out drains and sumps, and made new covers for the latter.[68] In August 1892 he opened a passage from the cesspool, near the West Bastion, into the drain carrying off sewage from the quarters. This corrected the deficiency caused by the clogging up with sand of the drain leading into the sea from the sump in the center of the parade.[69]

A storm hammered the area in November 1892. One hundred and thirty-five feet of bulkhead protecting the wharf road went down. Colonel Mendell used an emergency allotment to effect repairs.[70]

Employing funds made available by the Quartermaster Department, workmen in the autumn of 1892 whitewashed and repaired a number of the quarters in the gorge occupied by families of enlisted men assigned to the Presidio.[71]

g. Lieutenant Flagler Inspects the Old Fort

Lt. Daniel W. F. Flagler, Colonel Mendell's young assistant, made the required semi-annual inspection of the Winfield Scott fortifications on December 22, 1892. He found the masonry of the old fort "in fairly good condition," but the pointing had disappeared in a number of places, "principally along the crowns of the arches in the casemate tiers." Many 2d Tier embrasure shutters were missing, while the iron stairways of the gorge front were badly rusted.

The brickwork of the counterscarp gallery was in good condition, but the cement roof was cracked and broken, and the iron gratings and frames of the embrasures badly rusted.[72]

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68. Mendell to Chief Engineer, Sept. 1892, NA, RG 77, Ltrs. Recd., Chief Engineer.

69. Flagler to Mendell, Jan. 19, 1893, NA, RG 77, Ltrs. Recd., Chief Engineer. When work was began on the Endicott batteries in 1891, Colonel Mendell was assigned several assistants. Lt. Daniel W. Flagler was his assistant in charge of construction at Fort Winfield Scott.

70. Ibid.

71. Ibid.

72. Flagler to Mendell, Jan. 19, 1893, NA, RG 77, Ltrs. Recd., Chief Engineer.

Commenting to the Department on Flagler's report, Colonel Mendell noted that policy was "to maintain everything in as good order as can be done at moderate expense, always bearing in mind" that the old fort was "to be entirely remodeled in the future." In his opinion, there was "no justification" for expenditure of funds to repoint the masonry.[73] The Chief Engineer agreed with Colonel Mendell. No funds were allotted for repair of the old fort, and its maintenance was entrusted to the fort keeper.

When Lieutenant Flagler returned to the fort on June 24, 1893, he saw that since his last inspection the keeper had scraped and painted the gorge stairways. He observed that much of the other ironwork was in needed of such attention, especially the gorge colonnade, and the gratings and shutters of the counterscarp gallery.[74]

h. Lieutenant Kuhn's Inspection

There was a new inspecting officer in December 1894, Lt. Joseph E. Kuhn. Reporting what he had seen to Colonel Mendell, he wrote, "the outer brickwork, especially on the exposed western front, is wearing quite badly under the action of wind and water. Some of the bricks have been worn away 1 1/2" from their original faces. All the exterior pointing is practically gone. The interior brick is in perfect condition." He also observed that the woodwork was beginning to decay.[75]

In view of the Department's policy to allot no funds, beyond those represented by the keeper's salary, for maintenance of obsolete masonry fortifications, no action was taken to correct the deteriorations cited by Lieutenant Kuhn.

C. Construction of the Endicott Batteries

1. Maintenance and Protection, 1884-1891

Until 1891 little money was spent on maintenance and protection of Batteries East and West. In 1891 a series of projects involving heavy expenditures were inaugurated resulting in the obliteration of Battery

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73. Mendell to Chief Engineer, Jan. 23, 1893, NA, RG 77, Ltrs. Recd., Chief Engineer.

74. Flagler to Mendell, June 30, 1893, NA, RG 77, Ltrs. Recd., Chief Engineer.

75. Kuhn to Mendell, Jan. 7 & July 1, 1895, NA, RG 77, Ltrs. Recd., Chief Engineer.

West, and its replacement by reinforced concrete Endicott emplacements armed with modern breech-loading rifles.

The fort keeper in Fiscal Year 1884, in his spare time, replaced a number of sills and footings in the Engineer mess hall, quarters, and stables; repaired fences and drains; repainted doors of service magazines; lacquered the mortar platform ironwork; and mowed portions of the earthen parapets and traverses.[76]

Colonel Stewart's inspection in the first week of January 1885 revealed that the parapets, terrepleins, and traverses of the exterior batteries were "in pretty good condition; the slopes having retained their forms as well as could be expected when revetted with the kind of sod . . . that can be had here, & when subject . . . to the burrows of weasels & gophers."[77]

During Fiscal Year 1885 the keeper mowed the parapets and traverses and lacquered ironwork of the mortar platforms. Maintenance ceased for more than two years beginning August 6, 1886, when Congress stopped appropriations for preservation and protection of coastal fortifications. When money again became available in Fiscal Year 1889, Colonel Mendell undertook an ambitious maintenance program. Keeper Perigo and several day laborers cut brush and weeds that had grown up on the parapets and traverses during the 28 months of neglect. Grass was again mowed. Slopes, ventilators, and fences repaired; brickwork cleaned; and magazine doors painted. New steps were built over the parapet of Battery East and a new gate in the fence at Battery West. Iron plates from ten of the badly decayed mortar platforms were removed and stored in adjacent magazines. Two of the mortars were dismounted and removed during the year.[78]

The keeper in Fiscal Year 1890 erected 1,216 feet of barbed wire fencing around two sides of the unfinished emplacements in Battery West, and 400 feet of the same in front of Battery East. He also cut weeds, painted magazine doors, and coal-tarred mortar plates.[79]

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76. "Annual Report of Progress made in the Construction of Fort Winfield Scott, California, during the year ending June 30, 1884," NA, RG 77, Ltrs. Recd., Chief Engineer.

77. Stewart to Wright, Jan. 5, 1885, NA, RG 77, Ltrs. Recd., Chief Engineer.

78. Mendell to Chief Engineer, July 7, 1890, NA, RG 77, Ltrs. Recd., Chief Engineer.

79. Mendell to Chief Engineer, July 9, 1891, NA, RG 77, Ltrs. Recd., Chief Engineer.

2. Destruction of Battery West

a. Fort Point Escapes

Preliminary plans for modernizing the defenses at Fort Winfield Scott, in accordance with the Endicott study, called for construction of reinforced concrete emplacements for two 16-inch rifles within the masonry fort. This would entail destruction of much of the handsome old structure, which for "many years has stood guard at the entrance to the Golden Gate," the Examiner informed its readers on July 13, 1890. "The ponderous smoothbores," the reporter continued:

> once the pride of the military . . . are becoming rusted from want of use and the portholes [embrasures] are covered with cobwebs and the grim-looking corridors which once knew the martial tread are now silent and deserted save for the merry prattle of children voices or the presence of curious sightseers. The obsolete guns are being dismantled and removed to the United States arsenal at Benicia.[80]

b. Work Begins

A change in plans saved old Fort Point from a fate similar to that which befell Fort Sumter and a number of other Second and Third System forts. The Fortifications Board decided to locate the new works programmed for Fort Winfield Scott on the bluff occupied by Battery West.

Money having been appropriated and plans approved for construction of a number of Endicott emplacements, Colonel Mendell in June 1891 hired and turned out a large force of artisans and laborers. Besides rehabiliting the old Engineer buildings, the workmen erected on the bluff south of Fort Point a storehouse, and plumbing, paint, blacksmith, and carpenter shops. Next, they began dismantling a number of the Battery West emplacements. By the end of the month, four 15-inch guns had been dismounted and platforms 32-36 demolished. With the ordnance and masonry out of the way, workmen began excavating for the new emplacements.[81] Progress was rapid, and by December 1892 six of the new Endicott emplacements, Nos. 11-16, were nearly completed.[82]

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80. San Francisco Examiner, July 13, 1890.

81. Mendell to Chief Engineer, July 9, 1891, NA, RG 77, Ltrs. Recd., Chief Engineer.

82. Mendell to Chief Engineer, Sept. 1892, NA, RG 77, Ltrs. Recd., Chief Engineer.

By June 30, 1893, Emplacements Nos. 11-16 had been completed, except for gaps left in the breast-height walls to facilitate installation of the disappearing carriages. On April 5 workmen had broken ground for a 16-gun mortar battery.[83] This giant emplacement by autumn of 1894 was finished, and four huge 12-inch mortars positioned.[84] The other 12 were mounted by June 30, 1895. A 12-inch rifle, mounted en barbette, had also been positioned in Emplacement No. 16.[85] During the first six months of 1896, a second 12-inch rifle on barbette carriage was mounted in Emplacement No. 15, and work far advanced on positioning two 10-inch disappearing carriages in Emplacements Nos. 10 and 12.[86] These carriages were in position by late December 1896, and the rifles to be mounted thereon, along with the disappearing carriage for Emplacement No. 11, had been received. The 12-inch rifle and barbette carriage for Emplacement No. 14 and the 10-inch rifle for Emplacement No. 11 had not arrived.

Construction of three more concrete emplacements, Nos. 8, 18, and 19, was begun in October 1896. To clear the site for No. 8, four 15-inch Rodmans (Nos. 25-28) in Battery West were dismounted, the platforms salvaged, and the traverses demolished.[87]

Rapid progress was made on these emplacements, and on June 30, 1897, Lt. Charles L. Potter reported them "practically finished." In June work was started on Emplacements Nos. 9 and 10. As these would occupy part of the site of Battery West, two more 15-inch Rodmans (Nos. 29 and 30) were dismounted, leaving five in position--four in Battery West and one in Battery East.

Since the first of the year, ordnance personnel had received and mounted a 12-inch rifle in Emplacement No. 14, and disappearing carriages and 10-inch rifles in Emplacements Nos. 11 and 12.[88]

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83. Flagler to Mendell, June 30, 1893, NA, RG 77, Ltrs. Recd., Chief Engineer.

84. Kuhn to Mendell, Jan. 7, 1895, NA, RG 77, Ltrs. Recd., Chief Engineer.

85. Kuhn to Mendell, July 1, 1895, NA, RG 77, Ltrs. Recd., Chief Engineer.

86. Kuhn to Suter, July 1, 1896, NA, RG 77, Ltrs. Recd., Chief Engineer.

87. Potter to Suter, Dec. 31, 1896, and Jan. 15, 1897, SFRC, RG 77, Ltrs. Sent by Project Engineer, Entry 1914. Col. Charles R. Suter had replaced Colonel Mendell as District Enginear in 1896, while Lieutenant Potter had relieved Lieutenant Kuhn as project engineer at Fort Winfield Scott.

88. Potter to Suter, June 30, 1897, SFRC, RG 77, Ltrs. Sent by Project Engineer, Entry 1914.

By December 31, 1897, Emplacements 8-10 were nearly ready for their armament. The only work remaining for which the Corps of Engineers was responsible was some pointing and completion of a roadway in their rear. Two 12-inch rifles had been mounted on non-disappearing carriages in Emplacements Nos. 18 and 19.[89]

Emplacements Nos. 8-10 had been completed by the end of Fiscal Year 1898, and 10-inch rifles on disappearing carriages mounted in Nos. 9 and 10. The disappearing carriage for the 12-inch rifle to be mounted in No. 8 had not been received. Mortar Battery No. 2 had been completed, the 16 carriages positioned, but nothing more could be done until the mortars arrived. Construction of emplacements for two 5-inch rapid fire guns had been suspended, and no further work could be done pending receipt of cylinders.[90]

c. The End of Battery West

In the summer of 1898 work was commenced on Emplacements Nos. 6 and 7 for two disappearing 12-inch rifles. Before any earth could be excavated, four 15-inch Rodmans (Nos. 21-24) and their carriages were dismounted and removed from the site. This marked the end of Battery West. Battery East, although obsolete, was left undistrubed, with five of its emplacements armed--No. 16 with a 15-inch Rodman and Nos. 13, 14, 17 and 18 with 8-inch rifled guns.

While concrete was being poured for Emplacements Nos. 6 and 7, earthen parapets were thrown up for protection of the three 15-inch dynamite guns, their magazines, and power house.[91]

A 12-inch rifle and disappearing carriage were mounted in Emplacement No. 8 in the winter of 1898-99, and by the end of the fiscal year Emplacements Nos. 6 and 7 had been completed.[92] The latter emplacements

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89. Wolf to Suter, Dec. 31, 1897, SFRC, RG 77, Ltrs. Sent by Project Engineer, Entry 1914. Lt. Louis C. Wolf had replaced Lieutenant Potter as project engineer on December 1, 1897.

90. Wolf to Suter, June 30, 1898, SFRC, RG 77, Ltrs. Sent by Project Engineer, Entry 1914.

91. Wolf to Davis, Dec. 31, 1898, SFRC, RG 77, Ltrs. Sent by Project Engineer, Entry 1914; telephone conversation, Hawkins with Bearss, Nov. 7, 1972. Maj. Charles E.L.B. Davis had replaced Colonel Suter as District Engineer in 1898.

92. Wolf to Davis, March 31, 1899, SFRC, RG 77, Ltrs. Sent by Project Engineer, Entry 1914.

were armed and turned over to the artillerists during the winter of 1899-1900.

Two years later, on February 14, 1902, the War Department issued General Order No. 16 designating Emplacements Nos. 6, 7, and 8 as Battery Lancaster in honor of Lt. Col. James M. Lancaster, 3d U.S. Artillery, who had died at Fort Monroe, Virginia, on October 5, 1900. Emplacements Nos. 9 and 10 were designated Battery Cranston in honor of 1st Lt. Arthur Cranston, 4th, U.S. Artillery, killed in the Modoc War on April 26, 1873. Emplacements Nos. 14, 15, and 16 were designated Battery Godfrey in honor of Capt. George J. Godfrey, 22d U.S. Infantry, killed at San Miguel de Mayumo, Island of Luzon, June 3, 1899.

Seven months later, on October 9, 1902, the War Department issued General Order No. 105 designating the 5-inch rapid fire emplacements Battery Boutelle to honor 2d Lt. Henry M. Boutelle, 3d U.S. Artillery, killed in action near Aliaga, Philippine Islands, on November 2, 1899. Five years later, on October 11, 1907, a General Order was issued designating Emplacements Nos. 11, 12, and 13 Battery Marcus Miller to honor Brig. Gen. Marcus P. Miller, who died, December 29, 1906, in the Philippine Islands.[93]

3. The Dynamite Battery

Chief Engineer Thomas L. Casey on April 22, 1889, recommended that three dynamite guns be mounted on Point Diablo. In absence of an appropriation, it would be impossible for the government to prepare a site for these guns before the contractor could make delivery. Casey therefore recommended that "the site upon which the contractors shall deliver these guns and the appliance connected with them, and put them together 'ready for use' shall be in some of the Exterior Barbette Batteries at Fort Winfield Scott." The site would be left to the discretion of the superintending engineer. Tests would be made at this emplacement. After Congress had made the necessary appropriation, the Point Diablo Battery could be constructed and the guns transferred.[94]

There was no need for haste, however, because more than six years passed before the three dynamite guns were received at Fort Winfield Scott. In accordance with instructions from District Engineer Mendell, they were positioned south of Emplacement No. 16, covering the approaches to the Golden Gate.

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93. War Department, General Orders Nos. 16 and 105, Series of 1902, and General Order No. 210, Series of 1907, NA.

94. Casey to Secretary of War, April 22, 1889, NA, RG 77, Ltrs. Sent, Chief Engineer.

On December 9, 1895, the Dynamite Battery, which had been under construction for more than a year, was tested. Upon this test depended whether the War Department could accept the "plant." A crowd of officers, soldiers, and civilians gathered to watch the "test of the important role these giant air guns are to play in the defense of San Francisco harbor." Brig. Gens. James W. Forsyth and William M. Graham and their staffs arrived early.

The tests were for range and accuracy and were supervised by Col. L.S. Babbitt of the Benicia Arsenal, assisted by Maj. W.H. Hevery and Lt. O.M. Lissak, B.C. Batcheller of the Pneumatic Dynamite Gun Manufacturing Co. was in charge of firing the guns.

At 10 o'clock the first projectile was fired, to be followed by three more, each carrying 100 pounds of nitroglycerin. Although the range was 5,000 yards, a rectangle 50 by 70 yards encompassed the beaten zone. Colonel Babbitt directed that the fifth projectile be aimed at a bluff on the Point Bonita side. The sixth projectile was fired at the same spot, striking the bluff a few feet from the mark left by the fifth. This testified to the accuracy of this powderless implement of war.

As a finale, projectiles charged with 500 pounds of explosive were fired from each gun. They were timed to explode one-half second after striking the water. The range was 2,200 yards, and the projectiles on plunging into the sea sent geysers of water leaping many feet into the air, causing the crowd to cheer. The explosions killed thousands of fish. As soon as the tests were secured, fishermen by the score cast off and filled their boats without having to put out lines and nets.

Officers who witnessed the tests waxed enthusiastic, declaring that no ship could fight its way through the Golden Gate while subjected to the fire of the Dynamite Battery.[95]

No parapets having been erected for protection of the Dynamite Battery, Lieutenant Potter in December 1896 informed District Engineer Suter that "some form of protection" for these guns and their powerhouse was needed.[96] Steps were accordingly taken to protect the battery.

4. Five Guns are Mounted in Battery East

a. A 15-inch Rodman is Positioned

With construction scheduled to begin on the Endicott batteries and four 15-inch Rodmans about to be dismounted, Colonel Mendell on June 12,

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95. Morning Call, Dec. 10, 1895.

