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A CONSTRUCTIONAL HISTORY OF FORT JEFFERSON,

1846 - 1874

by

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NATIONAL PARK SERVICE

REGION ONE

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Photograph of Horatio Gouverneur Wright, First  
Construction Engineer at Fort Jefferson,  
1846-1856

By Courtesy  
Office of the Chief Signal Officer  
War Department  
Washington, D. C.

## FOREWORD

The present compilation was made in order to provide detailed information about construction of the great fortification in the Dry Tortugas Islands.

The Army records kept at Fort Jefferson were taken to Key West and stored about 1910. Not all survived, but apparently most of the Engineer Office papers came through. Later, it appears, the cache was sent to the National Archives, where it is now joined with the group of related records that had been maintained in the Washington offices of the Army.

Researches in the Fort Jefferson records at Key West were carried on in 1934-1936 by workers on a special project. Comprehensive reports were written for each year studied (1844-1867, 1874, 1899-1906). The reports dealt with all major construction, but the project terminated before study of some of the less active years (1868-1873) could be done.

Copies of the reports were sent to Fort Jefferson, where presumably they are on file today. Other copies were placed in the Key West files of the Florida Works Progress Administration.

In Washington during the 1930's, Historian H. L. Garrett was also reading Fort Jefferson records for the National Park Service. His notes eventually became available to me.

As supervisor of the Key West research, I had hoped to develop the reports mentioned above into a history of the fort. However, the project ended before the proposed history could be completed beyond 1860. Fortunately, it was later possible to arm the interpreters at Fort Jefferson with "A Handbook for Fort Jefferson History" (1942), which summarized interesting historical data from the research reports.

Since the "Handbook" is not sufficiently detailed for constructional history, this more voluminous text is provided. It is based upon the following:

1. The 1846-1860 history
2. Excerpts from the 1861-1874 research reports
3. Excerpts from the "Handbook", 1874 ff.

This procedure provides data for each year except 1868-1873, a period when no large-scale construction took place anyway.

Though I claim authorship of this compilation, these are the people who did the research reports on which it is founded:

Mary Sweeting Lowe: 1847-1853

Enrique Esquinaldo, Jr.: 1854-1860, 1867

Dexter W. Woods: 1861-1864, 1866-1867

Oliver Armayor: 1874

Albert Manucy: 1844-1846, 1865, 1867

A. H.  
October 1961

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Air View of Fort Jefferson (ca. 1935)





## INTRODUCTION

The flying machine has brought Fort Jefferson National Monument into the itinerary of the tourists who have an interest in America's beautiful and historic areas. Only recently a National Monument, the Dry Tortugas was formerly a little recognized romantic spot and the ideal fishing ground for the yachtsman; its allurements as a place off the beaten path made it a powerful magnet for those fortunates who had a friend with a boat. Today's publicity and transportation conveniences have shortened the distance and minimized the difficulties of the sixty miles from Key West. Yet comparatively speaking, Fort Jefferson National Monument is still away from the usual trail, and thereby exerts a strong appeal to those individuals who shun the ordinary tourist havens.

Obscure in its own romance, Fort Jefferson is the magnetic center in the attractabilities of the Dry Tortugas. On the other hand, the fort is by no means the only item of interest in the islands. Themselves, the keys of the Tortugas must enthrall the tourist.

The archipelago forms the outermost tip of the great reef-like dam that extends from the southern tip of the Florida Peninsula two hundred miles into the Gulf of Mexico. The peculiar Marquesas Keys, midway between Key West and Dry Tortugas, form an atoll reminiscent of the south sea formations; and the Tortugas are also in a generally circular shape. The clear green water of the Gulf and the white sandy sea bottom are combined with colorful sea growth in an indescribable marine canvas of refracted light, while on close inspection the sea gardens, inhabited by myriads of colorful tropical fish, assume a fascinating character of their own.

Part of the National Monument long has been a wild life reserve; thousands of graceful--and some not too gracefull--sea birds migrate to these islands to fish and raise their young unmolested. The Carnegie Institution has established on Loggerhead Key a marine laboratory from whence comes much interesting information. On that island, too, is the famous Dry Tortugas Lighthouse.

When Ponce de Leon visited the group in 1513, he counted ten "rocky islets"; in 1844, there were eight; East Key, Sand Key, Middle Key, Long Key, Bush Key, Bird Key, Loggerhead and Garden Key; since that time, Bird Key has washed almost entirely away and a "New Bird Key" has formed across the channel to the east of Garden Key. The powerful sweep of ocean currents ever changes the contours of the group, but today, as a hundred years ago, the one island easily approachable by a deep channel leading into a safe and commodious harbor is Garden Key, on which is squeezed Fort Jefferson.

A first impression of Fort Jefferson is influenced by the grand scale of the sea. In the midst of a half dozen tiny islands barely above the surface of the Gulf, this squat fort of brick and mortar appears as if sinking below the surface of the sea--to have its larger mass under water and its superstructure barely above the waves. Not until one walks in the shadow of its walls does he appreciate the immensity of the structure. Its very bigness serves to dwarf it. Covering almost the entire area of Garden Key, the edifice has nothing near to lend it a proportionate scale.

The fort is hexangular, with four sides of four hundred seventy-six feet and two of three hundred twenty-five feet; from each of the six corners projects an angular bastion. Rising some twenty feet from the roof of the fort, an obsolete lighthouse surmounts the southeastern bastion stair tower.

On the north and south ends of Garden Key are the rusting ruins of two coal rigs built by the Navy Department at the turn of the century. When the fort was abandoned after 1906, usable apparatus from these buildings was removed and much of the metal salvaged. There remain only the skeletons of the structures, affording a touch of drab sienna to the otherwise colorful reds and greens of the picturesque mass.

The one entrance to the fort--a small sally port--is approached by a bridge over the encircling seventy-foot moat that protects the work itself from nature's encroachment. From the bridge, the forty-five foot walls of the fort assume their proper proportions, and from here the rusted embrasures of the lower tier afford a glimpse into a gloomy interior--gloomy, but shady and cool. The curtain or scarp wall is seen as millions of yellowish, hand-made bricks, rising almost vertically about forty feet to a crown of smaller, redder and more regular bricks. Second tier embrasures are rough and gaping, examples of interrupted construction.

From the granite curve at the entrance and the symmetrical rows of brick spans in the casemates, through the unusual askew sweep of the bastion supports, to the semi-circular and elliptical decorative arches of the stair tower doorways, Fort Jefferson is a splendid example of arch construction. The entrance is of granite, a segmental arch surmounted by a pediment. With the corbelled arches of the fort crown, this pediment comprises almost the sole attempt at architectural decoration. On either side of the sally-port are slot-like, off-set openings in the scarp wall, windows for the two guardrooms. Above the pediment are three narrow loopholes that open into a casemate above the gateway. Aside from these symmetrically placed openings, the

embrasures form a monotonous encircling chain. Half a dozen feet above the second tier embrasures is a corbelled band running like a collar about the fort; resting upon the band above each embrasure is a small rectangular recess of embrasure dimensions to give the impression of another row of gun ports, just as the dummy embrasures on the curtain walls of casemate magazines belie the eight foot thickness of brick behind. A contiguous series of semi-circular corbelled arches, kept from monotony by the interposition of a larger unit in every four, juts from the parapet height.

Within the fort extends a vast expanse of parade ground, on which the casemates open and where stand the parade buildings. To the east is the soldiers' barracks: a three hundred foot, three story structure now in ruins. On the north is a similar brick building, the officers' quarters, and between the two rises a great incomplete barrel vaulted magazine and a low lying shot oven. On the west side of the court are a few kitchens for a second officers' quarters never erected, the foundation for offices and chapel, and another partly built parade magazine.

Under each lower tier casemate is a cistern; upon the cistern arches is supported the level flagstone paving of the casemates. Traverse stones for great rectangular piers carry the weight of beautifully executed casemate arches in the segmental style typical of the entire fortification. The piers are pierced by drainage pipes from the roof of the fort to the cisterns beneath, and by small communication arches leading from one gun room to another. In the lower tier, each of the four long fronts has a magazine covering the area of two casemates. Second tier casemates are an incomplete repetition of those below, but there appear two sets of arches--the inner arch covering the gun room from curtain to traverse arcs, and an outer arch, two feet higher, over the area from the small communication arch to the parade facade. Few of the second tier gun rooms are flagged, there are no traverse arcs, the curtain is but a brick or two in thickness, embrasures are little more than gaping, irregular holes, but on the parade exposure some of the rooms are bricked up for quarters.

At each interior angle of the fort is a octagonal bastion stair tower, five sides and the entrance of which abut on the parade. Of medieval vintage, each stairway is an artistic example of the stonemason's ability: triangular slabs of granite, the outer ends of which are embedded in the walls of the towers, revolve about a centripetal axis that is smoothed into the similitude of a column. Thus the stairway supports its own weight. Bastions, too, have small magazines, the wooden inner walls of which show no ravages of time.

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Height from the parade to roof of the fort is approximately forty feet, while the breast height wall or parapet extends some six feet higher. On the roof (which is about forty feet wide) and at right angles to the length of each front are traverse magazines after the French plan, three on the long and two on the short fronts. Between the magazines are traverse arcs for gun carriages--and a few obsolete barbet guns sprawl forgotten in the rank vegetation.

So Fort Jefferson remains--an historic relic, its strategic function outlived. But in the cloister-like galleries, where the long reaches are no longer impeded by ponderous guns ready to belch forth smoke and hot iron, lurk ghosts of forgotten engineers, grinning blacks, Union soldiers and prisoners that died in the shadowy casemates. Those great yellow bricks, their edges rounded by weather, are humble monuments to skillful craftsmen, strong-backed Irish and singing Africans who toiled sweating in the broiling sun. Under a triangular arch on the parade is a stark white tablet of imperishable marble, ostensibly placed to the memory of a brave doctor and his little boy; actually it is a simple symbol of respect for the futile heroism of Man's struggle for conquest. While the walls of Fort Jefferson crumble and fall into the sea, the white stone stands firm under the polishing of the winds--until the day the coral sand covers it, or until it, too, vanishes into the bosom of the sea.

June 1936

A. M.

**PART ONE:**

**THE FORT AT GARDEN KEY**

**1846-1860**

Map Showing Position of Dry Tortugas in  
Relation to the Gulf Coast, May 25, 1893



GULF OF  
MEXICO

DRY  
TORTUGAS

KEY WEST

FLORIDA STRAITS

BAHAMAS

HABANA

CUBA

MAP SHOWING POSITION OF  
DRY TORTUGAS  
IN RELATION TO THE GULF COAST

From Pilot Chart of Central American Waters  
Sheet No 3500, Hydrographic Office U.S.N.  
15 Mar 1935

KEY WEST FLORIDA





## THE FORT AT GARDEN KEY

1646-1660

### The Conquistadores

Swinging westward in a crescent curve from the southern point of the Florida Peninsula is the limestone upheaval and accumulation known as the Florida Reef. At its tip, about sixty-five miles west by nor'west of Key West are clustered eight little islets, romantically connected with the conquest story of the Americas. Hardly a score of years after Columbus made his landfall in the West Indies, Ponce de Leon named the tiny group Las Tortugas, appropriately enough for the great turtles that infested the waters.<sup>1</sup>

From the vantage of the 20th Century, gigantic Fort Jefferson on the center Tortugas island appears in the similitude of a huge white elephant; in point of modern defense the relic on Garden Key looms closer to medieval times than our own. Yet, a young and growing republic saw fit to expend millions for a Gibraltar of the Gulf in the

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<sup>1</sup> F. P. Spofford, translation of Herrera: Historia General de los Castellanos en las Islas tierras firme del Mar oceano (from T. F. Davis: History of Juan Ponce de Leon's Voyage to Florida, in the Florida Historical Society Quarterly, Vol. XIV, No. 1, July, 1905). Ponce de Leon evidently first sighted the islands about May 18, 1513; in June he returned to them: "...On Tuesday, the 21st, they reached the rocky islets, which they named Las Tortugas, because in one short time in the night they took, in one of these islands, one leopard and sixty tortoises, and might have taken many more if they had wanted them. They took also fourteen seals, and there were killed many pelicans and other birds that amounted to five thousand...."

firm belief that nature could not have provided a more strategic site for impregnable defensive works.

Nor was the idea peculiar to United States strategists: The Spanish fort called San Anton,<sup>2</sup> though on the mainland of Florida, had much the same strategic function in the 1500's that Fort Jefferson had during the 1800's. 1522 marked Juan Sebastian del Cano's return from circumnavigation of the earth, but it was also the date of a spectacular warning that Spain was not to have things her own way in the Americas. Cortes had just reconquered Mexico. To ingratiate himself

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<sup>2</sup> See J. T. Connor (ed.): Colonial Records of Spanish Florida, Vol. I, Appendix A, Memoria presentada a Su Majestad por el Capitan Antonio de Prado sobre quatro fuertes de la Florida, Nov. 16, 1509. De Prado's Memorial is couched in the peculiar syntax of old Spanish: "...En la florida A de aber quatro fuertes...En el fuerte de sant anton q esta en la tierra de carlos q Cae sobre la cabeça de los martires frontero de las Tortugas a de aber çien soldados porq desde alli guardan allanan y aseguran toda la cabeça de los martires y canal de bahama y es de mucha ynportançia y los yndios son muy guerreros y Casi todos los caçiques enemigos nros y amigos de los françoese...."

Connor's translation follows: "...In Florida there must be four forts.... In the fort of San Anton, which is in the land of Carlos, which is situated at the head of Los Martires, in front of las Tortugas, there should be one hundred soldiers; for from there they protect, make secure and keep open the whole of the head of Los Martires and the Bahama Channel and this is of much importance, and the Indians are very warlike, and nearly all the Caciques are our enemies and friends of the French...."

Cf. M. Kenny: The Romance of the Floridas, index, Adelantado Pedro Menendez.

with the Spanish Emperor, he gathered up a generous and representative collection of treasure, which he despatched for Spain. But the cargo of loot was destined, through the fighting ability of a French corsair, to grace the court of Francis I rather than that of the Emperor Charles V, and the capture of Cortes' emissary was only the beginning of enthusiastic piracy by which French, Irish, English and Dutch secured compensation for their exclusion from the new continents. These high-handed seamen soon sailed to America to do their work, infesting the neglected Caribbean islands and the Bahama Channel.<sup>3</sup> The conquistadores were brought face to face with the realization that if Spain did not occupy her claims to the Florida salient, it was sure to be preempted as a piratical base--and such was the circumstance that came to pass, if we may judge credible the pirates tales even to the 19th Century.

#### The Expansionists

It was not until after Florida formally changed hands on February 22, 1821 that the determined and resourceful hand of Porter drove the Brethren of the Coast from their accustomed haunts along the Florida Keys.<sup>4</sup> As another step in maritime insurance, Garden Key,

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<sup>3</sup> J. B. Brebner: The Explorers of North America, pp. 102-103.

<sup>4</sup> Report of Secretary of the Navy to the President, Dec. 29, 1822 (from W. C. Maloney: History of Key West, Florida, note D, p. 9).

Dry Tortugas, was selected as a lighthouse site, and three years after the authorizing Congressional Act of May 7, 1822, the structure was erected.<sup>5</sup>

Establishment of a light at this remote group of islands indicated in some measure its important position in relation to an increasing American commerce. A new West, no longer bottled up by foreign occupation of New Orleans, flourished. Behind the Appalachians, along the Ohio, the Missouri and the Tennessee, thousands of New settlers floated their produce down the Mississippi and loaded it aboard schooners for the East. Vessels voyaging from Gulf coast to Atlantic seaboard were obliged to navigate the treacherous Florida Straits. The War of 1812 was but yesterday; a new nationalism pervaded the entire nation, and fortification of the Florida Reef was justified as potential security not only for United States commerce, but against encroachment upon the newly acquired, sparsely settled territory.

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<sup>5</sup> Copy of Letter, Sept. 9, 1847: R. M. Young, Commissioner, General Land Office, Wash., to Hon. R. J. Walker, Sec. Treas., Wash. (encl. of Letter, Nov. 29, 1847: Col. J. G. Totten, Engineer Dept., Washington, D. C., to Lt. H. G. Wright, C. E., Tortugas Island). See also Laws of United States Relating to the Establishment, Support, and Management of the Light-houses, Light-vessels, Monuments, Beacons, Spindles, Buoys, and Public Piers of the United States, from August 7, 1789, to March 3, 1855, pp. 57, 59, 64, 128, 131, 133, 161, 168, 190, 195.

In addition, there was the boiling pot of Latin-American independence: an outpost at the extreme southern boundary of the expanding<sup>d</sup> United States was a progressive step in carrying out the policy that came to be known as the Monroe Doctrine. And, of course, Tortugas was seen as a base of operations against recurrent piracy. No man realized these facts better than Andrew Jackson, who had experience of an extremely practical nature in Florida and along the Gulf coast.

It was under Jackson's administration that the Navy Department made a preliminary survey of the Florida Reef, which resulted in a cogent argument by Captain Tatnall for establishing bases in that vicinity:

"...A naval force, designed to control the navigation of the Gulf, could desire no better position than Key West or the Tortugas. Upon the very wayside of the only path through the Gulf, it is, at the same time, well situated as to all the great ports therein. It overlooks Havana, Pensacola, Mobile, the mouths of the Mississippi, and both the inlet and the outlet of the Gulf.

"The Tortugas harbors...afford shelter for vessels of every class, with the greatest facility of ingress and egress. And there can be no doubt that an adversary, in possession of large naval means, would, with great advantage, make these harbors his habitual resort, and his point of general rendezvous and concentration for all operations on this sea. With an enemy thus posted, the navigation of the Gulf by us would be imminently hazardous, if not impossible; and nothing but absolute naval superiority would avail anything against him. More military means could approach no nearer than the nearest shore of the continent.

"It is believed that there are no harbors in the Gulf at all comparable with these, that an enemy could resort to with his larger vessels. To deprive him of these, would, therefore, be interfering materially with an organized system of naval operations in that sea. The defence of these harbors, would, however, do much more than this. It would transfer to our own squadron, even should it be inferior, these most valuable positions; and it would afford a point of refuge to our navy and our commerce at the very spot where it would be most necessary and useful. By occupying two (or at most three) small islands, the harbors of the Dry Tortugas...may be thoroughly protected..."<sup>6</sup>

Lieutenant Maury's researches showed that seasonal winds blew to the disadvantage of the shipping south of Cuba; and that passage became extremely difficult from January to April while the southern cotton crop was transported to market. Tatnall further pointed out that Great Britain, France, Spain, and Denmark had possessions in the Gulf region. Some of the island possessions of these nations were "said to be well fortified," whereas the United States had no suitable retreat for the navy along five hundred miles of coast. In case of war, these powers would constitute a menace to the United States: since most of the region's trade passed through the Florida Straits, a powerful enemy could blockade the entire Gulf and consequently bottle up the new West. So perturbed was the Captain about the "encroachment" of England that on maps accompanying his report he marked with a black flag the possessions of this "island poacher," called attention to the important naval station in the Bermudas, and remarked that from there British cruisers and

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<sup>6</sup> Report of House Committee on Military Affairs, 28th Congress, 1st Session, Vol. II, Report 47, pp. 1-19.

"blackamoor" regiments might descend at will upon the South Atlantic ports.

Within that decade of the '30's, Texans took matters into their own hands and broke from the republic of Mexico. Sam Houston's envoy to Washington demanded annexation or recognition; he got the latter since the question of annexation brought the slavery issue to the fore, the administration was lukewarm, desirous of keeping that particular thorn out of Dame Politics' side. Yet, Texas, as an independent nation that had acquired a navy, a national debt, and recognition from both Britain and France, was liable to ominous overtures from foreign powers. As a matter of fact, growing Texas appeared increasingly impatient with United States scruples against annexation, and was herself prone to be not too discriminating about her affiliations. Mexico had made little effort to coerce the recalcitrant back into the fold, but Houston nevertheless realized that Texas needed protection and security. Annexation to the United States would provide it. If it were not forthcoming, the alternative was dual mediation by Great Britain and France to obtain acknowledgment of Texan independence by Mexico; then, adequate guarantee to maintain it.

Undoubtedly that project had appeal to European statesmen. A friendly Texas appeared not only a commercial asset, but a redoubt against further United States expansion. In 1844, Mexican ministers at London and Paris were informed that, if their nation would recognize

the Texan Republic, England and France would guarantee both the independence of Texas and the boundaries of Mexico.

California, too, complicated the situation. Tyler, by his peculiar party affiliations, was restricted in open action, but with Daniel Webster he moved swiftly and resolutely under the curtain of diplomacy. Just as Calhoun wanted Texas for his planters, Webster needed points of support for whaling and China trade in the Pacific. Acquisitive proposals of every nature fell on deaf ears in Mexico, and when in 1842 Commodore Jones seized Monterey on the strength of a rumor that the United States and Mexico were at war and California might be turned over to England, his display of pugnacity proscribed peaceful annexation of that territory.

And paradoxically enough, because it was diametrically across a great continent from the Key to the Gulf, Oregon likewise bore upon the establishment of Gulf fortifications. The difficulty of over-land communication led to projects of inter-oceanic canals. When James Monroe was in the White House, Great Britain already had two bases in Central America; and between 1825 and 1845, weakness of Latin-American republics, lapse of the Monroe Doctrine at Washington, and the very enterprise of the ubiquitous Britisher brought about a sensible increase in English dominion and influence.



Yet another knot in the tangle was restless Cuba. Southerners professed a fear that failing Spain would be elbowed off the imperial stage, and if the Pearl of the Antilles did not go to England it might well become another Haiti--unless, of course, the Union placed a protective wing over the large and redundant slave population that was a mote in the speculative eye of a cotton-growing southland. From the military viewpoint, Dry Tortugas, almost an exclave of the United States in its proximity to Spanish possessions, was the southernmost outpost, and the imminence of hostilities was adumbrated in an admonitory letter to the Fort Jefferson engineer:

"...Make haste with your work, we shall want it all ready, mounted with 212 pounders or 12 inch columbiads in less than 5 years. The Cuban question will be forced upon us..."<sup>7</sup>

In the 1844 presidential election, the Democratic party cleverly managed to link the Oregon and Texas issues, setting aside the slavery aspect and making the platform one of national expansion and prestige. Endorsement of expansion rendered imperative immediate steps for defense of acquisitions.<sup>8</sup> December 2, 1844, belatedly recalling Tatnall's

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<sup>7</sup> Letter, Oct. 20, 1847: Maj. W. H. Chase, Pensacola, Fla., to Lt. H. G. Wright, C. E., Tortugas.

<sup>8</sup> For a more detailed discussion of the foregoing argument see S. E. Morison and H. S. Commager, The Growth of the American Republic, pp. 455-59, 463, 484-86, 684; also C. A. Beard and M. R. Board, The Rise of American Civilization, pp. 591, 602-03, 621.

observation that if the strategically located Florida Keys were of any value to the United States, they were invaluable to a potential enemy as an "habitual resort," the Engineer Department at Washington issued orders<sup>9</sup> for a survey of the Florida Reef to determine the extent and feasibility of a proposed defense system; the nature of the orders indicated that considerable attention already had been given the idea of sister fortifications at Key West and Tortugas--in fact, an engineer had been sent to make the preliminary observations<sup>10</sup> -- and the findings of the Survey Board confirmed the nebulous opinion of the engineers.

February 18, 1845, Congress voted Texas into the Union. December 17, 1845 President Polk proclaimed Garden Key a military reservation.<sup>11</sup> Major Hartman Bache's topographical survey was completed early the next year,<sup>12</sup> and plans for one of the most important

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<sup>9</sup> Engineer Order No. 11, Dec. 2, 1844. Certain documents not in the Key West Barracks Collection of Source Material would clarify date and extent of surveys and reports previous to 1845: (1) Letter, Jan. 30, 1844: Engineer Dept. to Secretary of War asking for a reconnaissance and survey of the Florida Reef, (2) Letter, Sept. 10, 1844: instructions from the Chief Engineer to Capt. J. G. Bernard, (3) Bernard's reply, Nov. 14, 1844, to those instructions.

<sup>10</sup> Senate Documents, 21st Congress, 1st Session, Vol. I, p. 569: 1845-1846, Fortifications on the Florida Reef, Report of J. G. Totten, Chief Engr.

<sup>11</sup> Copy of Letter, Sept. 9, 1847: R. M. Young, Commissioner, General Land Office, Wash., D. C., to Hon. R. J. Walker, Sec. Treas.

<sup>12</sup> Letter, Feb. 2, 1846: Lt. G. L. Welcker, Engineer Dept., Wash., D. C., to Capt. G. Dutton, C. E., Key West, Fla.

links in the chain of southern seacoast fortifications proceeded  
apace.

May 19, 1846 Captain William D. Fraser of the Engineer Corps  
was placed in charge of the projected fortification at Tortugas,<sup>13</sup> but  
he had not fairly started on his task when he was ordered to join the  
Army about to move into Mexico from San Antonio de Bexar. On July 27,<sup>14</sup>  
Colonel Joseph G. Totten, Chief Engineer, imposed on Second Lieutenant  
Horatio Gouverneur Wright the duty of erecting the

"...Hexangular casemated work, elongated, but  
symmetrical /sic/...being four longer sides of  
476.88 feet each, and two shorter sides...of  
324.88 feet each...."

Horatio Wright  
(1846 - 1856)

Connecticut-born, Horatio Wright was a West Point graduate of  
1841, ranking second in his class. A favorite with his associates--  
if his correspondence is any indication--he was typical of that group of  
West Point men who served during the expansionist movement in the first  
half of the 19th Century, and who, whether they elected North or South  
in the coming civil conflict, afforded gallant leadership. Until he  
was handed the Tortugas charge in 1846, Wright acted intermittently as

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<sup>13</sup> Unfinished Letter: Engineer Dept., Wash., D. C., to Capt. W. D.  
Fraser, C. E., Wash., D. C., p. 1: There is no date, but the letter  
must fall between May 19 and July 27, 1846. See post, Appendix.

<sup>14</sup> Letter, July 27, 1846: Col. J. G. Totten, Engineer Dept., Wash.,  
D. C., to Lt. H. G. Wright, C. E., Wash., D. C.

assistant to the Board of Engineers, and as instructor in French and Engineering at his Alma Mater.<sup>15</sup>

The promising young officer was duly impressed with the importance of his Tortugas assignment, the more so because of his obvious inexperience; after he was established at Garden Key and the first flush of enthusiasm had faded, he confided to his chief:

"...The kind of work is entirely new to me, and greater or less difficulty may be met with than I have allowed for...."<sup>16</sup>

It turned out to be "greater difficulty."

Two-hundred thousand dollars (\$200,000) had been appropriated by Congress for the Florida Reef fortifications, and the day following his appointment Wright received the initial allotment of \$10,000 to begin actual operations.<sup>17</sup> It took four months to prepare for the first expedition: bids for the Garden Key buildings were

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<sup>15</sup> G. W. Cullum, Biographical Register of the Officers and Graduates of the United States Military Academy at West Point, New York, from Its Establishment March 16, 1802, to the Army reorganization of 1850-57, Vol. II; Eaitman, F: Historical Register and Dictionary of the United States Army from Its Organization, September 29, 1730, to March 2, 1903, Vol. I.

<sup>16</sup> 1848 Annual Report of Operations.

<sup>17</sup> Letter, June 30, 1848: Bank of Commerce, N. Y., to Lt. H. G. Wright, C. E., Wash., D. C.

received and compared;<sup>18</sup> the Portsmouth firm of Norton and Parker signed a contract for erection of the temporary structures;<sup>19</sup> Wright bought the 112-ton schooner Activa, hired a crew of six, a clerk, mason and a carpenter. December 1, 1846 he sailed from New York harbor.<sup>20</sup>

The maiden voyage took a trifle more than a fortnight; on the fifteenth day<sup>21</sup> out of New York the Activa was piloted into the clear emerald water of Tortugas harbor. Wright saw a barren group of eight little islands, covered with dusky green mangrove and button-wood save where the warm water laved dazzling white sand beaches. The largest of the islands, Loggerhead, was perhaps a half mile long; others were awash at high tide. Garden Key itself was barely three feet above sea level, a rough oval about 300 yards long by 200 wide with a stagnant pond in the center, but it had the advantage of fronting on the

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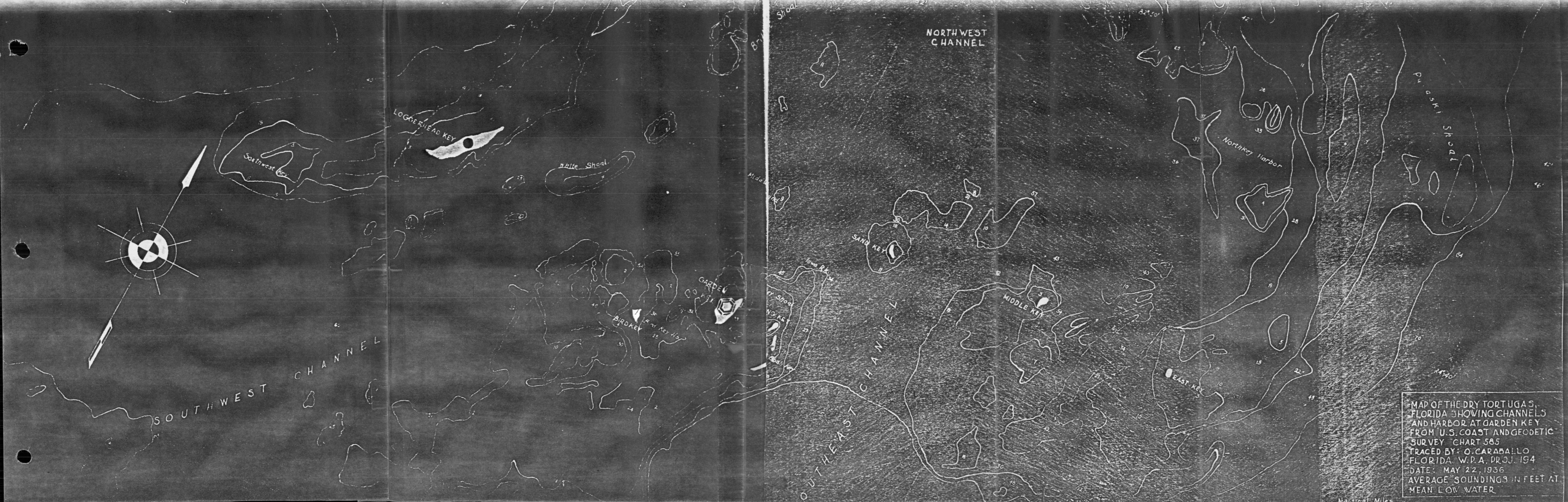
<sup>18</sup> Wright secured bids for both temporary and permanent buildings-- that is, for brick quarters and barracks on the parade, and wooden buildings for supplies and work shops. Benjamin Parker, who later acquired Norton as a partner, offered to erect the six temporary wooden buildings by Feb. 30, 1847 for \$5,485. Bids for the permanent structures were without exception so high that Wright recommended their construction by the Government at a later date. Totten approved the plan, and Parker set forth a satisfactory price for putting up two additional wooden buildings as temporary workmen's quarters. For the administrative force, Wright suggested Government construction of the officers' quarters kitchens. (See Memorandum, Oct. 3, 1846: H. G. Wright; also Memorandum, Oct. 11, 1846: Col. J. G. Totten, C. E., Buffalo, N. Y., to Lt. H. G. Wright.) The last part of the plan was later modified to include erection of a 69-foot section of the officers' quarters. Cf. post, Appendix.

<sup>19</sup> Letter, Nov. 11, 1845: B. M. Parker, Portsmouth, N. H., to Lt. H. G. Wright, C. E., N. Y.

<sup>20</sup> Quarterly Returns, 4th qr., 1846: Vouchers 2, 59, 62.

<sup>21</sup> Ibid., Voucher 60.

Map of the Dry Tortugas, Florida, Showing  
Channels and Harbor at Garden Key. From  
U. S. Coast and Geodetic Survey Chart  
525, May 23, 1903.



NORTH WEST CHANNEL

LOGGERHEAD KEY

Southwest Key

White Shoal

GARDEN KEY

BIRD KEY

SAND KEY

MIDDLE KEY

EAST KEY

North Key Harbor

SOUTHWEST CHANNEL

SOUTHEAST CHANNEL

MAP OF THE DRY TORTUGAS,  
 FLORIDA SHOALING CHANNELS  
 AND HARBOR AT GARDEN KEY  
 FROM U.S. COAST AND GEODETIC  
 SURVEY CHART 585  
 TRACED BY: O. CARABALLO  
 FLORIDA W.P.A. PROJ. 194  
 DATE: MAY 22, 1936  
 AVERAGE SOUNDINGS IN FEET AT  
 MEAN LOW WATER

Nautical Miles

commodious harbor.<sup>22</sup> The sole residence was that of the Garden Key light keeper, but thousands of birds were numbered among the inhabitants and occasionally fishermen from Key West and Cuba sailed in and loaded aboard not only hundreds of pounds of fish but thousands of bird eggs.<sup>23</sup>

From the outset Lieutenant Wright was faced with the difficulties attendant upon isolation. Rain furnished the only supply of fresh water in the Dry Tortugas.<sup>24</sup> Key West, twenty leagues to the east over treacherous water, was but a thirty-year old village of less than a thousand people;<sup>25</sup> practically no supplies of any kind were immediately forthcoming from that point. Freight rates from the Gulf ports were exorbitant,<sup>26</sup> and the Engineer found himself obliged to depend mainly for supplies and materials on the commercial center of New York, a two weeks' journey from his islands.

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<sup>22</sup> Photostatic copy of Plan, June 9, 1846: Fortifications Florida Reef: Projected Fort for Garden Key, Dry Tortugas. Engineer Dept., Wash., D. C., Drawer 74. Sheet 2; also, Monthly Report of Operations, Oct. 1849.

<sup>23</sup> So John James Audobon attested after his visit in 1832. (See J. J. Audobon: Ornithological Biography, 1835, Vol. III, pp. 283-299. The extract is given in 1917 Annual Report of the Smithsonian Institution, pp. 473-77, P. Hartsch: Bird Rockeries of the Tortugas.)

<sup>24</sup> Cf. Letter, June 11, 1846: Capt. J. G. Barnard, C. E., New Orleans, La., to Capt. G. Dutton, C. E., Key West, Fla. "...I certainly did not suppose, that you mentioned the dryness of Key West and the Tortugas, as insuperable objections to their fortification...I purposely advised against commencing at that time at the Tortugas as I thought so extensive a system required perfect knowledge of the locality and much deliberation..."

<sup>25</sup> In 1830 Monroe County census showed 517 inhabitants; in 1840, 688; 1850, 2,645; 1860, 2,913.

<sup>26</sup> 1847 Annual Report of Operations.



In spite of these things, Wright lost no time getting to work. While the Yankee carpenter, Jeremiah Feabody, put up a temporary shelter, he and the mason, George Phillips, laid out sites of fort and temporary buildings, discovered that an October hurricane had already changed the contours that Bache had recorded, and examined the various Keys in a hunt for construction materials.<sup>27</sup>

Meanwhile, Norton and Parker were supposed to have made the first shipment of materials for the eight temporary buildings by Christmas Day, 1846; as a matter of fact, materials were all ready and partially loaded on the vessel when Lieutenant D. Leadbetter at the New York Engineer Agency was informed that the firm had failed; without means, the men had taken the contract at too low a figure, and their creditors swooped down upon them. Under the circumstances there was nothing to do save advertise for new bids, and the subsequent delay was the first intimation Wright had as to the aggravating difficulties he had to overcome in building his great fort.

The new contract was awarded to Andrew B. Vennard, a Portsmouth creditor of the bankrupt firm; Vennard was in possession of the materials, and delegated the unlucky Norton and Parker his foreman. The stipulated price for erection of the buildings--blacksmith shop, carpenter shop, barracks, kitchens and mess room, bakery, stable and storehouse--was \$13,800.<sup>28</sup>

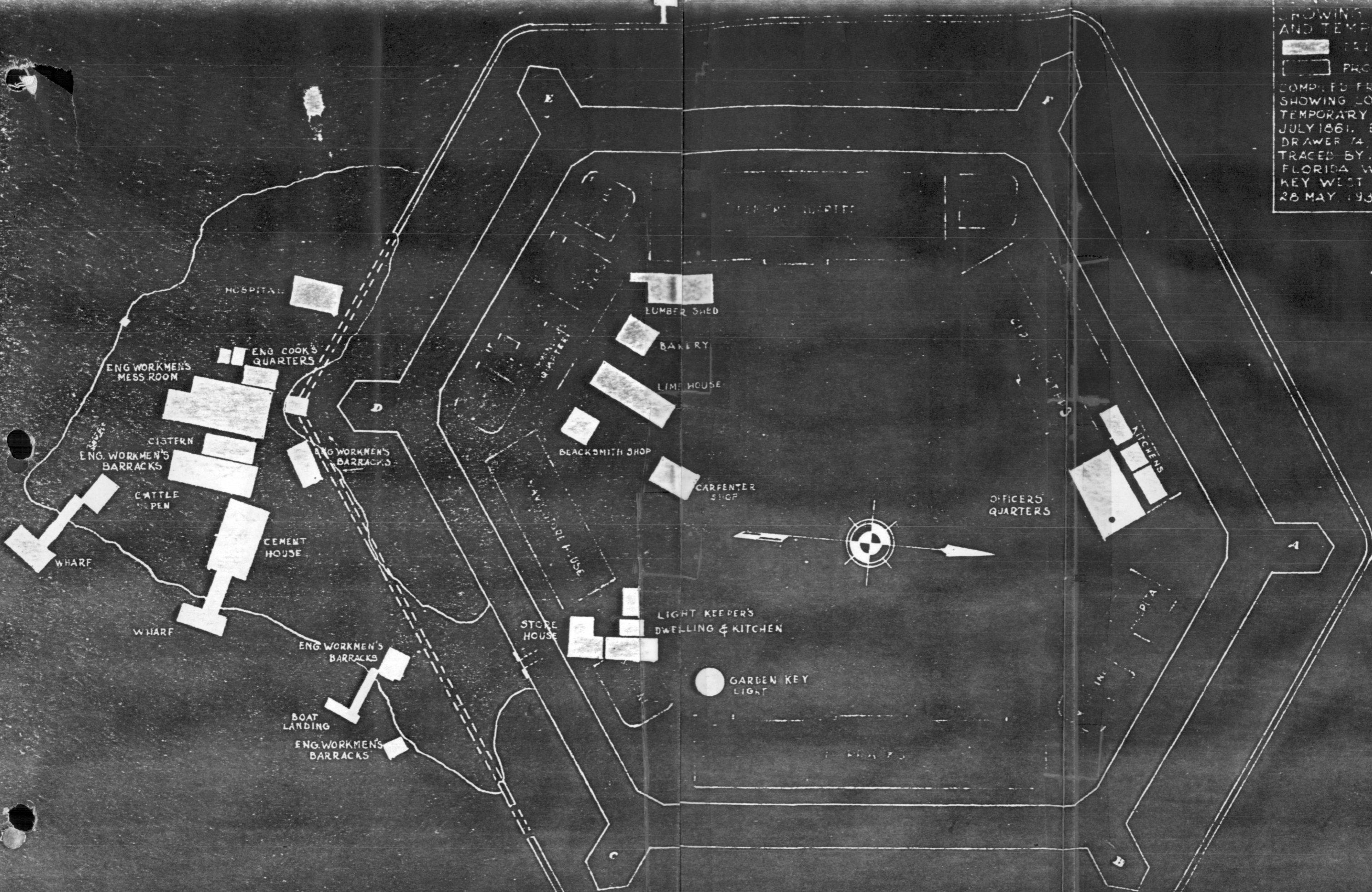
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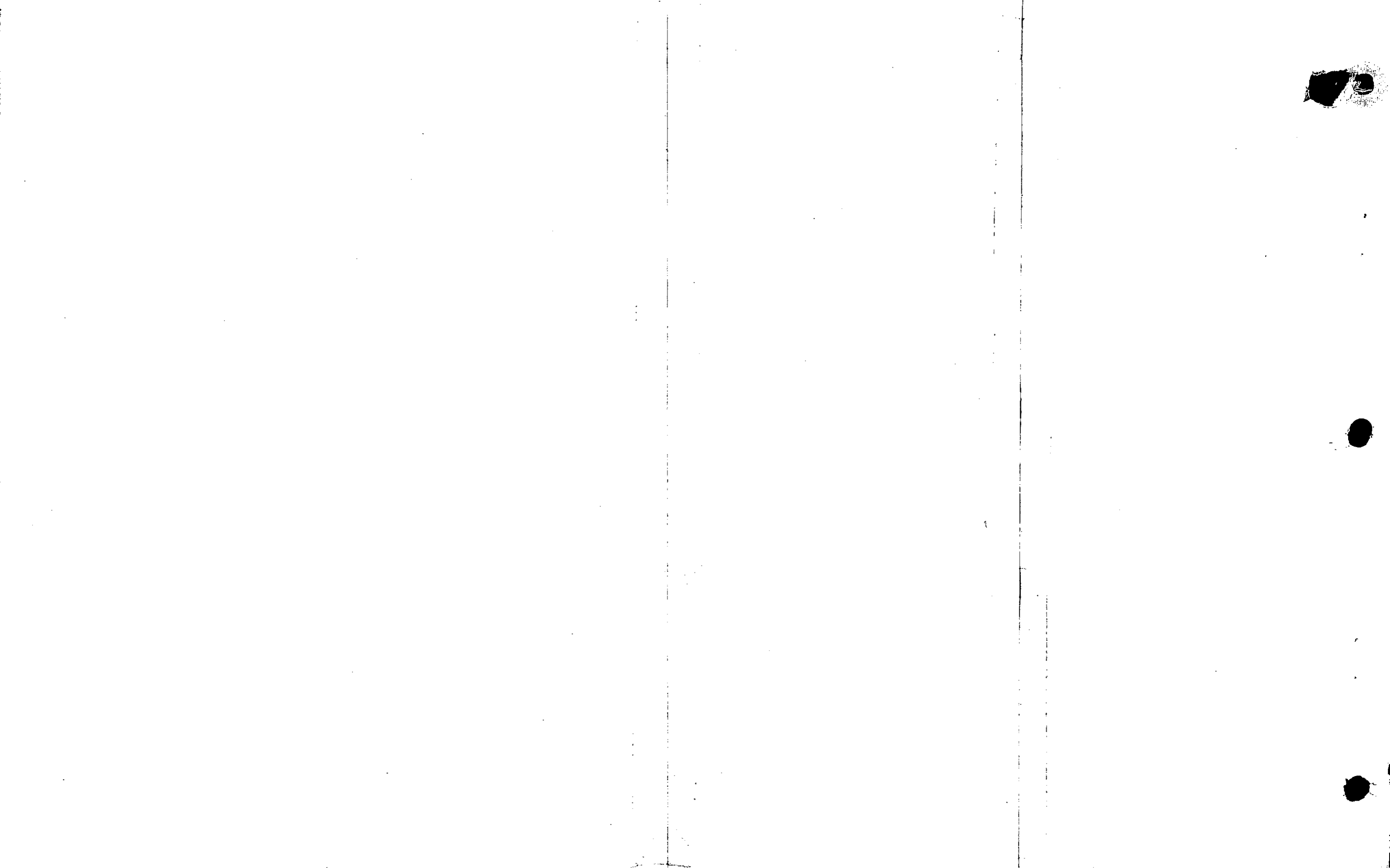
<sup>27</sup> Monthly Report of Operations, Dec. 1846; 1846 Annual Report of Operations.

