

**CALIFORNIA HISTORIC MILITARY
BUILDINGS AND STRUCTURES INVENTORY**

**VOLUME II:
THE HISTORY AND HISTORIC RESOURCES OF THE MILITARY
IN CALIFORNIA, 1769-1989**

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LIST OF ACRONYMS^{1/}

A&E	Architect-Engineer
AAF	Army Air Forces
AAFB	Army Air Forces Base
ABM	Anti-Ballistic Missile
ACHP	Advisory Council on Historic Preservation
AFB	Air Force Base
AFCEE	Air Force Center for Environmental Excellence
AFS	Air Force Station
AFSWP	Air Force Special Weapons Project
AMC	Air Mobility Command
ASCE	American Society of Civil Engineers
ATC	Air Transport Command
BEQ	Bachelor Enlisted Quarters
BLM	U.S. Bureau of Land Management
BOMARC	Boeing and Michigan Aeronautic Research Center
BRAC	Base Realignment and Closure
BuDocks	Bureau of Yards and Docks
BUIC	Backup Interceptor Center
Caltech	California Institute of Technology
Caltrans	California Department of Transportation
CB	Construction Battalion
CBC	Construction Battalion Center
CCC	Civil Conservation Corps
CERL	Corps of Engineers Research Laboratory
CFR	Code of Federal Regulations
CHRIS	California Historical Resources Information System
CMECC	California Military Environmental Coordination Committee
COMCABWEST	Commander Marine Corps Air Bases, Western Area
COMNAVBASE	Commander Naval Base, Navy Units
CRMP	Cultural Resources Management Plan
CRPAT	Cultural Resources Process Action Team
DDJC	Defense Distribution Depot San Joaquin
DLA	Defense Logistics Agency
DLI	Defense Language Institute
DoD	Department of Defense
DPR	Department of Parks and Recreation
DRMO	Defense Reutilization and Marketing Office

LIST OF ACRONYMS^{1/}

DSA	Defense Supply Agency
EA	Environmental Assessment
EFA	Engineering Field Activity
EIS	Environmental Impact Statement
EW	Electronic Warfare
FAA	Federal Aviation Administration
FISC	Fleet and Industrial Supply Center
FUD	Formerly Used Defense (Sites)
GGNRA	Golden Gate National Recreation Area
GOCO	Government-Owned, Contractor-Operated (production facility)
GOGO	Government-Owned, Government-Operated (production)
GPS	Global Positioning System
GSA	General Services Administration
HABS	Historic American Buildings Survey
HAER	Historic American Engineering Record
HARP (Plan)	Historic and Archaeological Resources Protection (Plan)
HPMM	Historic Preservation and Maintenance Manual
HPP	Historic Preservation Plan
HRI	Historic Resources Inventory
IBM	Industrial Business Machines
ICBM	Intercontinental Ballistic Missile
ICRMP	Integrated Cultural Resources Management Plan
ILWU	International Longshoreman's Workers Union
INS	Immigration and Naturalization Service
IRBM	Intermediate Range Ballistic Missile
LRA	Local Redevelopment Authority
LTA	Lighter-Than-Air
MATS	Military Air Transport Service
MCAGCC	Marine Corps Air Ground Combat Center
MCAS	Marine Corps Air Station
MCMWTC	Marine Corps Mountain Warfare Training Center
MCRD	Marine Corps Recruit Depot
MFA	Moffett Federal Airfield
MIT	Massachusetts Institute of Technology
MOA	Memorandum of Agreement
MWR	Morale, Welfare and Recreation
MWTC	Marine Warfare Training Center
N&MRC	Naval and Marine Reserve Center

LIST OF ACRONYMS^{1/}

NAAS	Naval Auxiliary Air Station
NAB	Naval Amphibious Base
NACA	National Advisory Committee for Aeronautics
NAD	Naval Aviation Depot
NAF	Naval Air Fields
NAS	Naval Air Station
NASA	National Aeronautics and Space Administration
National Register	National Register of Historic Places
NAVFACENCOM SW DIV	Naval Facilities Engineering Command Southwest Division
NAVSOC	Naval Special Operations Command
NAVSTA	Naval Station
NAWS	Naval Air Weapons Station
NCO	Non-Commissioned Officer
NCS	Naval Communication Station
NCSHPO	National Conference of State Historic Preservation Officers
NEL	Naval Electronics Laboratory
NEPA	National Environmental Protection Act
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NORAD	North American Air Defense
NOTS	Naval Ordnance Test Station
NPS	National Park Service
NRC	Naval Reserve Center
NRRF	Naval Radio Receiving Facility
NSD	Naval Supply Depot
NTC	Naval Training Center
NTS	Naval Training Station
NUC	Naval Undersea Center
NWS	Naval Weapons Station
OHP	Office of Historic Preservation
OPR	Office of Planning and Research
PA	Programmatic Agreement
PAVE PAWS	Perimeter Acquisition Vehicle Entry Phased Array Warning
PMOA	Programmatic Memorandum of Agreement
POW	Prisoner-of-War
PWC	Public Works Center
R&D	Research and Development
RDT&E	Research, Development, Testing and Evaluation

LIST OF ACRONYMS^{1/}

SAC	Strategic Air Command
SAGE	Semi-Automatic Ground Environment
SALT	Strategic Arms Limitation Talks
SCI	San Clemente Island
SDI	Strategic Defense Initiative
Seabee	Construction Battalion
SERE	Survival, Evasion, Resistance and Escape
SHPO	State Historic Preservation Officer
SNI	San Nicolas Island
SNORT	Supersonic Naval Ordnance Research Track
SSC	Space and Naval Warfare Systems Center
SSTB	Salton Sea Test Base
Statewide Inventory	Statewide Historic Buildings and Structures Inventory
T&E	Testing and Evaluation
UCLA	University of California, Los Angeles
USACE	U.S. Army Corps of Engineers
VAL	Variable Angle Launcher
V-J	Victory over Japan
VLAP	Vietnam Laboratory Assistance Program
WPNSTA	Weapon Station

^{1/} This list contains acronyms used in Volumes I, II, and III of the *California Historic Military Buildings and Structures Inventory* (Statewide Inventory).

PREFACE

This is Volume II of the four-volume series “California Historic Military Buildings and Structures Inventory” which reports the results of the Statewide Historic Buildings and Structures Inventory for Department of Defense (DoD) Installations (Statewide Inventory). The Statewide Inventory is a program that was developed by the California Military Environmental Coordination Committee (CMECC) in response to the need for better coordination between the military service branches in conducting historic buildings and structures evaluations at military installations. This need is particularly important, given the number of large-scale inventories being done for military base closures in California. The CMECC, through its Cultural Resources Process Action Team (CRPAT), believed that the service branches could achieve better consistency in evaluating historic buildings and structures at military bases by taking a statewide and interservice approach. Such a coordinated approach would help in avoiding the pitfalls of over-representing or under-representing important time periods or historic themes in National Register of Historic Places (National Register) nominations.

This coordinated approach would have three key ingredients: 1) a stock-taking of previous work that would assess the extent of survey completed and the types of properties found that meet National Register criteria, 2) preparation of a historic themes and contexts statement for the entire state and all four service branches, and 3) an understanding of some key property types that best exemplify the most important time periods and historic themes of California military history.

The four volumes of this study address these program elements. Volume I, titled “Inventories of Historic Buildings and Structures on California Military Installations” is the report of an effort to collect and classify all previous studies of California DoD buildings and structures inventories. It includes an installation-by-installation assessment of inventory completeness, and an analysis of the historic buildings and structures found to date that meet National Register criteria in terms of their period of significance and their general function and specific use types.

Volume II, this volume, presents an interservice and region-wide history and historic themes statement for the military in California, 1769 to 1989. It provides a fabric for understanding the significance of the properties found that meet National Register criteria in past studies, and should serve as a guide for future studies taking the interservice and statewide context approach.

Volume III, titled “Historic Context: Themes, Property Types, and Registration Requirements” brings the analysis of inventoried historic properties together with the historic themes statement, by discussing key or representative property types that particularly exemplify the historic character of a given time period or that memorialize the events of that period. It gives examples of properties representative of the various identified property types that researchers have found

that meet National Register criteria. This volume also discusses the registration requirements for these key property types.

A fourth volume contains the appendices to the other three volumes. Appendices A and B address the concordance of installation names by most recent name and by historic name, respectively. Appendices C and D present the two key data tables used in the study and analyzed in Volume I. The “Inventories and Documents Data Table,” with information about each of the past studies done, is presented as Appendix C. The “Historic Properties Data Table,” presented as Appendix D, contains information about all properties on California military installations found, to date, to meet National Register criteria.

The Statewide Inventory should serve as a guide to future research, as DoD moves towards achieving the goal of completing the historic buildings and structures inventory that remains to be done at California installations. This remaining inventory is being done both to meet National Historic Preservation Act (NHPA) Section 106 requirements as bases being closed are prepared for transfer, and to meet the NHPA Section 110 mandate that federal agencies take stock of historic properties under their management. As this program moves forward, it will help DoD in achieving its overall goal of preserving our heritage while safeguarding our future.

The Statewide Inventory is being conducted with funding from the DoD Legacy Resources Management Program. Participating agencies in the CMECC’s Cultural Resources Process Action Team (CRPAT) include the four military service branches (Army, Navy, Marine Corps, Air Force), Advisory Council on Historic Preservation, California Office of Historic Preservation, National Park Service, and Governor’s Office of Planning and Research. See Volume I for a more detailed introduction to the program and a list of the program’s contributors and participants by name.

1.0 INTRODUCTION

This historic context and thematic statement was prepared as Phase II of the Statewide Historic Buildings and Structures Inventory, DoD Installations, State of California. The overall purpose of this document is to establish themes and contexts to be used by all branches of the armed services in evaluating significance of historic military resources in California. The historic themes in this context are necessarily broad in nature, pointing to the most decisive developments in military history, from which more discrete themes and property types may be developed and applied to individual bases and properties.

In a sense, the relationship between California and the American military has come full circle in recent decades. Before 1900, a relatively small part of the military's assets was invested in California installations; the great American facilities were centered in the Northeast and South, with substantial assets in the Midwest, as well. Between 1900 and the early 1990s, however, military investments (both facilities construction and weapons procurement) in California rose sharply. During the most recent build-up of American forces and weapons in the 1980s, California accounted for a hugely disproportionate share of military spending. During the early 1990s, however, California shouldered the largest burden of military downsizing associated with the Base Realignment and Closure (BRAC) Commission, or BRAC Act, actions. Throughout California, the base closures were devastating. Areas once influenced, if not dominated, by national defense institutions were suddenly without any military presence at all.

No one can predict what will happen in the future; California may or may not experience the heady growth in military expenditures that prevailed in the early 1900s, late 1930s, 1950s, and 1980s. Whatever the future may hold, the BRAC closures afford an opportunity to take stock and assess the importance of the century and a half in which the American military has played such a key role in the life of the state. The occasion is all the more important because so many physical reminders of that history—buildings, structures, objects, sites—will soon pass out of the control of the military and into civilian hands. An assessment of the important trends in military history is of value to military and civilian personnel alike. The civilian agencies that take control of the BRAC-closed installations will have the responsibility of managing the legacy of many of the oldest of the California facilities, such as Mare Island and the Presidio of San Francisco. The historic military properties remaining under military control may gain additional significance, owing to the fact that many of the most valuable historical military properties are no longer DoD-owned or controlled and face an uncertain future.

During the BRAC process and for many years previously, military facilities in California have surveyed their holdings to identify properties that may be of historical significance. In the administrative framework for historic preservation planning, historic significance is defined as

eligibility for listing in the National Register. In general, the various military installations and branches have proceeded responsibly in this effort, and nearly every base in California has conducted some type of inventory of its historic properties. What has been missing from this exercise, however, has been some sense of the bigger picture, the larger trends and events that have shaped the history of the military in California. Military personnel or their contractors have worked diligently to identify significance for properties on individual installations, but without the benefit of a more comprehensive framework that might help define significance in a statewide perspective.

The purpose of the present volume is to establish that larger picture, to highlight the dominant trends in the military history of California. This context pursues two basic questions as it analyzes events in various time periods: What of importance occurred in that time frame? And did those events leave behind tangible resources (buildings, structures, objects, sites)?

This context is divided into seven periods or eras, each discussed in a separate chapter: the Colonial Era (1769-1846), the Frontier Era (1846-1865), the Traditional Era (1866-1902), the Modernization Era (1903-1918), the Interwar Era (1919-1938), World War II Eras (1939-1945), and the Cold War Era (1946-1989). These are interpretive constructs and do not necessarily denote radical transformations of military in California. History is rarely so tidy as to fit into such neat compartments. Nonetheless, if we understand the underlying trends in military history and construction of military buildings in each period, we may begin to appreciate what is or is not important about the historic properties that remain from those different eras.

This broad historic context is designed to identify the dominant historic themes that characterize each of these periods, as well as the broad categories of historic properties associated with each theme. The dominant theme of the first period examined is the role of the Spanish military as part of the state-sponsored colonization program of Spain in California. The Colonial Era (1769-1846) is the most unusual of the group in that it is the only era that concerns a military other than that of the United States. The Spanish military was part of a three-pronged strategy for controlling the California frontier, along with the Catholic Church and small secular communities. The mission, the presidio, and the pueblo were the foundations of Spanish colonization for hundreds of years before the Spanish began settling California in 1769. The presidio served its limited function for about half a century, until Spanish rule was overthrown in the Mexican war of independence in 1821. The presidios lapsed into disuse and disrepair under Mexican rule; none of the presidios were occupied at the time American forces seized California in 1846.

During the Frontier Era (1846-1865) California itself was a frontier area and the bulk of American military assets were devoted to maintaining domestic order, including quelling Indian-

white violence, in the remote areas of the state. While a few permanent facilities were built during this period, most notably Mare Island, the Benicia Arsenal, and the Presidio of San Francisco, the core asset of the American military was the string of small Army camps and forts far removed from San Francisco Bay.

The Traditional Era (1866-1902) represents a period for the Army and Navy in which post-Civil War forces and installations were built around a 19th century model for military organization and building design. Russell Weigley¹ has called this period the “Twilight of the Old Army,” referring to the strategy and training regimen of the Army and arguing that the Army did little to modernize from pre-Civil War conditions. This was also the “twilight” of the old Army and Navy architecture. From the standpoint of success in the battlefield or development of new technologies, this was a somewhat languid period for the military in California. The nation was at peace for most of this period (except for persistent Indian Wars) and force levels were at historic lows until the build-up during and after the Spanish-American War. From the standpoint of the design of military buildings, however, this was arguably the most successful period in the history of the state, or at least among the most successful. The handsome barracks, shops, family quarters, and stables from this era represent a full expression of the 19th century military base design.

During the Modernization Era (1903-1918), all branches of the military modernized and were forced to adapt to fundamentally new technologies such as the airplane, submarine, tank, motorized vehicle, and radio communication. The Army, which had to adapt to trucks, tanks, and machine guns, began in 1917 to assemble a modern training facility on Monterey County lands which would become Fort Ord during World War II. The Navy, which had to adapt to new battleship designs, submarines, and airplanes, modernized its shipyards and built its first Naval Air Station (NAS) during this period. The emerging Army Air Forces had to adapt to an entirely new technology. These fundamentally new technologies required new installations, training requirements, and radically different building types.

The Interwar Era (1919-1938) was one of consolidation for the military in California, in which the various branches concentrated on training in the use of the major new technologies introduced during the first two decades of the 20th century. It was also a period in which the various branches spread to new regions of the state, extending far beyond their traditional base in the San Francisco Bay Area. This dispersal may be attributed to several factors, not the least of which was the fact that the Army and Navy had outgrown the relatively small installations such as Mare Island, the Presidio of San Francisco, and the Benicia Arsenal. The dispersal may also

¹ Weigley, Russell F. *History of the United States Army*. New York: MacMillan Co., 1967.

be attributed to the diverse needs of the branches as they expanded upon the modernization program from World War I: Naval Air Stations, Army Air Corps fields, armored cavalry training bases; and so forth. To a large degree, however, the geographical dispersal of the military during this period can be attributed to the fact that various California cities competed with one another to reap the social and economic advantages that came with the construction of new installations.

The World War II Era (1939-1945) was like no other in its impact on nearly every aspect of life in practically every California county. World War II was distinctive in its impact on California for two reasons. It was an “all out” war and it was fought as fiercely in the Pacific as in the Atlantic. The United States marshaled every asset at its disposal to win the war. It acquired land throughout California for dozens of new installations. It called upon every manufacturer in the state to produce weapons, clothing and food, and anything else troops might need. It partially transformed California universities, particularly high technology-oriented universities like the University of California and the California Institute of Technology, into advanced weapons research laboratories. In short, World War II affected nearly every aspect of life in California and produced a great variety of new military facilities. Most of these new facilities were mundane. Training facilities for infantrymen and pilots were the most numerous. A few, however, were decidedly high technology in their orientation, such as the Navy’s missile test facility at China Lake or the Army’s airplane test facility at Muroc (later Edwards Air Force Base [AFB]). The small number of high-technology bases helped set the stage for California’s technological role in the Cold War.

Throughout the Cold War Era (1946-1989), California was the nation’s leading region in the development of high technology weapons and systems. This was true of the military bases as well as the private contractors and universities in the state. The ascendancy of California in technology may be largely attributed to the special role of a handful of research and development (R&D), and testing and evaluation (T&E) bases—the Navy’s laboratory at China Lake, their test stations at China Lake and Point Mugu, and the Air Force’s test station at Edwards AFB and launch facility at Vandenberg AFB. Even the older installations took on increasingly high technology assignments. The old Navy shipyard at Mare Island, for example, became a key nuclear submarine facility. Contractors and universities also played important roles in the establishment of California as the technology center for the military. California helped the military win the Cold War; in turn, the military helped transform California into the technology capital of the United States.

The dominant themes outlined above relate chiefly to patterns in military strategy and technology. These themes have a great deal to do with property types as well. Knowing that the submarine was a turn-of-the-century invention, for example, helps us to appreciate the potential significance of submarine repair buildings at Mare Island from the 1910s. Understanding that

essentially all of the frontier Army forts have passed out of DoD ownership helps us to appreciate the potential significance for any remnants of those forts still owned by the military (there are very few). In essence, this context is designed to identify the “big picture” themes from which more discrete evaluative themes may be derived for the individual branches or installations.

This context also affords the opportunity to tell the story of the importance of the military in the history of California. Surprisingly, this story has not been previously told, at least not comprehensively in a single volume. That history has been characterized by ebbs and flows of troop strength and appropriations. Since the BRAC process of the early 1990s, the military has assuredly ebbed, although history suggests the condition will not be permanent. The lull in military activity, accompanied by the closure of numerous bases statewide, provides an excellent opportunity to reflect on what is significant about the military history of the state. Most people likely sense intuitively that the military has had a profound impact on California, and that Californians, in turn, have contributed to the development of the American military. This volume explores exactly how and why this interaction between Californians and the American military was historically important.

This volume draws upon the findings of four types of documents: secondary historical literature on the various military branches and individual activities; secondary historical literature on the history of California and its distinct regions; national historic contexts prepared by DoD for specific military activities and types of properties, mostly during the Cold War; and hundreds of cultural resource inventories prepared for military installations in California.

Secondary literature was most helpful in documenting the early history of the military in California, particularly the Colonial and Frontier eras. DoD national contexts were invaluable in documenting the history of specific aspects of the military in California. These contexts are limited only by the fact that they deal primarily with the Cold War era; relatively few national contexts have been developed for military properties from earlier periods. These two types of references (secondary literature and DoD national contexts) are listed in the bibliography at the back of this volume.

By far, the most useful sources of information were the hundreds of cultural resource inventories prepared for military installations throughout California. These reports were written over a long period of time, from the early 1970s through the late 1990s, and vary considerably in terms of the quality of research and completeness of the surveys. Nonetheless, there is no better way, short of original research in primary records, to document the variety of military activities in California.

These inventories, however, suffer from two limitations from the point of view of most researchers: lack of availability and narrowness of focus. Cultural resource surveys are

notoriously difficult to locate. The reports, while prepared for a specific purpose, are generally prepared to comply with Federal historic preservation requirements. When that purpose has been met, the reports are usually filed away in government archives. Rarely do these reports find their way to public libraries or other locations where they could be used by the general public. Additionally, the reports are usually very limited in their focus. Each inventory is concerned with the buildings and structures on a particular base and usually does not address statewide or national trends. The more recent inventories, particularly those dealing with Cold War properties, are more comprehensive than earlier studies. Despite their shortcomings, these cultural resource inventories collectively represent the most important research program dealing with the history of the military in California. These inventories are listed in the bibliography for this volume, as well as in the inventories database in Appendix C.

2.0 COLONIAL ERA (1769–1846)

Long before the United States conquered California in 1846, nations from around the world contemplated colonizing this beautiful and abundant land. At one time or another, the navies of England, Russia, France, and Spain sailed by the California coastline or stopped in her bays and harbors. In the larger geopolitical perspective, it was all but inevitable that one of the European colonial powers would seize the land from its Native American residents and hold it by military force. Spain was the founder of the military tradition in California, but only because it got here first.

By the time Spain settled California, it had hundreds of years of experience in colonizing what would become the Southwest of the United States, as well as most of Latin America.² Permanent Spanish settlers reached California in 1769, nearly 225 years after Cortez invaded Aztec-controlled Mexico. By then, the Spanish government had worked out the essential strategy for how to occupy a new area at the least cost to the crown and the settlers. The Spanish approach to colonization was built around three major institutions—the mission, presidio, and pueblo—with the presidio being the only one military in its orientation. The mission—a church-run community populated chiefly by Native Americans, designed to convert and “civilize” the Indians—was the best known and, arguably, the most successful of the Spanish tools of colonization. The pueblos were essentially small towns, built around civilian, secular rule. The pueblo planted the seeds of civic government and a secular, civilian populace and economy. The presidio was the only specifically military institution within the Spanish system. It provided a military force to defend the colony against foreign aggression and internal disorder. In modern terminology, a presidio was simply a military installation.

The presidios, however, were so fundamentally different from the later American military installations that the two can hardly be compared. The closest functional equivalent of the American experience in California would be the small forts the American Army established in the frontier regions of the state between 1846 and 1865. The two are comparable in that the presidio, like the early American forts, provided a barracks for troops and a place of refuge for civilian settlers during times of trouble, usually Indian-white conflict. The presidio was a building as well as an institution, and many of the American frontier forts were built with barricades, in the manner of the presidios. Another comparison might be between the presidio and the coastal defense batteries built by the United States before the Civil War. The presidios of San Francisco, San Diego, and Monterey included separate barricaded batteries at the entrances

² The general Spanish strategy has been discussed in numerous general works. John Francis Bannon, *The Spanish Borderlands Frontier, 1513-1821* (Norman: University of Oklahoma Press, 1974) is highly regarded.

to the most valuable harbors, to provide artillery positions to defend those harbors.³ These coastal defense forts were separate from and supplemental to the main presidio barracks and embattlements. Thus, the Spanish had seized high ground to defend their three most important harbors. It is not surprising that the Americans would capture those same coastal defense sites in 1846 and use them for exactly the same purposes. In reality, however, comparisons between the Spanish presidio and American forts fall short, due to the fundamentally different roles the military played in the two societies.

The troops at the presidios were part of a unified, state-sponsored program of colonization, a program that relied upon the Catholic Church as much as the military or civilian rule to settle and control the new territory. This linking of state-sponsored colonization with religious conversion has no equivalent in the American military experience.

The presidios were also notable for the degree to which they were understaffed. The Presidio of Monterey, for example, which had to defend the capital city, had 63 troops in 1792.⁴ In 1790, there were only 200 soldiers divided among the four California presidios (San Diego, Santa Barbara, Monterey, and San Francisco, see Figure 1).⁵ Even the Gold Rush-era American forts in the California wilderness were generously staffed by comparison. The generally ineffectual operations of the presidios caused one historian to pose the question: “The Presidio: Fortress or Farce?”⁶ His conclusion was that they were as much a farce as a fortress.

The Spanish military leaders in California were rarely accorded the respect of their peers or later historians, as were the spiritual leaders or some civilian leaders. No military leader, for example, has gained the attention garnered by Father Junipero Serra or some of the other mission leaders.⁷ We know little about most of these soldiers or how they lived. Jose Arguello is among the best known. Born in Mexico in 1753, Arguello enlisted in the army in 1773 when he was 20 years old. He came to California in 1781 and was stationed in Santa Barbara before being appointed commandant of the Presidio of San Francisco in 1791. Arguello served as commander of the

³ Leon G. Campbell, “The Spanish Presidio in Alta California During the Mission Period, 1769-1784,” *Journal of the West*, 16 (1977). This coastal defense function was unusual among the Spanish presidios of the American southwest. This function, of course, was unnecessary in land-locked Arizona and New Mexico and was not pursued in coastal Texas. The Spanish concern over coastal defense was, in Campbell’s view, related to their fear that England, France, Russia, or the United States might seize California, a fear that proved to be warranted.

⁴ Donald C. Cutter, *California in 1792: A Spanish Naval Visit* (Norman: University of Oklahoma Press, 1990), 121.

⁵ Campbell, “The Spanish Presidio in Alta California,” 66.

⁶ Odie B. Faulk, “The Presidio: Fortress or Farce?” in David J. Weber, *New Spain’s Far Northern Frontier: Essays on Spain in the American West* (Albuquerque: University of New Mexico Press, 1979).

⁷ This is a central tenet of Campbell, who points to the fact that the years of Mission-Presidio-Pueblo colonization are commonly called the “mission period.”

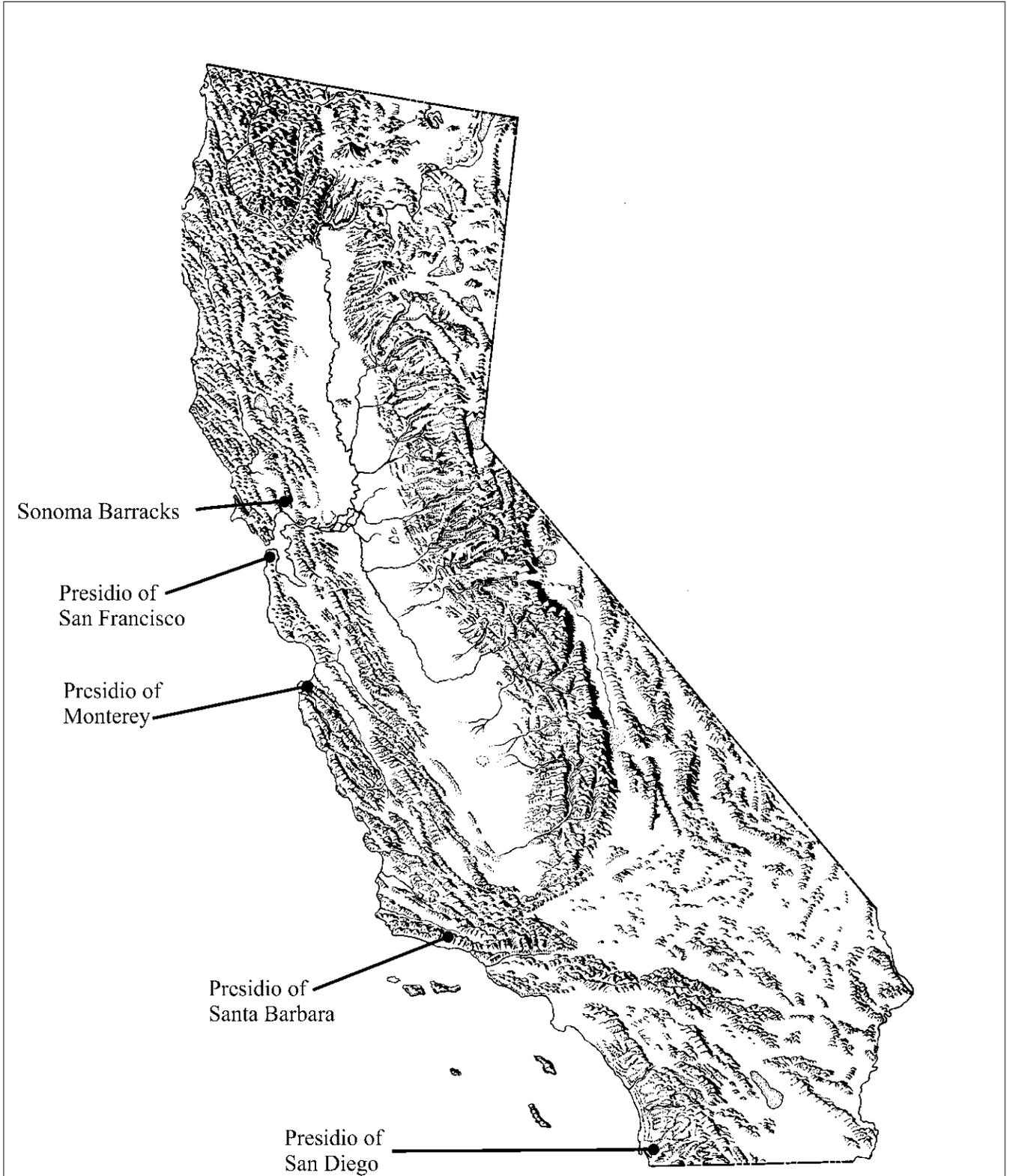


Figure 1. Spanish presidios and barracks during the Colonial Era, 1769-1846

Presidio of Monterey between 1791 and 1796 and later as governor of Baja California.⁸ A 1792 Spanish inspection report described the condition of the 63 men led by Arguello when he was commander of the Presidio of Monterey. Most were married and lived with their families in buildings within the presidio walls. Faced with few and infrequent military threats, the men at the presidio spent most of their time managing the farmland outside the presidio or tending to their stock and supplies. Their health was good, in the opinion of this observer, because of the “lack of opportunity to abandon themselves to the vices that destroy mankind.”⁹ In 1790, nearly two-thirds of the 200 Spanish soldiers throughout the four presidios in Alta California were married and virtually all were illiterate.¹⁰

As noted, the presidio, like the mission, was both a building and an institution. Like the missions, the presidio buildings changed over time. Odie Faulk, a student of presidios throughout the Southwest, maintains that presidio buildings were generally consistent in design, in California and elsewhere. In general, the presidios were square in plan, featured fortress walls at least 10 feet in height, usually made of adobe, included bastions at opposing corners, and enclosed a series of buildings inside the rampart walls, the roofs of which were high enough to permit troops to use them as parapets for firing over the walls. The internal buildings typically included an armory, a chapel, officers’ quarters, and barracks or family housing for the troops.¹¹ This description, however, does not describe perfectly any given presidio or any given presidio at all times.