96. Potter to Suter, Dec. 31, 1896, SFRC, RG 77, Ltrs. Sent Project Engineer, Entry 1914.

1891, hired a stone cutter to dress stone for a platform for a 15-inch gun in Battery East. As the pintle-block and part of the concrete platform for Emplacement No. 16 had been in place for a number of years, progress was rapid. The prop traverse stones and platform irons were salvaged from one of the Battery West platforms. No flagging stone was used, as the space between the pintle-block and prop stones was filled with concrete. The project was completed by the beginning of the first week in July, when the huge 50,000-pound gun was mounted.[97]

b. Four 8-inch Rifled Rodmans are Mounted

Until the spring of 1897 only one gun occupied the 20 emplacements in Battery East. This situation changed when Lieutenant Wolf turned a crew to building platforms for four 8-inch rifled Rodmans in Emplacements Nos. 13, 14, 17 and 18. These platforms were completed by December, and "four 8-inch converted Rifles" mounted.[98]

D. Changes in the Armament

1. The Annual Report for 1883

a. Seven 24-pounders are Dismounted and Removed

In Fiscal Year 1883 the six 24-pounders on the right flank of the East Bastion (Nos. 26, 27, 56, 57, 86 and 87) were dismounted, surveyed, and positioned as ornamental curbs and posts on the reservation. The wooden carriages remained in battery.

One of the 24-pounder flanking howitzers, No. 131, in the counterscarp gallery was also dismounted and sent to the ordnance yard.[99]

b. Other Guns are Shifted

At some undesignated date several years before, there had been a repositioning of guns on the 2d Tier. Casemate Nos. 31-37, 40, and 43-50

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97. Mendell to Chief Engineer, July 9, 1891, and Sept. 1892, NA, RG 77, Ltrs. Recd., Chief Engineer.

98. Wolf to Suter, Dec. 31, 1897, SFRC, RG 77, Ltrs. Sent by Project Engineer, Entry 1914.

99. "Annual Report of Progress made in the Construction of Fort Winfield Scott, California, during the year ending June 30, 1883," NA, RG 77, Ltrs. Recd., Chief Engineer.

were now occupied by 16 8-inch rifled guns, mounted on iron carriages; Casemate Nos. 41-42 and 51-52 were armed with 10-inch Rodmans. Casemate No. 58 housed five 24-pounder coehorn mortars, and Casemate Nos. 38-39, 53-55, and 59-60 were vacant. The two 10-inch siege mortars on the Barbette Tier had been relocated--they were now positioned in rear of the gorge between platforms 97-100 and 109-112.

Stored in the ordnance yard were one 24-pounder flanking howitzer, 33 42-pounders, 17 8-inch columbiads, two 10-inch columbiads, 55 10-inch Rodmans, 12 15-inch Rodmans, six 100-pounder Parrotts, six 200-pounder Parrotts, and two 300-pounder Parrotts; and 122 carriages (12 casemate and 110 barbette).[100]

2. Gun No. 25 is Dismounted

There was excitement at Fort Winfield Scott on October 1, 1884, the day selected by Col. Alanson M. Randol for test firing three of the huge 15-inch Rodmans (Nos. 28-30) in Battery West. The guns were manned and, as a large number of spectators looked on and second-guessed, aimed at a large rock, 3,700 yards from shore and about midway between the battery and the Cliff House.

Three 320-pound shells were fired from each of the guns, six of them bursting over the target and fragments striking the rock. The misses were blamed by Colonel Randol on defective fuses. Next, the gun captains prepared to fire 450-pound solid shot propelled by 100 pounds of powder at the target. The pieces were set at 9° elevation and No. 28 fired. There was a boom. The carriage recoiled, and the chassis tramsom buckled. When No. 29 was fired the results were more spectacular, and the gun was dismounted.[101]

Adjutant Allyn Capron blamed the accident on the carriage, which was of the "old pattern and obsolete," and designed to sustain powder

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100. Ibid.

101. Stewart to Wright, Oct. 2, 1884, NA, RG 77, Ltrs. Recd., Chief Engineer. The counter-hurters of No. 29 were "shorn and torn off the chassis rails; the rear cross transom of chassis torn & broken off; the rear ends of horizontal diagonal braces of same detached; the rails somewhat spread apart at same end & the left hand rail of chassis somewhat twisted & slightly bend downward at rear end. The top carriage & gun slid off to rear, the butt end of the piece striking side slope of traverse (No. 14) on the right, & then gun & top carriage turned over to the left, falling diagonally to the left & rear of chassis."

changes of 50 pounds. He was quoted by the press as stating that carriages of this type "should be replaced by the improved carriage with hydraulic buffers."[102]

The dismounting of the gun ended the target practice but not the excitement. Smokers set fire to the dry grass behind the battery. The keeper, suspecting what might happen, had taken precautionary measures. Buckets of water and sacks were on hand, and the blaze was soon extinguished.[103]

3. The Proposal to Modernize Platforms

Colonel Stewart on March 10, 1885, was asked to provide the Department with estimates of the "cost of putting in serviceable order the existing platforms of 8-inch, 10-inch, and 15-inch guns, of mortars, and of rifle guns bearing" on the Golden Gate.[104]

When he filed his report, Stewart informed the Chief Engineer that on the barbette tier there were 25 centre-pintle platforms for 8- and 10-inch columbiads mounted on wooden carriages. One of these platforms had been modified to mount a model 1864 iron carriage. To adapt the remaining 24 to similar carriages would cost $125 per platform.

The fort's casemate platforms were serviceable.

In the exterior barbette batteries there were 20 front-pintle platforms for 15-inch Rodmans, on 12 of which (Nos. 21-30 and 40-41) guns were mounted. Two more (Nos. 32 and 33) were nearly ready for platforms, while six (Nos. 34-39) were without pintles and rails. These had not been put down, because of unequal settlement. To take up and relay the platforms in these six positions would cost $1,000 each.

Twelve timber platforms for XIII-inch mortars were in position, eight of which bore on the seaward approach to the Golden Gate. To replace each of these would cost $300 or a total of $2,400.

All magazines were serviceable, except the two for the four mortars in Battery East bearing on the harbor. These could be repaired for $80 each.

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102. San Francisco Examiner, Oct. 2, 1884.

103. Stewart to Chief Engineer, Oct. 2, 1884, NA, RG 77, Ltrs. Recd., Chief Engineer.

104. Chief Engineer to Stewart, March 10, 1885, NA, RG 77, Ltrs. Sent, Chief Engineer.

Further points to be considered by the Department in making an allotment were: (a) the failure of local lumber dealers to stock seasoned wood, and if the mortar platforms were rebuilt with unseasoned timber they would again rot; and (b) in an attack by ironclads the barbette tier of the fort would be untenable.[105]

Before making the necessary allotments, Chief Engineer Newton desired more information. On May 7 Colonel Stewart was asked for information on the number of 15-inch-gun front-pintle platforms at Fort Winfield Scott, whether the carriages were mounted, and data on the type of traverse stones.[106] Stewart answered: there were 20 front-pintle platforms with low traverse stones; six platforms, because of unequal settlement, were not ready for guns; 12 15-inch guns were currently mounted; and there were carriages available for mounting guns on eight vacant platforms.[107]

After studying the needs of the service and weighing the requests for funds, Chief Engineer Newton on June 29 notified Stewart that he was being allotted $1,500 for adapting to iron carriages 12 of the old model centre-pintle platforms of the barbette tier; $3,000 for taking up and relaying three platforms for 15-inch guns in Battery West; $2,400 for replacing eight XIII-inch mortar platforms; and $1,000 for contingencies.[108]

Before construction was started on this project, the Department, having a change of heart, did some reprogramming. All the subject funds, except the $3,000 budgeted for replacement of the three Battery West platforms, were withdrawn. For an account of how this project fared, the reader is referred to pages **295-96 of this study.**

4. New Carriages for Battery West

Although construction had commenced on the Endicott Batteries in 1891, it would be a number of years before they were armed. To be on the safe side in event of a foreign war, the War Department, taking

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105. Stewart to Chief Engineer, March 30 & June 18, 1885, NA, RG 77, Ltrs. Recd., Chief Engineer.

106. Chief Engineer to Stewart, May 7, 1885, NA, RG 77, Ltrs. Sent, Chief Engineer.

107. Stewart to Chief Engineer, May 14, 1885, NA, RG 77, Ltrs. Recd., Chief Engineer.

108. Chief Engineer to Stewart, June 29, 1885, NA, RG 77, Ltrs. Sent, Chief Engineer.

cognizance of the accident which had resulted in the dismounting of Gun No. 29 determined to take corrective measures.

In the autumn of 1892 soldiers from the Presidio replaced with model front-pintle iron carriages eight of the old sea coast carriages in Battery West. Four of the 15-inch Rodmans dismounted to permit construction of the new batteries were transferred to Lime Point.[109]

During the following spring, troops replaced the remaining old model carriages in Battery West. The obsolete carriages were shipped by the Quartermaster Department to the Watertown, Massachusetts, Arsenal. As of June 20, 1893, there were ten 15-inch Rodmans mounted in Emplacement Nos. 21-30 of Battery West and one in Emplacement No. 16 of Battery East.[110]

5. Old Fort Point Loses its Teeth

a. Disarming the Counterscarp Gallery

In April 1885 the remaining three 24-pounder flanking howitzers were removed from the counterscarp gallery. The garrison commander used the tubes as "posts at various points" on the reservation.[111] Meanwhile, two 10-inch siege mortars on iron carriages were brought into the fort and stored in Casemate No. 16.[112]

b. Removal of the Barbette and 3d Tier Ordnance

Colonel Mendell in January 1888 recommended removal of the 24 42-pounders of the 3d Tier and the ten columbiads (two 10-inch and eight 8-inch) and eleven 32-pounder navies from the barbette tier. Their presence, he argued, "is simply a mortification, in view of their utter worthlessness." It would be better "to have empty places,"

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109. Flagler to Mendell, Jan. 19, 1893, NA, RG 77, Ltrs. Recd., Chief Engineer.

110. Flagler to Mendell, June 30, 1893, NA, RG 77, Ltrs. Recd., Chief Engineer.

111. Stewart to Newton, May 30, 1885, NA, RG 77, Ltrs. Recd., Chief Engineer.

112. Mendell to Chief Engineer, Jan. 9, Feb. 28, and June 30, 1888; Duane to Mendell, Jan. 31, 1889; "Annual Report of Progress Made in the Constrution of Fort Winfield Scott, California, during the year ending June 30, 1885," NA, RG 77, Ltrs. Recd., and Sent, Chief Engineer.

he continued, "than to present a pretense of defense with an equipment that would probably fall to pieces when the guns are fired."

If the Department were agreeable, Colonel Mendell would see if the commander at the Presidio would have the obsolete ordnance removed.[113]

Upon receipt of the Chief Engineer's telegram approving his proposal, Colonel Mendell referred it to the proper authorities. A large fatigue party was sent over from the Presidio. The designated guns, along with the six 10-inch mortars on the barbette and 3d Tier, were dismounted, and the guns and carriages removed. During this operation some damage was done to several 3d Tier casemates. One coping stone on the face of a casemate arch was broken and several traverse rails dislocated.

The removal of these guns left positioned in the fort: on the 1st Tier 28 10-inch Rodmans and two 10-inch siege mortars; and on the 2d Tier 16 8-inch rifled guns and four 10-inch Rodmans.[114]

c. Removal of Two 10-inch Mortars from the 1st Tier

Colonel Mendell in Fiscal Year 1890 removed the two 10-inch siege mortars from Casemate No. 16, and turned them over to the commander of the Presidio.[115]

d. Removal of the 1st and 2d Tier Guns and Carriages

Personnel from the Presidio in the autumn of 1893 removed the two 8-inch rifled guns on skids near the entrance to the sally port, and the four 8-inch casemate carriages on skids near one of the shot furnaces.[116]

Lt. Louis C. Wolf made the prescribed semi-annual inspection of Fort Winfield Scott in December 1897. He found 45 guns (32 10-inch Rodmans and 13 8-inch rifled guns) mounted on the 1st and 2d Tiers of the old fort. There was a fourteenth "converted rifle" on blocking in the 2d Tier. The two platforms for 10-inch mortars had recently

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113. Mendell to Chief Engineer, Jan. 8, 1888, NA, RG 77, Ltrs. Recd., Chief Engineer.

114. Mendell to Chief Engineer, June 30, 1888, NA, RG 77, Ltrs. Recd., Chief Engineer.

115. Mendell to Chief Engineer, July 9, 1890, NA, RG 77, Ltrs. Recd., Chief Engineer.

116. Flagler to Mendell, Jan. 11, 1894, NA, RG 77, Ltrs. Recd., Chief Engineer.

been removed from the barbette tier.[117] The converted 8-inch rifle on blocks was removed from the fort in the autumn of 1898.[118]

In March 1900 the 32 10-inch Rodmans and 13 8-inch rifled guns and their carriages were removed from the 1st and 2d Tier casemates.[119] After 39 years of guarding the Golden Gate the old fort had been disarmed. The obsolete guns, including a number of 15-inch Rodmans from the ordnance yard, were purchased by Herman White for scrapping, and were referred to as "White's elephants." White, however, solved the problem. A large, deep pit was dug. Each cannon was dropped into the pit by a steam hoist derrick, so that it remained with its muzzle pointed upwards. The vent was then plugged and the bore filled with water. "Giant powder" was attached to a rod which was thrust into the bore. The charge was detonated electrically, sundering the tube into fragments which could be handled by several men.[120]

6. The Presidio Gets a Historic Cannon

Workmen excavating for a new Endicott Emplacement uncovered a rust-encrusted iron 32-pounder near the site of Castillo de San Joaquín. On September 6, 1893, Brig. Gen. William M. Graham and a detachment from the Presidio positioned the piece on wooden blocks in front of the adobe barracks, currently used by him and his officers as an assembly hall. General Graham proposed to preserve the gun as "a relic of the old days."[121]

General Graham accordingly gave orders that the "gun be left in the condition it was found, and that no attempt . . . be made to remove the rust with which it is encrusted." Discovery that the piece had been spiked caused much speculation, because there were no records among Spanish and Mexican archives relating to the Presidio, referring to an attack on the Castillo that may have resulted in the spiking of the gun.[122]

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117. Wolf to Suter, Dec. 31, 1897, SFRC, RG 77, Ltr. Sent Book Project Engineer, Entry 1914.

118. Wolf to Davis, Dec. 31, 1898, SFRC, RG 77, Ltr. Sent Book Project Engineer, Entry 1914.

119. W. Kelly to Davis, March 31, 1900, SFRC, RG 77, Ltr. Sent Book Project Engineer, Entry 1914.

120. Morning Call, April 14, 1901.

121. The gun weighed more than two tons and was 18 feet long.

122. Examiner, Sept. 7, 1893.

E. The Seawall and Bulkheads

1. The Seawall

Lieutenant Flagler on June 27, 1894, visited the fort and pronounced the seawall in good condition. Along the west face of Elliot's Wall, fishermen were in the habit of cutting out the lead pointing to a depth of one-inch to secure material for sinkers. There were numerous holes in the bituminous pointing of De Russy's Wall. When he examined these holes, Flagler found them occupied by fiddler crabs, which led to the assumption that they were eating the pointing.[123]

2. The Timber Bulkhead Protecting the Wharf Road

At the time of Lieutenant Flagler's June inspection, the timber bulkheads were in good condition but were liable to damage whenever a gale hammered the Bay area.[124]

In October 1894, 150 feet of the structure was rebuilt, but before the end of the year howling winds and raging seas wrecked 50 feet of bulkhead. Carpenters and laborers closed the breach before additional damage occurred.[125]

On July 1, 1895, Lieutenant Kuhn reported that the greater part of the bulkhead had been rebuilt in recent years. There was, he continued, about 160 lineal feet at the western end, built in 1878, that was badly "decayed and liable to go to pieces in a storm." To rebuild this section would cost $480.[126] In the spring of 1896 about 375 lineal feet of bulkhead were taken down and rebuilt.[127]

F. The Engineer Buildings and Shops

1. The 1884 Inventory of Buildings

On the bluff behind the barbette batteries were found in 1884 a number of buildings erected by Lieutenants Whiting and Alexander

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123. Flagler to Mendell, June 28, 1894, NA, RG 77, Ltrs. Recd., Chief Engineer.

124. Ibid.

125. Kuhn to Mendell, Jan. 7, 1895, NA, RG 77, Ltrs. Recd., Chief Engineer.

126. Kuhn to Mendell, July 1, 1895, NA, RG 77, Ltrs. Recd., Chief Engineer.

127. Kuhn to Suter, July 1, 1896, NA, RG 77, Ltrs. Recd., Chief Engineer.

33 years before. Colonel Stewart reported these structures of little value, but if repaired, he added, they would posses utility if construction were resumed. These buildings were:

(a) Keeper's quarters, currently occupied by the Fort Winfield Scott keeper and his family, were in fair condition. The plumbing and water closet were out of order, and the porch and front steps should be repaired.

(b) Mess Hall (79 x 24 x 9 feet, with 18 x 13 x 9-foot kitchen). Before it could be used for that purpose, a new cover would have to be put on the cistern, repairs made to kitchen floor and chimney, several sashes and lights replaced, the partitions repapered or whitewashed, and the fence rebuilt.

(c) Mechanics' Quarters (44 x 20 x 10 feet). New sills and underpinnings were needed on the south side, 25 panes of glass for windows currently boarded over, and the bunks should be repaired.

(d) Wagon-House and Laborers' Quarters. Several sash were missing and the windows boarded up. In the end used for quarters, the sash should be replaced, bunks repaired, and the interior whitewashed.