<sup>28</sup> 1847 Annual Report of Operations; Letter, Feb. 8, 1847: Lt. D. Leadbetter, C. E., N. Y., to Lt. H. G. Wright, C. E., Garden Key, Fla.; Letter, Apr. 3, 1847: G. L. Welcher, Engineer Dept., Wash., D. C., to Lt. H. G. Wright, C. E., Garden Key, Fla.; Letter, Nov. 3, 1847: A. B. Vennard, N. Y., to Lt. H. G. Wright, C. E., Garden Key.

Plan of Fort Jefferson, Florida, Showing  
Location of Permanent and Temporary Build-  
ings Before 1861.

PLAN OF THE FORT  
 SHOWING LOCATION OF  
 PERMANENT AND TEMPORARY  
 BARRACKS  
 [Hatched Box] EXISTING  
 [Dashed Box] PROPOSED  
 COMPILED FROM "FORT  
 SHOWING LOCATION OF  
 TEMPORARY BARRACKS  
 JULY 1861. ENGINEER  
 DRAWER 74 SHEET 5  
 TRACED BY ORLANDO  
 FLORIDA W.P.A. PROJECT  
 KEY WEST  
 28 MAY 1936.





Materials were finally shipped in the latter part of May. And although the buildings were evidently supposed to be prefabricated in New England and erected at Garden Key by July 20, 1847, it was not until the early part of the year following that the last two were finished, and Wright finally had to furnish out of the Government store the requisite material for their completion.<sup>29</sup>

While Vennard was engaged with his work, Wright had procured what he needed to begin the permanent part of the work.<sup>30</sup> About October 1847, a score of slaves started digging on the site of the officers' quarters. Two months later, some fifty men were industriously mixing mortar, laying brick and sawing lumber. There was a lull during the following summer; funds were running low, and except for the desultory labor of the Activa's crew and a single carpenter, work remained virtually at a standstill<sup>31</sup> until Wright, by this time a First Lieutenant,<sup>32</sup> wrote George Phillips at Buffalo in September, urging him to go posthaste with mosquito bars and three good masons to Tortugas--Congress had set aside \$25,000 for the Fort on Garden Key.<sup>33</sup> February 1849, the gang of laborers began excavation for the counterscarp, and the masons little by

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<sup>29</sup> Letter, Nov. 30, 1847: A. B. Vennard, Portsmouth, N. H., to Lt. H. G. Wright, C. E. See also sources cited ante note 13.

<sup>30</sup> 1847 Annual Report of Operations.

<sup>31</sup> Monthly Report of Operations, Oct.-Dec. 1847, Jan.-Dec. 1848; Letter, Feb. 12, 1848: H. A. Ogden, Key West, Fla., to Lt. H. G. Wright, C. E.; Letter, May 30, 1848: Lt. D. Leadbetter, C. E., N. Y., to Lt. H. G. Wright, C. E.; Quarterly Returns, 3rd qr., 1848.

<sup>32</sup> Feb. 28, 1848. See Cullum, op. cit., and Heitman, op. cit.

<sup>33</sup> Letter, Feb. 12, 1848: Lt. H. G. Wright, C. E., Key West, Fla.

little turned their attention from quarters to breakwater.<sup>34</sup> The next year, a completed section of the quarters, 69 by 44 feet, stood three stories high, and was backed up by three detached kitchens.<sup>35</sup>

1850 was an eventful year; the quarters were finished, then damaged by high winds; fever visited the key for the first time,<sup>36</sup> and on October 3 the Garden Key work was dignified with the name of Fort Jefferson.<sup>37</sup>

Early in 1851, the first concrete for the scarp foundation of Front 1 was poured into the forms.<sup>38</sup> August saw the counterscarp up on every side of the island except the south where the key jutted out to afford adequate protection from the sea; and with the breakwater on the shoal thus far completed, the force concentrated on scarp and chapel foundations.<sup>39</sup>

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<sup>34</sup> Monthly Report of Operations, Feb.-Dec. 1849.

<sup>35</sup> 1850 Annual Report of Operations.

<sup>36</sup> Letter, Aug. 23, 1850: D. W. Whitehurst, Garden Key, Fla., to Lt. H. G. Wright, C. E., Key West, Fla.; Letter, Sept. 9, 1850: D. W. Whitehurst, Garden Key, Fla., to Lt. H. G. Wright, C. E.; Quarterly Returns, 3rd qr., 1850: Voucher 5.

<sup>37</sup> Letter, Oct. 9, 1850: Capt. F. A. Smith, Engineer Dept., Wash., D. C., to Lt. H. G. Wright, C. E., N. Y.

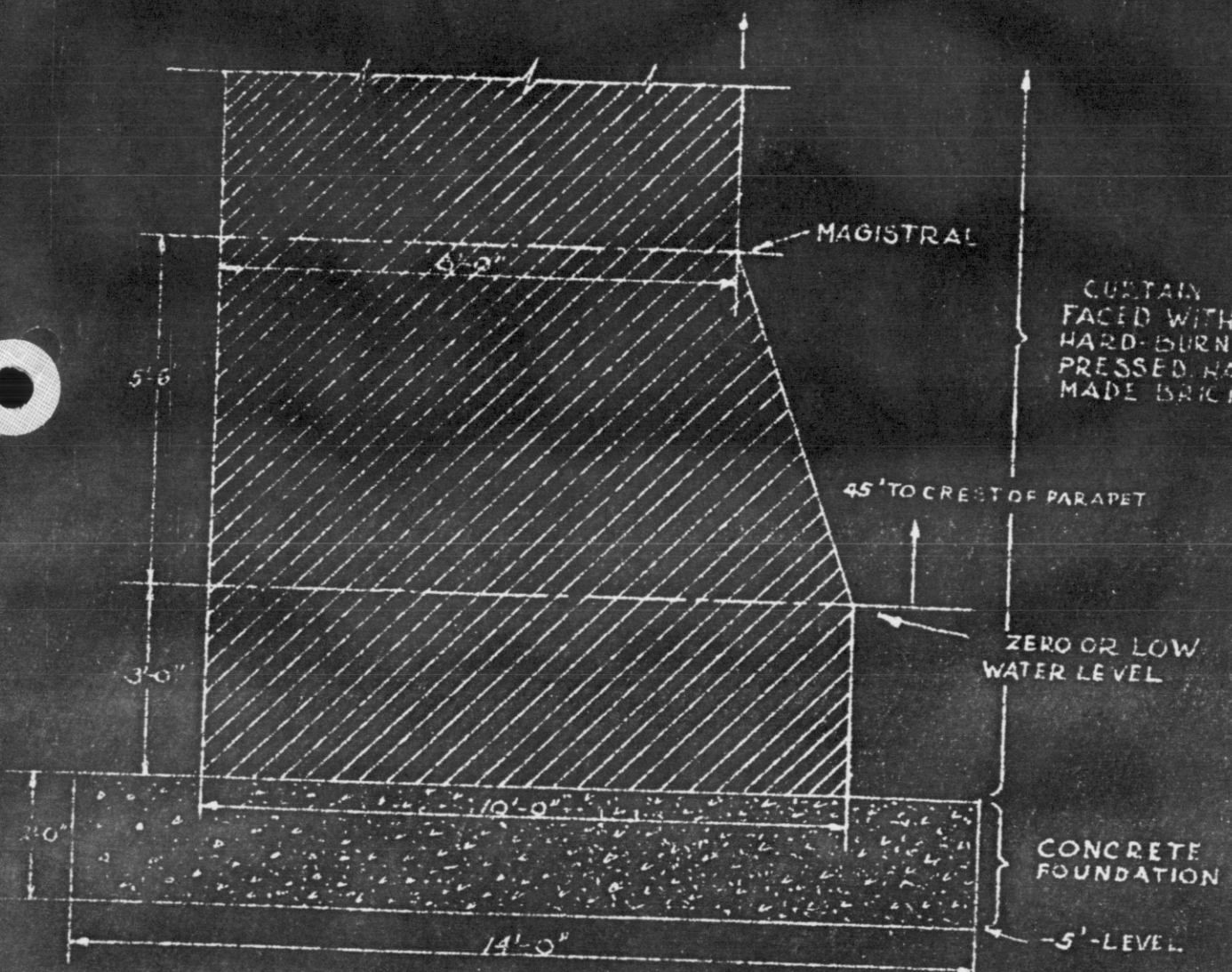
<sup>38</sup> Monthly Report of Operations, Mar. 1851.

<sup>39</sup> 1851 Annual Report of Operations; Monthly Report of Operations, Jan.-Dec. 1851. In the process of building the breakwater, Engineer Wright abandoned the treacle process (for laying concrete under water) that Captain G. Dutton had used with such success at Fort Taylor. In its stead he utilized the extremely satisfactory cofferdam method. (See Letter, Mar. 22, 1849: Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Lt. H. G. Wright, C. E., Garden Key, Fla.)

Sketch showing Section of Scarp Foundation  
and Wall, Fort Jefferson, Florida. Com-  
piled from unfinished letter, 1846:  
Engineer Department, Washington, to  
Capt. W. D. Fraser, Corps of Engineers,  
Washington. May 28, 1833.

SKETCH SHOWING SECTION OF SCARP FOUNDATION AND WALL  
 FORT JEFFERSON, FLORIDA  
 COMPILED FROM UNFINISHED LETTER, 1846: ENGINEER DEPARTMENT,  
 WASHINGTON, TO CAPTAIN W.D. FRASER, CORPS OF ENGINEERS,  
 WASHINGTON

TO CREST OF PARAPET,  
 BATTER OF  $\frac{1}{8}$  OF AN INCH  
 TO 1 FOOT



SCALE -  $\frac{3}{8}$ " = 1'-0"



Excavation for the chapel had begun concurrently with that of the scarp in February; it was hardly with an eye to religion, however, that Wright thus early made a beginning of the chapel: Vennard's wooden cisterns were already warped and rotten, and it was a matter of vital importance that masonry water reservoirs ensure an adequate supply for the isolated Dry Tortugas. The foundations of the combination chapel and offices would provide a great cistern, and although the superstructure was never begun, by 1852 the foundation was completed.<sup>40</sup>

In spite of Wright's urgings that the scarp be raised as soon as possible to low water level with an eye to efficient and economical construction from that point, no appropriation was forthcoming in 1852, and he was obliged to suspend work on May 13. In the meantime, he had pushed operations to the point that when the force left Garden Key, the scarp on Fronts 1 and 6 as well as at Bastions A and B was up to low water or reference zero.

Construction was not resumed until July 1853, but the \$100,000 appropriation had been so long anticipated that there was no delay in despatching materials, provisions and men for the fort. As Wright had prophesied, considerable time and money were expended making repairs, receiving materials, and placing an enroachment along the weather front

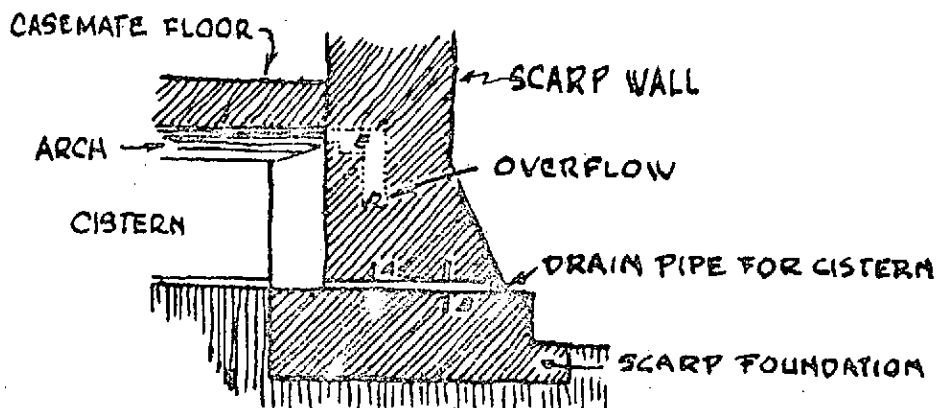
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<sup>40</sup> Monthly Report of Operations, Feb. 1851; 1851 Annual Report of Operations; Letter, June 15, 1850: Capt. F. A. Smith, Engineer Dept., Wash., D. C., to Lt. H. G. Wright, C. E., Garden Key, Fla.; Letter Sept. 12, 1850: Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Lt. H. G. Wright, C. E.; 1852 Annual Report of Operations. Utilization of the chapel and offices foundation as water reservoir appears to have been Totten's inspiration (See Letter, Sept. 12, 1850: Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Lt. H. G. Wright, C. E.).

Sketch Showing Cistern Drain and Overfloor  
Pipes Through Scarp Walls, Fort Jefferson,  
Florida. May 29, 1939.

Sketch Showing Cistern Drain and Overflow Pipes  
Through Scarp Walls, Fort Jefferson, Florida

Traced from Sketch in Letter, 25 November 1854:  
Gen. J. G. Totten, Engineer Department, Washington,  
to Lt. H. G. Wright, Corps of Engineers, Key West,  
Florida.



At the bottom of every cistern, a two-inch composition metal pipe capped at its outer end with a removable screw cap (C), was placed to empty the reservoir. Copper plates (AB) were brazed to the pipe to prevent leakage.

There were siphon-like connections - voids in the masonry - in the scarp wall from one cistern to another. The dam (E) at the mouth of each overflow cavity secured additional cistern capacity.

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Florida W. P. A. Project 194  
Key West  
29 May 1936

breakwater, undermined by an 1852 hurricane. As a result, the work progressed little during that year.<sup>41</sup>

In his annual Report for 1853 the engineer made first mention of structural condition; there were small cracks in the counter-scarp wall that Wright attributed to unequal expansion between brick facings and concrete filling, and face bricks in the officers' quarters showed signs of decay. These items Wright considered negligible, but he was confirmed in the opinion that northern bricks were unsuitable for the climate.<sup>42</sup> Eventually the quarters were repointed with southern bricks.<sup>43</sup> During the 1852 suspension, Wright himself had visited the New England States to make conditional contracts for material. On his return to Tortugas the next August, he traveled by way of the Gulf Coast, where with a southern brick yard at Pensacola was made the first in a series of contracts that extended to the outbreak of the Civil War. Florida firms were already furnishing lumber for the work.<sup>44</sup>

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<sup>41</sup> 1851 Annual Report of Operations; 1852 Annual Report of Operations; 1852 Annual Report of Operations.

<sup>42</sup> 1853 Annual Report of Operations; Monthly Report of Operations, Jan.-Dec. 1853.

<sup>43</sup> 1855 Annual Report of Operations.

<sup>44</sup> Letter, June 17, 1853: Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Lt. H. G. Wright, C. E., Wash., D. C.; 1854 Annual Report of Operations; Letter, Apr. 13, 1853: Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Lt. H. G. Wright, Mayport Mills, Fla.; Letter, June 14, 1853: Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Lt. H. G. Wright, C. E., N. Y.; Letter, Aug. 10, 1853: Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Lt. H. G. Wright, C. E., Key West, Fla. During the interim, Wright served in Florida as member of commission for improvements of St. John's River, as Lighthouse Engineer, and supervised repairs of the St. Augustine Canal (see Cullum, op. cit.).

But the optimistic subsidence report Wright had made two years<sup>45</sup> before had to be revised in the light of subsequent observations. To remedy the settlement situations, General Totten advocated utilization of a cheap grillage under the piers, an innovation that required changes in both casemate piers and cisterns. Grillage placement under the scarp Totten left to Wright's own judgment.<sup>46</sup> Unfortunately, the Engineer deemed the massive curtain foundations sufficient.

Beginning with the anticipatory instructions about the grillage, General Totten loosed a stream of orders, comments, revisions and initiations. He impressed upon the young officer the necessity of hurrying construction to the point of defensibility, which meant carrying the curtain to the height of the embrasure cheeks, and told Wright that the fort would be in use before the second tier was completed. Totten's prognostication was of deeper significance than he dreamed: although it was not until 1861 that Jefferson mounted the first gun, the second tier was never finished. In line with the anticipation of early usage, the plan of construction was modified to introduce embrasures into not only casemates, but the flanks of bastions, a space

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<sup>45</sup> 1851 Annual Report of Operations.

<sup>46</sup> Letter, Sept. 29, 1853: Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Lt. H. G. Wright, C. E., Fort Jefferson, Fla.; Letter, Dec. 9, 1853: Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Lt. H. G. Wright, C. E., Fort Jefferson, Fla.

Sketches Showing Construction of Piers,

Fort Jefferson, Florida, May 29, 1836.

Sketches Showing Construction of Piers, Fort Jefferson, Florida.

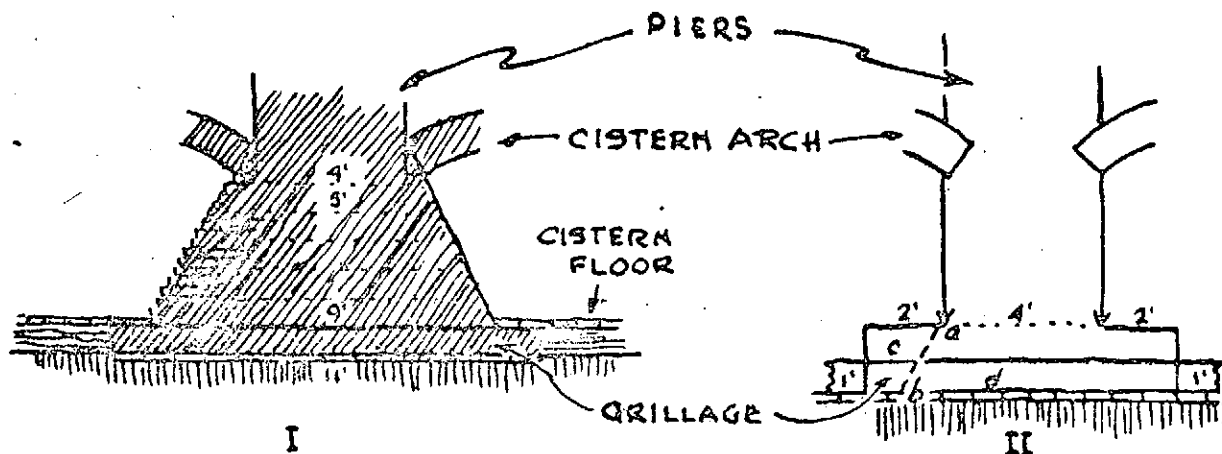
Traced from Sketches in Letter, 9 December 1853: Gen. J. G. Totten, Engineer Department, Washington, to Lt. H. G. Wright, Corps of Engineers, Tortugas, Florida.

Figure I shows the adopted modification of pier design. Subsidence made necessary the introduction of a grillage, which consisted of sleepers and crossbeams arranged thus:

Planks were laid the length of the pier; superimposed at the zero level were transverse timbers eight inches apart. Under the pier, spaces between timbers and planks were filled with concrete, forming a foundation eleven feet wide. Offset a foot on each side, the pier began at a width of nine feet. In spaces between piers, the timbers were planked and served as cistern bottoms.

Figure II shows the discarded design of the pier foundation with the grillage.

The Engineer Chief theorized that the latter arrangement was unsatisfactory: pressure would be conveyed along the line ab, leaving useless weight of concrete (c) and length of grillage (d).



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originally designed for storerooms. The projected operations required immediate construction of pier foundations and cistern arches, although not until later were the piers raised above the lower casemate floor level.<sup>47</sup>

Grillages and foundations for the piers were started in 1855. The sewer was begun, decayed bricks in the officers' quarters replaced, mess hall kitchens and an old stable enlarged and adapted as quarters for the increasing numbers of workmen. A new wharf projected at Front 2 to accommodate the increased influx of building materials. On the work itself the curtain ranged from low water level to height of 24 feet. But in spite of the evident progress, Wright chafed under the realization that he had expected by this time to have every part of the work above high water.<sup>48</sup>

In May 1855, after a decade of service on the Garden Key fortification, Wright requested a change of station; with no forthcoming results he renewed application in September, to be informed that the change would be made shortly. His impatience was manifested when he again urged a transfer the following month, but it was not until December 17, 1855 that General Totten relieved him of the Fort Jefferson charge and brought him to Washington as Assistant Engineer. Captain D. P. Woodbury,

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<sup>47</sup> Letter, Nov. 25, 1854: Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Lt. H. G. Wright, C. E., Key West, Fla.; Letter, March 22, 1855: Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Lt. H. G. Wright, C. E., Fort Jefferson, Fla.

<sup>48</sup> 1855 Annual Report of Operations.



Sketch Showing Location of Sewer Mains and  
Design of Outlets. Fort Jefferson, Florida.  
May 29, 1939.

Sketch Showing Location of Sewer Mains and Design of Outlets, Fort Jefferson, Florida.

Traced from Sketch in Letter, 6 May 1857: Gen. J. G. Totten, Engineer Department, Washington, to Lt. H. G. Wright, Corps of Engineers, Fort Jefferson, Florida.

Figure I: The sewer extends around the fort on every front except Front 3, and provides three outlets (a, b, c) into the moat. These outlets through the scarp, near the angle of the flank, under the floor of oblique casemates, interfered with no cistern.

Figure II: The outlet through the scarp is cylindrical with a clear diameter of two feet - hard-burned brick laid on cement. The opening was below low water level, and flushing the sewer was accomplished by tidal rise and fall. At A is a gunmetal grating of three-quarter inch rods. At the inside face of the scarp is a flushing gate (B) to be lifted into the casemate above. This gate provided for retention of tide water until tidal fall would permit flushing the main culvert by gravity. The main culvert is of such a diameter to admit the passage of a man.

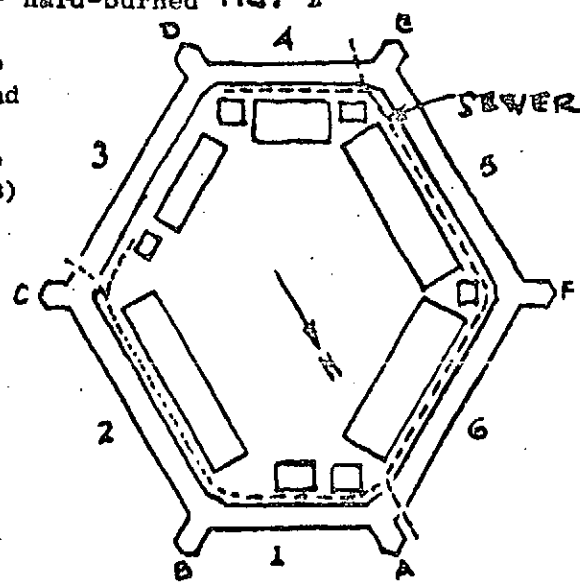
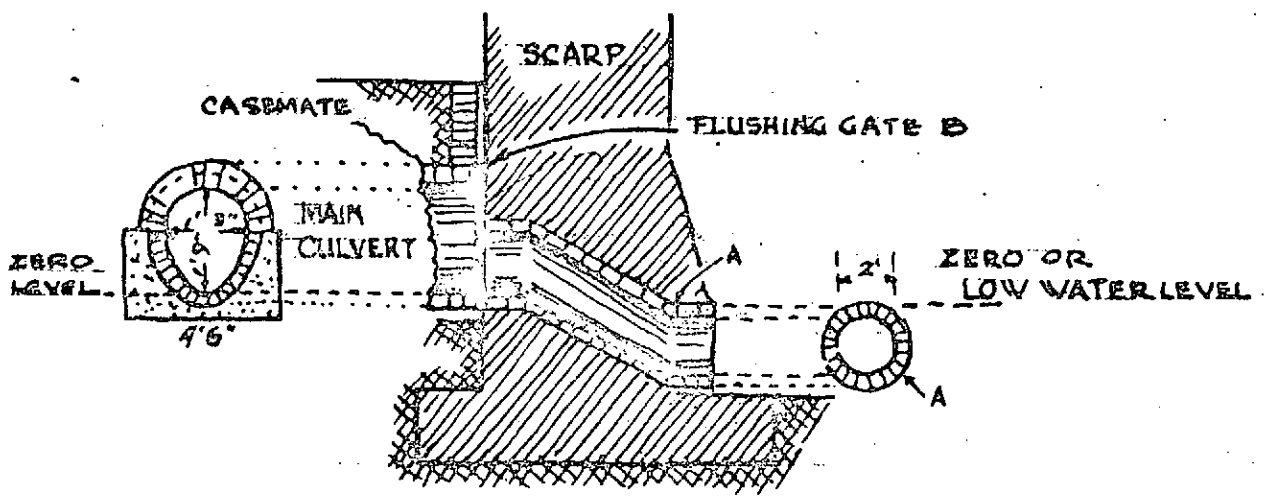


FIG. II



O. Caraballo  
 Florida W. P. A. Project 194  
 Key West  
 29 May 1936

who had been stationed at Wilmington in North Carolina, was the  
49  
replacement.

As Wright left the work early in 1853, the scarp wall was at heights from zero on Front 5 to  $9\frac{1}{2}$  feet on Front 2; Front 1 was raised  $8\frac{1}{2}$  feet, Fronts 3 and 4 were at  $5\frac{1}{2}$  feet except at the postern entrance where the scarp was but a foot above the zero reference, and Front 6 was at 2 feet. The piers on all fronts averaged about 5 feet. The bastions varied from zero at A and F, 1 and 2 feet respectively at E and D, to 4 feet at B and C.

On January 8, 1856, Captain D. P. Woodbury and Lieutenant  
50  
W. P. Craighill, Engineer Corps, arrived at Fort Jefferson.

#### The Man of Talent

(1833-1860)

Daniel Phineas Woodbury, a native of New Hampshire, was in his early forties when he was sent to Tortugas. He was but recently a captain; the promotion had come March 3, 1853 by virtue of his fourteen

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49 Letter, May 1, 1855: J. D. Kurtz, Engineer Dept., Wash., D. C., to Lt. H. G. Wright, C. E., Garden Key, Fla.; Letter, May 20, 1855: Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Lt. H. G. Wright, C. E., Garden Key, Fla.; Letter, Sept. 22, 1855: Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Capt. H. G. Wright, C. E., Fort Jefferson, Fla.; Letter, Nov. 20, 1855: J. D. Kurtz, Engineer Dept., Wash., D. C., to Capt. H. G. Wright, C. E., Key West, Fla.; Letter, Dec. 17, 1855: Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Capt. H. G. Wright, C. E., Key West, Fla. In 1854 and 1855, after the death of the Fort Taylor engineer, Wright was placed in temporary charge of that fortification and the Naval Coal Depot, in connection to the Fort Jefferson assignment (See Special Order No. 113, July 17, 1854). On July 1, 1855, for his fourteen years continuous service, Wright was advanced to the rank of captain (See Cullum, op. cit.).

50 Fort Jefferson Daily Report Book (J-R 61), Jan. 8, 1856.

years continuous service. That the Engineer Department recognized Woodbury as an authority on sustaining wall and arch construction, and assigned him to Fort Jefferson at what seems to have been an opportune time is apparent--but the polished Woodbury little appreciated the honor; he was a gregarious individual who set a premium upon culture and education, possessed an ingrained love of sparkling company and the effervescence of society, and had--as such--little stomach for the drab isolation of Tortugas.<sup>51</sup>

Whether or not his responsibilities in North Carolina afforded a timely excuse, he hastened to accompany Lieutenant Wright when the latter left Garden Key four days later, and while Wright went on to his new duties at Washington, Woodbury managed to stay another month in Carolina.<sup>52</sup> But Craighill, left in charge at the fort, soon followed Wright's trail to Washington as Assistant in the

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<sup>51</sup> Cullum, op. cit., and Heitman, op. cit. In 1854 Woodbury published Sustaining Walls, and in 1858, Theory of the Arch (see Cullum). No more typical illustration of Woodbury's social standards is to be found than in his informative letter to Captain Meigs in 1860; in the same breath he measures the educated Dr. Holder and the earthy Phillips, who perhaps lacked social graces, yet had "...unusual talent in controlling men...Dr. Holder is a naturalist, a pleasant gentlemanly man; Mrs. Holder is the very woman Mrs. Meigs would like to meet at such a place as Tortugas...George Phillips, the general overseer, is a very active ambitious, efficient man, in his place ..." (Letter, Sept. 28, 1860: Capt. D. P. Woodbury, C. E., Wilmington, N. C., to Capt. M. C. Meigs, C. E., Wash., D. C.)

<sup>52</sup> General Account Current, 1st Qr. 1856.

Engineer Department, and Woodbury was obliged to supervise personally the work at Fort Jefferson. There he arrived March 22.<sup>63</sup> Two months passed; his early request for a leave of absence was denied and he seemed fated to pace the confines of his little island throughout the summer. Yet, on June 3 the indefatigable Captain was at Washington and from there he proceeded to New York city to arrange for publication of his monograph on arch construction.<sup>64</sup>

Meanwhile, the Chief Engineer anticipated a fight for additional appropriations in the coming Congressional session, and from Woodbury gathered particular data on early efficiency of the fort. The work, Woodbury estimated, could be finished within three years for \$750,000, and a third of the entire armament of 314 guns could be added each year; \$200,000 and a year's time would make the first tier defensible with guns and casemate arches.<sup>65</sup>

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<sup>63</sup> Letter, Mar. 7, 1856: Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Wilmington, N. C.; Fort Jefferson Daily Report Book (J-R 61), Mar. 22, 1856.

<sup>64</sup> Letter, May 30, 1856: Capt. H. G. Wright, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Key West, Fla.; Letter, June 10, 1856: Capt. H. G. Wright, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Key West, Fla.; Letter, June 9, 1856: Capt. D. P. Woodbury, C. E., Wash., D. C., to Col. S. Thayer, C. E., Boston, Mass.; Letter, June 12, 1856: Capt. D. P. Woodbury, C. E., Wash., D. C., to Col. S. Thayer, C. E., Boston, Mass.

<sup>65</sup> Letter, Feb. 23, 1856: Col. J. G. Totten, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letter, Mar. 3, 1856: Capt. D. P. Woodbury, C. E., Wilmington, N. C., to Gen. J. G. Totten, Engineer Dept., Wash., D. C. Cf. post, 45.

An appropriation of \$150,000 was made in that year of 1856, but evidently the money was not utilized during the slack summer season. After March the force of over 150 men dwindled to 58 in July and August, not increasing materially until November when operations were vigorously resumed.<sup>56</sup> Woodbury thus inaugurated a precedent of curtailed summer operations that not even the influential Senator Mallory's expostulations two years later affected to any marked degree.<sup>57</sup>

Dan Woodbury found difficulty interesting himself in the fortunes of Fort Jefferson. For him, two months at Garden Key sufficed, and he made known his desire for a change from his Tortugas assignment to charge of Fort Taylor in Key West where life in the growing community of some 3,000 inhabitants lacked the monotony of that at Garden Key. Here again he was disappointed; the Engineer Department seemed determined to utilize his talents at the Dry Tortugas, and increased his responsibilities by giving him supervision of the construction of a new hundred and fifty-foot lighthouse at Loggerhead Key. More or less willingly Woodbury took the added charge; that he was irked by the additional imposition is evinced in his request for an assistant. That

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<sup>56</sup> Letter, Aug. 20, 1856: Capt. H. G. Wright, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. R., Key West, Fla.; Fort Jefferson Time Roll Book (J-Tr. 21): Mar.-Nov. 1856.

<sup>57</sup> Letter, Feb. 9, 1858: S. R. Mallory, to Hon. W. Floyd, Secretary of War.

Totten summarily refused. The General left him to sink or swim alone, sopping his denial with an appreciation of the need--but current demands of the Corps made it impossible to furnish help. <sup>58</sup>

Affinity between the Engineer Officers at the sister fortresses heretofore amicable enough, with Woodbury's advent assumed a close and very obvious aspect of friendliness and cooperation, perfectly in line with Woodbury's congenial nature. <sup>59</sup> In 1857, however, the fraternal bonds were disrupted by the departure of Fort Taylor's Major Sanders; and without General Totten's knowledge, Woodbury was given temporary supervision of Fort Taylor and the Key West Naval Depot in addition to Jefferson and Loggerhead Light. Some time previous, Woodbury's request

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<sup>58</sup> Letter, Aug. 26, 1856: Capt. H. G. Wright, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Key West, Fla.; Letter, Oct. 1, 1856: Capt. H. G. Wright, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Key West, Fla.; Letter, Sept. 12, 1856: J. G. Parke, Treas. Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letter, Oct. 27, 1856: Gen. J. G. Totten Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Wash., D. C.; Letter, Dec. 2, 1856: Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla. With the erection of a new light at Loggerhead, Garden Key Light was to be reduced to a harbor light with sufficient range to be seen only to the reef. Two years later, the reduction was evidently accomplished. (Letter, Sept. 12, 1856: J. G. Parke, Treas. Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letter, Feb. 16, 1858: W. B. Franklin, Treas. Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.)

<sup>59</sup> Letter, Jan. 8, 1857: Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla., to Maj. J. Sanders, C. E., Key West, Fla.; Letter, Apr. 20, 1847: Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla., to Maj. J. Sanders, C. E., Key West, Fla.; Letter, Apr. 25, 1847: J. C. Clapp, Key West, Fla., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letter, Feb. 4, 1859: Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla., to Lieut. E. B. Hunt, C. E., Fort Taylor, Fla.

for an assistant finally had been approved, and the Captain now made the smug suggestion that, should the coming assistant be of inferior rank, he, Captain Daniel P. Woodbury, be permitted to retain charge of whichever fortification he chose. Totten's reaction was a doubtful encomium of Woodbury's talents. Fort Jefferson was a construction job demanding as high a degree of engineering ability as any work along the seacoast, and the Chief Engineer refused to countenance placement of an officer like Woodbury, with his "high experience and administrative talents," at the nearly completed Fort Taylor to the detriment of the Garden Key work. On October 7, 1857 Lieutenant E. G. Hunt was ordered from Fort Adams to relieve Woodbury of his Key West responsibilities.<sup>60</sup>

In spite of his reluctance to stay at Fort Jefferson, Captain Woodbury tackled the work in his usual brilliant fashion, flooding the Engineer Department with his conceptions of minor changes to render the fort more efficient. Some of the suggestions were approved, some were discussed, and some Chief Totten peremptorily set aside, ordering

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<sup>60</sup> Letter, Jan. 16, 1857: Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letter, Aug. 13, 1857: Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Key West, Fla.; Letter, Apr. 16, 1857: Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Key West, Fla.; Letter, June 16, 1857: Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Key West, Fla.; Letter, Oct. 17, 1857: Capt. H. G. Wright, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Key West, Fla.



the Engineer in no uncertain terms to abide by the original project.<sup>61</sup>

The force was doubled during the latter part of 1857, reaching the highest point before 1861--299 workers in December: 148 white laborers, 58 slaves, 68 masons, 7 carpenters, 2 smiths, 2 stone cutters, a physician, overseer, 8 crew and 4 utility men;<sup>62</sup> By March 1858 almost all of the first tier casemate arches other than a few at the gateway and Bastions A and F were turned--and the stone cutters had dressed and laid many casemate flagstones.<sup>63</sup> Soon thereafter, Woodbury, possessed of a leave of absence, departed for Washington in gleeful haste.<sup>64</sup>

Lieutenant Hunt was stationed that summer at Boston, and Woodbury advanced him the information that a special fortification bill

<sup>61</sup> Letter, May 30, 1856: Capt. H. G. Wright, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Key West, Fla.; Letter, June 15, 1856: Capt. H. G. Wright, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letter, Feb. 16, 1857, Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letter, Apr. 20, 1857: Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letter, Nov. 30, 1857: Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letter, May 30, 1857: Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Key West, Fla.; Letter, May 17, 1859: Capt. H. G. Wright, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.;

<sup>62</sup> Fort Jefferson Time Roll Book (J-Tr. 21): Dec. 1857.

<sup>63</sup> Monthly Report of Operations, Nov. 1857, Mar. 1858.

<sup>64</sup> Letter, Mar. 27, 1858: Col. S. Thayer, C. E., Boston, Mass., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letter, May 10, 1858: Capt. D. P. Woodbury, C. E., Key West, Fla., to Dr. D. W. Whitehurst, Fort Jefferson, Fla.

So precipitate was Woodbury's departure that he forgot to leave instructions for Whitehurst.

had been stopped in the House; but money for the Florida Reef forts probably would be available through some other channel. Later events proved him right: whether because of a supposed exigency in foreign connections or not, a substantial sum was placed at Woodbury's disposal. The waters of Washington politics, he confided to Hunt, were no longer troubled over Anglo-American relations, and with sly humor he professed a "half fear" that he would have been hurried straight back to defend Fort Jefferson from the British much the same as Polk had wanted General Scott to rush to Mexico in advance of his troops to fight the Mexicans!

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It was not until November of 1858 that Woodbury returned to Garden Key,<sup>63</sup> and less than two months afterward he received instructions to suspend all operations unless services and materials could be procured under the distinct understanding that no payments were possible until additional funds were supplied from the Treasury. As a matter of fact, construction was unhampered throughout the year, since Woodbury secured cooperative agreements; even the financial handicap was of short duration: in March following some notification of a

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<sup>65</sup> Letter, May 29, 1859: Capt. D. P. Woodbury, C. E., Wash., D. C., to Lt. E. B. Hunt, C. E., Boston, Mass.

<sup>66</sup> Fort Jefferson Daily Report Book (J-R 64), Nov. 22, 1858.

\$95,000 appropriation.<sup>67</sup>

In 1856, Francis Watlington, master of the schooner Activa, had resigned his position--professedly in defense of his self-respect! Soon thereafter, the schooner en route to Key West was caught in a blow and broke up near Marquesas Keys.<sup>68</sup> Woodbury had contracted at Wilmington for construction of a new vessel, a boat which Captain Horatio Wright received in the spring of 1857 and more or less appropriately named Tortugas.<sup>69</sup> Before he laid eyes on the craft, guileful Woodbury requested permission to visit Havana in her.

<sup>67</sup> Letter, Jan. 5, 1859: Col. R. E. DeRussy, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letter, Jan. 24, 1859: Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla., to J. Filor, Key West, Fla.; Letter, Jan. 25, 1859: J. Filor, Key West, Fla., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letter, Mar. 18, 1859: Col. R. E. DeRussy, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla. The enterprise of the contractors is graphically illustrated by the fact that they notified Woodbury of the appropriation a fortnight before official communication reached him. (See Letter, Mar. 11, 1859: J. Filor, Key West, Fla., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.)

<sup>68</sup> Letter, June 22, 1856: F. Watlington, to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letter, Aug. 30, 1856: F. Senac, Key West, Fla., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla. Woodbury was flooded with applications for the skipper's berth. Significantly typical is this one: "...I am informed that you are in want of a man to take charge of the schooner Activa, if such be the case, I offer you my services, that is, if I should suite. I am sorry to say that I am not acquainted with navigation and as you may expect that of the one whom you may employ I inform you beforehand..." (Letter, July 21, 1856: M. McNamara, Key West, Fla., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.)

<sup>69</sup> Letter, Dec. 16, 1856: Capt. H. G. Wright, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letter, Apr. 14, 1857: Capt. H. G. Wright, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla. The Tortugas cost about \$6700 and was of 110-tons burthen.

The Engineer Department, through Wright, informed him that the extraordinary arrangement could hardly be carried through. The Secretary of War's consent was essential, and Totten was not inclined to "bother" the Secretary with such a small matter. Consequently, Wright naively advised him to make the trip by steamer on his own leave, adding for Woodbury's benefit that such was the customary procedure among officers stationed in that vicinity.<sup>70</sup> Two years later, Woodbury was granted a week's leave of absence to visit Havana. He went on the schooner Tortugas.<sup>71</sup> The obvious pleasure trip hid actual accomplishment:

"...Your letter of the 16th inst on the subject of the defenses of Havana, with the map & drawings therein referred to is received & for those you have the thanks of the Department...."<sup>72</sup>

So do men, in time, justify their actions.

Appropriation for the fiscal year 1859-1860 was but half the amount requested, and the next year's sum was likewise small.<sup>73</sup> It

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<sup>70</sup> Letter, Apr. 16, 1857: Capt. H. G. Wright, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.

<sup>71</sup> Letter, Jan. 27, 1859: Col. R. E. DeRussy, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Fort Jefferson Daily Report Book (J-R 64), 4, Mar. 12, 1859.

<sup>72</sup> Letter, March 31, 1859: Lt. W. P. Craighill, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.

<sup>73</sup> 1858 Annual Report of Operations; Letter, Mar. 18, 1859; Col. R. E. DeRussy, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; 1859 Annual Report of Operations; Letter, June 28, 1860; Col. R. E. DeRussy, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Wilmington, N. C.

naturally followed that during 1860 construction of Fort Jefferson little advanced, and consisted mainly of turning second tier casemate arches, setting first tier embrasure irons, and laying tower steps and landings.<sup>74</sup>

In April that year Woodbury repaired to Washington, leaving the faithful overseer George Phillips in charge of the work. That summer, although he retained nominal charge of Fort Jefferson, he was appointed member of a Board of Engineers; not until September 18, 1860 was he relieved of the Fort Jefferson work by Captain Montgomery C. Meigs, who had fourteen years before drawn the plans for the Garden Key work. In October both men journeyed to the fort. Woodbury remained two days and then boarded the Tortugas for Key West, bidding farewell to the island where the Department had managed to keep him four years.<sup>75</sup>

On the eve of the Civil War, the work stood at the height of its second tier arches. The scarp was at the reference 32½ feet; practically all of the second tier arches were laid over; the bastion towers were at 37 feet with steps and all except third tier landings. Casemate magazines could be used, and copper work of three tower

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<sup>74</sup> Statement Showing Condition of the Work (J-S 1860), June 30, 1860; Statement Showing Condition of the Work (J-S 1860), Sept. 30, 1860.

<sup>75</sup> Memorandum of Orders and Instructions Relating to the Corps of Engineers (J-Memorandum 1860) June 8, 1860; Memorandum of Orders and Instructions Relating to the Corps of Engineers (J-Memorandum 1860), Oct. 16, 1860; Fort Jefferson Daily Report Book (J-R 65), Apr. 26, 1860; see also ante, note 22.

Photograph - Close-up view of spiral stairway,

Fort Jefferson (ca. 1938)



magazines was finished in 1860. Nearly all the first tier embrasure irons were set, and that tier was ready to receive its guns.