The Presidio of Santa Barbara is among the best known of the four California presidios today because it is a State Historic Park and has been extensively researched, archivally, archeologically, and architecturally. In plan, it matches Faulk’s general description: it was a square, included exterior defensive walls with bastions on opposing corners, and included a series of internal buildings. As discussed below, the Santa Barbara Presidio is also important because the buildings, some of which are reconstructions, are available for public inspections and interpretation. The floor plan of the Presidio and its relation to adjoining streets in downtown Santa Barbara is shown in Figure 2. The Presidio of San Francisco also matches Faulk’s general description of the typical Presidio.¹²

⁸ Cutter, *California in 1792*, 84.

⁹ Cutter, *California in 1792*, 121. The report was prepared by Jose Cardero, who visited California as part of a Spanish naval inspection of the Pacific Coast in 1792.

¹⁰ Campbell, “The Spanish Presidio in Alta California,” 66.

¹¹ Faulk, “Presidio: Fortress or Farce,” 70.

¹² This floor plan is shown in John Philip Langelier and Daniel Bernard Rosen, “Historic Resource Study: El Pueblo de San Francisco, a History Under Spain and Mexico, 1776-1846,” (National Park Service, Golden Gate National Recreational Area, 1992), 72.

Generally, the various presidios were staffed and maintained during the period of Spanish rule (until Mexican independence in 1821) and allowed to decay during the Mexican period of California history (1821 to 1846). A 1792 inspection of the Presidio of Monterey found it to be in good repair and adequately staffed.¹³ An 1837 visitor to the Presidio of San Francisco (there were actually two presidio buildings, the main quadrangle in the main post of the current Presidio and a coastal defense battery, called El Castillo de San Joaquin) found a radically different situation. The presidio buildings, in the eyes of this American observer, were in a state of advanced decay: “Since the expulsion of the Spaniards in the revolution, the place has been going to ruins.”¹⁴ The only Mexican military building that was intact and capable of housing troops in 1846 was the Sonoma Barracks. The Sonoma Barracks was not a presidio; it was a two-story adobe building constructed by Mexican Army troops under the command of General Mariano Vallejo, the last commander of the Presidio of San Francisco. Vallejo had taken his troops to Sonoma, north of and inland from San Francisco, in 1835, and completed the barracks in 1841.¹⁵ For whatever reason, all of the soldiers were gone on June 14, 1846 when about 30 members of the Bear Flag revolt captured Vallejo at his home.¹⁶

In short, Mexico made little effort to militarily defend California. The American decision to conquer California is often interpreted as a response to the fact the province was so defenseless that it invited conquest by a foreign power, whether the United States, England, France, or someone else. In other words, the United States elected to seize California before someone else did.¹⁷

When the United States conquered Mexico in 1846, the federal government reserved for the American military any lands formerly used for military purposes by the Mexicans. Thus, the Department of War (later DoD) inherited many of the older presidios. The Presidio of San Francisco (the American station) occupied the same land at the Spanish-Mexican installation of the same name, including the coastal battery site. The Mexican troops had abandoned the

¹³ Cutter, *California in 1792*, 121-129.

¹⁴ Kenneth B. Ransford, *Readings on California in the Spanish-Mexican Period* (Davis: University of California, Davis, 1978), 129. The observer was Philip Edwards who was driving cattle from California to Oregon.

¹⁵ Neil Harlow, *California Conquered: The Annexation of a Mexican Province, 1846-1850* (Berkeley: University of California Press, 1982), 98; The rationale for establishing the Sonoma Barracks is discussed in Langelier and Rosen, “Historic Resources Study: El Pueblo de San Francisco.”

¹⁶ There were other non-presidio “forts” in California during Mexican years, but these were not military buildings in the usual sense. Sutter’s Fort in Sacramento was a private fortification. Fort Ross on the Sonoma County coast was technically a fort of the Russian-American Fur Company, although it existed with the blessing of the Russian government and was a cause of considerable concern to the Mexican government in California.

¹⁷ The historiography of this issue is explored in Harlow, *California Conquered*.

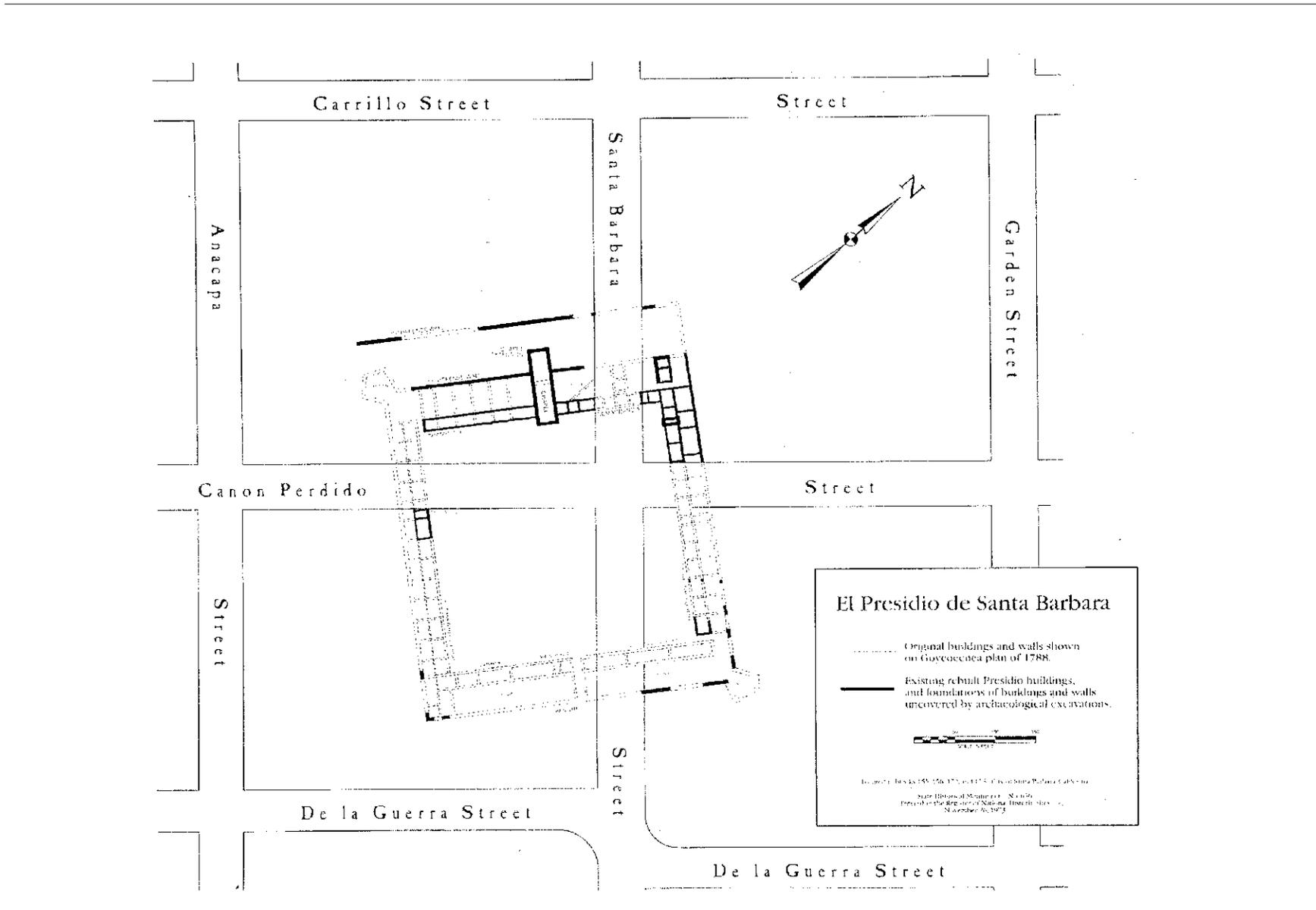


Figure 2. Original general plan for the Presidio of Santa Barbara, superimposed over modern streets in downtown Santa Barbara. (Source: Santa Barbara Trust for Historic Preservation.)

Presidio as early as 1835.¹⁸ What the American military inherited, then, was largely useless for the purpose of defense or garrisoning troops. The American military would briefly occupy the coastal battery of the Presidio of Monterey. They built Fort Mervine in 1846 and constructed barracks on the property during the Civil War. The barracks were later abandoned until the early 20th century, when that land was used to establish the American facility called the Presidio of Monterey (now the Defense Language Institute).

Virtually nothing remains from any of the Spanish presidios on land controlled by the American military after 1846. It is generally recognized that part of the original presidio buildings was incorporated into the officers' club at the American Presidio of San Francisco.¹⁹ As noted, the "Castillo" at the Presidio of Monterey was occupied in 1846 and renamed Fort Mervine. The remnant of El Castillo, however, is best described as a minor ruin, barely distinguishable from the surrounding natural hillside.²⁰ Fort Guijarros at Point Loma, San Diego was abandoned by the Mexicans in 1835 and virtually all material at the fort had been salvaged by settlers in San Diego for building material.²¹ Thus, although the military acquired the land occupied by the old presidios, the buildings were either in ruins or had been destroyed altogether. The presidios of San Francisco, San Diego, and Fort Guijarros (except for the small building remnant in the officers club in San Francisco) exist only as archeological sites.²²

A few presidio-related resources did survive in private, non-profit, and public ownership. The most significant remnants of the Spanish-Mexican military resources exist in Monterey and Santa Barbara. The chapel of the Presidio of Monterey still exists. It was used as a church, unrelated to the military at the time of the conquest, and is still used for that purpose.²³ Two original buildings remain from the large presidio in downtown Santa Barbara, and other buildings have been reconstructed as part of the El Presidio de Santa Barbara State Historic Park.²⁴ The Sonoma

¹⁸ Langelier and Rosen, "Historic Resources Study."

¹⁹ "Presidio of San Francisco, National Historic Landmark District," Prepared by the National Park Service, 1992, 7-63. Hereafter referred to as Presidio NHL, followed by page number. This lengthy nomination is a key historical document in analyzing the history and architecture of this installation. The age of this building element is subject to interpretation; it may date to the 1780s or to the 1840s.

²⁰ William E. Prichard, "Preliminary Archeological Investigations at El Castillo, Presidio of Monterey, Monterey, California," Central California Archeological Foundation, 1968.

²¹ Flower & Roth, "Cultural Resource Inventory, Archaeology/History/Architecture, Navy and Coast Guard Lands, Point Loma, San Diego, California," October 1982, 5-130. Barry Alan Joyce, *A Harbor Worth Defending: A Military History of Point Loma* (Cabrillo: Cabrillo Historical Society, 1995).

²² Presidio excavations represent a substantial chapter in the history of historic archeology in California. All four presidios have been excavated to some degree. The Presidio of San Diego is the site of an on-going excavation in which the work is open to public access. See: Brad Bartel, "Archaeological Excavation and Education at the San Diego Royal Presidio, 1987-1990," *Journal of San Diego History*, 37, No. 1 (Winter 1991), 1-30.

²³ Sally Woodbridge, *California Architecture: Historic American Buildings Survey* (San Francisco: Chronicle Books, 1988), 168.

²⁴ Woodbridge, *California Architecture*, 246-247.

Barracks, which was occupied by Mexican troops occasionally for about five years, still exists and is a part of the Sonoma State Historic Park. If one wishes to study the architecture of the military during this period, it may be done only through archival research, inspection of these few remnant elements, none of which exist on military lands, or through archeological investigations at the Presidio of San Francisco, Presidio of Monterey, and Point Loma, or through inspection of the Sonoma Barracks.

2.1 SPANISH-MEXICAN ERA BUILDINGS OWNED BY THE MILITARY

The military does own buildings and structures from the Spanish-Mexican period, but these were not built as military resources. These came to be military resources by accident when the United States acquired land for training bases during World War II. When the Marine Corps acquired a large rancho to establish Camp Pendleton in 1942, it also acquired two adobe homes: the Las Flores Adobe and the Santa Margarita Ranch House. President Franklin Roosevelt, in California to dedicate Camp Pendleton in 1942, spent a night in the Santa Margarita Ranch House, now the home of the commander at Camp Pendleton. Roosevelt warned that any military leader who modified the building faced punishment at the presidential level. Thus, the lovely commander's residence at Camp Pendleton, one of the largest and least modified Mexican era adobes in California, was preserved by presidential decree, an action that was a forerunner of historic preservation efforts California military bases would undertake after passage of the National Historic Preservation Act of 1966.²⁵ The Army also acquired substantial Spanish-Mexican era resources when it acquired the land for Fort Hunter Liggett from newspaper magnate William Randolph Hearst. Many of these resources are associated with the Mission San Antonio de Padua.

2.2 CONCLUSIONS

The dearth of cultural resources from the Spanish-Mexican military period in California relates to many factors: the passage of time, the fragile nature of some of those buildings, and the fact that the Mexican soldiers largely abandoned these bases long before the Americans conquered California. The Spanish government attempted to a limited degree to defend California from military attack. The Mexican government made little effort to do so and allowed its military bases to fall into disrepair. The failure to maintain the presidios is symptomatic of the conditions that allowed California to be conquered with relative ease by the Americans. American troops faced stiff resistance at times, but this came in the form of civil insurrection rather than an organized resistance by Mexican troops.

²⁵ JRP Historical Consulting Services, "National Register Nomination: Santa Margarita Ranch House, Camp Pendleton, San Diego County, California," 1993.

The few remnant presidio buildings in Monterey and Santa Barbara, the barracks at Sonoma, and the archeological sites elsewhere, take on a correspondingly high degree of significance, recognizing their rarity. These buildings assuredly are part of the military legacy of California. These resources, however, were built by and for the military of another nation and represent a radically different conception of the relationship between the military and civilian populations. These resources take on a greater degree of significance, not only for their antiquity and rarity, but because they represent the military thinking of a fundamentally different culture on land now owned by the United States.

3.0 FRONTIER ERA (1846-1865)

This period of American military history in California is best interpreted as a frontier era. The U.S. military was the crucial stabilizing force during the often-chaotic Gold Rush and Civil War years, when the population and wealth of the state far surpassed the viability of its civil institutions. The military conquered California and was responsible for civilian as well as military rule during the years between the conquest in 1846 and admission of California as a state in 1850. The military remained the chief enforcer of law in many parts of California during the early years of statehood, while local law enforcement agencies were being organized. The military presence was even greater during the Civil War, when the Army and Navy were called upon to defend against Confederate and foreign aggression, in addition to dealing with lingering Indian-white hostilities and internal unrest. Although their numbers were small by modern standards, the sailors, soldiers, and Marines in California between 1846 and 1865 arguably played a more pivotal role in California society than at any other time in the history of the state. Only a few permanent military facilities were established during these years. The bulk of the military's assets were stationed at dozens of small camps in the sparsely settled frontier regions of the state.

3.1 CONQUEST AND MILITARY GOVERNMENT

American troops conquered Mexican California, operating from ships, temporary encampments, and Mexican buildings seized to provide quarters. The conquest was accomplished through joint exercises of the Navy, Marine Corps, and Army. The Navy, under the command of Commodore John Drake Sloat, seized the capital at Monterey with 250 Marines and sailors. The Army had the hardest duty; General Stephen Watts Kearny marched his 1st Dragoons (300 strong) from Santa Fe to Southern California and suffered heavy losses along the way, particularly at the Battle of San Pasqual. The Army, Navy, and Marines combined their 600 forces for the decisive Battle of Los Angeles against *Californio* insurgents in October of 1846, marching from San Diego to Los Angeles under the command of General Kearny.²⁶ The various military branches have probably never coordinated their efforts in California to greater effect than was the case during the Mexican War.

In the immediate aftermath of the war, the isolated American military commanders assumed the roles of civilian as well as military leaders, as General Kearny (the highest ranking officer in the state) assumed control of all aspects of governance in the new territory. He was replaced by Colonel Richard Mason and still later by Generals Persifor Smith and Bennett Riley. These men

²⁶ The history of the Mexican War in California is told most definitively in Neil Harlow, *California Conquered*.

attempted to enforce some degree of domestic order by mixing direct military rule, reliance upon the Mexican *alcalde* system, and creation of *ad hoc* American-style local governments. This situation survived from the conquest in 1846 and through the end of the war in early 1848, until California was accepted into the union of states in 1850.²⁷

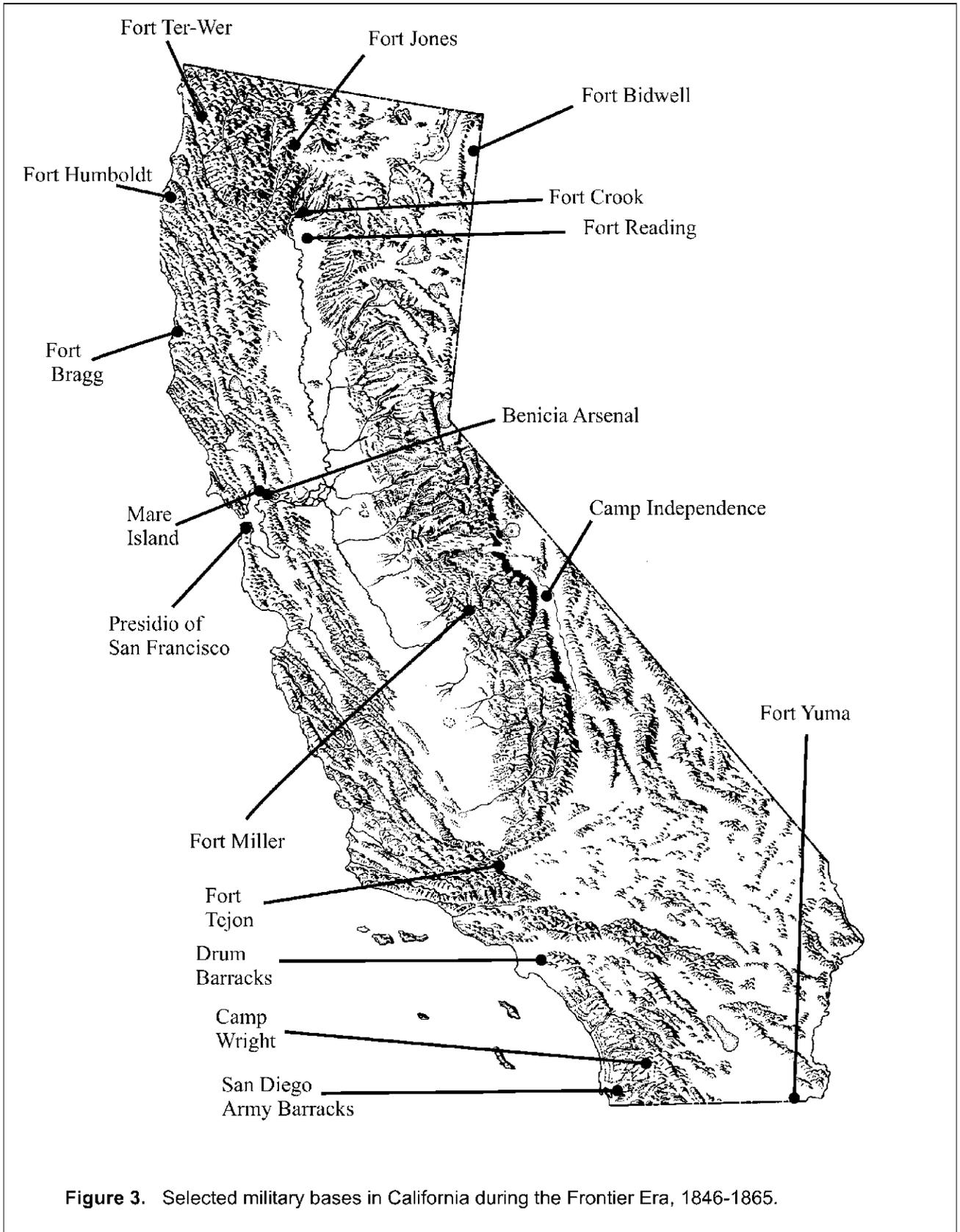
During the course of this four-year period of military rule, James Marshall discovered gold in the American River and hundreds of thousands of gold seekers rushed into California in one of the greatest demographic movements in the history of the world. The Gold Rush had powerful short- and long-term impacts on the military in California. In the short term, it depleted the force of soldiers and sailors, who deserted in large numbers to search for gold. In the long run, the new population thrust the military into the unwanted role of an internal police force for a vast territory that had no rule of law at the time. The state adopted a constitution in 1849 and a government in 1850; local governments were organized shortly thereafter. While cities and counties would ultimately relieve the military of these responsibilities, those local institutions developed slowly. Between the Mexican War and the Civil War, the military (especially the Army) was an invaluable force for domestic order in the California frontier.²⁸

3.2 ARMY FORTS ON THE FRONTIER

Between 1846 and 1865, the military established dozens of installations in California, with the vast majority being Army forts. Few of these still exist and almost none are still owned by the military. The California installations from the Frontier Era may be categorized in several ways. The most obvious distinction is between Army and Navy facilities: there were more than a dozen Army camps, but only one Navy station, the Naval Shipyard at Mare Island (there were no independent Marine Corps facilities in California until the early 20th century). Another distinction can be drawn between sites seen as permanent from the outset and those built to temporary standards with the expectation they would be abandoned when an emergency had passed. This second distinction also coincides with geographical distribution. The permanent facilities were all in the San Francisco Bay Area, except for the Army's small San Diego Barracks, while the temporary camps were scattered throughout the far-flung corners of the state, where civilian rule was weakest (Figure 3).

²⁷ Harlow, *California Conquered* chronicles this period of military government.

²⁸ The importance of the Army as a domestic police force during these years has received surprisingly little notice. Gerald D. Nash rarely mentions the Army in his seminal study of the development of the California State government: *State Government and Economic Development: A History of Administrative Policies in California, 1849-1933* (Berkeley: Institute of Governmental Studies, 1964.)



Statistically—in numbers of posts and soldiers—the temporary frontier camps reflect the real presence of the U.S. military in California during this period, especially in the years before the Civil War. These camps were established initially to impose some order on the white population, to deal with Indian-white hostilities, or both. The Army built each for a unique mission, with the thought that it would be disbanded when the mission had been accomplished. Many were kept in place through the Civil War to deter threats from Confederate sympathizers, in addition to maintaining internal order. Indeed, a large number of the frontier camps lasted through the 1870s and 1880s. The longevity of the camps reflects the many purposes for which they were built and used, as well as the intractability of the problems for which they were established, particularly Indian-white conflicts.

As noted, almost none of these camps are still owned by the military. Nonetheless, these frontier forts represented the most important presence of the military in California during this period and are significant parts of the legacy of the military in California. Fortunately from the standpoint of the historian of military affairs and military architecture, remnants of some of these have been preserved by state, local, and federal agencies as well as non-profit groups. The history and historic resources of a few of these forts help establish a general context for the larger group, as well as a context for appreciating the significance of the few military resources from this period that are still controlled by the military.

Some frontier Army camps were established almost as soon as the United States took possession of California. In 1849, the Army established Fort Yuma, initially called Camp Calhoun, on the Colorado River in Imperial County to guard a key river crossing against Indian attack. The Army retained a presence at the fort through the 1880s.²⁹ Fort Yuma is a National Historic Landmark and many buildings still remain from the 19th century fort. The Army built Fort Humboldt in Eureka in 1853, again to quiet Indian-white conflicts. The Army occupied the fort until 1866; one original building remains on the site and is owned by the California Department of Parks and Recreation (DPR).³⁰ Fort Reading was established in Shasta County in 1852 to defend Noble's Trail, an important emigrant and trade route. It was near the town of Anderson and was occupied until 1867; nothing remains of it today.³¹ Fort Crook, also in Shasta County in the Fall River

²⁹ The data on these small camps were gathered chiefly from the files of the California Historic Landmark Program at the Office of Historic Preservation in Sacramento. Virtually every known old Army camp has been so designated. Landmark 806, Fort Yuma, June 28, 1965.

³⁰ Landmark 154, Fort Humboldt, March 14, 1934. Ulysses S. Grant was stationed at Fort Humboldt after the Mexican War. One interesting aspect of California history during this period was the clustering there of men who would become leaders of Union forces during the Civil War. In addition to Grant's stay in Eureka, William Tecumseh Sherman served briefly in Monterey as an aide to General Persifor Smith and worked in San Francisco as a civilian in the mid-1850s, while David Farragut was the first commandant at Mare Island.

³¹ Landmark 379, Fort Reading, January 3, 1944. The history of forts in northwestern California, including Humboldt, Crook, Jones, Ter-Wah, Reading, and Bragg is told in detail in William F. Strobridge, *Regulars in the*

Valley, was established in 1857 to deal with Indian-white conflicts. It was closed in 1869 and nothing remains of it either.³² The Army established Fort Tejon in Kern County in 1858 and occupied it through 1864. The troops from Fort Tejon were sent to Southern California to guard against Confederate threats. The Army built its buildings at Fort Tejon of adobe—in the Southwest they were quick to learn from local building traditions—and many have survived. The remnant Fort Tejon buildings are now operated as a state park by DPR.³³ Fort Miller was established in 1852 in the Sierra Nevada above Fresno to deal with Indian-white conflicts in the gold mining region of the area. It was abandoned in 1864; the site of the fort is now below the waters of Millerton Lake.

Fort Ter-Wer, originally called “Ter-Waw” after the Indian tribe native to the area, was founded on October 12, 1857 for the purpose of keeping the peace between the Indians and white settlers in Del Norte County. The Army abandoned the post after it was destroyed in a flood of 1861-1862.³⁴ Fort Jones in Siskiyou County was established in October 1852 to deal with Indian hostilities, but it too was abandoned in June of 1858.³⁵ The now vacant site is located on private property. The Army built Fort Bragg in Mendocino County in June 1857 to establish a presence on the Mendocino Indian Reservation. The Army abandoned the fort in 1864; a single building remains from the encampment.³⁶

The Army built a second series of frontier camps during the Civil War. Many of these were designed to contend with the persistent problems of internal disorder and Indian-white conflict that were the rationale for the first group of forts. Some of the Civil War temporary camps, however, were also established to deal with the perceived threat posed by Confederate troops and sympathizers. The Army erected the Drum Barracks in Wilmington (near Los Angeles) chiefly to train California Volunteers to fight against Confederate or Southern sympathizers; the fear of treason was highest in the southern counties of California. It remained open only until 1866. A lone remnant building is operated as a county park.³⁷ Camp Independence was established in Inyo County in 1865 to quell Indian-white violence there. It was operated through 1877 and a

Redwoods: The U.S. Army in Northern California, 1852-185 (Spokane, Washington: The Arthur F. Clarke Company, 1994.)

³² Landmark 355, Fort Crook (site of), October 9, 1939.

³³ Landmark 129, Fort Tejon, October 10, 1954. Among its other distinctions, Fort Tejon was home to the United States Camel Corps, a brief and unsuccessful experiment in the use of camels as pack animals in the American Southwest. The last camels were auctioned off in 1863 and 1864 at the Benicia Arsenal. See: A.A. Gray, “Camels in California,” *California Historical Society*, IX.4, (December 1930,) 299-317.

³⁴ Landmark 544, Fort Ter Wer, January 27, 1956.

³⁵ Landmark 317, Fort Jones, July 12, 1939.

³⁶ Landmark 615, Fort Bragg, July 24, 1957.

³⁷ Landmark 169, Drum Barracks, 1935; updated information in September 1965. See also Don McDowell, *The Beat of the Drum: The History, Events and People of Drum Barracks* (Santa Ana: Graphic Publishers, 1993.)

few buildings remain, although not on site.³⁸ The troops from Camp Independence probably built a redoubt and stone masonry barracks near the little mining town of Coso. This distant camp was occupied during the 1860s.³⁹ Army forces built Fort Bidwell in Modoc County in 1865. Although it was a Civil War-era facility, Fort Bidwell was established chiefly to protect wagon traffic to new mining districts in Idaho and northern Nevada.⁴⁰ The Army occupied Fort Bidwell through 1893 and it was the last of the frontier camps in California to be abandoned. Camp Wright was built in 1861 on Warner's Ranch in San Diego County, an important stage stop, to guard the lines of communications along the southern route. It was abandoned in 1866.

3.3 PERMANENT ARMY AND NAVY FACILITIES

The distinction between temporary and permanent installations is sometimes blurred. As noted, many of the camps were designed as temporary facilities, but stayed open for several decades because the underlying problems did not disappear as quickly as had been expected. A few of these, such as Fort Tejon, were built to permanent standards, even though the Army used the camps for relatively short periods of time. As discussed below, the Presidio of San Francisco, which was always seen as a permanent installation, was initially built to temporary standards. As a result, virtually none of the buildings from this period have survived. The San Diego Barracks was a permanent camp in that it was long-lived; however, it was never a major installation and was not built to permanent standards.

The military has always recognized a distinction between “permanent” and “temporary” construction standards. The definitions are intuitive, but the materials changed over time. In the 19th century, “permanent” almost always meant stone or brick masonry. Today, “permanent” buildings are usually concrete or steel-framed. “Temporary” buildings are usually wooden.

The distinction between permanent and temporary is useful as a way of distinguishing between bases that the military built for long-term occupation and those that were designed to deal with short-term problems. The few permanent bases built between 1846 and 1865 were: the Presidio of San Francisco, which for many decades was at the heart of the Army's presence in California;

³⁸ Landmark 349, Camp Independence (Fort), October 9, 1939. The story of Fort Independence and the bloody conflict that led to its establishment is told in W. A. Chalfant, *The Story of Inyo* (Los Angeles: Chalfant, 1933.)

³⁹ JRP Historical Consulting Services, “Before the Navy: A Contextual Overview of Naval Air Weapons Station, China Lake Kern, Inyo, and San Bernardino Counties, California Prior to its Acquisition by the U.S. Navy,” (1997), 67. The “fort” at Coso is on land that is now part of the Naval Air Weapons Station, China Lake, making it one of few, if not the only, of these temporary, frontier forts that is still owned by the DoD.

⁴⁰ Landmark 430, Fort Bidwell. March 16, 1949. The story of this fort is told in detail in Chuck Hedel, Christopher Raven, and Butch Ascherman, *Fort Bidwell: The Land, the Indians, the Settlers* (Fort Bidwell: Butch Ascherman, 1981.)

Mare Island Naval Shipyard, long the center of Navy activities in California; the Benicia Arsenal, an important Army supply depot throughout the 19th and early 20th century; and the San Diego Barracks, a small camp, but an important part of the Army's presence in Southern California during the 19th century. In addition, the Army built numerous smaller sub-installations to the Presidio in the San Francisco Bay Area during this period, including numerous coastal defense batteries in San Francisco and Marin counties and on three islands—Angel, Alcatraz, and Yerba Buena—strategically located in the San Francisco Bay.