(e) Laborers' Quarters (upper building 45 x 26 x 9 feet). Two sash and eight lights were missing and the steps in need of repair.

(f) Laborers' Quarters (lower building 44 x 20 x 16 feet) The floors, roof, steps, and sash needed extensive repairs.

(g) Storehouse (built in late 1860s and 69 x 24 x 16 feet). This building was in good condition. Under one elevation there was a small basement, the bulkhead of which had collapsed.

(h) Officers' stable (22 x 15 x 14 feet). In fair condition.

(i) Stables (100 x 14 x 10 feet). These were serviceable with some slight repairs.

(j) Wooden Water Tank was unserviceable.[128]

2. The Shops in 1885

Colonel Stewart was also responsible for upkeep of the Engineer Shops. Since the mid-1860s they had been located on the cove near

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128. "Annual Report of Progress made in the Construction of Fort Winfield Scott, California, during the year ending June 30, 1884;" Stewart to Wright, Jan. 5, 1885, NA, RG 77, Ltrs. Recd., Chief Engineer.

the wharf. On January 5, 1885, Stewart listed the condition of these structures:

(a) Blacksmith Shop (40 x 20 x 8 feet). Serviceable, but the sash out and the openings boarded over. One end of the structure somewhat damaged by surf.

(b) Mortar Shed (66 x 50 x 6 feet). Serviceable, but some glass broken in window of small room under shed.

(c) Storehouses. In fair condition, with a few windows broken out. Colonel Stewart had permitted the garrison to use one of them as a gymnasium.

(d) Carpenter's Shop (30 x 25 x 9 feet). In good order.

(e) Wharf Boathouse. Beyond repair and no longer required for use by the Engineers.

(f) Wharf. A number of piles and some of the planking should be replaced, while the derrick was in ruins.[129]

3. Maintenance of the Buildings and Shops, 1891-96

Preparatory to a resumption of construction, after a 15-year hiatus, the buildings and shops were rehabilitated in Fiscal Year 1891. The wharf which had been destroyed by storms in the winter of 1886-87 had to be replaced, and a new one equipped with derricks and hoisting engines was built.

When he inspected the shops on December 22, 1893, Lieutenant Flagler reported the blacksmith and carpenter's shops, mortar shed and lime house, storehouse, and drying shed in "fairly good condition." One item (the rotten floor sills in the lime house and carpenter's shop) should be attended to. The Engineer quarters in rear of Battery West were in "fair condition." A new floor was needed in the mechanics' dining room of the mess hall, while the roof of the main dining room leaked.[130]

The mess hall was repaired in the spring of 1893.[131] When Lieutenant

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129. Stewart to Chief Engineer, Jan. 5, 1885, NA, RG 77, Ltrs. Recd., Chief Engineer.

130. Flagler to Mendell, Jan. 19, 1893, NA, RG 77, Ltrs. Recd., Chief Engineer. The floor of the carpenter's shop had collapsed when the building was converted into a temporary storehouse for cement used in construction of the Endicott emplacements.

131. Mendell to Chief Engineer, Jan. 23, 1893, NA, RG 77, Ltrs. Recd., Chief Engineer.

Flagler made his next inspection on June 24, 1893, he found the quarters mess hall, stables, and storehouses in "serviceable condition."[132]

Inspecting the shops and buildings 12 months later, Flagler reported the wharf, engines, and derricks in good condition. Although 18 months had passed, no steps had been taken to repair the flooring of the lime house and carpenter's shop.[133]

Teredos were wreaking havoc on the piles of the wharf. Lieutenant Kuhn reported on January 7, 1895, that some of the piles "have not one-half their original cross section," and what remained had little strength. These piles must be replaced in the near future.[134] The Department failed to act. One year later Kuhn warned that the wharf was unsafe and would soon be condemned. By June 30, 1896, the wharf had succumbed to the ravages of the teredos and collapsed.[135]

Two of the shops (the blacksmithy and a storehouse) also were surveyed during the first six months of 1896. The former was undermined by a storm and the latter collapsed because of decay.[136]

Construction was started on three more Endicott emplacements in October 1896. To support this activity a new concrete warehouse with a capacity of more than 3,000 barrels was erected, and a new wharf built.[137]

G. Augmenting the Water Supply

The post when garrisoned was supplied by water from the conduit of the Spring Valley Water Company. A conduit with a capacity of 2,000,000 gallons, daily, in bringing water from Lobos Creek to San Francisco tunneled through the bluff several hundred feet south of Old Fort Point. Where it debouched onto the beach at the cove, the conduit was tapped by a pipe which delivered water into a 3,000-gallon tank on the barbette tier or into the cisterns.

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132. Flagler to Mendell, June 30, 1893, NA, RG 77, Ltrs. Recd., Chief Engineer.

133. Flagler to Mendell, June 28, 1894, NA, RG 77, Ltrs. Recd., Chief Engineer.

134. Kuhn to Mendell, Jan. 7, 1895, NA, RG 77, Ltrs. Recd., Chief Engineer.

135. Kuhn to Craighill, Jan. 7, 1896, and Kuhn to Suter, July 1, 1896, NA, RG 77, Ltrs. Recd., Chief Engineer.

136. Kuhn to Suter, July 1, 1896, NA, RG 77, Ltrs. Recd., Chief Engineer.

137. Potter to Suter, Dec. 31, 1896, NA, RG 77, Ltrs. Recd., Chief Engineer.

A secondary source of water was the spring about 4,000 feet south of the fort. Water from the spring, conducted through 2-inch redwood pipes, was used in the Engineer buildings on the bluff. Until the mid-1880s it had been stored in a 20,000-gallon tank, but the years had taken their toll and the tank was now useless.

As the Spring Valley conduit, except where it passed through the bluff, was exposed, it would be vulnerable to destruction by naval bombardment.[138]

To reduce dependency on the Spring Valley conduit and to increase the supply of water available at the buildings and shops, Colonel Mendell in Fiscal Year 1890 installed a new iron pump at the windmill. Two hundred feet of iron pipe were then laid to connect it with the tanks in the stable yard. With the National Cemetery now drawing water from the spring, an effort was made to increase its flow. A hole was dug into the side of the hill, but this backfired as debris soon clogged the pipe leading to the fort and Engineer buildings.[139] Sections of pipe had to be cleaned to release the stoppage. This was a recurring problem, and to combat it the maintenance people had frequently to remove sand from the spring.[140]

H. Construction and Installation of New Fog Signal on West Bastion

1. Removal of Old Fog Bell Supports

San Francisco maritime interests had continued their campaign to get the Lighthouse Board to up-grade the fog warning facilities at Fort Point. In 1889 the Board sought to improve the bell by installing a new striking apparatus, but this did not silence the critics.[141] The next year Colonel Mendell's recommendation that the "old support for the fog bell" be removed from the exterior face of the scarp was implemented.[142]

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138. Mendell to Chief Engineer, Jan. 20, 1887, NA, RG 77, Ltrs. Recd., Chief Engineer.

139. Mendell to Chief Engineer, July 7, 1890, NA, RG 77, Ltrs. Recd., Chief Engineer.

140. Mendell to Chief Engineer, July 9, 1891, NA, RG 77, Ltrs. Recd., Chief Engineer.

141. Holland & Koue, "Historic Structure Report--Fort Point Light," p. 20.

142. Mendell to Chief Engineer, July 7, 1890, NA, RG 77, Ltrs. Recd., Chief Engineer.

2. Secretary Root Gives His Approval

The Lighthouse Board in the autumn of 1899, through the Secretary of the Treasury, approached the Secretary of War with a request for authority to position a new fog signal on the West Bastion of the fort. Located on the bastion's barbette tier were two platforms for 8- or 10-inch smoothbores, with pintle-blocks and pintles in place. No guns, it was pointed out, were mounted on the barbette tier, and moreover the fort did not constitute a part of the "modern system" of fortifications designed for defense of the Golden Gate.

The Board proposed to fill up the subject platforms with concrete to level of the pintle-blocks to form the floor of a signal house. The breast-height wall of pressed brick, surrounding the platforms, would be raised to a height of 6'6" with the same material. The roof would be thin concrete and twisted iron rods.

Dimensions of the structure would be 22 feet long by 13 feet wide at the entrance, and 18 feet wide in the circular part over the engine bed. The interior height would be 10 feet. Positioned inside the structure would be a 2d class Daboll trumpet, powered by a Hornsby-Akroyd oil burning engine, with pumps, air receivers, Crosby Signals, etc.[143]

The Corps of Engineers raised no objections, and Secretary of War Elihu Root on November 4 informed Secretary of the Treasury Lyman J. Gage "that there was no objection on the part of the Department to the erection of the proposed structure."[144]

3. Congress Acts

Congress failed to fund the project. The wreck of Rio de Janiero on Fort Point Shoals with a loss of more than 100 people galvanized Congress into action, and in June 1902 it appropriated $7,000 for the subject fog whistle.

Trouble now developed over costs. Approved plans called for the signal house to be constructed of the same type of brick as the fort. When bids were solicited, the lowest one was $3,100, which the District Engineer believed was excessive, and would leave insufficient money for the machinery and whistle. The bids were accordingly rejected, and

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143. Acting Secretary of the Treasury to Secretary of War, Oct. 9, 1899, NA, RG 77, Ltrs. Recd., Chief Engineer.

144. Root to Gage, Nov. 4, 1899, NA, RG 77, Ltrs. Recd., Chief Engineer.

the District Engineer authorized to erect the building with day labor, using hard burned brick instead of pressed brick. In building the structure, he substituted concrete for brick. The Daboll trumpet and two five-horsepower Hornsby-Akroyd engines were positioned, and the new signal first used on October 1, 1904.[145]

I. The Troops Come and Go

1. A Battalion of Artillerists Garrison the Post

New Year's 1883 found Maj. John Mendenhall's battalion of the 1st U.S. Artillery (Batteries B, F, and H) stationed at Fort Winfield Scott. Battery F quartered in the frame barracks, near the wharf, changed places on Friday, March 23, with Battery B, heretofore billeted in the fort.

Seven months later on October 10, Battery H was transferred to the Presidio, and on December 12, 1883, Battery C, 1st U.S. Artillery, marched over from the Presidio and reported to the post commander. The newcomers were quartered in the gorge barracks. One year later, in December 1884, Battery F were ordered to Fort Canby, Washington Territory. Before the week was over, Battery A, 1st U.S. Artillery, replaced that unit, being transferred to Fort Winfield Scott from Alcatraz.

The post was garrisoned by three batteries (A, B, and C, 1st Artillery) until December 30, 1885, when Battery A was ordered to Benicia Barracks. Nine months later, Battery B was transferred to Alcatraz, and on September 15, 1886, Battery C moved out of the frame barracks, closed down the post, and marched to the Presidio. After eight years the fort was again without a garrison, and responsibility for its security was vested with the commander of the Presidio. To discourage trespassers, an outpost was established and manned on the road leading from the Presidio to Fort Point, one half-mile east of the fort.[146]

2. The Gorge as Quarters for Dependents

In Fiscal Year 1890 several of the gorge quarters were occupied by families of married enlisted men posted at the Presidio.[147] They were

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145. Holland & Koue, "Historic Structure Report--Fort Point Light," p. 21.

146. Returns for Regular Army Artillery Regiments, June 1829-Jan. 1901, NA, Microcopy M727; Mendell to Chief Engineer, Jan 9 & 20, 1887, NA, RG 77, Ltrs. Recd., Chief Engineer.

147. Mendell to Chief Engineer, July 7, 1890, NA, RG 77, Ltrs. Recd., Chief Engineer.

there in mid-September 1893 when a correspondent for The Morning Call visited the site. He described the area as "about the most desolate place" on the peninsula. "The only tenants" were a "few families of enlisted men." Their quarters were "dark, damp, and dismal," but they were the best available. The commanding officer at the fort was the sergeant in charge of the guard detail, and his and his men's meals were brought to them in a mule cart from the Presidio.

Climbing the three flights of stairs leading to the barbette tier, the reporter found the superior slopes grown up in California poppies and other wild flowers. The view of ocean, bay, and headlands was breathtaking.

There seemed to be no objection to visitors, as the sally port gates were open, and on Sundays there were many tourists. The seawall was a popular resort for fishermen.

The sergeant of the guard told him that the only time the guns were fired was on ceremonial occasions. When this occurred a company of artillerists was sent down from the Presidio. The last salute had been fired to honor Vice President Levi P. Morton on his visit to the area.[148]

This publicity proved unfortunate for the soldiers and their families. Orders were promptly issued by the Presidio commander for them to vacate Old Fort Point. As soon as they moved out, the quarters were policed and the sally port doors locked.[149]

3. The Soldiers Return

The fort was again used for quarters in 1899 by Battery I, 3d U.S. Artillery.

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148. The Morning Call, Sept. 18, 1893.

149. Flagler to Mendell, Jan. 11, 1894, NA, RG 77, Ltrs. Recd., Chief Engineer.

XI. FORT POINT IN THE TWENTIETH CENTURY

A. Old Fort Point and the Great San Francisco Earthquake

1. Relocation of the Engineer Buildings

In the winter of 1901-02 plans were made and approved for removal of the Fort Winfield Scott Engineer buildings. The old complex located on the bluff behind Batteries Lancaster and Cranston would be replaced by a new one near the wharf. According to the project engineer, many of the old buildings, dating to the 1850s, were "too old and flimsy" to be moved. It was also recommended that a new road be constructed north of Batteries Lancaster and Cranston, thus eliminating the unsightly bridge south of Emplacement No. 13.[1] These projects were carried out in Fiscal Year 1903.

2. The 1906 Earthquake

Enlisted personnel of the 66th Company, Coast Artillery, were quartered in old Fort Point in April 1906. Maj. George M. Renfro, Jr., recalls that his father was a member of this unit and was billeted in the 3d Tier of the gorge. His father told him:

> The quake naturally came as a surprise. As the men began to collect their wits, they were attracted to a noise coming from outside of one of the windows. Standing on the outside ledge, with his face covered with dust, was one of his roommates calling for help. One could imagine his wildeyed look that my father described. They could not figure out how he got there. They felt that at first shock, still asleep, he probably climbed out the window and the window fell closed behind him.

If the man "had fallen or turned loose, he would have dropped about 60 feet onto" one of the huge cannon positioned on either side of the sally port.

After rescuing their comrade, the men of the 66th Company hurriedly evacuated the fort. The senior Renfro remembered:

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1. Deacon to Handbury, Jan. 31, 1902, SFRC, RG 77, Ltrs. Sent by Project Engineer, Entry 1914. Lieutenant Deacon had replaced Lieutenant Wolf as project engineer, while Colonel Handbury had relieved Davis as District Engineer.

> The normal route from the Fort to the mainland was over a bridge [built by the Lighthouse Board], which ran from the cliff to the top [barbette tier] of the Fort. It had fallen down. They got out through the Sally Port at ground level. Once outside they could see more of what had happened and began to calm down. Then they discovered they had left the fort in various stages of undress--mostly without pants!
>
> Fearing that another quake might come, several formed a human chain and returned to their rooms for clothes.
>
> A rock slide prevented them from using the [wharf] road from the Fort to . . . the Presidio. They had to go it in single-file--walk around and jump over rock and dirt.[2]

3. Damage to the Fort

An inspection disclosed serious damage to the 50-year-old casemated fort and minor damage to the reinforced concrete Endicott Batteries of Fort Winfield Scott. A three-man board was appointed by the commanding officer of the Presidio "to examine and report upon the condition of the Brick Fort," and to "give its opinion as to the safety & advisability of occupancy of this building as barracks."[3]

On May 24 the board visited the "Brick Fort" and saw that "the south wall has moved outward from the building about 8 inches in some places." What it observed satisfied the board that the structure, "in view of the frequent occurences of earthquakes" in the Bay area, was unsafe for further use as barracks. The board recommended that the 66th Company be transferred to new quarters, and signs be erected on "the south wall warning persons of the danger."[4]

The dislocation of the south wall had pulled the 92-foot bridge used by the lighthouse keepers in passing between their quarters and the barbette tier off its south foundation. When he inspected the

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2. J.G. Motheral, Fort Point, "Gibraltar of the Pacific" (San Francisco, 1971), pp. 35-6.

3. S.O. 120, the Presidio, May 21, 1906, NA RG 92, Documents File, 1890-1914, Members of the Board were 1st Lts. S. Avery, J. R. Pourie, and 2nd Lt. G. Parker.

4. Endorsement to S.O. 120, May 24, 1906, NA, RG 92, Documents File, 1890-1914.

damage, the inspector for the 12th Lighthouse District made a more comprehensive report than the army board. He observed:

> The north end of this bridge is anchored to the S [false] wall of the fort and the S. end of the bridge rests on a plate, with rollers, to allow for movement. The S. wall of the Fort has moved, at the top, about 15" & outward causing a like movement of the bridge which carried the S. end nearly off its supports. As the S. wall of the Fort will, doubtless, have to come down, it would appear that the best repair would consist of resitting the bridge adding about 13'-14' to its N. end (so as to bring the anchored support on the arch work of the Fort, which is injured) and giving the other members of the bridge such reinforcement as this additional length will demand.[5]

Although the Lighthouse Board took prompt action to rebuild the bridge, the army was in no hurry to repair the south wall of the obsolete fort. Available funds were applied by the Corps of Engineers to repair damages to the Endicott emplacements, which at Fort Winfield Scott totaled $1,983. Old Fort Point was abandoned as a quarters in accordance with the board's recommendation.[6]

B. The Army Repairs the Damage Caused by the Earthquake

1. Plans are Proposed and Rejected to Rehabilitate the Fort for the 1915 Exposition

Attention was again focused on old Fort Point in 1912 as planning for the Panama-Pacific Exposition advanced. On July 22 the San Francisco

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5. Engineer Secretary to Engineer, 12th L.H. District, Washington, Sept. 8, 1906, L.H. Board, Ltrs. to Engineer 12th District, Jan. 1, 1906-Dec. 31, 1906. The original bridge, built in 1874, had been replaced by a steel structure in 1899-1900. Holland & Koue, "Historic Structure Report--Fort Point Lighthouse," p. 20.