A sum of \$1,259,113.37 had been spent on Fort Jefferson since 1846.<sup>76</sup> The fort was less than half finished--the second tier was not embrasured although it had received the upper arches. The third tier was still to be done. Only a 69-foot section of the three-story officers' quarters was up; nothing had been done to build the remainder of the 300-foot unit or its twin along Front 5, nor had the soldiers' barrack at Front 2 been started; the chapel foundations provided a cistern, but the superstructure was not started; hospital, commanding officers' quarters, navy storehouse and detached magazines were still nothing but plans. Of the temporary buildings, the store house had burned to the ground in 1857 with an estimated loss of \$7,000. Woodbury believed that \$1,278,911.21 would be needed to complete Fort Jefferson.<sup>77</sup>

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<sup>76</sup> Fort Jefferson Ledger; Cash Book (J-Lgr 1), 1846-1852; Quarterly Returns, 1846-1859; Fort Jefferson Ledger: Cash Book (J-Lgr 3), 1853-1860; Fort Jefferson Ledger: Accounts Payable Book (J-Lgr), 1860; Fort Jefferson Time Rolls (J-Tr) 1860. See post, Appendix.

<sup>77</sup> 1857 Annual Report of Operations; Estimate of the Cost of Completing the Fort Proper from 1 July 1859 (J-S 1859). Cf. ante, p. 41: the previous estimate did not include parade buildings.



## Geology

The Army engineers in 1844 evidently were under the impression that Dry Tortugas was a stable island group brought to the surface of the Gulf by the age-long efforts of the coral polyp. The basic nature of the coral-reef limestone would provide, they believed, an excellent bed for the massive concrete foundations of a great fort. Lieutenant Wright's 1851 report on his settlement experiments seemed to bear out that theory. Wright built a table carrying a load theoretically equivalent to twice the weight of the completed scarp wall, and under that pressure subsidence of the soil was apparently satisfactory; under the greatest weight, the table went down only 9/16 of an inch. But in 1853, cracks appeared in the counterscarp wall. At first Wright attributed them to unequal expansion between the brick facing and concrete filling, then later revised his theory and blamed the slight fissures to the slow slacking of lime in the concrete. And though the experimental table, loaded far in excess of the calculated weight of the curtain, continued its ominous sinking, Wright yet saw no cause for pessimism. The Engineer Department, not particularly worried, recommended to Wright the use of a grillage in place of the concentrated and massive pier foundations originally planned, but the mass of masonry fourteen feet wide for the scarp foundation both Wright and the Department considered generally efficient.

Sketch Showing Subsidence Experimental

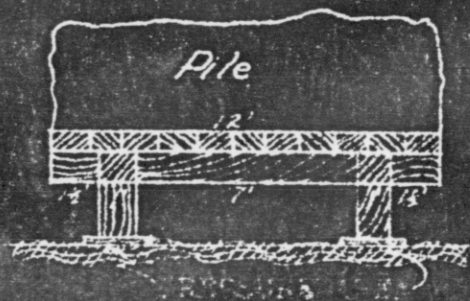
Table of Fort Jefferson, Florida.

May 29, 1936.

Sketch Showing Subsidence Experimental Table at  
Fort Jefferson, Florida

Traced from Sketch in Letter, 10 April 1851; Gen  
J. G. Totten, Engineer Department, Washington, to  
Lt. H. G. Wright, Corps of Engineers, Fort Jefferson,  
Florida.

The twelve foot square table rested on four short  
posts, each of which in turn was supported by a two  
foot square base. The table was bedded on a level,  
smooth, rammed surface of the island soil. Bricks  
to a height of six feet were piled on the table to  
give it a pressure weight over a sixteen square foot  
area theoretically equal to the weight of the fifty  
foot scarp.



J. C. ...  
Florida ... P.A. Project 104  
507 Feet  
May 1856

By May of 1859 some sections of the work had gone down almost a foot, and that settlement became faster as the weight of the work increased was proven by the fact that the foundations had sunk three inches within the last six months.<sup>78</sup> By this time, subsidence had assumed such an important aspect that exhaustive subsoil and rock strata experiments were begun in earnest. Not until 1864 were they completed, but the findings revealed that there was no solid rock within eighty feet of sea level; the islands and the entire bank upon which they were formed consisted of sand intermingled with sea shells and "coral heads"—a great mass gradually deposited by tidal action and powerful ocean currents. In other words, the patches of rock visible at the water's edge of many islands in the archipelago, and which had given support to the early theory of a stable underlying rock bed, were nothing more than mere concretions of sand, shell and coral, hardened by atmospheric action.<sup>79</sup> The heavy mass of Fort Jefferson deposited upon such

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<sup>78</sup> 1859 Annual Report of Operations.

<sup>79</sup> Fort Jefferson Letter Book (J-L 3B), pp. 251-252, Letter, May 3, 1864: Lt. A. H. Holgate, C. E., Fort Jefferson, Fla., to Capt. W. M. McFarland, C. E., Key West, Fla. Holgate's observations were made on Bird Key but he asserted that "...There is nothing materially different in the ground at Bird Key from that at Garden Key, as regards stability of foundation." Cf. the opinion of the modern geologist: "...This archipelago [Tortugas] consists of seven low islands of shell and coral sand..."...The Marquesas and the Dry Tortugas are marked on our state geological map as being of Miami oolite [oolitic limestone], the same as the islands around Key West and the mainland.

"The Keys north of Bahía Honda are classed as Key Largo Limestone, the one is a white oolitic limestone, the other coral reef limestone..."

"The coral Keys from Bahía Honda northward have been elevated from the sea. They are of coral, and coral never forms out of water..."

(J. C. Gifford, The Great Florida Barrier Reef, pp. 4-5, article in magazine Paths, Vol. 1, No. 10, Dec. 1934; also J. C. Gifford, Floridan Keys, p. 3.)

an unstable bed forced from beneath the marly combination in a slow oozing fashion comparable to soft jam crushed between two layers of bread. The result was a slow sinking of the entire mass into the sea; but to make matters worse, the settlement was not equal, and the engineers were faced with the probability of patching cracks as long as the fort was maintained. In any event, the work was faced with a slow but nonetheless inexorable destruction.

#### Brick in Davy Jones' Locker

A more immediate problem was procurement of construction materials. Contracts with firms in the vicinity of governmental works did not necessarily follow the Federal practice of contracting with the low bidder; as a matter of fact, Lieutenant Wright found northern brick considerably cheaper than the product from southern firms, and that mainly because of the transportation charges involved. There were growing concerns in the South anxious to supply materials for the two fortifications on the keys, but the barks, brigantines and schooners were too busy handling the profitable cotton export to incur the financial risk of sailing brick to Jefferson; as late as 1854 Wright remarked on the scarcity of freighters handling lumber and brick.<sup>80</sup> Neither Tortugas nor the port of Key West--especially the former--were able to supply return cargoes, and a ship discharging its hold halfway between

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<sup>80</sup> 1854 Annual Report of Operations.

the Atlantic and Gulf was obliged to return empty to port or proceed the rest of a long journey in hopes of picking up business. In equity, the master was entitled to compensation for his lost time between ports and cargoes. Northern firms in the midst of a commercial and maritime district found shipowners more or less amenable to very reasonable freight charges, whereas the newer and smaller southern firms had no such good luck: vessels were scarce in the Gulf. Yet, this difference in gross cost of material did not mean that the cheaper was better. As time proved, northern brick deteriorated in the warm salt atmosphere of the Dry Tortugas. And there was another reason for trading with southern brick yards; the first year in the tropics led Wright to report that:

"...great advantage would result from excess of size /of southern bricks/ over the Northern bricks and much of the liability to disaster to which vessels are subject in Navigation of Gulf Stream and along Florida Reef would be avoided..."

"Liability to disaster" was an understatement; four freight vessels had gone to Davy Jones' locker by 1860 and others suffered from the vicious sea en route to Tortugas. Of course, the Mexican Gulf was far from a skipper's paradise; one of the four losses was the Lucy Whitham out of Pensacola with a cargo of brick. She went down sixty miles east of the Florida port. Nor was the weather responsible for every casualty. The John Howell, a new and fast sailing ship, caught afire and went down like a rock with Jefferson's brick and lime aboard.

Fortunately the Pharsalia, Liverpool bound, picked up captain and crew, and \$15,000 in specie taken from the burning vessel eventually found its way back into the hands of the Engineer Department. Even on the short journey from Key West, there were hazards. The treacherous channel between Rebecca Shoals and Tortugas, for many years unmarked, was to sailing craft a constant menace. Today's power boat skippers still have the healthiest kind of respect for its powerful cross currents, and few have the temerity to attempt its navigation in nasty weather. The schooner O. K., sailing the sixty miles from Key West, in 1849 had to jettison part of her lumber cargo. And for ten years the Activa had sailed the reef waters; finally a new skipper piled her up on Marquesas. Vessels along the northern coast fared no better; the engineer practice of speeding operations during the winter season naturally led to seasonal difficulties in the north; more than once harbor ice cut through a freighter before she could clear to sea.

Although the Engineer officers made every effort to keep on hand a reserve supply of construction materials, pecuniary difficulties or unforeseen exigencies oftentimes left them only Burns' rueful consolation:

"The best laid schemes o'mice an' men  
Gang aft a-gley..."

Delay in delivery at Garden Key meant a lag in the construction program, unless a beneficent Fort Taylor engineer had an oversupply of brick or cement, iron or lime. Nor was the trouble always in shipment; far from

the source of supply and usually dependent upon the New York Engineer Agency for contracting and purchasing, the engineers at Jefferson sometimes found themselves saddled with quantities of stuff that did not come up to their requirements, or even with supplies they had no conceivable use for.<sup>81</sup>

All of these matters could not be remedied. Little more than brick and lumber were available in the South. In 1847 Wright bought lumber and a little iron in Mobile, Alabama, and two years later definitely placed the burden of furnishing lumber on the capable shoulders of southern firms.<sup>82</sup> In 1853 came the first contract with a southern brick yard,<sup>83</sup> and from that year until the Civil War, companies in Pensacola, Mobile, New Orleans, Charleston and Savannah pressed

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<sup>81</sup> Letter, Sept. 16, 1847: Lt. D. Leadbetter, C. E., N. Y., to Lt. H. G. Wright, C. E., Garden Key, Fla.; Agreement, Nov. 6, 1847: H. G. Wright; Letter, Jan. 27, 1849: W. H. Wall, Key West, Fla., to Lt. H. G. Wright, C. E., Garden Key, Fla.; Letter, Feb. 6, 1849: T. F. McFarland, Key West, Fla., to Lt. H. G. Wright, C. E., Garden Key, Fla.; Letter, Mar. 7, 1849: W. D. Fraser, C. E., N. Y., to Lt. H. G. Wright, C. E., Tortugas, Fla.; Copy of Letter, Sept. 22, 1855, J. R. Bacon, U. S. Vice Consul, Nassau, N. P., Bahamas, to Hon. W. L. Macy, Secretary of State, Wash., D. C.; Letter, Aug. 30, 1856: F. Senac, Key West, Fla., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letter, Jan. 28, 1858: Lt. Q. A. Gillmore, C. E., N. Y., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letter, Feb. 27, 1858: Lt. Q. A. Gillmore, C. E., N. Y., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letters, Aug. 25, 1860, Sept. 6, 1860, Sept. 15, 1860; G. Phillips, Garden Key, Fla., to Capt. D. P. Woodbury, C. E., Wilmington, N. C.; Letters, July 16, Nov. 15, Dec. 11, Dec. 15, 1849: Maj. W. D. Fraser, C. E., N. Y., to Lt. H. G. Wright, C. E., Garden Key, Fla. The John Howell went down in 1847, the Paris in 1855, the J. Vail in 1858, and the Lucy Whitman in 1860.

<sup>82</sup> Monthly Report of Operations, Feb.-Mar. 1847; 1849 Annual Report of Operations.

<sup>83</sup> Letter, Dec. 31, 1853: H. G. Ingraham, Pensacola, Fla., to Lt. H. G. Wright, C. E., Fort Jefferson, Fla.



millions of brick for both Fort Jefferson and the work at Key West.<sup>84</sup>  
As a result of the trade, Bacon and Abercrombie at Pensacola, firm supplying brick in increasing quantities, prospered with the Government business, and in 1859 attempted to introduce a machine-made brick to replace the old handmade mud product; but the time was too soon, and the experiment was a failure.<sup>85</sup> This firm of Bacon and Abercrombie was the mainstay of Fort Jefferson construction; good bricks were obtainable from other yards, but only from Pensacola were the engineers able to obtain a sufficient supply at stated and regular intervals--at the reasonable cost delivered of \$21 per thousand.<sup>86</sup>

Stone was available only from Northern ports, mainly the quarries in Vermont; cement, too, was usually shipped from New York.<sup>87</sup> Such supplies as filling for the cement were provided by nature at the work; the coral sand in the Tortugas vicinity was more or less suitable, and required only excavation for utilization.<sup>88</sup>

<sup>84</sup> Fort Jefferson Material Book (J-M 96), pp. 35, 56, 73, 90, 102; Fort Jefferson Ledger: Accounts Payable Book (J-Lgr 4), 1860.

<sup>85</sup> Letter, Apr. 15, 1859: Bacon and Abercrombie, Pensacola, Fla., to Capt., D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letter, May 23, 1859: Bacon and Abercrombie, Pensacola, Fla., to Capt. D. P. Woodbury C. E., Fort Jefferson, Fla.; Letter, July 28, 1859: Bacon and Abercrombie, Pensacola, Fla., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla. The original firm was Raiford and Abercrombie, but in 1847 Col. Raiford sold his interest to Col. Bacon of Columbus, Ga., and the new firm took the name of Bacon and Abercrombie. (Letter, April 13, 1857: Bacon and Abercrombie, Pensacola, Fla., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.)

<sup>86</sup> Letter, Sept. 28, 1860: Capt. D. P. Woodbury, C. E., Wilmington, N. C. to Capt. M. C. Meigs, C. E., Wash., D. C.

<sup>87</sup> Letter, Jan. 10, 1848: Lt. D. Leadbetter, C. E., N. Y., to Lt. H. G. Wright, C. E., Garden Key, Fla.; 1852 Annual Report of Operations; Fort Jefferson Material Book (J-M 96): pp. 3, 5, 34, 56, 68, 61, 77-116; Fort Jefferson Ledger: Accounts Payable Book (J-Lgr), 1860.

<sup>88</sup> Fort Jefferson Annual Reports of Operations, 1847-1859.

### Fiduciary Matters

The Governmental work on the Florida Reef naturally brought to Key West a thriving business that went a long way toward giving it in later years the reputation of the wealthiest city per capita in the United States. Realizing that it was to their advantage to establish branch offices near the customer, evidently more than one contractor set up offices at Key West. The enterprising citizenry was by no means slow to capitalize on its opportunities, and the phenomenal increase in business naturally profited certain individuals. To what extent can be appreciated readily in an extract from a letter to Woodbury:

"...Should you wish any specie for your check for any amount I shall be glad to cash it..."<sup>89</sup>

There is more to the letter, however, than the indication of Key West's wealth; the statement connotes some of the difficulties that the engineers experienced in fiduciary matters. A certain amount of specie was essential at the fort for payment of workmen, slave owners, and for other incidental expenses. Gold shipments were made by the New York Engineer Agency at the request of the engineer on the ground, and many were the risks to which such shipments were exposed, although, of course, every precaution and utmost secrecy were maintained.

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<sup>89</sup> Letter, Oct. 22, 1857: J. Filor, Key West, Fla., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.

Fortunately, events at Fort Jefferson did not emulate the loss sustained by Major Dashiell, paymaster who lost \$23,000 when his skiff capsized at the mouth of the Indian River:<sup>90</sup> the usual financial handicap at Fort Jefferson was a direct outcome of Congressional reluctance to set aside sufficient monies. And from the viewpoint of the officer on the ground, the Engineer Department was often culpable through procrastination in making timely allotments; more than once during the history of the fort the officer in charge was embarrassed by pecuniary deficiencies, even though there were adequate funds on the books.<sup>91</sup> Key West merchants were fully cognizant of the peculiar situation, and cooperated to their own advantage by furnishing cash to the worried engineers.<sup>92</sup> For the contractors along the Gulf coast, funds were placed with the Assistant Treasurer at New Orleans and drafts payable to the New Orleans Bank liquidated Fort

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<sup>90</sup> Letter, May 16, 1857: G. H. Ash, Key West, Fla., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla. See also ante, pp. 57-58.

<sup>91</sup> 1849 Annual Report of Operations: 1854 Annual Report of Operations; Letter, Dec. 16, 1857: Capt. H. G. Wright, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letter, Feb. 6, 1858: Asst. Treas. A. J. Guirard, New Orleans, La., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letter, March 30, 1860: Capt. H. G. Wright, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.

<sup>92</sup> Letter, May 6, 1859: J. Filor, Key West, Fla., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla. See also ante, p. 61.

Jefferson's obligations to those distant firms until 1801.<sup>93</sup>

#### Garden Key

During the early period, life at Garden Key was in some measure comparable to pioneer experiences in the West. A monotonous existence unexciting in its manifold privations was certainly the lot of those at the work; the beauties of marine gardens and tropical sunsets soon paled upon virtual prisoners on an island hardly larger than the ship that brought them. Where the western pioneer might tire of the shaded forest or the rolling sun-baked plain, at Fort Jefferson a man soon had his fill of yellow brick, glaring sunlight and the sea; while the westerner shot or trapped an abundance of fresh meat, at Garden Key the rifle rusted and fisherman was hunter. The surrounding waters abounded in fish, turtle, crawfish, and it required only the effort to scull over to Bird Key and pick up ingredients for a palatable omelet<sup>e</sup>--if the season were right. Of red meat there was little during this early phase, and barrels of beef and pork were not always of best quality.<sup>94</sup>

The tiny islands of Dry Tortugas grew only a tough and sparse vegetation. Even the garden that graced Fort Jefferson's parade in

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<sup>93</sup> Letter, Feb. 13, 1855: Paymaster B. W. Brice, New Orleans, La., to Paymaster Gen. A. Campbell, U. S. A., Wash., D. C.

<sup>94</sup> Fort Jefferson Material Book (J-M 92), 4th qr., 1847; 1848 Annual Report of Operations; Order, Nov. 9, 1848: Lt. H. G. Wright, C. E., Garden Key, Fla. Usual provisions were pork, beef, flour, beans, rice, molasses, sugar, potatoes, onions, grits, coffee, tea, turtles and fish.

later years was maintained more as a curiosity than for food supply.<sup>95</sup>  
Fresh vegetables were at a premium, and tiring of a fish diet, the laborers ate stale meat, desiccated vegetables, and good or poor bread according to the ability of the incumbent baker. Small wonder that Dr. Whitehurst wrote for Arrow-Root:

"...to meet the character of those ailments, which have particularly occurred / sic / among the laborers.- Almost all of them, have their origin in gastric derangement. - And a light and nutritious diet, would more permanently ensure their return to health, than by suddenly placing the feeble and invalid on food of a more solid character..."<sup>96</sup>

#### Quarters

Chief Engineer Totten originally intended to have built three or more temporary officers' quarters kitchens to house the engineer administration, but the plan was modified by putting up a section of the quarters themselves, enough to furnish abundant room for the engineer officer in charge, his assistant, clerk, physician, overseer and others, with the necessary office room. Two-story kitchens behind the three-story quarters aided in accommodations.<sup>97</sup> The officers'

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<sup>95</sup> Report of Assistant Surgeon S. A. Storrow, United States Army, and Acting Assistant Surgeon W. E. Day, United States Army, c. 1870.

<sup>96</sup> Letter, Sept. 7, 1847: Dr. D. W. Whitehurst, Garden Key, Fla., to Lt. H. G. Wright, C. E., Key West, Fla.

<sup>97</sup> Fort Jefferson Letter Book (J-L 35), pp. 334-335, Letter, June 20, 1865: Capt. W. MacFarland, C. E., Fort Jefferson, Fla., to Gen. R. Delafield, Engineer Dept., Wash., D. C. See ante, note 19.

quarters with plastered walls, venetian blinds, piazzas and fenced yard, was by far the most imposing structure on the island.<sup>98</sup> Standing on the north side within the inclosure,<sup>99</sup> these pleasant dwellings housed at one time or another the Wrights, Woodburies, Phillipoes, Whitehursts, Holders and Dakelies. About midway the length of the island, in the angle of Bastion C, towered the slender lighthouse, and fenced off at its foot were the light keeper's quarters. At the southwestern end of the parade were bakery, lime house, blacksmith and carpenter shop. Clustered to the south and outside the fort walls were a number of other wooden buildings--the workmen's barracks, kitchens, and mess room, store house, and stable.<sup>100</sup> Both white and black workmen were quartered in the barracks--the blacks below and the whites above in the coolest sleeping quarters on the island. In 1855 the old stable was converted into sleeping quarters to take care of the additional force as the work progressed, and by 1858, the carpenters were fitting

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<sup>98</sup> Monthly Report of Operations, Jan.-Dec. 1849, Jan.-Dec. 1850;  
1854 Annual Report of Operations.

<sup>99</sup> Photostatic copy of Plan, July 9, 1846: Fortification Florida Reef;  
Projected Fort for Garden Key. Engineer Dept., Wash., D. C., Drawer  
74, Sheet 2. Monthly Report of Operations, Jan. 1847.

<sup>100</sup> Photostatic copy of Sketch, July 1861: Fort Jefferson Sketch Show-  
ing Locations of Permanent and Temporary Barracks, Storehouses, etc.  
Engineer Dept., Wash., D. C., Drawer 74, Sheet 59. See Map, p. 28.

up temporary quarters in the casemates of Front 4.<sup>101</sup> On Loggerhead Key lived the light keeper, his wife, daughters and two assistants; and it was within that little band rather than at Garden Key that strife prevailed.<sup>102</sup>

### The Builders

The group at Garden Key was far from homogeneous. Most of the skilled workmen were Yankees from the North,<sup>103</sup> although there were a few slaves who plied their trades of masonry and carpentry.<sup>104</sup>

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<sup>101</sup> 1849 Annual Report of Operations: 1855 Annual Report of Operations: Monthly Report of Operations, Jan. 1858. According to the original plan, whites and blacks were to have separate quarters (see Memo-randum, Oct. 11, 1848: Col. J. G. Totten, C. E., Buffalo, N. Y., to Lt. H. G. Wright, C. E.).

<sup>102</sup> At Loggerhead occurred an incident, spicy in its very obscurity. The light keeper--but not his wife and oldest daughter--appeared to have considerable trouble with his assistants. One summer's day in 1860 the keeper and a near-naked daughter (who had been bathing when the incident occurred) appeared at Garden Key with the story that the assistants, the keeper's spouse and the oldest daughter banded together in an attempt on his life. The keeper ably defended himself with a carving knife, and with his single sympathizer fled to Fort Jefferson. Garden Key pacifists were not able to effect a reconciliation and the unfortunate half of the family made its way to Key West (Letter, June 9, 1860: G. Phillips, Fort Jefferson, Fla., to Capt. D. P. Woodbury, C. E.), leaving the assistants victorious.

<sup>103</sup> Letter, Apr. 7, 1849: P. Benet, St. Augustine, Fla., to Lt. H. G. Wright, C. E., Key West, Fla.; Letter, Feb. 9, 1858: S. R. Mallory, to Hon. W. Floyd, Secretary of War; Letter, Feb. 13, 1858: Capt. H. G. Wright, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letter, Feb. 23, 1848: Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla., to Lt. E. B. Hunt, C. E., Key West, Fla. See also Time Rolls.

<sup>104</sup> Letter, Aug. 14, 1848: P. Benet, St. Augustine, Fla., to Lt. H. G. Wright, C. E., Tortugas, Fla.; Letter, Aug. 30, 1848: P. Benet, St. Augustine, Fla., to Lt. H. G. Wright, C. E., Tortugas, Fla.; Letter, May 26, 1859: J. Filor, Key West, Fla., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.

Jefferson got its quota of unskilled Irish; and slaves from Key West were perennially at the work.

The forty or fifty white men found recreation after the work with no difficulty. They could play games, they could cool off after the day's work with a swim; they could fish from the wharves where big game might take the bait meant for small fry, and have splendid fish stories to tell back North.

The slaves, some thirty or thirty-five in number, needed little for amusement. Many of them, after the ten-hour day that prevailed six days a week, worked extra time either on the work itself or fishing, and with the few extra pennies they earned, bought confections. For an occasional frolic, Key West owners sent "delicacies," probably tobacco and cheap liquor, and in lieu of vacations, occasional visits to Key West sufficed. The "boys" were usually permitted to have their wives, who did double duty--as laundresses. <sup>105</sup>

For the officers, life at the fort left much to be desired. Wright's urgent requests for a change of station are not as significant as Woodbury's frantic efforts to find a loophole--every one of which the Engineer Department successfully plugged for four years. Even

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<sup>105</sup> Letter, Jan. 26, 1857: J. Filor, Key West, Fla., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letter, April 6, 1859: W. C. Dennis, Key West, Fla., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letter, Aug. 5, 1859: W. C. Dennis, Key West, Fla., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letter Nov. 30, 1860: Dr. J. B. Holder, Fort Jefferson, Fla., to Capt. M. C. Meigs, Fort Jefferson, Fla.



Lieutenant Craighill, who did his work with little ado during his short stay, condoled Woodbury thus:

"...I hope that you are better satisfied at Fort Jefferson than I was, for if not, you must be having a miserable time of it. I offer you very sincere sympathy..."<sup>106</sup>

There was an occasional visitor--an Army officer, or perhaps a priest. The supply schooner made frequent trips to Key West and the engineer usually spent at least one out of four weeks in that center of society, professedly on "business of the work."<sup>107</sup> At Garden Key he enlivened the dignity of his leisure in scientific study, and improved the time by putting his theories of construction into black and white. After Louis John Rudolph Agassiz's visit in 1858, Captain Woodbury was inspired to follow in that famous naturalist's footsteps--he sent a valuable collection of specimens to the Smithsonian Institution.<sup>108</sup> And he wrote to his successor:

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<sup>106</sup> Letter, July 30, 1856: Lt. W. Craighill, Engineer Dept., Wash., D. C., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.

<sup>107</sup> Fort Jefferson Daily Report Books (J-R 61, J-R 62, J-R 64, J-R 65); Fort Jefferson Daily Hospital Report Book (J-R 63).

<sup>108</sup> Cullum, op. cit.; Letter, Nov. 19, 1849: Gen. J. G. Totten, Engineer Dept., Wash., D. C., to Lt. H. G. Wright, C. E.; Letter, Mar. 19, 1858: Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla., to Lt. E. B. Hunt, C. E., Key West, Fla.; Letter, Jan. 3, 1869: Mordecai and Company, per Salvo, Charleston, S. C., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.

"...Let me advise you to carry to Fort Jefferson all necessary microscopes & other instruments for investigating marine specimens. In that way only can you make your time pass pleasantly. You see I write as if you were to remain at Fort Jefferson some time. It would be a very pleasant service if you could manage like Hunt to spend the summer north...."<sup>109</sup>

The few children at the key were at a tremendous disadvantage.

Phillips set forth the situation when he asked for a raise in salary:

"...Now this is certainly too little for a prudent man in such a isolated place as this, where one is cut off from all society, debarred from all the comforts of life, and deprived even of the common schools for their children. There are few who I think would be willing to forego the above named disadvantages, only with the view of making a little more than a bare living..."<sup>110</sup>

Isolation of the Tortugas also meant difficulty in obtaining a sufficient and efficient crew of workmen.<sup>111</sup> Horatio Wright was very fortunate in securing the services of George Phillips in 1846. Phillips

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<sup>109</sup> Letter, Sept. 28, 1860: Capt. D. P. Woodbury, C. E., Wilmington, N. C., to Capt. M. C. Meigs, C. E., Wash., D. C.

<sup>110</sup> Letter, Jan. 27, 1855: G. Phillips, Fort Jefferson, Fla., to Lt. H. G. Wright, C. E.

<sup>111</sup> 1848 Annual Report of Operations; 1849 Annual Report of Operations; 1856 Annual Report of Operations; 1857 Annual Report of Operations; Letter, Aug. 31, 1858: Capt. D. P. Woodbury, C. E., Wash., D. C., to Dr. D. W. Whitehurst, Fort Jefferson, Fla.; Letter, Sept. 28, 1860: Capt. D. P. Woodbury, C. E., Wilmington, N. C., to Capt. M. C. Meigs, C. E., Wash., D. C. Yet Woodbury says in the latter epistle, perhaps encouraging Meigs...You can always obtain the best of workmen by sending for them..."

came from Buffalo, New York, and made the first trip to Garden Key with the Lieutenant. From that time he became a faithful Government employee, advancing from master mason to the responsible position of chief overseer and living at Garden Key until the end of the Civil War when with his family he moved to Key West.<sup>112</sup>

But men like Phillips were few and far between. The Government pay of \$1.12 per day with room and board prevailed for both white and black labor;<sup>113</sup> skilled workmen received from \$1.50 to \$2.00; foremen, from \$2.25 to \$2.50; the master carpenter, \$3.00; Phillips himself was early raised from the latter daily rate, and by 1860 was drawing a monthly salary of \$125, a wage surpassed only by salaries of clerk and physician. These rates were little if any better than elsewhere, the most of the whites were laid off during the summer months, and there was no particular incentive for workmen to exile themselves in the tropical climate.<sup>114</sup> During the summer months they were beset by hordes of insects and the spectres of fever and dysentery were ever present.<sup>115</sup> Inefficient personnel was the bane of

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<sup>112</sup> Fort Jefferson Time Roll Book (J-Tr 39), Feb., Apr., May 1865; also see ante, notes 20, 33.

<sup>113</sup> Letter, Nov. 10, 1857: S. R. Mallory, Key West, Fla., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.; Letter, Nov. 19, 1857: S. R. Mallory, Key West, Fla., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla. But not until 1855 was that situation true (see Fort Jefferson Time Roll (J-Tr 19) Apr. 1855).

<sup>114</sup> Fort Jefferson Time Rolls, 1856-1860; Quarterly Returns; Fort Jefferson Time Roll Books (J-Tr 19-26); see also ante, notes 103, 111.

<sup>115</sup> Fort Jefferson Daily Hospital Report Book (J-R 63).

engineer existences--good men were hard to hire for the Tortugas work: of five recruited laborers sent to the work in 1847,

"...one had a lame hand,--and the others, Seem'd bloated from excess and with scarce energy to get along..."<sup>116</sup>

The equable and warm climate of Tortugas was hardly the ideal setting for hard labor; of course, slaves were acclimated for the task in hand, but certain of the lower class white laborers were disposed to shirk their work. There was but one way to handle them: in reply to a query as to the best method of dealing with such situations, Woodbury wrote:

"...I wish you would make examples of one or two of the worst..."<sup>117</sup>

And there were the usual petty offenses that the engineer officers in charge sometimes found themselves called upon to arbitrate.<sup>118</sup>

Slaves were the backbone of the labor force.<sup>119</sup> Generally a happy and contented lot, they received little attention other than an occasional hiding for one thing or another--usually their propensity for thievery,<sup>120</sup> but there were some exciting moments: One night

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<sup>116</sup> Letter, Sept. 7, 1847: D. W. Whitehurst, Garden Key, Fla., to Lt. H. G. Wright, C. E., Key West, Fla.

<sup>117</sup> Letter, Aug. 31, 1858: Capt. D. P. Woodbury, C. E., Wash., D. C., to Dr. D. W. Whitehurst, Fort Jefferson, Fla.

<sup>118</sup> Letter, Sept. 13, 1859: F. Knoblovs, Fort Jefferson, Fla., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.

<sup>119</sup> Fort Jefferson Time Rolls. Wright remarked in his 1851 Annual Report that the proportion in numbers of free and slave force reacted to the advantage of both.

<sup>120</sup> Letter, Jan. 27, 1859: H. W. Emery, Key West, Fla., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.

during the summer of 1847 while Wright was at Key West, seven blacks stealthily boarded the schooner Union and set forth into the Gulf. At daybreak the force at the key awoke to find but the decrepit, leaky, old Victor remaining on the beach--the slaves had set the other boats adrift. Whitehurst immediately set men to repairing the craft, and with makeshift oars rowed for the Union, which was becalmed some miles off shore. When the Victor was within two or three miles, the Negroes hauled down their jib, cut the mainmast, and set their course in a small boat that the loggy Victor could not overhaul. The fate of the Negroes is still a mystery; their only hope lay in rescue by a passing steamer--the small boat could hardly survive the Gulf weather. <sup>121</sup>

As the work on Fort Jefferson progressed, many of the Key Westers purchased slaves to realize income from their Fort Jefferson labor. Woodbury's limited operations during the summer naturally put some of the Negroes out of employment and resulted in a loss to slave owners. Senator Stephen R. Mallory in 1858 alluded to the situation and protested that for the public good, construction work should go at full blast summer and winter. Mallory, as one of the principal slave owners, was naturally interested. <sup>122</sup>

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<sup>121</sup> Letter, July 12, 1847: D. W. Whitehurst, Garden Key, Fla., to Lt. H. G. Wright, C. E., Key West, Fla.

<sup>122</sup> Letter, Feb. 9, 1858: S. R. Mallory, to Hon. W. Floyd, Secretary of War; Letter, July 8, 1859: J. Filor, Key West, Fla., to Capt. D. P. Woodbury, C. E., Fort Jefferson, Fla.

In the years immediately preceding the Civil War, Key Westers were glad to have the blacks isolated at Fort Jefferson and out of contact with the northern visitors to Key West. Much for that same reason, they were opposed to Negro education--even simple reading and writing: The oil of education might prove incendiary were the slaves exposed to abolitionist sentiment. And as the decade of the '60's drew closer, the owners lived in constant fear of losing their chattels. The climax came in the early part of 1860 with rumors of a wholesale escape from Fort Jefferson to Nassau. At the fort itself, the whites were apprehensive; the black assistant to the smith was employing every leisure moment in manufacturing spear heads! But nothing came from these scares.<sup>123</sup>

#### Fever

For the first few years of the Garden Key occupancy there is no record of serious illness. Not until 1850 did a nameless fever make its way through almost all the force. Several panic-stricken families left the key. A Mrs. Morrison was the single casualty; after her death the others gradually recovered, although Whitehurst with

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Letter, Feb. 7, 1857: J. Filor, Key West, Fla., to Capt. D. P. Woodbury, Fort Jefferson, Fla.; Letter, July 8, 1859: J. Filor, Key West, Fla., to Capt. D. P. Woodbury, Fort Jefferson, Fla.; Letter, May 1, 1860: J. Filor, Key West, Fla., to G. Phillips, Fort Jefferson, Fla.; Letter, June 19, 1860: G. Phillips, Fort Jefferson, Fla., to Capt. D. P. Woodbury, C. E., Wilmington, N. C.

doubtful rhetoric declared that most of the women and children were "properly" covered with boils--

"...Ugly, excrescences on the beauties of the Key,"<sup>124</sup>  
in which your humble servant joins the category...

Heavy rains that renewed the depleted water supply also cleared the sick list.

In 1854 came the first epidemic of yellow fever. Brought from Key West by Lieutenant Wright, it spread rapidly through the officers' quarters, attacking every white person but two. Even Negroes were stricken with it, but strangely enough, the epidemic was confined mainly within the area of the fort walls, and unacclimated workmen quartered on the southern part of the island were not affected. Wright had fallen ill in the latter part of May, and about six weeks later the disease had disappeared, taking out of some thirty cases but one victim, the master machinist.<sup>125</sup>

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<sup>124</sup> Letter, Sept. 10, 1850: D. W. Whitehurst, Garden Key, Fla., to Lt. H. G. Wright, C. E.; see also Letter, Aug. 28, 1850: D. W. Whitehurst, Garden Key, Fla., to Lt. H. G. Wright, C. E., Letter, Sept. 9, 1850: D. W. Whitehurst, Garden Key, Fla., to Lt. H. G. Wright, C. E.; Letter, Oct. 1, 1850: D. W. Whitehurst, Garden Key, Fla., to Lt. H. G. Wright, C. E.; Fort Jefferson Quarterly Returns, 3rd qr. 1850, Voucher 5.

<sup>125</sup> Letter, Dec. 24, 1877: G. Phillips, Key West, Fla., to Dr. J. Y. Porter, United States Army. Phillips' description of the epidemic twenty-three years after its occurrence is perhaps not altogether accurate; it is true that twenty-nine blacks were employed at the work in May (see Time Roll, May 1854), and Wright reported the machinist's death (Letter, July 10, 1854: Maj. W. D. Fraser, C. E., N. Y., to Lt. H. G. Wright, C. E., Garden Key, Fla.), but he appears to have made no mention of his own illness, nor do the Time Rolls record more than sixty people at the key any time during the summer of 1854, while Phillips stated that more than a hundred

There was the occasional accidental death--a laborer was drowned piloting out the brig Governor Brown; tuberculosis claimed two of Woodbury's draftsmen;<sup>126</sup> but in the larger view, Tortugas was a remarkably salubrious vicinity.

The blacks were notoriously healthy. In a penetrating and discerning word picture, Doctor J. B. Holder evinced a thorough and tolerant understanding of the slave "boy" health problem:

"...It is impossible for me to say that anyone of those admitted to quarters for medical treatment during the past year was not really suffering more or less at the time ill health.

"...Application for medical treatment has been made more frequently at times when it is necessary for the men to remain in water at work many hours - and after performing "task work" - as boating coral - etc.

"...During the performance of this latter work (particularly in the warmer months) - the men have exerted themselves to the utmost, that they might accomplish their task in time for recreation, or (in many cases) for a quick return to "extra work" such as cutting wood, gathering coral, catching fish, crawfish &c for which they get extra pay.

"...I would submit the following conclusion:

"...These men are working to the extent of their powers during the hottest part of the day - they all come in very much heated; and as they are all notoriously imprudent - are quite liable to suffer a sudden check of perspiration - particularly those who afterwards go on the water -

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persons were quartered outside the fort. Copies of the Monthly Reports of Operations for May and June of that year are missing from the Key West Barracks Collection, although they were written and sent to Washington. In July, however, certain of the laborers are listed as "attending the sick."

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Fort Jefferson Daily Report Book (J-R 64), Jan. 19, 1858; Letter, Sept. 28, 1860: Capt. D. P. Woodbury, C. E., Wilmington, N. C., to Capt. M. C. Meigs, C. E., Wash., D. C.



"...Rheumatism, and slight febrile affections very naturally supervene - And it is seen that- they mostly make complaint in that direction.

"...Of late we have complaints of Rheumatism, pleuritis, and slight catharrhal affections -

"...Such maladies as we expect to see resulting from undue exposure to cold (water) -

"...While the men are wheeling brick and mortar or employed in mixing, a complaints are not unfrequently made of "lame back" and lameness of ankles and wrist -

"...Undoubtedly many of them were they working for pay would keep on and with due care escape serious sickness and altogether be as well eventually.

"...In attention to the changes of temperature, Notions of the efficacy of medicines to cure them when sick, - A strong disposition to ignore the laws of hygiene (diet particularly) circumstances like these attend nearly all cases or complaints of ill health among the blacks -

"...I believe that they scarcely leave the work from mere idleness - but that the fear of sickness gives them the appearance of being more unwell than is really the case..."<sup>127</sup>

#### The Early Phase

In this early phase of Fort Jefferson history, nature appeared tolerant of human endeavor. There was mild weather, a minimum of sickness, and within a decade the fort walls rose near to completion - ironically enough, the engineers were almost to attain their goal before hurricanes, disease, and the inexorable march of progress proved the futility of their efforts.

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<sup>127</sup> Letter, Nov. 30, 1860: Dr. J. E. Holder, Fort Jefferson, Fla., to Capt. M. C. Meigs, Fort Jefferson, Fla.

**PART TWO:**

**CONSTRUCTION DURING THE WAR**

**1861-1865**

## CONSTRUCTION DURING THE WAR

1861 - 1865

1861

Captain M. C. Meigs, Corps of Engineers, was relieved from duty on the Washington aqueduct and from the charge of Fort Madison and assigned to the charge of construction of Fort Jefferson on September 18, 1860. He left Washington on October 22 and traveled south by way of Lynchburg, Va., Knoxville, Tenn., Columbus, Ga., and Montgomery, Ala., to Pensacola, Fla. At Pensacola he embarked on the mail steamer which touched at Apalachicola, Saint Mark's, Cedar Keys, and Tampa, arriving at Key West on November 7, and at Fort Jefferson the next day.

Meigs became uneasy upon encountering a strong feeling of hostility toward the Union as far north as Lynchburg, Va., but his foreboding became greater on finding the spirit of rebellion and disloyalty increasing as he continued southward. At Montgomery, Ala., resistance to the inauguration or the administration of a Republican President was openly discussed, causing Meigs more misgivings. Finally his suspicions were confirmed, and he wrote "The temper of the South is excited - is dangerous...."<sup>128</sup> On every hand he heard that southern senators intended resigning "if Mr. Lincoln is elected."<sup>129</sup>

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<sup>128</sup> The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies (Washington), Series I, Vol. 52, Part I, p. 4, Nov. 10, 1860 letter: Capt. M. C. Meigs, at Fort Jefferson to Lieut. Gen. Winfield Scott, Commanding U. S. Army, New York. Hereafter cited as WR-A 1.52.1, etc.

<sup>129</sup> Ibid.

Meigs' anxiety was not abated upon arriving at Key West. If anything, he became more firmly convinced of the imminence of war by hearing Key Westers contemplating the effect of a demand by the Governor of Florida for the possession of the United States' public works in Florida. What avail a lone Yankee engineer without arms or men, surrounded by hostile, hot-blooded, rebellious southerners?

Such was Meigs' apprehension, upon finally arriving at Fort Jefferson and finding that post with -

"not a single gun, and I doubt whether among the seventy or eighty persons, white & black, employed or permitted on the island half a dozen fowling pieces could be found...."<sup>130</sup>

that he immediately wrote to Lieutenant-General Winfield Scott, Commanding the U. S. Army, Captain T. A. Craven, Commanding the Naval Forces in the Gulf, and to Captain John Brannan, Commanding Fort Taylor, clamoring for guns, or reinforcements.

Indeed, his apprehension was well founded as is shown by the fact that -

"...The people of Key West, some of the U. S. officials at which place are reported disloyal, believed that the Wyandotte had been captured and would shortly visit Fort Jefferson. At last it was reported to me by the fishermen in the harbor that the sheriff and an officer of Florida had arrived with instructions from the authorities of Florida to arrest and carry to Key West one fishing vessel - a schooner - and the master of another, under a

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<sup>130</sup> Ibid., p. 4.

"law unconstitutional, and even if constitutional, thus attempted to be enforced out of the jurisdiction of the state, I was also informed that the State convention had passed the ordinance of secession, and that the Governor had seized all the U. S. property within his reach, and that another vessel was off the bouy, supposed to have come to assist the sheriff in seizing the vessels and citizens, lying under what ought to have been the protection of this fortress. Under these circumstances, having in the course of the day assured myself from the crews of the fishing vessels in the neighborhood I could in case actual attack obtain the assistance of thirty men loyal to the Union, I chartered a fast-sailing smack and dispatched her to Key West with the letter to Captain Brannan, dated the 17th instant, of which I inclose a copy, I know that he had in Fort Taylor a surplus of field artillery and more heavy guns than he could possibly need for defense.