In March 1847, the Army decided to occupy the old Presidio of San Francisco site which, as noted, had its origins in a 1776 decision by Spanish authorities to fortify high grounds at the entrance to San Francisco Bay. Late in the 19th century, the Presidio became the headquarters for the Military Division of the Pacific, with command over most of the American West, as well as the Department of California. During the 1850s and 1860s, however, it was but one of many Army posts scattered throughout California. During this period, the buildings at the Presidio were not built to any higher degree of permanence than was the case with the dozen or so small encampments in the unsettled regions of the state. The garrison at the Presidio was scarcely larger than many of the minor camps. During the 1850s, the Army attempted to refurbish some of the Mexican buildings within the original Presidio walls and built a few new buildings of adobe, as well. The only wood-frame buildings from this period were a two-story barracks and a two-story hospital building. None of the buildings from this period have survived.

The one notable exception to this pattern of impermanence at the Presidio was the great coastal battery at Fort Point, which was under construction between 1853 and 1861. Modeled after Fort Sumter in South Carolina, the brick and stone masonry fortification was a classic mid-19th century casemate fort (Figure 4). It was fitted with 141 cannon positions, although the Army mounted only 55 at its busiest during the Civil War.⁴² The Confederate assault on Fort Sumter showed the vulnerability of this type of fortification, and the Army abandoned Fort Point shortly after the end of the war. The building survived, however, and was spared from destruction when the Golden Gate Bridge was designed to arch over it during the 1930s. The great brick and stone

⁴² Fort Point is a National Historic Site, owned by the National Park Service. The NPS has prepared numerous historical studies of it, including an informative web site, www.nps.gov/fopo. It is discussed in context in Emmanuel Raymond Lewis, *Seacoast Fortifications of the United States: An Introductory History* (Annapolis: Naval Institute Press, 1979.)



Figure 4. View of Fort Point, Presidio of San Francisco, taken in 1929. (Source: National Archives.)

structure is now a National Historic Site, owned and operated by the National Park Service. The outbreak of the Civil War in 1861 fundamentally transformed the function of the Presidio. No longer could the Army be concerned solely with pacifying the frontier. The poorly defended harbor of San Francisco and the wealth of the California interior were at risk of capture by Confederate troops, Southern sympathizers, or the troops of almost any foreign nation. Despite the desperate need for troops on the eastern battlefields, the Army elected to build up the troop strength at the Presidio to establish at least one formidable fighting force in California. By 1865, the garrison at the Presidio had grown to 1,000 men.⁴³

Thus, the earliest permanent buildings of the Presidio date to the Civil War, an era in which the Presidio was first recognized as the center of the Army's presence in California. The Civil War-era buildings were wood-framed, but built to high standards of construction, and many such buildings remain. Arguably, the most important of these is the 1863 Post Hospital (most recently the Presidio Army Museum), which would set the neo-classical architectural theme for construction at the Presidio throughout most of the 19th century. There also exists a row of Greek Revival officers' quarters for the 9th Infantry Regiment, an 1862 barracks for the same regiment, and an 1864 chapel. The only masonry building from this period is a magazine, built in 1863 some distance from the parade grounds. The Presidio of San Francisco was just beginning to emerge as the predominant Army installation in the American West during the 1846-1865 period. The preeminence of the Presidio is more the product of the post-war Indian War campaigns than of the period treated in this chapter.

3.3.1 Mare Island Shipyard

This was not the case with the Navy's installation at Mare Island. It was established in 1854 and was the only Navy facility on the West Coast for several decades. Even after the Navy established other stations, Mare Island remained the center of power for the Navy on the West Coast. If one is to study the history and historic resources of the Navy on the West Coast, that study must begin at Mare Island.

The Navy built a shipyard at Mare Island in 1854 to support the ships of the Pacific Station. The Pacific Station existed chiefly to defend American commercial interests, although it could be called upon for other military missions, as well. Commodores Sloat and Stockton conquered California from their ships of the Pacific Station. The Navy was first involved in patrolling the Pacific Ocean in the early 19th century, in defense of American commerce. Attacks from Barbary Coast Pirates prompted the establishment of the first distant station shortly after the War of 1812. The Pacific

⁴³ "Presidio NHL", 8-25. Erwin Thompson, "Presidio of San Francisco: An Outline of its Evolution as a U.S. Army Post, 1847-1990" (National Park Service, Denver Service Center, 1992.)

Station was the second, followed by several others.⁴⁴ By 1835, the Pacific Station consisted of the Pacific Squadron of four ships. Although equipped for three-year voyages, the ships of the Pacific Squadron suffered from a lack of a permanent base on the West Coast. After the Mexican War, the Pacific Squadron, then 14 vessels strong, remained one of the key elements of U.S. strength in California. The task of protecting California's shores and the ships that sailed to and from her various ports led to expansion of the Pacific Squadron. Older ships and vessels in poor repair, however, could not make the trip around Cape Horn without considerable risk and had to be left in California. New vessels took up to a year to reach the Pacific Station from eastern seaboard Navy yards. The Navy recognized the need for a permanent shipyard as early as 1848.⁴⁵

The initial interest in a West Coast naval station concerned the need for a safe haven in the region both for repairing and refitting ships cruising in the Pacific Ocean and for the health of the crews. Additionally, a permanent station in the West would free the Navy from dependence on private establishments for building and repair of public vessels in the region. In 1852, Secretary of the Navy William A. Graham commissioned a board of naval officers to survey San Francisco Bay for a protected site for a Navy yard. Once they found a suitable location, they were asked to plan the best locations for drydocks, piers, wharves, shops, storehouses, offices, a hospital, residences, and other facilities. In July 1852, the board, led by Commodore Sloat, notified Secretary Graham that they considered Mare Island the most suitable location. In 1853, on the recommendation of the Board of Officers, the government bought the island for \$83,491 and moved a floating drydock into place in the Mare Island Strait.⁴⁶

Based on observations at the site, William P. S. Sanger conceived the original plan for the Navy Yard at Mare Island, a plan that is commonly called the Sanger Plan.⁴⁷ The Sanger Plan for Mare Island covered the plateau at the north end of the natural island. The plan called for a wharf a mile long on a deep part of Mare Island Strait. Sanger planned the yard level at the quay line at 10 feet and planned to use excess dirt from the uplands as fill. A wide quay was to extend the length of the wharf, interrupted in the center by a permanent drydock, flanked by building ways with ship houses and a wet basin for the existing floating drydock. Although Sanger appreciated the utility of the floating drydock for slight repairs, he believed it to be unsafe for extensive repairs. North of the central permanent drydock, the planned three large shop buildings, with a work area over storage space, for mast production and Sanger Plan designated an area for timber sheds and warehouses.

⁴⁴ Robert E. Johnson, *Thence Round Cape Horn* (Annapolis: United States Naval Institute, 1963), 1, 7.

⁴⁵ James P. Delgado, *To California By Sea* (Columbia, South Carolina: University of South Carolina Press, 1990), 129.

⁴⁶ Arnold S. Lott, *A Long Line of Ships: Mare Island's Century of Naval Activity in California* (Annapolis: U.S. Naval Institute, 1954), 8-9.

⁴⁷ Kenneth Cardwell, *Historical Survey of Mare Island Naval Complex, Final Report* (Berkeley: Mighetto and Youngmeister, 1985), 31.

South of the drydock, Sanger repair. Further south, beyond the warehouses, his plan called for a large wet basin with eight drydocks.⁴⁸

Sanger's plan called for a second row of shops and storage buildings to be located west of the main shipyard buildings and separated from them by a wide street. Backing the shipyard was another wide street. Next were three blocks for residential buildings. The middle block of the residential quarter was to contain the commandant's residence, flanked on either side by houses for ranking officers. At the southernmost end of the residential block, a chapel and schoolhouse were to be erected. Another tract southwest of the residential zone was reserved for a hospital. A similar-sized district was also reserved for a Marine Corps compound.⁴⁹ Thus, Mare Island was planned as a multiple-function Navy station from the outset. The diversity of functional and architectural types at the island today reflects the multiple-function nature of the base. The inclusion of so many functional units in the original master plan also reflects one simple fact: Mare Island was the only Navy station on the West Coast.

In August 1854, the Secretary of the Navy assigned Commander David Glasgow Farragut to Mare Island as the first commandant. Upon his arrival, Farragut observed additional problems with the plan for the naval yard. In several cases, U.S. Navy BuDocks planners had ignored the topography of the island and located buildings with one end on level ground near the water's edge and the opposite end extending into the hillside far enough to require the removal of 20 to 30 feet of soil to bring the foundation to grade. Modifying the Sanger Plan to correct these deficiencies, Farragut and his Superintendent of Yards and Docks, Daniel Turner, began construction of the naval yard.⁵⁰

In 1854, the Chief of BuDocks appointed Daniel Turner as the Civil Engineer for the Navy Yard at Mare Island. Turner served as Civil Engineer at Mare Island from 1854 until 1860. During his tenure at Mare Island, he oversaw the construction of the early buildings and facilities at the station. Of these early buildings, six associated with Turner are still standing. These structures are: Building 46, the smithery, built in 1856; Building 71, a storage building, built in 1858; Building 85, the foundry, built in 1858; Building 87, a machine shop, built in 1858; Building 89/91, the boiler shop, built in 1858; and Building A1, the magazine, built in 1857.⁵¹

An ammunition depot was added to Mare Island very early in the history of the shipyard. It was an integral element of the shipyard in the sense that there was a need for a site to temporarily store the ordnance from ships that came to the dry docks for repair. In 1856, Commandant

⁴⁸ Cardwell *Historical Survey*, 31; Plan for a Navy Yard at Mare Island, California, 1854.

⁴⁹ Lott, *A Long Line of Ships*, 24; Plan for a Navy Yard at Mare Island, 1854.

⁵⁰ Lott, *A Long Line of Ships*, 24.

⁵¹ Cardwell, *Historic Survey*, 33.

Farragut received a request to temporarily store ordnance material at Mare Island. Farragut chose the southern end of the island as the location of the ammunition depot. In January 1857, work began on Magazine A1. When completed later that same year, the sandstone structure became the first naval magazine on the West Coast. The following year, two brick shell houses (A3 and A4) were built at the site. In 1860, the oldest residence still standing on Mare Island, Building A45, was built on the bluffs above the ammunition depot as a residence for the Chief Gunner. As with the shipyard buildings, the use of masonry construction was typical for the period. Among the early magazines, Building A1 is most distinctive because it is a sandstone structure and was so carefully ornamented, with quoins at the corners and wreathed eagle ornamentation at the doorway.

With the onset of the Civil War, the Pacific Squadron's most important duty turned to protecting the California gold shipments carried by mail steamers to Panama. Not only did the Union need the gold bullion, but also the capture of a single gold steamer would have greatly strengthened the foreign credit of the Confederacy. By July 1861, with only six ships, the Pacific Station was the only U.S. distant station that maintained a squadron. Virtually all U.S. warships had been recalled to enforce the blockade of the Confederacy. By late summer, the Pacific Squadron was reduced to half its force due to damage to three ships. The situation might have been critical had it not been for the presence of Mare Island Navy Yard. Ships of the Pacific Squadron could be thoroughly overhauled and repaired without leaving the station. Moreover, Mare Island's magazine was so well stocked that none of the warships was forced to borrow gunpowder or shot from others.⁵² In 1862, in response to a request by Pacific Squadron Commander Flag Officer Charles Bell, Secretary of the Navy Gideon Welles assigned a contingent of 140 Marines to guard Mare Island Navy Yard. Captured and released by the Confederacy while in the Caribbean, these Marines arrived at Mare Island in 1863.⁵³

By the close of the Civil War, the basic form of the Mare Island shipyard had been established. The Navy had adopted a master plan and constructed a substantial number of buildings. A surprising number of those buildings still exist, with the smithery (Building 46) and the sandstone magazine (Building A1) being the most notable examples. The plan established an architectural pattern or program for the shipyard and ammunition depot areas, a classical revival theme that was followed

⁵² Johnson, *Thence Round Cape Horn*, 114.

⁵³ Lott, *A Long Line of Ships*, 76; Letter 3 Aug 1863, MINSY Commandants Office, Letters Received from the Bureau of Yards and Docks, RG 181, National Archives, San Bruno, California. The Marines, 5 officers and 100 men, left New York in the fall of 1862, but were quickly captured by the Confederates. The Navy was able to secure their release with a cash payment of \$216,000 and a pledge that the Marines "would not serve against the Southern Confederacy during the war or until regularly discharged. The Marines arrived at Mare Island in January, 1863.

throughout the remainder of the 19th and into the early decades of the 20th century. A handsome group of brick officers' quarters was built along Walnut Avenue, roughly in the locations of today's Captains' Row, but these homes were demolished following a major earthquake in 1898. Although the original plan called for a permanent hospital and Marine Corps garrison, no construction was completed on either prior to the Civil War. The legacy of the 1850s and early 1860s, then, is reflected in three areas: the old brick shops in the Shipyard North; the oldest magazines and one old residence in the Ammunition Depot; and in the master plan for the base.

3.3.2 Benicia Arsenal

The Benicia Arsenal was, arguably, a more "permanent" facility during this period than was the Presidio of San Francisco. The Benicia Arsenal was, in some respects, more comparable to the Navy's Mare Island shipyard than to the Army's Presidio of San Francisco. It was similar to Mare Island in two important respects. First, it was a multiple-purpose facility from the outset. Second, the buildings there were constructed of high-quality brick or stone masonry, the working definition of "permanent" military construction during the mid-19th century.

The Benicia Arsenal actually pre-dates Mare Island and was, at one time, considered as a site for the Navy shipyard. Both the Navy and Army were interested in the same piece of land along Carquinez Strait because it was on a deep-water shipping channel, about midway between San Francisco Bay and the inland entrepot at Sacramento, the gateway to the mining regions and to the Army's frontier forts. The Army finally acquired the site and in 1849 began building. The Arsenal, then, is five years older than Mare Island. Other than the Presidio, which was not built to permanent standards for several decades, the Benicia Arsenal is the oldest American military facility in the state.

The Army's use of the land was straightforward. In general, the Army built a Quartermaster Depot to supply its inland troops; an arsenal to arm its interior troops; and a permanent barracks to garrison troops to defend and man the depot and arsenal. For some time, the three enclaves were identified individually. In time, the operation would simply be called the Benicia Arsenal, although it was always much more than that. The Army initially saw the Benicia facility as a key installation, perhaps the most important installation in the state. In 1849, General Persifor Smith, commander of the Division of the Pacific and one of the military governors of California before statehood, moved his headquarters to the new facility. It stayed there until 1857, when it was moved to rented space in San Francisco.⁵⁴ It was not until well after the Civil War that the Presidio of San Francisco came to be seen as the headquarters for the Army in California.

⁵⁴ Robert Brueggemann, *Benicia: Portrait of an Early California Town*. (San Francisco: 101 Productions, 1980), 64.

The building program at the Benicia Arsenal was unlike anything else in California during this period, with the possible exception of the Navy's construction at Mare Island. Nearly everything the Army constructed at Benicia was built to be permanent. The first barracks, built in the early 1850s, were wood frame and did not last. A small hospital, however, was built in the barracks area in 1854. It was a Greek Revival stone masonry structure and still exists. The early Quartermaster Depot buildings were also wood frame and did not survive into the 20th century. The Arsenal buildings were built to extraordinarily high standards and represent some of the most important 19th century military buildings in California. These, too, were Greek Revival stone masonry buildings, not unlike the masonry magazines at Mare Island, except on a grander scale. Arsenal Buildings 2 and 10, both powder magazines, include vaulted masonry ceilings that have no precedence in the historic architecture of California, although they were apparently patterned after an older arsenal in New York State.⁵⁵ These rather small magazines were joined in 1859 by a great Gothic Main Arsenal Storehouse, a three-story sandstone structure with a crenellated clock tower at one corner and turrets at the others. Although it lost one story in a 1912 fire, the building stands as one of the most remarkable pieces of military architecture in California. The officers' quarters, built just before the Civil War, were unusual among quarters from this period in that they were built around stylish Italianate design, appended to an essentially Greek Revival form.

3.3.3 San Diego Barracks

At this time, virtually all permanent military assets in California were centered on San Francisco Bay; this was the great metropolis of the state and the shipping channel for California gold and goods for the frontier. Southern California remained an essentially Mexican settlement during these years, more closely resembling the pre-1846 Mexican California than the bustling San Francisco Bay Area. The only "permanent" military base in the south part of the state was the depot and arsenal at San Diego.

The Quartermaster Depot for the U.S. Army established the San Diego Barracks between 1850 and 1851. Originally called "New San Diego," its purpose was to supply the military camps and bases of the Southwest region, including Forts Tejon and Yuma in California, as well as various posts in Arizona. The first prefabricated frame military building, shipped around Cape Horn from the East Coast, arrived in 1851, under the command of Second Lieutenant Thomas Johns. Andrew B. Gray, William H. Davis, and their business colleagues were trying to establish a township across the bay in what was to become New San Diego. Concerned that the establishment of the first government building in La Playa would draw prospective occupants away from their fledgling township, they eventually convinced Johns to locate the building in New San Diego. Johns became a partner in the venture, and the physical plant was founded.

⁵⁵ Bruegmann, *Benicia*, 74.

The first Army troops were assigned to the post in 1855. It was during this early phase of the Barracks' history that the supply pack train was successfully established to supply the interior of Southern California. This operation continued until the onset of the Civil War. All regular army troops were transferred east to help in the war effort, and the post was subsequently occupied by California Volunteers until 1866. The San Diego Barracks survived until 1921. The post was located in what is now downtown San Diego, however, and no trace of it remains.⁵⁶

3.4 CONCLUSIONS

The American military was a powerful stabilizing influence during California's often chaotic Frontier Era of California, between the Mexican War and the Civil War. The military was perennially understaffed for this task and succeeded through good luck and the courage and perseverance of the troops and their leaders. It is difficult to imagine just how isolated and dangerous the situation was for these men. A sense of the situation is illustrated in the military career of Edward F. Beale, who came to California in 1846 as a young midshipman with the Navy. Beale, who came from a family of Navy professionals, was on the *Congress* with Commodore Robert Stockton when Commodore Sloat seized Monterey. Commodore Stockton arrived in California a few days later and took command. Stockton assigned Beale to a unique battalion, called the "Naval Battalion of Mounted California Volunteer Riflemen," comprising a rag-tag band of mountain men and Bear Flag volunteers assembled by Major John C. Fremont. Beale was dispatched to meet General Stephen Kearny's 1st Dragoons as they approached San Diego on their long march from Santa Fe. Beale arrived just in time to participate in the Battle of San Pasqual, where he was slightly wounded. After the decisive Battle of Los Angeles, Beale was sent overland with the legendary frontiersman, Kit Carson, to deliver the news of the California situation to Washington, D.C.

Beale left the Navy in 1852 to become Superintendent of Indian Affairs in California. This job put him in contact (and often in conflict) with some of the new Army posts that were being built to quell Indian-white conflict. He was particularly interested in Fort Tejon, which was being built near Bakersfield to defend a large reservation Beale hoped to establish in the area. The reservation, however, was never funded, leading Beale to resign in disgust in 1855. He remained in the area and became a very successful rancher, putting together the huge Tejon Ranch. In 1856, however, he was asked to lead another unusual military expedition. He was to take a battalion of regular Army troops and civilians to explore a road from Texas to California, using camels as draft animals. Beale led the "camel corps" for two years before it was disbanded as

⁵⁶ The San Diego barracks is among the least recorded of the pre-Civil War military bases in California. The base is described in Elizabeth C. McPhail, *The Story of New San Diego and Its Founder, Alonzo E. Horton* (San Diego: Pioneer Printers, 1969.)

unworkable. The camels were kept at Fort Tejon for several years before being auctioned at the Benicia Arsenal. Beale had a highly successful civilian life in California and in Washington, D.C., helping to found Standard Oil of California and serving as Minister to Austria. The military accomplishments of this sailor who served most of his career with the Army are commemorated in the naming of an Air Force base, Beale AFB, near Marysville.⁵⁷

The frontier conditions endured by Beale prevailed throughout the 1846 to 1865 period. Because it was settled much earlier than most Western states, California's frontier period passed more quickly than was the case with other states in the American West. The military in California during this period was preoccupied with those frontier conditions: ruling the new territory until a state government could be organized; fighting the Indian wars in the emerging inland and coastal communities; and guarding supply lines to the state. The Army would be called on to perform similar functions in the Southwest, Northwest, and Great Plains during the remainder of the 19th century, and many of the troops that fought the Indian Wars of the 1870s and 1880s were assembled and trained in California.

Because its focus was on the inland frontier, the military placed its assets there. Relatively few permanent buildings remain from this period—a handful of buildings from the frontier forts, and collections of permanent buildings at Mare Island, the Presidio of San Francisco, and the Benicia Arsenal, and the great battery at Fort Point. The military played a key role in California history during this period, contributing more significantly to the stability of the civilian government than in any other period of the state's history. The few remnants, buildings, and structures from this period, then, are of tremendous significance as rare symbols of the role of the military as a stabilizing factor in California. Virtually all of the military's assets from this period have passed from DoD ownership or will do so in the near future when the BRAC process has been completed for Mare Island and the Presidio of San Francisco.

⁵⁷ Beale's biography is presented in several sources. See Gerald Thompson, *Edward F. Beale & the American West* (Albuquerque: University of New Mexico Press, 1983.)

4.0 TRADITIONAL ERA (1866-1902)

The period from 1866 to 1902 is best understood as a traditional era for the military in California, in which the Army and Navy built upon and reinforced pre-Civil War traditions, without making major changes in military technologies or strategies. By the end of the Civil War, the Army and Navy had established several classic 19th century installations in California (see Figure 5), including Army facilities in San Francisco and Benicia and the Navy's shipyard at Mare Island. During most of this period, the Army and Navy continued to build upon those assets, making them more permanent, more functional, and, in many cases, more beautiful. Immediately after the Civil War, all branches were demobilized in one of the most dramatic force reductions in the nation's history. The Army and Navy forces that remained were scarcely larger than pre-war levels and their efforts were focused on domestic rather than overseas considerations. Army historian Russell F. Weigley calls this period "The Twilight of the Old Army," in which force size, tactics, and base design fell back to pre-war conditions.⁵⁸ The Navy post-war reduction was even more dramatic; by 1880, the United States had decommissioned so many ships that it had only the twelfth largest Navy in the world, ranking behind such countries as Denmark, China, and Chile.⁵⁹

Late in the period, however, American military planners, alarmed by the growing military strength of European colonial powers, saw the need for increased American military preparedness, particularly in terms of naval power. All branches grew in force in the years leading to the Spanish-American War. The war had its most profound effect on the Army, which was assigned the task of pacifying the newly acquired territories, particularly the Philippines, where a major insurrection persisted through 1902. In general, there was a downward trend in force strength and appropriations, followed by a substantial build-up during the latter years of this period.

The major California installations defied some of these trends, particularly the worst effects of the post-war reduction. For the Army, the Indian wars of the Plains and the Southwest required constant training of troops bound for the interior; California facilities, especially the Presidio of San Francisco and the Benicia Arsenal, grew in response to the need. For the Navy, these years represented a time of technological change as the Navy transformed its fleet from sailing ships to coal and later fuel-oil propulsion. The Naval Shipyard at Mare Island grew modestly in response to the changes in shipbuilding materials and propulsion systems.

⁵⁸ Russell F. Weigley, *History of the United States Army* (Bloomington: Indiana University Press, 1984), Chapter 12.

⁵⁹ Carroll Storrs Alden, *The United States Navy* (Chicago: J.B. Lippincott Company, 1943), 282.

The build-up before, during, and after the Spanish-American War resulted in a more accelerated growth in California bases than elsewhere in the United States. The Army was particularly impacted by the Philippine Insurrection; the Presidio of San Francisco and, later, the Presidio of Monterey were staging areas and training centers for that military action. The shipyard at Mare Island also grew after the war as the Navy sought to upgrade its fleet, at least partly in response to problems witnessed during the war. New Navy facilities were also built to accommodate increases in force on the Pacific. Thus, the years just after the Spanish-American war saw steady growth on military bases in California, setting the stage for far more expansive growth and modernization during the early decades of the 20th century.

4.1 PRESIDIO OF SAN FRANCISCO

The Army in 1866 was poised for a period of typical post-war demobilization. The force at the Presidio of San Francisco, which had grown to 1,000 during the war, was rapidly drawn down to a permanent force of about 200, most assigned to the 2nd Artillery Regiment.⁶⁰ One by one, the remaining frontier forts were closed: Fort Humboldt and the Drum Barracks in 1866; Fort Redding in 1867; Fort Crook in 1869; Fort Independence in 1877; Fort Yuma in 1884; Fort Bidwell in 1893; and similar forts. During the 1870s and 1880s, however, the Presidio of San Francisco began to grow again, in total force and in permanent construction. This growth was in response to a variety of factors. The first factor was the closure of the smaller inland forts. In an effort to reduce costs, the Army elected to consolidate its many lightly built facilities into a smaller number of permanent installations.⁶¹ The Presidio benefited from this new philosophy and was a recipient of some of the units reassigned from the abandoned bases. A second factor was the outbreak of the greatest of the Indian Wars on the Great Plains, the Southwest, and the Northwest. Many occurred within the jurisdiction of the Division of the Pacific. The Indian Wars in California were all but over by the end of the Civil War. (The one notable exception was the Modoc War of 1872-73, in which Presidio of San Francisco troops participated directly and suffered heavy casualties.) The period from the late 1860s through 1890, however, was one of the most violent periods of armed conflict with the Sioux and other tribes on the Great Plains, the Apache in Arizona, and the Nez Perce in the Northwest. The Presidio became a central deployment center for Army troops headed to many of the inland flashpoints. Thus, the population at the Presidio at any given time was much greater than the permanent force, which never exceeded 1,000 during the Indian War campaigns.⁶²

⁶⁰ "Presidio NHL," 7-34 .

⁶¹ "Presidio NHL," 8-34; Thompson, "Presidio of San Francisco."

⁶² "Presidio NHL," 8-27.

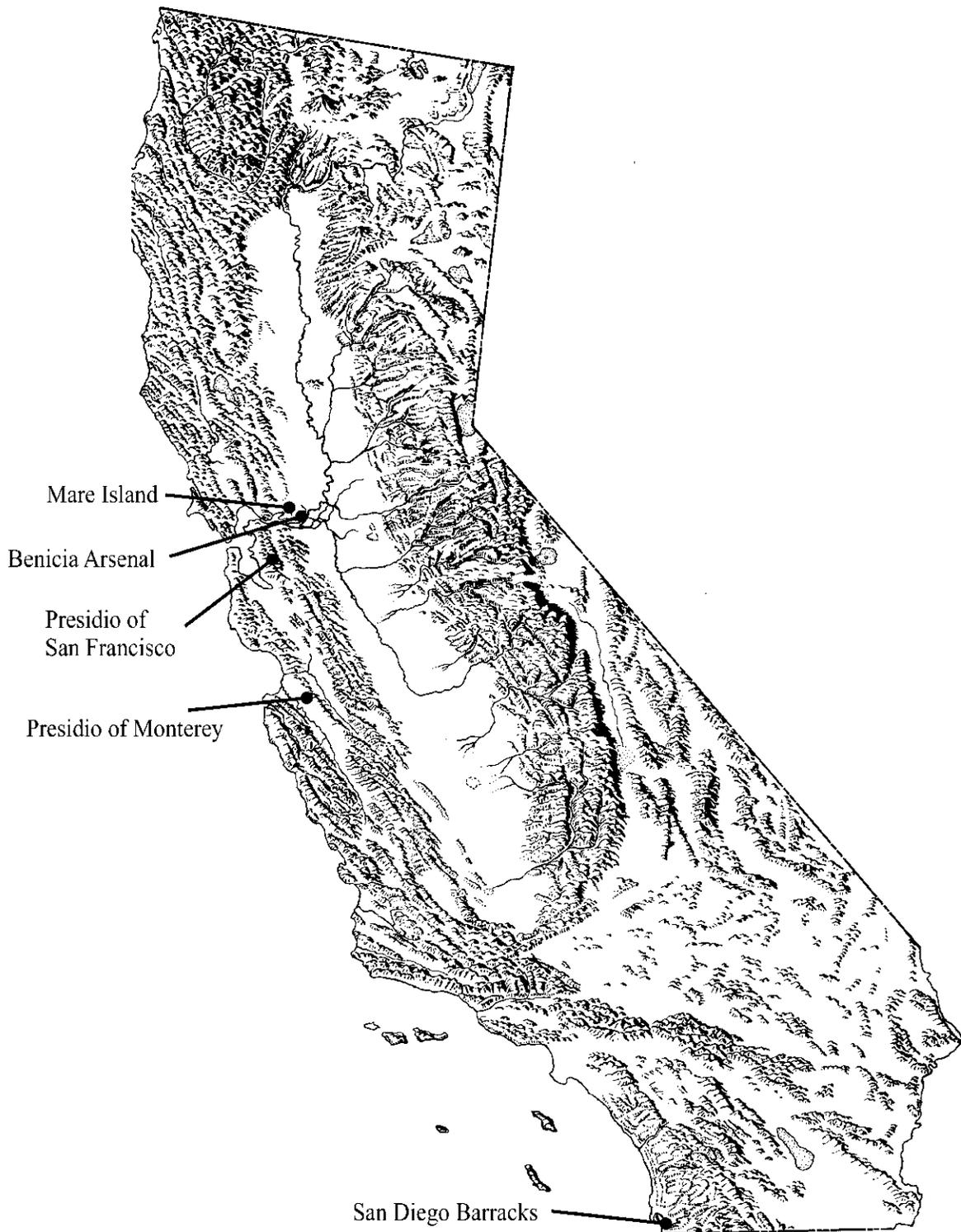


Figure 5. Major military bases in California after the Civil War, 1866-1902.

The role of the Presidio during the Indian Wars helped cement the importance of the base within the command structure of the Army. In 1878, the headquarters for the Division of the Pacific, as well as the Department of California, were moved to the Presidio. Thus, it was one of four Division command centers in the United States.⁶³ The final factor in sustaining personnel and funding appropriations to the Presidio before the Spanish-American War was improvement in coastal defense strategies and technologies. These are discussed in a section on coastal defense installations in California during this period (Section 4.4).

The Spanish-American War and subsequent occupation of the Philippines had an even more profound effect on the Presidio, leading to one of its most sustained periods of growth. The lessons of the Spanish-American War had long-term effects on the Army, leading to a period of modernization discussed in the following chapter. In the short term, however, the war broadened the responsibilities of the Army to new overseas possessions, most of them in the Pacific. The Presidio of San Francisco was charged with training and billeting most of the troops headed to the Pacific, including troops bound for hard duty in the Philippines.

