

## Battery Cavallo, Fort Baker: Survivor of the Plan of 1870

John Martini

### The Land

The U.S. Army always envisioned the Golden Gate as the key to the defense of San Francisco Harbor. As early as 1847, the Corps of Topographical Engineers began surveying the hills and islands nearest the gate. Although San Francisco at that time was a small Mexican settlement of about 350 people, the military was already turning its eye toward defensive positions around the bay.

By 1850 the situation had changed radically. Gold had been discovered on the American River in 1848, and when word reached the outside, one of the great historic movements of people began. In the words of one historian, “the world rushed in.” Within two years San Francisco’s population skyrocketed to nearly 40,000, and its harbor blossomed with shipyards, piers, warehouses, factories, banks, mints, an arsenal, and all the other features of a dizzily-diverse economic boom.

It was obvious to any military (or political) leader that the new port of San Francisco would make a rich prize in time of war. The city was also a long ways from nowhere, and strong defenses were critically needed. In April 1849 a joint army-navy commission met in the city to make recommendations for future fortifications to defend San Francisco and the entire Pacific Coast. For over a year they traveled and studied the coast of California and the Oregon Territory, and in November 1850 they announced their initial vision in a report to Congress.

For San Francisco Harbor the board recommended two large forts, one on either shore of the “Golden Gate,” as the opening to the port had recently become known.<sup>(1)</sup> This strait, only a mile across at its narrowest, was a perfect location for what the board referred to as the “outer line” of fortifications. The forts (or “works” as they were officially termed) envisioned in this plan were multi-tiered masonry forts of the type prevalent along the East Coast. These two forts together would mount nearly 300 smoothbore guns and provide a withering crossfire at the Gate’s narrowest point.

Should any vessel be able to pass through the crossfire, an additional work was called for inside the bay: “The difficulty might be obviated by having, in addition to a strong battery on each shore at the narrowest point [of the Golden Gate] a third battery on Alcatrazos [sic] Island which lies within the bay...” Finally, recommendations were made for smaller backup batteries on Angel Island, Yerba Buena Island, and Point San Jose on the northern San Francisco waterfront, thus creating an “inner line” of works whose fire could intersect with the guns of Alcatraz.

The locations chosen for the two outer forts were precipitous headlands at the narrowest point on the Golden Gate channel. On the San Francisco side, the board chose the northern tip of the Presidio of San Francisco, a point officially named “Punta del Cantil Blanco,” but where the ruins of an 18<sup>th</sup> century Spanish fort had led to the local nickname “Fort Point.” On the Marin shore to the north, the corresponding promontory was a towering headland officially called “Punta San Carlos” but more popularly known to Yankee newcomers as “Lime Point” because of bird guano encrusting the rocks at the peninsula’s shore.

Before construction could begin on the forts Congress had to approve funding. Then the land had to be acquired. At Fort Point and Alcatraz this was not a problem since the lands had always been under direct control of the Spanish and Mexican governments. The United States cleanly assumed title to them. Lime Point, however, was another story. It was part of the sprawling “Rancho Saucelito” owned by former Captain of the Port William Antonio Richardson. He had received title from the Mexican government in 1837, and his claim to the land was solid. Before the fort at Lime Point could be commenced, the land would have to be acquired from Richardson—either through purchase or condemnation.

The subsequent story of the army’s negotiations with Captain Richardson and his successor owner to the Rancho, Mr. William Throckmorton, has been related many times in other history studies, possibly nowhere better than in Erwin Thompson’s *Historic Resource Study: Forts Baker, Barry, Cronkhite* (Denver: National Park Service, 1979). Suffice it to say that it took 16 years of negotiations, correspondence, condemnations, and behind-the-scenes maneuvering before the United States finally acquired title to Lime Point. On July 24, 1866, final purchase was made of the “Lime Point Military Reservation,” consisting not only of Lime Point proper but also 1,898.66 surrounding acres, stretching from the Golden Gate to the Point Bonita Lighthouse. The total cost was \$125,000.

### The Fortifications

Although negotiations for the purchase of Lime Point dragged on until 1866, the Corps of Engineers had been busy drafting and redrawing their plans for the work proposed for the point. In 1858 they produced their first detailed drawings of the fortification—an immense, masonry fort stretching for a quarter mile along the foot of Lime Point. It would partly resemble Fort Point in that it would consist of three stories of casemated guns with an exposed barbette tier atop the casemates. However, unlike Fort Point, which is an enclosed multi-sided work, the Lime Point fort would be an elongated, open structure, snaking along the base of the cliffs. The fort would have no cover on its rear face and be separated from the rocky headlands by only a few dozen feet. The proposed armament was to be 250 guns. (By contrast, Fort Point has positions for 126 weapons.)

Shortly after the Government formally acquired Lime Point, the engineers released a revised plan for the proposed fort. This 1867 version of the fort was scaled back in the number of proposed guns (109), but in other ways the structure was even more challenging. Although only two stories tall and with a partial barbette battery, the proposed fortification had evolved into a largely enclosed work. It would necessitate carving out a four or five-acre plateau at the very foot of Lime Point.

The officer assigned to construct the new Lime Point fortifications was Col. George Mendell of the Corps of Engineers. He consulted with the Board of Engineers for Fortifications in New York, and after finessing the drawings and calculations he announced that an excavation of 1,000,000 cubic yards would be required for the fort’s foundations. He also estimated that the total cost of the work would be \$3,000,000—\$31 million in 1999 dollars.

Through 1867 and 1868, Mendell drilled and blasted at Lime Point in an abortive effort to excavate foundations for the planned fortification. While his workmen were tunneling and hauling rock, though, the New York Board of Engineers was reviewing the nation’s needs for fortifications in light of lessons hard-won during the Civil War. At siege after siege during the war, heavy masonry works had shown their vulnerability. Multi-tiered masonry

forts such as Fort Pulaski and Fort Sumter had proven themselves to be little more than oversized targets for artillerymen with rifled guns. Following the war, the army realized it needed to radically redesign all its forts.