6. McKinstry to Mackenzie, May 8, 1906, SFRC, RG 77, Ltrs. Sent District Engineer. Maj. C.H. McKinstry was district engineer and Brig. Gen. A. MacKenzie was Chief Engineer. The Dynamite Battery, which had been abandoned, had suffered serious damage in the quake. All slopes had been badly cracked and had slipped; the east retaining wall of the power house had failed and the structure had collapsed; and the floor of the temporary battle commander's station had buckeled.

Morning Call carried a lead article announcing, "Old Fort Point may be Restored." A Morning Call reporter had learned of plans by Presidio officers to ask the War Department for funds to rehabilitate the fort. If this proposal were authorized, there would be tours transporting visitors "direct from the scene of an up-to-date army post into the army post of the past."

"Fort Point," the correspondent informed his readers, was one of the region's most historic sites. Commanding the Golden Gate, its "original fortifications" dated to the Spanish era. "But now, with the modern coast defense batteries, lurking in hidden pits and with the Presidio one of the principal centers of military activity in the country, the old fort has fallen into desuetude."

Visitors to the 1915 Exposition, provided the War Department allotted necessary funds for rehabilitating the structure, would have an opportunity to view the site as the citizens of earlier generations knew it. They would see muzzle loading mid-nineteenth century cannon and possibly a few Spanish bronze guns.[7]

On the previous day, July 21, Col. John P. Wisser, commanding officer at Fort Winfield Scott, had recommended that the old fort be "rehabilitated and such guns as remain remounted."[8] This communication was forwarded through channels, and on August 22 ended up on the desk of Brig. Gen. W.H. Bixby, Chief Engineer of the U.S. Army. Bixby was unsympathetic to the proposal. Because of the "urgent demands upon funds provided for the maintenance of . . . modern works of defense," it was foolish to "apply any funds to the repair or maintenance of fortifications of obsolete type, such as old Fort Point." There were no plans to incorporate the old fort into the Endicott System, he added, and all available funds were "needed for the improvement, repair or maintenance of modern defenses."

He would be willing to allot $200 "to clearing away of earth and debris from the rooms of the old fort."[9]

Secretary of War Henry L. Stimson approved Bixby's Indorsement. The Chief of Staff's Office on returning the correspondence to the Department of California, suggested that troops or prisoners be employed to remove the earth and debris from the casemates.[10]

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7. Morning Call, July 22, 1912.

8. Post Commander to C.O., Dept. of Calif., July 22, 1912, NA, RG 77, Ltrs. Recd., Chief Engineer.

9. Bixby to Chief of Staff, C.A.C., Div., Aug. 22, 1912, NA, RG 77, Ltrs. Recd., Chief Engineer.

10. Chief of Staff, C.A.C., Div. to A.G.O., Aug. 24, 1912, NA, RG 77, Ltrs. Recd., Chief Engineer.

2. Rehabilitation of the Gorge Quarters Begins

Colonel Wisser lost no time in making use of the $200 allotment. A squad of artisans and laborers were turned out and put to work rehabilitating the fort's gorge quarters. Although the damage caused by the 1906 earthquake had not been repaired, steps were taken to make the fort safe.

A correspondent from the Examiner, visiting the site in late August, reported that built for war, the fort had "succumbed to the least warlike of all forces." It was about to become a "honeymoon lodge" for soldiers and their wives.

Among the artillerists stationed at Fort Winfield Scott were a number who were married. While the single men lived in barracks, the married soldiers occupied "scattered shacks at the post or took apartments in the high priced neighborhood" south of the Presidio. Colonel Wisser had decided to do something toward relieving the financial plight of his married soldiers, and at the same time discourage vandalism. Since the 1906 earthquake, thieves had taken advantage of the abandonment of the fort by its occupants to plunder it of fixtures.[11]

3. Possible Rehabilitation and Interpretation of the Fort

One of Colonel Wisser's staff, Maj. Wilbur Davis, had reviewed the correspondence in which the War Department had rejected the proposal to rehabilitate the fort for the forthcoming Exposition. He decided this decision rested on insufficient information. On September 9, 1912, he prepared a memorandum for Colonel Wisser pointing out:

> My object in writing . . . regarding the present condition of Old Fort Scott was not with a view to its rehabilitation for purposes of defense or as quarters for troops, but simply that it would constitute a valuable object lesson at the Panama-Pacific Fair, and that for this purpose timely repairs should be made and sufficient of the old smooth-base ordnance should be installed to accomplish this end.

Continuing, Major Davis observed that the subject Exposition would open in two years on a site encompassing part of the Presidio grounds. Because of its proximity, the old brick fort would receive thousands of visitors, "not only for its own sake, but also because it affords the best attainable view of the Golden Gate."

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11. San Francisco Examiner, Aug. 28, 1912.

If funds could be budgeted, Major Davis proposed to have the fort "repaired and utilized as a sort of artillery museum, in which would . . . be illustrated the ordnance" of and immediately preceding the Civil War. A detachment would be detailed to serve these old pieces. Nearby one of the Endicott batteries would be open to visitation, along "with such fire-control equipment, mines etc., as it might be decided to display." This would "serve as an eye-opener to our non-military population, and would explain why it takes more time to train modern artillery men than it did the artillery men of 1860."

In rehabilitating the structure, he merely proposed that it be made decently "clean and presentable" to serve an interpretive purpose. Funds for this undertaking, he believed, could be allotted from the appropriation for the War Department exhibit at the Exposition. Repair of the south face of the fort, damaged in the 1906 earthquake, should, because of its "delicate" nature, be supervised by the Corps of Engineers.[12]

When he endorsed and forwarded Major Davis' memorandum, Colonel Wisser added, "a part of the old fort should be put in habitable condition for non-commissioned staff officers and other non-commissioned officers."[13]

Before transmitting the correspondence to Washington, Wisser's superiors approved the employment of troops to remove debris from the fort's casemates but vetoed the proposal to rehabilitate the gorge casemates as quarters.[14] Colonel Wisser, on learning that a pet project had been scrapped, recalled the correspondence. No further action was taken on the proposal to rehabilitate the fort until the next year, and plans to use the quarters as housing for married enlisted men were quietly pigeonholed.[15]

4. Major McManus' Report has Repercussions

Rehabilitation of the fort was given a boost in mid-March 1913 by Maj. George H. McManus' inspection report. McManus, having toured the structure, informed the commanding general of the Western Department that

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12. Davis to Wisser, Oct. 8, 1912, NA, RG 77, Ltrs. Recd., Chief Engineer.

13. Wisser to C.O., Dept. of California, Oct. 8, 1912, NA, RG 77, Ltrs. Recd., Chief Engineer.

14. Headquarters Western Division to Wisser, Oct. 16, 1912, NA, RG 77, Ltrs. Recd., Chief Engineer.

15. Wisser to Headquarters, Dept. of Calif., Oct. 25, 1912, NA, RG 77, Ltrs. Recd., Chief Engineer.

the south wall had "broken away" from the fort and was "bulging outwards in places about a foot from its original position." He urged that the wall either be repaired or be "torn down before possible damage is done by its falling." This project should be given high priority, even if plans to exhibit and interpret the fort in connection with the 1915 Exposition were dropped.

At present, Major McManus continued, there was a Coast Artillery searchlight on the barbette tier and its power plant in one of the 1st Tier Casemates. The Lighthouse Board, as it had since the 1860s, continued to use part of the barbette tier for its facilities.[16]

Commenting on Major McManus' report, the officer in charge of Fort Winfield Scott agreed that the south wall might collapse. The roadway passing in front of it would be fenced and "all persons forbidden to pass over that ground." This problem had become more acute with plans for a Golden Gate Boulevard. If such a roadway became a reality, it would skirt the south face of the fort, thus requiring either repair or demolition of the wall.

The wall, itself, was "an outer retaining wall of brick inclosing an earth filling between it and the tiers of casemates" beyond.

He recommended that the "wall and other bad places in the old fort be repaired," so as to preserve the structure for whatever use higher authority may direct.[17]

Headquarters Western Department on April 10 called on Lt. Col. Thomas H. Rees, District Engineer, for an estimate of

> the cost, either of repairing, buttressing or in any way strengthening the south wall of the old fort . . . so as to make it a safe rear wall for the casemates which it covers, if this is considered possible and practicable, or else of building a new wall of either brick or reinforced concrete to form a rear wall for the casemates in question and render it possible to use the old fort in connection with a stockade in rear of the fort for safe keeping of military prisoners engaged in work on the Fort Winfield Scott and Presidio reservations.[18]

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16. McManus to C. O., Western Department, March 18, 1913, NA, RG 92, General Correspondence, QMG, 1892-1914.

17. Chase to C.O., Pacific C.A. District, March 26, 1913, NA, RG 92, General Correspondence, QMG, 1892-1914.

18. Murray to Rees, April 16, 1913, NA, RG 92, General Correspondence, QMG, 1892-1914. Brig. Gen. Arthur Murray was commanding officer Western Department.

5. Colonel Rees' Proposal

Colonel Rees, on examining the fort, formulated a plan of action. He proposed to: (a) remove debris from the quarters and barracks of the gorge casemates, clear the space between the outside wall and piers and floors of the main structure to "obviate the possibility of bricks, etc., working farther down between the walls and the adjoining masonry . . . [and] increasing the thrust against the outer walls." (b) Position metal tie rods at the level of the top of the windows on the 3d Tier, thus tying the outer wall to the main structure. He hoped these rods would enable him to pull the outer wall back with concrete, where they are separated from the outer wall. (d) Restore the waterproofing of the joints between the outer wall and the main structure at the bottom of the fill forming the parapet, on the barbette tier, and then replace the earthen fill. (e) Patch the cracks in the outer wall as far as practicable.

He estimated cost of this work at $1,728, with items (b) and (c) absorbing most of the expense.[19]

After reviewing Colonel Rees' estimates, Brig. Gen. Arthur Murray (commanding the Western Department) mailed the correspondence to the War Department, with a recommendation that "immediate steps be taken to make available the necessary funds to repair the old masonry fortification." If there were no money programmed, it should be transferred "from some other post less in need of urgent repairs."

To support the request, General Murray reported: (a) it was the intention to use "the old fort in connection with a stockade" in its rear for confinement of military prisoners; and (b) the fort, having become a landmark, should be preserved.[20]

In Washington, the Secretary of War referred the subject to Quartermaster General J.B. Aleshire. The Quartermaster General responded that as there was a searchlight and power plant at the fort, responsibility for its repair belonged to the Corps of Engineers.[21] The papers were accordingly forwarded to Chief Engineer Bixby.

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19. Rees to Murray, May 31, 1913, NA, RG 92, General Correspondence, QMG, 1892-1914 Cost of installing the tie rods was placed at $460 and of extending floor arches and filling space between wall and main structure $486.

20. Murray to AG, June 3, 1913, NA, RG 92, General Correspondence, QMG, 1892-1914.

21. Aleshire to AG, June 20, 1913, NA, RG 92, General Correspondence, QMG, 1892-1914.

Before taking action, General Bixby called on Colonel Rees for information as to "whether the proposed repairs . . . are in any degree necessary for the maintenance of any features of the modern defenses."[22] Rees replied on July 3 that the old fort was "used for the following purposes in connection with modern defenses of San Francisco Harbor": (a) a 60-inch searchlight was installed in a shelter on the barbette tier on the ocean front of the structure; (b) the power plant for the searchlight was in one of the 1st Tier casemates on the bay front; and (c) the Coast Artillery maintained a temporary signal station on the barbette tier. In no way would the proposed repairs to the south wall affect these installations.[23]

Colonel Rees did not believe there was any danger of the gorge wall collapsing unless there was another violent earthquake, as it was built of "solid brick masonry six feet thick." It was possible, he continued, that increased pressure at the toe of the wall would cause unequal settlement and "a further deflection from the vertical." Consequently, it was desirable to effect the repairs suggested in his letter of May 31 to General Murray.[24]

6. Chief Engineer Bixby Gives his Reluctant Approval

Chief Engineer Bixby, on returning the correspondence to the Secretary of War, called his attention to Colonel Rees' report, indicating that the repairs were "not **necessary** to the maintenance of the existing modern seacoast fortifications."

With funds for maintenance of fortifications "severely limited," allotments, as a rule, were not made for repair of obsolete works. But, in view of arguments advanced for the fort's preservation as a historic landmark, its use in connection with a detention barracks, and as an interpretive site to be toured by visitors to the Panama-Pacific Exposition, General Bixby was agreeable to an **allotment** from Engineer funds for necessary repairs.[25]

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22. Bixby to Rees, June 25, 1913, NA, RG 92, General Correspondence, QMG, 1892-1914.

23. Rees to Bixby, July 3, 1913, NA, RG 92, General Correspondence, QMG, 1892-1914. From the fan room of the power plant, a doorway opened into the southeast casemate of the gorge, and off this room there was an old toilet fitted with modern fixtures for use of the power plant attendants.

24. Ibid.

25. Bixby to AG, July 17, 1913, NA, RG 92, General Correspondence, QMG, 1892-1914.

Assistant Secretary of War Henry Breckinridge accordingly approved an allotment not to exceed $1,728 for repair of old Fort Point.[26]

7. Colonel Rees Gets the Job Done

Colonel Rees moved promptly to obligate the allotment. Within a few weeks he had a crew at work. Tie rods were positioned, and the rear wall "pulled back into place and anchored to the main portion of the structure." Earth and other debris were removed from the gorge casemates, ends of the floor arches and abutment walls extended with concrete, waterproofing replaced as needed, and cracks in the outer wall repaired.[27]

C. Fort Point is Altered for Use as a Detention Barracks

1. Proposed Legislation Compels the Army to Act

Secretary of War Lindley M. Garrison was at Fort Winfield Scott in the summer of 1913, and while there a decision was made to transfer the detention barracks for the Western Department from Alcatraz to the old brick fort.

The Secretary's decision to convert old Fort Point into a detention barracks was triggered by information of plans afoot in Congress to turn over Alcatraz and the facilities thereon currently used for the detention of military prisoners to another governmental agency. On October 24, 1913, Representative John E. Raker of California's 2d District introduced legislation providing for transfer of Alcatraz to the Department of Labor to be used by the Bureau of Immigration and Naturalization. Raker's bill, H.R. 9017, was referred to the Committee on Military Affairs.

On June 24, 1914, H.R. 9017 was reported to the floor of the House, after being amended to read:

> That Alcatraz Island and all its buildings thereon, now under the control and jurisdiction of the Department of War, and now used as and known, designated as and called the United States Military Prison on Alcatraz Island, California, be, and the same hereby is, transferred to the Department of Labor to be used by the Bureau of Immigration and Naturalization,

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26. Breckinridge to Bixby, July 22, 1913, NA, RG 92, General Correspondence, QMG, 1892-1914.

27. Rees to Chief Engineer, Sept. 25, 1915, NA, RG 77, Ltrs. Recd., Chief Engineer.

> the said Alcatraz Island and all its buildings thereon to be hereafter under the exclusive control and jurisdiction of the Department of Labor.[28]

H.R. 9017 was placed upon the House Calender, and called by Representative Raker, with a request for unanimous consent on August 17. After some debate, indicating there was opposition to its passage, because of the probability that an appropriation would be required, H.R. 9017 was "passed over without prejudice."[29]

Meanwhile Representative Julius Kahn of California's 4th District had introduced H.R. 10401 to accomplish a similar purpose, but

> carrying an appropriation of $50,000 to be expended out of any money in the Treasury of the United States not otherwise appropriated, under direction of the Secretary of War, for the purpose of restoring, altering or transforming Fort Point as a military detention barracks, and provided that the transfer of Alcatraz Island to the Department of Labor should occur when the transformation of Fort Point into detention barracks was completed.[30]

H.R. 10401 was likewise referred to the House Committee on Military Affairs. When no action was taken on the subject legislation, the Assistant Secretary of War wrote Representative Kuhn, pointing out that the transfer of $50,000 of appropriated funds from the Department of Labor to the Department of War to fund conversion of Fort Point into a detention barracks had not been included in Mr. Raker's bill, H.R. 9017. He wished to know if this omission was an oversight or intentional, and "whether it was the purpose to press the Bill to passage in its present form."

Replying for the Committee, its chairman on June 9, 1914, informed Secretary of War Garrison that this was not an oversight, and it was planned to press for passage of H.R. 9017 in its present form.[31]

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28. Bethel to Adjutant General, Aug. 28, 1914, NA, RG 92, Office of the QMG, General Correspondence File, 1917-1922. W.A. Bethel was Acting Judge Advocate General.