"...The next morning a large steamer coming from the west and showing no colors hove to off the reef and sent in a boat. It was a relief to most persons on the key to find that the boat contained an officer of the U. S. Army, announcing the arrival of a company of artillery, instead of a summons to the fort from the party who with two steamers and 700 men are reported to have seized Fort Morgan. The work is now secure to the United States, and I trust that its flag once raised upon these walls will never again be lowered. As my late dispatches to the Department have been sent by chance opportunities via Havana, I inclose a copy of my last letter, dated 15th instant, which may reach the Department earlier by the return of the Joseph Whitney than via Havana. A considerable portion of the appropriation yet remains available, and I propose, unless differently instructed, to expend it in such constructions as will increase the efficiency and security of this work, and not to attempt at present the erection of the section of barracks embraced in the project of operations of Captain Woodbury...."131

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131 Ibid., pp. 2-3. (Letter, Jan. 19, 1861: Capt. M. C. Meigs to Gen. Jos. G. Totten.)

The extent of Meigs' frenzied efforts to render the fort defensible may be appreciated from his report of January 15, referred to above:

"...Here I have closed nearly 200 openings in the scarp wall, taken up several bridges which gave easy access to the work, put up a draw bridge and a gate at the postern, and brought the work into a condition which would enable a small force with guns and supplies to hold it. The upper arches, not being yet covered with earth, are not bomb-proof. I shall proceed to cover some of them with bricks or other materials so as to make bomb-proof a magazine and some shelter for a garrison...."<sup>132</sup>

The advent of the garrison, however, did not bring the peace and security vouchsafed by Meigs. No excuse was needed for the garrison and the Engineer Department, thrown together in the partially completed fort, to renew their traditional feud.

Other troubles were encountered; transportation was expensive, men were scarce, material was high, and the spirit of the Confederacy played its part in interfering with progress. Part of Fort Jefferson funds were deposited with the Assistant Treasurer at New Orleans, and with the formation of the Confederacy, these funds were confiscated, checks were voided and the Fort's accounts thrown into a hopeless tangle. Indeed, on January 2, 1866,<sup>133</sup> Captain Walter McFarland, Corps of Engineers, in charge of operations at Forts

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<sup>132</sup> WR-A 1.52.1 p. 5. January 15, 1861. Capt. M. C. Meigs to Lieut. Col. R. E. DeRussey, Commanding, C. E., Washington, D. C.

<sup>133</sup> Fort Jefferson Letter Book, Letters Sent (1862-1880), p. 393, Jan. 3, 1866. Major A. H. Burnham to Capt. Walter McFarland. Hereafter cited as J.-L 35.

Taylor and Jefferson, was still requesting all papers which could be found referring to money accounts of the first quarter of 1861.

A new privy was built because of "...the soldiers taking possession of the former ones...." And finally, the engineers built a boat house to lock the engineer boats in to prevent the soldiers from staving them in.<sup>134</sup>

INSTRUCTIONS: With increased activity during the year due to the necessity for adequate defense against the newly formed Confederacy, various operations were proposed. On April 11, Major Arnold was instructed to build water batteries on neighboring Keys capable of offering resistance to a sudden assault. These batteries were to contain bombproof magazines for a small ammunition supply.<sup>135</sup>

It can be inferred that the Engineer Corps was instructed to cooperate as far as practicable with the Post Commander, Major Arnold, in rendering Fort Jefferson defensible. The Engineer Office could not give authority for establishing defenses on Bird Key, but referred the matter to the proper authorities.<sup>136</sup>

Morton wrote Captain Hunt at Fort Taylor, asking information about iron work of the drawbridge and the whereabouts of the patterns.<sup>137</sup>

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134 J-MCB. Sketch Drawer 74, Sheet 59, inclosure of J-L, July 27, 1861. Morton to Totten.

135 J-L Apr. 11, 1861. Blunt to Arnold.

136 J-L June 24, 1861. Totten to Morton.

137 J-L Sept. 27, 1861. Morton to Hunt.

Meanwhile, the New York Agency had been instructed by the Engineering Department to examine various contrivances for the distillation of water.<sup>138</sup>

During December, General Totten notified Morton that a shot furnace was to be sent to the work; and Morton apparently received drawings of the parade magazine and grillage foundation. His instructions were to carry on with the work until funds gave out.<sup>139</sup>

The Navy regarded Fort Jefferson as an important base and late in December the Secretary of the Navy made the request through the War Department that sufficient space (for ordnance stores) be set aside in the casemates and magazines of Fort Jefferson for the Navy in the Gulf of Mexico. This information was transmitted to Morton by the Chief Engineer, December 11, and Morton was instructed to keep an account of the resultant expenses for the Navy Department. The storage space was to have capacity of 2,000 barrels of powder, 5,000 shells and 1,000,000 small arms ammunition.<sup>140</sup>

Detailed instructions were sent to Morton concerning procedure in construction of the terreplein, parapet, gun recesses, roof drainage, and barbette platforms of the bastions.<sup>141</sup>

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<sup>138</sup> J-L Apr. 5, 1861. Totten to Morton.

<sup>139</sup> J-L Dec. 7, 1861. Totten to Morton.

<sup>140</sup> J-L Dec. 5, 1861. Gideon Wells, Secretary of the Navy, to Major General George B. McClellan Commanding the U. S. Army. J-L Dec. 11, 1861. Totten to Morton.

<sup>141</sup> J-L May 24, 1861 (A-1) Totten to Morton;

J-L June 10, 1861 (A-2) Totten to Morton; A-1 and A-2 are references to the writer's notes. Drawings 50 and 51 were attached and frequently referred to.



Engineer Department decided that bricks could be substituted for stone in forming the coping and cordon at Fort Jefferson. It was, though, in doubt as to the quoins mentioned in a requisition from Morton.<sup>142</sup>

Totten on August 16 endorsed Morton's plans with respect to additional temporary buildings and requested sketches and an estimate of cost for the proposed permanent wharf,<sup>143</sup> and on July 27 approved other plans concerning sheds for cement and lumber to be erected out of used lumber and staves. At this time he agreed that stone coping should be used where bricks would not serve so well.<sup>144</sup>

The importance of Jefferson and Tortugas harbor to the Union was such that Arnold was instructed by Brown to -

"...Take measures for the occupation by sea coast earthen batteries of all the points in the harbor of Tortugas necessary to secure a complete command of the anchorage and of the channels of entrance thereto...."

These earth batteries were to be constructed to resist projectiles then used in the navies of the Union and European countries. They were to contain not less than 3 pieces of heavy calibre, be closed works capable of offering some resistance to a sudden assault, and to contain bomb-proof magazines for a small supply of ammunition. The points to which

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<sup>142</sup> J-L Sept. 9, 1861. Gillmore to Morton.

<sup>143</sup> J-L Aug. 16 (?), 1861. Totten to Morton.

<sup>144</sup> J-L July 27, 1861. Totten to Morton.

Arnold's attention was particularly directed as probable to be occupied, were Bird Key, Sand Key, Loggerhead Key, East Key, Middle Key, and Bush Key. Their construction was to be commenced at once in order to be ready for receiving guns as soon as they arrived. The garrison was to be employed in their construction and the engineer officers at Fort Jefferson were to be called upon for professional advice. Plans were to be transferred to headquarters department for consideration and approval, but Arnold was not to wait for this approval but to commence work immediately on Bird Key. <sup>145</sup>

CONSTRUCTION: On January 15, Engineer Meigs said:

"...Here I have closed nearly 200 openings in the scarp wall, taken up several bridges which gave easy access to the work, put up a draw bridge and a gate at the postern, and brought the work into a condition which would enable a small force with guns and supplies to hold it. The upper arches, not being yet covered with earth, are not bomb-proof. I shall proceed to cover some of them with bricks or other materials so as to make bomb-proof a magazine and some shelter for a garrison...." <sup>146</sup>

At the end of the first quarter, 1861, in the fort proper, the second tier arches of the bastions had been laid over and the concrete work between the arches raised enough to turn the water into the conduit pipes at the ref 32'6", with an average ref of about 32'9". At the end of the third quarter, 1861, the brick work of the breast

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<sup>145</sup> WR-A 1.1. 1860-1861. Harvey Brown, Col. Commanding Transport SS ATLANTIC, to Major L. G. Arnold, Fort Jefferson, Apr. 11, 1861, p. 371.

<sup>146</sup> WR-A 1.52.1, p. 6 (or 8?), Jan. 15, 1861. M. C. Meigs to Lieut. Col. R. E. DeRussy.

height walls on the bastions was raised to the ref 42'9", and the brick work of the scarp wall of the bastions to an average ref of about 37'6". The roof surfaces of the arches were formed and asphalted, the brick drains were formed and the arches covered with brick. On the fronts, the parade end of the brick work was raised to the ref 37'4½", the brick work of the scarp wall to an average ref of about 40'4", and the concrete work and scarp wall to an average ref of about 35'. On Fronts 1 and 4, concrete was filled in the terreplein to ref 30'4".<sup>147</sup>

A new boat house and a new privy were built by July 27.<sup>148</sup>

REPAIRS: Seventeen cisterns on Front Three and thirteen on Front Four remained in the condition of repair as Captain Woodbury left them in 1860. The floors were overlaid with brick, parade ends built up and the whole interior surface plastered with two coats of cement mortar. All thirty of these cisterns leaked through the vertical point at the junction of the scarp wall and the casemate piers. Twenty-four cisterns were made water-tight during the first quarter of 1861, and fifty-five more were made water-tight during the second quarter.<sup>149</sup>

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<sup>147</sup> J-S Mar. 31 - Sept. 30, 1861, Feb. 28, 1862; also see Appendix.

<sup>148</sup> J-MCB. July 27, 1861. J Sketch, Drawer 74, Sheet 59 (?).

<sup>149</sup> J-S June 30, 1861, Morton.

ARMAMENT: Six 8" Columbiads with 700 shells, two 6 pounder and two 12 pounder howitzers, 10,000 pounds of powder with a small supply of ammunition for the howitzers were transferred to Major L. C. Arnold from Capt. J. M. Brannan, Fort Taylor. Meigs in a January letter to Major Arnold at Fort Jefferson, recommended that one 8" columbiad be placed in the right-curtain casemate on the right and left of Bastion A, C, and E; one flank gun in casemate next to curtains in each bastion. These guns were to be placed so by January 24, 1861.<sup>150</sup> Up to this time the only mention of armament at Fort Jefferson is in a letter from Winfield Scott, Washington, D. C., to M. C. Meigs, at Fort Jefferson, notifying him that with this letter he would receive 100 muskets and accouterments complete with 100 rounds of cartridges for each musket.<sup>151</sup> Then on February 6, 1861, Capt. John M. Brannan at Fort Taylor transferred seven 8" columbiads to Major Arnold at Fort Jefferson. He did not spare Arnold ammunition but supposed it would be furnished by the Ordnance Department.<sup>152</sup>

Harvey Brown, Colonel Commanding, in charge of an expedition to reinforce Fort Pickens, arrived at Fort Jefferson April 14, 1861,

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<sup>150</sup>WR-A 1.1. 1860-1861. M. C. Meigs, Capt. at Jefferson, to L. C. Arnold, Major at Jefferson, Jan. 23, 1861, p. 347.

<sup>151</sup>WR-A 1860-1861, Winfield Scott, Wash., D. C., to M. C. Meigs, Fort Jefferson, Jan. 4, 1861, p. 350(?).

<sup>152</sup>WR-A 1.1. 1860-1861. Capt. John M. Brannan, Fort Taylor, to Lieut. Col. L. Thomas, Assistant-Adjutant Gen.: Headquarters Army, Wash., D. C., Feb. 6, 1861, p. 345.

and inventoried the armament of Fort Jefferson finding thirteen 8" columbiads, a field battery, 104 barrels, gun powder, 608 shells, 150 shot, a vessel at the wharf occupied in unloading thirty 8" columbiads, twenty-four 24 pounder howitzers with carriages, implements, etc., complete, and four hundred 8" shells, 600 round shot, and an proportionate quantity of ammunition. Upon leaving for Fort Pickens, he took from Fort Jefferson a field battery and four mountain howitzers with implements and ammunition.<sup>153</sup>

FINANCE: The ledgers carrying balances of Fort Jefferson accounts from the early part of the year 1861 are not to be found. Allotments of \$3,000 were made on January 8 to the Assistant Treasurer at New Orleans,<sup>154</sup> and on May 27 an allotment was made in the form of a \$10,000 loan from the contingent fund.<sup>155</sup> Meanwhile, Meigs, in turning over his accounts to Reese, left Reese with \$10,042.39 to his credit on February 12, 1861,<sup>156</sup> And then on April 17, Morton was notified when he assumed charge of Fort Jefferson that there was \$3,954.45 to his credit with the Assistant Treasurer, New York.<sup>157</sup>

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<sup>153</sup> J-Tr. 1859-1861, p. 7.

<sup>154</sup> J-L Jan. 8, 1861. Totten to Meigs.

<sup>155</sup> J-L May 27, 1861. Totten to Morton.

<sup>156</sup> J-L Feb. 12, 1861. Totten to Morton.

<sup>157</sup> J-L Apr. 17, 1861. Totten to Morton.

Appropriations for Jefferson works in 1861 amounted to \$175,000; March 2, \$75,000; July 17, \$100,000. The \$10,000 allotment of May 27 borrowed from the contingent fund was replaced in July, thus making the net appropriations \$165,000.

Allotments were made on the following schedule:- June 18, New York Treasury \$20,000; June 24, New York Treasury, \$5,000; June 24, Gillmore, New York Agent, \$10,000; July 17, Gillmore, New York Agent, \$10,000; July 17, New York Treasury, \$25,000; August 10, Gillmore, New York Agent, \$10,000; October 18, New York Treasury \$20,000; November 2, Foster, New York Agent, \$3,368.14; November 4, New York Treasury, \$20,000; November 15, Foster, New York Agent, \$8,751.60. The total was \$132,119.74, leaving \$32,880.26 of the \$165,000 not yet allotted but to be remitted on the following dates: November 22, \$12,880.26; December 1, \$10,000; December 15, \$10,000.<sup>158</sup>

MATERIALS: The difficulty of getting materials to Fort Jefferson became more pronounced with the outbreak of the Civil War. Indication of this fact is found as early as January 5, 1861, when a letter to Meigs from Abercrombie and Company at Pensacola intimated that their negotiations would be terminated if Florida seceded.<sup>159</sup> On the 10th of the next month Abercrombie and Company sent notice of their refusal to fill orders for lumber and brick because of the formation of the Confederacy.<sup>160</sup>

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<sup>158</sup> J-L Nov. 22, 1861. Totten to Morton.

<sup>159</sup> J-L Jan. 5, 1861. Abercrombie and Company to Meigs.

<sup>160</sup> J-L Feb. 26, 1861. Abercrombie and Company to Meigs.

The situation could be remedied in only one fashion: the brick must be obtained from new sources. Gillmore at the New York Agency informed Engineer Morton that contracts for brick had been made with two northern companies, Brewer in Maine, and Danvers in Massachusetts.<sup>161</sup>

Gillmore, upon negotiating with those two new companies, found that the stock of bricks on hand at the companies' yards was so low that new kilns would have to be built to supply bricks in the quantities he desired.<sup>162</sup> Subsequent delay in shipment of materials from these two companies naturally resulted in shortage of materials at Jefferson.<sup>163</sup>

Some materials were lost on the brig H. K. Eaton and the resulting shortage was to be made up by the Engineering Department.<sup>164</sup>

On August 18, Gillmore notified Morton that he was marking ten representative bricks of the next two shipments of brick to Fort Jefferson. These bricks were bought for use as front bricks;<sup>165</sup> but on November 26, a letter from the Agency informed Morton that the Danvers' brick did not come up to the standard represented.<sup>166</sup>

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<sup>161</sup> J-L June 18, 1861. Gillmore to Morton.

<sup>162</sup> Ibid.

<sup>163</sup> J-L June 14, 1861. Morton to Hunt;  
J-L June 20, 1861. Hunt to Morton.

<sup>164</sup> J-L Dec. 4, 1861. Totten to Morton.

<sup>165</sup> J-L Aug. 18, 1861. Gillmore to Morton.

<sup>166</sup> J-L Nov. 26, 1861. Trowbridge to Morton.

1862

INSTRUCTIONS: Early in the year 1862, detailed instructions concerning the construction of one of the large magazines on the parade and the position of the independent magazines (whose outline and dimensions were to be changed from the first design) were sent to Jefferson. Totten instructed Morton to start work at once on one of the largest magazines, and stressed the formation of the magazine grille.<sup>167</sup>

Totten refused to sanction Morton's proposal to build a horse railway, but authorized him to put down a common wooden tramway of light bar rails.<sup>168</sup>

On March 6, 1862, Totten wrote Morton that Congress had appropriated \$200,000 for a new fort to be placed on Bird Key, and instructed him to ascertain the substance of the ground on Bird Key.<sup>169</sup> More instructions concerning this new fort were found in a letter dated March 8, 1862, wherein Totten indorsed Morton's proposed plan of moving machinery, and similar material to the new fort at Bird Key. In this same letter Totten directed that the two shot furnaces be located-- one at the northern angle of the parade between the hospital and the officers' quarters, and the other at the south angle near the magazine between the Commanding Officer's quarters and the Navy storehouse.<sup>170</sup>

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- <sup>167</sup> J-L Jan. 9, 1862. Totten to Morton; also J-L, Feb. 4, 1862, Totten to Morton.
- <sup>168</sup> J-L Jan. 11, 1862. Totten to Morton.
- <sup>169</sup> J-L March 8, 1862. Totten to Morton.
- <sup>170</sup> J-L March 8, 1862. Totten to Morton.



Instructions concerning the placement of traverse irons, with a sketch showing the dimensions and positions of the segments were sent on March 13, 1862;<sup>171</sup> then on the 28th, Totten again referred to the new fort at Bird Key;<sup>172</sup> and on April 19 asked McFarland to experiment on Bird Key for substance by driving piles.<sup>173</sup> By the last day of January the pile driving was discontinued and a rough sketch made for sending McFarland at Key West.<sup>174</sup>

CONSTRUCTION: During January 1862 the smiths made iron-work for the gateway; the masons laid brick in the barbette magazines and breast height wall,<sup>175</sup> and in February continued to exert most of their time to these ends.<sup>176</sup> The condition of the work, as shown in a statement of February 28 (?), 1862, was briefly as follows: The references of the bastions and the fronts were raised approximately: scarp wall to 42'10", breast height wall to 43'9", parade wall to 37'4½", and the brick work of the barbette magazines on front four to the ref 46'. The roof surfaces of the arches were asphalted, drains constructed and arches laid over with brick.<sup>177</sup> The majority of the

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<sup>171</sup> J-L March 13, 14, 1862. Totten to Morton. Two letters clipped together accompanied by a sketch. Sketch is in collection.

<sup>172</sup> J-L March 26 (?), 1862. Totten to McFarland.

<sup>173</sup> J-L April 19, 1862. Totten to McFarland.

<sup>174</sup> J-L May 31, 1862. McFarland to Pearsall.

<sup>175</sup> J-R 66 Jan. 1862. pp. 359-403.

<sup>176</sup> J-R 66 Feb. 1862. p. 403 ff.

<sup>177</sup> J-S Feb. 28, 1862. Statement of work done.

masons were employed in laying brick in the barbette magazines and the breast height wall for the balance of the year. Small numbers of them were engaged in other work from time to time: the shot cellars of the breast height/<sup>wall</sup> the pintle blocks and braces and transverse circles of the barbette tier.<sup>178</sup>

On March 12 Trowbridge, at the N. Y. Agency, notified Morton that the irons for the drawbridge were at hand and to be sent soon.<sup>179</sup>

As a result of the appearance of yellow fever at Key West, the Fort Jefferson surgeon wrote McFarland to suggest that a small building on Bird Key be repaired and enlarged as a proper place to confine "scourge" patients,<sup>180</sup> but no immediate action seems to have been taken.<sup>181</sup>

SUBSIDENCE: On March 6, 1862, Totten requested Morton to make tests at Fort Jefferson to determine to what extent the piers had settled,<sup>182</sup> and on the 12th, Morton, evidently in reply to this request,

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<sup>178</sup> J-R 30: 1862, March, May, June, July, August, September, October, November, December.

<sup>179</sup> J-L March 12, 1862. Trowbridge to Morton.

<sup>180</sup> J-L August 27, 1862. Holder to McFarland.

<sup>181</sup> J-L Sept. 26, 1862. Jekyll to Capt. Wm. G. Tackaberry, Chairman Board of Health: "...I should have long since added to that small building but discovered orders in this office, from Engineer Department, forbidding the erection of any temporary building, not contemplated in the plans of Fort Jefferson, without the direct sanction of General Totten. ..."The building was described as accommodating only four people.

<sup>182</sup> J-L March 6, 1862. Totten to Morton.

asked for a copy of the last subsidence levels taken at Fort Jefferson.<sup>183</sup> Finally, on April 22, 1862, there appeared a table made by Pearsall in January 1862, which had something of subsidence in it. This table, though, was the difference of settlement between the scarp and piers and lower casemate arches.<sup>184</sup> The table of absolute settlement, and an accompanying table showing the blow by blow account of the pile driver, was sent to McFarland by Pearsall on May 30, 1862. The bastions had settled--A, 1.150 feet; B, .284 feet; C, .841 feet; no measurements or reasons for the omission were given for D; E, .370 feet; and F, .637 feet.<sup>185</sup> McFarland ordered Pearsall to discontinue the pile driving on May 31, 1862.<sup>186</sup>

ARMAMENT: No evidence of additional armament arriving at the fort during 1862 could be found.

CHANGES IN PLANS: On January 6, 1862, Totten wrote Morton that all the independent magazines were changed in their outline and dimensions from the first design. The Armament Board decided to mount a 15" gun in each of the bastions of Fort Jefferson.<sup>187</sup> The new iron casemate carriages for heavy guns required that the radii of the

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183 J-L March 12, 1862. Totten to Morton.

184 J-L April 22, 1862. Table by Pearsall.

185 J-L May 30, 1862. Sketch by Pearsall sent to McFarland. In collection.

186 J-L May 31, 1862. McFarland to Pearsall.

187 J-L Jan. 6, 1862. Totten to Morton.

middle line of the inner and outer traverse irons be changed. This was a change in plans for the embrasures not yet completed, as the ones already completed were to be left as they were.<sup>188</sup>

MATERIALS: On February 13, 1862, Trowbridge communicated to Totten the substance of a large order from Morton, in which Morton wished to receive 500,000 bricks before the first of April. This number was to complete the order for 2,900,000, of the summer of 1861.<sup>189</sup> On February 14, Trowbridge was authorized to fill this order.<sup>190</sup>

There were 329,686 bricks on hand at the end of the first quarter, and additions during the second quarter amounted to 660,878; additions during the third quarter amounted to 401,660, and during the last quarter 313,000 arrived. On December 31 there were on hand 294,928 bricks, and this amount subtracted from the total amount of bricks received gives 1,416,302 bricks as the number of bricks used at Fort Jefferson during the last three quarters of 1862. By this same method it is found that there were 5,480 barrels of cement used over the same period.<sup>191</sup>

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<sup>188</sup> J-L March 13, 1862. Totten to Morton.

<sup>189</sup> J-L Feb. 13, 1862. W. P. Trowbridge to Totten.

<sup>190</sup> J-L Feb. 14, 1862. Totten to Trowbridge.

<sup>191</sup> J-M 105. 1862. p. 19 and 36.

INSTRUCTIONS: Totten sent detailed instructions concerning the setting and reinforcing of the "feeble" traverse stones, to Lieut. W. McFarland on the 19th of February 1863.<sup>192</sup>

Col. Alexander instructed Frost to pierce the breakwater wall at points on Fronts 1 and 2 to facilitate drainage of the ditches by tidal fluctuation,<sup>193</sup> and a month and a half later, wrote again instructing Frost to remove parts of the Front 6 coffer dam which interfered with the flow of tide. He also ordered Frost to build a flood gate in the opening which had been made in Front 1.<sup>194</sup> Ten days after that, June 16, Alexander instructed Frost to do something about the stagnant water in the ditch along Fronts 2 and 5. Alexander blames the Engineer Department for constructing a coffer dam which he asserts caused this condition of stagnancy.<sup>195</sup>

Frost was instructed by Capt. McFarland to use iron floor beams under the two floors of the barracks, but he was not to use them under the roof. In this same letter of June 8, Frost was reprimanded for putting too much superfluous material in his reports; McFarland

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<sup>192</sup> J-L Feb. 19, 1863. Totten to Lieut. McFarland, Key West.

<sup>193</sup> J-L April 19, 1863. Alexander to Frost.

<sup>194</sup> J-L June 6, 1863. Capt. McFarland to Frost.

<sup>195</sup> J-L June 18, 1863. Alexander to Frost.

stated that Frost was to make a requisition only a requisition and not a combination of two or more things. <sup>196</sup>

On July 7, Totten wrote McFarland not to allow the masons to waste time in cutting any of the arch bricks except the groin. <sup>197</sup>

On the 29th of the same month, Totten wrote Capt. McFarland that instructions of March 6, 1862 from the Engineer Department to Capt. Morton, in charge of Engineer Office at Jefferson, had not been complied with. These instructions concerned the borings and other experiments on Bird Key. <sup>198</sup>

An old friend of Fort Jefferson, D. P. Woodbury, who was a Brigadier General in charge of Key West District at the time of this letter, September 26, 1863, wrote Holgate instructing him to have the wharves at Fort Jefferson repaired thoroughly and immediately. <sup>199</sup>

On the 19th of December, McFarland found himself to be running short of Maine bricks with the source of supply shut off; so he instructed Holgate at Jefferson to cease use of that type of brick and to send the remaining bricks on hand back to Key West for use at Fort Taylor. The only reservation was that the number of bricks needed to finish the front of the barracks were to be held at Jefferson. <sup>200</sup>

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- 196 J-L June 8, 1863. Capt. McFarland to Frost.  
197 J-L July 7, 1863. Totten to Capt. McFarland.  
198 J-L July 29, 1863. Totten to Capt. McFarland.  
199 J-L Sept. 26, 1863. Brig. Gen. D. P. Woodbury, Commander, Department of Key West, to Lieut. A. H. Holgate, Key West.  
200 J-L Dec. 19, 1863. Capt. McFarland to Holgate.

The nine front pintle 42 pounders mounted on wooden carriages on the barbette tier had their traverse limited to 10 or 12 degrees each way. On December 28, Totten sent full instructions, accompanied by a sketch, showing the manner of mounting these guns so that they would have a full 60 degree traverse each way.<sup>201</sup>

CONDITION OF THE WORK: On March 18, the traverse stones were laid upon brick foundation walls throughout the barbette along Fronts 1 and 2. The sand was ramm'd and leveled, ready for brick foundations, nearly throughout Curtain 6; the brick foundations for two circles were started on this Curtain, but that work was stopped. On Curtains 3, 4, and 5, nothing had been done. No traverse irons were set in any barbette tier, except on the six center pintle wooden platforms (one in each bastion) carrying a 10-inch Columbiad in each Bastion. The pintle blocks were complete along all six Fronts.<sup>202</sup>

On June 30, the application of labor had considerably advanced the works of the barbette tier. Excavation of the main ditch was wholly completed upon two fronts (Fronts 1 and 2) and partially completed upon a third (Front 6(?)). Construction of barracks and main sewers was commenced and considerably advanced. Most of the

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<sup>201</sup> J-L Dec. 28, 1863. Totten to Capt. McFarland.

<sup>202</sup> J-L March 18, 1863. Edward Frost to Lieut. W. McFarland.

cisterns were carefully examined and repaired. The wood and copper work of the second tier tower magazines was executed. The four Curtain magazines were completed, and one hot shot furnace was finished. The gun rooms of the lower tier casemates received extra traverse arcs for the use of iron carriages. <sup>203</sup>

On December 28, the work on the barracks was advanced enough for an estimate to be made of the approximate date of readiness for a roof. <sup>204</sup> The work done between June 30 and December 31 centered around the barracks, main sewer and the extension to the officers quarters. Other items such as digging main ditch, repairing casemate cisterns, setting barbette pintle irons, laying stones for gun platforms on barbette tier and pointing cracks in casemate and scarp walls, occupied the time of the remainder of the force. <sup>205</sup>

CONSTRUCTION - Set-backs: The superior slope of the terreplein had been covered with asphalt which projected a few inches beyond the face of the cornice, and the asphalt was softening and drooping down away from the cornice stones to which it had been meant to stick. <sup>206</sup>

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203 J-Ry June 30, 1863. Yearly Report.

204 J-L 35 p. 170 Dec. 28, 1863. Frost to Capt. McFarland.

205 J-Ror 1863. (No page numbers) Monthly Reports.

206 J-L March 18, 1863. Phillips to Mr. James McFarland.



Mortar made up with lime in it was found to be far inferior to that with cement only. Phillips explained the contrast and gave as the reason for it the tropical climate. Much work had been done using mortar with lime and cement mixed together; and this work was crumbling; while work which had been done with mortar composed of cement without the lime was hardening with each passing year.<sup>207</sup>

The marly characteristic of the material dug from the ditches was becoming less marly along Fronts 5 and 6. This material was utilized for filling in between the scarp wall and the breast height wall; it was necessary that the substance have a high content of marl in it so that it would cement together and be of a permanent nature.<sup>208</sup>

A breach, 25' wide, in the counter scarp wall on Front 1 near Bastion A was completed as per instructions from Col. Alexander of April 13 and 19.<sup>209</sup>

Piles were driven at two of the wharves and the docking was put down on one of them.<sup>210</sup> This work was done as per instructions of September 26, from D. P. Woodbury.

The pile driver for the works on Bird Key had arrived, but the piles had not been heard from on November 2. The borings were suspended for that reason.

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207 J-L Dec. 4, 1863. Phillips to Holgate.

208 J-L 35 p. 34. March 24, 1863. Frost to Lt. McFarland.

209 J-R 70 or 1863.

J-L Apr. 13, 1863. Frost to Alexander.

210 J-L Nov. 2, 1863. Lt. A. H. Holgate to Capt. McFarland.

SUBSIDENCE: After Frost arrived at Fort Jefferson and had adjusted himself somewhat, he wrote Lt. McFarland and described the overt effects of subsidence at Fort Jefferson.

"...I have not failed to notice that the subsidence of Bastion C, and the cracks in the contiguous scarp wall and the casemate arches of Curtain Three require to be carefully observed. On my first arrival here, their position and extent were pointed out to me. Indeed they necessarily arrest one's attention in approaching the Fort...."

He further stated that the cracks in the casemate arches had gained the greater part of their width during the month of February 1863; but at the time of this letter, the cracks appeared to be almost stationary. Frost then requested that copies of the subsidence tables, made by Woodbury and Morton, be sent to Fort Jefferson so that he, Frost, could add the latest data.<sup>211</sup> Totten sent the required tables and sheets to Capt. McFarland a month and a half later, May 20.<sup>212</sup> The prosecution of "Record of Settlement" had not yet been attempted on September 3; however, Lt. Holgate was at that time preparing to make the necessary experiments.<sup>213</sup>

ARMAMENT: On March 18, 1863, Frost wrote Lt. McFarland that no traverse irons had been set in the barbette tier except the six center-pintle wooden platforms (one in each bastion) carrying six 10-inch Columbiads. He went on to say that he was about to put down

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<sup>211</sup> J-L 35 p. 38-39. March 30, 1863. Frost to Lt. McFarland.

<sup>212</sup> J-L May 20, 1863. Totten to Capt. McFarland.

<sup>213</sup> J-L 35 p. 124. Sept. 3, 1863. Holgate to Capt. McFarland.

J-L 35 p. 121. Sept. 3, 1863. Lt. A. H. Holgate to Capt. McFarland.

not more than nine traverse irons on curtains one and two for the purpose of mounting a like number of 42 pounder guns which he had on hand at the time; also on hand were six pintles and six sets of traverse irons furnished for the 15-inch gun in each bastion. Frost remarked "...that we have as yet no guns mounted at this Fort, with which to observe the effect of the recoil upon the traverse circles, mentioned in General Totten's letter of the 20th...."<sup>214</sup> The next day Frost sent a full report to McFarland concerning the armament of Fort Jefferson:

"...2nd tier casemates, -contains 6 forty-two pounders James' rifled guns, on wooden carriages; traverse irons and pintles only temporarily secured. No other traverse irons than these are put down. Contains also, (in casemates 14 and 17 of Curtain three) 2 twenty-four pounder iron guns, mounted upon ship's carriages. These cannot be fired, as there is no provision against the recoil.

" None of the embrasure irons have been set except No 1 on Curtain three, where they have been set in brick alone, none of the prescribed cut stones having been yet provided. There are about 31 sets of these irons on hand, inclusive of the above one set. There are also on hand a large number of traverse irons, and these could be put down very rapidly, but the requisite flagging and granite is not here nor known to have been ordered.

" Very many, indeed almost all, casemates unprovided with guns are at present occupied as quarters, or for storehouses and miscellaneous purposes.

" 3rd lower tier casemates, - contains 37 eight inch Columbiads distributed as follows: -Curtain One -8, Two - 5, Three -3, Five -9, and Six -9 and twenty-four pound Howitzers, there being 4 in each of the six bastions:

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<sup>214</sup> J-L 35 p. 26. March 16, 1863. Frost to Lt. McFarland.

" All the gun-platforms in this tier, bastions included, are ready for guns, (and in the case of those upon the Curtains) are adapted both to carriages of wood and iron, excepting 4 on the curtains left unfinished to await determination of how to construct the drain &c., and also excepting the outermost two in each bastion. In bastion F, which is exceptional, the outermost one only...." <sup>215</sup>

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J-L 35 p. 28. Mar. 19, 1863. Frost to Lt. McFarland

Sketch Showing Armament Mounted at Fort  
Jefferson. March 14, 1883.

Front No. 1

There is an 8" Columbiad in 1st tier of Casemates as represented by their respective numbers on each of the fronts viz:

- (No. 1) 3x4x6x7x9x10x12x13.
- (No. 2) 3x5x7x9x21.
- (No. 3) 3x5x20.
- (No. 4) 5x8x13.
- (No. 5) 2x3x5x6x8x15x17x19x21.
- (No. 6) 3x4x6x8x10x16x18x20x21.

There is also a 24 lb Howitzer at each of the red points in the several B-stations in 1st tier. There are 6-42 lb "James's Rifled guns" on the 2nd tier viz:

- { Front No. 1 } Over Nos. 2x9.
- { " " 2 } " " 4.
- { " " 3 } " " 9x17x22.

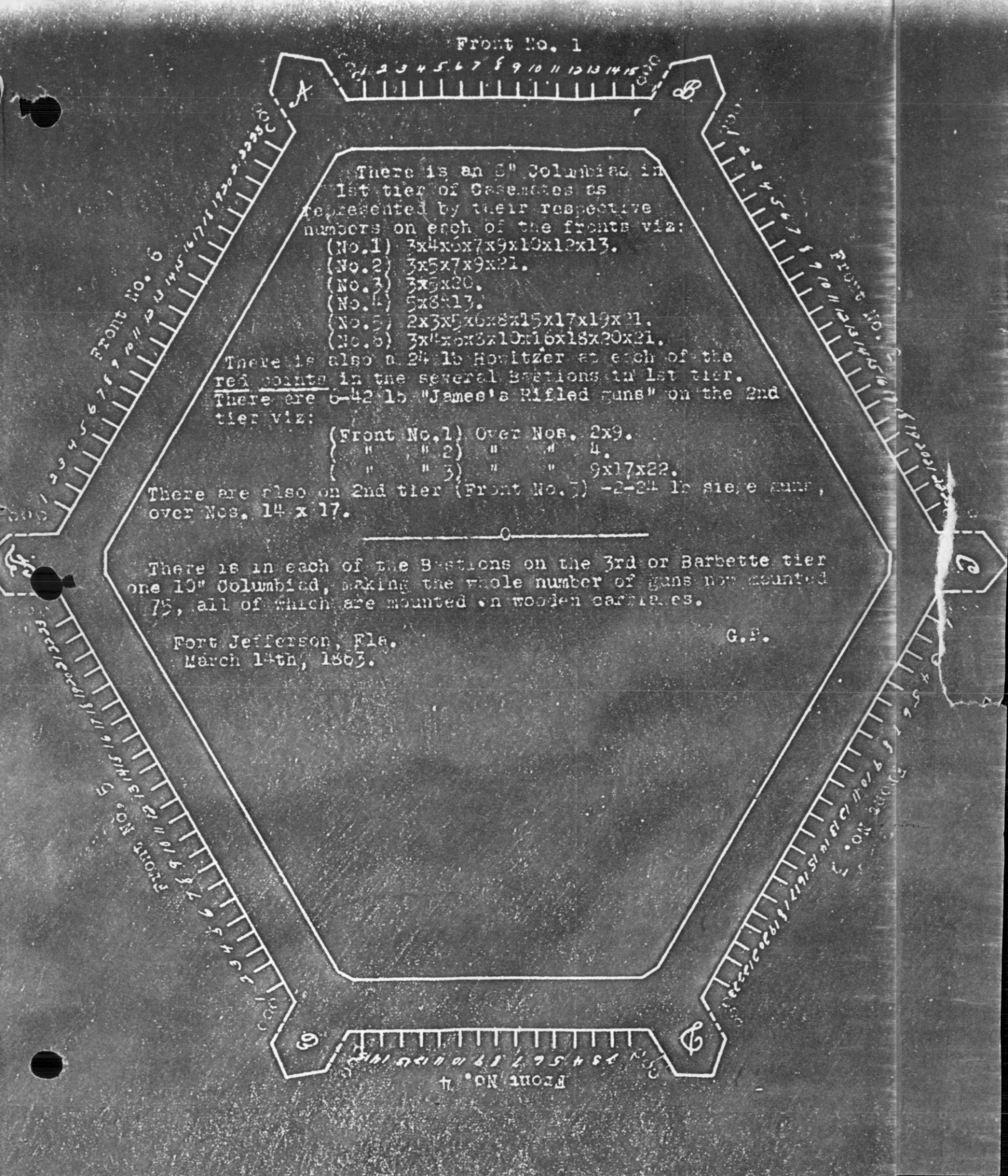
There are also on 2nd tier (Front No. 5) -2-24 lb siege guns, over Nos. 14 x 17.

There is in each of the B-stations on the 3rd or Barbette tier one 10" Columbiad, making the whole number of guns now mounted 75, all of which are mounted on wooden carriages.

Fort Jefferson, Fla.  
March 14th, 1863.

G.P.

Front No. 4



On the next day, the 20th, Frost sent to Lt. McFarland a

list of the guns at Fort Jefferson not mounted; the list follows:

9	iron 42 pounders				
10	" 24 "				
6	" 18 "				
2	" 24 "	Howitzers Flank de fuse.			
2	" 24 "	" " " " "	car-		
			riages & chassis		
	3 thirty-two pounder casemate carriages and 2 chassis for same.				
19	42 pounder barbette carriages and chassis				
9	32 " " " " "				
18	24 " " " " "				
1	12 " " " " "				
31	Traverse irons for bastions				
10	sets of 3½" inner circles for 8" Columbiads.				
4	" " 6 " " " " " "				
29	" " 3½" outer " " " " "				
6	" " 6 " " " " " "				
106	" " barbette traverse circles				
6	" " " " " " for 15" guns				
6	pintles for " " " " " " 15" "				
106	" " barbette guns				
38	" " 8" Columbiads	216			
26	" " bastion Howitzers				

Appended to Frost's yearly report made in June 1863 was a statement of ordnance from which the following was taken:

CASEMATES AND BARBETTES ENTIRELY READY FOR GUNS

<b>IN LOWER TIER:</b>	All the curtain casemates except 4	110
	In each flank of the bastions	24
<b>IN SECOND TIER:</b>	None permanently; but temporarily secured with embrasures still open for reception of irons are mounted	6
<b>IN BARBETTES:</b>	Four on Curtain No 1 and 6 on No 2	6
	Six temporary wooden carriages in bastions.	6
	Total capacity for guns	156
	Temporary or incomplete	12
	<b>TOTAL BARBETTES AND CASEMATES ENTIRELY READY</b>	<b>148</b>

ORDNANCE ON HAND AND MOUNTED

<b>IN LOWER TIER:</b>	Eight inch Columbiads (wooden carriages) . . .	37
	Twenty-four pounders and Flanking Howitzers . . .	24
<b>IN SECOND TIER:</b>	42 lbs, James rifled, wooden carriages, temporary . . . . .	6
	24 lbs, on boat carriages, unfit for firing . . .	2
<b>IN THE BARBETTE:</b>	Ten inch Columbiads, one in each bastion mounted upon temporary platforms . . . . .	6
	42 lbr guns, 4 on front 1 and 5 on 2 . . . . .	9
	<b>TOTAL OF PRESENT NUMBER OF GUNS MOUNTED . . . . .</b>	<b>84</b>
	Temporary or incomplete . . . . .	14
	<b>TOTAL OF GUNS PERMANENTLY MOUNTED . . . . .</b>	<b>70</b>

ARMAMENT ON HAND

10 . . . . .	Iron 24 pounders			
6 . . . . .	" 18 "			
2 . . . . .	" 24 "	Flank Howitzers		
18 . . . . .	24 "	Barbette carriages and chassis		
2 . . . . .	24 "	Flank casemate		"
9 . . . . .	32 "	Barbette carriages and chassis		
19 . . . . .	42 "	" " " "		
1 . . . . .	12 "	" " " "		
3 . . . . .	32 "	Casemate	"	"
2 . . . . .	32 "	"	"	"

CASEMATES AND BARBETTES EXPECTED TO BE MADE READY

During the fiscal year ending June 30, 1864.

**BARBETTE** . . . . . The whole was expected to be made ready  
**CASEMATES** . . . . . None under the "present" instructions

During July there were four guns mounted on Front 1 and five on  
 Front 2, all in barbette. Guns on hand and not mounted on July 31:

10 . . . . .	24 pounders	
6 . . . . .	18 "	
2 . . . . .	24 "	Howitzers



Barbettes prepared: -9 for the 42' pounders mentioned above. No guns were received during the month; no casemates were prepared; but expected to have two barbette platforms ready during August. <sup>217</sup>

During August, 5 guns were received, none were mounted, and there were on hand:

10	24 pounders	
6	18 "	
2	24 " Howitzers	<sup>218</sup>
5	unclassified	

No guns were received, during September none were mounted, and there were on hand and not mounted:

5	10 inch Columbiads
6	24 pounder guns
2	34 pounder Howitzers
6	18 "

Two Barbette platforms were made ready for guns during September. No's 1 and 2 of Front 3. <sup>219</sup>

From a table dated November 1, 1863, the following information was gleaned:

**BARBETTE GUNS**

Platforms ready but armament not yet supplied-

2	15 inch or 13 inch guns, front pintle
24	10 " " 6 " Columbiads, front pintle, lacking pintles and traverse iron.

Platforms ready and armament in place-

6	10 inch, temporarily arranged w/front pintle
9	42 pounders, wooden carriages, traverse confined by contact with the breast height wall.