Proposals ranged from hanging metal plates on their exterior faces to replacing them entirely with rotating iron gun turrets. More conservative engineers, however, studied Civil War battlefields where dirt earthworks had been extensively used. These improvised fortifications, they noted, had been simple to build, provided excellent protection against enemy fire, and were easy to repair. Earthworks, they decided, would become the basis of the next generation of permanent American forts. In the words of historian E.R. Lewis, “Never again would forts be built in the storybook style as single structures housing large numbers of cannon. From this time on, a fort was a piece of real estate occupied by a number of dispersed individual batteries.”(2)

In August 1868 the New York board presented a report concerning the proper profile for postwar barbette batteries. These specifications would be the standards for what came to be called the “Plan of 1870” by later military historians. Historian Erwin Thompson summarized the board’s findings:

As a material for parapets, sand was far superior to clay.

A parapet of sand, 20 feet between the crests, supported by a breast-height wall 4 feet thick, would suffice as a minimum.

A wall in the body of the parapet was not recommended.

The introduction of iron plates in parapets was inexpedient in peculiar cases.

The minimum distance between 15-inch guns should be 34 feet, and the minimum distance between 10-inch guns should be 22 feet.

The terreplein should not be less than 30 feet in depth.

There should be a traverse for every two guns that were exposed to direct or oblique fire, and a traverse for every gun subjected to enfilading fire. When practicable, there should be a parados for guns liable to reverse fire.

Minimum dimensions for a traverse should be 14 feet in height, 12 feet in thickness at the top, and 20 feet in thickness at the bottom.

Service magazines were indispensable. Good well-rammed concrete was the best material, with no lining.

The board concluded that the use of guns in barbette batteries would be greatly modified in the future, and it recommended that the present carriages and platforms not be constructed in great numbers.(3)

The last-mentioned carriages and platforms would become a heated topic of research and development. The Ordnance Department was then carrying out experiments on a wide variety of cannon and carriage designs, and one that showed particular potential was the “King’s Depressing Carriage.” This weapon was, in effect, a conventional muzzle-loading gun mounted on an inclined, sliding carriage. After firing, the cannon slid down and out of view for loading. Emplacement design and technology for the next half-dozen years revolved around the anticipated—but never implemented—introduction of King’s carriage.

These new American fortifications would be low-rise affairs, extending only twenty feet above grade at most. In order to provide maximum protection for the guns, the weapons would no longer be mounted in long, unbroken lines as in the 1850s. It was now planned to

emplace the cannon in pairs, and each pair would be separated from the next by earth hills called “traverses.” The traverses would both protect against incoming shells and (theoretically) limit battle damage to at most two weapons at a time. Each traverse was also to house a powder magazine for ammunition storage. Brick-lined arched tunnels through the earthworks permitted the safe movement of men and supplies during battle.

The new plans also called for a high degree of standardization of weaponry. Instead of the hodge-podge of calibers so common in Civil War forts, the new batteries would mount only four different types of ordnance: 13-inch smoothbore mortars; 15-inch and 20-inch Rodman smoothbore guns; and 12-inch muzzle loading rifles still under development.

At Lime Point, Mendell suspended excavation work at the site of the casemated fort and ordered surveys of the nearby hills. Five sites were eventually chosen along the Marin shore for new earthwork barbette batteries, and preliminary plans were forwarded to the New York Board of Engineers. The sites and their proposed armament were as follows:

<i>Location</i>	<i>Name</i>	<i>Armament</i>
Summit of Lime Point Bluff	Ridge Battery	Four 15-inch guns, front pintle Four 15-inch guns, center pintle Four 13-inch mortars
Foot of Gravelly Valley	Gravelly Beach Battery	Ten 15-inch guns, front pintle
Point Diablo	Point Diablo Battery	Seven 15-inch guns, front pintle One 15-inch gun, center pintle One 20-inch gun, center pintle
East of Point Bonita	Point Bonita Battery	Twenty 15-inch guns, front pintle
South of Yellow Bluff	Battery Cavallo	Ten 15-inch guns, front pintle Three 20-inch guns, center pintle Two 12-inch rifles, center pintle Six 13-inch mortars
On Point Cavallo	Point Cavallo Battery	One 15-inch gun, front pintle One 15-inch gun, center pintle

The first battery contemplated by the Pacific board appears to have been the large work at Point Cavallo, plans for which were submitted on April 9, 1870.(4) The construction of this battery was not finally approved until 1872, the delay principally caused by design concerns for installing the pending King’s Depressing carriage.(5)

### Battery Cavallo

Colonel Mendell wrote at length about the geography of Point Cavallo, the work that he proposed for the site, and its fields of fire:

The position is an admirable one for defense. It looks across the entrance through the Golden Gate, and sees all the waters inside toward San Jose, Alcatraz and Angel Islands. It likewise looks through Raccoon Straits, and covers the anchorage in Richardspoint by its fire with the works of Lime Point, Fort Point, Point San Jose, Alcatraz Island, Angel Island and Peninsula Point [Belvedere Island]...

Mendell went on to describe how the battery should be laid out to protect both the harbor entrance and the important anchorage off Sausalito:

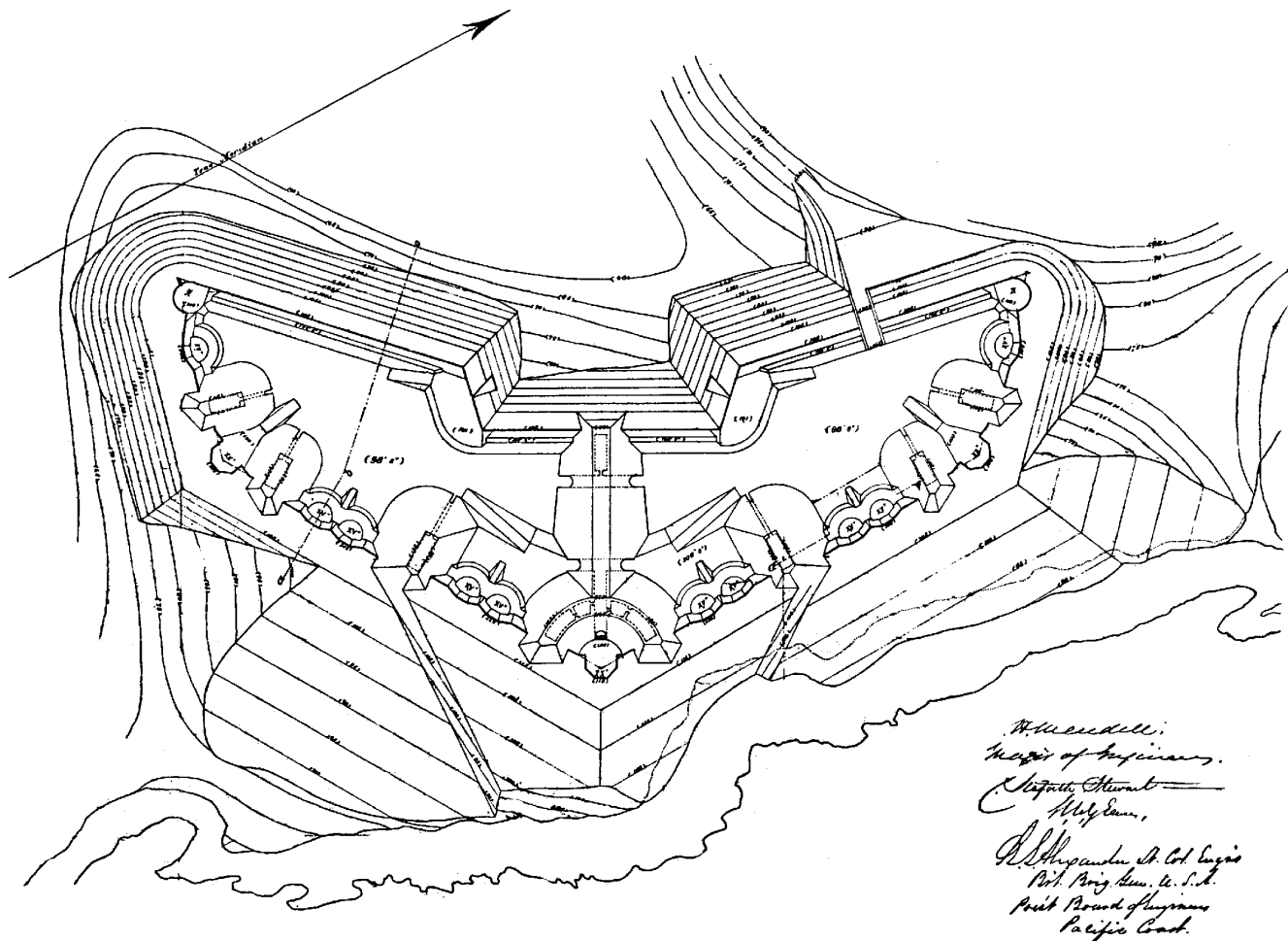


But, in addition to the important waters covered by the fire of the guns of these two fronts, there is an extensive anchorage at the entrance to Richards Bay in the direction of Saucelito [sic] which ought to be protected by the fires of guns in this position. This requires another front [along the northern side of the work].

In like manner in order to cover all the waters of "Horse Shoe Cove" between Point and Point Cavallo, and the landings around its shore, a similar front is required at that end of the work so that the battery becomes a lunette in shape with two faces and two flanks.

As an open battery in this position might possibly be taken *de main* it is believed that it will be better to close its gorge [rear] by a light parapet . . . in the form of a bastioned front.

The result of Mendell's reasoning was a symmetrical earthen fort built roughly in the shape of a broad arrowhead. A central traverse bisected the battery into two equal parts, and "communication tunnels" large enough to permit the passage of horses and wagons pierced this long traverse at two points. Other traverses with interior brick magazines separated each pair of guns. Mendell's concern that an attacking party might storm the battery from the rear was addressed by entirely enclosing the landward side with an earthen defensive wall fitted with firing steps for riflemen. Two reentrant angles formed two bastions, and atop these



The Cavallo Battery as finally proposed by Colonel Mendell in 1872. Note the positions for 20-inch smoothbore and 12-inch rifled Rodman guns at the salients, and the ramps, embrasures, and firing steps on the gorge side. The never-completed sally port is at the upper right. (Courtesy the National Archives.)

bastions were embrasures for field pieces to provide flanking fire along the exterior faces. Entry to the work was to be through a sally port passageway. Battery Cavallo thus became a totally enclosed fortification, more like an earthen fort than the lines of open barbets constructed elsewhere under the Plan of 1870. As such it may be architecturally unique in the United States.

Mendell's first plans called for 19 heavy guns and mortars, two of them in a separate work further out on the point. Cavallo was to have had the most massive firepower of any battery on the Pacific Coast, including two 12-inch rifles, four 13-inch mortars, twelve 15-inch, and three monstrous 20-inch smoothbore Rodman cannon. These last weapons, weighing nearly 100,000 pounds apiece, would be able to fire a 1,000-pound solid projectile over four miles.

However, before actual construction began, a lengthy argument broke out between the Pacific board and the New York board. This dispute centered on the then-unanswerable question of whether the maximum caliber for seacoast guns would be a 20-inch smoothbore gun or a heavy 12-inch rifled gun. Also, the continued indecision regarding adapting the works for King's depressing carriages caused further confusion. Eventually, Cavallo's main work was modified to reflect a more standard armament of one 20-inch and fourteen 15-inch smoothbore Rodmans, while the separate outwork on the point would mount a pair of 15-inch guns.(6)

Work was well underway at the other Lime Point batteries before construction finally began at Cavallo in June 1872, when an access road to the site was built. By July 1873 Mendell had constructed the two arched passageways through the central traverse. The powder magazines were almost completed. The entire parapet had taken rough shape, and sodding had begun on the interior slopes. In his annual report for fiscal year 1874, Mendell reported the main work complete except for the continuing construction of breast-height walls and platforms. Six months later he was able to say the same about the two-gun outwork. In October 1874 he summarized the cost of the battery (excluding the outwork) as \$107,825.17. Not surprisingly, the vast majority of the funds (\$76,744) had been expended for labor.(7)

This would reflect the highest level of activity at Cavallo, for in 1875 the Lime Point appropriation for the next fiscal year amounted to only \$20,000 for all the Marin works. A parsimonious Congress was having doubts about expending vast amounts on new fortifications, especially in light of rapidly-evolving military technologies being demonstrated in Europe.