29. Ibid.

30. Ibid.

31. Ibid.

2. The Interior of the Fort is "Butchered"

a. Plans and Specifications are Prepared and Approved

The task of preparing plans and specifications to implement Secretary of War Garrison's decision to convert old Fort Point into a detention barracks was given to Lt. Col. G.K. Williamson of the Quartermaster Corps, stationed at Fort Mason. Williamson was a hard worker. By mid-September 1913 he had forwarded copies of his plans and estimates through channels to Quartermaster General Aleshire. On reviewing the documents, General Aleshire found that the estimated cost of the work was:

Appropriation "Regular Supplies"	$12,946.00
Appropriation "Barracks & Quarters"	6,695.50
Appropriation "Water & Sewers"	7,215.00
	$26,856.50

This troubled him, because the reserve balances under the subject appropriations were insufficient to fund the project unless others were cancelled. Relaying this information to Chief of Staff Maj. Gen. Leonard Wood, General Aleshire observed, "unless it is deemed essential that this project be carried out at an early date, it is recommended that action thereon be deferred until later in the fiscal year."[32]

General Wood, in view of the Secretary's wishes, urged that the project be undertaken with the "least practicable delay." As most of the work could be done by convict labor, he believed "reasonable satisfactory quarters may be prepared at Fort Winfield Scott for a considerably smaller amount of money than that estimated, also that some of the conveniences desired could be eliminated."

It was directed that the estimate be revised, "with a view to cutting out everything which is not absolutely necessary." Special attention was called to the proposed installation of "heating apparatus," which General Wood felt could be dispersed with. "Only such [apparatus] being installed as necessary for cooking and to provide hot water for bathing."[33]

In paring the estimates, Quartermaster General Aleshire first focused on the appropriation for "Regular Supplies." A reduction of $2,256 was effected by omitting an electric light system, and substituting a number of oil pendant lamps. Elimination of a steam heating

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32. Aleshire to Wood, Oct. 22, 1913, NA, RG 92, Office of the QMG, General Correspondence File, 1904-1914.

33. Wood to Aleshire, Oct. 24, 1913, NA, RG 92, Office of QMG, General Correspondence File, 1904-1914.

plant saved $10,690. In lieu thereof flues would be provided for stoves under the appropriation for "Barracks & Quarters," at an estimated cost of $470. The addition of this figure increased that appropriation to $7,165. A decision to save $225 by eliminating an item for 150 gallons of paint for painting the stone floors reduced the allotment necessary from the "Barracks and Quarters" appropriation to $6,940.50.

Elimination of one-half the projected toilet facilities reduced the estimate for funds to be allotted from the appropriation for "Water & Sewers" to $3,800. These economies reduced the cost of converting the fort into a detention barracks from $26,856.50 to $10,740.[34]

The revised estimates were approved.

b. The Construction Program as Carried Out

Having secured the approval of Quartermaster General Aleshire, Colonel Williamson made his arrangements. While he finalized plans and specifications, he in January 1914 placed Superintendent of Construction Gary F. Richards in charge of the project. Daily, Richards with his labor force (prisoners confined at Alcatraz) would be landed at the wharf and proceed to the fort. In the evenings they returned to Alcatraz. In addition, a number of civilian artisans were employed.

A storm which lashed the Bay area, washing out part of the wharf road, slowed construction. By mid-April Colonel Williamson was able to report most of the materials on hand, and the project 25 per cent completed. Work accomplished included: (a) demolition and removal of the two shot furnances; (b) the scraping and painting of the ironwork, including the colonnade; (c) the rehanging of the sally port doors; (d) iron window guards for the 1st and 2d Tier embrasures positioned; (e) all iron traverse rails removed; (f) all iron railings facing the parade removed to make room for wooden walls closing off the openings at the rear of the casemates; (g) wooden walls positioned to close off the openings into the gun casemates of the 1st Tier from the parade; (h) walls for kitchen extensions put up; (i) porch floor repaired; (j) porch roof cleaned off and old tin roofing removed, preparatory to receiving a tar and gravel roof; (k) lathing in finished rooms repaired; (l) replastering commenced; (m) old sash repaired; (n) mill work ready for positioning; (o) most of the chimneys cleaned and fireplaces ready to be rebuilt; (p) old soil pipes traced out and sewer lines reopened; and (q) holes cut for roughing in pipe.[35]

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34. Aleshire to Wood, Oct. 31, 1913, NA, RG 92, Office of QMG, General Correspondence File, 1904-1914.

35. Williamson to Commanding General, Western Dept., April 15, 1914, NA, RG 92, Office of the QMG, General Correspondence File, 1904-1914.

On June 30 to reduce expenditures all civilian artisans were discharged, and the work readied for completion by the military prisoners.

Colonel Williamson on July 24, 1914, notified the Quartermaster General that his men had completed the following work, in addition to removing the two shot furnaces:

First Tier

Hanging sally port doors, outside
Hanging sally port doors, inside
Setting sash "port hole windows"
Setting gallery windows
Hanging doors and frames
Cleaning colonnade
Removing traverse circles
Kitchen extensions
Laying wooden floor
Lathing and furring
Plastering
Connecting Kitchen floors
Inclosing casemates on inner parade with wooden walls

Second Tier

Removing traverse circles
Setting exterior "port hole windows"
Setting gallery windows
Repairing gallery floors
Fireplaces
Hanging doors and frames
Laying and repairing wooden floors
Plastering
Concrete iron rail on balcony
Inclosing casemates on parade with wooden walls
Putting in embrasure guards (a) cutting out for (b) setting

Third Tier

Putting in embrasure guards
Setting exterior "port hole windows"
Setting gallery windows
Repairing gallery floors
Removing iron railings along gallery
Connecting iron rail on balcony
Removing traverse circles
Hanging doors and frames
Laying and repairing wooden floors
Lathing and furring
Plastering
Fireplaces
Inclosing casemates on parade with wooden walls
"Balcony roof" (a) preparing for new roof (b) putting on new roof

Plumbing--First Tier

Sewers on exterior of building
Roughing in for toilet room #1
Roughing in for toilet room #2
Roughing in for toilet room #3
Setting fixtures for toilet room #3
Roughing in for kitchen
Setting fixtures in kitchen

Plumbing--Second Tier

Roughing in for toilet room #5
Roughing in for toilet room #6
Roughing in for toilet room #7

Plumbing--**Third Tier**

Roughing in for toilet room #9

Roughing in for toilet room #10

Roughing in for toilet room #11

Plumbing--**General**

Setting water heaters and tanks

Grease trap and man-**hole**

Work that will be completed within two weeks:

First Tier

Putting in embrasure guards (a) cutting out for (b) setting
Wire screen partitions
Calcimining walls
Painting ironwork
Painting woodwork
Placing chimneys
Putting on hardware

Second Tier

Kitchen roof
Wire screen partitions
Placing new chimneys
Painting ironwork
Painting woodwork
Calcimining walls
Putting on hardware

Third Tier

Wire screen partitions
Calcimining walls
Putting on hardware
Painting woodwork
Placing new chimneys
Painting ironwork

Plumbing--**First Tier**

Main water supply

Setting fixtures for toilet room #1

Setting fixtures for toilet room #2

Plumbing--**Second Tier**

Setting Fixtures for toilet room #5

Setting fixtures for toilet room #6

Setting fixtures for toilet room #7

Setting fixtures for toilet room #8

Plumbing--**Third Tier**

Setting fixtures for toilet room #9

Setting fixtures for toilet room #10

Setting fixtures for toilet room #11

Plumbing--General

Piping for hot water

Kitchen plumbing

Projects not yet commenced or requiring more than two weeks to complete:

Concreting parade ground
Cutting 10 south gorge windows in the 1st Tier larger
Removing 4 1st Tier partition walls

The repair of the roof to curb seepage into the casemates below. To accomplish this, all vegetation would be removed from the superior slopes and the earthen fill covered "with a concrete slab, waterproofed, and all cracks" filled with hot asphalt.

The subcontractors would be finished installing the water system by August 15, while the firm positioning the oil supply line and oil burners in the two French ranges would be through by August 20.[36]

c. The Debate over Installation of a Heating Plant and Electric Lighting

Colonel Williamson at this time recommended the installation of a steam heating plant in the fort. Unless this was done, he warned, the cold and dampness of the building would cause "many complaints and much dissatisfaction, if not sickness." In addition to the two large French oil burning ranges and two hot water heaters, his men had "built fifteen fireplaces with basket grates and twenty flues for the use of stoves," but he did not believe these were "adequate to properly heat" the structure.

Lighting would also be a problem, because the casemates had very low ceilings, and the embrasures were so small that ventilation was bad. Coal oil lamps would compound the problem. In hopes that the Quartermaster General would see the merit in allocating funds for an electric lighting system, Colonel Williamson prepared specifications and estimates for installation of a suitable system.[37]

Colonel Williamson's communication about a steam heating plant and electric lighting system was referred to the army's legal authority--the Judge Advocate General. After reviewing all documents bearing on

36. Williamson to Quartermaster General, July 24, 1914, NA, RG 92, Office of the QMG, General Correspondence File, 1917-1922.

37. Ibid.

the situation and taking cognizance that the decision to eliminate these facilities had originated with Secretary of War Garrison, the Judge Advocate recommended that the matter be resubmitted to the Secretary of War, and perhaps the Surgeon General.[38]

Before again approaching the Secretary, it was decided to secure the opinion of a medical officer, Lt. Col. W.P. Kendall, as to whether stoves and oil lamps would suffice for heating the structure as at Fort Jay, New York.[39] Colonel Kendall, after making an inspection, reported that stoves could not be relied on to produce the necessary amount of heat, because of the: (a) need for a steady rather than "an intermittent, elevated temperature"; (b) comparative cost; (c) character of the fort; (d) absence of sunlight and presence of fogs; (e) saturated atmosphere; and (f) high winds. On studying the returns for the post, he saw that a high incidence of sickness had led to the recommendation for removal of troops from the fort on several occasions.

Even with installation of a steam heating system, Colonel Kendall forecast that as the prisoners would be required to work outside part of the time, the number on sick call would be large.[40]

Capt. Charles Howland, commanding officer of the Alcatraz Detention Barracks, agreed with Colonel Kendall on the need for a steam heating system to guarantee the health of his prisoners. He believed that with the French ranges, it would be possible to install a low pressure system, costing about $6,700. Until such a system was installed, fireplaces and stoves could be used, although "they are local in their heating effect and use the oxygen in the air." This would be objectionable, because there was no ventilating system in Fort Point.[41]

The Judge Advocate General and Surgeon General, after reviewing the correspondence, recommended that Secretary of War Garrison authorize "installation of an adequate low pressure heating plant in the barracks at Old Fort Point."[42]

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38. Bethel to Adjutant General, Aug. 28, 1914, NA, RG 92, Office of the Quartermaster General, General Correspondence File, 1917-1922.

39. Aleshire to Adjutant General, Sept. 5, 1914, NA, RG 92, Office of the QMG, General Correspondence File, 1917-1922.

40. Kendall to Commanding General, Western Department, Oct. 27, 1914, NA, RG 92, Office of the QMG, General Correspondence File, 1917-1922.

41. Howland to Commanding General, Western Department, Nov. 5, 1914, NA, RG 92, Office of the QMG, General Correspondence File, 1917-1922.

42. Surgeon General to Judge Advocate General, Nov. 17, 1914, and Judge Advocate General to QMG, Feb. 16, 1915, NA, RG 92, Office of QMG, General Correspondence File, 1917-1922.

Soon afterwards the question of heating the structure became academic, when the bills authorizing transfer of Alcatraz to the Department of Labor failed to pass the 3d Session of the 63d Congress. Whereupon the Adjutant General notified the Quartermaster General that there was no immediate need of spending additional funds for "preparing the barracks at Old Fort Point for occupancy by the disciplining battalion for the Pacific Branch, U.S. Disciplinary Barracks."

Secretary of War Garrison accordingly disapproved the request for the allotment for the heating system, with the understanding that the subject would be re-examined if, in the future, it became necessary to employ Old Fort Point as a disciplinary barracks.[43]

d. The Project is Completed

Meanwhile, work had progressed to the point where Colonel Williamson on September 29, 1914, was able to report "the conversion of the old fort" almost completed. The only details remaining were cleaning up and finishing out the 1st Tier gorge rooms designed as the "guard dormitory." These could be done under direction of the officer commanding the post. Williamson accordingly asked authority from the Quartermaster General to turn over Old Fort Point to either the commanding officer, Fort Winfield Scott, or the commanding officer, Military Detention Barracks, Alcatraz Island.[44]

Taking note of Williamson's communication, the War Department on October 13 issued General Order No. 77, authorizing the commandant of the Pacific Branch, U.S. Military Prisons "to occupy Old Fort Point." Commandant Howland accordingly visited Fort Point on the 21st. He was disappointed to discover that the four 1st Tier dormitory rooms were unfinished, and all work had ceased. A review of Colonel Williamson's correspondence satisfied him that it was the intention of the construction quartermaster "to turn the building over with this work not done as called for in the drawings." Since this project could not be classified as cleaning up work, Commandant Howland urged that it be finished under the supervision of Construction Quartermaster Williamson. It should be attended to at once, because the subject rooms were needed to insure an orderly occupancy of the building by his command. Only after this work was done would he be prepared "to inspect and accept the building."[45]

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43. Adjutant General to Quartermaster General, March 11, 1915, NA, RG 92, Office of QMG, General Correspondence File, 1917-1922.

44. Williamson to QMG, Sept. 29, 1914, NA, RG 92, Office of the QMG, General Correspondence File, 1917-1922.

45. Howland to Adjutant General, Oct. 22, 1914, NA, RG 92, Office of the QMG, General Correspondence File, 1917-1922.

Colonel Williamson, commenting on Commandant Howland's memorandum, pointed out that the task of converting Old Fort Point into a detention barracks had been completed, with the exception of the four 1st Tier rooms west of the sally port. To finish these rooms as a guard dormitory required "cutting out some heavy brick and concrete walls." This could be done by prisoners, and in his opinion would in no way interfere with use and occupation of the building by Commandant Howland's command.[46]

While the subject rooms were being completed, there was considerable discussion and exchange of correspondence between interested individuals on what should constitute the meters and bounds for the prison reservation at Old Fort Point." Before they could be formalized, the need for action had passed with the failure of Congress to enact legislation authorizing transfer of Alcatraz from the War Department to the Department of Labor. The structure, although its interior had been "butchered," thus escaped being used as a detention barracks.[47] The orders transferring the Pacific Branch, U.S. Military Prison, from Alcatraz to Fort Point were never implemented.

D. Fort Point from 1915-1920

1. Colonel Rees' September 1915 Inspection

District Engineer Rees, the officer who had repaired the earthquake damage, visited the fort in September 1915. He found that it had been

> practically rehabilitated. Doors, windows, etc., have been replaced, walls and ceilings of the portion of the structure to be used as living quarters have been replastered, tinted, etc., plumbing fixtures installed, the main court [parade] of the ground floor and the entire area of the barbette tier and parapet wall previously occupied by earthen fills have been paved with concrete, windows installed in all the embrasures, the archways at rear of each emplacement on the 1st, 2nd, and 3rd casemate tiers . . . have been closed with sash partitions, and the building generally put in good condition.[48]

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46. Williamson to Commanding General, Western Dept., Nov. 10, 1914, NA, RG 92, Office of the QMG, General Correspondence File, 1917-1922.

47. Crowder to Adjudant General, March 5, 1915, and Wright to Quartermaster General, March 11, 1915, NA, RG 92, Office of the QMG, General Correspondence File, 1917-1922. E.H. Crowder was Judge Advocate General and W.M. Wright was the army's Adjutant General.

48. Rees to Chief Engineer, Sept. 25, 1915, NA, RG 77, Ltrs. Recd., Chief Engineer.

The proposal to transfer military prisoners from Alcatraz having been aborted, responsibility for Fort Point again belonged to the commanding officer, Fort Winfield Scott, instead of personnel of the Pacific Branch, U.S. Military Prison. If the structure were to be put to any defensive use by the Coast Artillery, Colonel Rees believed expenditures charged to the Corps for its upkeep would be nominal. But should it remain unoccupied as at present, there would be maintenance charges for replacement of broken glass indoors and windows, repair of chimneys, and repainting at two to three year intervals of doors, sash, and other exposed woodwork. A certain amount of policing would be necessary to keep the fort in a "presentable condition, particularly if the main doors are left open and visitors admitted." Discounting painting, he believed $50 per year would suffice to cover maintenance.[49]

Currently the fort was being used by the Lighthouse Bureau as a site for a fourth-order revolving light. Supporting this activity on the barbette tier was a concrete building housing a fog signal station and a small concrete structure used for oil storage. Nearby was a concrete and galvanized iron structure sheltering a 60-inch searchlight. The power plant for the searchlight remained in one of the 1st Tier casemates, while several other 1st Tier casemates were used on occasions by the Coast Artillery for storage of explosives.[50]

2. Fort Point on the Eve of United States Declaration of War

Sixteen months later in January 1917, three months before the United States entered World War I, Colonel Rees again visited the fort. He found the structure unoccupied except for the activities heretofore enumerated. The condition of the building was unchanged, except for breakage of some glass, damage to metal chimney tops, and other minor defects.[51]

3. The War and Post-War Years

With the United States at war, the fort was pressed into use as quarters to help accommodate the large numbers of officers and men flooding the Presidio and Fort Winfield Scott. Although there was a rapid demobilization in the months following the November 11, 1918, Armistice, Fort Point in the autumn of 1920 was being used as a Bachelor Officers' Quarters.

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49. Ibid.