The physical resources at the Presidio from 1866 to 1902 follow a pattern that is surprising at first glance, but makes sense in the context of the Army's development during this period. The buildings and structures from the earliest years—from 1866 to 1898—are decidedly permanent in character. Most are brick and designed in Greek Revival style. These buildings represent a continuation and improvement on trends begun during the Civil War. This permanent and neo-classical design extends to every building type at the base, from barracks to officers' quarters to storehouses. Nowhere is the quality and permanence of construction during this period more evident than in the row of Greek Revival-influenced two-story barracks (Buildings 101 through 105) that line the western edge of the parade grounds. Handsome, permanent, brick buildings were erected for miscellaneous purposes as well, including storehouses and a bakery.⁶⁴

In addition to buildings, the Presidio of San Francisco was first formally landscaped during this period, according to a plan approved in 1883. Although the landscape would not mature for many years, the decision to transform the sand dunes and hills of the area was one more indication of the permanent commitment the Army had made to this site.

During and immediately after the Spanish-American War, however, the Army built a series of essentially temporary buildings at new "camps"—the East and West Cantonments. The hastily built barracks were erected to house thousands of troops going to or returning from the Philippines as well as duties in China and elsewhere. Only a few of the wood-frame buildings

⁶³ "Presidio NHL," 8-29.

⁶⁴ Thompson, *Presidio of San Francisco*, 68.

from this period remain. These wartime temporary structures were, in some respects, a continuation of the design traditions of the frontier forts built in California during the 1850s and 1860s. They were also precursors of the temporary buildings that would be built in great numbers during World War I and especially during World War II. The temporary construction at the Presidio of San Francisco also helps explain the character of construction at the Presidio of Monterey, which was authorized as a sub-installation of the Presidio of San Francisco specifically to house troops returning from the Philippines. Although occupied in late 1902, no buildings were erected there until 1903. The unusual wood-frame design of the 1903 buildings is best understood in the context of temporary design during the great build-up of the Army after the Spanish-American War.

4.2 MARE ISLAND

The Navy followed a parallel pattern of post-war decline and then accelerated growth during this period, as may be observed in the history of the shipyard at Mare Island. The period between the Civil War and the Spanish-American War, while a languid era for the Navy generally, was one of sustained activity at Mare Island, a fact that reflected its primary importance on the West Coast. Construction during this period complemented and extended trends from the pre-Civil War era. The major focus remained the shipyard, where the great Drydock 1 and several large brick industrial buildings were built. Slowly, the base began to fill in the details of the Sanger Plan. By 1870, the Navy had completed the original hospital and Marine Corps barracks, as well as the original administration building. Not all of these buildings still exist; many were demolished in a major earthquake of 1898. Enough remain, however, to reflect the character of construction during these years.

After the Civil War, the Navy generally lapsed into a period of decline that lasted nearly two decades. At war's end, the Navy numbered over 700 ships, including 65 ironclads, mounting over 5,000 guns, making it one of the strongest in the world. By the mid-1870s, however, the government had auctioned or scrapped more than two-thirds of that force. For the most part, the fleet of ironclad monitors was allowed to rot; those slated for reconstruction, in some cases, sat "in ordinary" (mothballed) for almost 20 years before repairs were completed. By 1880, the Navy had only 48 ships remaining capable of firing a shot.

Although the Pacific Station was in a state of nearly constant administrative reorganization, from 1866 to 1897 Mare Island Navy Yard continued to serve as home for the ships of the Pacific Squadron. The condition of the ships on the Pacific Station in the years following the Civil War was poor. Hard service and hasty repair during the war shortened the effective lives of the ships. Congress, with an eye more on economy than safety, frequently put off overhauling naval vessels as long as possible. Often ships sent to the Pacific as reinforcements to the fleet stayed there until

stricken from the *Navy Register*, usually after rotting, tied up "in ordinary" at Mare Island.⁶⁵ The poor condition of the vessels was not improved by the post-war Navy Department prohibition of the use of steam power due, to the expense of coal. This was particularly hard on the ships in the Pacific with its vast expanses of calm waters and crosswinds. It was harder still because the sail power of most ships in commission during the Civil War had been reduced so they could operate more efficiently under steam. To remedy this problem, the Navy Department sent all ships in the Pacific Squadron to Mare Island to receive full-sail rigging.

Despite being home to the Pacific ships, Mare Island was not immune to the post-war malaise that struck the Navy. In the years following the end of the Civil War, the yard suffered from scandal and fraud. In 1877, the *San Francisco Chronicle* ran an editorial asserting that the commandants of Mare Island had long been subservient to politicians and hired workers solely on the basis of party allegiance. The article further charged that the yard was hiring incompetent men and paying them twice the wages of workers at East Coast Navy yards. Often the cost to repair a ship at Mare Island was 100 percent more than the initial cost of the vessel. For a time, the Navy was reluctant to order ships to Mare Island for overhaul, as the yard had a reputation for making the work last as long as possible, and a ship would be lost to the Pacific Squadron for months.⁶⁶

In spite of the neglect naval forces suffered during the early years of this period, in 1872 Congress authorized construction of a stone drydock at Mare Island. Designed by Civil Engineer Calvin Brown, the stone drydock was only the second such structure built for the Navy and the first on the West Coast. Before beginning the drydock, Brown toured dockyards in Europe looking for innovations in naval construction. The design he brought back was apparently new to America. Brown proposed building the dock's shell out of concrete and then embedding granite blocks into the shell. The first concrete was poured in 1874 and the first stone laid the following year. The dock was not finished until 1891 and was \$400,000 over budget.⁶⁷

Brown was first assigned to the post of Civil Engineer in charge of BuDocks at Mare Island from 1862 to 1864, and then again from 1869 to 1881. During his second and much longer term on the island, Brown supervised the building of a large portion of the foundry and machine shops, the construction of the sawmill, the ordnance storehouse, and the iron plating shop. Also completed during this term were the original Marine Barracks, the original hospital, a powder magazine, and a reservoir system for the protection of the ammunition depot. He also completed Building 87 of the

⁶⁵ Johnson, *Thence Round Cape Horn*, 128-129.

⁶⁶ Lott, *A Long Line of Ships*, 97; *San Francisco Chronicle*, November 21, 1877; Johnson, *Thence Round Cape Horn*, 136.

⁶⁷ Lott, *A Long Line of Ships*, 102; E.D. Wichels, "Pages From the Past," *Vallejo Time-Herald*, May 8, 1966.

steam engineering complex and designed the stone drydock. In addition to Drydock 1, Brown was responsible for the design and construction of Buildings 50 and 52, completed in 1871 and 1873, respectively.

Although a hospital reservation of approximately ten acres was included in the original shipyard plans, construction of the hospital did not begin until after the Civil War. Responding to the need for adequate medical centers demonstrated by the Civil War, Congress authorized funds to enlarge and modernize several military hospitals. Prior to this, doctors at Mare Island from the Bureau of Medicine and Surgery nursed the sick and wounded in a temporary facility. Although given the title "hospital," the facility operated more as a dispensary than a full-fledged infirmary. In 1869, a guardhouse near the ferry landing was sawed in two and half was moved to a site near the ammunition depot to serve as a "pest house," presumably to isolate patients with highly communicable diseases. The same year, work began on a full-fledged hospital at Mare Island under the direction of Calvin Brown and Surgeon J. M. Browne. Sited in the area designated by the Sanger Plan, the brick structure consisted of three stories and an attic capped with a Mansard roof. This original hospital was destroyed in the 1898 earthquake and the replacement building was constructed atop the first building's basement story.⁶⁸

Like the Hospital Area, the Marine reservation was laid out in the Sanger Plan in 1854, but was not built until after the Civil War. Shortly after the establishment of Mare Island Navy Yard, Commander Farragut requested a Marine guard to protect and ensure the safety of the station. Marines were not ordered to the island, however, until 1862. Because there were no permanent facilities for them on the island, the Marines were at first temporarily quartered on the *USS Independence*. Later they moved into the loft of the unfinished foundry. Nearly a decade passed before the Marines stationed on Mare Island received permanent quarters.⁶⁹

The original Marine Corps Barracks on the island was completed in 1871. It was a yellow, two-story, brick structure some 500 feet in length containing a kitchen, bakery, mess hall, and laundry. Fronting the barracks to the east, parade grounds extended approximately to Cedar Avenue. Flanking the parade grounds on the south was a house for the commander of the Marine Corps detachment, completed in 1870 (Figure 6). In the late 1880s, three additional structures for Marine officers' quarters were built on the north side of the parade grounds. Use of the original Marine Barracks changed when the Marine compound moved to a more westerly location on the island and a new barracks building was built in 1917. The original building was used for a variety of purposes until the early 1950s. The original Marine Corps parade grounds were converted to baseball

⁶⁸ Lott, *A Long Line of Ships*, 102.

⁶⁹ Lott, *A Long Line of Ships*, 76; Letter 3 Aug 1863, MINSY Commandants Office, Letters Received from the Bureau of Yards and Docks, RG181, National Archives, San Bruno, California.



Figure 6. Commanding Officer's quarters at Mare Island. (Source: Historic American Buildings Survey for Mare Island, photographer William Dewey.)

diamonds. In 1952, the Navy razed the original 1871 barracks building to make room for new construction.

By the late 1870s, the Mare Island shipyard was threatened with closure for reasons that would plague the facility throughout its history. The narrow, shallow passageway up San Pablo Bay and the Mare Island Strait was inadequate for the emerging classes of Navy ships. Adequate for the wooden sailing vessels of the 1850s, the Mare Island facility became increasingly obsolete with each new advance in shipbuilding. In 1878, a *San Francisco Chronicle* article announced that Mare Island would probably have to be abandoned due to the "rapidly decreasing depth of the harbor" caused by silt build-up. In 1882, Congress ordered the Secretary of the Navy to appoint a three-person committee to assess the condition of the nation's Naval Yards. Additionally, the commission was to report on the advisability of closing any of the yards not suited to the manufacture and repair of ships in the "steel age." In a report dated June 6, 1883, the commission concluded that it was absolutely necessary to retain Mare Island Navy Yard, sparing the base from the first of many efforts at closure.⁷⁰

4.3 OTHER ARMY POSTS

The Benicia Arsenal, like Mare Island, had been built to substantial standards during the 1850s and 1860s, allowing it to make an important contribution to the Union Army efforts during the Civil War. In another similarity to Mare Island, the Benicia Arsenal was built around three separate commands, giving it a diversity of building types and styles. All three of the separate commands at Benicia—the infantry detachment, the quartermaster depot, and the ammunition arsenal—prospered and grew in the latter decades of the 19th century, although the Quartermaster Depot was folded into the command structure of the arsenal after 1858.⁷¹

The construction history at the Benicia Arsenal during this period closely parallels that at the Presidio of San Francisco and at Mare Island. Dozens of buildings were constructed there between 1866 and the start of the Spanish-American War. Almost all were of brick or stone masonry and in the general Greek Revival design that characterized most of the early construction as well. This pattern of permanent, neo-classical design extended to every type of building, including large storehouses, shops buildings, barracks, officers quarters, and office buildings. The infrastructure was in place by 1898 for the Benicia Arsenal to play a key role as a supplier of arms and goods for Army troops in the Pacific. The Benicia Arsenal reached its zenith of importance during this period. During the 20th century, new supply depots were built throughout the American West, rendering the 19th century base in Benicia increasingly irrelevant.

⁷⁰ *San Francisco Chronicle*, January 27, 1878; Memoranda of the Navy-Yard Commission, 6 June 1883, Sen. Doc. 1, 48th Cong., 1st sess., 5-10, 33.

The arsenal became the first of the great 19th century bases in California that was closed in the post-World War II era.

The San Diego Barracks survived during this period, but barely. After the Civil War, the base was deserted until 1870, when it was briefly reoccupied by Army troops. Again in 1876 the base was reoccupied, this time until 1904. It was during this period, and specifically on April 5, 1879, that the name of the base was changed from “New San Diego” to the “San Diego Barracks.” In 1904, the Army transferred the bulk of the troops to the recently established Fort Rosecrans on Point Loma. The San Diego Barracks continued its existence in a reduced capacity as a sub-post for Fort Rosecrans. Throughout its history, the post served its original purpose as a supply depot. At the time of its final abandonment in 1921, the Barracks was being used to supply troops patrolling the Mexican-American border. Immediately following its closure, the buildings at the post were torn down; nothing of the post exists today.

4.4 COASTAL DEFENSE

During this period, the Army and Navy made several attempts to occupy and use the three main islands of San Francisco Bay—Angel, Alcatraz, and Yerba Buena—although none of these grew into major installations. Alcatraz had been occupied during the 1850s and 1860s and fitted with cannons for coastal defense purposes. Throughout the Civil War, the island was also used as a temporary prison for Union as well as Confederate troops. That prison use gradually displaced the fortress at Alcatraz. It would remain a military prison until 1933, when it was rebuilt as a federal correctional facility.⁷²

The Army also occupied Angel Island during the Civil War to provide coastal defense, as well as a training camp. Camp Reynolds was built on the island in 1863 as an infantry training base. This small base remained active throughout this period. In 1899, Angel Island was built up in direct response to the Spanish-American War and the subsequent Philippine Insurrection. A quarantine station was built on the eastern end of the island to isolate troops who had been exposed to infectious diseases during their tours in the Pacific.⁷³ Angel Island was retained by the Army through World War II and was used for miscellaneous purposes, including non-defense purposes. Arguably, the most important function at the island was its role as an immigration station—the West Coast equivalent of Ellis Island in New York Harbor.

⁷¹ Bruegmann, *Benicia*, 66.

⁷² Erwin N. Thompson, *The Rock: A History of Alcatraz Island, 1847-1972: Historic Resource Study, Golden Gate National Recreation Area* (National Park Service, Denver Service Center, n.d.)

⁷³ WWW.CRL.COM/ISLAND.

The Army also attempted to make some use of Yerba Buena Island during these years. It occupied Yerba Buena Island in February 1867, and by 1868 had garrisoned 125 men on the island. The mission of the Army facility was to establish an artillery base and Quartermaster depot, all at the eastern end of the island. The eastern side of the island was home to most military functions because it presented the only naturally flat terrain. Other flat spots have been created over the years, including sites on the west side of the island. With limited manpower at the site, the Army did not build a large number of buildings. The Army was active there from 1868 through 1879. Between 1879 and 1891, the island was essentially deserted, although still formally under Army control. The Army reoccupied parts of the island in 1891 as a torpedo station. Although Yerba Buena Island became a Naval Training Station (NTS) in 1898, the Army retained ownership and control of the eastern tip of Yerba Buena Island through 1960.

The Army occupation of Yerba Buena Island falls into two broad periods, 1867-1879, and again from 1891 to 1897. During the early years, the facility was occupied by more than 100 men, who resided in large barracks and for whom the Army erected numerous support buildings. Nothing appears to have survived from this period of occupation. The large barracks burned in 1875 and the remaining buildings were dismantled and moved elsewhere when the artillery base was shut down.⁷⁴ The 1867-1879 Army post, like all military facilities at Yerba Buena, was centered on the east cove, a natural cove at the northeastern part of the island, due south of the abutments for the cantilever spans of the San Francisco-Oakland Bay Bridge.⁷⁵

While it closed its artillery installation at the island in 1879, the Army did not relinquish ownership or control of the island. In 1891, the Army reoccupied the eastern tip of the island to develop a torpedo station. In 19th century parlance, a “torpedo” was what is called a mine today. The torpedo station was a very small installation under the control of the Army Coast Artillery Corps. Its function was to house and assemble submarine mines used in the defense of San Francisco Bay.⁷⁶ The station had two industrial buildings, a new wharf, and several officers’ quarters. The entire complex was located at the eastern base of East Point or Army Point, the promontory at the northeastern end of the island, now occupied chiefly by the Bay Bridge. The former location of the wharf, officers’ quarters, and one of the industrial buildings is unknown.

⁷⁴ Two buildings from Yerba Buena Island, both Officers’ Quarters, were moved to Angel Island and incorporated into Camp Reynolds, a coastal defense installation. Those buildings still exist and are being rehabilitated by the Department of Parks and Recreation. They are identified as Quarters 11 and 12, at the head of the Parade Ground at Camp Reynolds.

⁷⁵ JRP, “Mare Island,” 1-9. This report includes a photograph of the Army base; the original photograph can be found at the California Historical Society Library.

⁷⁶ The history of the design of this building is detailed in Erwin N. Thompson, “Historic Resource Study, Seacoast Fortifications, San Francisco Harbor, Golden Gate National Recreation Area, California” (National Park Service, 1979.) Thompson’s history is based upon research of Army records at the National Archives.

One industrial building remains, identified as Building 262 by the Navy. Designed and built by pioneering engineer, Ernest L. Ransome, Building 262 is one of the oldest reinforced concrete buildings in California and the nation. The concrete was hammered and chiseled to resemble ashlar stone masonry, making it also one of the more interesting concrete buildings from an architectural standpoint. The Army retained ownership of this building until the 1930s. In the meantime, the Navy began planning for a large training station on the island; this station was not occupied until 1902 and is discussed in a later chapter.

The Army's activities on Yerba Buena Island point to a final area of military growth in California during these years: coastal defense. The successful bombardment of forts on the eastern seaboard during the Civil War by Union and Confederate forces alike demonstrated the vulnerability of traditional masonry forts similar to Fort Point in San Francisco.⁷⁷ Beginning in the early 1870s, the Army Coast Artillery Corps began to redesign its coastal batteries. The new group of batteries was built, not around buildings, but around individual batteries, placed at strategic points in the landscape to deter detection or destruction. This new thinking regarding coastal fortifications resulted in two generations of construction along coastal California: during the 1870s and, again, in the 1890s, when the Army built an even more formidable group of batteries in response to the recommendations of the Endicott Commission. These new batteries were installed at various locations in California, but most notably in San Francisco Bay and at the entrance to San Diego Harbor.

The Presidio of San Francisco was made the best-fortified and most modern coastal defense installation in California. The Coastal Artillery installed Battery East and Battery West in the early 1870s. Planned for 35 guns, eight mortars, and 21 traverses, construction on these batteries ceased in 1876 when funds were exhausted. Construction began anew in the 1890s, according to the more comprehensive recommendations of the Endicott Commission. Battery Howe-Wagner was built in 1893, followed by Battery Godfrey in 1896. Most of these batteries remain in place, although the guns were removed many years ago.⁷⁸

In San Diego, the drive for more an effective coastal defense resulted in the establishment of an entirely new base: Fort Rosecrans on Point Loma. As noted in an earlier chapter, the Spanish built Fort Guijarros (*Fuente del Punta Guijarros*) in the 1790s for precisely the same purpose. The land passed to the Army under the conditions of the Treaty of Guadalupe Hidalgo, which gave to the United States military any lands previously reserved by Mexico for military purposes. General Stephen Kearny ordered a survey of the military reserve in 1852, but no work was undertaken at the site until the 1870s. The initial work at Fort Rosecrans began in 1873, when

⁷⁷ Flower & Roth, "Cultural Resources Inventory, Point Loma" 1982, 1.5-165.

the Army began construction of a 15-gun battery at the base of Ballast Point. This work continued for about a year until funding ran out. The 1870s fortification was never completed and the new fort lay vacant for another 20 years.

During the 1890s, Fort Rosecrans, like the batteries in San Francisco Bay, was upgraded to the recommendations of the Endicott Commission. In 1896, Congress approved funding for construction of a battery (Battery Wilkinson) with four 10-inch disappearing guns, along with a mine storage building at Ballast Point. This battery was not completed prior to the Spanish-American War. After the war, new batteries were built at Point Loma, along with barracks and other improvements for the men stationed there, beginning the intensive military development at the gateway to San Diego Harbor.⁷⁹

4.5 CONCLUSIONS

The late 19th century was generally a quiescent era for the American military. The nation was at peace until the very end of this period, except for the protracted Indian Wars, which occupied the Army in particular. Excepting the Indian Wars, there were few notable American successes on the battlefield during this period. Neither was this a period of great technological innovation or notable changes in the command structures of either of the two major branches. In short, this period is generally lacking in the types of military achievements and events through which military significance is usually measured.

In terms of historic resources, however, the buildings and structures from this period are among the finest architectural specimens ever built by the military in California. True, assessing the architectural value of these buildings is subject to a greater degree of subjective judgment than is an assessment of military achievement. Nonetheless, it is difficult to observe the late 19th century buildings at Mare Island, the Presidio of San Francisco, or the Benicia Arsenal and not be struck by the quality of design and construction. The designers of military buildings during this period seemed determined to project and maintain a sense of order and decorum on military installations, continuing a proud tradition of neoclassical design that dominated all types of federal architecture since the founding of the Republic.⁸⁰ They did this in contradiction to the patterns of civilian architecture, which spun off into a dozen different popular styles during these years, most with the exuberance and over-embellishment of Victorian architecture generally.

⁷⁸ "Presidio NHL," 7-45.

⁷⁹ Joyce, *A Harbor Worth Defending*.

⁸⁰ Lois A. Craig. *The Federal Presence: Architecture, Politics, and National Design* (Cambridge, Massachusetts: MIT Press, 1994).

When Russell Weigley calls this era the “Twilight of the Old Army,” he is speaking chiefly of the command structure and Army post layout. The same term, however, might be used to describe the architecture of the period as well, for both the Army and the Navy. If this period was the final expression of an old Army and Navy organization, it was also the final and best expression of a 19th century phase of military architecture. The calm, almost genteel quality of design in the late 19th century fit well with the organization of the forces at the time.

As discussed later in this volume, the “Old Army” and “Old Navy” were torn apart in the early 20th century through changes in command structures and particularly in response to technological innovations. The cavalry troops and wooden sailing ships of the 19th century quickly gave way to submarines, tanks, airplanes, trucks, and radios during the first decades of the 20th century. All aspects of military life would change in response to this modernization program, including military architecture. The military architecture of the late 19th century may be seen as the flowering of one era of military design, and as one of the most successful periods in military architecture. That architectural tradition would begin to fade in the early 20th century as the Army, Navy, Marine Corps and the forerunner of the Air Force were subjected to the profound effects of technological modernization.

5.0 MODERNIZATION ERA (1903-1918)

This relatively brief period (15 years) was an era of profound change in the military in California, as all of the branches sought to modernize their equipment, strategies, and tactics in response to new technologies. This process of modernization began with lessons learned during the Spanish-American War and subsequent actions in the Philippines and Asia. The pace of modernization accelerated as the United States began to prepare for what many saw as inevitable American involvement in the Great War in Europe. While California installations were not involved directly in World War I, the drive to adapt to modern warfare affected these facilities as profoundly as the developments of any period except for World War II and the Cold War. The military in California began this period with a set of well-developed 19th century bases. It ended the period with many new installations and older facilities that had been transformed by the drive for modernity (see Figure 7).

Military assets in California had not evolved significantly between the Civil War and the end of the Philippine Insurrection. The number and types of bases had changed little over that period, apart from the abandonment of the frontier Army forts, which, in most instances, was completed by the early 1880s.

Developments of the early 20th century exposed some of the weaknesses of the 19th century military structure. The period, 1903-1918, may be seen as one of modernization of all aspects of the military in California, from the command structure to the technology of weaponry. This process of modernization is reflected in the types of buildings the military constructed during this period, whether on established bases or on the new bases built during this period. It is also reflected in the distribution of power between and among the military bases in California. The “big three” of the 19th century—the Presidio of San Francisco, Mare Island, and the Benicia Arsenal—were of unquestioned dominance in 1903. By 1918, that dominance had begun to fade and the momentum of growth was shifting elsewhere, particularly to installations in rural northern California and in various parts of southern California, particularly the San Diego area.

The changes in the art of war during these years were ultimately technology driven. The early 20th century was a time of accelerated technological innovation in all aspects of American life, including the military. Fundamentally new inventions from this period were so numerous that one hesitates to list examples. Five major inventions were particularly important in changing the way war was waged: the airplane; the motorized vehicle; the tracked motorized vehicle, principally tanks; the submarine; and radio communications. Most of these were under development in the years before World War I and would be tested during the war. The war, if it taught anything, showed how poorly equipped the United States was in the use of these

technologies. To a large extent, the interwar period was dedicated to learning how better to apply these new technological innovations for use on the battlefield and at sea and to adapt tactics accordingly.

5.1 MARE ISLAND

The pace of modernization was arguably most evident in the Navy, which was the subject of a long drive to rebuild the fleet throughout this period. The Navy gave the shipyard at Mare Island the opportunity to modernize, in part because it had the funds to do so and in part because a large number of buildings had been destroyed in an earthquake in 1898. During this period, the shipyard was asked for the first time to build new capital ships and to begin its long association with submarines.

During the 19th century, the Navy contracted with private industry to construct most of its vessels. Most ships built by Mare Island before 1904 were wooden and steel-hulled tugboats used by island crews to carry on the work of the shipyard. After the Spanish-American War, Mare Island and other naval yards insisted they be allowed to compete with private yards in shipbuilding. Finally, Mare Island was awarded the contract for building the steel-hulled training ship *Intrepid*, a full-masted sailing vessel. Although obsolete by modern standards, the *Intrepid*, launched on October 8, 1904, signaled the emergence of Mare Island as a shipbuilding plant. Mare Island further proved its efficiency by constructing two steel colliers (coal-carrying ships), the *Prometheus* (1908) and the *Jupiter* (1912). The *Prometheus* was the biggest, longest, heaviest, and most expensive vessel built at Mare Island up to that time. In the early 20th century, the Bureau of Steam Engineering began to experiment with electric drives as a means of reducing speed from the turbine to the propeller. The *Jupiter* was the first electrically propelled ship constructed for the Navy. The battleship *California*, also constructed at Mare Island between 1915-1919, was the first dreadnought installed with electric drive.⁸¹ The construction of the two successful collier projects was followed by construction of several smaller river boats – a 36-ton revenue cutter, two 160-ton gunboats, oil and water barges, and a ferry boat – at Mare Island Shipyard in the years leading up to the outbreak of World War I. The only other large ships undertaken at Mare Island prior to the war was the 5,500-ton steel oil tanker *Kanawha* and her sister ship the *Maumee*.⁸²

During the first decade of the 20th century, the Navy Department continuously debated whether or not a battleship squadron could be spared for the Pacific fleet. While the General Board affirmed that the United States needed a "two-ocean Navy," it feared that an attack from Europe while the

⁸¹ Herbert M. Neuhaus, "Fifty Years of Naval Engineering in Retrospect, Part III: 1908-1921" *Journal of the Society of Naval Engineering* (November 1938); The *Jupiter* was later outfitted with a flat deck and became the Navy's first aircraft carrier – the *USS Langley*.

⁸² Lott, *A Long Line of Ships*, 147-157.

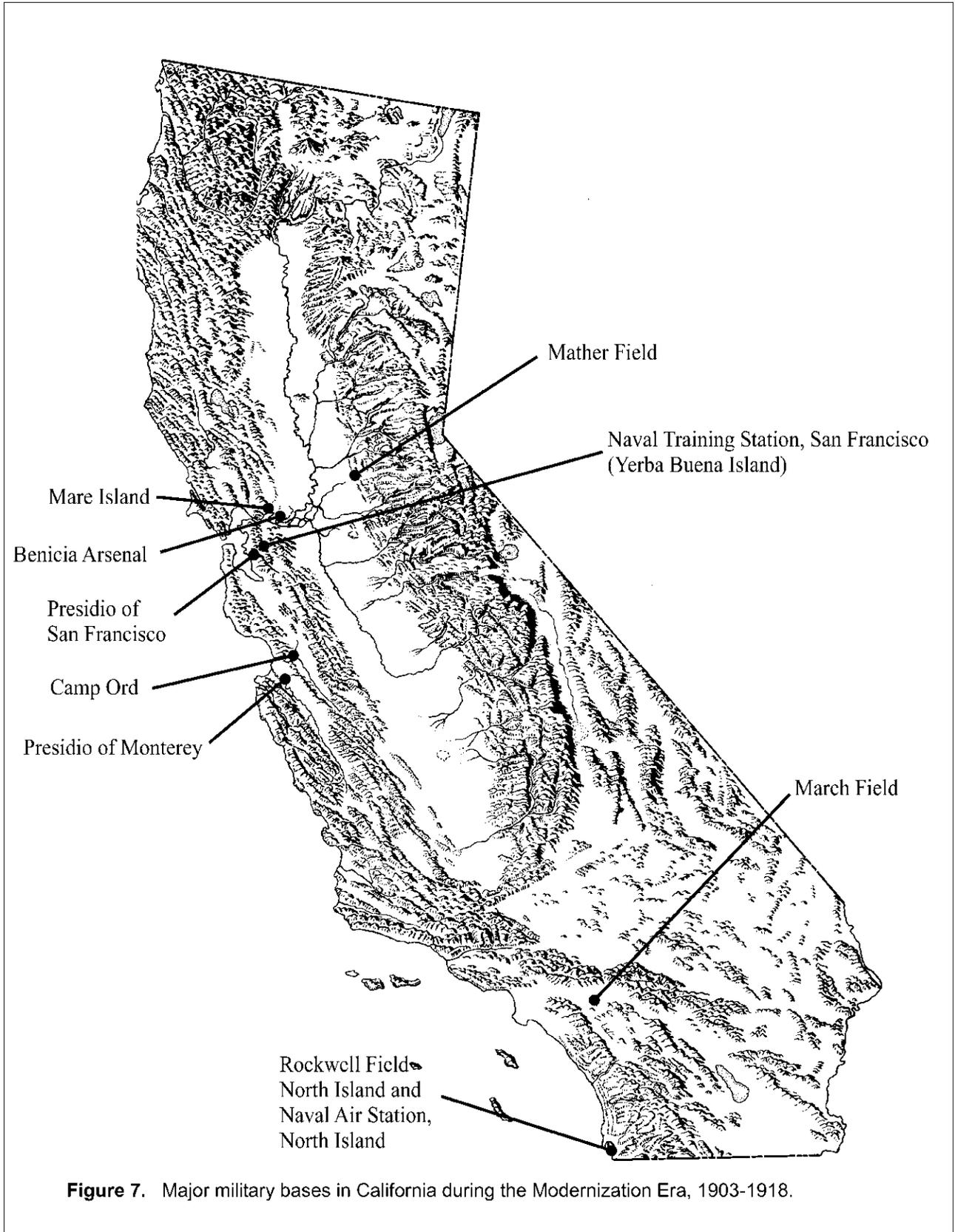


Figure 7. Major military bases in California during the Modernization Era, 1903-1918.