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217	J-L	35 p. 109.	<u>Aug. 13, 1863.</u>	Armament Report
218	J-L	35 p. 123.	<u>Aug. 31, 1863.</u>	Monthly Report
219	J-L	35 p. 136.	<u>Oct. 1, 1863.</u>	Monthly Report

**CASEMATE GUNS**

Platforms ready but armament not supplied-

73 ..... 10 inch or 8 inch Columbiads, front pintle  
11 ..... flank Howitzers, front pintle

Platforms ready and armament in place-

37 ..... 8 inch smooth bore guns  
2 ..... 24 pounder smooth bore guns on ship's carriages,  
front pintle  
24 ..... Flank Howitzers, front pintle, smooth bore  
6 ..... 42 pounders, rifled, temporarily arranged,  
front pintle<sup>220</sup>

During October, no guns were received; no guns were mounted; and there were on hand and not mounted:

5 ..... 10 inch Columbiads  
10 ..... 24 pounder iron guns 221  
2 ..... 24 pounder iron Flanking Howitzers  
6 ..... 18 pounder iron guns

No guns were received during November and December, none were mounted, and there were on hand and not mounted:

5 ..... 10 inch Columbiads  
10 ..... 24 pounder iron guns  
2 ..... 24 pounder iron flanking Howitzers 222  
6 ..... 18 pounder iron guns

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- 220 J-L 35 p. 145. Nov. 1, 1863. Table of armament at Jefferson Oct. 31, 1863.  
221 J-L 35 p. 149. Nov. 1, 1863. Monthly Report.  
222 J-L 35 p. 159. Dec. 1, 1863, and J-L 35 p. 181. Jan. 1, 1866. Monthly Report.

On December 28, Totten sent Capt. McFarland a detailed sketch showing the correct way to mount the nine front pintle 42 pounders, which had their traverse impeded by contact with the breast height wall.<sup>223</sup> Then on the 30th of December, the Engineer Department at Washington recommended to the Ordnance Department that there be sent to Fort Jefferson 2 front pintle 100-pounder Parrott rifles, and 8 casemate 42-pounder rifled guns.<sup>224</sup>

At the end of December 1863, there were six 10-inch, and nine 42-pounder iron guns mounted in the barbette tier; and 26 platforms were ready for guns not yet received at the fort. The casemates contained, - thirty-seven 6-inch, two 24-pounders, twenty-four flanking howitzers and six 42-pounder rifled guns, - all mounted and in place. Eighty-four casemates were supplied with platforms, but the armament for these had not yet been received at the fort.

CHANGES IN PLANS: Shortly after arriving at the Fort, Frost, on March 28, proceeded to write Lt. McFarland that the stone traverse arcs along Curtains 1 and 2 were not in accordance with the latest instructions, and they could be reinforced according to a sketch enclosed in this letter.<sup>225</sup>

After careful examination of the drawings for the Soldier's Barracks, Frost concluded that the number of iron girders proposed was too high. He suggested that the number be reduced from 378 to 252.<sup>226</sup>

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223 J-L Dec. 28, 1863. Totten to Capt. McFarland.

224 J-L Dec. 30, 1863. Totten to Capt. McFarland.

225 J-L Mar. 28, 1863. Frost to Lt. McFarland.

226 J-L 35 p. 55. Apr. 30, 1863. Frost to Lt. McFarland.

FINANCES: On March 26, Totten wrote Lt. W. McFarland acknowledging receipt of McFarland's request for a \$37,000 allotment for Fort Jefferson to cover expenses for January and February, and the estimated expenses for March. With this acknowledgment, Totten notified McFarland that \$20,000 had been remitted to the Assistant Treasurer for Fort Jefferson, \$16,000 was remitted to W. P. Trowbridge, New York agent, and an application was made for \$17,000 to be remitted to the Assistant Treasurer and charged to McFarland on account of Fort Jefferson. When this remittance should be made, the balance with the Treasurer (which had been appropriated for Fort Jefferson and not yet drawn for the use during the fiscal year for which it was appropriated) was \$64,910.31. In addition to this undrawn balance, there was appropriated for the fiscal year ending June 30, 1864 \$300,000 for Fort Jefferson. McFarland was instructed not to consider the last named amount subject to draft before July. <sup>227</sup>

In spite of this large unexpended balance at New York, there were several instances of men leaving the fort, allegedly because of non-payment of wages long overdue. <sup>228</sup>

Applications for allotments and acknowledgments of same came in the following order: Trowbridge requested \$10,000 and application was made for same, to be remitted to Trowbridge and charged

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<sup>227</sup> J-L March 26, 1863. Totten to McFarland.

<sup>228</sup> J-L Apr. 20, 1863, Frost to Mr. J. McFarland; J-L Apr. 23, 1863, J. McFarland to Frost; J-L Apr. 27, 1863, Frost to J. McFarland; J-L May 12, 1863, Frost to J. McFarland.

to McFarland; <sup>229</sup> in compliance with McFarland's request of June 12, application was made to the Assistant Treasurer at New York for \$20,000 to be placed to McFarland's account for Fort Jefferson; in compliance with Trowbridge's request of June 11, application was made for \$10,000 to be remitted to him for Fort Jefferson; <sup>230</sup> in compliance with McFarland's request of November 12, application was made for \$20,000 to be remitted to the Assistant Treasurer and charged to McFarland; in compliance with request of Trowbridge of November 24, application was made for \$25,000 to be remitted to Trowbridge and charged to Fort Jefferson; <sup>231</sup> in compliance with request of McFarland, application was made for \$15,000 to be remitted to the Assistant Treasurer and charged to McFarland; <sup>232</sup> in compliance with request of Trowbridge, application was made for \$7,000 to be remitted to him and charged to Fort Jefferson. <sup>233</sup>

From the 1863 ledger, it is found that there was at least \$142,665.45 spent during 1863. <sup>234</sup>

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- 229 J-L Apr. 6, 1863. Totten to Capt. McFarland.
- 230 J-L June 20, 1863. Major J. D. Kurtz by order of Totten to Capt. McFarland.
- 231 J-L Dec. 8, 1863. Totten to Capt. McFarland.
- 232 J-L July 24, 1863. Totten to Capt. McFarland.
- 233 J-L (Tentatively) Sept. 20, 1863. Maj. J. C. Woodruff, Wash., D. C., to Capt. McFarland.
- 234 J-Lgr 13, J-Lgr 14, 1863. This amount is not established as the total.

ESTIMATES: About March 1863, Capt. McFarland made a chart

from which the following has been taken:

Sum open to expenditure . . . . .	\$300,000	
Unexpended balance at Asst. Treas. April 1 . . . . .	64,910.31	
Unexpended balance in hand and proceeds of sales yet to credit U. S. A. . . . .	5,089.69	
	<u>360,000.00</u>	
Amount set aside for preservation to 1865 June 30 . .	10,000.00	235
Proposed expenditures from April 1, 1863 to June 30, 1864	<u>350,000.00</u>	

From the Project of Expenditures, McFarland sets forth:

That the total net cost of the services of a force of 300 persons for one month was \$9,590.37; that the number of employees was 156 at the beginning of the 2nd quarter, 1863, and that number was fallen to less than half before the end of the quarter: that it was desirable the number not fall below 420 during the first quarter of 1864; this increase was to bring the average for the year up to the desired 300.

The \$9,590.37 per month was further broken down into provisions, wages and supplies. <sup>236</sup>

On September 23, Frost informed Trowbridge that the following items would require certain numbers of bricks which were not already called for:

Unfinished work of soldier's barracks . . . . .	800,000	
Extension of officer's quarters . . . . .	900,000	
Completion of counter scarp wall . . . . .	200,000	
Erection of Navy storehouse . . . . .	<u>500,000</u>	237
	2,400,000	

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- 235 J-E Apr. 1, 1863. Capt Walter McFarland.
  - 236 J-E 1863 - 1864. Project of Expenditures.
  - 237 J-L 35 p. 130. Sept. 23, 1863. Frost to Trowbridge.

MATERIAL: The supply of bricks was nearly exhausted on April 7; Frost wrote Trowbridge of this situation and ordered 400,000 bricks, meanwhile fearing suspension of operations because of failure to receive supplies.<sup>238</sup> On June 6, 150,000 bricks arrived at the Fort; and Frost wrote Trowbridge: "...As to the bricks, I am extremely disappointed firstly because of the kind and secondly it is a very poor lot of the kind. At least 3/5 of the whole lot must be counted as soft brick...."<sup>239</sup>

The Brig Renshaw, captained by Charles F. Smith, encountered a storm off Cape Hatteras, on August 22 and 23, 1863. 15,000 bricks for Fort Jefferson had to be jettisoned.<sup>240</sup>

Fort Taylor Engineers were using Maine bricks and found themselves running low. Upon investigation, they discovered the supply in Maine was to give out soon; consequently, they wrote Frost instructing him to load all of the Maine bricks not needed in finishing the front of the soldiers' barracks for Fort Taylor.<sup>241</sup> This order was partly complied with on October 10; although Col. Alexander commanded that the Matchless be used immediately for transporting his monthly papers, Frost managed to load 44,000 bricks for Fort Taylor before the vessel could get away.<sup>242</sup>

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- 238 J-L 35 p. 44. April 7, 1863. Frost to Trowbridge.  
239 J-L 35 p. 77. June 5, 1863. Frost to Trowbridge.  
240 J-L 35 p. 129. Sept. 23, 1863. Frost to Trowbridge.  
241 J-L Sept. 30, 1863. Frost to Lt. Holgate.  
242 J-L Dec. 19, 1863. Capt. McFarland to Lt. Holgate.  
J-L Oct. 10, 1863. Phillips to A. H. Holgate.

On November 2, Holgate wrote to Capt. McFarland, informing him of a shortage of material at Fort Jefferson.<sup>243</sup> Perhaps the reason for this shortage is shown in Trowbridge's letter to McFarland of November 28, 1863:

"...Bricks are very scarce and high I am trying my best to ship all I can but fear the quality of some will be low and the price very high...."<sup>244</sup>

The following information is set down to be understood as a meter for the amount of material used during the year 1863.

Bricks

On hand Dec. 31, 1862	.....	294,928	.....	\$1,622.10	
Additions to Mar. 31, 1863	.....	267,650	.....	1,650.09	
Consumption to Mar. 31, 1863	...	60,624	.....	323.27	
On hand to Mar. 31, 1863	.....	501,954	.....	2,845.92	
Consumption to June 30, 1863	...	378,719	.....	2,095.02	
On hand to June 30, 1863	.....	123,235	.....	760.00	
Additions to Sept. 30, 1863	.....	314,000	.....	2,821.00	
Consumption to " " "	.....	224,169	.....	2,029.54	
On hand to Sept. 30, 1863	.....	213,066	.....	1,541.43	
Additions to Dec. 31, 1863	.....	667,600	.....	5,208.90	
Consumption to " " "	.....	603,520	.....	4,960.33	
On hand " " "	.....	277,346	.....	1,770.00	245
<b>Total additions during 1863</b>	.....	<b>1,249,450</b>			

Cement

On hand at Dec. 31, 1862	.....	2,762 bbls.		\$2,064.00	
Consumption to Mar. 31, 1863	...	940		705.00	
On hand ... at " " "	.....	1,813		1,359.00	
Consumption to June 30, " "	.....	735		507.75	
On hand " " "	.....	1,077		851.25	
Additions to Sept. 30, 1863	.....	1,000		1,200.00	
Consumption " " "	.....	1,023		824.25	
On hand " " "	.....	1,054		1,227.00	
Additions to Dec. 31, 1863	.....	1,900		2,200.00	
Consumption " " "	.....	1,934		2,314.00	246
On hand " " "	.....	1,020		1,193.00	
<b>Total Additions during 1863</b>	.....	<b>2,900</b>			

243 J-L 35 p. 146. Nov. 2, 1863. Holgate to McFarland.

244 J-L Nov. 28, 1863. Trowbridge to Capt. McFarland.

245 J-M 105 p. 19, 1863.

246 J-M 105 p. 36, 1863.



White Pine

On hand on Dec. 31, 1862	.....	230,829	.....	\$4,141.48	
Addition to Mar. 31, 1863	.....	20,004	.....	700.14	
Consumption " " "	.....	60,059	.....	1,750.00	
On hand on " " "	.....	200,774	.....	3,091.62	
Addition to June 30, 1863	.....	68,147	.....	2,252.81	
Consumption to June 30, "	.....	80,407	.....	2,049.42	
On hand to June 30, 1863	.....	209,514	.....	3,295.00	
Additions to Sept. 30, 1863	.....	10,011	.....	194.92	
Consumption to " " "	.....	13,459	.....	204.00	
On hand Sept. 30, 1863	.....	206,066	.....	3,285.92	
Additions to Dec. 31, 1863	.....	148½	.....	7.42	247
Consumption " " "	.....	98,384	.....		
		108,825½	.....		
Total Additions during 1863	.....	118,310½			

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247 J-M 105 p. 121. 1863.

1864

During 1864, Fort Jefferson construction was hampered and finally almost halted by lack of funds. Operation costs were exceedingly high with the material cost leading the list of many expensive items needed for continuance of construction; even old reliable workmen were forced to join in the petitioning and striking that ultimately resulted in the desired raise in wages to counteract a rapidly advancing cost of living.

INSTRUCTIONS: There were to be iron stairs manufactured as per specifications made by Frost; and the company making up the stairs was in doubt concerning some points which they believed to be errors in the drawing up of the plans. They wrote the Engineer Agency at New York; and the Agency forwarded the letter to Capt. McFarland, who then wrote Lt. Holgate instructing him to have the desired information transmitted to Key West by return mail for forwarding to New York. McFarland said, "...Such a blunder as is therein involved should be made to fall upon the person through whose carelessness it was committed...."<sup>248</sup>

Gen. Delafield approved McFarland's proposition to substitute iron roofs for wooden ones on the buildings at Fort Jefferson, but stated that the existing slate roof was not to be removed at once.<sup>249</sup>

McFarland instructed Duncan to make an inventory of bricks on hand at Fort Jefferson and an estimate of those needed to finish work

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<sup>248</sup> J-L Apr. 4, 1864. Capt. McFarland to Lt. Holgate.

<sup>249</sup> J-L May 25, 1864. Richard Delafield to William P. Trowbridge.

on the large magazine, the new barracks, the addition to the officer's quarters and the kitchens attached to each. <sup>250</sup>

Instructions restricting work at Garden Key were the only kind received after June. Delafield wrote McFarland that the barracks roofs were not to be constructed that season on account of expense. <sup>251</sup> On December 6, McFarland issued a most discouraging order, cutting the force at Jefferson to a Physician, Chief Overseer, Captain and Crew of Tortugas, 3 masons, 3 carpenters, and 10 laborers. As an anticlimax, orders were added that excavation work of the main ditch was to be discontinued: prisoners were doing this work, and all that was needed to keep it going was coal for the boilers.

CONDITION OF THE WORK: The magazine roofs were near completion during the early part of June. Some of them were yet to be filled with sand from the ditch at the time of resuming work on the remaining half of the ditch along Front 6. Duncan suggested that after completion of excavation on Front 6, the engines be moved to the angle at Bastion D, the ditch excavated on Fronts 3 and 4, and the marly substance used to fill in the terreplein and parapet of Fronts 3 and 4, thus counteracting the unequal settlement to some extent. Some of the buildings on the parade lacked only materials to complete them. The roofs of the barracks and officers' quarters demanded immediate attention. Plans were needed for the Navy Storehouse, Hospital, Chapel, Commandant's Quarters, and Permanent Wharf. <sup>252</sup>

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250 J-L June 19, 1864. McFarland to James Duncan.

251 J-L 36 pp. 281-282. Sept. 9, 1864. Frost to McFarland.

252 J-L 36 p. 261-262. June 1864. Memorandum to Capt. McFarland.

On June 19, a memorandum by James Duncan stated that the grillage of the magazine was at that time laid; and the men were carrying the concrete up the proper references; but the brick work was not commenced as yet; the external walls " &c." were completed on the New Barracks; 2 kitchens of the New Barracks were nearly completed; 4 sections of the Officers' Quarters were completed 2 stories high; and 1 yard wall, privy, and Officer Quarters' kitchen were completed.<sup>253</sup> The kitchen intended for the quartermaster of the post was in the hands of the painters for completion on June 20; meanwhile, all other operations were going on favorably.<sup>254</sup>

From the annual report we find the following: of the front pintle platforms occupying the several faces, all but 16 were fully completed. Progress was made in supplying doors and jambstones to the shot-cells, but none <sup>were</sup> completed. The interior work of all the barbette magazine traverses was completed; all the barbette magazine traverses on Fronts 1 and 2 were finished on the exterior, and rafters raised over all the remaining ones. The banquette, except at the shot cells, was complete on Fronts 1, 2, and 5--the remainder barely commenced. On the first tier, there were 1800 superficial feet of flagstone flooring laid in casemates otherwise complete, and 5 new pattern 10-inch Columbiads mounted on iron carriages. In the parade, the main sewer was entirely completed except setting the valves or gates

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<sup>253</sup> J-L 35 p. 265. June 19, 1864. Memorandum of James Duncan.

<sup>254</sup> J-L 35 p. 266. June 20, 1864. J. Duncan to Capt. McFarland.

controlling the outlets; the Soldiers' Barracks walls were made ready for receiving the roof; the 2 Barracks' kitchens at the southern extremity were built; the walls of the Officers' Quarters were made ready for receiving the roof; 2 Officers' Quarters double kitchens were constructed and the foundations for 4 more were laid. <sup>255</sup>

Under standing instructions, work on the second tier was suspended during the fiscal year ending June 30, 1864. There was little to be done, however, as the second tier casemates lacked only completion of embrasures, floor surfaces and traverse arcs. <sup>256</sup>

On July 7, the 2 double kitchens were almost finished, needing only window glasses and sash cord. <sup>257</sup>

Work centered around the Officers' Quarters and Barracks the last 6 months of the year; but the force was reduced to so small a body that the work took the form of repairs and small scale improvements. <sup>258</sup>

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<sup>255</sup> J-Ry June 30, 1864. Yearly Report, 1864. Appended to this yearly report was detailed proposal for changes in plans for the Officers' Quarters. It covered widening of the verandas, running all the windows to the floor on the first story, throwing out the brick partitions on either hand of the hallway central to each section, constructing tanks to receive rain water from the roofs, constructing service from these tanks to the parts of the building, building water closets, and constructing additional cisterns. For the kitchen buildings, the following items were set forth: constructing flat roofs, widening and extending the roof, veranda like, and small items to effect more circulation of air.

<sup>256</sup> MCB. June 30, 1864. Annual Report Chart.

<sup>257</sup> J-L July 7, 1864. James Duncan to Capt. McFarland.

<sup>258</sup> J-R70or. Jan-Dec. 1864.

PROBLEMS AND SET-BACKS IN CONSTRUCTION: On January 10, Frost wrote that the sewer was completed and the pumps were at work removing water from the main ditch in Front 6; he also informed McFarland by this same letter that he hoped to forward a plan, or at least a sketch "sufficient if approved," by which to start the Navy Storehouse.<sup>259</sup> Again on the 26th, Frost informed McFarland that the plan of operations for the year embraced the partial construction of the Navy Storehouse; but the only points upon which Frost was certain, were that the building was to be bomb proof, 2 stories high, 160' x 58' in plan and located parallel to and near Curtain 3 in the position indicated upon the general plans in the Fort Jefferson Engineer office. The material for the foundation was not on hand. There was a nameless and dateless sketch of a project for the Navy Storehouse which Frost criticized severely, saying the walls were too heavy and the supports too light.<sup>260</sup> McFarland laid the needs at the desks of the Washington office, pointing out that the Jefferson Engineer office was then in need of plans of the Navy Storehouse, Chapel and Offices, Commandant's Quarters, Hospital, smaller detached magazines and the permanent wharf and sluice. He also remarked that delays in receiving materials compelled them to work at a disadvantage.<sup>261</sup>

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<sup>259</sup> J-L 35 p. 189. Jan. 10, 1864. Frost to McFarland.

<sup>260</sup> J-L 35 pp. 193-195. Jan. 26 (?), 1864. Frost to McFarland.

<sup>261</sup> J-L Feb. 22, 1864. Capt. McFarland to Gen. Totten.

ROOF FOR BARRACKS: On March 7, Holgate submitted plans for a roof for the much needed barracks,<sup>262</sup> and Capt. McFarland wrote to Trowbridge pressing for immediate action concerning the iron roof for the same barracks on June 15.<sup>263</sup> But it was not until after Frost had written McFarland on August 2<sup>264</sup> that any definite answer was received, and then it was a decision by the unsympathetic new Chief Engineer, Gen. Richard Delafield, who decided that the expense was too great to put up a roof for the barracks with the means available.<sup>265</sup> How the thing was put up in spite of these obstacles is not known, but up it went. Phillips wrote Frost on November 30 that the roof of the barracks was on but the Quartermaster Department had not kept its promise in supplying shingles.<sup>266</sup> He stated that the roof timbers of a section of the barracks were strong enough to support slates, of which there was a large quantity on hand and enough prisoner carpenters at hand to put them up. This resourcefulness on Phillips' part is shown more clearly by the following note:

After stopping main ditch operations, in compliance with December 6 instructions from McFarland, Phillips was at a loss to find work for the then idle prisoners. But somehow he managed to get the machinists who had been running the engines for the ditch excavation to agree to commence work again on their own responsibility. His next

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262 J-L 35 pp. 213-214. Mar. 7, 1864. Lt. Holgate to Trowbridge.

263 J-L 35 pp. 262-263. June 15, 1864. Capt. McFarland to Wm. F. Trowbridge.

264 J-L Aug. 2, 1864. Frost to McFarland.

265 J-L Sept. 9, 1864. Trowbridge to Frost.

266 J-L 35 p. 306. Nov. 30, 1864. Phillips to Frost at N. Y.

step was to negotiate with the Post Quartermaster the 1-1/2 tons of coal needed by the boilers in exchange for other articles "of which we have an over supply for present use...." All of this he was doing when the absent Frost was in nominal charge of the operation and Phillips was listed as an ordinary machinist on the rolls!<sup>267</sup>

MAIN DITCH: Slowly advancing operations in the main ditch were brought to a halt when on the night of March 30 some of the wood-work above the furnaces caught fire under peculiar circumstances. Holgate investigated the matter, but apparently made no remarkable findings.<sup>268</sup> On the 27th of the following month, Holgate admitted again that the operations in the main ditch had "heretofore progressed very slowly, I am now making preparations to commence anew and this time I expect to succeed...."<sup>269</sup>

The laboring force used in excavating the main ditch chiefly comprised prisoners, and some trouble was experienced in keeping the prisoners at their jobs.<sup>270</sup> On October 28, Phillips wrote that excavation of the main ditch, along with construction in general, was progressing satisfactorily although rainy weather had retarded it to some extent; the prisoners were not turning out in the numbers Phillips

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<sup>267</sup> J-L Dec. 19, 1864. Phillips to McFarland.

<sup>268</sup> J-L 35 p. 229. Mar. 31, 1864. Holgate to Capt. McFarland.

<sup>269</sup> J-L 35 p. 242. Apr. 27, 1864. Holgate to Capt. McFarland.

<sup>270</sup> J-L 35 pp. 298-299. Oct. 10, 1864. Frost to Col. Hamilton.



wanted, but the matter had been referred to the Colonel (Hamilton) who had promised a larger turnout. The ditch on Front 6 was to be finished in the course of 8 days, and then work would be started along Front 5; <sup>271</sup> notwithstanding, it was not until November 30 that Phillips wrote Frost of the completion of the main ditch on Front 6. <sup>272</sup>

BIRD KEY OPERATIONS: Experiments were being carried on at Bird Key in order to determine the nature of the soil and substratum; <sup>273</sup> and Lt. Holgate, in charge of the experiments, wrote on April 19 that "...The experiments on Bird Key are completed and as soon as I can lick the report into shape it will be submitted...." <sup>274</sup>

On May 3, Holgate again wrote McFarland:

"...If it be intended to commence operations at Bird Key soon, the following temporary buildings should be erected without delay:- viz:-

"1 Wharf 1 Blacksmith's forge 1 Carpenter's shop 2 sheds to cover lime, cement &c.

"The wharf could be built immediately upon the receipt of the requisite authority for its commencement, as (with exception of the piles) we have a supply of that particular kind of lumber on hand at Fort Jefferson. The piles (mangrove) could be procured from Key West.

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- 271 J-L 35 p. 300. Oct. 23, 1864. Geo. Phillips to Edward Frost at N. Y. Phillips also stated in this letter that the drawbridge machinery had arrived and he had not had time to look it over.
- 272 J-L 35 p. 306. Nov. 30, 1864. Phillips to Frost at N. Y.
- 273 J-L <sup>35</sup>/p. 219. Mar. 14, 1864. Holgate to Col. Chas. Hamilton
- 274 J-L Apr. 19, 1864. Holgate to Capt. McFarland.

"I send herewith a plan of the proposed wharf, with the estimate and cost of labor and materials. Its position is indicated on the accompanying diagram and is, in my opinion, the best that could be chosen, as it is on Bird Key Harbor where there is at all times a safe anchorage and a sufficient depth of water.

"Also before commencing it will be necessary to remove from the island about 60 dead bodies, mostly victims of the small pox and yellow fever, buried there about 2 years ago...."<sup>275</sup>

CHANGES IN PLANS: On March 7, Holgate proposed to Gen. Totten substitution of iron roofs for wooden ones in construction of the buildings at Fort Jefferson.<sup>276</sup> The proposal was approved by Richard Delafield on the 25th of May, but he later decided that the expense was too great for the means available that year.

Masonry of the recesses for the nine 42-pounders in barbette was to be changed in plan; the walls of the small detached magazines were to be made 7'6" all around; and the piers in the anteroom which guard the entrance were to be made longer and placed nearer the outer door, affording more security to the inner door.<sup>277</sup>

SUBSIDENCE: The subsoil and rock strata experiments on Bird Key were completed on April 19. These experiments were carried on in accordance with the Engineer Department instructions dated July 20, 1863, but they were not begun until February 24, 1864, at which time Lt. A. H. Holgate resurveyed the Island and began experimentation which brought to light the following facts:

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<sup>275</sup> J-L 35 pp. 253-254. May 3, 1864. Holgate to McFarland.

<sup>276</sup> J-L 35 pp. 212-213. Mar. 7, 1864. Lt. A. H. Holgate to Totten.

<sup>277</sup> J-L Jan. 12, 1864. McFarland to Edward Frost.

"... 1. There is no solid rock within 30' of the surface of the island, and in all probability there is none within reach of the longest pile we could procure.

"2. For about 12' from the surface, there is a stratum of a firmer nature than that which underlies it, as proved by the relative distances gained by the hammer.

"3. After reaching a depth of about 18' the piles entered a substance more easily penetrated than the stratum above and this substance continued as far as the piles could reach.

"4. The borings gave a very unsatisfactory result, as in all cases except one (No. 28) the auger was stopped by coral heads, which were, notwithstanding, easily penetrated by the piles.

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"By reference to the chart of the Tortugas group of islands, there will be found in the channels which wander in various directions through the shoal or 'bank' upon which they stand, depths of water varying from 40' to 50' - 60' and even 80'. The beds of these channels consist of sand, of the same kind as that found at a depth of 20'. It may not be unreasonable to suppose, therefore, that we must penetrate at least to this depth (80') before reaching anything like solid rock. Further - is it not possible that this entire group of islands, and the bank upon which they stand, consists of sand, intermingled, nearer the surface with coral shells and 'coral heads', the whole having been gradually formed by the action of the tides, and by the powerful ocean currents which exist in these regions.

"The patches of rock visible at the water's edge on East Key, Loggerhead and elsewhere, and which formerly gave support to the theory of underlying rock, are pretty well proved to be a mere concretion - sand, shells and coral, hardened by the action of the waves. This rock is quite thin and can be penetrated by a mangrove pile, which after breaking through the rock, enters the sand beneath.

"The underlying stratum of sand such as is brought up on the flukes of anchors, from the bottom of our channel appears to

consist of finely pulverized shells and coral, and has a decided marly appearance, perhaps from the extreme minuteness of the particles....<sup>278</sup>

Attached to the above letter was a table of subsidence for Fort Jefferson in which Holgate asserted that -

"...There is nothing materially different in the ground at Bird Key from that at Garden Key, as regards stability of foundation...."

In compliance with General Totten's instructions to Capt. J. St. O. Morton (March 6, 1862) and later to Capt. McFarland (July 29, 1863), Lt. Holgate prepared a general statement of the settlement of the piers and bastions of Fort Jefferson. Bastion A settled 1.468', B 0.489', C 1.523', D 1.492', E 0.529', and F 0.721'.<sup>279</sup>

In some instances, there was a material difference between the levels of the parade and scarp wall. This unequal settlement caused the floors of the casemates to be uneven, so the flagging was not to be put down until some course had been taken to correct "this evil."

ARMAMENT: At the beginning of 1864, there were six 10-inch, and nine 42-pounder iron guns mounted in the barbette tier; 26 platforms were ready for guns not yet received at the fort. The casemates contained 37 8-inch, two 24-pounders, 24 flanking howitzers, and six 42-pounder rifles, guns all mounted and in place. Eighty-four casemates were supplied with platforms, but the armament for these had not yet been received at the fort.

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<sup>278</sup> J-L 35 pp. 251-252. May 3, 1864. Lt. A. H. Holgate to Capt. Walter McFarland. The outline of Bird Key had changed so much since the "Officer of the Coast Survey" made the charts (probably the survey made by Major Hartman Bache in 1845-6) that it was necessary for Holgate to make a new survey of the Key in order to show properly the position of his experimental piles.

<sup>279</sup> Ibid., pp. 252-253.

During January no guns were received or mounted; there were on hand and not mounted 5 10-inch Columbiads, 10 24-pounder iron guns, 2 24-pounder flanking howitzers, and 6 18-pounder iron guns. Four platforms were made ready during the month, and 8 were expected to be made ready during the ensuing month. <sup>260</sup>

During February, 5 of the 10-inch Columbiads were mounted. <sup>281</sup> Twelve platforms were made ready during the month.

During the remainder of the year, no guns were received or mounted, and there were on hand and not mounted 10 24-pounder iron guns, 2 24-pounder flanking howitzers, and 6 18-pounder iron guns. <sup>282</sup>

One gun platform was completed in the barbette during March; <sup>283</sup> 37 front pintle platforms were completed in the barbette during April, <sup>284</sup> 13 during May, <sup>285</sup> 12 during June, and none were completed during the remainder of the year.

On June 30, all the lower tier casemates, except four which required traverse circles and the outer embrasures in each flank,

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<sup>260</sup> J-L 35 p. 203. Jan. 1864. Monthly report.

<sup>281</sup> Ibid., p. 221. Feb. 1864. Monthly report.

<sup>282</sup> J-R 70or. 1864. Monthly reports.

<sup>283</sup> J-L 35 p. 233. Mar. 1864. Monthly report.

<sup>284</sup> Ibid., p. 255. Apr. 1864. Monthly report. All gun platforms reported completed (ready for guns) since the special report bearing date Mar. 19, 1863 were to be understood as barbette front pintle platforms.

<sup>285</sup> Ibid. p. 268. ? 1864. Monthly report.

were entirely ready for guns; all the front pintle barbette platforms except 14 on Fronts 6 and 3 were entirely ready for guns; there were 6 barbette full circle platforms carrying 10-inch Columbiads (one in each bastion), and 6 casemate platforms for James' 42-pounder rifles in the second tier—all temporarily arranged.

On June 30, 1864, there were mounted 6 10-inch Columbiads on temporary platforms in barbette, 9 42-pounders on permanent platforms in barbette, 6 42-pounder James rifles on temporary platforms in second tier, 2 24-pounders on ship's carriages in second tier, 24 24-pounder flanking howitzers in flanks of first tier, 37 8-inch Columbiads and 5 10-inch Columbiads (new pattern) in first tier. <sup>286</sup>

On December 17, application was made to the Ordnance Department for 10 10-inch Rodman guns with casemate carriages and 2 200-pounder Parrott guns with front pintle barbette carriages to be sent to Fort Jefferson. <sup>287</sup>

FINANCE: In compliance with McFarland's requests of January 18 and February 15, 1864, application was made to the Assistant Treasurer at New York for \$24,000 to be placed to McFarland's account for Fort Jefferson. <sup>288</sup> In compliance with McFarland's request of March 29, application was made to the Assistant Treasurer at New York for \$25,000

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<sup>286</sup> J-Ry June 30, 1864. Yearly report.

<sup>287</sup> J-L Dec. 17, 1864. J. D. Kurtz to Capt. McFarland.

<sup>288</sup> J-L Feb. 26, 1864. Totten to McFarland.

to be placed to McFarland's account for Fort Jefferson. In compliance with William P. Trowbridge's request of April 9, application was made for \$25,000 to be remitted to Trowbridge and charged to Fort Jefferson.<sup>289</sup>

The Department had been slow about complying with McFarland's requests for allotments, so he wrote Holgate that he was "...not going to compromise myself and the government any further by aiding in keeping at work men who get so little thanks for their pains...."<sup>290</sup>

On May 31, 1864, Gen. Delafield wrote McFarland that no appropriation for Fort Jefferson had been requested for the ensuing year. The balance left from the last appropriation was in round numbers \$95,000, and operations at Fort Jefferson during the ensuing year were to be carried on in an entirely different manner, on a moderate scale and avoiding all expenditures not absolutely necessary to keep the work going on as successfully as the limited means would permit.<sup>291</sup> An allotment of \$11,000 was applied for on June 2, leaving a balance of \$84,410.31 at the Treasury for Fort Jefferson. In the informative letter, Gen. Delafield stated:

"...The Fortification bill now pending in Congress does not include any amount for either of these works Forts Taylor and Jefferson and the operations for the next fiscal year must, as far as can at present be foreseen, be restricted to the sums herein specified, including all liabilities and all likely to arise from engagements already entered into; and I have thereto to request that your operations be so conducted as to avoid any liability or debt of any sort beyond means now available unless you are specially authorized hereafter to do so...."

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289 J-L Apr. 11, 1864. Totten to McFarland.  
290 J-L Apr. 12, 1864. McFarland to Lt. Holgate.  
291 J-L May 31, 1864. Richard Delafield to McFarland.

McFarland was further instructed to draw up a balance statement of funds on hand and subject to his draft after all existing liabilities had been provided for. If there was a deficit he was to send a request for the amount needed to clear up.<sup>292</sup>

There was a direct set-back to the work in Delafield's letter to McFarland of June 10. Delafield enclosed the plans for the small detached magazines, but with regard to the other plans asked for, he said:

"...As your means for the next year will be so much restricted, you will not, at present, require the other plans asked for...."

McFarland conscientiously sought a further allotment which would enable him to continue operations, but after remaining in New York for some time, hoping each day to receive news that an application to the Secretary of War for a transfer of funds would bring favorable results, he was ordered on November 23 to return to Key West.<sup>293</sup> The very next day Delafield received the discouraging news that the application was awarded unfavorable decision by the War Department, but McFarland had already left for Fort Jefferson and did not receive the news until December 7, the day after he had issued the order which anticipated the news completely dissipating his hopes.<sup>294</sup>

McFarland's order provided that everyone in the Engineer Department at Fort Jefferson be discharged except the physician,

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<sup>292</sup> J-L June 2, 1864. Richard Delafield to McFarland.

<sup>293</sup> J-L Nov. 23, 1864. Delafield to McFarland at New York.

<sup>294</sup> J-L Nov. 25, 1864. Delafield to McFarland.



Chief Overseer, Captain and crew of the Tortugas, 3 masons, 3 carpenters, and 10 laborers; however, he did say that "...if any of the old hands prefer to stay on their own responsibility at the rates given above [which were drastically lowered] they may do so and I know they will be paid but I cannot tell how soon perhaps not in several months...." <sup>295</sup>

ESTIMATES: Edward Frost gave the probable cost of the permanent wharf at \$4,935.98; <sup>296</sup> the detached magazine, he estimated, would cost \$32,882; <sup>297</sup> and the roofs for the Barracks and Officers' Quarters he estimated at \$8,283.22 each. <sup>298</sup>

An approximation of the amount of the 1863-1864 appropriation which would remain untouched at the end of the fiscal year, June 30, 1864, was made on April 30:

Untouched balance in Treas. Apr. 1, 1864	\$ 54,910.31
Appropriation for 1863-1864 . . . . .	300,000.00
Total .....	\$354,910.31
Pay rolls for Jan., Feb. and Mar.	\$30,425.79
Pay rolls for Apr., May and June	18,000.00 (Estimate)
	\$48,425.79
	<u>48,425.79</u>
	\$306,484.52

To the appropriation there was also added a further credit, consisting of an unadjusted account for labor and materials expended upon Bird Key, to be paid thereafter out of the appropriations for that work. <sup>299</sup>

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- <sup>295</sup> J-L Dec. 6, 1864. McFarland to Geo. Phillips.
- <sup>296</sup> J-L 35 p. 186. Jan. 9, 1864. (signed) Edward Frost.
- <sup>297</sup> J-L 35 pp. 187-188. Jan. 9, 1864. (signed) Edward Frost.
- <sup>298</sup> J-L 35 pp. 284-285. Sept. 8, 1864. Frost to McFarland.
- <sup>299</sup> J-L 35 p. 249. Apr. 30, 1864. To McFarland.

MATERIAL: On January 21, McFarland wrote Trowbridge requesting him to reship to Fort Taylor the large quantity of hard Brewer brick already sent to Fort Jefferson.<sup>300</sup> The brick market in Maine was completely exhausted; so, failing to obtain bricks elsewhere, Trowbridge was compelled to send more and more of the North River bricks for use at Forts Taylor and Jefferson.<sup>301</sup> Trowbridge stated that "...Materials are enormously high and will continue so as long as the war lasts...."<sup>302</sup> But the working season ended at Fort Taylor on April 23, and McFarland promptly removed the restriction placed by himself upon the use of Maine bricks at Fort Jefferson in his letter of December 19, 1863.<sup>303</sup>

From a memorandum of the brick, lime and cement required to complete certain interior buildings the following was taken:

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300	J-L	<u>Jan. 21, 1864.</u>	McFarland to Trowbridge.
301	J-L	<u>Jan. 25, 1864.</u>	Trowbridge to Lt. A. H. Holgate.
302	J-L	<u>Mar. 29, 1864.</u>	Trowbridge to Lt. A. H. Holgate.
303	J-L	<u>Apr. 23, 1864.</u>	McFarland to Lt. A. H. Holgate.

Building	No. Bricks	Bbls. Lime	Bbls. Cement	Remarks
Large detached magazine	550,000	150	5000	Brick wall not commenced.
New Barracks	350,000	25	750	External walls &c. completed.
Kitchens for New Barracks	100,000	40	350	Two nearly completed.
Four sections of Officers' Quarters'	410,000	60	900	Say two stories completed.
Kitchens of Officers' Quarters including privies and yard walls.	245,000	100	1000	one completed
<b>TOTAL</b>	<b>1,663,000</b>	<b>375</b>	<b>8000</b>	
<u>On hand June 19, 1864</u>				
	1,082,500	1200	5661	
Ordered from agency	1,150,000		3838	
On hand and to be received	2,241,500	1200	9499	304

Lime deteriorated quickly; it was necessary to slake it immediately upon receiving it, and keep it in a closed vat until used. <sup>305</sup>

On April 29, an unsigned letter was sent to Trowbridge declaring that the 416 foundation stones for barbette traverse circles had arrived, but were of the wrong type. <sup>306</sup>

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- 304 J-L June 19, 1864. Memorandum.
- 305 J-L 35 pp. 218-217. Mar. 12, 1864. Holgate to Totten.
- 306 J-L 35 p. 247. Apr. 29, 1864. To Trowbridge, unsigned.

1865

It was not a constructive year: the little engineer force, augmented by prisoner labor, was able to make no appreciable progress, and the disaster of an October hurricane kept the additional workmen that reached the fort a few days later busy for the remaining months of the year repairing storm damage. The year was marked by continuous garrison changes, and Negro troops made up the majority of the force.

Fort Jefferson, with its hundreds of military prisoners, received the assassination conspirators.

CONSTRUCTION: During the latter part of 1864, construction work at Fort Jefferson had taken the form of mere repairs and small scale improvements.<sup>307</sup> Work on the second tier had been entirely suspended. On the terreplein, front pintle platforms were practically completed. All traverse magazine interiors were finished; exteriors of those on Fronts 1 and 2 were built and rafters were raised over the ones remaining. The banquettes except at the shot cells was completed on Fronts 1, 2, and 5. First tier casemates were completed except for flagging. On the parade the sewers were finished with the exception of flushing-gates at the outlets. Soldiers' Barrack walls were ready for roofing, as was the new section of the Officers' Quarters; two Barrack kitchens were finished, two double kitchens for the quarters were done and foundations laid for four others.<sup>308</sup>

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<sup>307</sup> J-R 70 or: 1864 Monthly Reports of Operation.

<sup>308</sup> J-L 35, pp. 293-98, J-Ry 1864: Annual Report of Operations.

The second tier at the fort was deliberately left unfinished; Engineer Department orders required discontinuance of its construction until further notice because of the foundation's continued settlement.

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During the first part of 1865 there was still comparatively little construction; the engineer force did not number more than 37 until July, and not until that month were there more than 3 carpenters, 4 masons, and relatively few laborers at the work; prisoners, although considerable in number, <sup>311</sup> were not fully

309 J-L 35, p. 318: W. McFarland, Capt. Engineers, J, to Capt. M. D. McAlester, Chief Engineer, Military Division of W. Miss., January 31, 1865.

310 J-R 70 or, Jan.-Aug. 1865; J-Rn OH, Sept.-Dec. 1865; also J-Tr 29, 1865. It appears that during this year Geo. Phillips, hired by Lt. H. G. Wright in 1846 as master mason, and who since that year had been at Garden Key usually in the capacity of Chief Overseer, was finally dropped from the payroll May 17. Thomas Geraghty, hired as master carpenter in February, replaced Phillips as Chief Overseer on April 10, at which date the old man went to work as receiver of materials until his name disappeared entirely from the payroll in May. (See J-Tr 29, 1865: Feb., April, May; also J-L 35, p. 317: W. McFarland, Capt. Engineers, J, to T. Geraghty, carpenter, Feb. 9, 1865.) Phillips made his home in Key West where he subsequently served as caretaker at Fort Taylor. Throughout his government employ, Geo. Phillips is shown as a sober, reliable man, not overly educated, but with Yankee common sense and always with the government interest next his heart. His descendants still reside in Key West.

311 J-L 35, pp. 322-23: W. McFarland, Capt. Engineers, J, to Brig.-Gen. R. Delafield, Engineer Dept., Wash., D. C., Feb. 4, 1865. McFarland wrote: "... at Fort Jefferson we shall probably for a long while to come be able to find employment for Two hundred Military Convicts. This under present arrangements, would require a force of five or six hundred Convicts to be kept here constantly, for what with the sick the worthless, and the details for the Quartermaster and the Garrison, we seldom can be sure of getting over two-fifths of the whole number. - There will be no difficulty in procuring Guards for them and in keeping them securely - but the question

of Quarters is a more serious matter...at present we manage to stow away between seven and Eight hundred in Quarters and Casemates formerly arranged for - Employees of the Engineer Department...."