50. Ibid.

51. Rees to Chief Engineer, Jan. 29, 1917, NA, RG 77, Ltrs. Recd., Chief Engineer.

The San Francisco Chronicle in a feature travel story at this time reported, "Naturally there is no use for the old pile in a military way. One shell from the huge rifles of a modern dreadnaught would make mincemeat out of the whole building," and send it tumbling down on the heads of its occupants.[52]

E. Twenty-One Years of Neglect

1. The A.I.A. Becomes Interested in Preservation of Fort Point

During the early 1920s the army ceased using the fort as a Bachelor Officers' Quarters, and for a few years several of the casemates were occupied as a vocational school. By 1926 the structure was all but abandoned and being ravaged by vandals.

An important committee of the influential American Institute of Architects now became interested in preservation of old Fort Point. Dr. Lawrence Kocher, Chairman of the Department of Architecture at Pennsylvania State College and Chairman of the A.I.A's. Committee on Preservation of Historic Monuments and Scenery, wrote Secretary of War Dwight Davis. In his letter, dated March 2, 1926, Dr. Kocher informed the Secretary, "It is the opinion of many architects that the massive fortress possesses much merit in both design and construction." The walls of Fort Point, although "solidly constructed of brick and granite," were "in danger of deterioration through lack of proper upkeep."

Dr. Kocher and his group also were concerned with the changes of the previous decade, involving "erection of temporary partitions which alter the original and historical purpose of the plan." In closing Dr. Kocher observed that his committee was "deeply interested in the preservation of our early American buildings."[53]

The Secretary's office referred the subject to the responsible officers of the Quartermaster Corps. On March 11 the IX Corps Quartermaster was asked for "a general statement" on the condition of old Fort Point. Public relations, it was pointed out, dictated cooperation with the American Institute of Architects, "insofar as possible with the limited funds available" for maintenance and repair.[54]

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52. San Francisco Chronicle, Oct. 3, 1920.

53. Kocher to Davis, March 2, 1926, NA, RG 92, General Correspondence, Quartermaster General, 1922-1943.

54. Casey to Quartermaster General, IX Corps, March 11, 1926, NA, RG 92, General Correspondence, Quartermaster General, 1922-1943.

2. Colonel Bash's Report

When asked for his comments on condition of the fort, Capt. F.P. Tingley, Assistant Quartermaster, Harbor Defense, reported that "every effort is made to keep it in repair." Lack of funds, however, limited what could be done. Except for facilities of the Lighthouse Service and several casemates currently used for storage, the fort was unoccupied.[55]

Captain Tingley's report was deemed unsatisfactory, and in mid-May, Lt. Col. L.B. Bash of the Quartermaster Corps made a thorough inspection of old Fort Point. He found the structure in "poor condition." Vandals had broken "nearly all the accessible windows, except some of the 3d Tier." Most of the doors opening onto the parade were broken or unserviceable. One of the exterior doors to the sally port had been knocked off its hinges, and the wood and ironwork broken. The inner doors were also in bad condition. Iron bars positioned at the embrasures 12 years before were badly rusted, and some could be bent, enabling prowlers to enter the casemates. The ironwork of the gorge stairways and colonnade was badly rusted.

Pointing had failed and water had seeped through the casemate arches. Grass and weeds grew on the barbette tier. Much of the plumbing was missing and the remainder in deplorable condition. Some of the scotch flagging had been pried loose from the balconies and carried away. The iron cover of the parade cistern had been stolen.

Brickwork on the seaward faces had been eroded by wind and water.

Colonel Bash, on reviewing records, found that the fort had been rehabilitated in 1914-15 as a detention barracks but had never been occupied for that purpose. No repairs had been made since then.

Until it was known what use was to be made of the structure, it would be difficult to make estimates of the cost of necessary repairs. It had been suggested that the fort be converted into a military museum, with a concession for a restaurant to fund upkeep. Colonel Bash liked this proposal, because the beauty of the site would attract thousands.

To stabilize the building and effect necessary repairs would require:

Carpentry work, repair of doors, windows, and hardware	$1,300

55. Tingley to Chambers, March 23, 1926, NA, RG 92, General Correspondence, Quartermaster General, 1922-1943. Lt. Col. John S. Chambers was Assistant Quartermaster, IX Corps.

Painting all woodwork and ironwork, derusting ironwork, and replacing broken glass	$2,000
Asphalting leaks in barbette tier and removing weeds	1,000
Miscellaneous work to tiling, concrete floors, etc.	500
	$4,800

Colonel Bash's estimates did not include repairs to the plumbing and lighting and installation of a heating system, which would add greatly to the cost.

Pending action on his estimates, Colonel Bash recommended erection of a marker outlining the history of old Fort Point and warning of arrest for defacing government property.[56]

3. Colonel Hase's Comments

Colonel W.F. Hase, the post commander on reviewing the correspondence, reminded his superiors that the Lighthouse Service operated a light and fog signal on the barbette tier. The only defense installations for which his men were responsible were the searchlight and its power plant. At the same time the public had access to the barbette tier by way of the bridge from the Lighthouse Service Reservation.

Several years before a still had been found in one of the casemates. When he made his first inspection of the structure after taking command of Fort Winfield Scott, he had found: (a) walls covered with "obscene" drawings; doors and windows broken; floors torn up; and "that defecations had taken place in many rooms."

All accesses to the lower tiers were now barred. To post a guard at the fort would, in his opinion, be too burdensome for his understrength command.[57]

4. Colonel Bottoms' Proposals

On June 2, 1926, Col. S.F. Bottoms notified the Quartermaster General that, in addition to repair of the structure, two problems had to be

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56. Bash to Chambers, May 17, 1926, NA, RG 92, General Correspondence, Quartermaster General, 1922-1943.

57. Hase to Commanding Officer, IX Corps, May 20, 1926, NA, RG 92, General Correspondence, Quartermaster General, 1922-1943.

resolved--how to afford protection against vandals and how to maintain the structure once it had been repaired. As he saw it, the army had four options. It could: (a) post a permanent guard at the fort; (b) "hermetically" close all exterior doors, windows, and other means of ingress; (c) employ a civilian caretaker; or (d) lease the building, under proper restrictions, to a concessionaire for "a restaurant or other commercial purposes in connection with its interest as a historic relic."

Colonel Hase was opposed to the first alternative. Fencing or boarding up the fort would "interfere with its utility as a sightseeing proposition and largely defeat the purpose of its retention." Thus of the options only two were viable. Cost of employing a caretaker would be $1,500 to $2,000 annually, while he believed the rental received from a concessionaire would be sufficient to cover the cost of maintaining and protecting the fort.[58]

Colonel Hase was asked to comment on Colonel Bottoms' proposals. He recommended that inquiries be made of concessionaires interested in leasing the fort. If this were to be done, the army would have to: (a) rewire the structure to secure proper lighting; (b) enlarge the embrasures to permit an enjoyment of the view; (c) repair broken sewer connections; and (d) do a lot of carpentry.

Another problem would be public access. There were only two roads leading to the fort, one through Crissy Field and the other through Fort Winfield Scott. He did not know whether the commander of Crissy Field had any objections to public use of the former road, but the bluff road through Fort Winfield Scott was very rough, as it was paved with granite blocks.[59]

5. The Army Boards up the Fort

Headquarters IX Corps, after reviewing all the correspondence, recommended to the War Department that to curb vandalism "all doors and windows, and other means of ingress be closed." The proposal to lease the structure to a concessionaire was deemed unfeasible, because of its isolation, lack of proper approach roads, and prohibitive cost of placing it in condition for restaurant purposes. The only use to which the army could put the building was for storage of quartermaster

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58. Bottoms to Quartermaster General, June 2, 1926, NA, RG 92, General Correspondence, Quartermaster General, 1922-1943.

59. Hase to Commanding Officer IX Corps, June 24, 1926, NA, RG 92, General Correspondence, Quartermaster General, 1922-1943.

and ordnance property. But this was conditioned by the realization that the items stored must be resistant to the ravages of salt air.[60]

The Quartermaster General accordingly determined not to allot any funds to repair of the old fort as requested by the American Institute of Architects. On August 7, 1926, the IX Corps Quartermaster was ordered to board up the fort's doors and windows to curb vandalism.[61] Cost of this work was $40.37.

6. Maintenance 1924-1941

During the 18 years from 1924 to 1941 the army spent almost nothing on maintenance of old Fort Point. In 1924-25, when several of the casemates were used as quarters for a vocational school, maintenance costs totaled $44.58. The Quartermaster Corps, in the six years following the boarding up of the fort in 1926, charged $56.29 to maintenance of the structure. No funds were spent on upkeep of the fort during the first five years of Franklin D. Roosevelt's New Deal.

With the breakdown of collective security in the Far East, Europe, and Africa, the United States Congress beginning in Fiscal Year 1938 increased its appropriations for the War and Navy Departments. Works Progress Administration funds were made available to the defense agencies to improve buildings and grounds. This enabled the IX Corps Quartermaster to again allot money for maintenance of old Fort Point. In Fiscal Year 1938, $13.12 of Buildings and Quarters funds and $89.57 of WPA monies were disbursed to clean out the fort sewers and to close with brick the window and embrasure openings. The following fiscal year $216.50 was disbursed on the fort's upkeep. Efforts to ascertain the nature of these improvements were unsuccessful. Fiscal Year 1940 saw the government spending $46.82 in WPA funds on the historic structure, and in the fiscal year ending June 30, 1941, $19.54.[62]

F. Saved from Destruction

In the 1930s Fort Point was saved from destruction by Joseph P. Strauss. Initial plans for construction of the Golden Gate Bridge,

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60. Holly to Secretary of War, July 21, 1926, NA, RG 92, General Correspondence, Quartermaster General, 1922-1943. Holly was the IX Corps Adjutant.

61. Casey to Quartermaster IX Corps, Aug. 7, 1926, NA, RG 92, General Correspondence, Quartermaster General, 1922-1943. Casey signed for Maj. Gen. B. Franklin Cheatham, Quartermaster General of the U.S. Army.

62. Completion Reports and Historical Files, Fort Winfield Scott, 1922-1941, NA, RG 92, Historical Records and Completion Reports, 1922-1943.

connecting San Francisco with Marin County, called for razing the fort to provide space for footings.

Strauss, the distinguished engineer who designed and built the bridge, was impressed with the old fort's architectural significance, and determined to do something to save it. A massive steel arch was constructed to carry the roadway safely above the fort. But in doing so, it was necessary to demolish the counterscarp gallery. The surviving breast-height walls and gun platforms of the long abandoned 10-Gun Battery also disappeared as approaches to the bridge spread across the landscape.

Strauss in 1937 informed his directors why he had acted:

> While the old fort has no military value now, it remains nevertheless a fine example of the mason's art. Many urged the razing of this venerable structure to make way for modern progress. In the writer's view it should be preserved and restored as a national monument, and that was the primary reason for the arch.[63]

San Francisco Mayor Rossi, impressed by what Engineer Strauss had done, appointed a citizens' committee of 15 to make a survey of Fort Point with the goal of preserving it as a historic site. Strauss chaired the group, and told the press that the fort's "old . . . dungeons and marvelous winding stairways are well preserved." Since saving it from destruction, he had become interested in converting the fort into a military museum, "similar to New York's Fort Ticonderoga." The group planned to approach the Works Progress Administration for assistance and to ask the War Department's aid in assembling objects.[64]

With the nation struggling to escape the throes of a world-wide depression and with the armed services operating on limited budgets, there was little interest in preservation and restoration of Fort Point as a "military museum." Efforts of the Committee of 15 came to naught.

G. Fort Point in World War II

The Japanese December 7, 1941, attack on Pearl Harbor plunged the United States into World War II. For the next six months, until the battle of Midway, the Japanese fleet as Admiral Isoroku Yamamoto predicted had "run wild." Fears were voiced that the Japanese were about

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63. Motheral, Fort Point: "Gibralter of the Pacific," pp. 36-7.

64. San Francisco Chronicle, Oct. 20, 1936.

to attack the Pacific Coast. Anti-aircraft guns, searchlights, and barrage ballons were hurriedly deployed to protect key harbors and ports.

For the first time since World War I troops occupied the historic old masonry fort. These men belonged to Battery N, 6th U.S. Coast Artillery. To protect the Golden Gate Bridge, two rapid-firing 3-inch anti-aircraft guns were removed from Battery Yates at Fort Baker and mounted on the barbette tier, along with a fixed searchlight and its generator.

Working parties under supervision of Post Engineer H.N. Krenkel were turned to converting some of the casemate rooms into a messhall, dayroom, barber shop and post exchange, and rehabilitating the gorge officers' quarters and enlisted men's barracks.

The troops remained for more than a year. They were withdrawn in 1943 after United States forces had seized the initiative in the Pacific, and the threat of Japanese attacks on West Coast cities had evaporated.[65]

H. The Initial Proposal to Declare Fort Point Surplus

1. The Sixth Army Floats a Trial Balloon

With the end of World War II there was a rush by the United States to demobilize its powerful military force and return to a peacetime economy. On September 5, 1947, the San Francisco News carried an article headed, "Guardian of a Golden Gate, San Francisco Neglects an Old Pal, As Fort Point Yields to Sea and Rust." The reporter explained that "one of San Francisco's best potential tourist attractions is badly in need of a friend." Commenced more than 90 years before, the fort was locked against intruders, but was within easy reach of sightseers who sped overhead as they drove across the Golden Gate Bridge.

Visiting the fort, the reporter found a wartime sign warning off trespassers, but it was being ignored by many San Franciscans fishing from the seawall. A Sixth Army spokesman explained that the M.P's did not enforce this order. The sally port doors, he continued, were kept locked because the structure in its present condition constituted a danger to unwary visitors.

Entering the fort, the reporter found that the sally port looked upon a barren parade, and the gun embrasures stared "vacantly through

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65. Ltrs., Krenkel to Stewert, Oct. 4, 1955, and Krenkel to Erwin, Sept. 14, 1955, files Fort Point NHS. Maj. Earle K. Stewart was Post T.I. & E Officer in 1955 and Kenneth Erwin was editor of The Star Presidian in 1956.

rusted bars at the sea." Rust lay "in great scales on the barbette pintles on the parapet. Rust had eaten the ironwork railings. The seaward side and outer walls . . . are pocked and pitted by nearly a century of attack from the sea." He found the architecture worthy of the visitor's attention. He wrote of "the self-supporting winding stone stairs, the pitchdark prisoners' cell, the old barracks rooms where the sound of surf comes in through the narrow windows," and the view of the great bridge and headlands.

When questioned, the public affairs officer explained that the post-war army did not have funds to rehabilitate the fort. But, he continued, the War Department might "be amenable to its conversion to a public monument."[66]

2. General Clark Makes an Important Announcement

The tour and interview set the stage for an announcement by Sixth Army Commander Gen. Mark Clark on September 23. He proposed to declare the fort surplus to the army's needs and recommend that it be maintained as a national monument by the city, State, or Federal Government.[67] Commenting on General Clark's announcement, the News reported that the decision to declare Fort Point surplus opens the way to establishment of the site as a public monument. As it was on Federal Land, the News suggested that perhaps the National Park Service was the appropriate agency to take charge of the fort. If not, then the California State Division of Parks must act, because Fort Point would be a splendid acquisition.

Speed, however, was essential. The newspaper trusted that the historic old fort could be "restored" and opened to the public for the centennial of California's admission to the Union.[68]

Army engineers at the Presidio, when asked, estimated cost of stabilizing the fort (putting it in presentable shape, repairing iron railings, replacing broken glass, and a general clean up) at $5,000. To restore the fort to its nineteenth century appearance and emplace heavy ordnance was "a different story."[69]

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66. San Francisco News, Sept. 5, 1947.

67. San Francisco Examiner, Sept. 24, 1947; Western Star, Oct. 7, 1947.

68. San Francisco News, Sept. 24, 1947. The Sixth Army to commemorate 100 years at the Presidio had in March 1947 held an open house. Tours were conducted through Fort Point, and the public given its first official opportunity in years to explore the site. Western Star, Oct. 7, 1947.

69. San Francisco Chronicle, Oct. 6, 1947.

3. The Department of Defense Decides to Retain Fort Point

Before acting on General Clark's recommendation, the Department of Defense in March 1948 sent Lt. Col. A.M. Lazar to San Francisco. He was to assemble data to guide the Secretary in making a decision as to whether the fort could be declared surplus to the Department's needs. Colonel Lazar explained that if Fort Point were declared surplus, it would be turned over to the War Assets Administration for disposal to "some agency, Federal, state, municipal, or private, which might restore it as a public attraction."[70]

News that the fort might be declared surplus interested several patriotic groups. The Ladies of the Grand Army of the Republic in May 1948 announced that they would discuss possible sponsorship of Fort Point as a state or national memorial at their Sacramento convention. Other interested groups were the Sons of Veterans of the Civil War, Daughters of Union Veterans, the Women's Relief Corps, and the Women's Auxiliary of the Sons of Veterans of the Civil War.[71]

Hopes that the Department of Defense would declare old Fort Point surplus to its needs, thus making it available for preservation and restoration as a historic site, were premature. After reviewing Colonel Lazar's report, the Department determined, in the nation's interest, to retain possession of the area.

I. Fort Point Becomes a National Historic Site

1. The DAR Plaque

During the early 1950s the American public became increasingly interested in preservation of historic sites. With more leisure time available and rapid transportation, the public descended on sites associated with our country's history in large numbers. Attendance figures maintained at various sites showed big annual increases.

As to be expected, forces interested in preservation of the nation's heritage would not forget Fort Point. On May 7, 1955, in a heavy rain, a number of hardy members of the Daughters of the American Revolution, their guests, and members of the Sixth Army assembled at the fort to dedicate a historical plaque. Korean War hero and Deputy Commander of the Sixth Army, Maj. Gen. William Dean accepted the plaque on behalf of the Department of Defense.[72]

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70. San Francisco News, March 11, 1948.