Only minor work took place over the next year at Cavallo. Some additional sodding was carried out, ventilators were installed in the magazines, doors were hung on the magazine in the two-gun outwork, and the road from Lime Point was repaired. As elsewhere in the nation, fortification construction came to a halt on June 30, 1876.(8) That year, Congress allocated only a very small annual sum (roughly \$100,000 for the entire United States) for "Protection, Preservation and Repair" of fortifications.(9)

This cutback on construction expenditures in the Lime Point area was devastating. Only one gun had been mounted in all of the Marin fortifications – a lonely 15-inch Rodman on a wooden platform at Gravelly Beach. The handsome new earthwork Battery Cavallo, more than 95% complete, would not mount any weapons until nearly the turn of the century.

Lime Point and all of the unfinished fortifications were relegated to caretaker status for the next two decades. At Cavallo itself, the battery lacked only a few finishing touches such

as masonry platforms for the Rodman guns, completion of parapet walls at the salient positions, and construction of a sally port where only a rough gap existed in the gorge wall. However, without regular maintenance, the battery soon began to fall into disrepair. Mendell's annual reports reflected this state of entropy. For example, in 1878 he wrote:

The works and public property have been under the charge of keepers throughout the year. No construction was in progress, all operations being suspended for want of funds. No changes have taken place either in number of platforms or in armament.(10)

Mendell mentioned one continuing headache he endured at Lime Point: "A little rodent called the Gopher is the worst enemy we have. He burrows in the parapets and destroys their shape and compactness." Poisoning them did not help because "recruits from the outlying country come in." Interestingly, he reported the earthworks on Alcatraz to be in the best condition of any under his care, primarily due to their unique situation on an island. Gophers, apparently, had not yet learned to swim.(11)

### Arming, Alterations, and New Uses

In 1886 Secretary of War William Endicott convened a board to review the sad state of the country's defenses. Their sweeping recommendations would eventually result in a wholesale rebuilding of America's fortifications. Around San Francisco Bay and at harbors around the country, new "Endicott" era fortifications obliterated many Plan of 1870 earthworks that happened to occupy the same strategic locations. At Fort Baker, construction began in the mid-1890s on new batteries atop Lime Point Ridge and at Gravelly Beach, destroying the unfinished earthworks at those locations. Positions for five disappearing guns were also proposed for Point Cavallo in 1890, but were dropped from subsequent construction plans. Battery Cavallo would escape the initial Endicott construction program unscathed.(12)

The Spanish-American War of 1898 brought a flurry of excitement to America's forts when dozens of aging Rodman guns were quickly emplaced to thwart the entry of the near-mythical (and soon sunk) Spanish fleet. At San Francisco, the army emplaced 8-inch rifled Rodman guns at Fort Winfield Scott, Angel Island, Alcatraz Island, and Fort Mason. Interestingly, instead of being positioned to intercept a fleet entering the Golden Gate, these guns were all sited to protect underwater mine fields within the Bay. At Fort Baker, three 8-inch guns were emplaced at Battery Cavallo in positions #10, 11, and 13, all on the left flank of the work where their fire would intersect with similar guns on Alcatraz and Angel Island.

Work began slowly, though, and the war was long over before the guns were mounted. The annual ordnance sketch for Cavallo showed that by January 1, 1899, the Rodman platforms were just being finished. It is believed that the guns were emplaced before the start of the new century.(13) No documentation has been found regarding these weapons or their service history, but they apparently remained in place until about 1910 when they were salvaged along with most of the obsolete smoothbore ordnance in the bay's defenses.(14)

Cavallo's first major alteration occurred in 1910 with the construction of a power plant that served two nearby Endicott-era batteries and a searchlight. This reinforced concrete building, measuring 18 x 28 feet, was located in the battery's south parade behind positions #6 and #7. The structure contained two gasoline powered 25 kW General Electric generators that provided electricity to Battery Duncan (two 8-inch barbette rifles), Battery Yates (six 3-inch rapid-fire rifles), and a 36-inch searchlight at the very tip of Point Cavallo.(15)

Eight years later, a coincidence range finder (CRF) position for Battery Yates was constructed at the forward point of the earthworks, directly in front of never-completed position #8. This station was a simple 10 x 20-foot concrete-lined open pit mounting a 9-foot horizontal-base optical range finder. The structure also served as the battery commander's station, so it was fitted with cast-iron telephone boxes and pedestals for additional observers' telescopes. A fabric canopy stretched over a metal frame provided the only protection for the optical instrument, its crew, and the battery commander.(16)

Aerial photographs taken during the 1920s and 1930s provide excellent documentation of Battery Cavallo before World War II. One striking feature of these photos is how little the structure had changed since construction halted in 1876. Aside from the addition of the Duncan-Yates power plant and Yates' CRF position, the battery remained essentially unchanged. Even such small-scale features as the firing steps on the landward face and earthen ramps leading to the gun positions were still intact.

An interesting, undocumented alteration to Cavallo also becomes apparent in these aerial photographs. At some undetermined time, all the traverses had been reconstructed with large earthen extensions added to their seaward faces. The traverses had all been originally designed with gently sloping sides, but the earthen additions changed these outlines into



This enlargement of a 1925 aerial photo of Fort Baker clearly shows Point Cavallo, Battery Yates, and the earthworks of Battery Cavallo. Visible within the battery is the flat-roofed powerhouse for Batteries Yates/Duncan and Searchlight #11. On the hill to the left is Battery Duncan.(Courtesy Golden Gate National Recreation Area, Park Archives, GOGA-1766, Lloyd 30th Infantry Album.)





Taken from 10,000 feet, this November 1937 aerial view shows how closely Cavallo's final form corresponded to the 1872 plan. Clearly visible are the positions for the Rodman guns, the traverses with their mushroom-head alterations, the gun platforms and ramps, the bastions and firing steps along the gorge, and the opening for the never-completed sally port. At the extreme tip of the battery is the CRF for Battery Yates. (Courtesy Golden Gate Recreation Area, Park Archives, GOCA-1766, PAM PhotoCollection, Division of Interpretation Collection, #77-C-39)

distinctly mushroom-like shapes when viewed from overhead (see drawing on page 19). Oddly, the surviving maps and plans do not reflect these alterations nor do the engineer records make any mention of the remodeling work. It is speculated that the alterations probably occurred after initial work on the battery was suspended, possibly to provide additional protection from enfilading fire when the decision was finally made to arm Cavallo. (The same alteration has been noted at Plan of 1870 works on Alcatraz Island and at Fort Stark in New Hampshire.)