The garrison under command of Col. Charles Hamilton, 110 N. Y. Vols., was (according to McFarland) in most amicable relations with the Engineer Department at Fort Jefferson. McFarland, however, anticipated a change in garrison, and bearing in mind past unpleasant experiences, wrote Chief Engineer Delafield in an attempt to ensure quarters for the Engineer force at the work. At the beginning of Garden Key fortification, Chief Engineer Totten intended to have three or more temporary Officers' Quarters kitchens built for Engineer force accommodation, but the plan was later modified by putting up one section of the Quarters themselves, enough to furnish abundant room for the Engineer officer in charge, his assistant, clerk, physician, overseer and others, with necessary office room. Woodbury in later years erected a kitchen on Front 6 to accommodate the overseer and his family. These accommodations served until the garrison arrival in 1861, when the Officers' Quarters were taken over by the commanding officer. Engineer offices and quarters moved several times to suit the commandant's whim, while the Engineer clerk and physician were crowded out altogether. Engineer Morton built two kitchens on Front 5 for the physician and clerk, and McFarland himself later ordered construction of a third kitchen in that locality as quarters for the Engineer officer, since Holgate, then assistant in charge, was unable to procure room in the Officers' Quarters for his family and himself. McFarland emphasized the point that these kitchens were built out of proper order solely because of the need to provide living quarters for the chief employees of the Department, and yet "...we have been & are in danger of being, turned out of these, as we were turned out of the Officers' Quarters, whenever the Commanding Officer of the post thinks proper to do so...." (J-L 35, pp. 334-35; W. McFarland, Capt., Engineers, J, to Brig-Gen. R. Delafield, Engineer Dept., Wash., D. C., June 20, 1865.)

A trace of friction between engineers and garrison is evident in the following letter from civilian Engineer Frost to Devendorf, Post Commandant at the time: "...An individual acting as foreman or Overseer of gangs of prisoners...was y'day employing them in transporting hogs, which he claims as his personal property, from their ranging ground on Long Key to Bird Key, on which you are aware are the scattered graves of many Union Soldiers who have died at this Post during the war - and turning the said hogs loose to range over and through them.... I...request that so soon as their restoration to Long Key is accomplished - the above named individual be directed to employ the labor which he has been misapplying to his

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utilized as laborers. According to Captail Walter MacFarland there was no work at either Jefferson or Taylor other than prisoner labor devoted to matters necessary but affecting neither defensive or offensive powers of the fortification, but actually the force was working steadily on the living quarters and some of the casemate cisterns. As augmented in October, the force but continued labor along the same lines, not beginning work on the cofferdam until December (although some excavation was done on the moat the previous month). Masons worked in both Quarters and Barrack laying stone sills

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private emolument in the return of the Cattle Pen from the centre of the Parade to its former locality on Long Key--referring to reasons... foremost amongst which I place the rapid destruction now going on of the priceless shade trees within its limits-..."

(J-L 35, pp. 337-38: E. Frost, Asst. Engineer in Charge, J, to Maj. N. Devendorf, 110 N. Y. Vols., Commanding Post, July 18, 1865.)

Nothing seems to have been done about the matter of the cattle pen until the arrival of the 82 U. S. Colored Infantry in September, when Maj. Geo. Wentworth signified that he wanted the cattle removed from the parade (J-L Sept. 20, 1865: J-Duncan, Engineer Dept., J, to Maj. G. E. Wentworth, Commanding Post).

In December there came up a more serious matter. Engineer workmen were refused use of drinking water from the condenser and found themselves obliged to utilize unfit casemate cistern water. Burnham wrote Gen. Hill, Commandant, about the matter, complaining that he could see no reason why 250 workmen were excluded from the benefits of an apparatus intended for the wellbeing of all the island inhabitants. Burnham was particularly irritated by the refusal to provide even a pitcher full for his office (J-L 35, p. 387: A. H. Burnham, Bvt. Maj. Engineers, J, to Bvt. Brig.-Gen. B. H. Hill, 5 U. S. Artillery, Dec. 28, 1865).

312 J-L 35, pp. 356-57: E. Frost, Assistant Engineer, J, to Col. C. Hamilton, May 28, 1865.

and brickwork, placing iron stairs and slating roofs, and incidentally found time in June to begin again flagging lower tier casemates. Carpenters worked at Barrack and kitchen roofs and finish woodwork within both Quarters and Barrack.

Comparatively speaking, no appreciable progress is ascertain-  
able during the entire year; on June <sup>last</sup> 7, construction operations dur-  
ing the fiscal year were recapitulated to show that work had been  
limited to disbursement of the unexpended appropriation balance, mainly

313 J-R 70 or: 1865 Monthly Reports of Operations. In February Capt. McFarland was ordered to the command of Gen. E. R. S. Canby for duty in the Mobile, Alabama, vicinity, and later went to Texas to join the 13th Army Corps. He did not return to the Florida post until the ensuing fall. For his activities at the new assignment, see J-L 1865: Apr. 18, W. McFarland, Capt. Engineers, aboard schooner Tortugas, to E. Frost, J; Ibid: July 8, R. Delafield, Engineer Dept., Wash., D. C., to Hon. E. M. Stanton, Secretary of War; Ibid: June 26, R. Delafield, Engineer Department, Wash., D. C., to Lt.-Col. W. McFarland, Hdqrs., 13 A. C.; Ibid: Aug. 1, W. P. Trowbridge, N. Y. Engineer Agency, to E. Frost, Agent, J; Ibid: Aug. 24, R. Delafield, Engineer Dept., Wash., D. C., to Capt. W. McFarland, C. E.; Ibid: Sept. 7, J. D. Kurtz, Assistant Engineer, Engineer Dept., Wash., D. C., to Capt. W. McFarland, C. E.; Ibid: Sept. 8, R. Delafield, Engineer Dept., Wash., D. C., to Capt. W. McFarland; J-L 35, p. 330; T-L 1865: Apr. 22, R. Delafield, Engineer Dept., Wash., D. C., to Capt. W. McFarland, C. E., Key West; Ibid: July 1, J. D. Kurtz, Assistant Engineer, Engineer Dept., Wash., D. C., to Capt. W. McFarland, C. E., Key West; Official Records of the Union and Confederate Armies during the War of the Rebellion, s. 1, Vol. 43, pt. 2, pp. 329, 424; Ibid: s. 1, Vol. 49, pt. 2, pp. 431, 560, 759.

Edward Frost himself was absent from the work until the last of March. On April 12, McFarland appointed him agent of the Engineer Dept. for Forts Jefferson and Taylor. (See J-L Apr. 18, 1865: W. McFarland, Capt. Engineers, aboard Schooner Tortugas, to E. Frost, C. E., J. For information concerning Frost's presence at the work, see J-Tr 29, 1865.)



advancing the detached buildings that served as living quarters and constructing four Barrack kitchens. In addition, foundations were laid for a second parade magazine, while on the work itself the magazines and shot-cells of the barbette were forwarded and flagging the first tier casemates progressed slowly.

Work in the immediate future was directed along the same lines: it was the Engineer's intention to complete for occupation the entire Barrack, a portion of the Quarters for officers, construct the big magazine just north of the Barrack, and renew work at the south fronts by building the moat wall, placing a drawbridge at the sally-port, and excavating the ditch. For this continuation \$200,000 was estimated.

In detail, the work was advanced in this proportion: On the barbette tier, no work had been done on the gun platforms, and the six temporary wooden ones carrying 10-inch guns at the bastions had become unserviceable and were not replaced. Only two magazine traverse roofs (on Front G) were fully completed in addition to the five done the previous year, although the remaining nine required little more than iron sheathing to be called finished. Fifty-two shot cells were completed and 21 had stone work in place, but not a stroke of additional work had been done on the banquette.

Second tier openings in the scarp wall had been walled and loopholed at the beginning of the war; in 1865 they are reported as "wholly disarranged," irregularly broken out through the whole circuit

of the fort, and rickety porches or balconies of rough boards for accommodation of lodgers projected from many of the casemates. <sup>314</sup>

The first tier, fairly complete already, saw no additional work than laying of flagstones--which by the end of the year 1865 completed 33 casemates.

On the parade, the completed sewers were not yet placed in operation; the outlets opened into the moat, which the engineers felt should be provided with sluice to leeward of Front 6--a change necessary and inexpensive. Foundation of the large detached magazine was completed and the second of these was ready for further construction. The Quarters and Barrack were advanced by carpentry constituting the interior wood finish, and brick floors sustained by iron beams were laid in eleven Barrack apartments, and their iron stairways completed so that twelve covered apartments became available for storage. In the meantime, temporary shed roofs were built by the Quartermaster Department over some ground floor apartments to provide mess rooms for the prisoners. <sup>315</sup>

The immediate problem confronting the engineer force at Jefferson was construction of roofs for both Quarters and Barracks, but the Washington Office was slow about giving definite instructions for the promulgation of the work: the Department, the Jefferson office and the New York Agency had considerable correspondence the previous

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<sup>314</sup> J-L 35, pp. 360-63. Annual Report of Operations, June 30, 1865.

<sup>315</sup> Ibid.

year of 1864, and 1865 brought further discussion that led to no definite decision. Chief Engineer Richard Delafield appeared dilatory in his recommendations, not caring to spend the original estimated sum for covering these buildings. Engineer Edward Frost wrote from Jefferson in July, urging expediency of definite instruction in view of enlarged operations for the coming winter, and submitting a plan and estimate of construction cost for the necessary roofing. He brought to mind the fact that two-fifths of the Barrack was already roofed:

"...A Number of large square hackmatack timbers 13" to 16" on the side, not being wanted for their original purpose, were split down through the centers and the sticks thus obtained were arranged as purlins their ends bearing on the gable and party walls. The pediment occurring in the north double sections was raised upon these purlins and the small rafters boarding and slating added. The whole forms a sound and quite durable roof, of a pattern very generally adapted for large warehouses, and of the most simple construction dispensing entirely as it does with principal rafters and trussing. It conforms of course to the outlines and finish of the original (discarded) frame Roof. The roofing may now be continued in both buildings upon the same general method with substitution of the I iron girder for the timber purline and of galvanized iron sheathing for the slates; which are obvious improvements on the plan as thus far executed, and may possibly recommend it to the department as to the proper construction for what remains to be covered in.

"The total cost of completing the roofing of the Quarters by this method will be something under \$15,000 that of the Barracks will fall below \$12,000...."316

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*Ibid.*: pp. 351-52: E. Frost, Assistant Engineer, J, to W. F. Trowbridge, Engineer Agency, July 29, 1865. Frost made a previous estimate of \$8,200 for roofing the Barrack.

There appears no direct answer to Frost's letter, and it was not until September that Delafield ordered MacFarland to draft a project for these roofings and submit his plans to the Department. <sup>317</sup>

Twenty years before, the fortification of Fort Jefferson would have bounced cannon shot from its vertical adamantine scarp wall until the ditch below was full of iron; but unfortunately for the engineers' plans, the science of ballistics went forward in great strides. The smooth bore columbiad with which the fortification would have been armed in 1845, was already replaced by rifled guns of superior power, against which Fort Jefferson was no longer impregnable. And so, the conscientious Frost was absorbed in other problems than roofing; again anticipating larger scale operations within a few months, he turned his attention toward the defense and modernization of the fortification. He asked instructions from the Engineer Department at Washington and made four suggestions to remedy existing deficiencies:

(1) The terreplein lacked sufficient width; the recommendation was that an iron platform supported by brackets be thrown out at the roof level; and Frost also suggested that the parapet be filled with more resistant material to make up for deficiency in thickness.

(2) In the bastions where were to be introduced permanent central pintle platforms, the width between breast height walls was inadequate, but they might be retired two feet by consequent reduction in thickness.

(3) Gun platforms along Fronts 3, 4, and 5 were un-serviceable; one or two pintles might be adapted to the chassis by shrinking on a collar and determining by experimental firing the resistance of masonry arranged about the pintle.

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<sup>317</sup> J-L Sept. 8, 1865: R. Delafield, Engineer Dept., Wash., D. C., to Capt. W. McFarland, N. Y.

(4) Construction of the traverse arcs on Fronts 1, 2, and 6 required changes; Frost suggested that a basis for solution of the problem might be obtained in testing the strength by experimental firing.<sup>318</sup>

Frost planned to commence the principal operations of the season in the latter part of October,<sup>319</sup> and he evidently completed preliminary arrangements for employment, transportation and such items by making a trip in August to New York.<sup>320</sup> On October 11,<sup>321</sup> the bark ARGEAN sailed from New York with 184 men<sup>322</sup> for Fort Jefferson, and the following day Engineer Frost set sail in the GOVERNOR MARVIN. The ARGEAN arrived at Tortugas on October 26, and Frost reached Key West about a day later. The GOVERNOR MARVIN passed with little damage through a terrific hurricane that must have waylaid the ARGEAN as well. The Tortugas, tied up at a Key West wharf, was a total loss and forty

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- <sup>318</sup> J-L 35, pp. 352-54; E. Frost, Assistant Engineer, J, to Brig.-Gen. S. Delafield, Engineer Dept., Wash., D. C., July 31, 1865. Early in December, W. P. Trowbridge left the Engineer Agency for a private position. Maj. F. E. Prime, C. E., replaced him. (See J-L Nov. 17, 1865; W. P. Trowbridge, N. Y. Engineer Agency, to E. Frost, Assistant Engineer, J; also J-L 35, p. 378; A. H. Burnham, Evt. Maj. Engineers, J, to F. E. Prime, C. E., N. Y. Engineers Agency, Dec. 6, 1865.)
- <sup>319</sup> J-L 35, p. 341; E. Frost, Agent, J, to W. P. Trowbridge, N. Y. Engineers Agency, July 15, 1865.
- <sup>320</sup> J-L Aug. 17, 1865: J. Duncan, Clerk, J, to W. Bethel, Clerk, T. (James Duncan, Clerk at Fort Jefferson, arrived there June 5, 1865 to take his old job.) J-L Sept. 5, 1865: J. Duncan, J, to Lt.-Col. W. McFarland, N. Y.
- <sup>321</sup> J-L Oct. 7, 1865: E. Frost, N. Y. Engineers Agency, to W. Bethel, Clerk, T; also Frost's letter of same date to J. Duncan, Clerk, J.
- <sup>322</sup> J-L Oct. 26, 1865: unsigned (probably J. Duncan), J, to W. Bethel, Clerk, T.

vessels were reported wrecked along the wharves and a hundred miles of the reef near Key West. Fort Taylor suffered considerable damage, as did Fort Jefferson, for which place Frost sailed on October 28. <sup>323</sup>

Duncan described it:

"...We have just passed through an ordeal (something like a hurricane) the like of which has not happened during my residence here and the oldest inhabitant (as usual on such occasions) has the opportunity of saying he never saw the like of it on this island....

"On Sunday morning (22nd) the weather looked threatening with a strong breeze from the north east and a drenching & drizzly rain continued all day without intermission. 7 P. M. Wind wearing more to the north'ard - blowing stronger, raining and very dark. 9 P. M. On crossing the Parade found some trees blown down, Cattle pen broken and cattle roaming about.

"12 P. M. blowing a hurricane..

"1 A. M. rear wall of 3d. storie of first section of in-completed range of Officers' Quarters fell inwards. In this section were living under a temporary roof William Dowden an employee and family but who had fortunately removed out of the building an hour previous to the heavy fall of masonry and took refuge with his family in the casemates. Had the masonry fallen outward (ie to rear of building) it would have crushed the Kitchen to the ground that Mr. Matley and family were living in at the moment of danger. As it is the fall of masonry completely enveloped the deserted abode of Dowden and his family.

"4 to 5 AM (23) rear wall of 3d. storie of south section of O. Q. fell outwards crushing in the roof &c of the Kitchen immediate to the rear and killing in bed almost instantaneously Lieut. Sterling Quarter Master of the Post and wounding Captn. Sterns on the head - the only two inmates of the house. The hurricane about this time began to subside the wind wearing around to the west'ard.

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323 J-L 35, p. 366: E. Frost, Assistant Engineer, K. W., to Capt. W. McFarland, C. E., Oct. 27, 1865. F. W. Beers of New York negotiated with the Engineer Department to raise the schooner Tortugas (see J-L Nov. 1, 1865: F. W. Beers, N. Y., to Engineer Department), but there is no evidence to show that the attempt was made in 1865.

"The rear wall of 3d. storie, middle section of O. Quarters being yet standing though continually in motion to and fro it was deemed advisable by the Commanding Officer and myself to take the same down. A Rope was accordingly thrown round it and with almost an unperceivable resistance the heavy mass of masonry gave way.

"The above are our 'principal losses but I shall enumerate all of the parts of the work which has suffered more or less from the hurricane.

"(1) Rear wall of 3d. storie of unfinished blocks of O. Quarters will have to be rebuilt.

"(2) Traverse Magazines Galvd. I. Roofs - Damage done them equal to two (2) of them totally stripped of iron.

"(3) One (1) Chimney stack of finished block of O. Quarters blown down on roof of building, and building now leaking badly.

"(4) Slight damage done to Solder Barracks.

"(5) Carpenters shed outside of Postern blown down.

"(6) One (1) Kitchen of O. Quarters roof totally destroyed, and part of brick walls will have to be rebuilt.

"(7) Some slight damage to the engines and machinery of C. S. Wall. Shed covering engine blown down.

"(8) Middle Wharf damaged and several Piles driving for mooring carried away by the Bark 'Rosina.'

"(9) Captain Pierson of the Bark 'Rosina' on account of the Wharf and piles to which he was made fast giving way, found it necessary to drop from the Wharf, put out his anchors in the stream and lay there for the rest of the night. He reports that his vessel has sustained damage...

"(10) A number of our Hogs and Hog Pen on Long Key washed away....

"The appearance of the interior of the fort on the morning of the 23d. fully showed the violence of the storm. The centre of Parade was literally covered with uprooted trees and torn

branches - water knee deep around army hospital, slates and bricks scattered all over the fort, men women and children seeking refuge in open casemates, and add to this the melancholy fate of Lieut. Sterling...."324

The next few months were spent in repairing the hurricane damage. At the end of the year, the Engineers put their men to work anew on the moat: the carpenters were engaged in constructing a cofferdam as the preliminary step toward finishing the counterscarp wall on the postern front or island side of the fort. At the end of the year, the Engineer Office was employing 540 men.

Meanwhile, Brevet Major Arthur H. Burnham was assigned as assistant to Captain McFarland, and with Burnham's reporting to McFarland he was assigned November 28 to duty at Fort Jefferson.<sup>325</sup> In December, Burnham reported a labor strike: the three complaints were that the men had agreed to work for \$1.20 per day and were getting only \$1.00, that they reserved the right to leave the work when they chose, and that the food was insufficient in both quantity and quality. Only a few of the men seemed engaged in the dispute, and Burnham stated

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324 J-L 35, pp. 371-73: J. Duncan, Clerk, J, to W. Bethel, Clerk, T, Oct. 24, 1865.

325 J-L Oct. 27, 1865: Special Order; J-L 35, p. 377: A. H. Burnham, Bvt. Maj. Engineers, USA, to Bvt. Brig.-Gen. E. Townsend, AGO, Wash., D. C., Nov. 30, 1865; Ibid., p. 391: A. H. Burnham, Bvt. Maj. Engineers, J, to Brig.-Gen. R. Delafield, Engineer Dept., Wash., D. C., Dec. 31, 1865; also J-L Nov. 28, 1865; W. McFarland, Capt. Engineers, T, to Bvt. Maj. A. H. Burnham, C. E., Key West. Burnham was evidently assigned to his new position from the District of Alabama, where he was Chief Engineer (see Official Records, ut supra, s. 1, Vol. 48, pt. 2, p. 767; S. O. 148, June 4, 1865). For other information concerning him, see J-L 1865: July 27 and Nov. 26.



that of the three complaints, only the second left room for justifiable dispute. He decided to give the strikers a day to decide whether they would return to work; if they refused, he intended to put them under guard, work them during the day, lock them up at night, and whether they decided to return to work or not, to ship them back to New York at the first opportunity. <sup>326</sup>

ARMAMENT: During the latter part of 1864, the armament maintained status quo; at the beginning of the new year, the fort mounted a total of 89 guns: 15 in barbette, 8 in the second tier, and 66 in the gunrooms of the first tier. <sup>327</sup> Eighteen guns were not mounted: ten 24-pounder iron guns, two 24-pounder flank iron howitzers, and a half dozen 18-pounder guns. <sup>328</sup> In May the fort received ten 10-inch rodmans, which were mounted immediately, seven 200-pounder and one 300-pounder parrotts; <sup>329</sup> and in June six of fifteen 10-inch Rodmans received were mounted, <sup>330</sup> being added to the newly mounted Rodmans in the first tier. Of all the guns at the fort in June, nine 42-pounders were on permanent platforms in barbette, six 42-pounder James rifles were temporarily mounted in the second tier, while thirty-seven 8-inch columbiads on wooden carriages,

<sup>326</sup> J-L 35, p. 382: A. H. Burnham, Bvt. Maj. Engineers, J, to Capt. W. McFarland, Key West, Dec. 13, 1865.

<sup>327</sup> J-L 35, p. 285: 1864 Annual Report of Operations, Appended Armament Report.

<sup>328</sup> J-R 70 or: Jan. 1865 Report of Operations.

<sup>329</sup> Ibid.: May 1865 Report of Operations.

<sup>330</sup> Ibid.: June 1865 Report of Operations.

twenty-one 10-inch rodmans on iron carriages and twenty-four 24-pounder howitzers (the latter in the bastions) were in the first tier, bringing the total mounted guns to 97: 9 in barbette, 6 in the casemates of the second tier, and 82 in the lower tier. On hand and not mounted were 53 guns: six 10-inch columbiads, nine 10-inch rodmans, seventeen 200-pounder parrotts, one 300-pounder parrott, two 24-pounder howitzers, twelve 24-pounder and six 18-pounder iron guns, both old pattern.

The six temporary wooden platforms that carried 10-inch Columbiads in barbette at the bastions had deteriorated and were not replaced, and two 24-pounders on ship carriages in the second tier were dismantled. Actually, the only progressive work done in the way of mounting armament until August was placement of sixteen 10-inch Rodmans in the first tier. <sup>331</sup> Frost remarked in July that with the exception of four 42-pounders on Front 1 and five similar guns on Front 2, all on wooden carriages, the barbette had not a gun for defense. The other barbette guns--a 10-inch Columbiad in each bastion--were mounted at the beginning of the War on wooden platforms that were in such a state of decay as to be useless. Except on two occasions there had been no firing from these bastion cannon within the last two years, and on the last of these occasions, at the third fire the gun was capsized. <sup>332</sup>

<sup>331</sup> J-L 35, p. 360: 1865 Annual Report of Operations. Appended Armament Report. In November, McFarland was asked to explain why unmounted guns remained at Fort Jefferson when there were apparently sufficient platforms to receive them (J-L Nov. 1, 1865: R. Delafield, Engineer Dept., Wash., D. C., to Capt. W. McFarland, C. E., J). The Captain's answer is not in the Barracks Collection of Source Material.

<sup>332</sup> J-L 35, p. 353: E. Frost, Assistant Engineer, J, to Brig.-Gen. R. Delafield, Engineer Dept., Wash., D. C. July 31, 1865.

Magazines complete enough for use were the four in the lower tier (the curtain magazines) with an ordinary capacity of 3450 barrels and the twelve in the six bastion towers, with an ordinary capacity of 2400 barrels, making a total capacity of 5850 barrels. Only two-thirds of this space was occupied. Extreme capacity of these magazines was respectively 3960 and 3480 barrels, a total of 7440.<sup>333</sup>

In July nine 10-inch rodmans arrived at the fort; three of them were mounted.<sup>334</sup> Next month the 10-inch Columbiads on the roof of the fort at the bastions were dismantled from the useless wooden carriages; another rodman and two 300-pounder Parrotts arrived,<sup>335</sup> followed by another 200-pounder Parrott in October.<sup>336</sup> In the fall other ordnance stores were ordered shipped to the fort,<sup>337</sup> but there is no evidence that they were received during the year 1865.

FINANCES: Although engineering operations at Fort Jefferson remained on a relatively small scale in 1865, it was not definitely because, as had often occurred in the past, the fortification lacked funds. On February 28 a \$100,000 appropriation for Fort Jefferson construction was approved, and on the second day of the following month \$75,000 was added to bring the total appropriation for 1865 to \$175,000.

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<sup>333</sup> Ibid., pp. 333-34: W. McFarland, C. E., J, to Brig-Gen. R. Delafield, Engineer Dept., Wash., D. C., May 13, 1865.

<sup>334</sup> J-R 70 or: July 1865 Report of Operations.

<sup>335</sup> Ibid. August 1865 Report of Operations.

<sup>336</sup> Ibid. Oct. 1865 Report of Operations

<sup>337</sup> J-L 1865: Sept. 12, Nov. 24, Dec. 22, J. D. Kurtz, Engineer Dept., Wash., D. C., to Capt. W. McFarland, C. E.

And in April, \$45,000 was placed with the New York Agency, \$25,000 with McFarland--evidently for the purpose of liquidating existing liabilities. McFarland, engaged in engineering duties elsewhere than on the Florida Reef during the first half of the year, apparently did not propose to begin work on a large scale until he had returned to his Florida post and until the cool weather had set in. At any rate, his program of expenditure required no disbursement of the \$95,000 set aside for 1865 operations before September, when \$5,000 would start the ball rolling. For the succeeding five months, he estimated monthly expenditure at \$15,000; March would expend only \$5,000, April \$4,000, May and June \$3,000 each. The program was to complete the Soldiers' Barrack, two sections of the Officers' Quarters, the draw-bridge, a parade magazine, the first tier casemates and excavation of the moat.<sup>338</sup>

In the remaining months of 1865, the engineers adhered to McFarland's program of expenditure and procedure as closely as possible, although the work received a serious setback in the hurricane damage recorded in October.

A total of \$131,780.80 was expended in 1865: \$43,845.63 for materials, \$36,788.10 for wages; \$6,970.44 for food, \$5,197.98 for equipment; and \$36,978.65 for miscellaneous items such as freight charges, contingent and transportation services.

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<sup>338</sup> J-L 35, p. 333; W. MacFarland, Lt. Col. and AAG, 13 AC, J, to Brig.-General R. Delafield, Engineer Dept., Wash., D. C., July 20, 1865.

**PART THREE:**

**THE CONCLUDING YEARS**

**1866-1874**

## THE CONCLUDING YEARS

1866-1874

1866

Fort Jefferson became the most important military prison of the United States.

It was not a year of construction. With the aid of prisoner labor, however, the small engineer force managed to turn the arch of the large interior magazine and to finish repairing the damages of the hurricane of 1865.

At the beginning the garrison was made up largely of colored troops, but by the end of the year all these had been replaced by white soldiers. May 16 heralded the peak garrison strength of the entire history of the fort--803 active soldiers on duty.

INSTRUCTIONS: On February 9, General Delafield requested McFarland to submit a project for supplying an abundant supply of wholesome water for the use of Fort Jefferson. It was desirable that the supply should be obtained by the Engineer Department for its own use independent of the Navy. <sup>330</sup> On August 3, Delafield authorized McFarland to purchase the fresh water condensing machine

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J-L Feb. 9, 1869: Delafield to McFarland. In this letter Delafield referred McFarland to a letter of Capt. E. B. Hunt of Sept. 3, 1861, in which Hunt had presented a project relevant to fresh water supply at Fort Jefferson.

which was at that time in use at Fort Jefferson, but was owned by the Acting Assistant Quartermaster.<sup>340</sup>

As early as March 6, the first instructions restricting operations were sent to Burnham by McFarland. Burnham was instructed to reduce operations to a much smaller scale and to reduce monthly expenditures to the lowest rate possible.<sup>341</sup>

The part of the building intended for barracks, which was being used as a hospital, was quite unfit for that purpose. John Bell, Assistant Surgeon, recommended that the hospital laid down in the plans of the Fort be built at once.<sup>342</sup> But about three weeks later, August 22, A. A. Humphrys, new Chief of Engineers, lamented that the small sum allotted by Congress for the fiscal year ending June 30, 1867 made it impractical for the Engineer Department to meet the reasonable demands of the Medical Department concerning a hospital.<sup>343</sup> Almost three months later, McFarland frantically dispatched a letter to Frost, informing him that:

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340 J-L Aug. 3, 1866: Delafield to McFarland.

341 J-L March 6, 1866: McFarland to Burnham.

342 J-L July 30, 1866: John Bell, Assistant Surgeon, J, to  
Srvt. Capt. William E. Van Reed, Post Adjutant, 4th  
U. S. Artillery.

343 J-L Aug. 22, 1866: A. A. Humphrys to McFarland.

"...Owing to an error of some months standing which I have just discovered, the working balance of the appropriation for Fort Jefferson is reduced from \$35,000--the amount mentioned to you before your departure from New York--to less than \$15,000.

" Of this amount \$3,000 must be deducted for the care of the work during the year ending June 30th 1866--and the remainder applied after the payment of present obligations, wages, requisitions &c--to the completion of part of the soldiers Barracks or Officers Quarters--or both.

" It will be manifest to you then, that the severest economy must be exercised in order to produce any positive progress during the coming season,--and to this end you will immediately draw up with the greatest possible care a scheme for the application of this balance of Twelve thousand dollars to the end in view--ie-- rendering habitable a part of either or both the Officers Quarters of the Soldiers barracks, /

"...entering with the utmost minuteness into an investigation of the necessity of every detail of the proposed expenditure and sodulously expunging every one that is not absolutely essential to that end.-

"Discharge every man who can be spared.

"It is quite possible that with prisoners labor you may need no other laboring force--but if you do--it is more than probable that you will find that the negroes mentioned in an accompanying letter will do more work and at a cheaper rate than white men -

"If so discharge the white men and employ the negroes. - Holland Delsary McBride and Conway, a tinsmith, come down by this trip of the Oriental - If either one of them is not absolutely essential in the progress of operation at Fort Jefferson send him back -

"Of the men and material for which you made requisition in New York, keep only such as is absolutely essential to your work - the remainder will be used at Fort Taylor.-

"Make a careful revision of this requisition, which I enclose, showing what Fort Jefferson does not need and therefore what it need not pay for, - and send it back to me.

"Do not lose an hour in attending to these instructions -

"Return the papers sent by this mail for correction by return trip of the Oriental or Nonpariel - and do not detain the Oriental longer than the necessities of your work may require.-

"I shall endeavor to come on her next trip. ..."<sup>344</sup>



After carefully reviewing the matters mentioned in the above letter, Frost replied that he found it compulsory to dispense with all operations and all the supplies not already upon the island.<sup>345</sup>

The old Schooner Tortugas, which had been wrecked in the blow of October 1865, was worthless to the Engineer Department, and Delafield, on May 1, 1866, authorized McFarland to sell the remains for what he could get.<sup>346</sup> In August the Department had as yet been unable to buy a boat to take the place of the Tortugas, so McFarland suggested that the Government should build a dispatch boat for Fort Jefferson.<sup>347</sup> More delay, and finally an extensive search was made of nearly every harbor in the United States towards the last of the year, but with no results.<sup>348</sup> At last, on November 1, McFarland was instructed to have a vessel built and charge the cost to Fort Jefferson's account.<sup>349</sup>

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345 J-L Nov. 17, 1866: Frost to McFarland. "I should therefore recommend in relation to the colored men, that they be left to seek employment elsewhere, if not wanted at Fort Taylor. I may further mention that their presence here would involve extra expense in the mess. ..."

346 J-L May 1, 1866: Delafield to McFarland. McFarland proposed that the Tortugas be sold in a letter to Delafield of December 7, 1865.

347 J-L Aug. 25, 1866: Woodruff to McFarland.

348 J-L Nov. 1, 1866: A. A. Humphrys to McFarland, N. Y.

349 J-L Nov. 1, 1866: Humphrys to McFarland.

On November 3, Humphrys instructed McFarland to prepare the platforms which were to hold the projectiles of the guns:

"...it will suffice to lay sleepers of cord wood or other inexpensive material with two inch plank nailed there to allow the air to pass between the sleepers along the terreplein of the battery and convenient to the armament. ..."<sup>350</sup>

On December 31, McFarland passed the above instructions along to Lt. W. A. Jones, Engineer at Jefferson, with the admonition to hurry.<sup>351</sup>

CONDITION OF THE WORK: The Officers Quarters and the Soldiers Barracks were not yet completed on March 7, needing only 25,000 square feet of iron sheeting.<sup>352</sup> A part of the unfinished barracks which was being used as a hospital was in such a state of incompleteness as to be unfit for use at all.<sup>353</sup>

On June 30, in the annual report of operations for both Fort Taylor and Fort Jefferson, McFarland stated that work at Jefferson had been almost entirely confined to the buildings inside the work during the fiscal year ending June 30, 1866. Then, he recapitulated as follows:

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350	J-L	<u>Nov. 3, 1866:</u>	Humphrys to McFarland.
351	J-L	<u>Dec. 31, 1866:</u>	McFarland to W. A. Jones, Engr., J.
352	J-L	<u>March 7, 1866:</u>	Burnham to McFarland.
353	J-L	<u>July 30, 1866:</u>	John Bell, Assistant Surgeon to Brvt. Capt. William E. Van Reed, 4th U. S. Artillery, Post Adjutant.

"...During the year the masonry of the officers Quarters, Kitchens, and soldiers Barracks, seriously injured by the Hurricane of October 22nd 1865, has been repaired and completed, - The walls of a large detached magazine raised thirteen and a half feet and its principal arch turned, - and the walls of a small detached magazine raised seven feet - Eighty thousand cubic feet of sand removed from the ditch and embanked, and the counterscarp wall constructed in front of curtain three (3) for a distance of a hundred feet.-

"Appropriation asked for, for the year ending June 30, 1866, two hundred thousand dollars. ..."<sup>354</sup>

On September 24, Geraghty informed McFarland as follows:

"...I also intend to get down the foundation of one of the single Kitchens in rear of the Officers Quarters pretty soon as it is the only one to complete that tier of buildings in order that it may be fully set before the brickwork commences if it is necessary to have it put up the coming season-..."<sup>355</sup>

The post Quartermaster was building a new wharf in front of the sally port during August.<sup>356</sup>

SET-BACKS IN CONSTRUCTION: Burnham analyzed the case-mate cistern trouble by stating that subsidence had been the main factor in the cracking of the cisterns, and that the sea water seeped in through the cracks only after the unequal subsidence of the outer and inner walls of the fort had wrenched the cisterns into cracking.

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<sup>354</sup> J-Ry June 30, 1866: Annual Report.

<sup>355</sup> J-L 35, p. 444: Geraghty to McFarland, Sept. 24, 1866.

<sup>356</sup> J-L 35, pp. 443-444: Geraghty to McFarland, Aug. 31, 1866.

As there was no feasible way to stop the subsidence and thus make practicable the casemate cisterns, Burnham suggested that there be cisterns constructed under the Officers Quarters and the Soldiers Barracks.

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ARMAMENT: On June 17, Frederick Robinson, Ordnance Lieutenant, 5th Artillery, made the following armament report for Fort Jefferson:

IN BARBETTE: 6 Ten-inch Columbiads mounted on wooden center pintle carriages; 7 Two-hundred pdr Parrott mounted on iron front pintle carriages; 15 Ten-inch Rodman mounted on iron front pintle carriages; 9 Forty-two pdr smooth bore mounted on barbette wooden front pintle carriages; total of 37 guns and carriages mounted in barbette. There were old fashioned sea coast pintles 2½ inches in diameter laid down for for 112 guns, while the traverse circles for 92 of those were finished. Deducting the 37 traverse circles already occupied, left 55 traverse circles vacant. It was doubtful, however, if any of the 55 circles would be available for the carriages at that time fabricated for Parrott and Ten-inch guns, since those required a pintle 4 inches in diameter.

IN SECOND TIER: 6 Forty-two pdr James Rifles mounted on wooden carriages with casemate chassis; the platforms, however, were only temporary.

IN FIRST TIER: 34 Ten-inch Rodman mounted on carriages for guns without preponderance, iron and front pintle; 37 Eight-inch Columbiads mounted on wooden front pintle carriages; 24 Twenty-four pdr Howitzers mounted on Howitzer wooden front pintle carriages; total of 95 guns and 104 carriages mounted in first tier. Traverse circles were laid for 107 guns and 35 Howitzers; that is, there were 29 embrasures for guns and 9 for Howitzers in which there were no carriages. Few of these, however, were available at that time because of their being occupied by the Engr Dept and Navy Dept as storehouses, and by the bakery for housing the apparatus for condensing water. The embrasures which were available had gun carriages mounted in them; and in those, (7 in number) guns were to be mounted as soon as possible.

"...As respects the armament of the fort. I have examined the plan of the work in the Engineer Office at this post. According to it Fort Jefferson when completed will mount 420 guns, and Howitzers viz:-

"In barbette	112 guns	112
In second tier	121 guns and 41 Howitzers	162
In front tier	111 guns and 35 Howitzers	146
		<u>420</u>

"But in these only 234 traverse circles are laid down on which 147 carriages of all kinds are mounted. In addition to the foregoing I would remark that I have received invoices for 12 10" Rodman guns which will only leave 4 10" carriages vacant-..."<sup>358</sup>

From the monthly Armament Reports for the balance of the year we find that during June, evidently after the 17th, 6 10-inch Rodman guns were received and 16 of the same type were mounted.<sup>359</sup>

During July, 12 10-inch Rodman guns were received and 21 were mounted.<sup>360</sup> No other guns were received or mounted until December when 4 10-inch Rodman guns were received. Then at the end of the year there were 175 guns mounted and on hand and not mounted were:

22 10-inch Rodman, 1 10-inch Columbiad, 4 300-pounder Parrott, 12 24-pounder iron guns, 6 18-pounder iron Guns and 2 24-pounder

Howitzers.<sup>361</sup> Gun carriages on hand and not mounted were:

1 18-pounder barbette, wooden front pintle; 6 32-pounder barbette, wooden front pintle; 10 42-pounder barbette, wooden front pintle; 1 300-pounder barbette, iron front pintle; 3 300-pounder barbette,

<sup>358</sup> J-L June 17, 1866: Frederick Robinson, 5th Artillery to General.

<sup>359</sup> J-R 70 or, June 1866.

<sup>360</sup> J-R 70 or, July 1866.

<sup>361</sup> J-R 70 or, August through December 1866.

iron centre pintle; 2 24-pounder howitzers, wooden front pintle;  
2 32-pounder casemate, wooden front pintle; 28 10-inch Rodman,  
iron front pintle.<sup>362</sup>

FINANCES: Congress, by act approved June 12, appropriated for Fort Jefferson \$50,000. This news was communicated to McFarland by letter of August 18 from A. A. Humphrys--along with the news that there was no money of the old appropriation left in the Treasury for Fort Jefferson.<sup>363</sup> The appropriation asked for, for the year ending June 30, 1866, was \$200,000.

Owing to an error of some months standing which McFarland discovered on November 15, the working balance of the appropriation for Fort Jefferson was reduced from \$35,000 to less than \$15,000; of that amount \$3,000 was to be withheld for the care of the work during the fiscal year ending June 30, 1866. Perhaps McFarland had overlooked the fact that by letter of February 16, Brevet Major N. Bowen, Captain of Engineers, in charge of the Engineer Agency at New York, applied to the office of General Delafield for remittance to the agency on McFarland's account \$25,000 for Fort Jefferson to enable him to pay for materials purchased and shipped to McFarland for Fort Jefferson; and that the undrawn balance at the Treasury on account for Fort Jefferson (only \$9,703.04) did not admit of the remittance called for.<sup>364</sup>

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362 J-R 70 or, December 1866.

363 J-L August 18, 1866: A. A. Humphrys to McFarland.

364 J-L February 24, 1866: Delafield to McFarland.

ALLOTMENTS: In compliance with McFarland's request of December 14, 1865, application was made for \$10,000 to be remitted to the Assistant Treasurer and held subject to McFarland's draft.<sup>365</sup>

In compliance with request of McFarland's of January 9, 1866, application was made for \$10,000 to be remitted to the Assistant Treasurer at New York and held subject to McFarland's draft.<sup>366</sup> In compliance with McFarland's request of May 15, application was made for \$9,902.25 to be remitted to the Assistant Treasurer and held subject to McFarland's draft.<sup>367</sup>

In compliance with McFarland's request of November 20, application was made for \$20,000 to be remitted to the Assistant Treasurer and held subject to McFarland's draft.<sup>368</sup>

General Delafield requested McFarland to send transcriptions of the check books of Captain Woodbury for 1859 and 1860; as he had discovered three checks made by Woodbury, one for \$163.80, January 10, 1859, one for \$156.45, April 5, 1859, and one for \$138.25, July 21, 1860, which had never been cashed. This led Delafield to the apprehension that there might be other checks outstanding and not paid.<sup>369</sup>

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- <sup>365</sup> J-L Jan. 24, 1866: J. D. Kurtz to McFarland.
- <sup>366</sup> J-L Jan. 24, 1866: J. D. Kurtz to McFarland.
- <sup>367</sup> J-L June 6, 1866: J. D. Kurtz to McFarland. "...This remittance for Fort Jefferson is all that is now in Treasury for that work, and no engagements of any sort beyond its amount should be entered into unless specially authorized by this Department. ..."
- <sup>368</sup> J-L Dec. 11, 1866: W. P. Craighill, Maj. of Engineers, to Capt. McFarland.
- <sup>369</sup> J-L March 17, 1866: Delafield to McFarland.

McFarland was instructed to build a boat to take the place of the wrecked Tortugas and to have the cost charged to Fort Jefferson alone.

MATERIAL: At the first of the year, work was being done at a rate requiring 50 barrels of cement per day. 370

The quality of the bricks received was judged as being so poor that 70% of the bricks received "this season" should not have been accepted. 371

On March 7, 25,000 square feet of galvanized iron were needed to complete the Officers Quarters and the Soldiers Barracks. 372

1867

INSTRUCTIONS: On February 18, McFarland sent the following instructions to his subordinate, Lieutenant W. A. Jones, Engineer Officer in charge of operations at the fort:

"...The Fortification Bill calling for appropriations for the year ending 30th June 1868 has been defeated, and it is necessary to bring operations at Fort Jefferson to a close without delay:-

"To this end the instructions verbally given you when I was last at Fort Jefferson must be modified to some extent.-

"1st - Let the plasterers continue work as I directed, until they have completed the middle and end portions of the section of Officers Quarters they are engaged upon.

"2nd - Discharge at once, all carpenters except those absolutely needed to secure that section against the effect of storms - This must be done in the speediest and cheapest manner possible - by boarding up the windows so that rain cannot enter and injure the plastering.-

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370 J-L 35, p. 403: Burnham to Brevet Col. N. Bowen, Agent at N. Y., Jan. 19, 1866.

371 J-L 35, p. 404: Burnham to Bowen, Jan. 19, 1866.

372 J-L March 7, 1866: Bowen to McFarland.



"If so much has been done towards putting in the sashes that can be accomplished at a cost equal to or less than that of boarding them up, then have the sashes put in - but not otherwise.