American battleships were divided between the Atlantic and Pacific might spell defeat for both fleets before they could be united. As the actual number of warships increased, concern shifted to whether there was an adequate home base for a battleship fleet in the Pacific. The General Board tried to overcome this, in part, by establishing bases in the Philippines and Pearl Harbor; but sending a separate squadron of battleships and armored cruisers to the Pacific Coast required facilities to repair and maintain them. When President Theodore Roosevelt turned to the Navy to ascertain whether the battleships could be maintained in the Pacific in good condition, he learned that shore facilities on the Pacific Coast were limited. In 1907, only the drydock at Bremerton in Puget Sound could accommodate the battleships and cruisers, if sent to the Pacific. The shallow channel at Mare Island limited its usefulness for the largest class of warships.⁸³

Many improvements to the storehouses, drydocks, and shipways were undertaken at Mare Island to prepare for the coming of the Pacific Fleet and in preparation for World War I. Even with all these improvements, however, channel restrictions inhibited access to Mare Island shipyard for the largest battleships and cruisers of the fleet. Thus, Mare Island constructed only one battleship, the *California*. When released down the shipway, the restraining cables broke, sending the hull of the *California* across the narrow channel, swamping boats and taking out the ferry slip on the Vallejo side. Construction of destroyers remained the yard's specialty. Mare Island set a record by launching of the destroyer *Ward* in 17 days from keel laying (Figure 8). Eight destroyers were launched at Mare Island during World War I and another eight were launched by 1920.⁸⁴

The U.S. Radio Reservation, Mare Island also has its origins in this period. Again, like so many other functions that accreted to Mare Island, the Radio Reservation came to Mare Island almost by default, simply because it was the best-equipped Navy station on the West Coast. In 1899, the Navy conducted the first experiments with the use of Marconi's wireless telegraph on U.S. warships. In 1900, a Marconi unit was installed at the Naval Torpedo Station, Newport, Rhode Island. A board of Naval officers conducted further tests in 1902 on communication between two ships at sea and between a ship and land station. The following year, seven sets were ordered for as many ships and 13 additional ordered for shore establishments. In 1903, Mare Island and four other Navy yards were provided instructions in fitting radio equipment in naval vessels.⁸⁵

⁸³ William R. Braisted, *The United States Navy in the Pacific, 1909-1922* (Austin, University of Texas Press, 1971), 203-239.

⁸⁴ Committee on Naval Affairs, *Report*, H. Doc. 41, 64:1 (1916).

⁸⁵ Neuhaus, "Fifty Years of Naval Engineering In Retrospect;" Plan of U.S. Navy Yard, Mare Island, 1918 and 1925; Captain L. S. Howeth, USN, *History of Communications-Electronic in the United States Navy* (Washington D.C.: 1963), 60-115.

During the mobilization effort, the Navy formulated a six-year building program that included an unprecedented expansion of Navy facilities by BuDocks. The preparedness program of 1916 provided for expansion of the fleet and drydocks, Marine bases, fuel depots, training stations, arsenals, and other shore facilities to service the expanded fleet. A large part of BuDocks activities aimed at improving and equipping Navy yards for the construction of ships, particularly at the major shipyards. During World War I, the public works of the Navy increased in value from about \$211,000,000 to \$469,000,000, a wartime expenditure greater than that spent on all navy yards and naval stations in the previous 125 years.⁸⁶

It was during this period that Mare Island workers had their first experience in working on submarines, a class of work that would dominate the shipyard until it was closed in the 1990s. In 1904, two of the first six submarines purchased by the Navy were assigned to Mare Island for testing, training, and repair work. The two craft—the *Grampus* and the *Pike*—were tiny by modern standards, each being 60' long and 11' wide. These craft saw no action.⁸⁷ Their significance lies in the degree to which they indicate the pace of modernization at the shipyard and the extent to which they pointed to the future of this shipyard. In the early 1920s, a permanent submarine base was established at Mare Island. Arguably, the most important work at the shipyard during World War II and the Cold War lay in the repair and construction of submarines.

The years 1903 to 1918 may be seen as the beginning of the modernization of Mare Island, a process that would continue uninterrupted until the base was closed in the 1990s. The earthquake of 1898, occurring the same year as the Spanish-American War, was a powerful event at Mare Island because it destroyed so much of the physical plant left over from the mid-19th century. The war taught the Navy a great deal about where and how it needed to modernize its fleet. Recognizing the need for new ways of doing things to support a new fleet, Mare Island rebuilt itself to accommodate new technologies to deal with changes in ship design and propulsion. The best symbols of the drive to modernize the base are: Building 271, the huge (for its time) steam engineering building, the first building on the station to use a curtain wall design; Drydock 2, which was large enough to accommodate any ship then under design; and Building 121, a new centralized power plant. Other facilities, such as the new hospital, were designed to take advantage of emerging technologies.

⁸⁶ Bureau of Yards and Docks, *Building the Navy's Bases in World War II* (Washington, D.C.: Government Publishing Office, 1947), 19.

⁸⁷ Lott, *A Long Line of Ships*, 140-141.



Figure 8. Crews working on Destroyer *Ward*, Mare Island, ca. 1918. (Source: National Archives.)

It would be a mistake, however, to regard the drive toward modernization as the only consideration in designing buildings in this period. The new power plant, for example, included a Beaux Arts brick shell over its steel frame and modern equipment. The buildings from this period are transitional, forward-looking in their operations and in the adoption of new building materials and methods but generally traditional in design.

5.2 OTHER NAVY BASES

The Navy also built a substantial new facility in San Francisco Bay when it established the NTS San Francisco, on Yerba Buena Island (Figure 9). As noted in an earlier chapter, the military had retained possession of all of the three main islands in the bay and had made meager attempts to use them, none to any great degree of success. The Training Station on Yerba Buena Island was arguably the most ambitious, but also perhaps the most misguided, of these various efforts. The need for a training station was demonstrable; efforts at various small training stations, including one on Mare Island, could not be coordinated. The problem with the Yerba Buena Island site is that it offered no room for expansion, leaving it hopelessly crowded during World War I. At the time it was built, the Yerba Buena NTS was one of four such facilities in the United States and the only one on the West Coast. The Training Station was a key facility for the Navy on the West Coast, ultimately, too important to house on the limited land at Yerba Buena Island. The Navy shut down the facility in the early 1920s, moving it to San Diego.⁸⁸

The Training Station used all of Yerba Buena Island to some extent but was centered on flat lands at the East Cove. The functional core of the Training Station was bounded by East Point, or Army Point, on the east; East Cove on the south (East Cove is now used by the Coast Guard); San Francisco Bay on the north (now the harbor between Yerba Buena and Treasure Islands); and on the west by the central hillside of Yerba Buena (denoted today by the east portal to the Yerba Buena Tunnel of the Bay Bridge). The initial building constructed was a large barracks, capable of housing 500 men, with a very large drill hall. As noted, this building was constructed in early 1900 and was located on the hillside at the east end of the island. This building was demolished in 1960.

While the barracks were under construction, the Navy began construction of Senior Officers' Quarters, just downhill from the barracks. The Commander's Quarters, Building 1, was completed in 1900, the seven other Senior Officers' Quarters (Buildings 2-8), were completed

⁸⁸ JRP, "Mare Island," 1-14. The use and appearance of the Naval Training Station is discussed in several articles in popular journals of the time. See: Fred A. Hunt, "Yerba Buena Island Naval Training Station," *Overland Monthly*, XLII, (1913); R.A. Weiss, "The Story of Yerba Buena," *Sunset Magazine*, XI, (1903) 6.; Douglas White, "Boy Blue Jackets of Yerba Buena," *Sunset Magazine*, XI, (1903) 517-525.

between 1901 and 1905. All eight of these buildings still exist. Buildings 1 through 7 are clustered in a neat neighborhood on the north side of the Bay Bridge. Quarters 8, on the south side of the Bay Bridge, is now isolated from the others; it is geographically more closely related to the Coast Guard housing complex than to the remainder of the 1901-1905 officers' quarters. It was built as quarters for the commander of the Marine Corps camp, which was located on the southern slope of the island; the Marine barracks, situated nearby, were demolished during the early 1940s. Quarters 9, located near Quarters 8, was built before 1917 as a Master of Tugs Quarters.

The NTS was active at the site between 1900 and 1923. Typically, between four and five hundred trainees were present at the station at any given time. Training included six months shore training, followed by six months at sea on training ships. As a busy facility, the only such basic training operation on the West Coast, the training station required a substantial number of buildings. Dozens of buildings were constructed there between 1900 and 1923, the majority of which have been demolished.

The 155-acre island was perennially overcrowded while it was used for this purpose, forcing the Navy to look elsewhere for a site for its major West Coast Training Station. The preparedness build-up prior to American entry into World War I so overtaxed the Yerba Buena facility that 13,000 men were assigned there at one time, most living in tent camps scattered throughout the island. After the war, the Navy decided to build a new training station in San Diego and close the training station at Yerba Buena Island. The last of the NTS personnel were relocated to San Diego in 1923 and the Yerba Buena Training Station facility was decommissioned. Yerba Buena Island remained a Navy facility, however, for a more limited "receiving ship" function; a "receiving ship" was a transient station for sailors awaiting assignment to duty on ships at sea. It appears that relatively few men were stationed at the facility in association with this function; those that were stationed there occupied the barracks and used the other buildings that had been built for the Training Station.⁸⁹

5.3 MODERNIZING THE ARMY

The Army was fundamentally transformed during this period, as well. The Army continued to build on its older assets at the Presidio of San Francisco and at the Benicia Arsenal. But these small, increasingly urbanized installations were shown to be inadequate for the kind of training

⁸⁹ JRP, "Mare Island," 1-39.



Figure 9. Yerba Buena Island (foreground) and Treasure Island, aerial view taken May 8, 1952. The major barracks for the Naval Training Station had been demolished by the time this photograph was taken. (Source: National Archives.)

facilities the Army needed to deal with and were also inadequate for the new guns, motorized vehicles, and other technological innovations of this period. The future of the Army in California lay with isolated facilities that had access to large blocks of open spaces. The Presidio of Monterey, which began as a tiny facility for rehabilitating troops returning from the Philippines, would point to the future of the Army in California.

The older Army bases in San Francisco and Benicia did not disappear during this period. The Benicia Arsenal, however, fell into a period of decline: virtually no new buildings would be constructed there until the late 1930s, when all California military assets were pressed into service in preparation for American involvement in World War II.⁹⁰

The Presidio of San Francisco actually grew considerably during these years. New construction in San Francisco, however, represented a maturing of older functions that had developed there over the years, rather than expansion of the mission of the base. For example, Fort Winfield Scott—the fort itself and the housing area associated with it—were built up as part of the Presidio to support the coastal defense batteries that had begun in the 1890s (Figure 10). The housing at Fort Winfield Scott is of interest for the introduction of Colonial Revival (American Colonial Revival), as well as Spanish Colonial Revival design, the modern design for civilian architecture of the period. The Presidio also grew through a substantial build-up of the hospital on the base, which became Letterman Hospital, one of the largest and most efficient hospitals of the American military.⁹¹ Symbolic of the degree to which the Presidio of San Francisco remained a traditional rather than a cutting-edge “New Army” base is the fact that one of the biggest construction programs there was the building of five huge cavalry stables, each designed to house 102 horses, along with a substantial veterinary hospital for the horses. These stables still stand.⁹²

As noted in an earlier chapter, the Presidio of Monterey was reopened in 1902 to handle troops returning from the Philippines who could not be housed in San Francisco. The Army built an odd collection of wood-frame barracks and officers’ quarters, most of which still remain and are used by the Defense Language Institute. The barracks, in particular, with their long veranda and tall post foundations, appear to have been derived from the true bungalows of the Far East, a plausible explanation, given the fact that the troops and Quartermaster Corps personnel who constructed the post were returning from combat in the Far East.⁹³ The initial plan called for a small facility (135 acres) with enough buildings to house various infantry, artillery, and cavalry

⁹⁰ Bruegmann, *Benicia*, 105-106.

⁹¹ “Presidio NHL”

⁹² Thompson, *Presidio of San Francisco*, 91.

⁹³ Jackson Research Projects, “The Presidio of Monterey,” National Register Inventory and Evaluation, 1985.

troops. Among the first troops to arrive were the 15th Infantry and the 9th Cavalry. The 15th Infantry was returning from duty in China and the Philippines. The 9th Cavalry, a “colored” unit, was returning from the Philippines and was assigned to the Presidio of Monterey, as well.

This essentially short-term duty evolved into a long-term mission for the Presidio of Monterey as a training base for infantry, cavalry, and artillery units. The fact that all three major functions were housed on the same post reflected the modern thinking of the Army which, after 1900, increasingly emphasized joint exercises.⁹⁴ It also reflected the need for a facility in which these troops could be introduced to modern weapons and tactics. During this period, the Army adopted as standard issue a bolt-action Springfield rifle, a Colt .45 automatic pistol, and machine guns. Motorized vehicles were adopted early in the 20th century to supplement horse-drawn vehicles to move troops and artillery pieces. In preparation for American involvement in World War I, the Army experimented in the use of an armored variation on track-driven farm vehicles—tanks—as well.⁹⁵ Training exercises for the many of the troops at the Presidio of Monterey—its troop strength grew to more than 1,000 before American involvement in World War I—depended upon availability of land that far exceeded the tiny base.

The answer to training these many troops in joint exercises came in 1917, when the government acquired a 15,200-acre parcel north of Monterey. The timing of this acquisition, of course, coincided with declaration of war with Germany in April and institution of a selective service system in May 1917. Overnight, the Army increased to full wartime force levels and training became an imperative.⁹⁶ Acquisition of this land enabled the Presidio to grow into a modern training base for all types of functions, from artillery to infantry to cavalry (mounted and motorized), to the Medical Corps and other units who would see action during World War I. The development of the large training grounds north of Monterey came just before America joined the action in Europe. That training facility would be used extensively during the war. In time, it would render superfluous the little post along Monterey Bay. Prior to American involvement in World War II, the Army established Fort Ord, an entirely new facility on the World War I

⁹⁴ This emphasis on training was but one part of a massive overhaul of the Army, undertaken at the insistence of Secretary of War, Elihu Root. Weigley, *History of the United States Army*, Chapter 14, “The New Army.”

⁹⁵ The first tanks were developed on the chassis of tractors built by the Caterpillar Corporation, a California company at the time. The tank was born of wartime research. The Caterpillar Corporation delivered thousands of its tractors to the United States, Great Britain, and France during the war to move equipment through muddy fields. Impressed by the durability of the Caterpillar, British and French military planners began to experiment with an armored version of it before the United States entered World War I. During the war, the United States made extensive use of Caterpillar tractors to move equipment, particularly artillery pieces. More limited use was made of armored versions of the Caterpillars, or tanks. Walter A. Payne, ed. *Benjamin Holt: The Story of the Caterpillar Tractor* (Stockton: University of the Pacific, 1982); Kenneth Macksey, *Tank Warfare: A History of Tanks in Battle* (London: Rupert Hart-Davis, 1971) for a discussion of these early tanks and their performance.

⁹⁶ Weigley, *History of the United States Army*, 354.

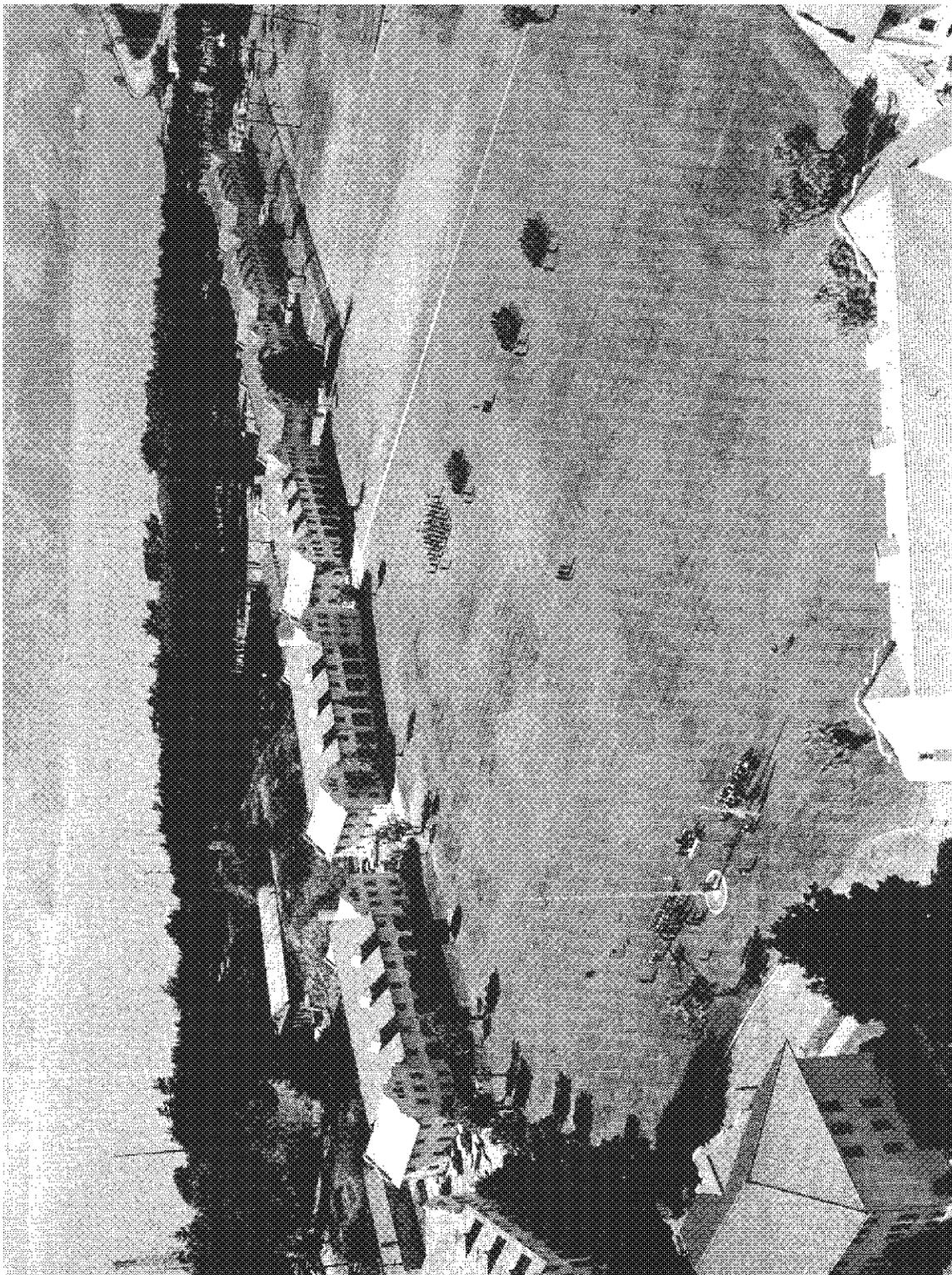


Figure 10. Fort Winfield Scott at the Presidio of San Francisco, 1961. (Source: National Archives.)

training ground. The buildings at the Presidio were used for miscellaneous purposes, including officers' housing and language training, for which they are used today.

5.4 EARLY MILITARY AVIATION

The American military during World War I learned to work with three fundamentally new vehicles: the tank, the submarine, and the airplane. The introduction of the tank transformed the training exercises at Army forts like the Presidio of Monterey. The introduction of the submarine would have a powerful impact on Mare Island, which developed into a submarine-dominated base after 1919. The introduction of the airplane as an instrument of war was arguably the single most important factor in the development of California as a central focus of American military strategies. The climate of California was favorable for aircraft training. At least in part because the climate was favorable, California also emerged as the center of the aircraft manufacturing industry. The growth of the California aircraft industry and aviation training bases would accelerate during the 1920s, 1930s, and 1940s. The seeds of this growth, however, were planted just before and during American involvement in World War I.

Airfields from this period could be established at a variety of locations; the aircraft were so small and under-powered by modern standards that tiny airfields would suffice. Although it was not established until the early 1920s, Crissy Field at the Presidio of San Francisco was developed into a substantial Air Corps training facility, despite being sandwiched into a tiny field along the edge of the bay.⁹⁷ Other small airfields were pieced together in all parts of California in the years just before American involvement in World War I.

The Army took the early lead in aviation development. In 1907, the Army Signal Corps established a separate Aeronautical Division, charged with working with all things that flew, including surveillance balloons and aircraft. By 1913, the Army had set aside a "First Provisional Aero Squadron," the dedicated first aircraft unit.⁹⁸ In the years before American involvement in World War I, the Signal Corps had developed a permanent training field on North Island in San Diego Bay. During the war, the newly created Army Air Service built ten new stations throughout the United States, many of which were in California.

The pioneering airfield in California was built on North Island, a sandy island that was barely connected with Coronado Island at the southern entrance to San Diego Bay. The Navy was the first branch to occupy North Island when, in 1901, troops from nearby Fort Rosecrans established

⁹⁷ "Presidio NHL;" the history of Crissy Field is discussed in detail in Thompson, *Presidio of San Francisco*. Stephen Haller of the Golden Gate National Recreation Area also produced a history of Crissy field in 1994.

⁹⁸ The history of constructing Air Corps bases is detailed in Jerold E. Brown, *Where Eagles Land: Planning and Development of U.S. Army Airfields, 1910-1940* (New York: Greenwood Press, 1990.)

a small coastal defense fortification, called Camp Pio Pico. The initial use of the island for aviation, however, was by the Curtis Aviation Company of New York State. In an interesting early sign of cooperation between private manufacturers and the military, Curtis Aviation established a small airfield on North Island for the purpose of training Navy personnel in the use of Curtis-made seaplanes. In 1911, joint Navy-Curtis tests began. The Navy bought its first Curtis aircraft in 1911, one of the earliest landmarks in the development of Navy air.

In the fall of 1912, the Army's Signal Corps established a camp on North Island, as well, beginning a joint Army-Navy use of North Island that would last until the Army left in 1935. The Signal Corps developed its first permanent flight training school there in 1913, naming it Rockwell Field for Lewis Rockwell, a Signal Corps pilot killed in training (Figure 11). The Army and Navy built no permanent buildings on the island before 1917 because the land was still owned by the Coronado Beach Company.

In May 1917, the United States took possession of North Island to establish a joint Army-Navy airfield. The branches partitioned the island in a logical manner, with the Navy taking land near the water and the Army moving inland. Although few permanent buildings were constructed before the end of the war in November 1918, both the Army's Rockwell Field and the Navy's field—called NAS North Island from the outset—had trained dozens of pilots and officers who saw duty in the war.⁹⁹ Permanent construction did begin, however, on a few of the Navy's permanent buildings. The Navy's base, built on plans by Bertram Goodhue, is not only a milestone in the history of Navy aviation but is also one of the most handsome military bases built in California. This Navy's base on North Island, completed during the inter-war years, is discussed in a succeeding chapter. NAS North Island was the only Navy aviation field developed in California during this period. The Army's air unit was called the Aviation Section during this period before being renamed the Air Corps in 1924.¹⁰⁰ The Aviation Section developed a string of air training fields throughout the United States during World War I. In addition to Rockwell Field, the Section built bases at March Field near Riverside and at Mather Field near Sacramento using standard plans that produced remarkably similar facilities (Figures 12 and 13). Both March Field and Mather would be deactivated at the end of the war, only to be reactivated at a later time. When they were reactivated—March during the 1920s, Mather during World War II—the flimsy, temporary World War I-era buildings were demolished and entirely new bases were erected.¹⁰¹

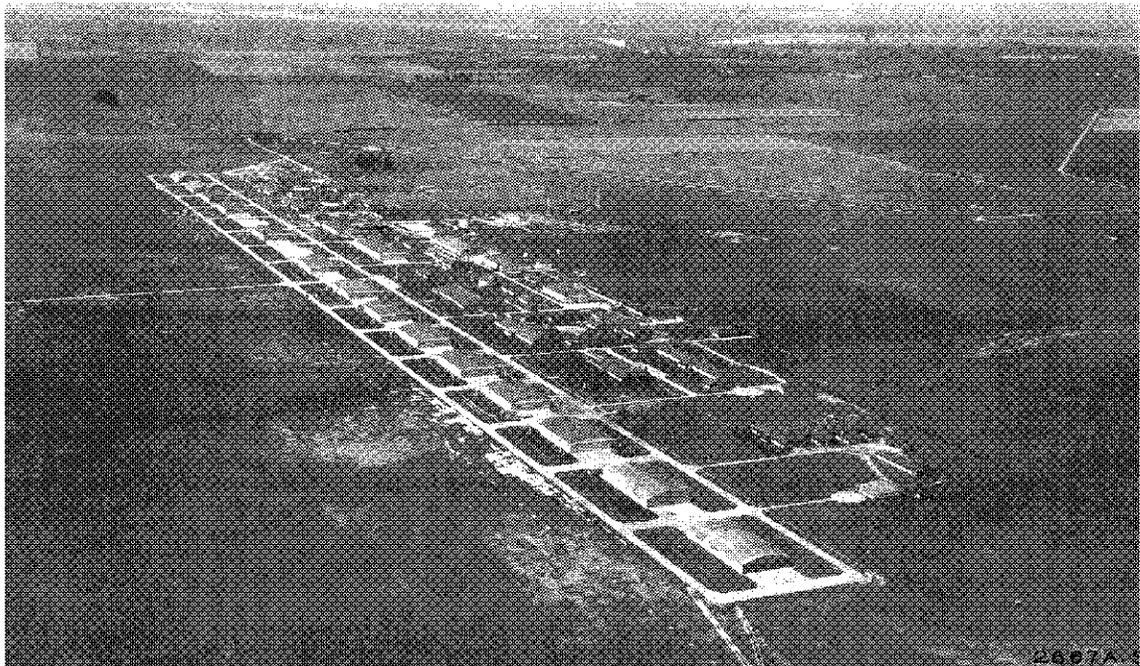
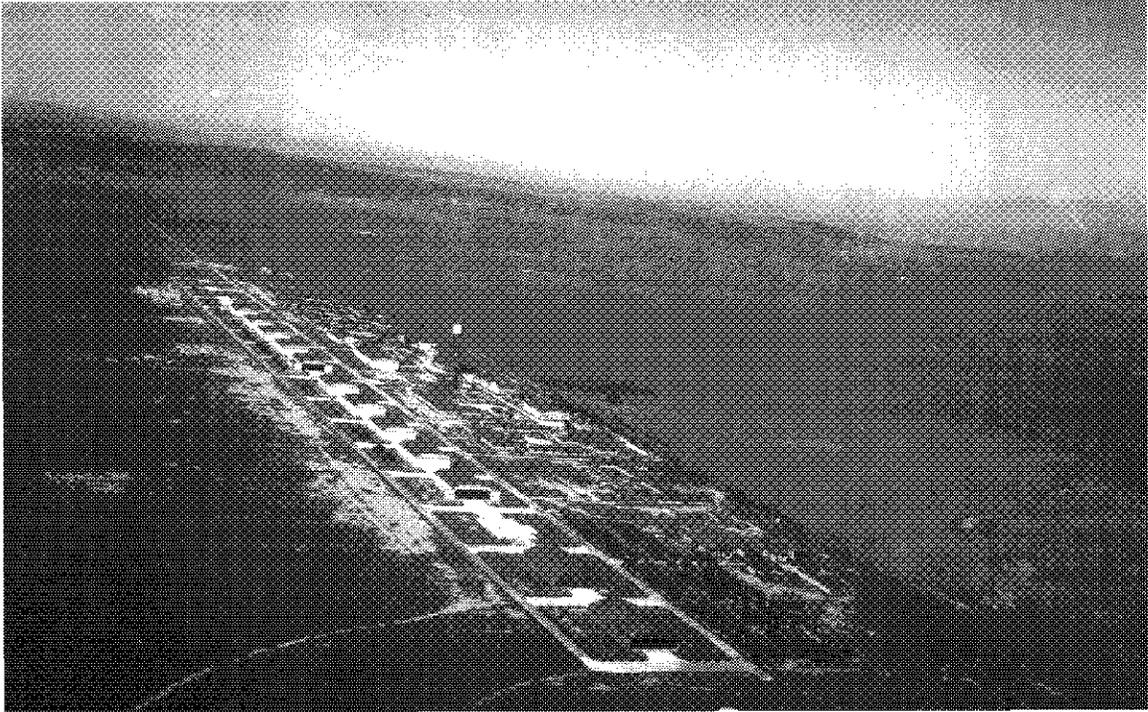
⁹⁹ *Jackrabbits to Jets: The History of Naval Air Station North Island, San Diego, California, Part 1* (San Diego: San Diego Publishing, 1992).

¹⁰⁰ www.af.mil/library/kitty.html

¹⁰¹ JRP Historical Consulting Services, "National Registration Form for March Field Historic Nomination" April 1992, 8-33.



Figure 11. View of North Island, 1925. At this time it was still an island. It is now contiguous with Coronado, through infill of the Spanish Bight. The Air Corps' Rockwell Field is in the center of the photograph, while the Navy's Air Station is in the distance. (Source: National Archives.)



Figures 12 and 13. March Field (top) and Mather Field (bottom), both built to standard plans during World War I. March Field became March Air Force Base, near Riverside; Mather Field became Mather Air Force Base, near Sacramento. (Source: National Archives.)

The Marine Corps modernized during this period by developing Marine-only training facilities. Until World War I, the Marine Corps presence in California was restricted to its barracks on Navy bases. The largest Marine Corps facility in California was its substantial barracks at Mare Island. In 1917, an entirely new Marine Corps area was built on an isolated location on the island, moving from a cramped site near the hospital. The new Marine Corps Barracks was huge in comparison to the earlier building, which had been damaged but not destroyed in the earthquake of 1898. The new building was designed, not only to house the Marine detachment at Mare Island, but to serve as well as a separate Marine Corps basic training station, the basic function offered by the Marine Corps Recruit Depot (MCRD) in San Diego today. The training station was completed in 1917 and served well during World War I.¹⁰²

Like the Army, the Marine Corps saw the need for open spaces in which it could train in the use of new weapons and vehicles. Marine Corps force authorization grew from 3,800 to 13,600 men between the Spanish-American War and World War I, with that growth attributed to establishment of a new mission: to serve as the expeditionary force in seizing advance bases.¹⁰³ This fundamentally new assignment required new bases in which Marines could train independent of the Navy.

Unfortunately, no permanent base was available for the Marine Corps in California during this period; that need would not finally be met until the huge Camp Pendleton was established in 1942. The Marines, under the command of Colonel Joseph Pendleton, trained where they could: at Mare Island, at the emerging Navy-Army airfield on North Island in San Diego, and on land leased on Kearny Mesa north of San Diego. By the end of World War I, the Marines decided to consolidate their presence in California at what was called the Marine Corps Base, San Diego, later to become MCRD. This base was built in the post-war period and is discussed in a following chapter. Like the NAS North Island, this beautiful base was designed by Bertram Goodhue. The Marine Corps Recruit Depot, however, did not solve the long-term needs of the Corps. It essentially replaced the Marine Barracks at Mare Island and gave the Marines their first independent station in the state. The tiny base was hemmed in on all sides, however, leaving the Corps to wander from one temporary site to another until they acquired the great base at Camp Pendleton at the outset of World War II.