The fort record book for Fort Baker mentions Battery Cavallo several times during the 1930s and 1940s, although usually in reference to the Duncan-Yates power station within the south parade. In 1932 it lists under "Main or Storage Magazine": "Battery Caballo[sic] This set of magazines is used at present time . . . for the purpose of storing Powder Charges and other miscellaneous Ordnance appurtenances."(17)

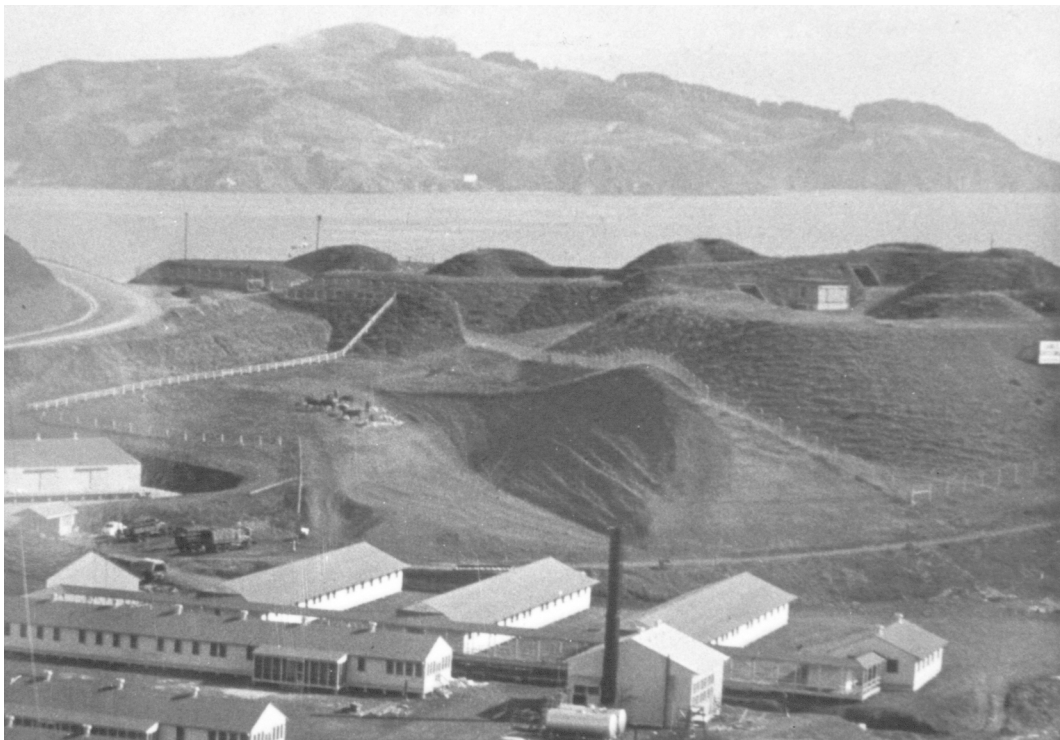
It is speculated that this storage also led to an interior modification of Cavallo's magazines. Originally, each magazine had been divided into two spaces by a "cross wall" set directly inside the entrance door. The doors in these walls were offset from the main doors to

prevent projectiles from entering the powder storage area proper. At some point these cross walls were demolished, probably to make it easier to maneuver large projectiles, powder cans, and boxes of “appurtenances” in and out of the magazines.

The use of Battery Cavallo as a central magazine also explains why its earthworks were kept clear of vegetation during this period, despite the fact that native coastal scrub grows quickly in this area. Any undergrowth would provide fuel for brush fires during dry California summers, and vegetation must have been quickly cut down as a safety measure.

In 1939 a proposal came forward that, had it been implemented, would have totally altered Battery Cavallo. That year a major in the Coast Artillery Corps proposed turning the old earthwork into “Club Cavallo,” a combination officers’ club, recreation center, parking lot, and guest-housing facility. The three sheets of plans he prepared show such intriguing details as formal gardens atop the main traverse, an indoor pistol range in one of the traverse magazines, a military museum in another magazine, a ballroom with veranda overlooking the bay, a large restaurant and lounge, and seven guest rooms with private baths.(18) It is not known whether this was a serious proposal or just skylarking on the part of a talented draftsman, but had “Club Cavallo” been built it would have destroyed most of the 1870s earthworks. Luckily, the austerity of the pre-war army probably made the proposal unworkable and the battery remained unaltered for the next several years.

Shortly after the attack on Pearl Harbor, Cavallo was again pressed into use as a harbor defense site. The outbreak of World War II brought an increase in the number of anti-aircraft (AA) and anti-motor torpedo boat (AMTB) guns emplaced around the Golden Gate, ranging from .50 caliber machine guns up through 90 mm radar-directed weapons. Many of the AMTB guns could also be used as anti-aircraft guns, and were thus designated dual-purpose (DP) guns.



This photo, taken just days before the Pearl Harbor attack, was meant to document the new Station Hospital at Fort Baker. Cavallo’s traverses stand out clearly against the skyline. Angel Island is in the distance. (Courtesy San Francisco History Center, San Francisco Public Library.)

A pair of these mobile 40 mm AMTB DP guns were mounted along the Fort Baker waterfront in 1944, one at the end of the mine wharf and the other at the very tip of Point Cavallo. These weapons were designated “Cavallo” in keeping with the practice of naming temporary batteries after geographical locations.(19) It is likely that the old traverse magazines of Battery Cavallo were used to store ammunition for these new guns as well as ammunition for other surrounding batteries. TNT for the underwater mines at the new Fort Baker mine depot may also have been stored at Cavallo during the war.

In 1942, the old Duncan-Yates power plant was put back into service as both a back-up generating plant and a substation for commercial AC power coming in from Sausalito. To protect the nearby AMTB guns and mine depot, soldiers constructed a sandbagged emplacement for a machine gun atop the earthwork traverse adjacent to position #9. Although it is not shown on official harbor defense plans, this oval emplacement probably mounted a .50-caliber Browning M2 water-cooled machine gun.

The increased wartime activity within the old earthwork battery also led to physical alterations when two access roads were bulldozed into the battery. The first led uphill from Battery Yates and wound through the seaward face before entering at position #3. The second road formed a bypass for vehicles too large to go through the old brick communication tunnels and skirted the landward face of the battery behind the central traverse.