"3rd - Discharge without delay every laborer who is not absolutely needed in carrying out the preceding part of these instructions. - - No man is to be kept on time an hour after his services can be dispensed with.

"The surgeon, and clerk will have their time continued until the end of this month.-

"The overseer and two laborers will be retained on the rolls.-

"All carpenters and laborers discharged can have employment at Fort Taylor if they wish it.-..."<sup>373</sup>

But on March 14, \$50,000 was appropriated for Fort Jefferson for the year ending June 30, 1868. <sup>374</sup>

In June McFarland instructed Thomas Geraghty to apply to Major Andrews for his designation of which barbette platforms were to be numbered in the 16 to receive new pattern pintles and plates. <sup>375</sup>

CONSTRUCTION: Until the suspension of operations in February, over 50 men were employed by the Fort Jefferson Engineer Office in work on the officers' quarters. <sup>376</sup> Then ensued a lull of three months when the engineer force was reduced to less than a dozen men, including the overseer and a 6-man crew for the service schooner. <sup>377</sup>

Even some pumps, boilers and pipes were dismantled and moved to Key West. <sup>378</sup>

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<sup>373</sup> J-L Feb. 18, 1867: McFarland to Lt. W. A. Jones.

<sup>374</sup> General Orders. General Order No. 17, March 14, 1867.

<sup>375</sup> J-L June 11, 1867: McFarland to Geraghty.

<sup>376</sup> J-L 36, p. 453: Jones to McFarland, Feb. 20, 1867.

<sup>377</sup> Returns: Officers and Hired Men, 1867; Ordnance and Ordnance Stores, January and December 1867.

<sup>378</sup> J-L July 6, 1867: McFarland to Geraghty.

In June came a blacksmith, who with the aid of two stone cutters managed to install 16 new pattern pintles and plates before the end of July.<sup>379</sup> Plasterers and carpenters made their appearance in August, and worked in the officers' quarters until September. At no time, however, did the engineer force exceed 15 men, and it was reduced again to bare maintenance status of 8 or 9 men for the months after September.<sup>380</sup>

In December a report was compiled to show the condition of the quarters:

- "1st Section (old portion) Head Quarters - Complete.
- "2nd Section One half finished complete and ready for occupations. The floors laid throughout - plastering finished with the exception of the three hallways of the first and second floors. The window frames of the half section on the front of the first and second stories were set in place and finished on the inside.
- "3rd Section has no inside finish done to it, and I lacks  $\frac{1}{2}$  the iron beams for one floor, and the cornice on the rear.
- "4th Section has two rooms finished on the first floor and occupied as Engineer Office. Three fire proof floors to be arched - three chimneys to be topped out, and iron beams required for two passageways. Since 30 Jun 1867.
- "2nd Section Officer's Quarters finished completely.<sup>381</sup>

The cisterns, which had given considerable trouble during previous years, were reported to contain 464,825 gallons of drink-  
able water.<sup>382</sup>

(Material compiled under date of May 30, 1936)

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379 J-L July 2, 1867: Geraghty to McFarland.

380 See Note 377.

381 Report, Dec. 4, 1867.

382 J-L Dec. 20, 1867: Report on cisterns.

ARMAMENT

Major J. D. Kurtz, assistant to the chief Engineer at Washington, wrote McFarland on August 26 instructing him in mounting armament as follows:

"...In reply to your letter of 25th ultimo, giving the reasons why certain guns have not yet been mounted at Forts Taylor and Jefferson, I have to say that the Ordnance Department have for some time past assumed the duty of mounting all guns. But as no Ordnance officer is present, and the Commanding officers at those works have undertaken to mount them, you will render them the use of machinery, teams, and even men, if they require it, or you think it best. The cost of all such labor to be kept separate, and a return of it made to this office for the purpose of having it re-funded by the Ordnance Department....

"...At Fort Jefferson it is suggested whether the Quartermaster and Commissary store in the 1st tier of casemates may be removed to the 2nd tier, and those casemates supplied with guns. Your opinion on this point is requested.

"The three 300 pdr. rifles on hand at Fort Jefferson are intended for the centre pintle platforms at the bastions. It is understood that permanent stone platforms in these bastions have not yet been constructed. On the 10th of June 1861, a drawing, giving details of roof drainage, barbette platforms etc., &c., of the bastions' was sent to Lieut. J. St. C. Morton with letters of that date. Since then the details for this class of platforms have been modified and a new drawing will be sent to you as soon as certain information asked of the Ordnance Department is received. ..."<sup>383</sup>

In line with the above instructions, Special Orders No. 149 (September 2, 1867), authorized the Commanding Officer at Jefferson

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<sup>383</sup> J-L Aug. 26, 1867: J. D. Kurtz to McFarland.

to detail from the Department of the Artillery on duty at Jefferson,  
one non-commissioned officer and twelve privates for extra duty in  
the Ordnance Department. <sup>384</sup>

Eleven 10-inch Rodman guns were received in January, but  
no guns were mounted. Guns on hand and not mounted include 33 10-inch  
Rodmans, 12 24-pounder iron guns, one 10-inch Columbiad, six 18-pounder,  
four 300-pounder Parrotts and two 24-pounder howitzers. No gun car-  
riages were received or mounted during January, and on hand and not  
mounted were one 18-pounder barbette front pintle wooden, six 32-  
pounder barbette front pintle iron, three 300-pounder barbette center  
pintle iron, two 24-pounder howitzers front pintle wooden flank defence,  
two 32-pounder casemate front pintle wooden, twenty-eight 10-inch Rod-  
man front pintle iron casemate. <sup>385</sup> In May, 15 carriages front pintle  
barbette, were received and remained on hand not mounted. <sup>386</sup> During  
September one 6-pounder Brouse (Model 1840) 0.387 bore gun and car-  
riage was received and one 10-inch sea coast mortar (cast-iron model  
1841) with its carriage were received. Neither the guns nor the car-  
riages were mounted during 1867 and outside of this addition there were  
no further changes through December 31, 1867. <sup>387</sup>

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<sup>384</sup> Special Orders No. 149, Sept. 2, 1867.

<sup>385</sup> Daily Report Book, April 1, 1862 - Aug. 31, 1869: Armament Report  
for January.

<sup>386</sup> Ibid.: Armament Report for May.

<sup>387</sup> Ibid.: Armament Reports, Sept. - December 1867.

ESTIMATES

McFarland made the following estimate for the fiscal year ending June 30, 1868:

Amount of former appropriation remaining undrawn June 30	\$10,000
Amount of new appropriation available . . . . .	25,000
	<u>35,000</u>
Outstanding obligations . . . . .	10,000
Care of work, year ending June 30, 1869 . . . . .	3,000
	<u>\$13,000</u>
Working balance . . . . .	22,000

The working balance was to be used in the completion of the Officers Quarters and the Soldiers Barracks. <sup>388</sup>

MATERIAL

There were only two purchases of material made during 1867; November 23, 15,027 feet of lumber and February 13, 13 pounds plaster of paris. These two items amounted to \$529.61. <sup>389</sup>

PERSONNEL

Wages continued at about the same level as during preceding years: physician, \$125 per month; chief overseer, \$4 per day; clerk, \$125 per month; blacksmith and stone cutters, \$3.25 per day; laborers, \$1.50 per day. <sup>390</sup>

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<sup>388</sup> J-L July 12, 1867: McFarland to Humphrys.

<sup>389</sup> Ledger: Accounts Payable, March 1862. Sept. 1868. See 1867.

<sup>390</sup> Returns: Officers and Hired Men, July 1867.

1874

CONSTRUCTION: The greater part of the work accomplished in the year 1874 at Fort Jefferson was on the south section of the soldiers' barracks, and at the close of the works on June 30, 1874, little remained to be done for the completion of this building. The officers' quarters were complete except for a small amount of carpentry and painting in one section.

OFFICERS' QUARTERS: The overhead of one large room was ceiled, two chimneys built, and the ceilings of five large rooms were plastered.

SOLDIERS' BARRACKS: Carpentry work consisted of the following: Roofing of the barracks was completed:- 1 section of roof frame was put on, 3 sections were covered with galvanized iron, and 11 iron girders were hoisted and set in place. (The October hurricane of the preceding year had taken off the iron roofing and carried some of the heavy iron girders over the parapet to the ditch outside.) Seven large rooms and 7 hallways were completed; 13 large rooms and 15 hallways were furred for lathing; 2 hallways were wainscoted; 6 rotten buildings were torn down; 4 temporary buildings were shingled and white-washed; and one large cistern was roofed.

Masonry consisted of the following: 1 chimney was built on temporary building; 2 brick pediments were built; and a brick wall, 3 feet high was built on one section.

Painting consisted of the following: 2 large rooms, 3 doors, 25 door frames; 38 pairs of sashes, and 112 window frames were primed. And 202 barrels of lime were slaked.

Plastering consisted of the following: 1 hallway, 1 small room, and 3 large rooms were plastered completely. The ceilings of 1 hallway, 4 small rooms, and 4 large rooms were also plastered. Four hallways, 3 small rooms, and 2 large rooms were hard-finished. Two hallways, 2 small rooms, and 7 large rooms were scratch-coated and browned. Two floor arches (in hallways) were turned.

MISCELLANEOUS: 13 four inch pintles were set in place in Barbette platforms; 25,744 cu. ft. of sand wheeled and hoisted to Barbette magazines for embankments; 2 flights of iron stairs were set in place; 6 traverse magazines were covered on their slopes with a wooden roof for each to hold sand in place. Various machinery was cleaned, repaired, and put in order for storing.

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RECOMMENDED FUTURE CONSTRUCTION: As there were no appropriations for continuing the work at Fort Jefferson during the last six months of 1874, no plan of future operations was submitted. In Major Jared A. Smith's report of operations for the year-ending June 30, 1874, he recommended the following:

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Letter Book (J-L 35), letters, Smith, JA, Major, Engineers, Key West, Fla., to A. Humphreys, Chief Engineer, Engineer Dept., Wash., D. C.: p. 551 (Feb. 3, 1874); pp. 556-7 (Mar. 5, 1874); p. 561 (Apr. 4, 1874); pp. 568-9 (May 4, 1874); pp. 576-7 (June 9, 1874); pp. 579-581 (circa. July 20, 1874); p. 586 (circa. Oct. 1874), J. A. Smith, Major, Engineers, New Bedford, Mass., (presumably) to A. Humphreys, Chief, Engineers, Engineer Dept., Wash., D. C.

"...In view however of the probability of the work being regarrisoned at some future time it is recommended that the officers and soldiers quarters be completed, as well as magazines and other unfinished work of the bar-bette tier. It is also desirable to reconstruct the privies, with cisterns or other arrangements for their cleansing. It is recommended that an appropriation of fifty thousand dollars be asked for these purposes.

"As the second tier of casemates at this work has remained for some years incomplete, it is suggested that some method of closing the scarp wall for cover of guns or other purposes should be devised...."<sup>392</sup>

CIVIL PERSONNEL: No records show the civil personnel at the Fort during 1874. In April of that year Major Smith voiced a desire to increase the working force, "considerably," from then until the end of June, at which time work was to cease on the fortification, and sent twelve laborers at the time.<sup>393</sup> From the monthly report of operations for May we know that the overseer, clerk, physician, masons, carpenters, laborers, machinist, receiver of materials, and mules and team were employed;<sup>394</sup> the number of masons, carpenters, and laborers however is undeterminable.

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<sup>392</sup> Letter Book (J-L 35), pp. 579-581: circa July 20, 1874, letter J. A. Smith, Major, Engineers, New Bedford, Mass., (presumably) to A. Humphreys, Chief Engineer, Engineer Dept., Wash., D. C.

<sup>393</sup> Letter Book (J-L35), p. 564, April 17, 1874, letter, J. A. Smith, Major, Engineers, Key West, Fla., to F. W. Whitaker, overseer, Fort Jefferson.

<sup>394</sup> Letter Book (J-L 35), pp. 576-7, June 9, 1874, letter, J. A. Smith, Major, Engineers, Key West, Fla., to A. Humphreys, Chief Engineer, Engineer Dept., Wash., D. C.



### Closing up Shop

Post war construction was carried forward, with some interruptions, to 1875. That date apparently marked the end of important construction by the Army. Between 1868 and 1870 the officers' quarters, with its 63 rooms, and the soldiers' barracks were brought reasonably close to completion, with the exception of permanent roofs and interior finish in certain sections. After the hurricane damage of 1873, these buildings were repaired and essentially finished. The quarters partially, and the barracks entirely, were roofed with galvanized iron. No additional work appears to have been done, and in 1876 the windows of both buildings were closed with wooden storm shutters.

Meantime, other work also went on. The parade magazines were continued--though never finished. In 1873 the counterscarp and excavation of the moat were finally completed.

By 1870 all the "modern" guns on hand had been mounted.

There was a suspension of work in 1871. The War Department was considering a project for adapting the barbette tier to guns of larger caliber. The next year the changes were begun. The 4 curtain magazines were strengthened by thickening the scarp in front of them to 12 feet, and in 1873 barbette magazine changes were accomplished. That same year, in view of the increasing tension

between Spain and the United States over Cuba (1873 was the year of the Virginus incident: this American schooner was seized by the Spanish vessel Tornado on suspicion of carrying men and arms to the Cuban insurgents), 6 15-inch guns and 3 300-pounder Parrotts were mounted. By 1874, the fort mounted 141 guns:

15-inch Rodmans . . . . .	6
10-inch Rodmans . . . . .	90
30-pounder Parrotts . . . . .	4
200-pounder Parrotts . . . . .	7
300-pounder Parrotts . . . . .	4
24-pounder flank defense howitzers . .	23
3-inch rifled guns . . . . .	4
6-pounder smooth bore . . . . .	1
24-pounder Coehorn mortar . . . . .	1
10-inch seacoast mortar . . . . .	1

Barbette tier modifications were entirely completed in 1875.

Other modernization, however, yet remained to be done. Congress consistently disapproved the annual requests for appropriations of about \$25,000 to finish the job, and in the decade after 1876 only maintenance work could be done. By 1883 the 15-inch guns were falling, for they had been mounted hastily on temporary wooden platforms.

By 1889, George Phillips reported increasing dilapidation. Wrote Phillips: " \* \* \* everything here, is going fast to destruction, and [ I ] will therefore only attempt to itemize but a few things. The once fine quarters of the Officers and Soldiers are now but a little more than a wreck, the windows and doors are broken and lie scattered around but few of them can either be open or shut,

many of them are open and can not be shut until repaired, and the water now pouring through them whenever it rains, destroying the fine stucco walls and ceilings by the hundreds of sqs. yards. The roofs of these quarters are of tin, and so badly rusted through in many places as to allow the water to run through them and destroy whatever property there may be stored within. The piazzas of the Officers quarters are in a dangerous condition not being safe to walk over, the roofs of them being blown off and lodged upon the roof of the main building. The Conductor pipes and gutters are rusted through so badly as to allow but little water to flow through them into the cisterns.

"The cornices too, have become rotten and are falling down. The Embrasure shutters to the fort will neither open or shut. The Barbette Magazines are all going to decay. The property of Ordnance Department is in a condition equally as bad as that of the Engineer Dept. Balls and shells by the thousands, are sinking deep into the earth of the parade. Vandalism too has lent its hand to the destroying elements, as no less than 77 stone covers to the manholes of the cisterns have been broken to pieces in order to obtain the brass bolts and rings by which the covers were lifted off and on. Doors and windows too have been taken from the quarters. The above represents but a small portion of the great destruction that has befallen these works." (Copy of Letter, Phillips to Capt. W. L. Fisk, April 21, 1859 (KW).) Of interest in this connection is an item in the collection of the Florida Historical Society--a silvered door knob which

is reported to have come from the officers' quarters at Fort Jefferson.

For at least a major part of the 1870's and 1880's, there was a fort keeper (Joseph E. Cole) employed at Jefferson in addition to the ordnance sergeant and his details.<sup>395</sup>

The tank and condensing plant were removed in 1906; the wireless continued in operation until 1909.<sup>396</sup>

The transfer to the Department of Agriculture was by Executive Order No. 779, April 6, 1908. By its terms, the Tortugas islands were "reserved and set aside for the use of the Department of Agriculture as a preserve and breeding grounds for native birds" to be known as the "Tortugas Keys Reservation."<sup>397</sup>

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<sup>395</sup> Report of the Secretary of War, Chief of Engineers (1866) p. 150; (1867), v. II, part 2, p. 13; (1868), p. 253; (1869), p. 211; (1870), v. II, part 2, p. 24; (1871), v. II, p. 21; (1872), v. II, p. 19; (1873), v. II, p. 20; (1874), v. II, part 1, p. 24; (1875), v. II, pt. 1, p. 24; (1876), v. II, pt. 1, p. 25; (1877), v. II, pt. 1, p. 20; (1878), v. II, pt. 1, p. 23; (1879), v. II, pt. 1, pp. 27-28; (1880), v. II, pt. 1, p. 46; (1881), v. II, pt. 1, p. 44; (1882), v. II, pt. 1, p. 44; (1883), v. II, pt. 1, p. 41; (1884), v. II, pt. 1, p. 46; (1885), v. II, p. 1, p. 39; (1886), v. II, pt. 1, pp. 39-40; Quartermaster General, (1892), v. I, p. 430; letters, Dagenfield to Capt. L. L. Langdon, Jan. 31, 1874, in Fort Jefferson letterbook, ordnance, letters sent (1865-1902) (KW); Maj. John M. Wilson to Capt. W. H. Heuer, July 12, 1883 (KW); Actg. Inspector Gen. R. Jones to the Asst. Adj. Gen., Dept. of the East, April 19, 1884 (AGO); Serg. Henry Wilkens to the Asst. Adj. Gen., Dept. of the East, Aug. 31, 1886 (AGO 4937, Reservation file, 1886, Fort Jefferson, Fla.); R. B. Marcy, op. cit., p. 243.

<sup>396</sup> See Report of the Secretary of the Navy, Bureau of Equipment (1906), pp. 352-353, 372; (1907), pp. 317-318; (1909), p. 257; Bureau of Yards and Docks (1907), p. 219; (1909), p. 116.

<sup>397</sup> AGO file 314.71.

H. L. Garrett's compilation (in "Fort Jefferson Notes," Fort Marion study collection) shows a net expenditure of \$2,697,935.47 between 1844 and 1877 inclusive. This table includes money spent for preliminary survey of both Tortugas and Key West sites. A total of \$2,935,000 was appropriated for the fortifications during the entire period. The Navy spent \$832,113.06 at Tortugas between 1898 and 1908. Including these Navy costs a conservative approximation of the total amount spent for the Fortification of Tortugas since 1844 is \$3,532,000.<sup>398</sup>

According to information obtained by former superintendent Felton from various persons in Key West, including Mr. Henry Haskins, a Mr. Rose (both formerly with the Lighthouse Service at Key West), and Mr. Andrew Albury, lightkeeper at Loggerhead, the barracks burned in 1913. The fire started in a privy back of the lighthouse keeper's cottage. The officers' quarters were burned in 1927 by a Capt. Rice of the Key West Army Post, who was on a fishing trip. When Mr. Haskins later asked him why he had burned them, he replied that they were "dangerous." As is usual in such cases, however, there are other guesses as to the cause. One is that the captain was intoxicated and wanted to see a big fire.

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Reports of the Secretary of the Navy, Bureau of Yards and Docks (1899), p. 219, 263; (1900), pp. 162-163; (1902), pp. 134-135; (1903), p. 112; (1904), pp. 124-125; (1905), pp. 93-94; Bureau of Equipment (1899), p. 299; (1900) p. 278; (1902) pp. 318-319; (1903) pp. 326-326; (1904) pp. 339-340; (1906) pp. 352-353; (1907) pp. 317-318; (1908) pp. 286-287; (1909) p. 257.

A P P E N D I X

The Chief Engineer's Description  
of the Proposed Fort Jefferson Project (1846).

(Transcript of an unsigned draft in the  
Fort Jefferson MSS.)

Capt. Wm. D. Fraser  
Corps of Engineers  
Washington

Engineer Department

Washington

[c June 1846]

Sir,

On the 19th day of May, I addressed you at Buffalo - informing you that the superintendence of the fortifications about to be commenced on Garden Key, one of the Tortugas Islands, was to be placed in your hands - calling you on to this city to receive preliminary instructions; & stating the importance of making all possible progress the present year. You have had an opportunity during the [..] days you have been in this city of studying the project so far as the plans have been matured - of receiving verbal explanations & of assisting in the preparation of drawings for certain temporary structures which are to be put up in the first instance - I purpose in this letter to give you explicit directions so far as I can now foresee your need of them.

Garden Key is the site of the Tortugas Light House, and of the dwelling house and outbuildings of the Light House-keeper; it is therefore at present in possession of the Treasury Department, and there must be authority obtained from that Department for occupying the island

for defensive purposes, & prosecuting labors thereon. It will be a particular duty on your part to see that nothing shall interfere with the reasonable possessions & accommodations of the Keeper and his family, or with the performance of the important duty intrusted to him: and in order to do this it will be proper for you in the first place to fence off a portion of ground for the exclusive use of his family, until it may become necessary in the course of the construction to remove or alter these limits.

The fort projected for the site of Garden Key is a Hexangular casemated work, elongated, but symmetrical /sic/; there being four longer sides of 478.88 feet each, and two shorter sides (which are opposite each other) of 324.88 feet each. The angles of the polygon are each 120. The Magistral is taken in the outside face of the scarp wall, &  $5\frac{1}{2}$  feet above the top of the foundation, & in the reference of ( $5\frac{1}{2}$ ) the Zero being assumed in the same low-water level as was taken in the plan of survey submitted to the Topographical Bureau by Major Hartman Bache -

The course (by the magnetic needle) of the S. E. Face of the polygon, will be North 50 degrees East - the variation of the needle being reported to be  $5^{\circ}22'10''.29$  East, Dec. 1845. To determine the position of the face, measure, from the S. E. corner of the dwelling house of the Light-House Keeper, a distance of 42 feet, in a direction S  $40^{\circ}$  E by the needle, and you have a point in that Magistral. From this point, measuring N  $50^{\circ}$  E, 186.88 ft. you will attain the eastern



extremity of the face; & measuring from the same point S 50° W, 280 feet, you will reach the other extremity of the face. This face being determined in position, all the others will result from the data given above.

At each angle of the polygon, there will be a tower bastion, of which the drawings give the details.

Under all the casemates of all curtains, cisterns are provided. In the middle of each long curtain, two casemates in the lower story are arranged as magazines: all the other casemates of the longer curtains, and all the Tower bastions, are, on the lower story, appropriated as storerooms of one kind or another, or as bakery &c; excepting however, three casemates near the middle of the S. E. curtain which will supply guard rooms, gateway &c.

All casemates in the lower story of the shorter curtains are to be fitted as gun rooms.

With the exception of a small magazine in the salient of each Tower, all the casemate rooms on the second floor, of all the fronts, will be gun rooms.

The whole terreplein of the work will be fitted to receive barbet guns -

The bottom of the foundation of the scarp of the whole work will be in the reference of (-5) i. e. five feet below low water; and the top will be in the reference of (-3) of all the curtains, this foundation will be 14 feet thick; & of the tower bastions, 12 feet thick.

Upon this foundation, there will be raised the first portion of the superstructure of the scarp which will be everywhere--except where the cisterns encroach upon it on the short faces--10 feet thick & three feet high, the top being in the zero level & both faces being vertical. Upon this Mass, the next portion of the scarp will be raised; being vertical on the back & having a batter of 2 ft in a rise of  $5\frac{1}{2}$  feet, on the front side: the bottom of this position will be 10 feet thick, & the top 8 feet thick--the top being in the ref. of ( $5\frac{1}{2}$ ) & the outer edge of the top being the magistral.- The remainder of the scarp will rise with a batter on the front side of  $1/96$  ( $1/8$  of an inch to 1 foot); it will receive recesses, embrasures, reductions of thickness &c; as shown on the profiles, and will be carried up to the crest of the barbet parapet in the reference of (45').

The foundations of the cisterns under the casemates of the two shorter fronts, & also of the piers, will be a continuation inward of the foundation of the scarp--indeed, it should all be made, at the same time & in one mass.

The similar foundations on the curtains of the long fronts, will lie three feet higher (the top thereof being in the zero level) -

The foundations of the piers connected with the Tower bastions will be begun in the ref. of (5') - their top being in the reference of (7') -

The floor of the lower tier of casemates throughout the work will be in the reference of (7½) - all the cisterns being covered with flat arches.

All the casemates of the lower tier will be covered with flat arches, so as to bring the floor of the second tier rooms to the ref. of (19').

The key of the arches over the second floor will be in the ref. of (33'): these arches will be roofed to shed water and covered with sand so as to be entirely bomb-proof bringing the terreplein at the tablet up to the ref. of (39), and, next to the parapet, to (39½).

The casemates of the lower story will have 10 feet greater length than those of the upper story, thereby affording a gallery all around the fort on the level of second floor.

All the rain water falling upon the terreplein & gallery will be conducted into the cisterns - and also all that may fall on the separate buildings which are to stand on the parade.

From the level of the floors of lower rooms, there will be a gentle descent to the level of the parade which will be in the ref. of (5').

In advance of the scarp, there will be a wet ditch - of which the bottom will be in the ref. (3). The arrondissement of the counterscarp at each salient will be drawn with a radius of

30 feet, and the intervening portions will be tangents to these curves. Where the counterscarp falls within the higher land of the island it will be 3 ft. thick at top, 4 ft. thick at bottom, resting on a foundation 6 ft. by 2 ft. - elsewhere it will be 6 ft. thick at top, 8 ft. at the bottom, upon a foundation 10 feet by 2 feet - the top of the wall being in the ref. (6) - the bottom in ref. (-3) and the bottom of the foundation in ref. (-5). At least one sluice must be made through this counterscarp wall so arranged as to retain, at pleasure, the water at the level of high tide. The position will be indicated hereafter -

The preceding description is designed to be very general; giving the principal features only, and referring foremost of the details to drawings communicated, herewith, & to such future descriptions & instructions as it may be thought project to give.

Within the walls of the fort there are to be many important buildings all of which are shown in position on the drawings.

1. There will be five independent Magazines - namely two, each 49' by 28' in the clear; & three, each 30' by 28' - all being two stories in height.

2. A Navy storehouse - also bomb-proof - 160' x 58' on the exterior & two stories high -

3. Commanding officers quarters 60' x 43' - two stories high - with detached kitchen -

4. Chapel 66' x 53' with six rooms for officers in the lower story.
5. A block of buildings for officers quarters, 3 stories high, 286'8" x 44 on the exterior - with detached kitchens -
6. A second similar block.
7. A Hospital; 52'4" x 52'4" - two stories high.
8. A Barrack for 10 companies - 338'5" x 36'6" on the exterior - 3 stories high - with detached kitchens - one for each company.

Of all these buildings, particular drawings have been or will be furnished you, adjusting all the details; a more particular description is deferred therefore for the present.

I come now to instructions as to measures preliminary to the great operations on the fortifications. - of these, one of the first is to provide such temporary buildings for the reception of stores, & to serve as workshops, &c, as are indispensable. At the same time, as this is an expense which is entirely lost as to any other result, it must be kept down to an absolute minimum - and on this point I must enjoin, once for all, the most rigid economy - by which I mean 1st that no expense of this nature shall be incurred that can be avoided without a loss to the nation greater than the proposed expense. 2. that all expenditures of this nature shall

be on the most economical scale - 3. that, as far as practicable, the permanent portions of the work shall be brought forward as to dispense with temporary expedients.

It will be necessary to put up, in the first instance, the following temporary buildings - for which the drawings are already provided - namely -

- A. One frame store house for provisions of all kinds - and for other matters, 80 feet long - 25 feet wide - 2 stories high.
- B. One frame building - part for Lime & part for cement. 80 ft. x 25 ft. & 1 story.
- C. One frame shed - for carpenters shop - 40 ft. x 25 ft. & 1 story high.
- D. One frame Blacksmith shop for one forge - 25 ft x 25 ft & one story high - admitting extension.
- E. One frame Bakery - 25' x 30' & 1 story high.
- F. One frame stable - 40' x 25' & 2 stories high - stalls below - forage above - admitting extension.

These are the only temporary buildings that need be erected by the Government. But there must be room for the accommodation of the workmen of all sorts, & also for the officers - Overseers, master workmen, &c, and, to provide this, you must erect in the first instance a portion of the permanent officers quarters;

and also a portion of the permanent barracks. Of the former, there will be erected a length of about 68 ft. which, being the full allowance of quarters for two companies, will afford ample accommodation for all the persons engaged in supervision & overseeing. -

Of the barracks, there will be erected a length of about 67 feet; this being the provision for two full companies, will suffice at least for the first year to afford lodging & messing room for laborers. The kitchen belonging to these sets of quarters & barracks will of course be erected at the same time.

In order to the more speedy erection of all these buildings, temporary & permanent, you will provide for their construction by contract; and, at the earliest day possible; and to this end your advertisements calling for proposals should be immediately circulated in the sections where they are likely to receive attention. These contracts must provide that each of the wooden buildings must be entirely framed and ready for raising, including all door & window frames - that all doors be ready for hanging & and all window sashes glazed & ready for insertion - All shingling & weatherboarding ready for nailing on - all floors prepared for laying down, before they are shipped from this coast: that all the bricks & lime necessary in their construction be shipped with the frames; that, with the frames and other necessary materials for these buildings, there be shipped all the mechanics & laborers required for putting

them up, & finishing them off in the shortest time practicable. Your contract must include the erection of the buildings; and therefore the contractor must take out with him provisions and water for his workmen; & the means of lodging them during the progress of erection. The contract must provide, moreover, that the first portion of the covering of the frames shall be of the roof; which must be covered with the best cedar shingles, jointed & laid in the best manner, to be immediately provided with tight & capacious eave-gutters and vertical conduits made of jointed & planed boards, so placed as to conduct all the rain water that may fall upon the roofs of all these temporary buildings, into cisterns.

The same contract, or another, must provide for these cisterns; which must be completed where the frames are made, and be taken out in the same vessels.

These will be  $\sqrt{\dots}$  in number - each  $\sqrt{\dots}$  feet in diameter at the bottom, &  $\sqrt{\dots}$  feet high: they will be made of the best seasoned stuff & put together in the best manner. The form being slightly conical to allow of tightening by driving the hoops. It is thought it will be best to draw the water from these cisterns by a pump inserted at the top. A cock at, or near, the bottom, could not be kept tight if the head happened to be considerable; and a great deal of water would be wasted at it, at any rate.



Besides the contracts for the temporary buildings of which I have been speaking; it will be necessary as before said, to prepare in the same way, for the erection of a position of the permanent barracks, & also of a portion of the permanent quarters for officers: by building these portions now, we save the whole expense that would be involved in the erection of temporary edifices for the accommodation of the persons to be employed at the works as officers, overseers, Master workmen mechanics & laborers. The barracks & quarters must be of bricks covered with slate roofs; and, as in the case of the temporary buildings, the contractor must take out with him everything necessary for the most expeditious construction of both. He must carry all the bricks, lime, slate, and other material (except sand) for the foundations, walls, slating, plastering, chimneys, windows & door sills & lintels, fire places, mantels, hearths - laths, &c. All the flooring, planed tongued & grooved & ready to be set up: doors ready to be hung - sashes glazed & ready to be inserted - surbass door, & window frame mouldings - stair steps & risers & railings - and all other things ready for immediate application.

It will depend on proposals received whether the contract for quarters & barracks should be the same as that for the temporary buildings - whether there shall be more than one contract for all

the temporary buildings, & one contract for each of the permanent buildings - separate proposals must be offered for each of the buildings - temporary or permanent.

In all cases the contract must provide for the earliest possible completion of each: it must beside specify the time when each is to be entirely finished - under penalty of forfeiture sic in case of failure.

As with the other buildings, cisterns, with the proper gutters & conduits, must be prepared to receive the rain water as soon as the roof is finished: two cisterns to each building.

There must be no bricks used in the construction of these buildings that are not hard burned and durable - none that contain particles of lime. Those on the outside facings & exposed and, if, of northern bricks, must be thoroughly burned & handsome "pressed bricks"; & if of Gulf of Mexico bricks must be of the best facers; care will be taken that no brick is laid in these facings that is at all broken on the edges & that the style & manner of the work is that which belongs to the handsomest fronts - in other words in the best style. One of the ends of the portion of officers quarters now to be built, & both ends of the portion of barracks, will become, when the buildings are finished, mere partition walls - they will not, therefore, be faced with pressed bricks or facers but will be

built as partition walls - the exterior joints being, however, carefully pointed. The mortar used in all the walls will be made in the best manner & will contain a portion of hydraulic cement. The foundations for these buildings will be of concrete containing a portion of hydraulic cement (one barrel of cement to one barrel of lime). It will be laid on the sand at the reference of (4') - the sand having been very carefully rrammed - It will be put down in layers 8 inches deep, each layer being rrammed in a most thorough manner. Having raised the foundations 18 inches high, with a batter on the front side of 6 inches, an offset of 9 inches will be made on the outside of all the outside walls; the remaining 8 inches in height of these outside foundations having carried up vertically & faced on the exterior with common bricks. Thickness of these foundations at bottom 4', ref. (4) - at the ref. of (5'4") thickness 3'6", and 2'9"; and at the ref (6') or top of foundation 2'9". All the foundations of the cross walls will rise from ref. (4') to ref. (6') and be 3 feet thick with vertical sides - they, will be made of concrete wholly. Numerous openings - not less, each, than 1'x2' (or the equivalent) must be left in the foundations of the outside walls & also in the cross walls. The cellar, or space under the lower floor will be levelled off in the ref. (4').

A granite water table 9" high & 10" thick - having a slight level along the upper edge will be introduced just above the top of the foundation, the top thereof being in reference of (7') the same as the reference of the lower floor.

Under every outside door & window there will be a cut stone sill; & over each, a cut stone lintel except the lower front doors & windows of Barrack which will be covered by a semi-circular brick arch. In every case of openings even when covered with a stone lintel there will be an arch (though concealed) to receive the weight of the incumbent wall; & this rule includes also internal openings through walls. These arches may be flat & need not exceed one brick in thickness or length of voussoir.

As the quarters and barracks differ in many respects, the following remarks will refer to them separately.

Barracks. The lower floor will consist of joists 3"x10-3/4" covered by flooring boards 1 1/2" thick; these joists will run transversely of the building, they will be 12 inches from centre to centre and will rest on an offset 12 inches wide at the front & rear walls and on a parallel wall one brick thick running midway between the front and rear - they may be, indeed must be, of two lengths overlapping upon the middle wall, & should therefore be about 18 feet long. It may be here stated that all the floors may be of northern or southern pine as shall prove most economical; but, in either case,

of good quality - free from any large, open, or decayed knots, from shakes or splits & from sap beyond a little occasionally on one edge. Not less than four rows of strutting should be carefully nailed in between the joists of the lower floor to prevent warping & twisting in the joists. The ends of the joists will never be laid in contact with the wall but should be separated by at least a quarter of an inch. The joists in the lower entries or passage ways will be laid just as in the lower rooms. The flooring boards will, for all the floors, be of the best hard southern pine, smoothly planed on the upper side & tongued and grooved on the edges - they must be what is called clear stuff, & entirely free from sap. The joists must be got out with a rise in the middle of the bearing to allow for some spring: this, with all floors, Pains must be taken to obtain, for all the floors, flooring boards that are seasoned; but as we shall not be certain of this without paying a very high price - the boards must, in the first instance, be tacked down; reserving for a subsequent time, and in the hottest weather, the nailing them down without rejointing: nails to be driven in the edge-groove.

The joists of the 2d & 3d floors will be 13 3/4" x 3" & 1 foot from centre to centre; they are to run in the other direction, that is, lengthwise of the building. These will be not less than

three rows of strutting inserted between the joists in each room of each upper story; & in order to secure a better bearing for the joists, the three upper courses of bricks of the partition walls on which they are to rest will be corbeled out, each  $1\frac{1}{2}$ " , making in all  $4\frac{1}{2}$  inches on each side; then upon the upper course there will be laid a stone about 4 inches thick and  $2\frac{1}{2}$  feet wide. On the cross walls dividing the buildings the joists will have a bearing on this stone of about 8 inches on each side - but on the wall dividing from the entry from the room the stone should be so placed as to give a bearing of 6 inches on the entry side & about 10 inches on the side of the room. The best kind of stone for this purpose is a thin, hard & strong flat stone, used at the north as flagging - the upper side being smooth, no cutting will be required. The partitions dividing the entry from the room, will be carried up for its whole length to receive the joists of the 2d floor. In the 2d & 3d stories, this partition will extend from the rear wall only to within 12'6" of the front wall; & having carried it up to receive the joists of the 3d floor, a girder 12" x 12" will be thrown from this partition wall over to the front wall, resting not less than one foot upon each - the top of the girder being in the level of the bottom of the joist. We thus obtain support for all the joists of the 3d floor. No part of this partition wall will be carried higher than to receive the joists of the 2d floor: above,

that is to say on the 3d floor, this portion will be formed of study 4" x 4" lathed & plastered on both sides. In the 2d & 3d stories, a sergeants room will be partitioned off from the passage; being 6 feet wide, it will project two feet into the soldiers sleeping room, for its whole length of 12 feet.

In the wall dividing one barrack entry from the adjoining one, there will be carried up from each Sergeants room a flue 9" x 9": at the bottom of each flue and at a proper height from the floor of each of these rooms, there will be provided a circular opening for the reception of a stove pipe: the four flues will be carried out of the roof in one chimney top.

In the wall dividing one barrack room from another, there will be built a fire place for each room, in each story; & from each fire place, a flue as large as the chimney & will allow the six flues being carried out of the roof in one chimney top - all these flues & those for stove pipes must be very carefully kept at their full dimensions in every part, as straight as possible & be smoothly plastered on the inside. The partition walls which divide one set of rooms & passages, from another, will be carried up to the top of the 3d story of the thickness of  $1\frac{1}{2}$  bricks from the height, they will be carried up, of the thickness of 1 brick, to the slating of the roof - the slate being laid thereon in a good bed of cement mortar.

In the cieling [sic] of the 3d story, there must be one opening for ventilation not less than 2' x 3' or the equivalent, over the upper entry & two, of about the same area over the upper sleeping room: over the door opening into each of the sergeants rooms, & in the partition, but quite near the ceiling, there should also be an opening of not less than 1' x 3', for the same purpose. And, in order to ventilate the attic, there should be a considerable opening through the roof over each set of barrack rooms.

As it may sometimes be necessary to go into the attic, there should be a platform 3 feet wide and 3 inches thick laid along the middle - that is to say just under the ridge; these 3 inch planks will reach from one principal tie-beam to another, & must not bear upon the ceiling joists. These ceiling joists will be 8" x 2" and will be mortised at the ends into the principal tie-beam so that their under side shall be in same plane as the underside of the beams.

The tread of the stairs will be made of 2 inch, & the risers of 1½ inch hard southern pine - the outer ends mortised into strong pieces, capped to receive ballisters - the frame supporting the steps being made very strong. There will be a hand railing 3" x 3" & plain rectangular balusters 2" x 1" - all of the same wood; the latter will be mortised of their full size into the rail and mitred down & well nailed on to cap of string & the former will be strongly fastened to a stout post at the top & bottom of each rise.



The outside doors will be  $2\frac{1}{2}$  inches thick, composed of 4 panels, raised on front with square back; styles & rails moulded. The inside doors will be 2 inches thick & also of 4 panels, with head & butt front and square back. All the doors will be made of the best seasoned stuff & in the best manner. Each door must be hung on three large & best butt hinges fastened in the best manner. The outside door-ways will be 3'3" x 8'; the inside door-ways to the soldiers rooms, will be 3'6" x 7'6"; & the doorway to the Sergeants room 3' x 7', this being, in each case, the clear space; the door will, of course, be a little larger. Over the outside front door there will be a semi-circular light, as seen in elevation: and over the doors which lead upon the back piazzas, from each story, there will be a rectangular light, so arranged that the lintel thereof shall be at the same height as the lintels of the windows of the story. The sizes and arrangement of the windows on the different stories & fronts will be seen on the drawings. The frames and sashes must be made of the best stuff and in the best manner - all the sashes except those in the door-ways being hung with weights & pulleys. All the door & windows frames will be faced towards the rooms & entries with an architrave of simple mouldings - the architrave - jambs of the doors will rest upon a simple unmoulded plinth of the same width as the architrave, and the same height as the surbase: a similar block may be introduced at each of the upper corners of all

the rectangular openings: in the semicircular openings on the front of the lower story the block will be introduced at the impost - the archivolt resting thereon being moulded to correspond with the architrave. Whenever the facings of the jambs of door or window openings exceed 10 inches in breadth they will be made of paneling. The wash board of each room & entry will be 10 inches high, with no moulding than a bead at top. The introduction of the brick corbels & projecting stones for the purpose of giving a better bearing to the joists may make it necessary to provide a simple cornice for each of the rooms & entries in the two lower stories, and it may be made of wood or plaster as shall be cheapest - which ever material is used, the cornice must be as simple as possible. The face of the jambs of the fire places, and the lintle, will be of stone: the former will show a face of 18 inches in width, 3'6" in height, & will be 9 inches thick; the latter will be 5'6" long, 1 foot high & 9 inches thick; the rest of the chimney breast will be of bricks on which the plaster will be flush with the face of the stone. The interior facings of the fireplaces will be fire bricks laid in clay mortar - as will be the hearth as far out as the face of the jambs - the rest of the hearth will be of one single stone, 7' x 2' from 4" to 6" thick - hard, and smooth, & laid solidly in a bed of good mortar. To each fire place there will be a wooden mantle piece, to consist of a flat pilaster on each side, supporting, upon a simple moulding, a projecting shelf.

The barrack rooms will be furred on the outside walls -  
(3" x 4")  
using for the purpose studs (4" x 4") - but on all the inside &  
partition walls the plaster will be laid upon the bricks.- The  
plastering will consist of two good coats, laid on in the best  
manner, as to truth, and evenness, & smoothness of surfaces; & also  
composed in the best manner as to the constituents, & mode of pre-  
paring the mortar - but the surface will not be what is called "hard  
finish". At the salient angles of the chimney breasts and at all  
other salient angles, a wooden head must be inserted along the  
angle for the protection of the plaster at those places.