¹⁰² JRP Historical Consulting Services, "Historic Context for Evaluating Buildings, Structures, Historic Archeological Sites and Landscape features at Mare Island, Vallejo, California" November 1995.

¹⁰³ J. Robert Moskin, *The Marine Corps Story* (Boston: Little, Brown and Company, 1992), 199.

5.5 CONCLUSIONS

The period 1903 to 1918 may be seen as one in which all branches of the military laid the groundwork for modern, well-equipped, and well-trained forces. The manifestations of this drive toward modernization differed from one branch to the next and from one facility to another. Two themes, however, unite the efforts of all branches: the need for training and the drive to adopt new technologies. The two were related. Technological innovations from this period were as dramatic as any other period in the history of the American military in the state, except, perhaps, for the innovations of the Cold War. The Navy fundamentally rebuilt its fleet. The Army adopted motorized vehicles, tanks, and machine guns and all but abandoned its mounted cavalry; a few mounted units would persist almost to World War II. The Marine Corps was made into a largely independent branch to serve as the advance expeditionary force, a task that called for new equipment, as well as new training. Both the Navy and the Army adopted airplanes as machines of war almost as soon as these new craft were proven to be capable of flight.

The new technologies required new types of training facilities. The most obvious case was that of the military aviation. With remarkable speed, both the Army and Navy built training installations for aircraft, with the facility on North Island representing one of the first in the nation. Similarly, the requirements of training with tanks, motorized vehicles, and machine guns required very large and isolated training bases for the Army, as well as the Marines. The Monterey County base for the Presidio of Monterey was the first such installation in the state. Even the shipyard at Mare Island, while it retained a building stock that was already very old, was able to adapt to new technologies in shipbuilding and repair, including its pioneering work in submarine repair.

These new functions and technologies required new types of buildings and structures, as well. Again, the airfield is but the most obvious example; there was no functional equivalent, for example, to a hangar from any of the earlier periods. Modern shipbuilding techniques called for entirely new types of buildings as well; the steel curtain Building 271 at Mare Island was one of the first examples of that building type in California, whether seen from the military or civilian context. Motorized vehicle repair sheds began to appear on all military bases in California during this period.

Nothing, however, changes completely overnight. The military building stock in California from this period is best seen as transitional, reflecting in many respects the drive for modernity as well as respect for the long design traditions of the military. It is true that there are many decidedly modern buildings from this period. It is also true that many military buildings from this period, particularly housing and office buildings, have more in common with 19th century construction than with the sleek, modern buildings that would be constructed in later decades. This

transitional character is best exemplified by buildings at Mare Island. Buildings from this period include the boxy, frankly utilitarian Building 217, as well as several dozen houses and shops buildings that retain the elegance and historicism of 19th century construction. The remaining buildings from the Navy's Training Station at Yerba Buena Island were similar to the classical buildings at Mare Island; indeed, these buildings were apparently patterned after Mare Island counterparts. Construction at the Presidio of San Francisco adopted modern styles—the Colonial Revival and Spanish Colonial Revival—but did so with the same concern for quality of design that characterized 19th century design.

While the drive for modernization explains the pattern of development of the military in California during this period, that drive is not always reflected in the historical building stock. The complexity of the historical buildings from this period indicates that the military, like any very large organization, is itself complex and capable of embracing different, sometimes contradictory, impulses. While modernization would continue to dominate the development of all branches throughout the 20th century, the impulse toward building pleasant, attractive, and high-quality bases would persist through the early 1940s.

6.0 INTERWAR ERA (1919-1938)

The period between World War I and World War II may be seen as one of consolidation of military assets in California. The “modern” Army, Navy, and Marine Corps as well as the predecessor of the Air Force were born in the years before and during World War I. The military in California spent the interwar years building upon lessons learned during World War I and capitalizing upon fundamentally new technologies introduced in the early 20th century. It did so chiefly by establishing new bases that were dedicated to new strategies and advancing technologies. The older bases—Mare Island, the Presidio of San Francisco, and the Benicia Arsenal—were not closed during this period, although proposals to that effect were made. These older bases, however, were increasingly irrelevant to the total presence of the military in California as the United States put its assets into modern facilities geared specifically to take advantage of emerging technologies.

While it was a period of consolidation, it was also an era of geographical dispersal. The early 20th century military was concentrated in the Bay Area, although a few distant installations had been established elsewhere. The trend in military construction during the interwar years was toward geographic dispersal, particularly a spread into the southern California counties (see Figure 14). The military planned this scattering of facilities for strategic reasons, but also reflected intense competition between various California cities to reap the economic benefits of military construction. California cities had lobbied for base construction during the 19th and early 20th centuries and that competition reached a fevered pace during the interwar years. The military, particularly the Navy, was content to let the competition go forward, as cities vied with one another to offer inducements for military construction. In the long run, it was likely that military construction would have spread beyond its traditional Bay Area focus even without this inter-city competition, simply because new activities required land that was unavailable in an urban area. The dispersal was hastened, however, by the intense municipal competition, creating what one writer calls the “metropolitan-military complex.”¹⁰⁴ San Diego was particularly aggressive in wooing the military and was ultimately the greatest beneficiary of new military construction.

Military buildings and structures from this period are unlike any that were built before or since. American municipalities first began to adopt city plans during the 1920s, although city planning

¹⁰⁴ Robert W. Lotchin, “The Metropolitan-Military Complex in Comparative Perspective: San Francisco, Los Angeles, and San Diego, 1919-1941” *Journal of the West*, 18 (July, 1979).

concepts were derived from the City Beautiful movement of the pre-war period.¹⁰⁵ Planners in the Army's Quartermaster Corps and the Navy's Bureau of Yards and Docks were deeply influenced by city planning concepts, particularly the notion that a large, multi-functional area could be rationally planned and designed to maximize efficiency and beauty. Lt. H. B. Nurse, chief of the Design Branch in the Engineering Division of the Quartermaster Corps, was a particularly outspoken and eloquent proponent of the idea that military bases could be designed as well-run cities. Nurse laid out March Field and Hamilton Field, two of the most rationally planned and beautiful air bases in the United States¹⁰⁶. He argued that base design should proceed according to five governing principles: 1) Unity (a base must "proceed from a single impulse and be the embodiment of one idea"); 2) Consonance in Design ("the form of recurring geometric figures, parallels, diagonals, and the like"); 3) Diversity ("identity does not exclude individuality"); 4) Balance ("the symmetrical disposition of the elements on either side of axial lines"); and 5) Radiation ("the various parts of any organism radiate from and refer back to common centers").¹⁰⁷

Nurse's commitment to city planning concepts in base design was matched by that of the Navy's Bureau of Yards and Docks. The Navy and Marine Corps installations from this era were, like Nurse's Air Corps bases, laid out according to rational planning concepts, including consistent architectural design. Both the Quartermaster Corps and Bureau of Yards and Docks turned to nationally known architects to assist in this effort, as discussed later in this chapter. March Field was rebuilt with the assistance of architect Myron Hunt and city planner George B. Ford. The Marine Corps Recruit Depot, NAS North Island, and the NTS in San Diego were designed by Bertram Goodhue, an architect of national repute.

This commitment to city planning concepts, coupled with the assistance of highly successful private architects, resulted in the creation in California of a half-dozen of the best-looking military installations in the United States. On the surface, there may seem to be a contradiction between the military's commitment to efficiency, on the one hand, and the construction of very beautiful facilities, on the other. The two were not contradictory in the eyes of Lt. Nurse and others. These planners were designing completely new facilities for essentially new functions: air stations where none had existed previously; independent Marine Corps installations where

¹⁰⁵ There is a very extensive historiography on American City planning. It is summarized in Martin Gellen, *The History of Urban Planning in the United States* (Chicago: CPL Bibliographies, 1983.)

¹⁰⁶ Lt. H.B. Nurse, as Chief of the Design Branch, had a hand in laying out most of the new Army or Air Corps facilities during this period. As discussed later, the original plan for March Field was developed by architect Myron Hunt and City Planner George B. Ford. Nurse's office, however, developed the final site plan, and Nurse signed that plan.

¹⁰⁷ Nurse, Lt. H.B., "The Planning of Army Posts." *Quartermaster Review* (Sept.-Oct 1928.)

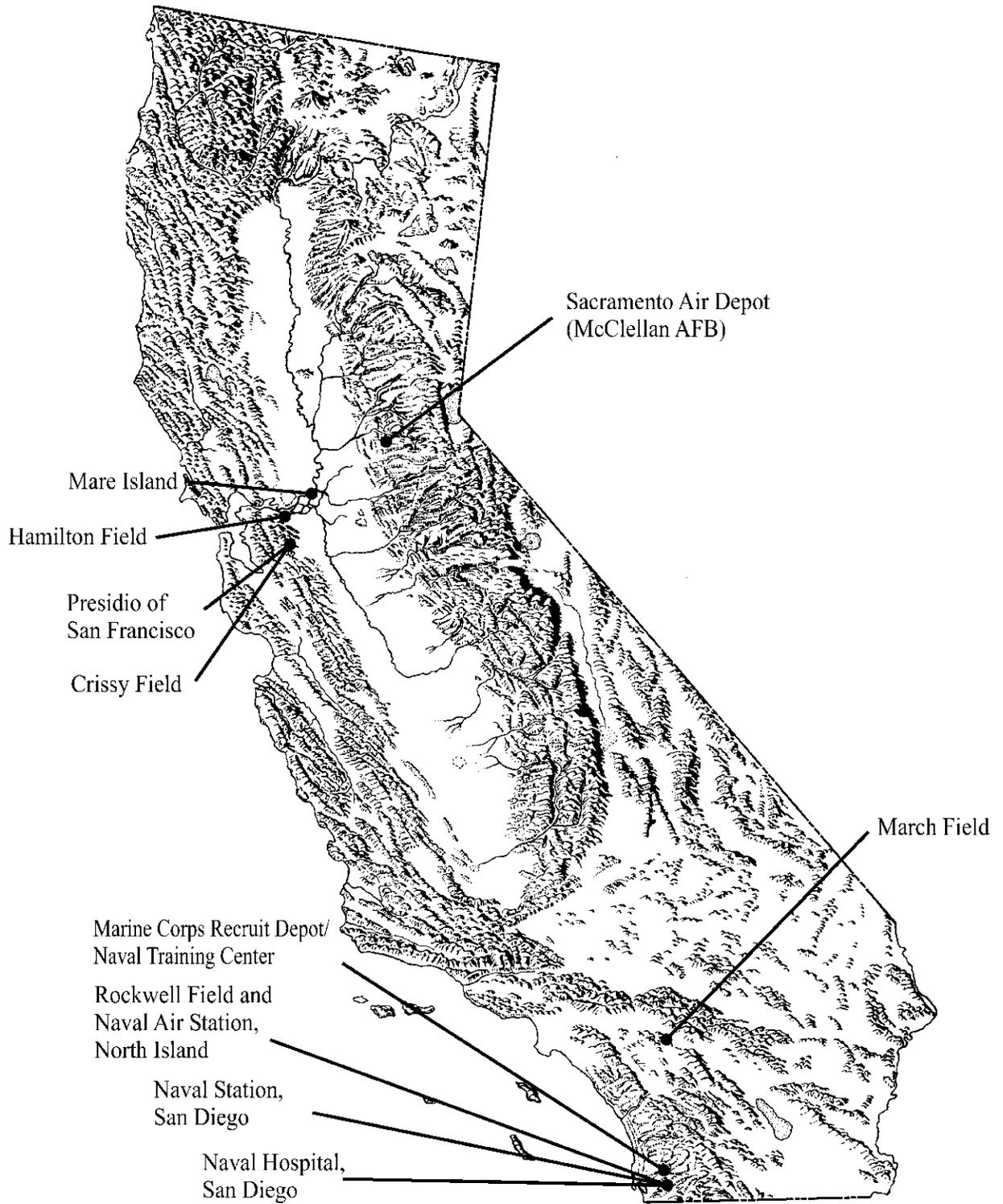


Figure 14. Major bases built or expanded during the Interwar Years, 1919-1939.

none had existed before; and so forth. They had the chance to start from scratch, unaffected by long-standing traditions of the military. The concept of total installation design, of course, was not entirely new. Army and Navy facilities from the 19th century, for example, had been laid out according to rational plans and consistent architectural design. The interwar bases, however, took these concepts to new heights, emphasizing not only consistency of design but also efficiency in physical operation. Although they seem “old-fashioned” in their emphasis on architectural beauty, the rationally-planned bases of the interwar years were the products of the drive for efficiency as much as the drive for beautification. They were thoroughly modern bases, including the modern concept of a base as a well-planned and attractive small city.

6.1 THE DEVELOPMENT OF SAN DIEGO AS A “NAVY TOWN”

The one area of military expansion in California that seemed almost inevitable was the construction of Navy shore facilities. The explanation was simple: in 1919, the Secretary of the Navy, Josephus Daniels, announced that the Navy would abandon its adherence to the “One-Fleet Theory,” expounded by Admiral Alfred Mahan in the late 19th century, and would move approximately one half of the fleet to the Pacific.¹⁰⁸ This decision made inevitable the fact that considerable expansion would occur in West Coast cities; the only question was where. The civic and political leadership of California cities, especially those in San Diego, Los Angeles, and the San Francisco Bay Area, did what they could to ensure that the lavish new construction of shore facilities would come their way. San Diego ultimately won this battle among California cities, but this outcome was by no means apparent in 1919. The ascendancy of San Diego as a “Navy town” presents an important case study in how local decision-making affected military decision-making, and in how the military, in turn, transformed the economic and social landscape of a local community.

The decision to relocate half the fleet—tens of thousands of sailors, dozens of battleships, major aircraft squadrons—presented the Navy with an embarrassment of riches to bestow on West Coast cities. Initially, Navy planners envisioned two major hubs of activity—one in San Francisco Bay and one in Puget Sound—accompanied by smaller installations, as needed. Of the two major hubs, San Francisco Bay was seen as the main West Coast operating base in the Pacific—an “American Singapore,” as one Navy planner put it.¹⁰⁹ This major new home port in the Bay Area would garner some 45,000 Navy personnel and hundreds of millions of dollars in

¹⁰⁸ Lotchin, “The Metropolitan-Military Complex,” 20.

¹⁰⁹ Lotchin, *Fortress California, 1910-1961 from Warfare to Welfare* (New York: Oxford University Press, 1992).

construction. Although various sites were considered, Alameda was the preferred site among most Navy planners.¹¹⁰

For various reasons, however, the Navy was forced to abandon the idea of one great station on the San Francisco Bay. A major factor was the opposition of political leadership from other cities. Congressman Charles Curry from Vallejo, for example, feared (probably with merit) that an Alameda port would spell the doom of Mare Island; he fought vociferously against this idea. Congressman William Kettner from San Diego similarly opposed the measure, fearing (again with merit) that one big base in Alameda would deprive San Diego of the Navy expansion it sought. Another factor was the Washington Naval Limitations Treaty of 1922, through which the major powers of the world agreed to limit and, in some cases, reduce their fleets. Congress was disinclined to fund construction of a huge new Navy complex so soon after it had agreed to restrict the growth of the fleet.

The death of the Alameda home port idea forced the Navy to seek more modest expansion of shore facilities in California, a development that worked in favor of geographical dispersal. Instead of seeking funding for one big facility, the Navy broke its overall plan into a series of smaller installations—an air station here, a training station there. Local cities could compete more effectively for these smaller components. The decline in funding for the Navy also put it in a position of entertaining offers from local communities. A community that was prepared to donate land, for example, had a distinct advantage over one that did not. Between 1920 and the mid-1930s, the cities of California engaged in what amounted to a bidding war to garner Navy shore establishments which, while less grandiose than the “American Singapore” idea, were nonetheless very substantial.

San Diego ultimately won that bidding war and became the most thoroughly “Navy town” in the state. It did so for many reasons, but four stand out: 1) the city truly wanted the Navy; 2) it had strong and canny political leaders; 3) it was very generous in donating land for the new installations; and 4) San Diego was ultimately a good fit for the needs of the Navy.

Local support was an intangible but nonetheless important factor in the Navy’s decision to move many of its facilities there. San Diego, with 74,683 residents in 1920, was a small community by comparison to San Francisco and Los Angeles.¹¹¹ The community had few of the non-military assets of the leading metropolises. It needed the Navy more than the others and was not ashamed to say so. In August 1919, for example, Secretary of the Navy Daniels visited the city and was

¹¹⁰ Lotchin “The Metropolitan .

¹¹¹ Greg Hennessey, “San Diego, the U.S. Navy, and Urban Development: West Coast City Building”, *California History*, 72:2 (Summer 1993), 139.

greeted by a crowd of thousands and newspaper editorials that proclaimed the Navy as a “harbinger of a prosperous destiny” for San Diego.¹¹² The citizens of San Diego made the Navy feel at home.

San Diego was also blessed with competent political leaders, the most effective of whom was William Kettner. An insurance salesman by trade, Kettner was congressman from San Diego between 1912 and 1920 and head of the Army-Navy Committee of the San Diego Chamber of Commerce between 1920 and 1930.¹¹³ If there was one Californian who embodied military boosterism, it was Kettner. He never missed an opportunity to meet and greet Navy and Marine Corps visitors to the city and became close friends with many of them, particularly Colonel Joseph Pendleton of the Marine Corps. The story of how Kettner and Pendleton brought MCRD to San Diego is discussed below.

Third, San Diego shouldered part of the burden in building Navy and Marine Corps facilities in the city. By 1929, the City of San Diego had donated one-third of its waterfront to the Navy¹¹⁴ and had spent millions of dollars in infrastructure improvements—new channels, roads, utilities, and the like—to make Navy construction possible. These land grants and infrastructure improvements were made one step at a time because the bases were added sequentially. Nonetheless, these valuable contributions helped reinforce the impression that the city was serious in courting the Navy.

Finally, in fairness to Navy planners, San Diego was a good fit with the Navy’s needs. Historical literature on the subject emphasizes the role of municipal largesse in attracting Navy construction, and this generosity no doubt played a part. It cannot be denied, however, that San Diego had much to offer. The gentle, sunny climate was perfect for the naval air station. The same climate worked well for a Marine Corps base, as well as a naval training station. In time, the Navy stations themselves became a local advantage. NAS North Island, for example, provided a powerful justification for home porting aircraft carriers in the area.

By 1930, the Navy and San Diego were, in the words of one historian, “interlocked.”¹¹⁵ Stated differently, San Diego had become a Navy town. There is every indication that the relationship was mutually beneficial. San Diego, certainly, had done its part to promote Navy construction. The Navy, for its part, had fueled unprecedented economic growth in the city. In 1923, the local military payroll was approximately \$15 million; only two years later it was between \$18 and \$21

¹¹² Hennessey, “San Diego,” 133.

¹¹³ Hennessey, “San Diego,” 134.

¹¹⁴ Lotchin, “The Metropolitan-Military Complex,” 26.

¹¹⁵ Hennessey, “San Diego,” 145.

million, while local expenditures by the Navy for food and supplies were about \$18 million. Historian Gregg Hennessey estimates that by 1930, the Navy had spent \$24 million on shore facilities, another \$42 million on improvements, machinery, maintenance and repairs, \$150 to \$165 million on wages (both military and civilian), and another \$115 million on supplies. The total—between \$331 and \$346 million—had a “multiplier effect” of about 1:4, meaning that the value of military spending in San Diego during the 1920s to the local economy was in the range of \$1.35 billion.¹¹⁶ The population of San Diego doubled between 1920 and 1930. Not all of this good fortune can be attributed to the Navy; the 1920s were a generally prosperous decade for California. But Congressman Kettner was probably correct when he observed that the arrival of the Navy represented the “starting point of San Diego’s real permanent growth and stabilized prosperity.”¹¹⁷

6.2 AIR FIELDS, NAVY AND AIR CORPS

Aside from Navy shore facilities, the greatest engine for military expansion in California during the interwar years was construction of air fields. During this period, the technology of aviation advanced faster than any other area of military design, with the possible exception of submarines. The steep learning curve affected aircraft design as well as related technologies, particularly the development of aircraft carriers. California fields were pioneers in the development of military aircraft technologies in the years before World War II, as were California aircraft manufacturers. California had the lead in military aircraft construction, testing, and training throughout the interwar period. California military facilities, in short, seized a leadership position in military aviation and would retain that dominant position throughout World War II and the Cold War.

The three most important air fields built during this era were March Field in Riverside County, Hamilton Field in Marin County, and NAS North Island, near San Diego. In addition to their importance in aviation, these three facilities, along with MCRD, best illustrate the “total base design” concepts that represent the most important development of this period in terms of the architecture of military installations.

As noted in a previous chapter, March Field was originally a temporary World War I training facility established in 1917. It was built on a standard design used elsewhere in California and around the country; Mather Field in Sacramento was its virtual twin. Like Mather, March Field was essentially closed down after the war; in 1923 it was placed in caretaker status. It reopened in 1927, however, as a permanent primary air training facility. The Department of War and

¹¹⁶ Hennessey, “San Diego,” 144.

¹¹⁷ Hennessey, “San Diego,” 149.

Congress elected to construct an entirely new base at this location to serve as the key training and bombardment facility on the West Coast.

March Field, as it re-emerged in the 1920s, was heavily influenced by two very important designers: California architect Myron Hunt, who established the Mission Revival theme, and George B. Ford, a prominent New York City planner, who as a consultant to the Quartermaster Corps assisted in laying out the base's distinctive triangular plan. Hunt was a prominent Los Angeles architect who also designed the Rose Bowl in Pasadena, the Huntington Library in San Marino, and other southern California landmarks.¹¹⁸ Ford had laid out numerous college campuses and had worked on important early city plans. The work was coordinated by Lt. H. B. Nurse of the Quartermaster Corps who, as quoted earlier, was an outspoken proponent of planning in facility design.

The facility, as designed by Nurse, Hunt, and Ford, was a wonderful blend of good architecture and inventive site planning. To deal with prevailing winds at March Field, the runways were laid out on a 45 degree angle from the square parcel. To take advantage of this fact, Ford laid out the buildings in a distinctive triangular plan, with axial streets dividing the area into a series of triangular shapes. For his part, Hunt, one of the leading proponents of the Mission Revival-style, designed a series of distinctive tile-roofed concrete buildings, creating one of the first unified Mission Revival bases in the United States (Figure 15). As noted below, his plans for March Field, particularly his homes, would be recreated on military installations throughout the Southwest.

Hamilton Field was constructed several years later, starting in 1932. Like March Field, it was primarily the design of Lt. Nurse. Congress authorized acquisition of Marin County land for the field in 1930 and, after a period of negotiation with affected landowners, the Quartermaster Corps detailed Lt. H.B. Nurse to the site as construction quartermaster. As was so often the case, the local area was asked to contribute land or money to the project. In this case, Marin County, along with other local governments, provided the additional funds necessary. On March 17, 1932, the deed to the entire 927-acre parcel was transferred to the Army and construction was able to begin.¹¹⁹

Nurse chose for Hamilton Field a style similar to that selected for other Army Air Corps fields in California and the Southwest, such as March Field, picking an architectural style that he felt gave the base an "early California" feel (Figure 16). Thus, he followed what would be the

¹¹⁸ JRP Historical Consulting Services, "Summary Report on Historical Significance and Historic Preservation Management for the March Field Historic District." Prepared for Sacramento District, U.S. Army Corps of Engineers, (November 1992), 3-8, 29-31.

Quartermaster General's policy during this period of fitting new construction into regional architectural motifs. Over the next several years the facility was laid out, landscaped, and barracks, hangars, and other necessary buildings constructed. It was formally dedicated in May 1935.¹²⁰

The Air Corps also expanded its facility at North Island, called Rockwell Field, as did the Navy. As noted in an earlier chapter, the Air Corps and Navy had established an unusual joint air training facility on North Island in the years just prior to American involvement in World War I.

Following the armistice, both branches built up their facilities on the island according to a plan in which the Air Corps base (Rockwell Field) was to the south and NAS North Island on the north, adjoining the harbor. This division may have made sense in the pioneering aviation years before the war but led to chronic overcrowding and confusion until the entire facility was turned over to the Navy in 1935.

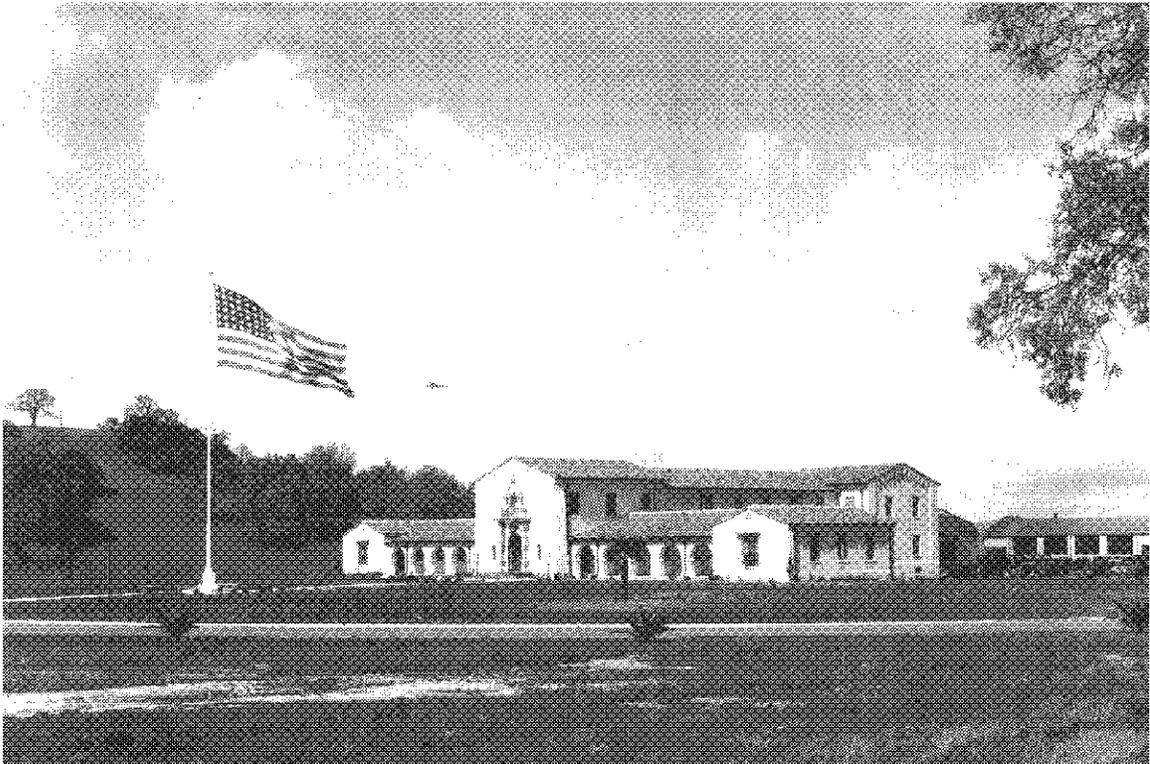
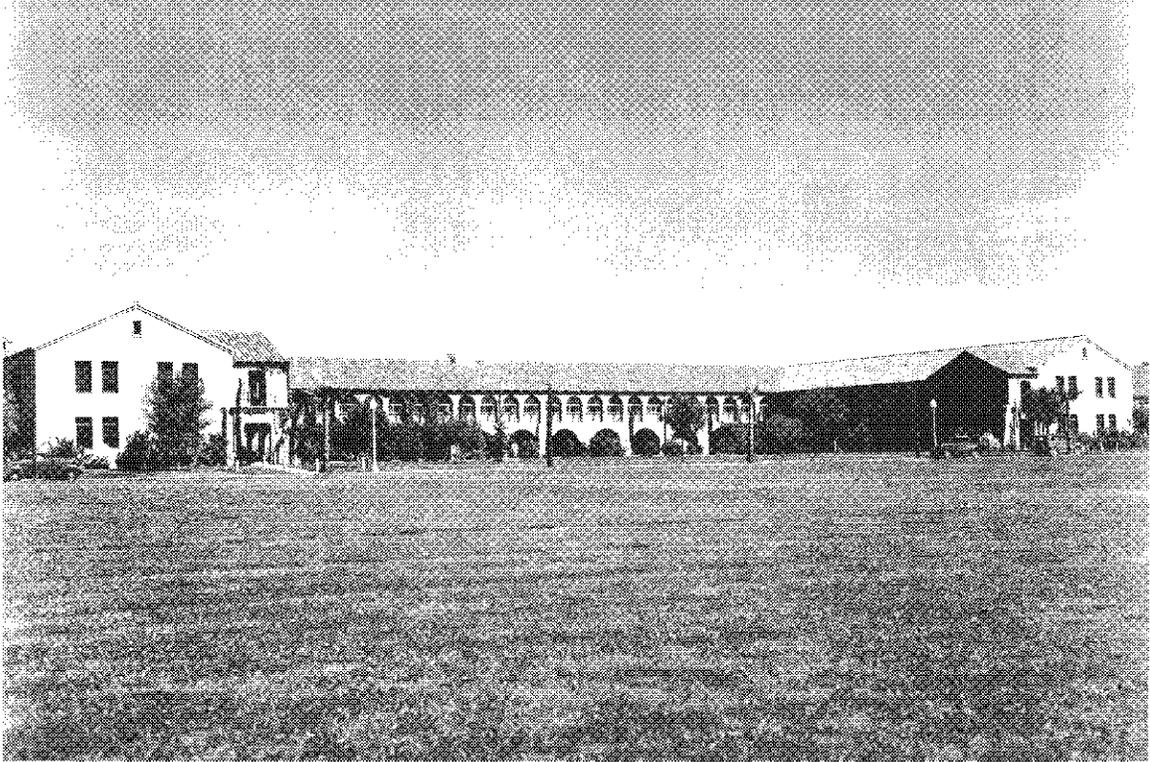
The two fields developed at different times and according to different plans. Rockwell Field was initially laid out according to site and building plans by Albert Kahn, one of the most respected industrial architects in the United States in the early 20th century. Although he is best known for his work on industrial buildings, particularly curtain-wall factories, Kahn did design several Army and Navy bases in the 1910s and 1920s, including Langley Field in Virginia and Navy bases in Hawaii.¹²¹ Many of Kahn's designs were implemented in 1918 and 1919, before a building moratorium was imposed by the Air Corps. Nine buildings from this period still remain. Kahn's buildings are generally Mission Revival in character, including the aircraft hangars.

Although the facility was heavily used, Rockwell Field was not expanded between 1919 and the early 1930s. In the early 1930s, Congress authorized a major expansion of Rockwell Field, including new family housing for officers and non-commissioned officers, and bachelor officers' quarters. The family housing units at Rockwell were patterned closely after the plans Myron Hunt had developed for housing at March Field during the mid-1920s. These plans were then

¹¹⁹ PAR Environmental Services, Inc., "National Register of Historic Places Evaluation of 12 Buildings on Hamilton Army Air Field, Marin County, California" (June 26, 1991), 8-10.