### Post War Uses

Following the war, Cavallo entered a long period of benign neglect. The anti-aircraft guns along the waterfront were removed in mid-1946, and the mine depot was turned over to the navy a few years later. All ammunition was probably removed about this time. Vegetation began to encroach onto the carefully graded earthworks, obliterating their form and disguising their original function. From 1945 to 1965 the growth of underbrush seems to have been particularly explosive, probably reflecting the downgrading of Fort Baker to a subpost of the Presidio and the removal of fatigue parties who had previously maintained Cavallo’s slopes.

Army documents and maps over the next thirty years designate the battery as a storage and training area, although a 1968 map indicates that the two curved magazines flanking position #8 were again being used for explosive storage, “but not more than 100 pounds total for both.” The same map also indicates that the magazines all still retained their original 4-inch-thick wooden doors.(20)

The biggest threat to Cavallo came from increased visitation to Fort Baker during the 1970s, especially from users who saw its mounded earthworks as excellent off-road terrain for motorized dirt bikes. The battery at this time stood totally open, its gates not even secured by a lock or chain for several years. The staff of the new Golden Gate National Recreation Area began to have serious concerns over the future of the earthworks, and in 1976 they urged the post commander at the Presidio to secure the gates to the battery and keep its fence in repair. Over the next ten years the gates were kept locked, but not much else was done in the way of protection and preservation.

Ironically, it would be one of the smallest residents of Fort Baker who would finally increase public awareness of Battery Cavallo. In the mid-1980s, park staff identified Cavallo as the habitat of the Mission Blue Butterfly, a federally listed endangered species. The butterfly only breeds in a handful of sites around San Francisco Bay, and the forward slope of the old battery sprouted large areas of the silver lupine plant that the Mission Blue use as habitat





In the early 1960s, historian E.R. Lewis photographed Battery Cavallo from nearly the same spot as the anonymous 1941 photographer. The encroaching vegetation is clearly evident, especially on the rear side of the battery. (Courtesy E.R. Lewis, used by permission.)

during their pupate state. (Ironically, the largest concentration of this lupine occurs along the bulldozed path of the World War II access road.) In early 1987 park staff erected a temporary wire fence around much of the habitat to form an exclusion area and repaired the battery's boundary fence. New interpretive signs were posted and patrols increased.

The increased protection of Cavallo and the Mission Blue butterfly seems to have had an unanticipated downside, however. In the late 1980s and early 1990s, Cavallo became the scene of increased trespassing and nocturnal activity and, unavoidably, vandalism. Graffiti began to appear on historic brick and masonry surfaces, unofficial foot trails appeared leading from holes in the fence line, and the old traverse magazines were soon littered with bottles, burned-out fires, and other debris. Park staff realized that the battery's hidden spaces and tunnels made it perfect for clandestine gang activities and soon identified graffiti "tags" belonging to gangs from the Mission District of San Francisco and the Canal area of San Rafael.

In 1995 park maintenance workers sealed the traverse magazines by installing solid steel plates over all their doorways. Although some reduction in gang activity was noticed, graffiti





Perhaps nothing better illustrates the changes at Cavallo over the last 60 years than comparing this 1997 aerial view with the 1937 photograph. Brush and trees have nearly obliterated the clean lines of the earthworks; the Duncan/Yates powerhouse has been demolished; the west end of the central traverse has been shaved off; and the World War II road cut is visible at upper right curving towards Battery Yates. Beneath all this vegetation, though, the original earthworks are believed to survive in a good state of preservation. (Photo by Towill, Inc., San Francisco, CA. Courtesy Golden Gate National Parks Association.)

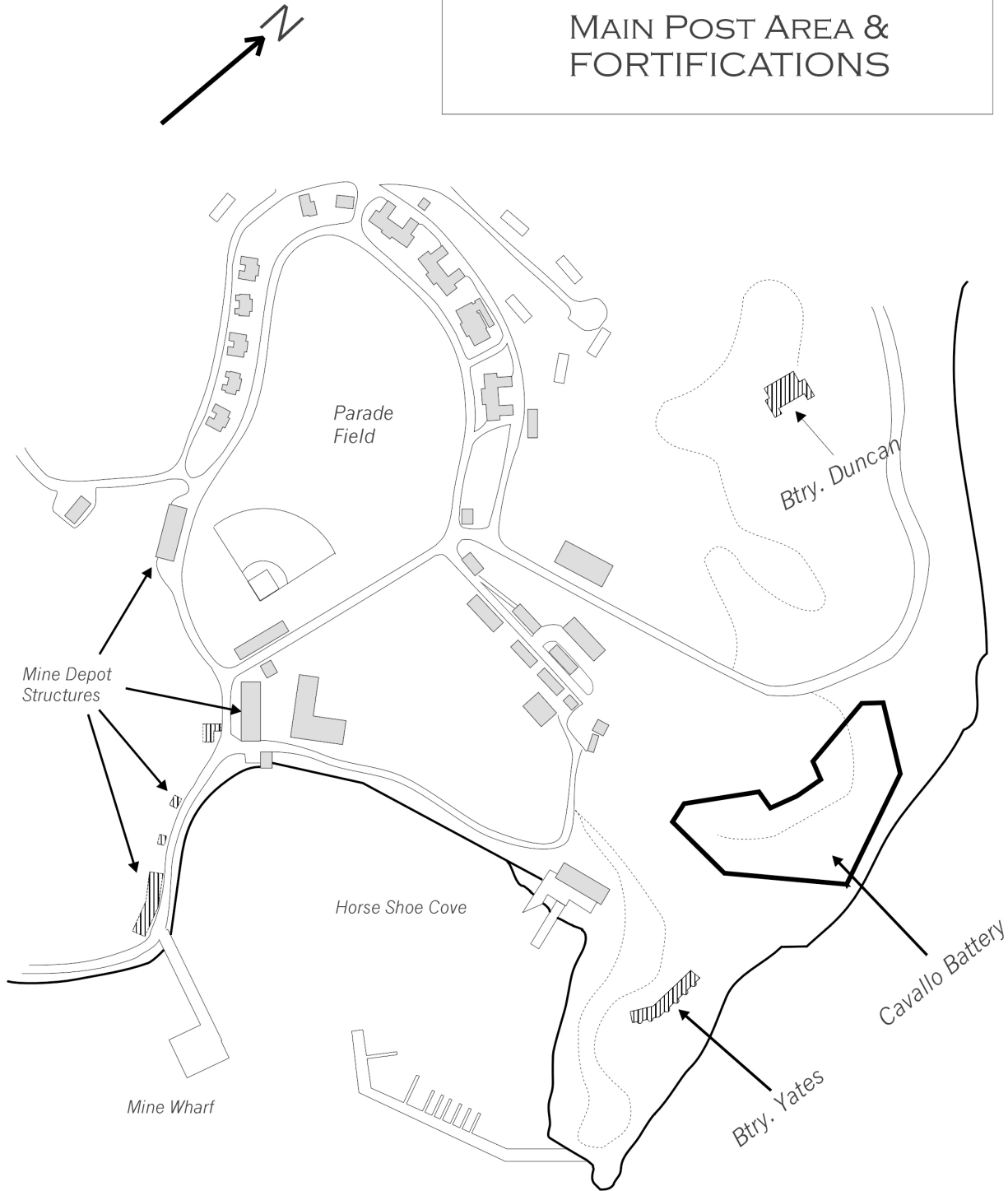
continued to appear on the brick walls, including some 40-foot long murals created by spray-can vandals.