In building up the face of the barrack it is designed to  
introduce some rusticated work in the lower story, surmounted by  
a belt consisting of several members - also to introduce a belt  
between the 2d & 3d stories - and also to introduce an entablature  
under the eaves. The drawings show these matters in ample detail  
-still a few remarks may be useful. Dimensions are written which in  
many cases must depend on the size of the bricks. Indeed the thick-  
ness of all the walls must depend on this same size of bricks - and  
as the sizes of the rooms width of entries &c are to be regarded  
as of fixed & invariable dimensions, the exterior dimensions of the  
buildings must also depend to a certain extent, on the size of the  
bricks; in these respects therefore, and in the ornamental parts  
above mentioned the written dimensions will often be liable to altera-  
tion. At the bottom, there will be a straight granite water table

(not recessed between the rustic columns); upon this, will stand the first member of the rusticated column. which will be 3 courses in height, & project beyond the true face of the wall, 4 inches: the next portion will be recessed as respects the first & third - projecting but  $2\frac{1}{2}$  inches from the true face, & will be 2 courses high, and thus the column will be raised of alternate projecting members of 3 courses & recessed members of 2 courses, until the top of the ninth recessed member is attained. Upon these columns and along the whole front there will then be laid, the first member of the belt projecting 4 inches from the face of the wall & consisting of 4 courses; on this, there will be laid the second member, projecting 5 inches from the face & consisting of 1 course; then the third member, projecting 6 inches, & consisting of 2 courses, & lastly the fourth member, projecting 8 inches & consisting of 1 course. All the bricked space between the columns, and under the belt, will be laid in the true face of the wall - the arch, of which the face will be kept in the same plane, will be a one-brick arch - that is to say the voussoirs will be bricks laid on end - a stone key will be inserted in the crown of each - projecting half an inch beyond the facing, sinking  $\frac{1}{2}$  inch below the soffit & rising to the under side of the belt.

As near as possible at mid-distance between the bottom of the lintels of the 2d windows & the tops of the sills of the 3d

windows - the second belt will be inserted. This will consist of 5 courses, & will project 1 inch.

The top portion of the cornice, including the eave gutter, will be of wood for a height of  $12\frac{1}{2}$  inches; below, the entablature will consist of 14 courses lying flatwise, & one on edge - as follows, beginning at the bottom. First, 6 courses forming the lower member, projecting one inch; next, six courses, forming the second members, projecting two inches from the face of the wall; next, one course, projecting four inches; then, one course, on edge - every third brick projecting four & a half inches from the face of the wall - the two intermediate bricks, projecting eight inches, & forming a dentil; & lastly the upper brick member, being one course laid flatwise, & projecting 10 inches beyond the true face of the wall.

The rustication of the lower story will be carried along the front and on both ends of the barracks, but not along the rear front. The same with the belts and entablature. Three pediments will be introduced in the main front - viz, a central one comprising eight openings in length, & two ends ones comprising each four. The front walls of all these pedimented parts will project two feet beyond the walls of the rest of the building making the building - as the rear wall will be straight - 2 feet deeper at these parts than elsewhere.

At every exterior door of the lower story there will be a granite door sill extending through the whole door way - the outer & exposed edge corresponding in height & projection with the water table.

All the window sills will be of granite five inches thick, running at either end 2 inches under the brick jambs - projecting one inch from the face of the wall & properly levelled & of proper thickness to pass well under the sill of the frame, which must be notched down upon it on the top. All the straight top windows & doors will be surmounted by a granite lintel entirely plain - extending at each end 6 inches beyond the opening: the height will be 9 inches or 3 courses of bricks & the thickness  $4\frac{1}{2}$  inches - the outside surface of the lintel will be in the plane of the face of the wall.

All the granite used in the facings of the walls & in the fire places, must be of the best quality - fine grained, free from cracks, or seams, or sap; of uniform color; the exposed surfaces fine-cut - the other sides & ends rough-cut straight, & true to dimensions - no stone to be laid that is broken in the least on any exposed edge, corner or face.

I omitted to state in a more proper place that there must be a large ventilator over the door which opens from the passage,

in the 2d story, into the soldiers rooms: this ventilator will be of the same width as the door way, & will extend from the top of the door nearly to the cornice - being surrounded by an architrave like that around the door way: a venetian blind - of which the slats will be 6" x  $\frac{1}{2}$ " capable of being open or shut by a common motion will occupy the space.

On the rear-face of the barrack, there will be a piazza for each story-opening out to which, there will, on the 1st story be a door at the end of the passage, and one from the room. On the 2d story there will be one door-way from the room to the piazza (none from the passage); & one also from the rooms of the 3d floor. The ground floor of the piazza being paved with the best hard paving bricks laid in Mortar, will have a declivity of 6 inches, descending from the bottom of the water table - ref. (6'3") to the ref. (6'9") on the top of the curb-stone this stone will be (9" x 12") set on edge - the bottom being in the ref. 4'9" - that is to say 3" below the level of the parade, & of the yard behind the barracks. A similar pavement, with a similar curb-stone, must be made, for a breadth of 15 feet, on the front of the barracks. The breadth of the back piazza-pavement will be 8 feet - the curb-stone being included in the breadth in both cases. The back piazzas will be continuous from one end of the barrack to the other; & those for the two upper stories will be sustained by forty one pillars; that is to

say, one pillar opposite each pier of the building. The lower pillars of the first story will each rest on a stone base 12" x 12" x 12" of which one face will correspond with the face of the curb-stone, & the top be 3 inches higher than the top of the curb-stone; this stone will stand on a concrete foundation 1 foot deep & 1½ feet square. Across the tops of the pillars will be extended a timber 12" x 9", the top being in the ref (18'10") destined to receive the outer ends of the piazza joists - the bottoms of which will, at the face of the wall, be at the same height as the bottoms of the room joists of the 2d floor, viz, 12'1", above the lower floor - or in the ref of (19'1"). To give a better bearing for the joists of the piazza - the three upper courses of bricks will be corbelled out, each 1½ inch, making in all 4½ inch; and every second joist will run 4½ inches into the wall - a hole a little larger than the end being left for it. These joists will be 8" x 3". Upon these joists, there will be laid, in the other direction, five battens of 4" x 3" - viz - one, flush with the outer ends of the joists; one, against the face of the wall & three equidistant, intermediate ones. Upon these & fastened to them by nails driven into the grooves, will be laid the piazza flooring of hard pine planks 1½ inch thick, tongued & grooved, joints filled with white lead having a descent outward of about 3 inches. The length of these planks will be exactly 8 feet; & they will overhang by 1" the outer-batten & also the outer ends of the joists. The floor of the piazza



will be in the reference (20' 1 $\frac{1}{2}$ ') next the wall - that is to say 2 3/4" below the floor of the room.--

The piazza of the 3d floor will be sustained in the same way as that of the 2d floor, just described, and it will have the same relation to the floor of the rooms opening out to it. But in the 2d & 3d stories there will be a hand rail & a foot rail running from one pillar to another - which may be respectively about 3" x 6", and sounded on the upper surface, extending from one to the other of these, and tenanted to their full size into them, should be rectangular balusters (say 2" x 1") about 5 inches apart - all these rails & balusters to be of hard pine.

Under each door, opening out to these piazzas, there must be a granite sill, extending from the floor of the room out to the face of the wall - 6 inches thick - the face flush with the face of the wall; the top, within the door-way, having a slight descent outward - each end to run 2 inches under the brick jambs.

The timber extending across the top of the upper piazza pillars will be at such a height as to serve as a plate to the small rafters of the roof; all of which will be extended down upon it, in continuation of the slope of the barrack roof, & projected far enough to receive, at the eaves, a proper gutter for the rain water. Into the same timbers, there will be tenanted, every two feet, a ceiling joist (2" x 6") the other end of which will rest on a brick

corbelling like the corbelling made below to sustain the joists of the piazzas. On the underside of these ceiling joists, there will be nailed the ceiling boards of 1 inch in thickness.-

All the wood used in these piazzas must be of the best kind, & well wrought on all sides - except the ceiling boards which will be tongued & grooved & planed on the under side only.

By strips of iron let into the wall, there must be means of fastening, here & there, these joists, & ceiling-joists to the wall.

As before said, the ref. of the lower floor of the barracks will be (7): the lower room being 12 feet high, the reference of the lower ceiling will be (19).

The reference of the 2nd floor will be (20'4"); the 2nd story room being 14 feet high, the ref of the ceilings of those rooms will be (34'4")-

The reference of the 3d floor will be (35'8") & the 3d story rooms being 14 feet also, the reference of the ceiling of these rooms will be (49'8").

At the height of 49'8" the rear wall will terminate - receiving, at that level, the wall plates (12" x 3"). On the front wall, the plate being laid (of course at the same level) there will be laid, in front of it the upper brick member of the cornice, of which the top will be level with the top of the plate.

The manner of forming the roof will be seen by the drawings-

All the timber in the frame will be of the best quality: if of southern hard pine, the dimensions written on the drawing will be used - if of white pine, the dimensions must be increased  $\left[ \frac{1}{8} \right]$  in the following statement, the upper dimensions are for southern pine, & the lower, for white pine. The tie beam will lie one foot upon the front wall & across the whole breadth of the rear - wall- and it will be (10"x5") (10"x8"). The Queenposts - or suspending piece, which will be in pairs, embracing the tie beam &c, will be each (5"x3 $\frac{1}{2}$ ") (5"x5") (6 3/4"x5") principal Rafters will be (6"x8"). The straining beam (7"x8"). The braces (4"x2 $\frac{1}{2}$ ") (8 $\frac{1}{2}$ "x5") (4"x2") - the purlins (9"x6"). The small rafters (5"x2").-

Iron straps 1 $\frac{1}{2}$ " x  $\frac{1}{2}$ " will be used in connecting the queen posts or suspending pieces with the tie beams & also in holding the feet of the principal rafters.

The roof will be covered with the best "Sadies slates" - fastened in the best manner to the best-lathing. The slating, of course, extending over the Piazza.- There will be one roof-truss or principal frame, over each piece of the front, or rear; which will place the - trusses about 8'6" from centre to centre.

A detail drawing exhibits the arrangement of the roof ventilator, of which there will be two, in the rear slope of the roof, over each set of rooms - about 17 feet from centre to centre.

In forming the wooden part of the cornice of the front - provision must be made for a wide & deep gutter, so that the rain water shall not overflow - and, as before said, a proper gutter must be provided for the eaves on the back side of the building also,- Proper care must also be taken that the water be conducted safely down to the cisterns -

In speaking of the foundations it should have been stated that there must be a mass of concrete sufficient in dimensions for the support of the chimneys & lower hearths - This mass may be set about 6 inches from the outline of the chimney and hearth.

Hard paving bricks are mentioned above as the material to be used for paving the lower piazza, and also in front of the barrack: a better material will be flagging stone; and this may be used, provided it be a hard & durable kind with a smooth and plain surface, & truly accurate edges, and at a price not materially greater than the expense of very good paving bricks.-

Behind every set of Barrack rooms there will be erected, at the clear distance of 9 feet, a kitchen consisting of a single room 15 feet by 18 feet on the inside of the walls - which will be of the thickness of one brick.

The foundation, cellar, &c, will be begun at the same level as those of barracks: viz, the bottoms of foundation & floor of cellar will be in the ref of (4') - the foundations will be

2 bricks thick & of the height of 12 inches or four courses. An offset of  $\frac{1}{2}$  a brick will then be made on the outside all around. From this level of (5') the wall will be carried up 1 foot higher of the thickness of  $1\frac{1}{2}$  bricks. An off set of half a brick will then be made all around on the inside; on which will be laid the joints of the floor. and from this ref of (6) the walls will be carried up to the top of the thickness of one brick. In one corner of the room there must be a mass of foundation sufficient to sustain the chimney, and also a hearth 6 feet wide by 9 feet long; a portion of this hearth 6' x 3' being designed as the position of a set of boilers - should they be needed. The fireplace will be large; & must be provided with a large & strong crane. In order to prepare for a set of boilers, a flue 9" x 9" will enter the chimney breast at the height of about 2 feet from the hearth, & lead into the fire place flue. A second flue of the same size (9"x9") leading off in the same way, will enter the chimney breast over the first one, and at about the height of 7 feet from the floor - this is designed to carry off steam and vapors, which will be conducted to this flue by a hood, of wood or sheet iron, suspended over the boilers. The side walls or eaves of the kitchen will be in the reference of (16) the ceiling of the room in the ref: of (17') making the kitchen 10 feet high in the clear. The roof of which

the ridge will be in ref (20'6") will be covered with the same kind of slating as that on the barracks. The rafters will all be small rafters 6"x2" and two feet from centre to centre - each pair being connected by a tie beam, also 6" x2". A water gutter will be placed under the eaves to receive rain water and conduct it to the cisterns. The brick work of these kitchens will be laid in the best manner; & will be faced, not with pressed bricks but with selected common bricks. The plastering on the side walls, will not be furred off, but laid upon the inside of the brickwork - over head, the plastering will be upon lathes nailed to the rafters & tie beams. The plastering will be in two coats laid on in the best manner, but not with a hard finish. The facing of the fire place will consist of granite jambs 12 inches wide on the face 12 inches thick, and 4'6" high surmounted by a lintel 12"x12"x7" - the remainder of the jambs, the back, & the hearth out to the face of the jambs, will be of fire bricks laid in clay mortar. The hearth in front of the fire place, will be of large smooth even & hard flagging stones. The joists of the floor will be of good southern pine 10½"x3" - they will be laid 1 foot from centre to centre. The flooring boards will be of good clear southern pine 1½" thick planed, tongued & grooved & nailed in the grooves.

There will be one door-way into the kitchen, & it will be opposite, & facing, the back door of the lower barrack room: it will be 3'6" feet wide & 7'6" high. There will be one window on the same side as the door & two windows on the side opposite the fire place - all of which will be 5'6" high by 3' wide - the bottoms of the windows being 2 feet above the floor. The dimensions just given of door way & windows, express the size of the openings between the jambs of the brick work in one direction, & sill & lintel in the other. There will be two sashes to each window - with glass as large as the window openings will allow - each sash being suspended by cord & weights. The sills & lintels of windows & door will be of granites, and in the same style & finish as those of barracks.

Opposite the door, there will be a set of shelves, 7 feet long arranged for the reception of plates, dishes, culinary implements &c. These will be made of clear white pine & be finished in the neatest manner, & with the proper number of standards or props, for strength.

On the same side as the door, there will be partitioned off a store room 8'6": this room will embrace one window. The partition will be of  $\overline{\quad} \dots \overline{\quad}$  inch boards tongued & grooved, reaching from floor to ceiling & nailed to battens on the inside. A door

6½" x 2'9" - formed also of boards nailed to battens - will open into the room nearly opposite the window. Besides a large thumb latch, this door should be provided with a strong and good stock lock.

On the outside of the window looking into this store room, there should be hung a venetian blind - with broad & strong slats - (say 6" x 1") - such as will admit light & air freely without being removed; and over the door of the store room there should also be inserted some of these slats in an opening say 2'9" x 2'.

In the middle of the ceiling of the room, there should be an opening (4 feet long by the width between tow tie beams) into the attic above; and in the roof & just above the opening, there

*Designs*

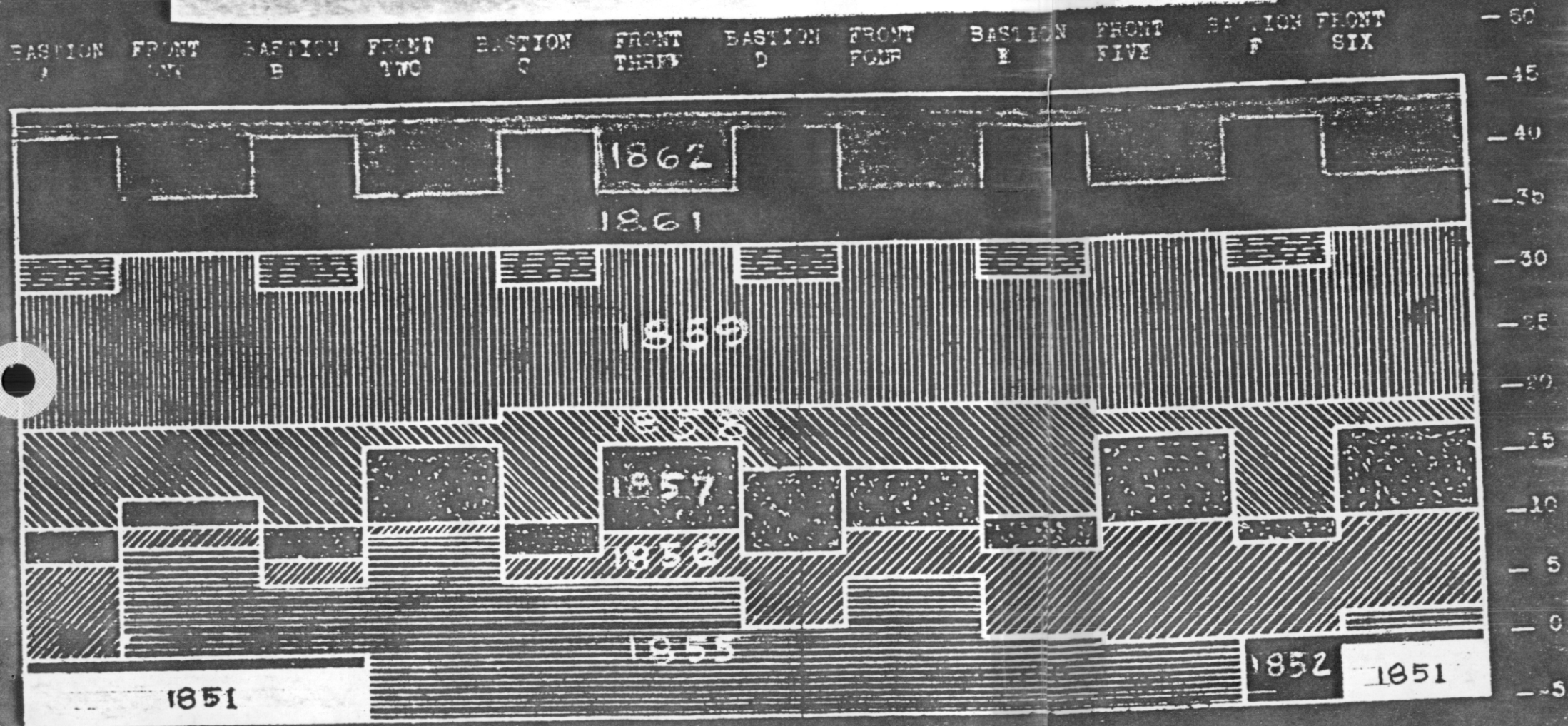
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Graph Showing Approximate Annual Heights in Feet  
of Scarp Wall. Compiled from Annual Reports of  
Operations.

GRAPH SHOWING APPROXIMATE ANNUAL HEIGHTS IN FEET OF SCARP (CURTAIN) WALL

Compiled from Annual Reports of Operations  
and  
Statements Showing Condition of Work



### CHRONOLOGY

- 1513 May 18 177 Ponce de Leon sighted Tortugas islands.  
June 21. Leon landed at and named Tortugas islands.
- 1565 Master John Hawkins, English slave trader and freebooter, replenished his provisions at Tortugas, taking on fish, birds and eggs.
- 1566 Pedro Menendez de Aviles, founder of St. Augustine and Adelantado of Florida, explored Tortugas and other keys.
- 1600-1822 Tortugas presumably used by pirates.
- 1803 Louisiana Purchase.
- 1815 Cayo Hueso (Key West) awarded by Florida governor to Juan Pablo Salas for meritorious services to Crown.
- 1816 Congress created Military Board of Engineers for Seacoast Fortification.
- 1817 Gen. Simon Bernard, former aide to Napoleon, began survey of American coast which ended in 1822 and became basis for plan of coastal fortifications.
- 1821 Cession of Florida to U. S., by terms of the treaty of 1819. Key West purchased from Salas by John W. Simonton.
- 1822 Lt. M. C. Perry took possession of Key West for the U. S. Commodore David Porter established naval station at Key West for his operations against West Indian pirates.
- 1824 U. S. Marines stationed at Key West.
- 1825 Lighthouse constructed on Garden Key.

1829 Lt. Josiah Tattnall surveyed the Tortugas.

1831 Army barracks constructed at Key West.

1832 Audubon visited Tortugas.

1835 Start of Second Seminole War in Florida.

1836 Texas gained independence from Mexico. Secretary of War listed potential coastal fortification sites, including Key West and Tortugas.

1842 End of Seminole War.

1844 Capt. J. G. Barnard made preliminary reconnaissance of fort sites.

April 12 Annexation treaty with Texas signed.

Dec. 2 U. S. Engineer Department ordered survey of fort sites.

1845 Fort Taylor at Key West started.

Feb. 18 Congress voted Texas into the Union.

Mar. 1 President approved joint resolution of Congress for annexation of Texas.

— 3 Florida became the 27th State.

-- 4 President Polk inaugurated.

July 24 Florida legislature enabled transfer of lands to U. S. for military purposes.

Sept. 17 Florida ceded jurisdiction of Tortugas to U. S. Polk's executive order made Tortugas a military reservation.

Dec. 29 Texas became 28th State.

1846 Maj. Hartman Bache made topographical survey of Tortugas.

1846

-cont'd.-

- April 25 Start of Mexican War.
- May 19 Capt. Walter D. Fraser was assigned charge of Tortugas fortification.
- June 9 Plan for fort completed.
- 15 Oregon boundary established by treaty with England.
- July 4 California declared independent from Mexico
- 7 California declared part of U. S.
- 27 Lt. Wright assigned charge of Tortugas Fortification.
- Dec. 1 Wright sailed from New York for Tortugas.
- 15 Wright reached Tortugas.
- (or 16)

1847

- Wright did preliminary work of laying out fort and temporary buildings. He purchased many supplies from Mobile, Ala.
- May 26 First shipment of materials for temporary buildings sent from Portsmouth, N. H.
- 26 First slaves arrived at Garden Key.
- July 9 Escape of 7 slaves.
- Oct. Slaves and other workmen began construction of section of officers' quarters.

1848

- Lull in operations due to lack of funds.

Feb. 2 Treaty of peace with Mexico.

Aug. 14 Oregon Territory formed.

1849

Feb. Counterscarp started.

Aug. 11 President issued proclamation against filibustering campaigns into Cuba.

1850 First section of officers' quarters completed. First concrete for scarp poured. Chapel-office foundation started to provide cisterns. Storm damage. Sickness.

Nov. 4 Fort named Jefferson

1851 Shoal water parts of counterscarp completed.

1852 May 13 Work suspended due to lack of funds.

1853 First contract with southern brick yard.

July Work resumed.

1854 First record of yellow fever at Garden Key. Wright sick with it.

May 31 President issued proclamation against invasion of Cuba.

1855 Jan. 28 Panama railroad completed -- first train from ocean to ocean.

Dec. 6 President issued proclamation against invasion of Nicaragua.

1856 Wright transferred to Washington. The Activa wrecked. Loggerhead Lighthouse started.

Jan. 8 Woodbury arrived to take charge of construction at fort.

1857 Schooner Tortugas sent to fort. Wooden storehouse burned. Settlement of fort became noticeable.

1858 Fort reported potentially defensible, though requiring guns. Garden Key light reduced to harbor light. Gen. Joseph Totten and Naturalist Louis Agassiz visited fort.

1859 Woodbury visited Havana, sent plans of Havana defenses back to Washington.

1860 Woodbury transferred. Yellow fever.

Nov. 8 Capt. M. C. Meigs arrived at fort, in charge of construction. Fort Jefferson made defensible.

1861

Martello Towers at Key West started.

- Jan. 3 Georgia State troops seized Fort Pulaski, Ga.  
-- 5 Alabama State troops seized Forts Morgan and  
Gaines at Mobile Bay.  
-- 6 Florida State troops seized U. S. arsenal at  
Apalachicola, Fla.  
-- 10 Florida seceded from the Union.  
-- 11 Louisiana State troops seized Forts Jackson  
and Phillips.  
-- 19 First garrison arrived at Fort Jefferson.  
-- 30 Meigs ordered to Washington.
- Feb. 9 Jefferson Davis elected President of the Con-  
federacy.
- April Col. Harvey Brown arrived at Fort Jefferson  
en route to reenforce Fort Pickens, Pensacola,  
Fla.  
12 Confederates fired on Fort Sumter.
- Sept. First prisoners of war arrived at Fort Jefferson.  
Maj. Arnold's troops transferred to Fort Pickens.

1862

Fort wall completed to full height, though  
second tier was unfinished. \$200,000 appro-  
priated for fortification of Bird Key. Yellow  
fever and smallpox.

1863

- Curtain magazines, second tier tower magazines,  
and hot shot furnace completed. Main sewer  
begun. Soldiers' barracks and extension to  
officers' quarters started.
- Jan. 1 Emancipation Proclamation.
- Mar. Civilian Engineer Edward Frost arrived at fort.  
-- 16 Woodbury placed in command of the District of  
Key West and Tortugas.
- April 18 Slave roll discontinued.

1864

Barbette magazines and most of terreplein com-  
pleted. Main sewer completed. Certain detached  
kitchens completed. Large parade magazine started.  
Lt. Holgate reported on subsoil experiments.

1864

-cont'd.-

Feb.                   Frost resigned.  
-- 26                  Presidential order specified imprisonment  
                         at Fort Jefferson instead of death sentence  
                         for deserters.

July                   Engineer Frost back at work.

Aug. 14               Woodbury died of yellow fever at Key West.

1865

Engineer Department ordered discontinuance of  
construction of second tier. Bird Key fortifi-  
cation essentially completed.

April 9               Lee surrendered at Appomattox.  
-- 14                  Lincoln assassinated.

May                   George Phillips left Fort Jefferson employ  
-- 1                   after long Government service.  
                         Trial of assassination Conspirators began.

July 5                President approved findings of the Court-  
                         Martial.

July 17               Mudd and other prisoners started on voyage to  
                         Tortugas.

-- 24                  Arrival of prisoners.

Sept. 25              Mudd attempted to escape.  
-- 31                  Kelly and Smith escaped.

Oct. 12               Escape of 3 prisoners.

-- 22 &               Hurricane caused 1 death at Tortugas by fal-  
                         ling debris; loss of schooner Tortugas at  
                         Key West.

1866

Arch of large parade magazine turned. Small  
parade magazine started.

Aug. 20               Official ending of the Civil War. General  
                         Amnesty proclaimed by President on Sept. 7.



1867 Feb. Engineer Frost left Fort Jefferson work permanently.

Aug. 1 /? Arrival of Capt. Crabb from Havana, possibly ill with yellow fever.

-- 18 Start of yellow fever epidemic in Co. K.

Sept. 5 Dr. Smith fell sick.

-- 6 Dr. Mudd placed in service.

-- 7 Dr. Whitehurst arrived from Key West. Other casemates converted to hospital.

-- 8 Death of Dr. Smith. Spread of fever to Co. I.

-- 11 Nurses fell sick.

-- 16 Height of epidemic; half of Co. /? attacked by disease on this night. Death of Lt. Orr.

-- 18 Death of Dr. Smith's son.

-- 21 Death of Maj. Stone's wife.

-- 23 Death of O'Loughlin

-- 25 Death of Maj. Stone after reaching Key West with his small son.

-- 27 Dr. Smith's wife and daughter left Tortugas. Death of Lt. Gordon.

Oct. 6 Arrival of Dr. Thomas; he and Mudd both fell ill. Abatement of epidemic.

Nov. 14 End of epidemic.

1868 Cuban revolution.

Mar. 7 Escape of Grenfell and others.

1869 Flight of Cuban patriots to Key West.

Feb. President Johnson pardoned Mudd.

Mar. 11 Mudd left the fort.

Mar. 20 Mudd arrived home.

1870 All "modern" guns mounted. Officers' quarters and barracks almost completed.

Oct. 12 President issued proclamation prohibiting military expeditions against nations at peace with the U. S.

-- 19 & 20 Hurricane.

1871 Work suspended.

1872 Fort modernization started; 4 curtain magazines strengthened.

1873 Counterscarp and moat excavation completed. Barbette magazines strengthened.

Aug. 28 Start of yellow fever epidemic. All women and children and some married men evacuated to Loggerhead Key.

-- 30 Except for volunteers remaining on Garden Key, entire garrison was evacuated to Loggerhead.

-- 31 Arrival of Dr. Otto from Key West.

Sept. 3 Dr. Gould sent to Loggerhead to help prevent outbreak of fever there.

-- 11 Death of Lt. Bell.

Oct. 6 End of epidemic. Severe hurricane.

-- 27 Gen. Sherman recommended abandonment of fort.

-- 31 Virginus seized by the Spanish vessel Tornado on suspicion of carrying arms and men to Cuban insurgents.

Dec. 19 Spain surrendered Virginus to U. S., but on return voyage the vessel foundered off Cape Fear.

1874 Hurricane damage repaired. Quarters and barracks finished.

Jan. 11 Garrison left fort.

1875 Barbette modifications completed. End of Army construction at fort.

1876 Windows to quarters and barracks boarded up. Fort Keeper and ordnance sergeant left in charge.

1882 The U. S. began a naval building program.

1883 Jan. 10 Death of Mudd.

1885 Isthmus of Panama threatened by insurgents; American troops were landed to protect American property.

1888 Aug. 2 Act of Congress set apart Garden, Bird and Loggerhead keys as site of a national quarantine station.

1889 Jan. 16 Transfer papers referred to Capt. Fisk to effect transfer from War Department to Treasury Department.

Feb. 25 \$250,000 appropriated by Congress to help workmen thrown out of employment by discontinuance of work on Panama Canal.

April 21 First case (smallpox) arrived at Tortugas quarantine.

Oct. 22 Work begun on Nicaraguan Canal.

1891 Much gunpowder removed from fort magazines.

1893 Nucleus of the Cuban Revolutionary Party formed at Key West. War Department required removal of the quarantine station at Tortugas.

1895 Large filibustering expeditions left Key West for Cuba.

1896 Dissatisfaction in the U. S. with Spanish conduct in Cuba. Revised plans for modernization of fort under consideration.

July 30 President issued a proclamation against filibusters.

1897 May 20 U. S. recognized belligerency of Cuba.  
-- 24 U. S. appropriated \$50,000 for relief of American citizens destitute in Cuba.

1898 During the war, the fort was garrisoned by the 5th Artillery, some volunteers and perhaps by some marines. Dredging channels was started; coal depot construction started.

Jan. 25 White squadron was anchored at Tortugas; the Maine arrived in Havana Harbor.

1898

-cont'd.-

- Feb. 15 Sinking of the Maine
- April 19 Congress recognized the independence of Cuba.  
-- 22 Squadron sailed from Key West for Cuba.  
-- 24 Spain declared war.
- Dec. 10 Peace treaty signed with Spain.
- 1899 Cable station from Key West to Tortugas started.
- 1900 Condensing plant completed.
- Feb. 5 Hay-Pauncefote Treaty provided for building Nicaraguan Canal.
- April 7 Tortugas transferred to Navy Department.
- 1902 Marine garrison at fort.
- June 2 All remaining War Department property transferred to Fort Taylor.
- 1903 Wireless Station started.
- 1904 Wireless Station in Operation. Tortugas coal depot completed, damaged by hurricane and repaired. Panama Canal Treaty with Panama ratified.
- 1905 July 1 Marine complement at fort reduced to 12 men.
- 1906 Condensing plant and water storage tanks removed respectively to Guantanamo Naval Station, Cuba, and Key West Naval Station.
- 1908 April 6 Tortugas transferred to Department of Agriculture as a preserve.
- 1909 Tortugas wireless discontinued. Last U. S. troops left Cuba.
- 1911 Wreck of the Maine raised from Havana Harbor.

- 1912 Soldiers barracks and lightkeepers dwelling on Garden Key burned.
- Mar. 16 Maine sunk in ocean.  
23 Maine bodies recovered were buried in Arlington Cemetery.
- 1914 Panama Canal completed.
- 1917 Wireless station rehabilitated and seaplane base established at Tortugas.
- 1927 Officers' quarters burned.
- 1935 Jan. 4 President Roosevelt proclaimed Tortugas a national monument.

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## GLOSSARY

- applicateur.** Fort Jefferson: workman engaged in applying asphaltum to roof surfaces of arches.
- architrave.** Beam or lowest division of entablature, which extends from column to column. The term is also applied to the moulded frame around door or window.
- archivoit.** Mouldings on face of arch, following its contour.
- arrondissement.** (French: arrondissement) Rounding (noun).
- askew arch.** Fort Jefferson: segmental arch which springs from oblique piers, and twists gracefully in its length to seat its weight fully upon the skewbacks.
- ballister.** Small pillar or column supporting handrail or coping. Series of such is called a balustrade.
- baluster.** See ballister.
- banquette.** Raised way, or foot bank, running along inside of parapet, on which musketeers stand to fire on enemy.
- barbette.** Platform in fortification on which guns are mounted to fire over parapet.
- barrack.** Large building for lodging of soldiers; barracks (plural): building or buildings for that purpose.
- barrel vault.** Fort Jefferson: brick semicircular arched covering of greater length than breadth.
- bastion.** Work projecting outward from main enclosure of fortress, consisting of two faces and two flanks, and so constructed that it is able to defend by flanking fire the adjacent curtain or wall which extends from one bastion to another.
- bastion towers.** Fort Jefferson: section of the bastion enclosing the spiral stairway.

- batten.** Narrow strip of wood or scantling used in various ways: at Fort Jefferson, to rest upon piazza joists and provide additional support for flooring.
- batter.** Backward slope of retaining wall.
- battery.** Any place where cannon or mortars are mounted for attack or defense.
- bead.** Fort Jefferson: narrow rounded moulding or protecting band at masonry corners.
- belt.** Strip or band.
- breakwater.** Fort Jefferson: counterscarp (moat) wall, seawall built to exhaust force of waves.
- breast height wall.** Fort Jefferson: interior slope of parapet, against which the garrison lean in firing.
- breastwork.** A defensive work of moderate height, hastily thrown up, of earth or other materials.
- brick facing.** The outer or exposed portion of brick wall.
- caballero.** (Spanish) Sort of fortification, or part of fortification.
- carriage.** Fort Jefferson: wheeled stand or movable support of gun.
- casemate.** Bomb proof chamber, in which cannon may be placed to be fired through embrasures in its front.
- cistern.** Receptacle for storing water; reservoir.
- coal rig.** Coal storehouse and apparatus for depositing coal in bunkers of vessel.
- cofferdam.** Water tight structure of pilings, used in engineering for excluding water from area excavated, so that foundations may be built dry.
- communication arch.** Fort Jefferson: arched opening that pierces casemate pier and gives access to adjoining casemate. These openings are near the rear of gun room or casemate, away from the arc described by traverse of gun carriage, which impeded progress through main and larger connecting casemate arches.

- contrabands.** Escaped Negro slaves, termed "contraband of war."
- coping.** Highest or covering course of masonry in wall, often with sloping edges to carry off water.
- corbel.** Fort Jefferson: projecting brick, generally used for support of element above, although occasionally for ornamentation.
- coron.** Coping of scarp wall, which projects a few inches beyond face of wall.
- cornice.** Horizontal projection which crowns or finishes the work to which it is affixed.
- counterscarp.** Exterior slope of ditch or moat opposite the scarp; moat wall: see scarp.
- curtain.** That part of rampart and parapet which extends between two bastions or gates.
- dentil.** Tooth-like cube in cornice.
- elliptical.** Arch, the rise of which follows oval curve above the long horizontal axis of an ellipse.
- embrasure.** Opening in a fort wall from which to fire guns.
- embrasure cheek.** Vertical side or jamb of an embrasure.
- embrasure iron.** Iron protecting frame about outer opening of embrasure.
- embrasure shutters.** Iron shutters to close embrasure.
- emplacement.** Position of guns within fortification.
- enrockment.** Fort Jefferson: protective layer of loose stone to prevent undermining of counterscarp foundation.
- entablature.** Fort Jefferson: upper part of the architecture, comprising architrave, frieze and cornice.
- facade.** Face or elevation of building.

- fascine.** Bundle of sticks or fagots bound together and used for fortifying ditches, building earthworks, etc.
- filter closets.** Fort Jefferson: opening in casemate pier where was placed apparatus to filter water conducted from terreplein to casemate cisterns.
- flagging.** Pavement of flagstones; sometimes used to denote a single flagstone.
- flagstone.** Large flat paving stone; at Fort Jefferson, a "Blue Stone Flagging," about six inches thick.
- front.** Fort Jefferson: designation of a side of the hexagonal figure; curtain. The sides of the hexagon are numbered, the angles (or bastions) lettered.
- gabion.** Large cylindrical bottomless basket filled with earth and used in building earthworks.
- girder.** Main beam in a floor.
- gorge.** Entrance into a bastion; usually synonymous with rear.
- grillage.** Arrangement of sleepers and crossbeams forming a foundation in loose or marshy soil. At Fort Jefferson, the grillage was placed under casemate and Bastion piers, and extended between those elements to form the understructure for cistern floors. See sketches showing construction of piers; text, ante.
- groin.** Curved arris (sharp edge) formed by the intersection of vaulting surfaces.
- gudgeon.** Pin, wedge or pivot placed at the end of a shaft to prevent pulley from slipping.
- gun circles.** See traverse arc.
- hot shot oven.** Furnace in which round shot was heated. Apparatus within the oven delivered the red hot balls to artillery men who by means of tongs conveyed them to muzzle loading cannon. These missiles could set a wooden vessel on fire, or wreak havoc in a magazine. They were capable of skipping upon water several times and still retaining enough heat to start a blaze.

**howitzer.** Short, light, large bore cannon, in which the hollow projectile could be placed by hand.

**jamb.** Upright side of a doorway, window or fireplace.

**joist.** Horizontal timber to which boards of floor or laths of ceiling are fastened.

**linstock.** Pointed, forked staff, shod with iron at the foot, to hold lighted match for firing cannon.

**lintel (lintle).** Horizontal member spanning an opening and carrying superincumbent weight by means of its strength in resisting crosswise fracture.

**loopholes.** Narrow aperture for observation or defense.

**lunette.** Detached bastion.

**magazine.** Building or room in which powder and explosives are kept in a fortification or ship.

**magistral.** Line from which the positions of various units of the fortification are determined. See sketch showing construction of scarp wall: text, ante.

**mitred.** Joined on a slanting line at the corners.

**moat.** Deep ditch around a fort, usually containing water.

**mortised.** Joined (as timbers) by putting a projecting part into a hole made to fit.

**pan-coupe.** Fort Jefferson: cant-wise slope of wall or skirt on parapet below mouth of gun to deflect shell fire.

**parade.** Courtyard or enclosure in fortification where troops are drilled.

**parapet.** Wall crowning curtain to protect soldiers from enemy fire.

**pediment.** Triangular piece over the entablature, which fills in and supports the sloping roof.

**permanent buildings.** Fort Jefferson: those buildings on Garden Key designed as integral units of the fortification or for the use of its garrison.

**piazza.** Veranda.

**pier.** Fort Jefferson: mass of detached masonry, distinct from a column, from which an arch springs.

**pilaster.** Rectangular column or pillar, inserted partly in or attached to a wall.

**pintle.** Pivot about which the chassis of the gun carriage swings.

**pintle stone.** Stone in which pintle is set.

**plinth.** Lowest square member at the base of a column; projecting face at the base of a wall.

**postern.** Entrance (usually subterranean) beneath the parapet and through the rampart of a fortification. Fort Jefferson: term that engineers used as synonymous with sally port or entrance.

**primage.** Small sum of money paid to a shipowner in addition to payment for carrying goods, as for the care of the goods.

**purlin.** Horizontal beam in a roof resting on the principal rafters and supporting the common rafters and roof covering.

**quarters.** Lodging; at Fort Jefferson, usually dwelling place for officers.

**quoin.** Term applied to corner stone at angle of building; hence, the angle itself. Also; support at breach of cannon.

**rampart.** Broad embankment round a place, upon which the parapet is raised.

**ravelin.** Detached work with two embankments which make a salient angle. It is raised before the curtain on the counterscarp of the fortification.

**recess.** Niche or hollow in the wall.

- reference.** Fort Jefferson: established level or elevation; engineers used the mean low water level as elevation (or reference) zero, and made their computations of height upon that basis. A point five feet below low water level was at reference minus five feet; ten feet above low water was similarly designated as at reference ten feet.
- revetment.** Facing of wood, stone, or any other material, to sustain an embankment when it receives a slope steeper than the natural slope; also a retaining wall.
- riser.** Upright part of a step.
- rusticated.** With reference to stonework, made with grooved joints or roughened surface.
- salient.** Projection.
- sally port.** Gate in a fortification, through which besieged troops might rush forth. See postern.
- scarp.** Slope of the protecting ditch or moat which touches the wall or parapet; inner slope of the protecting ditch at the foot of the parapet, nearly perpendicular.
- segmental arch.** Arch, the curve of which forms less than half a circle. This type of low arch the engineers usually referred to as "flat"; technically speaking, the soffit of a flat or straight arch is on the same level with its skewbacks - it is horizontal.
- semi-circular arch.** Arch, the curve of which forms a half circle. Sometimes called round arch.
- shoal.** Fort Jefferson: shallows about Garden Key.
- skewback.** In masonry, a stone block, steel plate, or the like, having a sloping face against which an end of the arch rests.
- soffit.** Ceiling or under surface.
- subsidence.** Sinking or settling.
- surbase.** Moulding around the top of a pedestal or where the wall of a masonry building rests on its foundation; interior; moulding or chair rail along the top of a wainscot or base-board.



**temporary buildings.** Fort Jefferson: structures on Garden Key erected for use of the workmen, and to be demolished as the permanent units replaced their utility.

**terreplein.** Main upper level of a rampart, where guns, shielded by a parapet, are mounted; roof of the fort.

**tiebeam.** Beam which acts as a tie in connecting the lower ends of rafters.

**transom.** Piece of wood or iron connecting the checks of some gun carriages.

**traverse arc.** Arc of part of a circle described by movement of gun carriage about the pintle or center point; the stone support and iron track upon which the gun carriage rolls to turn the gun right or left. By traversing the arc, the gun thus commands a horizontal range of about ninety degrees. Traverse arcs were laid in casemates and terreplein fronts.

**traverse circles.** The complete circle described by movement of gun carriage about the pintle or center point; the stone support and iron track upon which the gun carriage rolls to turn the gun right or left. By traversing the circle, the gun thus commands a horizontal range of three hundred sixty degrees. Traverse circles were laid on the bastion terreplein. Cf. traverse arc.

**traverse iron.** Iron track embedded in the traverse stone, and forming an arc upon which the wheels of the gun carriage roll.

**traverse magazine.** Fort Jefferson: magazine built athwart the terreplein.

**tremie.** Caisson-like device for laying concrete under water. The tremie used at Fort Jefferson was in the general shape of a truncated pyramid, the base of which rested on the sea bottom, and defined the limits of the mortar bed. Mortar was lowered through the upper opening of the apparatus, spread evenly on the bed, and rammed. Unlike a caisson, the tremie was not waterproof, and the experimental blocks laid at Fort Jefferson by that method were comparatively soft and porous.

traverse stone. Fort Jefferson: granite stone cut in the form of a small segment of a circle, so that with its mates it comprised the traverse arch.

triangular arch. So-called arch, the sides of which are straight and meet in a peak.

Venetian blind. Window shade or blind made of horizontal slats of wood on cords, turnable so as to admit or exclude light and air.

vault. Arched roof.

voussairs. Truncated, wedge-shaped blocks forming an arch.

wainscot. Paneled wooden lining on walls.

water table. Projecting course of masonry or moulding to throw water away from a wall.

zero level. Fort Jefferson: mean low water level; see reference.

Rough Sketch Profile, Fort Jefferson, Florida.

Giving Nomenclature. June 6, 1936.