¹²⁰ PAR, "Hamilton Army Air Field, Marin County, California." June 26, 1991, 8-10; Lt. Col. Francis Wheaton, "The Architecture of the Army Posts," *Quartermaster Review*, (September-October 1928). Wheaton noted that Colonial Revival was used on the East Coast, while "Spanish Mission" revival was to be employed in the Southwest and West Coast. He called out both March Field and Rockwell Field as examples of the use of this architectural style.

¹²¹ JRP Historical Consulting Services, "Maintenance Plan for Historic Buildings and Structures: Naval Air Station North Island, San Diego, California" (April 1995) 1-14 to 1-15.



Figures 15 and 16. Barracks at March Field (top) and Headquarters Building, Hamilton Field (bottom). March Field is near Riverside; Hamilton Field is in Marin County. (Source: National Archives.)

reused and adapted at air bases in Texas, and refined further on North Island.¹²² Dozens of these homes still exist and are used for housing.

This new construction was barely completed before the Air Corps transferred Rockwell Field to the Navy. This seemingly wasteful exercise is comprehensible in terms of the overall development of the two installations on this small island. Both had expanded their exercises greatly during the early 1930s, so much so that air control had become confusing and dangerous. The Army and Navy worked out an agreement through which the Navy would gain exclusive control over North Island in exchange for Navy lands in Sunnyvale (on San Francisco Bay) and in Hawaii.¹²³

NAS North Island, by contrast, was laid out according to a unified plan in 1918, a plan that was followed throughout an energetic building program of the 1920s and 1930s. As a result, the old naval air station part of North Island is far more coherent architecturally than is the Rockwell Field, which was built in two distinct generations of work. The Navy's part of North Island is also more coherent because it had been laid out by Bertram Goodhue, one of the most respected architects ever to have practiced in the United States. Through a series of chance encounters, the Navy's BuDocks hired Bertram Goodhue to design three facilities in San Diego: NAS North Island; NTS San Diego; and MCRD. Goodhue and the Bureau first got together to work on MCRD and the story of that encounter is told below.

The Goodhue designs for the NAS, NTS, and MCRD are similar in many respects. All are in Spanish Colonial Revival design and rely upon massive parade grounds defined by large buildings linked by arched *corredors*. All include a generous use of cast stone concrete detailing. People may disagree over which of the three is the most successful. The most convincing case is for MCRD because it was first and has been so lovingly maintained by the Marine Corps. If the choice is for the best single military building by Goodhue, however, the Headquarters Building at NAS North Island would be an excellent candidate. With its tall central tower, the building recalled the *del Prado* buildings Goodhue designed for the Panama-California Exposition World's Fair at Balboa Park in San Diego. It is also in the form of an airfield control tower (which it was) blending this modern function with the architecture of San Diego's Spanish-Mexican traditions (Figure 17).

Despite its merit from an architectural standpoint, NAS North Island would achieve its place in navy history chiefly for its role in the one truly significant technological development of the interwar years: the aircraft carrier. Until the mid-1920s, much of the focus of navy aviation had

¹²² JRP, "Maintenance Plan for Historic Buildings and Structures," 1-16.

¹²³ *Jackrabbits to Jets*, 190.

been on seaplanes; even NAS North Island had initially fitted with seaplane hangars. NAS North Island has been recognized as the “birthplace of naval aviation,”¹²⁴ in part because it was established so early and in part because of its pioneering work in training pilots to serve on aircraft carriers. The navy’s first aircraft carrier was the *Langley*, a collier that had been built at Mare Island in 1912 but converted to an aircraft carrier through installation of a flat deck on steel posts.¹²⁵ The *Langley* first moored at north island in 1924 and would remain there until 1936. It would soon be joined by the *Saratoga* and the *Lexington*, and in the late 1930s by the *Yorktown*.

6.3 OTHER NAVY STATIONS

The third Goodhue-influenced Navy facility was NTS San Diego. This facility replaced the short-lived and overcrowded base that existed on Yerba Buena Island between 1902 and 1923. Like the other Navy facilities in San Diego, the Training Center was relocated, in part, through the tireless efforts of Congressman William Kettner. Kettner learned of the Navy’s dissatisfaction with Yerba Buena Island as early as 1917. San Diego offered the Navy hundreds of acres of tidelands and private land for the new station, an offer that was accepted in 1919. The Navy eventually expanded this acreage to about 500 acres.¹²⁶ Appropriations were approved in 1920 and the base was completed in 1923.

The NTS was apparently designed by Navy personnel, drawing upon plans already submitted by Bertram Goodhue for NAS North Island and MCRD. Lincoln Rogers, the designer of record for these buildings, had worked in the Bureau of Yards and Docks in Washington, D.C., reviewing and revising Goodhue’s North Island and MCRD plans. Rogers was brought to San Diego to design and supervise construction of the Training Station, based upon the design concepts and building forms developed earlier by Goodhue (Figure 18). Thus, the NTS is a Goodhue design once removed, much in the same manner in which Rockwell Field was a Myron Hunt design, adapted and modified for re-use at a different site.

Although the bulk of Navy construction during the interwar period was in San Diego, construction did occur elsewhere, chiefly at Mare Island and in Long Beach-San Pedro. Congressional talk of closing Mare Island did not bode well for the naval station in Vallejo. The shipyard at Mare Island was forced to adapt to the fact that it was no longer the hub of the Navy

¹²⁴ www.nasni.navy.mil

¹²⁵ *Jackrabbits to Jets*, 104.

¹²⁶ The Terre Group, “Architectural and Historical Significance of Selected Buildings at the Naval Training Center, San Diego, California,” (February 1993.)

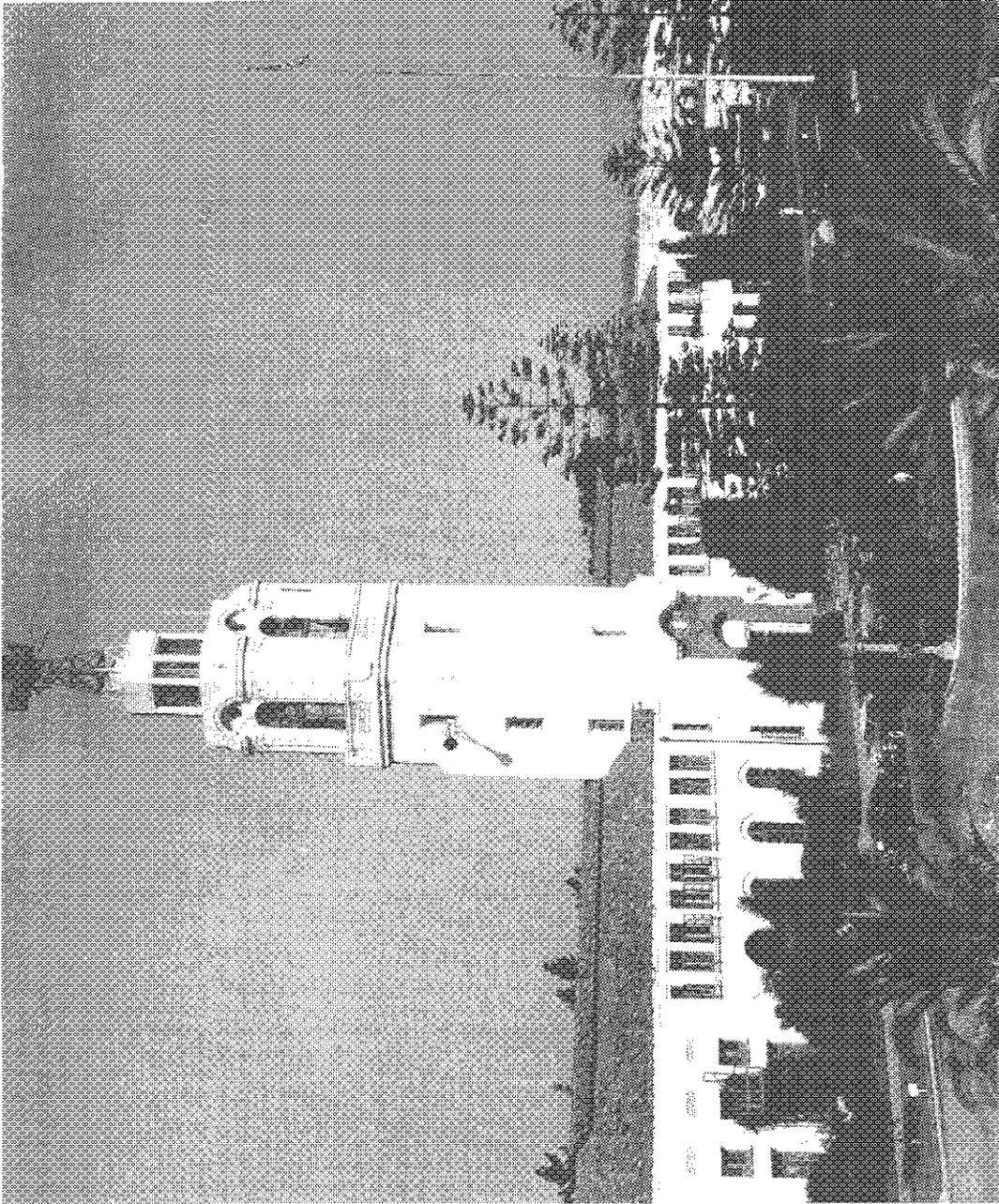


Figure 17. Headquarters Building, Naval Air Station, North Island, near San Diego.
(Source: National Archives.)

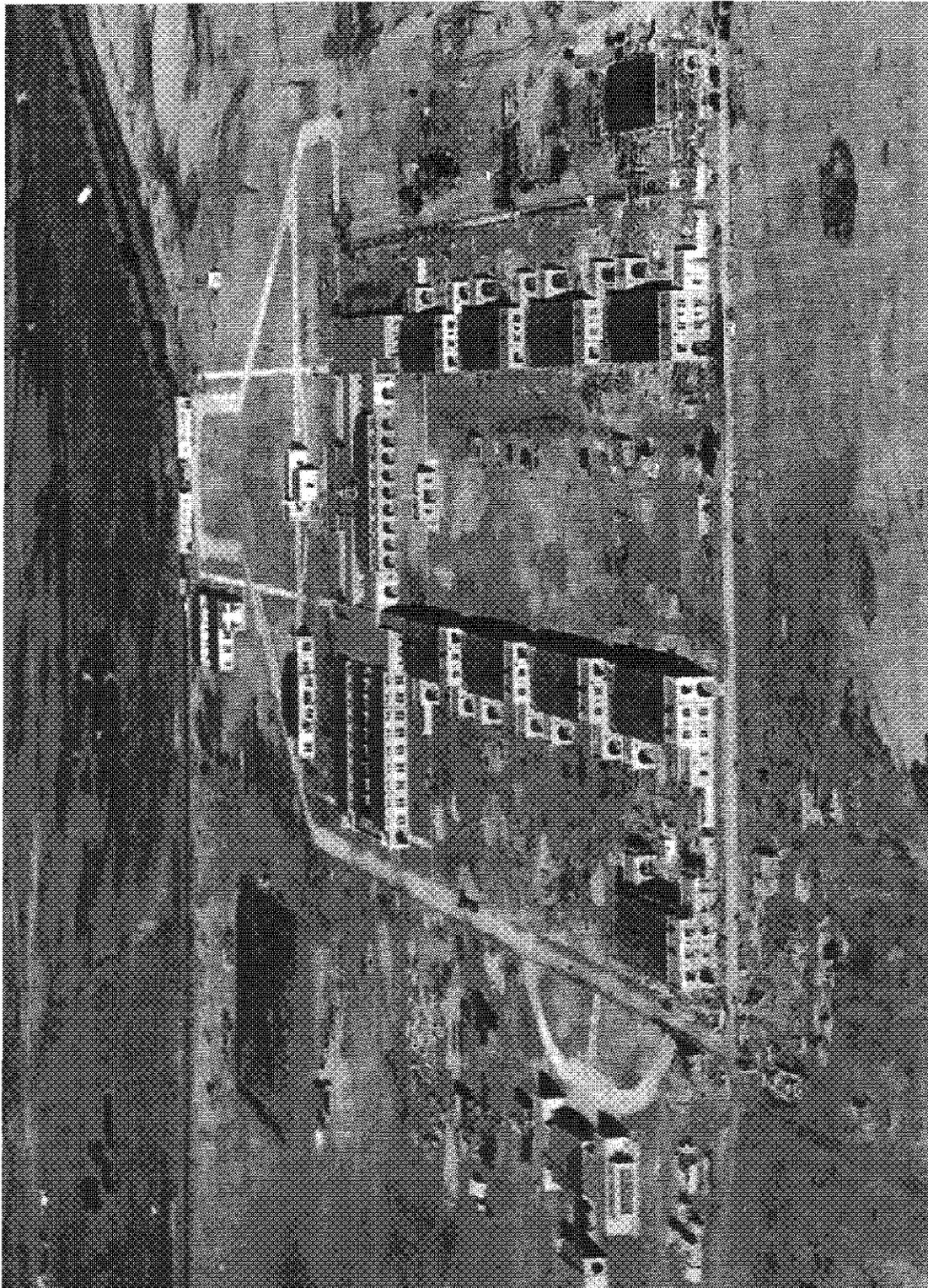


Figure 18. Naval Training Station, San Diego, under construction in 1922. (Source: National Archives.)

in California. Although other activities expanded to some degree during this period, sustained growth at Mare Island was restricted to two areas: submarine repair and construction; and growth at the Naval Hospital.

One of the lessons of World War I was that submarines were destined to become a critical component of naval warfare strategy. Mare Island had become the major West Coast submarine repair facility during the Great War and subsequently benefited from the growing importance of submarines in naval strategy. Although the special facilities at Mare Island were not capable of servicing the entire fleet, its ability to provide quarters for personnel, special supplies, and some special repair facilities, made it a significant submarine base. Mare Island continued to expand its submarine repair base throughout this period and was even awarded a contract to build its first submarine in 1925. This submarine work was suited to Mare Island as the vessels could easily maneuver the relatively shallow waters of the Mare Island Strait and San Pablo Bay.

A vigorous R&D program accompanied expansion of the Navy's submarine fleet in the interwar years. By the end of the decade, Rear Admiral Thomas Winters of the Navy War College articulated an imaginative change in submarine strategy: allow the boats to operate independent of a battle fleet in combined reconnaissance and attack missions. The submarine was redefined as a weapon of stealth and opportunity too valuable to risk in surface encounters with warships.¹²⁷ The Navy shipyards built some of these new submarines during the interwar years and by the eve of Pearl Harbor, had reached a level of design and construction expertise equal to that of any private submarine builder. The long production run of S-class submarines provided the Navy, for the first time, with experience in the naval architecture of submarines. The Navy also constructed nine V-type submarines during the 1920s. The *Nautilus* (V-6), the largest V-class submarine constructed, was built at Mare Island in the late 1920s. The final two V boats, the *Cachalott* and the *Cuttlefish*, were fundamentally different from the previous seven and represented a transition to the new lighter submarine designs of World War II that employed use of alloys, high tensile steel, lighter engines, and higher speeds.¹²⁸

The United States entered the 1930s with a submarine fleet of some 120 vessels. By 1934, a submarine design of about 1,500-tons emerged as the overwhelming preference of submarine officers. The success of the *Salmon* and *Sargo* design, reliable and habitable submarines with 17-knot surface speed testified to the consensus achieved by the Navy bureaus during the interwar

¹²⁷ Gary E. Weir, *Building American Submarines, 1914-1940* (Washington, D.C.: Naval History Center, 1991), 23-46.

¹²⁸ Herbert M. Neuhaus, "Fifty Years of Naval Engineering In Retrospect: Part IV, 1921-1938," *Journal of the Society of Naval Engineering*, November 1938, 540-557.

period. In recognition of the Navy's expertise in submarine technology and its design and construction capabilities, the Navy Department assigned a portion of the newly authorized class to the naval shipyards at Portsmouth and Mare Island. The Mare Island shipyard constructed three submarines between 1936 and 1939 – the *Pompano*, *Sturgeon*, and *Swordfish*.¹²⁹

This new submarine construction and repair work provided a rationale for modernization of the shipyard, especially its metal working plants. The most visible fruit of this modernization program was Building 386-388-390, housing the main structural shops at Mare Island. This building, so large that it was assigned three numbers for its main bays, was completed in 1922. In all essential features, the building and its equipment duplicated those erected a few years earlier at Portsmouth, Virginia and the Philadelphia Navy Yards. This structure is a huge steel-framed curtain wall building, consistent in construction methods and architectural treatment with the other shop buildings from the World War I era. The combined floor space is about 340,000 square feet, with massive clear spans and roof heights. The building plainly expresses its function as the shipbuilding core of the base and is significant as an example of 20th century factory design in addition to its obvious significance in the business of shipbuilding.

Beyond the shipyard, the major construction at Mare Island during this period occurred at the hospital. The main hospital building, a wood frame Beaux Arts structure, was built in 1901 and had been overcrowded ever since, especially in the years following World War I. Until the U.S. Naval Hospital at San Diego was opened in 1922, the Mare Island hospital accommodated a greater number of patients than any other naval hospital in the post-World War I period. Accommodation of these patients was achieved by continued use and additions to the temporary buildings erected at the hospital during the recent war.¹³⁰

At a cost in excess of \$366,000, the U. S. Naval Hospital began a program to modernize its facilities in 1926, including construction of a contagious and general hospital ward and quarters for sick officers. The main hospital building was also expanded in 1928 with construction of a five-story, L-shaped, reinforced concrete wing, extending to the northwest. On the eve of World War II, construction began on a second hospital wing that essentially duplicated the 1928 addition.¹³¹ These additions were architectural curiosities in that they were huge reinforced concrete wings in Mission Revival design, appended to the wood frame Beaux Arts 1901 hospital. Nothing so clearly documents the breakdown of total base design at Mare Island as these hospital additions.

¹²⁹ Weir, *Submarines*, 42-43 and 103-109.

¹³⁰ *Annual Report of the Navy Department for the Year 1921*, 104-105.

¹³¹ *Annual Report of the Navy Department for the Year 1925*, 9.

The Navy's presence in Long Beach-San Pedro relates chiefly to inadequacies in the port of San Diego. The fact that at this time larger ships, principally battleships and their support vessels, could not anchor in San Diego Bay's relatively shallow waters led the Navy to select Long Beach-San Pedro as headquarters for this portion of the fleet. The change to the Los Angeles area was also practical for the Navy as the large oil deposits nearby saved oil transportation charges, and a breakwater had been built in 1910 that provided 700 acres of anchorage space. Congress appropriated funds for an extension of the breakwater in 1937.

The presence of a substantial part of the fleet, however, did not initially result in construction of new buildings in the area. Military personnel assigned to the ships were forced to seek private housing in and near Long Beach, resulting in long commutes for many military and civilian personnel. The Navy pleaded with the city to construct or allow the Navy to construct new housing, particularly for lower-income personnel. Long Beach officials resisted these pleas, however, and very little permanent Navy construction proceeded during the interwar years. As discussed in a later chapter, the Long Beach-San Pedro Navy complex was, for practical purposes, a creature of World War II, when it was fitted with a shipyard, supply depot, housing, and other accoutrements of a major Navy base.

6.4 THE MARINE CORPS RECRUIT DEPOT: THE FIRST INDEPENDENT MARINE CORPS FACILITY ON THE WEST COAST

During the 1920s, the Navy's BuDocks built what is now the MCRD in San Diego (Figure 19). In many respects, MCRD was the most important single base constructed during this period, at least in terms of importance to the branch it serves. It was the first independent facility of the Marine Corps on the West Coast and only the second nationwide. Architecturally, it is arguably the best example of the Goodhue-designed bases in California and simply one of the best-looking military facilities in the nation. In social and political history, construction of MCRD is also a good case study in how cooperation between the military (in this case the Marine Corps, lead by Colonel Joseph Pendleton) and local government (San Diego, led by Congressman William Kettner) led to construction of this beautiful and functional facility.

Before MCRD was built, the Marines in California had occupied barracks on Navy bases or in temporary encampments wherever space was available. Colonel Pendleton came to San Diego in 1911 along with his Fourth Regiment of Marines, who were housed in tents on North Island. The

regiment was sent to Mexico in 1914 but returned to San Diego later that year to set up a “model camp” on the grounds of the Panama-California Exposition in Balboa Park.¹³²

During his stays at North Island and in the park, Colonel Pendleton began to recognize the potential advantages of San Diego as a permanent West Coast Marine Corps home. It was also during this period that he met the indomitable William Kettner. The two became friends and worked closely for the next decade and a half to see that such a permanent facility became a reality. Together, Pendleton and Kettner lobbied the leadership of the Department of the Navy, inviting the Secretary, Josephus Daniels, and Assistant Secretary, Franklin Roosevelt, to visit the city and alternative sites being offered by San Diego. The Navy ultimately selected a 500-acre parcel of tidelands, owned by the City of San Diego. The Navy took possession of this land in June 1917.

The plan for the new facility called for barracks, administration and service buildings to accommodate 1,700 Marines. At the suggestion of the San Diego Chamber of Commerce, the Navy invited Bertram Goodhue, chief architect of the 1915 Panama-California Exposition, to Washington D.C. in 1917 to discuss a preliminary layout for MCRD. Soon thereafter, Goodhue was appointed as "consulting architect" to the Bureau of Yards and Docks. By appointing Goodhue, the *San Diego Union* noted, the Navy Department signaled an intention to make the post "one of the showplaces of California."¹³³

The referral of Goodhue by the Chamber of Commerce set in motion one of the most unusual alliances in military post construction. Goodhue, a strong-willed and successful architect from New York City, designed an installation that was practical, modern, and coordinated in its architectural program, from the barracks to the administrative buildings to the storehouses. He forcefully defended his plan and ultimately resigned in disgust to the changes proposed by the Navy. Colonel Pendleton was equally attached to the Goodhue plan and fought vociferously against changes to it. Kettner was a strong ally of Colonel Pendleton in this campaign. The Marine Corps itself, then, was responsible for the fact that MCRD was built largely according to Goodhue's plan. This early defense of the plan presaged more than a half century of careful planning by the Marines to ensure preservation of this, one of the finest military installations in the United States.

MCRD was laid out by Goodhue in 1918 according to a formal site plan that featured Spanish Colonial style barracks buildings arranged around a parade ground in an elongated "U" shape

¹³² JRP Historical Consulting Services, "Marine Corps Recruit Depot Historic District," 1990; Nomination for listing in the National Register of Historic Places.

¹³³ *San Diego Union*, December 12, 1918.

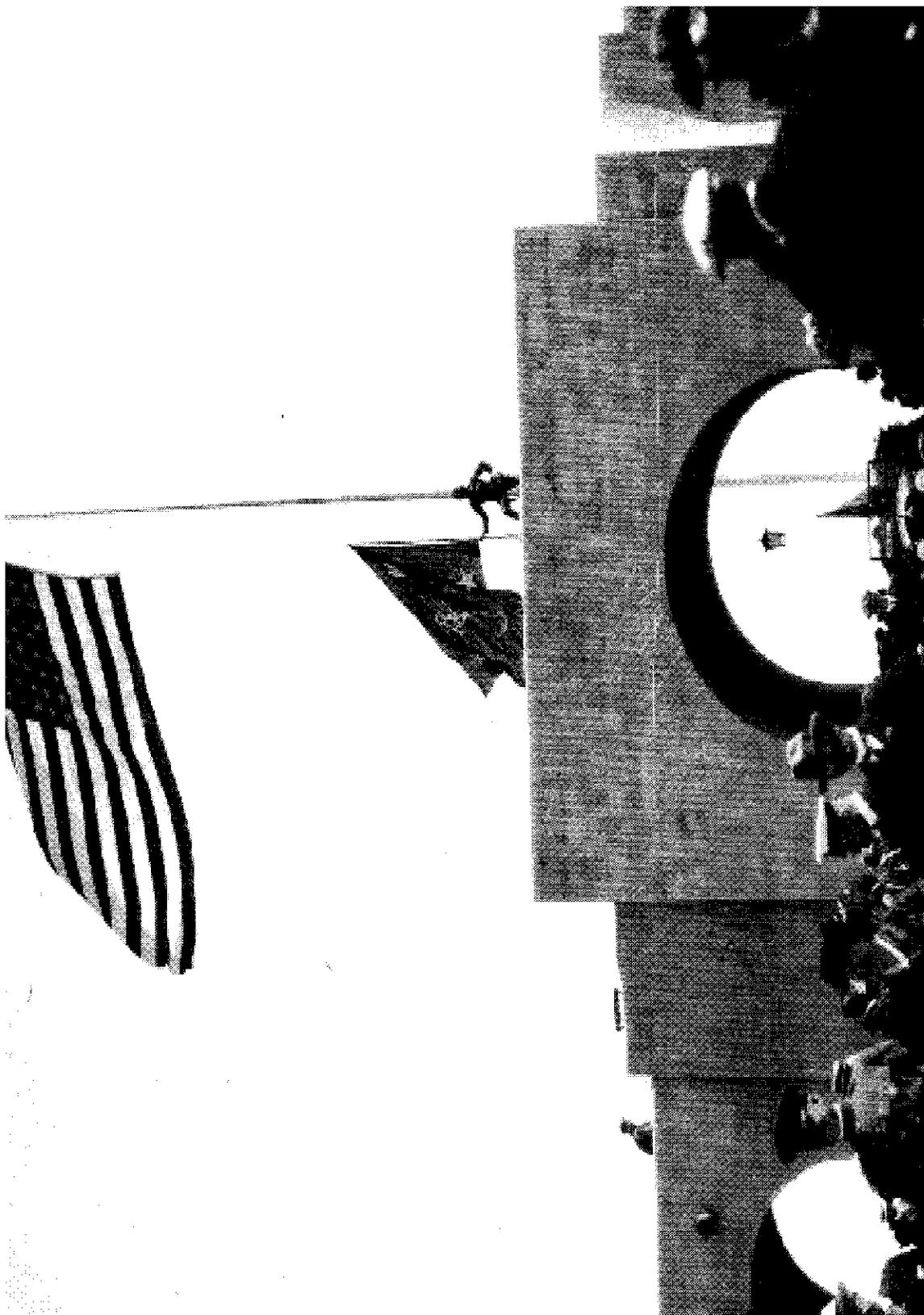


Figure 19. Celebrations at the Marine Corps Recruit Depot in 1923. (Source: National Archives.)

and linked by an arcade. A row of five administrative and support buildings was offset between the barracks and formed a secondary axis behind the arcade and a series of courtyards between the two rows of buildings. A third cluster of shops and industrial/service buildings was arranged in a less formal pattern behind the secondary row. Goodhue placed married officers' quarters, an officer's lyceum and recreational facilities, and the base hospital in a parklike setting around a large lake secluded from the remainder of the base. At the eastern end, Goodhue concentrated recreational facilities and athletic fields, leaving the large open space extending from the barracks to the sea for drills, parades, and military maneuvers.

The facility was not completed entirely to Goodhue's preliminary site plan. In fact, MCRD was only about 60 per cent completed during the first phase of development that ended in 1926. From 1914 until his retirement on June 2, 1924, at age 64, Pendleton, as commanding general of the West Coast advance force base, oversaw construction of a new military facility "built for the centuries" which he was determined to make "the most beautiful and picturesque military post in the United States."¹³⁴ In the summer of 1920, while the first buildings were under construction, he accompanied Bertram Goodhue on a tour of the site to gain a fuller understanding of Goodhue's proposed layout then being evaluated by the Navy Department. Thereafter, Pendleton corresponded and consulted with Goodhue when contractors or BuDocks proposed changes to his overall site design or building plans. After July 15, 1921, Marine Headquarters in Washington commanded that no changes of location of buildings could be approved by the Marine Corps without first consulting Pendleton and Major-General George Barnett. Pendleton resisted any proposed changes that could compromise the integrity and grandeur of the original site plan. "Let us sincerely hope," wrote Pendleton in 1921, "that nothing will be done in the way of changing the plans that will . . . spoil the wonderful beauty of the plan . . ."¹³⁵ To a large degree, Pendleton's hopes were realized.

6.5 ARMY INSTALLATIONS DURING THE INTERWAR YEARS

Somewhat surprisingly, the Army (as distinct from the Air Corps, which, of course was part of the Army) built no new bases in California during this period. It was not that the Army had no need for new facilities. New technologies required new training facilities, especially bases with lots of open spaces. The Army acquired these bases during World War II, when the Federal government set aside millions of acres throughout the state for this purpose. During the interwar years, however, that training was accomplished outside of California, with the exception of the

¹³⁴ Pendleton to Major General Littleton W. T. Waller, Headquarters, 1st Advance Base Force, Philadelphia, April 22, 1920 and Pendleton to Major General Commandant John A. Lejeune, October 5, 1921. Pendleton Papers, PC

¹³⁶ History and Museums Division, Marine Corps, Washington, D.C.

¹³⁵ Brigadier-General McCawley to Pendleton, July 15, 1921. Pendleton Papers.

pre-World War I training area associated with the Presidio of Monterey, which became Fort Ord during the Second World War. The Fort Ord encampment was originally called Camp Gigling until 1938, when it was renamed Camp Ord.¹³⁶

The absence of new construction by the Army during this period may be explained in part by the fact that the Army was decimated by post-World War I reductions in troop strength, from which it would not recover until the eve of World War II. There were 2.6 million enlisted troops at the end of the World War I. This decreased to 150,000 troops in 1921, a figure that was gradually reduced further, reaching a low of 118,750 troops in 1927.¹³⁷ Further, the Army was reluctant to invest heavily in new technologies except for aircraft. In the view of Army historian Russell Weigley, the Army pursued a poor tank design until the successes of German-built medium-weight tanks were shown during the Spanish Civil War.¹³⁸ In Weigley's view, tank training also lagged until the eve of World War II.

Faced with huge cutbacks, the Army in California made do with its old facilities. Throughout this period, the Army restricted its activities to the Presidio of San Francisco, the Presidio of Monterey, the Benicia Arsenal, and minor coastal defense facilities elsewhere. Even there, the Army completed relatively little new construction. At the Presidio of San Francisco, the one area of growth was Crissy Field, a small Air Corps facility built on the landfill from the 1915 World's Fair. This tiny field would remain in use through World War II but was never a major part of the Air Corps presence in California.¹³⁹ The Army built Letterman Hospital, at the Presidio of San Francisco, into a major facility during these years, much in the same way the Naval Hospital at Mare Island had grown. The new buildings at Crissy Field and Letterman were in the Mission Revival style, as were the hospital buildings at Mare Island. As with the situation at Mare Island, these new Mission Revival elements were grafted on to a predominantly Classical Revival base, detracting from the Presidio's continuity of design.