At present, park staff members are developing long-range plans for the preservation of Battery Cavallo and the Mission Blue habitat area. Happily, the most viable method for protecting the butterfly appears to also be the technique most suited for preserving the battery's earthworks: removing the heavy vegetation and encouraging the growth of grasses. As part of these planning and preservation efforts, this report was initially prepared as a segment of an environmental assessment that will evaluate a variety of preservation actions, their impacts, and possible mitigation efforts.

Some preservation work has already begun at Cavallo. In recent months, Volunteers in Parks (VIPs) and Marin Conservation Corps workers have cleared nearly a full acre of brush from the overgrown earthworks and have painted out graffiti murals. Law enforcement rangers have increased their patrols of Cavallo, both to protect the butterfly habitat and to prevent

# FORT BAKER

MAIN POST AREA & FORTIFICATIONS



*San Francisco Bay*

Fort Baker, showing the main post area and the location of fortifications and mine depot.  
(Illustration by John Martini.)

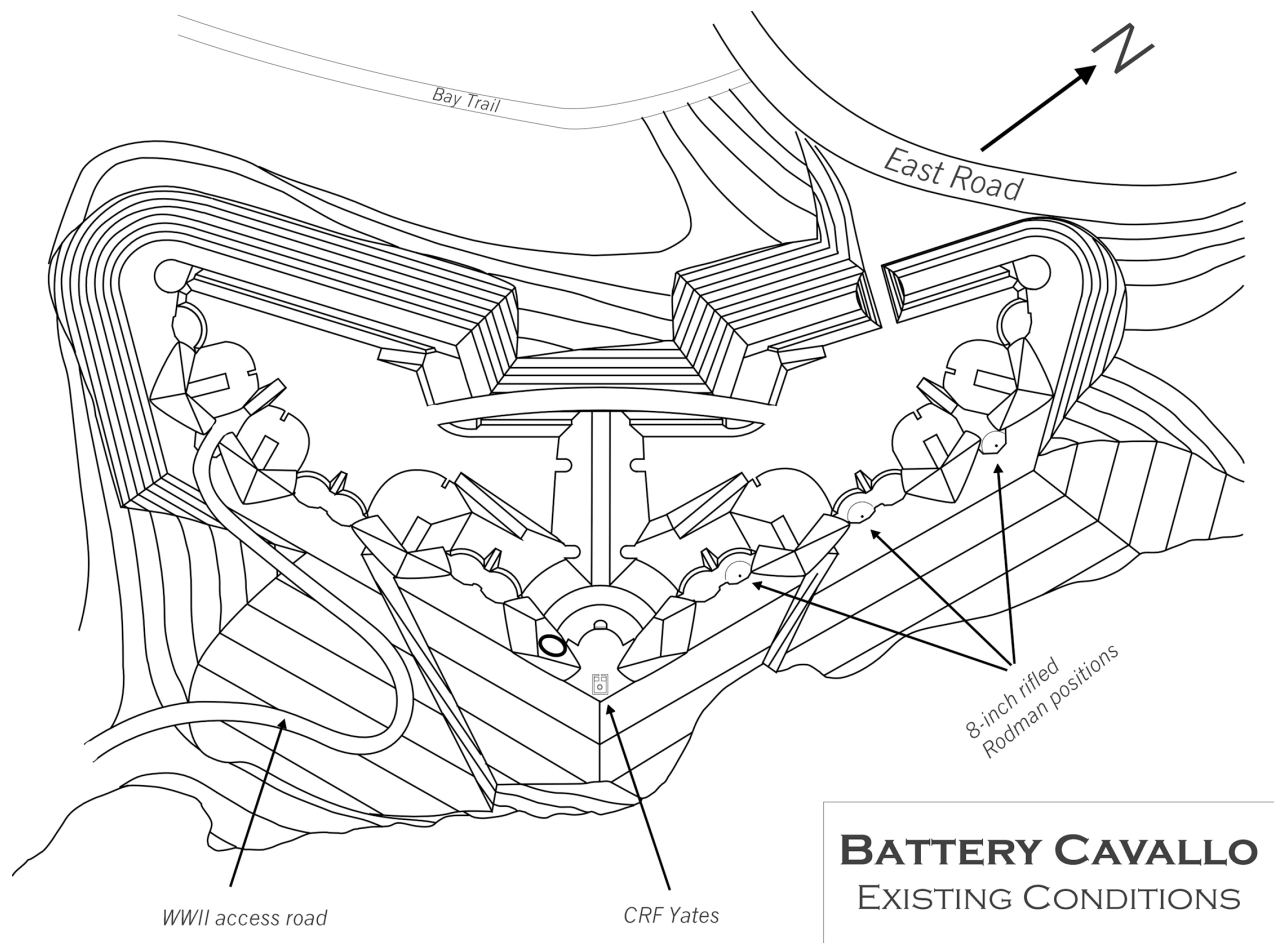
further vandalism to historic fortification. Fences have been repaired and new wayside exhibits are under construction.

Due to the fragile nature of the earthworks and the endangered status of the Mission Blue, however, access to Battery Cavallo is strictly controlled and limited only to guided groups.