71. Ibid., May 13, 1948.

72. San Francisco Chronicle, May 8, 1955.

2. Major Stewart's Report

Authorities at the Presidio realized that public interest in preservation and interpretation of Fort Point was mounting. In the summer of 1956, Maj. Earle K. Stewart, Post Troop Information and Education Officer, was asked by his superiors to comment on the significance of Fort Point.

He replied, "I am convinced, as a professional historian, that the uniqueness, historicity, present state of excellent preservation, and accessibility dictate the desirability of establishing Fort Point as a national monument." He recommended that it be established as a national monument under the National Park Service, but added, "I do not believe the Army **should** relinquish control of the ground on which it stands or to any avenues of approach." Any lease or easement to another Federal agency should include a recovery clause. He also opposed conveying the site to the state, city, county, or public corporation. Their assistance in its preservation and interpretation, however, should be sought. At the same time, he did not believe the army could devote necessary money and manpower to develop and maintain Fort Point as a historic site.[73]

3. The Fort Point Museum Association Steps In

Two years passed before the Sixth Army was compelled to take a stand and reveal its position. In the spring of 1958 the City of San Francisco triggered the subject by urging that Fort Point become a National Monument. National Park Service officials on the Washington level were not receptive. The California Park Commission, noting the proposal, determined to discuss possible addition of Fort Point to the State Park System at its July meeting.

A spokesman for the Sixth Army, to alleviate growing pressure, on **Wednesday,** the 16th, announced that the army did not have any plan to "release Fort Point to any other Federal agency or to the State or to a private agency." When questioned, he indicated that "the door is open to groups outside the army to provide, if they wish, funds for restoration and maintenance of the fort."

He informed the press that while the Sixth Army did not have "any official approved plan for restoration of the structure," a group of citizens had "prepared a plan which proposes . . . that a non-profit association or organization . . . raise the funds necessary for restoration of Fort Point and for the establishment and maintenance of a museum which will be open to the public but [which] will be under control of the army."

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73. Stewart to Deputy Post Commander, July 11, 1956, Fort Point File, the Presidio Library.

The army, he stated, "would probably support this project to the extent its limited means will permit," after detailed plans were submitted.

The army, he cautioned, would not enter into any agreement that would restrict its use or access to the fort; interfere with accomplishment of its mission; pose a security threat; bind it to provide specified funds or labor; or make the government liable to claims for property damage, bodily injury, or death.[74]

The Examiner informed its readers, "The Army, the State, the city and everyone who has visited the fort agree it should be preserved." There was just one problem, however, nobody wanted to fund the cost of restoration.

When questioned, Everett Powell, deputy chief of the Lands Section of the Division of Beaches and Parks, explained that his superiors believed the fort should be preserved as a monument. But, he added, they had no funds budgeted for this purpose.

County Supervisor Henry R. Rolph, leader of a local save-the-fort group, suggested that money might be allotted from the two million dollars programmed by the State for development of parks. The city, he added, was in no condition to foot the bill.[75]

With no funds available to underwrite restoration of the fort, and in view of the army's position, the California Park Commission took no action at its July meeting on the subject. A number of individuals interested in preservation of the structure were not so easily dismayed. In 1959 the Fort Point Museum Association was incorporated by Maj. Herbert Batz (U.S.A. retired); John J. Gould, civil engineer; Edward D. Page, San Francisco architect; and Myron B. Goldsmith (U.S.A. retired). Mr. Page was elected president. For the next 11 years the Association spearheaded a campaign to preserve Fort Point "for future Americans."

A special use permit was signed with the Sixth Army. Money was raised, the fort cleaned up, and a small museum established. The fort was opened to the public at certain times and tours given. In its work the Association enjoyed the good will and support of the Sixth Army.[76]

4. The 90th Congress Fails to Act

George M. Dean, retired San Francisco businessman and former army colonel, in 1967 became Association president. Under his direction a drive was launched to secure legislation establishing Fort Point as a National Historic Site.

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74. The Star Presidian, July 18, 1958.

75. Examiner, July 17, 1958.

76. Motheral, Fort Point: "Gibralter of the Pacific," p. 38.

On July 25, 1967, United States Senator Thomas Kuchel and Representative William S. Mailliard introduced companion bills into the 90th Congress, asking that 29 Presidio acres, including Fort Point, be transferred from the Department of Defense to the Department of the Interior.

In their introductory remarks, the legislators explained that the transfer could be accomplished without immediate cost to the taxpayer. But future improvements for a "modest restoration" and visitor facilities would cost about $300,000.

Currently, Representative Mailliard continued, "few people know of its existence which seems to be a historical waste."

The fort was open to the public at certain hours with guided tours provided by the non-profit Fort Point Museum Association. This group, interested in preservation and interpretation of the fort, had secured a special use permit from the Department of Defense. One of the Association's goals was to convert the fort into a museum. Members reportedly had located a number of objects and records associated with the structure, Fort Winfield Scott, and the Presidio, "including some of the original bronze cannon cast in Peru in the seventeenth century."[77]

Senator Kuchel's bill was brought before Senator Allan Bible's Sub-Committee on Parks and Recreation on August 15. Assistant Secretary Stanley Cain asked the Sub-Committee to delay action on the bill until the next session to permit the Department of the Interior to complete a "feasibility study."

Senator Kuchel took exception to this request, remarking, "I feel extremely sad that bureaucracy works that way. There is no sound reason to delay a proposal that was introduced with the concurrence of Secretary of the Interior Stewart L. Udall."

To mollify the senior senator from California, the Sub-Committee took advantage of his invitation and voted to tour Fort Point and Alcatraz "late this fall."[78]

An important step was taken in laying the groundwork for establishment of the area as a National Historic Site in October. The Secretary of the Interior's Advisory Board on National Parks, Historic Sites, Buildings and Monuments, at that time endorsed the proposal. Secretary Udall in advising Senator Kuchel of this action also reported that the National Park Service was completing its "feasibility study and expects to submit its recommendations to Congress" in January.

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77. Chronicle, July 26, 1967.

78. Examiner, Aug. 16, 1967.

Senator Kuchel, in releasing this news to the press, observed, "I take this as an indication that the Administration will report favorably on my bill, and I expect Senate passage in the opening weeks of the 1968 session."[79]

There had been a ceremony at Fort Point on September 18, 1967, when five men attired in U.S. Army uniforms of the 1860s hoisted a 45-star flag, said to have flown over the post in the late 1890s. This ceremony heralded a membership drive by the Association to galvanize support for passage of legislation for establishment of a National Historic Site.

About 100 persons gathered on the windy parade ground to listen to Association President Dean's appeal. He explained that money raised would be allotted first to stabilizing and restoring the structure, and then "to bringing together there a collection of U.S. Army artifacts, particularly those used in the late 19th century in the area."

In addition to Dean's speech, there was music as a brass band played songs of the 1860s, and "Yankee Blues escorted ladies in Gibson Girl costumes about the grounds." Coffee and cake was served to members and guests.[80]

Although the National Park Service submitted a favorable report, Representative Mailliard's bill was bottled up in Committee. The 90th Congress therefore adjourned without enacting the necessary legislation.

5. Congress Establishes Fort Point National Historic Site

Early in the 2d Session of the 91st Congress identical bills providing for establishment of Fort Point National Historic Site were introduced by Representatives Philip Burton and William Mailliard. Companion bills were sponsored in the Senate by Senators George Murphy and Allan Cranston, Thomas Kuchel having been defeated for re-election in the Republican primary in June 1968. Hearings were held and the bills sent to the floor with favorable reports. Passed by both houses of Congress, President Richard M. Nixon signed the bill into law on October 16, 1970.

Representative Burton, on releasing the news, informed the press that "this famous veteran of more than 100 years will be restored to its original condition and opened to the general public."

The legislation, he pointed out, authorized expenditure of five million dollars. Park Service plans called for construction of a

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79. Chronicle, Dec. 4, 1967.

80. Ibid., Sept. 19, 1967.

parking area on the bluff east of the southern approach to the Golden Gate Bridge.

When interviewed Representatives Burton and Mailliard praised the Fort Point Museum Association for its efforts to preserve and interpret the site. For the past several years, the Association had been opening the fort on Saturday and Sunday afternoons.[81]

On April 14, 1971, Fort Point was formally transferred by the Department of the Army to the National Park Service. While 200 city and civic leaders gathered on the parade, the Sixth Army Band played airs of the 1860s, "The Battle Cry of Freedom" and "The Yellow Rose of Texas."

Lt. Gen. Stanley Larson, Sixth Army commander, declared "today we are retiring an old soldier after standing guard over the Golden Gate for 110 years." He noted that the army had long been aware of the need for restoration of Fort Point, but it could not utilize any funds for such a project.

San Francisco Mayor Joseph Alioto described the site as affording "one of the great metropolitan views of the world and a place where history has passed in review through our Golden Gate since the nation's founding."

Association President Dean told the group that when restored by the National Park Service, "this grand old building will stand as a monument to the achievements and sacrifices of the U.S. Army in its development of the West."

Assistant Secretary of the Army J. Ronald Fox and Park Service officials both paid tribute to the Association, which for "13 years organized civic and fort interests which resulted in 'saving' the crumbling fort."

Dr. Ernest A. Connally of the National Park Service told the Examiner that it would take "many years and many millions" to restore Fort Point. He pointed out that although Congress had passed legislation authorizing transfer of the area and expenditure of public funds, no money had been appropriated. The Service, Dr. Connally explained, would ask for planning funds, and, after necessary historical and architectural studies had been made and evaluated, money would be programmed for stabilization and restoration of Fort Point.[82]

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81. Examiner, Oct. 20, 1970.

82. Ibid., April 14, 1971.

APPENDIX A

Estimates Prepared by the Board of Engineers for the Pacific Coast for Fort at Fort Point, submitted August 4, 1852.

MASONRY

Foundations

Stone & concrete	Scarp of water fronts and outwork from (-6') to (15'6") cubic yards	3584 @$28 =	$ 93,184
concrete	Scarp, land front, parade wall of land front, piers, service magazines, flanking arrangement, & stairways, cubic yards	1136 @$18 =	20,448

Superstructure

Brick & concrete	Scarp of main-work and outwork cubic yards	7195 @$25 =	179,875
	Piers and parade walls	4126 @$25 =	103,150
	Service magazines, stairways	790 @$25 =	19,750
Bricks	Arches of main-work, of flanking arrangement & service magazines, cubic yards	3316 @$36 =	119,376
Concrete	On arches cubic yards	1430 @$18 =	25,740
Brick & concrete	Flanking arrangement and sustaining wall cubic yards	882 @$25 =	22,050

Masonry

Brick & concrete	Breast-height wall of land front and exterior battery cubic yards	194 @$25 =	4,850
	Walls of magazine--exterior battery cubic yards	162 @$25 =	4,050
	Total Masonry	22,815 yards	$592,473

EXCAVATION

Preparation of site of main-work				
	cubic yards	110,273	@.25¢ =	$ 27,568
For flanking gallery & outwork				
	cubic yards	4,071	@.25¢ =	1,018
Ditch				
	cubic yards	8,432	@.25¢ =	2,108
Exterior Battery, glacis & roadway				
	cubic yards	9,044	@.50¢ =	4,522
For Foundations, scarp, piers &c				
	cubic yards	4,220	@$1 =	4,320
Total Excavation	cubic yards	136,040		$ 39,436

EMBANKMENT

Terreplein of parapet of main-work				
	cubic yards	3,674	@.75¢ =	$ 2,755
On flanking gallery				
	cubic yards	261	@.75¢ =	196
Terreplein				
	cubic yards	106	@.75¢ =	80
Glacis				
	cubic yards	250	@.75¢ =	188
Total Embankment	cubic yards	4,291		$ 3,219

MISCELLANEOUS

Coping of scarp, running feet	742	@$20 =	$ 14,840
Coping of parade & flanking gallery	525	@ 15 =	7,875
Stairs running feet	1,886	@ 5 =	9,430

Asphalting superficial yards	10,313	@$ 2 =	$ 20,626
Embrasures number 72		@ 100 =	7,200
Loopholes number 70		@ 50 =	3,500
Platforms for casemate guns 70		@ 100 =	7,000
Platforms and pintle blocks for barbette guns 46		@ 200 =	9,200
Gates--exterior and interior			1,500
Balcony of communication, 2 Tiers, 996 running feet		@ 10 =	9,960
Finishing casemates, magazines, etc.			50,000
Total Miscellaneous			$141,131
Contingencies			223,741

Recapitulation

Masonry	cubic yards	22,815	$ 592,473
Excavation	cubic yards	136,040	39,436
Embankment		4,291	3,219
Miscellaneous			141,131
Contingencies			223,741
		Total Cost	$1,000,000

APPENDIX B

"Estimate of Cost of Work to be done from 1st July 1858, to the Completion of Fort at Fort Point," by Major Tower.

Carpentry, painting, glazing &c for main work & Counterscarp gallery	$ 18,000.00
Rough Brick Masonry	52,185.00
Faced Brick Masonry	8,013.20
Concrete	39,128.90
Dry Brick Masonry, over Roof Surfaces of Arches	7,106.00
Broken Brick and Gravel over Roof Surfaces of Arches	2,000.00
Flagging, Casemates of Main Work & Counterscarp Gallery and storerooms on 1st Tier of Gorge	23,211.13
Paving Balcony, 3 Tiers (Tiles have been paid for)	500.00
Cordon & setting it (part has been paid for)	10,000.00
Coping of Casemates & Curbstones (part has been paid for)	2,128.00
Coping of Scarp & Parade Walls, for Main Work & Counterscarp Gallery	20,643.00
Thin Traverse Stones, 3 Tiers (part has been paid for)	24,317.40
Thick Traverse Stones, 1st Tier	3,200.00
Asphaltum--Main Work & Counterscarp Gallery (part has been paid for)	14,590.36
Covering asphaltum with slates	2,400.00
Steps on Terreplein of Land Front, in rear of Guns	14,000.00
Garde-fou, all around the work	4,895.00
Handrail of balcony--2 Tiers	1,170.00
Iron Stairways, roof of galvanized iron, iron roof trusses, &c.	3,000.00
Plumbing, iron water pipes, lead pipes, washing arrangements, soldering, tanks, force pump, &c.	2,500.00
Caps for vertical pipes from gutters of roof surfaces of arches	350.00
Franklin Stoves or grates & setting them	2,000.00
Forming Terreplein & Parapet, Main Work, Sodding &c	7,000.00
Grading Parade and Ditch	2,000.00
Mounting Guns, Main Work	3,300.00
Clerk, overseers, master mason, master carpenter, master blacksmith &c., for two years	31,728.00
Animals, boatmen and teamsters for two years	47,289.60
Platforms & Traverse Circles, complete, Barbette Tier	20,719.84
Stone Platforms & Traverse Circles, 10-Gun Battery	6,310.00

Covering Counterscarp Gallery with earth, forming the slopes and excavating for seawall	$ 5,200.00
Dismounting and Mounting Guns	300.00
	$379,185.00

Probable Cost of Work not Determined Upon

Seawall and Coping of Granite--300 feet long	$ 60,000.00
Masonry of "Place of Arms"	5,000.00
Grading, levelling, sodding &c for terreplein and slopes connected with 10-Gun Battery	5,000.00
Permanent Wharf	50,000.00
	$120,000.00

APPENDIX C

CANNON AT FORT POINT ON APRIL 8, 1868

Type of Gun	No. of Guns		Platforms						Traverse Circles		Carriages						Total	
			Centre-Pintle				Front-Pintle				Centre-Pintle		Front-Pintle					
	Mounted	Not Mounted	Occupied		Unoccupied		Occupied	Unoccupied	Occupied	Unoccu.	Wood	Iron	Wood	Iron	Mortar Beds	Guns	Platforms	Traverse Circles	Carriages
			Stone	Wood	Stone	Wood	Stone Wood	Stone Wood											
15-inch Rodmans		25										6		24		25			30
10-inch Rodmans		40								56				40		40		56	40
10-inch Columbiads	2			2		14					2					2	16		2
8-inch Columbiads	8			8							8					8	8		8
42-pounder Smoothbores	38	8						10	28				38			46	10	28	38
32-pounder Smoothbores	11							11					11			11	11		11
24-pounder Howitzers	4								4	1			4			4		5	4
300-pounder Parrotts		2										2				2			2
200-pounder Parrotts		6			1							6				6	1		6
8-pounder Brass (Mexican)		4														4			
24-pounder Smoothbores	6								6				6			6		6	6
10-inch Siege Mortars	2	4													6 Iron	6			
24-pounder Coehorns (bronze)	5														5 Wood	5			
	76	89	10		15			21	38	57	10	14	59	64					

APPENDIX D

15-inch Rodmans at Fort Point

On December 27, 1869, Major Elliot reported that there were at the Fort Point ordnance yard 25 15-inch Rodmans. None of these huge guns were mounted. He identified the tubes as follows:

	Where Cast	Inspector	Date of Casting	No. of Gun	No. of Times Fired & Powder Charge
1.	Fort Pitt Foundry	CC	1865	87	
2.	Fort Pitt Foundry	CC	1866	126	
3.	S. McM. & Co.	GGB	1866	20	
4.	Fort Pitt Foundry	CC	1866	132	
5.	Fort Pitt Foundry	CC	1866	133	
6.	Fort Pitt Foundry	CC	1866	134	
7.	Fort Pitt Foundry	CC	1866	123	
8.	Fort Pitt Foundry	CC	1866	125	
9.	Fort Pitt Foundry	CC	1866	124	
10.	C.A. & Co.	SCL	1865	54	3 times with 50 pounds of powder
11.	C.A. & Co.	SCL	1865	52	3 times with 50 pounds of powder
12.	C.A. & Co.	SCL	1865	53	3 times with 50 pounds of powder
13.	C.A. & Co.	MS	1865	71	3 times with 50 pounds of powder
14.	C.A. & Co.	SCL	1865	60	3 times with 50 pounds of powder
15.	C.A. & Co.	MS	1865	67	3 times with 50 pounds of powder
16.	C.A. & Co.	MS	1865	68	3 times with 50 pounds of powder
17.	Fort Pitt Foundry	CC	1866	119	
18.	Fort Pitt Foundry	CC	1866	118	
19.	Fort Pitt Foundry	CC	1866	121	
20.	Fort Pitt Foundry	CC	1866	113	
21.	Fort Pitt Foundry	CC	1866	120	
22.	Fort Pitt Foundry	CC	1866	122	
23.	Fort Pitt Foundry	CC	1865	86	
24.	Fort Pitt Foundry	CC	1866	114	
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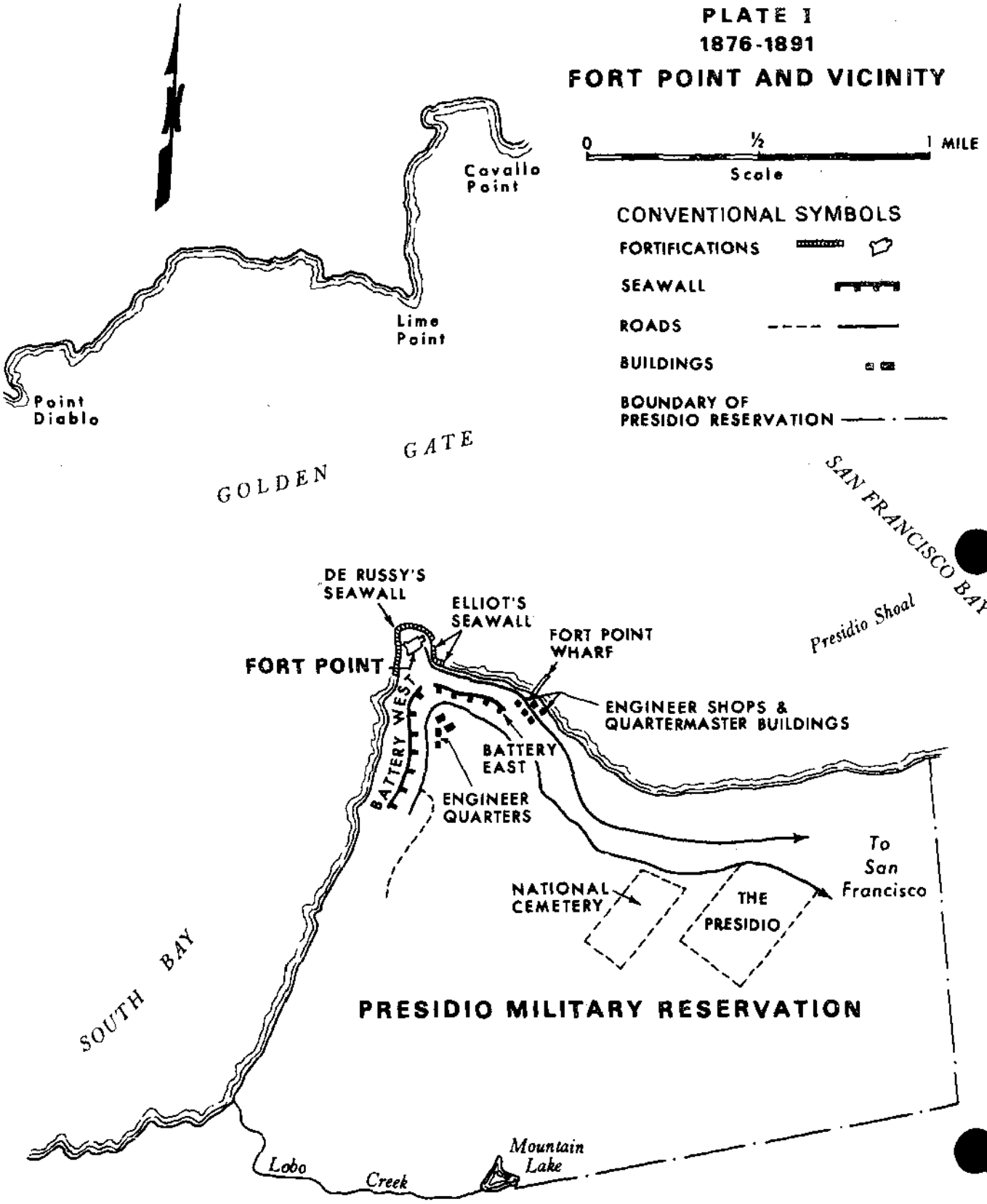
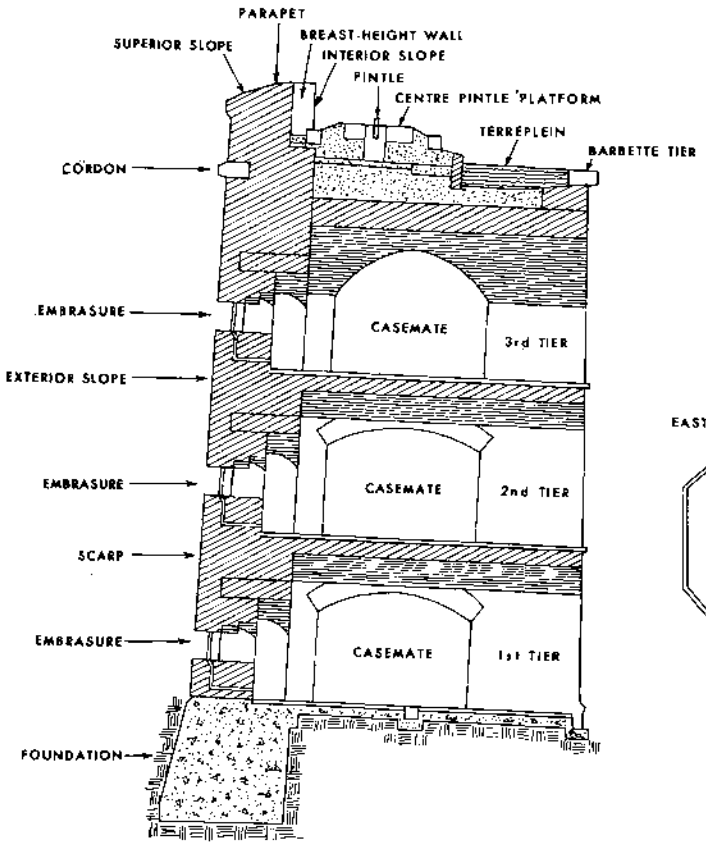


PLATE I
1876-1891
FORT POINT AND VICINITY
0
½
1 MILE
Scale
CONVENTIONAL SYMBOLS
FORTIFICATIONS
SEAWALL
ROADS
BUILDINGS
BOUNDARY OF PRESIDIO RESERVATION
Cavallo Point
Lime Point
Point Diablo
GOLDEN GATE
SAN FRANCISCO BAY
Presidio Shoal
DE RUSSY'S SEAWALL
ELLIOT'S SEAWALL
FORT POINT WHARF
FORT POINT
BATTERY WEST
ENGINEER SHOPS & QUARTERMASTER BUILDINGS
BATTERY EAST
ENGINEER QUARTERS
To San Francisco
NATIONAL CEMETERY
THE PRESIDIO
SOUTH BAY
PRESIDIO MILITARY RESERVATION
Lobo Creek
Mountain Lake

PLATE II

FORT POINT

NOMENCLATURE



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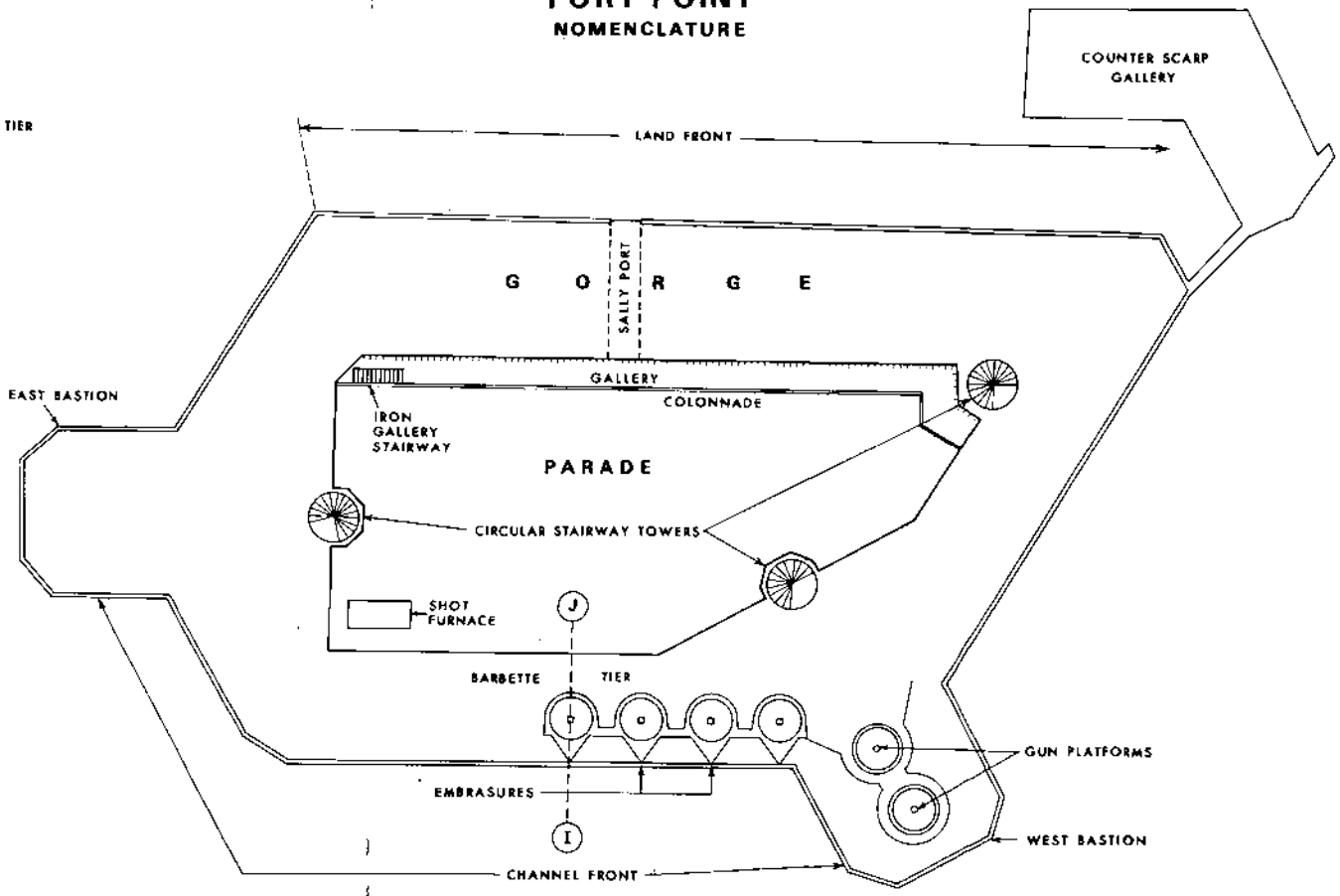

PLATE III

The Interior Face of the Gorge, circa 1868. Note the iron colonnade, shutters, benches, Spanish cannon, and sodded parade. Courtesy National Archives.

PLATE X

The Barbette Tier, West Bastion, Gorge, and Counterscarp Gallery of Fort Point, circa 1885. Note sodded superior slopes, exposed roof of counterscarp gallery, abandoned 10-gun Battery, and Lighthouse Keepers' Quarters. Courtesy San Francisco Maritime Museum.

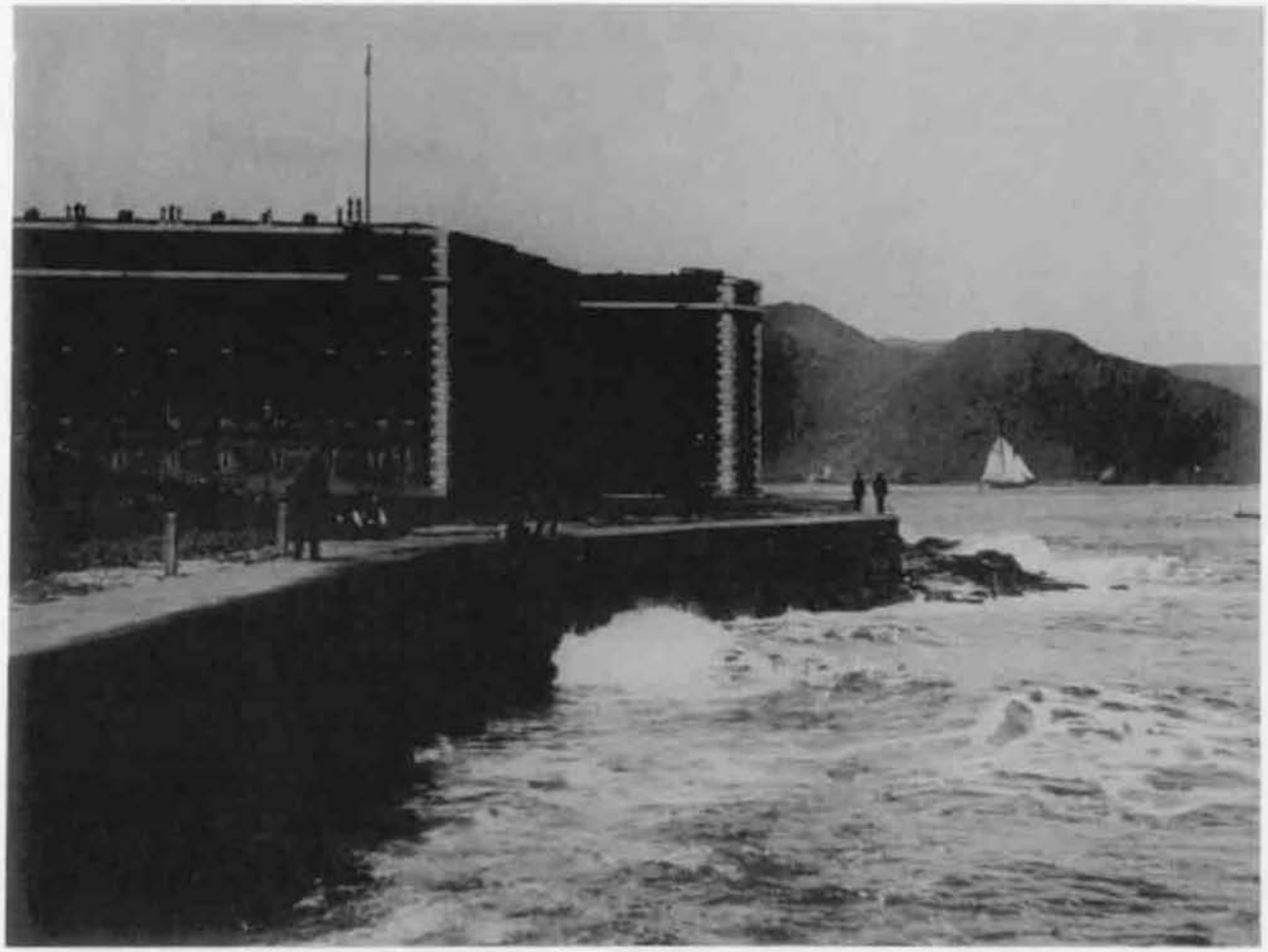

PLATE IX

The Gorge and East Bastion from the Re-entrant in Elliot's Seawall, circa 1875. Courtesy Bancroft Library, University of California.

PLATE VIII

The Gorge, East Bastion, Elliot's Seawall and Cofferdam from the Escarpment, circa 1868. Note the tracks and other evidence of construction activity and the seawall. Courtesy National Archives.

PLATE VII

The Parade and Northeast Shot Furnace, circa 1880. Note the casemate arches, the garde fou, the 10-inch mortars, 8-inch columbiads, flagstaff, and sodded parade. Courtesy Society of California Pioneers.

PLATE VI

The Barbette Tier of the Channel Front from the Superior Slope of the Gorge, circa 1868. Note the sodded superior slope and terreplein, the gun carriages and platforms, the lighthouse, the railings and garde-fou, and armament, especially the 10-inch and coehorn mortars. Courtesy National Archives.

PLATE V

The 8-inch Columbiads of the Channel Front, circa 1885. Note the brick of the breast-height walls and superior slope, the sodded superior slope and terreplein, and the gun platforms and carriages. Courtesy Bancroft Library, University of California.

PLATE IV

The Barbette Tier from the West Bastion, circa 1885. Note the lighthouse, earthen superior slopes and terreplein, brick of the breast-height walls, and superior slope, and the armament--8-inch columbiads, 32-pounders, and 10-inch mortars. Courtesy Bancroft Library, University of Califo[illegible].

PLATE XI

The Parade at Time of Conversion into Detention Barracks, spring of 1914. Note scaffolding and construction activities. Courtesy National Archives.