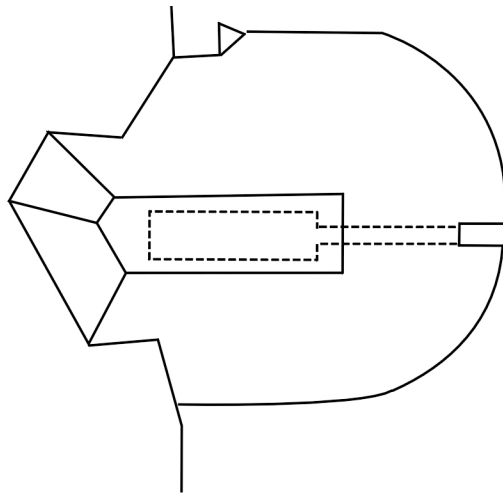
### Significance

Military fortification historians agree that Battery Cavallo is an outstanding example of Plan of 1870 fortifications. In his landmark *Historic Resource Study: Seacoast Fortifications San Francisco Harbor*, Erwin Thompson wrote: “Of all the works constructed in the 1870s, the Cavallo Battery was the most handsome architecturally and is the best surviving example of the post-Civil War earthworks... It is recommended that the necessary restoration of the parapets be carried out and that the battery be preserved and interpreted as a prime exhibit of the post-Civil War modernization project.”(21)

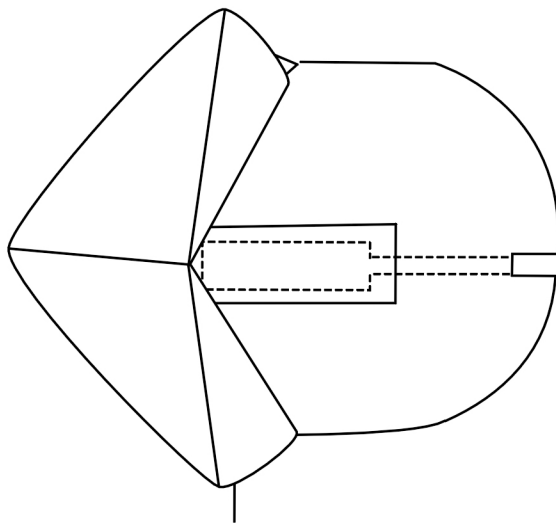
Recently, Matthew Adams added his opinion: “Cavallo remains to my mind the only ‘fort’ style 1870s construction built as part of the post-Civil War program and not as a detached outwork to some already existing brick fort. [It is] architecturally unique.”(22) Nelson Lawry, former CDSG preservation officer, describes Cavallo as “this most interesting



Battery Cavallo in 1999.  
(Illustration by John Martini.)



Traverse, original configuration  
1876



Traverse with earth addition

## EVOLUTION OF TRAVERSES

jamartini 9/5/99

The traverses at Battery Cavallo in their original 1872 form (top) and in their final configuration (bottom) with additional earth cover on their seaward ends. (Illustration by John Martini.)

and well preserved battery, clearly transitional between the harbor defenses of the Civil War and the early modern ones of the Endicott era.”(23)

Battery Cavallo today can be described as an impacted yet significant historic structure containing a high degree of integrity. The battery is currently listed on the National Register of Historic Places as part of a district that includes all of Forts Baker, Barry, and Cronkhite. It is also featured in a draft National Historic Landmark nomination currently being prepared by the National Park Service for the harbor defenses of San Francisco Bay.

The battery’s significance and integrity is undoubted. The challenge now is to preserve Cavallo for posterity.

### Notes

1. In his *Memoirs*, John Charles Fremont claims he named the harbor entrance “Golden Gate” in recognition of its similarity to the Golden Horn of Byzantium. However, Fremont actually used the Greek version of Golden Gate: “Chrysopylae.”
2. E.R. Lewis, *Seacoast Fortifications of the United States: An Introductory History*, (Washington, D.C.: Smithsonian Press, 1970), p. 70.
3. Erwin N. Thompson, *Historic Resource Study: Seacoast Fortifications of San Francisco Harbor*, (Denver: National Park Service, 1979), pp. 81-82.
4. Letter, Board of Engineers for Fortifications to chief of engineers, April 27, 1870. NARA, RG 77
5. E.R. Lewis, *A History of San Francisco Harbor Defense Installations: Forts Baker, Barry, Cronkhite and Funston*, (Sacramento: CA Div. of Beaches and Parks, 1965), p. 100.
6. Thompson, pp. 107-108
7. NARA, San Bruno, RG 77, OCE, San Francisco Dist., Journal of Operations, Lime Point, 1867-1876
8. Thompson, p. 109
9. *Annual Reports of the Chief of Engineers*, 1880 and years following.
10. *Annual Report of the Chief of Engineers*, 1883, p. 48
11. Thompson, p. 118
12. NARA, Fortifications File, Drawer 93, Sheet 69-8, “Plan & Sections of New Works at Point Cavallo, Proposed by the Board of Engineers, November 21, 1890.”
13. NARA, Fortifications File, Drawer 256, Sheet 22-26, “Armament Sketches of Defensive Works in San Francisco Harbor.”
14. Stephen A. Haller, and John A. Martini, *Ordnance Report: Golden Gate National Recreation Area*, (San Francisco: National Park Service, 1997), p.17.
15. War Department, Report of Completed Works, Form 5, Batteries Yates and Duncan, Oct. 1, 1921, Park Archives and Record Center, Golden Gate National Recreation Area (PARC), Records of Complete Works file.
16. “Coincidence Range Finder Station... Dec. 12, 1918,” Plan, PARC, Army Records, Plan Drawer 432.
17. Fort Baker Record Book, PARC, Army Records, Accession GOGA-1766, p. 62.
18. “Club Cavallo - Historical Monument and Officers Mess,” March 1939, PARC, Army Records, Plan Drawer 432,
19. “Military Reservation, Fort Baker, Location No. 10, Harbor Defenses of San Francisco, 15 November 1945,” PARC, Army Records, Plan Drawer 182.
20. “Battery Cavallo (Fort Baker), Bldgs.#664 & #665,” PARC, ARC, Plan Drawer 182. The author first visited Battery Cavallo in 1972. At that time, the doors were already missing from the battery.
21. Thompson, p. 424.
22. Adams to author, email, September 15, 1999.
23. Lawry to Stephen A. Haller, historian, Golden Gate NRA, October 23, 1999.