Very little new construction occurred at either the Benicia Arsenal or the Presidio of Monterey. The Army undertook some minor new works at the Presidio of Monterey. New buildings from the 1920s included additional officers' housing, artillery sheds, shops, stables, a new post school and library. During the Depression, the camp served as a Civil Conservation Corps (CCC) camp, housing as many as 1,055 men at a time. Because the Presidio's commander also served as a local CCC administrator, some of the improvements on the installation—such as rock retaining

¹³⁶ Lois J. Roberts and Jack L. Zahniser, "Cultural Resources: Literature Search and Overview, Fort Ord, California (nd).

¹³⁷ Weigley, *History of the U.S. Army*, 401.

¹³⁸ Weigley, *History of the U.S. Army*, 411.

¹³⁹ "Presidio NHL".

walls, walkways, and curbs—were products of CCC. New buildings erected during the 1930s included the post gymnasium, built in a style reminiscent of Mexican-era houses in Monterey, and improvements to sports, entertainment, and recreation facilities.¹⁴⁰

For the most part, however, the interwar years were a quiescent period for the Army in California, apart from growth in the Air Corps. This situation reversed dramatically in 1940, with passage of the Selective Service Act and the arrival of hundreds of thousands of new troops in California. The Army grew the fastest of any branch during World War II.

6.6 CONCLUSIONS

Four trends characterize this period of consolidation: 1) geographic dispersal, 2) the growth of aviation, 3) the birth of the Marine Corps as an independent branch, and 4) the construction of well-planned and integrated military bases. Although these four trends fit together more neatly in hindsight than they did at the time, all point to the fact that the military decided to consolidate its assets in California, paving the way for the establishment of California as the leading state in military construction and procurement during World War II and the Cold War. In short, the military decided during the interwar years to make California a leading part of its assets, a trend that grew after 1938.

The important work accomplished in California during this period was in emergent areas of military technology or strategy, best illustrated in the growth in aviation (Navy and Air Corps) and in the development of the Marine Corps as an independent branch. These new functions called for entirely new installations, which could be built far from the historical concentration of military assets in the San Francisco Bay Area. Discounting Hamilton Field, which was removed from the densely settled parts of the Bay Area, all of the real growth during these years was in Southern California, especially in San Diego. At that time, more land was available in Southern California than in the Bay Area. In addition, Southern California communities were far more willing to give away that land to entice military construction. The growth of San Diego into a “Navy town” may be attributable, in large part, to the willingness of the city to give away its best tidal lands to the military.

The final trend—the building of architecturally integrated facilities—is more difficult to analyze. It may be explained, in part, by the fact that growth occurred in entirely new types of installations, such as air fields and Marine Corps stations. Before MCRD, only one independent Marine facility had been built. There was no body of precedents or traditions to govern this type of construction; the architect, Goodhue, was free to invent what a Marine Corps installation should look like.

¹⁴⁰ Jackson Research Projects, “The Presidio of Monterey,” National Register Inventory and Evaluation, 1985.

Similarly, Air Corps and Naval Air Stations were relatively new types of facilities, except for minor construction during World War I, the interwar facilities were the first generation of permanent air installations to be established. The designers of these installations, including Goodhue, were granted free license to invent the form.

The instinct toward integrated design, however, came from within the military itself, influenced by important trends in civilian design. The previously quoted design philosophy of Lt. Nurse of the Quartermaster Corps documents the degree to which City Beautiful and city planning concepts had influenced the thinking of military architects and planners during this period. Interestingly, the military had practiced city planning for many years before the City Beautiful movement took hold in civilian quarters; old military facilities such as the Mare Island Naval Shipyard had been laid out according to these principles as early as the 1850s. The interwar installations, however, were more comprehensively planned than any that had come before and certainly those laid out during World War II or the Cold War. The beauty and cohesiveness of the best of the interwar bases—MCRD, NAS North Island, and March Field—came about through a happy coincidence of the decision to build entirely new bases at a time in which City Beautiful ideas had taken root in the design branches of the military. This coincidence resulted in bases that are near the top in the architectural legacy of the military in California.

7.0 WORLD WAR II ERA (1939-1945)

Two distinctive aspects of World War II separate it from other wars in terms of its impact on the military in California: it was an “all-out” war, in which the combatant nations dedicated every asset available toward victory; and it was fought as fiercely in the Pacific as in the Atlantic. Reasonable arguments could be made as to whether World War II or the Cold War was more profound in its impact on the economy and landscape of California. The case for World War II rests on the fact that it came first and laid the groundwork for the high technology-driven dominance of California during the Cold War.

None of this could have been predicted in 1939. In retrospect, several indicators that might have pointed to a decisive role for Californians, were the United States to decide to join in the conflicts in Europe and Asia. First, the decision by the Navy during the 1920s to divide the fleet into roughly equal Atlantic and Pacific fleets resulted in massive investments in San Diego-area Navy stations and extensive planning for construction of new stations in the San Francisco Bay Area. When Congress elected to proceed with large-scale naval expansion in 1938, existing or planned California stations were near the top of the list. Second, the aircraft manufacturing industry had grown up in Southern California during the 1920s and 1930s, based upon both civilian and military demand. This was a mature industry by 1941 that mushroomed during the war years. During the war, about 20 percent of the manufacturing workforce in California was engaged in aircraft production.¹⁴¹ Third, all branches, from the Army Air Forces¹⁴² to the Army, Navy, and Marine Corps, had come to realize the excellent opportunities for training personnel in the open spaces and advantageous climate of California. The Army had shown the way for wartime training facilities when it established the large ground troop training facility at what became Fort Ord, an adjunct to the tiny Presidio of Monterey. The Army Air Forces training base at March Field and the Navy’s air training station at North Island had demonstrated the advantages of the California climate for these purposes. The Marine Corps had established ground troop training facilities at Kearney Mesa and La Jolla as adjuncts to its tiny MCRD in San Diego. The huge wartime training bases, which comprised most of the California facilities during the war, had precedents in these few pre-war training stations.

For the most part, however, Californians were as reluctant as any other Americans to accept the inevitability of United States involvement in the European and Asian conflicts. By 1938,

¹⁴¹ “Wartime Expansion of the California Airframe Industry,” *Monthly Labor Review*, (October, 1945), 721.

¹⁴² The Army Air Corps became known as the Army Air Forces during the war. That term will be used in this chapter.

Californians were only beginning to see the easing of the effects of the Great Depression. The political leadership of the state was far more concerned with completion of civilian public works projects, such as the Central Valley Project and the San Francisco-Oakland Bay Bridge, than with expansion of the military. Congress and the administration of President Franklin Roosevelt led the way toward military expansion, despite the reluctance of the populace to accept the need for it. Massive increases in appropriations for all branches of the military between 1938 and 1941 laid the foundation for even greater expansion of the military after December 7, 1941 (see Figure 20).

The decisive turn toward preparedness came in 1938 and 1940, as President Roosevelt and Congress came to grips with the rapidly deteriorating situations in both Europe and Asia. The military appropriations from 1938 to 1941 vastly increased the resources available to all branches.¹⁴³ With these funds in hand, military planners in California began to expand old installations and assemble new ones in anticipation of American involvement in the global conflict.

7.1 PREPAREDNESS BEFORE PEARL HARBOR

The World War II effort in California and the rest of the nation may be seen as falling into two distinct periods: the military build-up in the years between 1939 and December 7, 1941, and the even greater build up during the years between the attack on Pearl Harbor and Victory over Japan (V-J) Day. The two periods are fundamentally different in terms of the historic resources they left behind. Most buildings from 1939 to 1941 were permanent, built to the same high standards of construction methods and architectural design that had characterized military construction in California since 1848. After 1944, construction was unique for its emphasis on low-cost, high-volume construction. Important exceptions exist to this rule, of course, as discussed below.

Military expansion in California during the 1939-41 period took two forms: establishment of entirely new facilities and expansion of the existing ones. Nearly every active installation in California grew to some extent during these years. The relatively compact MCRD in San Diego acquired nearly as many new buildings during these years as had been built in all of the previous years.¹⁴⁴ To the credit of Marine Corps designers, they elected to complete MCRD more or less

¹⁴³ The appropriations for the Army and Navy were increased in separate legislation. The Navy's prewar expansion began with the 1938 Vinson Bill, which authorized huge increases in the numbers of ships and planes. The Army's expansion began with a presidential proclamation in 1939, authorizing a modest increase in the size of the Army. The huge increase in Army appropriation came with the Selective Service Act, which authorized a 500 percent increase in the size of the Army; Erna Risch, *The Quartermaster Corps: Organization, Supply and Service*. (Washington: Center of Military History, 1995); BuDocks, *Building the Navy's Bases*.

¹⁴⁴ JRP Historical Consulting Services, "Marine Corps Recruit Depot Historic District."

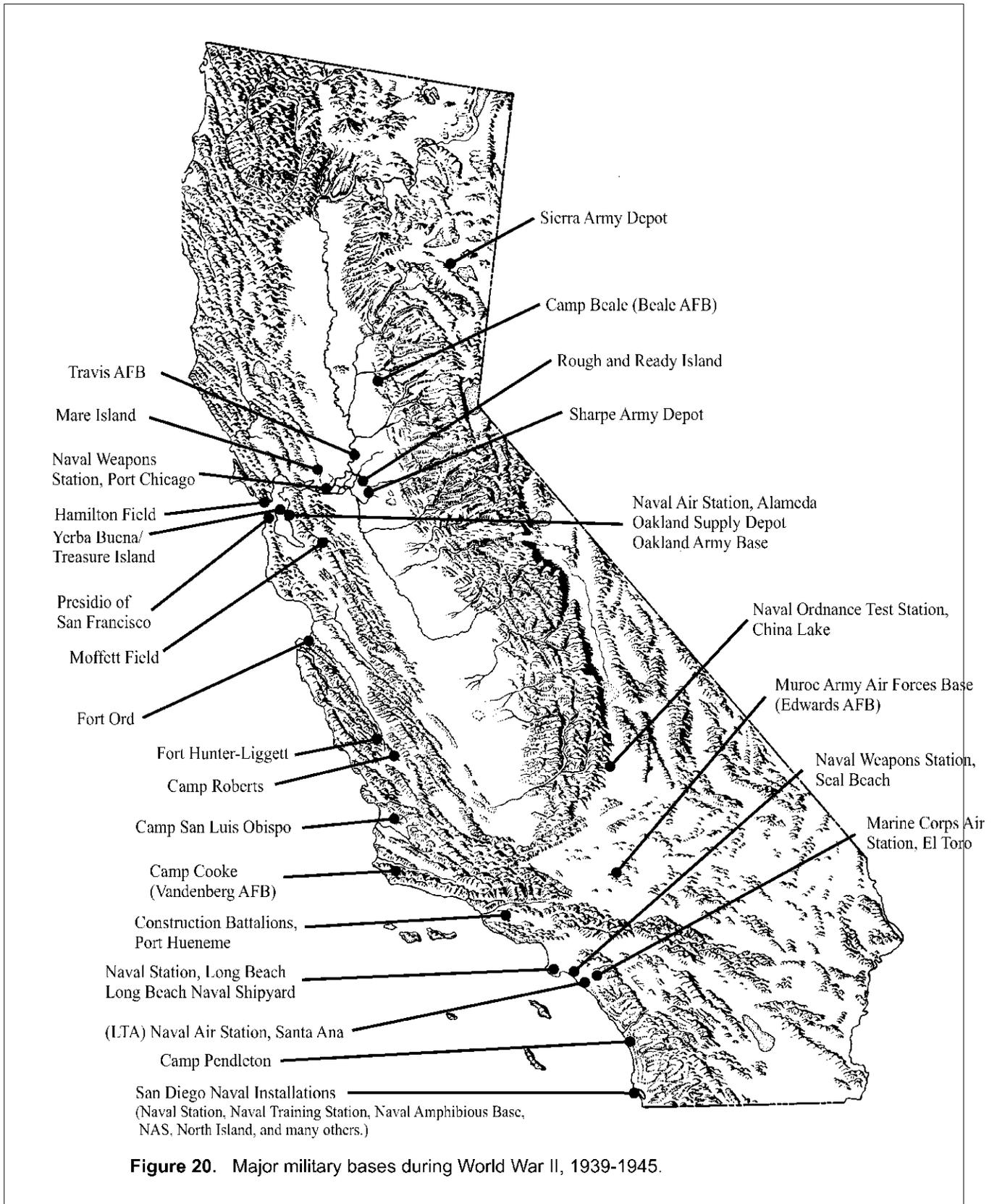


Figure 20. Major military bases during World War II, 1939-1945.

as it had been planned by Bertram Goodhue in the early 1920s, maintaining the consistency of site plan and architectural design that defines the beauty of that base. The Navy shipyard at Mare Island grew at an accelerated rate prior to the attack on Pearl Harbor. The same was true of the NAS at San Diego, the Army's Presidio of San Francisco, the Army Air Forces base at March Field, and most of the other existing bases. The construction on the older bases was generally permanent and built to high construction standards. The 1939-1941 construction at Mare Island was typical of work on bases throughout California. For example, Building 680, a massive machine shop, was built during this period and is the largest and arguably the sturdiest building constructed there, as well as being a thoroughly up-to-date industrial facility. A new headquarters was also built at Mare Island in 1940, a steel reinforced concrete building with modest Art Deco detailing.¹⁴⁵

The dominant trend during these years, however, was not expansion of older installations, but establishment of entirely new facilities. Many of the 1939-41 bases had been planned before 1939. As discussed in the previous chapter, the Navy had long sought to make San Francisco a major hub, if not the central focus, of its West Coast activities. One station at a time, the Navy built on all of the sites it had planned in the Bay Area. It had long sought to develop some type of facility at Alameda. The City of Alameda and the Army Air Corps had shown that the shoals at the north end of the island could be successfully filled to develop an airfield.¹⁴⁶ The Navy used part of its appropriations to build one of its largest permanent air training stations, on land it reclaimed from San Francisco Bay. Oakland Harbor was also seen as a major potential asset. In 1940, the Navy began constructing the huge Oakland Supply Depot (later the Fleet and Industrial Supply Center) at the edge of the harbor. Early in the century, the Navy had built a small training station on Yerba Buena Island and never relinquished control of the island, despite the fact that much of the island was taken over by the Bay Bridge in 1936. As soon as the Golden Gate International Exposition closed on the adjoining man-made Treasure Island, the Navy took over the place for a multiple-purpose training and "ship-in-waiting" facility.¹⁴⁷

The construction on these new Navy facilities in the Bay Area, with the exception of Treasure Island, was consistently of a high quality. NAS Alameda was also high quality from a design

¹⁴⁵ JRP, "Mare Island."

¹⁴⁶ The Army Air Corps had built Benton Field on reclaimed land, but constructed very few permanent buildings. JRP Historical Consulting Services, "Inventory and Evaluation of Buildings and Structures at the Alameda Annex and Alameda Facility, Oakland Fleet Industrial Supply Center, Alameda, Alameda County, California" (March 1996).

¹⁴⁷ JRP Historical Consulting Services, "Cultural Resource Inventory and Evaluation Investigations: Yerba Buena Island and Treasure Island Naval Station, Treasure Island, California" (January 1997.)

standpoint, mixing fashionable Art Deco design with traditional military neo-classicism.¹⁴⁸ The Oakland Supply Depot was strictly utilitarian from the design standpoint but was built primarily of sturdy two-story concrete warehouses that were considered state-of-the-art at the time they were constructed.¹⁴⁹ Treasure Island was acquired shortly before the war. The Navy “made do” on Treasure Island by reusing the old World’s Fair buildings and constructing new, essentially temporary buildings.¹⁵⁰

The Army Air Corps had long recognized the need for a repair and aircraft supply depot in California; it had lost its only repair depot when Rockwell Field was closed and given to the Navy in 1935. The decision to build a permanent repair facility—the Sacramento Air Depot (later McClellan AFB)—was made in 1936 and construction began the next year. Thus, McClellan AFB slightly predates the 1939 build-up of most California facilities. McClellan was built to the same permanent standards as the NAS Alameda and, indeed, closely resembles NAS Alameda in the use of Art Deco/neo-classical design (Figures 21 and 22).¹⁵¹ The Naval and Marine Corps Training Center in Chavez Ravine, Los Angeles, was built in 1940. Designed by Stiles O. Clements, it too was designed in the uniquely late 1930s and early 1940s combination of Art Deco and neo-classical detail.¹⁵²

The Army is the exception to this general pattern of high-quality, permanent military construction in California during the years between 1939 and 1941. The Army’s program during this period presaged the hurried approach to construction that would be taken by all of the branches after 1941. The Army received, by far, the largest increases in appropriations during this period, especially after 1940. The Army’s needs in California, however, were far different from those of the other branches, with the possible exception of the Marine Corps. The Army had little need for discrete, relatively small stations like NAS Alameda or the Sacramento Air Depot. Rather, it needed expansive installations in which infantry and armored units could freely train. The early start of the Army in frantic construction is attributable to the institution of the draft in 1940, which brought in hundreds of thousands of new recruits. Aside from the annex to the Presidio of Monterey (Fort Ord), the Army had no such assets in the state. In 1939 and 1940,

¹⁴⁸ The history and historic properties at NAS Alameda are discussed in JRP Historical Consulting Services, “Guide to Preserving the Character of the Naval Air Station, Alameda Historic District,” April 1997.

¹⁴⁹ Gregory King, “Naval Supply Center, Oakland, Historic Architecture Survey Report, Part VII. E., IV-Ala-880,” August 1990. Caltrans conducted this inventory, along with an inventory of the Oakland Army Base, in relation to a highway project in Oakland.

¹⁵⁰ JRP, “Treasure Island.”

¹⁵¹ Maurice A. Miller, *McClellan Air Force Base, 1936-1982* (Sacramento: McClellan Air Force Base, 1982), 20-29.

¹⁵² The history of this center is presented in detail in Bruce R. Lively, “Naval and Marine Corps Reserve Center Los Angeles,” *Southern California Quarterly*, (Fall 1987), 241-270.

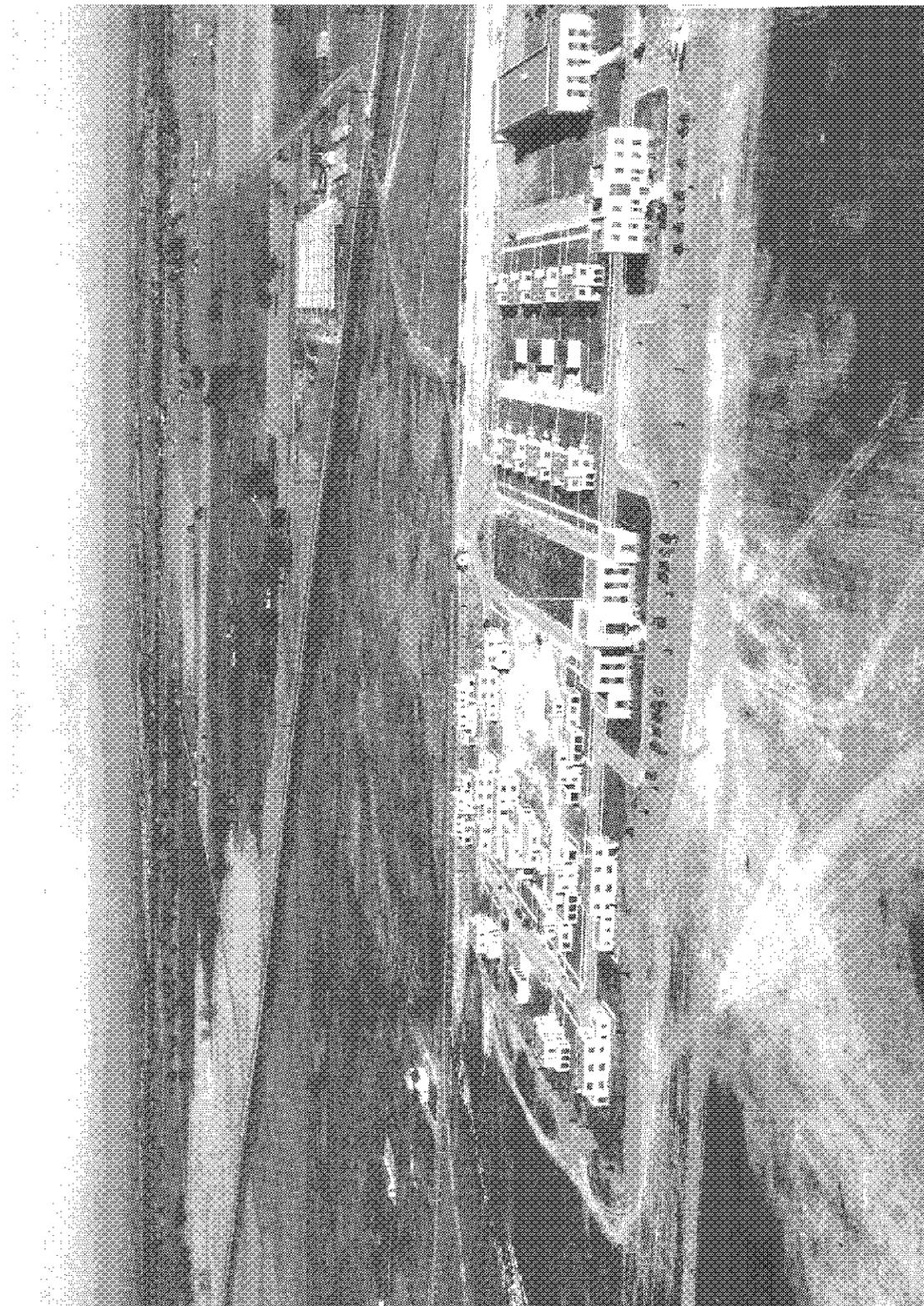


Figure 21. Aerial view of the Sacramento Air Depot under construction, ca. 1938. (Source: National Archives.)

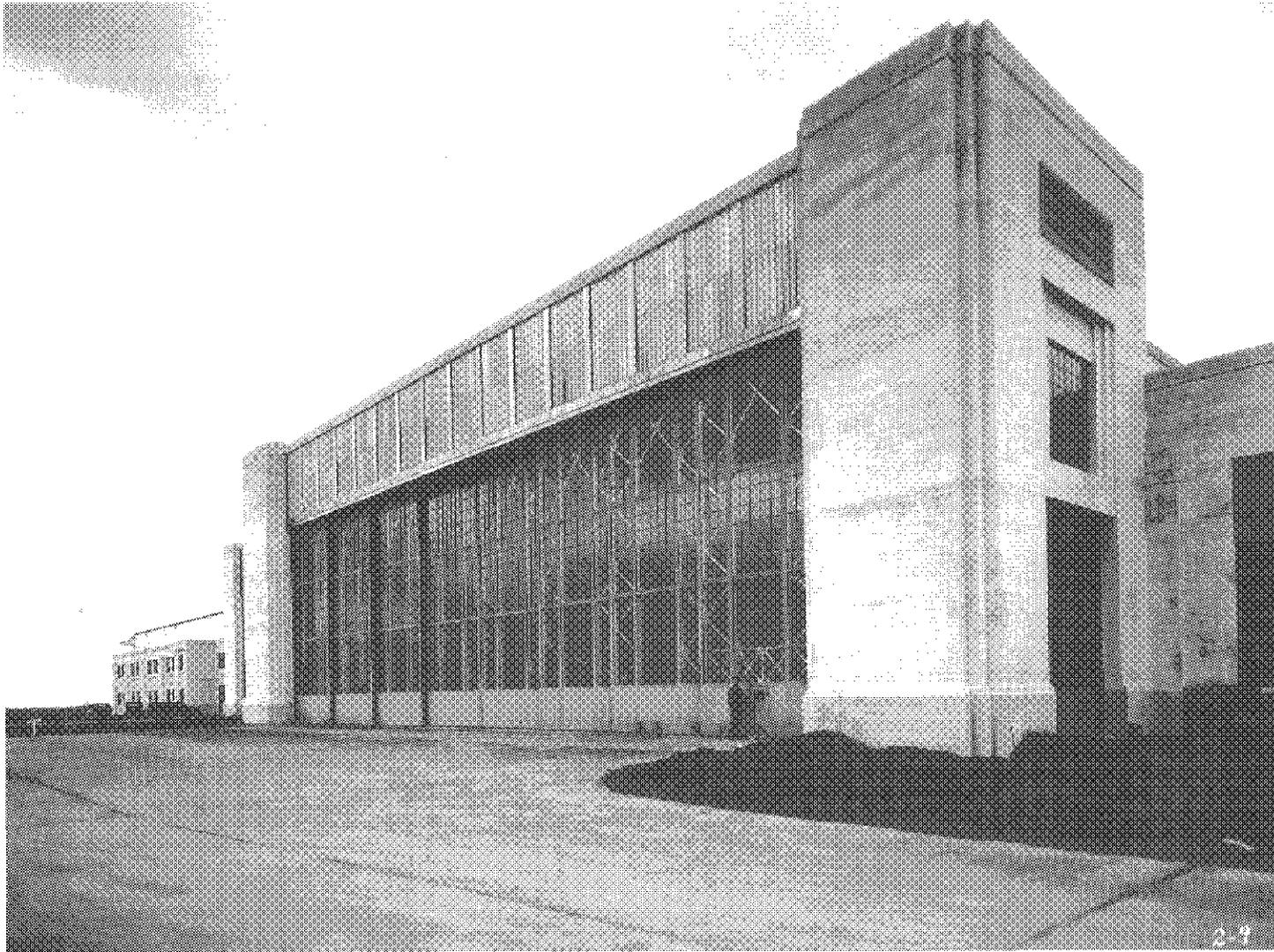


Figure 22. Building 251, the major repair hangar at the Sacramento Air Depot (today's McClellan AFB).
(Source: National Archives.)

the Army began to assemble the large land areas it would need for these purposes. The Army acquired Fort Hunter Liggett in Monterey County for this purpose in 1940 through a purchase from the Hearst family.¹⁵³ The Army also took over the California National Guard training base at Camp San Luis Obispo prior to the war. Similarly, the War Department acquired Camp Cooke for the Army in 1941, just prior to the attack on Pearl Harbor. This 92,000-acre parcel in Santa Barbara County later became Vandenberg AFB.

The Army began to plan, and in some cases actually initiated, construction on these new training stations before December 7, 1941. It did so as if the nation were already at war, planning virtual cities around standardized plans. The Army and, to a lesser degree, the Navy had experimented with temporary, standardized, mass-produced designs during World War I. Indeed, the “Series 600” standard plans had been developed in 1917, prior to American involvement in the war, analogous to the Army’s adoption of standard plans for its training facilities prior to the attack on Pearl Harbor. The Army adapted the early mobilization buildings from a “Series 700” group of drawings, which also dated to World War I.¹⁵⁴ In 1940 and 1941, the Army began to construct these instant facilities in much the same manner as it would later build its posts during American involvement in the war. It contracted with private architect-engineer (A&E) firms, which would be responsible for developing site plans, planning the infrastructure (roads, sewers, drinking water supplies, etc.), and adapting the standard plan series to the specific needs of each base.

At Camp San Luis Obispo, for example, the Army took over a small state militia training base in 1940 and contracted with the A&E firm of Leeds, Hill, Barnard & Jewett in 1940. Construction began in late 1940 and the camp was largely completed before the Pearl Harbor attack.¹⁵⁵ The Army acquired Camp Cooke near Santa Barbara in early 1941 and began to construct temporary, standardized barracks and other cantonment buildings before the attack on Pearl Harbor. Fort Ord, long used as a site for cavalry and armored unit training, was activated as a major “boot camp” in 1940. The Army let a contract for construction of 1,200 buildings, calling for completion of a building every hour; the contractor was able to bring this rate down to one building every 54 minutes.¹⁵⁶ Thus, the temporary, standardized buildings that typify World War prewar tests no doubt helped the Corps of Engineers and private contractors proceed with

¹⁵³ Environmental Research Archaeologists, “A Cultural Resource Reconnaissance and Overview, Fort Hunter Liggett, California,” (1978.)

¹⁵⁴ John S. Garner, *World War II Temporary Military Buildings: A Brief History of the Architecture and Planning of Cantonments and Training Stations in the United States* (USACERL Technical Report CRC-93/01, 1993), 38. California was not alone in this regard. One of the best-known articles on rapid and temporary Army construction is “A Thousand Buildings in Five Months,” *Engineering-News Record*, (March 1941), 72-74, documenting construction at the Indiana Gap Army camp in Pennsylvania, months before the attack on Pearl Harbor.

¹⁵⁵ JRP Historical Consulting Services, “Historic American Engineering Record: Salinas Dam” (February 1997). Salinas Dam was the drinking water supply for Camp San Luis Obispo.

¹⁵⁶ “A Building Every 54 Min. at Fort Ord,” *Engineering News-Record* (March 1941), 75-78.

great II construction were tested on a large scale before American involvement in the war. These dispatch once war was finally declared, and showed the way for equivalent temporary construction by the Navy's BuDocks, as well.

After December 7, 1941, the pattern established by the Army on a few large training camps was extended to every aspect of military construction in California: to the dozens of new installations that were built everywhere in the state; to completion of the large Army camps planned during the war; to expansion of the Navy and Army Air Forces' facilities built between 1939 and 1941; and to construction on the many older installations. The pattern was so much the same across the branches and in different parts of the state that it is tempting to conclude that all World War II construction was essentially identical, varying only in minor details. Seen superficially, this construction seems to vary little from one base to the next, differentiated only as to whether the buildings were designed by the Corps of Engineers or BuDocks. That conclusion has some merit. To the maximum extent possible, the Corps of Engineers sought to impose standard plans on Army and Army Air Force bases, as did BuDocks for its Navy and Marine Corps facilities. A very high percentage of buildings from this period fit this conclusion. Indeed, the differences between Corps of Engineers standard plans and Yards and Docks standard plans are so minor as to make even that distinction less than significant.

A more meaningful distinction may be made between construction at functional types of facilities. Simplifying somewhat, the military installations in California may be categorized as follows: training stations for ground troops and sailors; aviation training stations; supply depots; shipyards; and specialty installations. The construction methods and building types differ a great deal from one functional type to the next, as discussed below.

7.2 TRAINING CAMPS

Large training installations represented the most important aspect of the military in California during the war, when measured by nearly any criterion: people, acres, or dollars invested. To a large extent, California facilities were used during World War II to train soldiers, sailors, and pilots for combat in the Pacific Theater. Dozens of such camps were built, many of which were sub-installations of the larger training camps.

The Army centered its training program in California on three major groups of camps. The most active was a group built around Ford Ord (Figure 23). In 1940, the Army began building Fort Ord as a permanent training facility, in a manner typical of World War II-era construction. For a

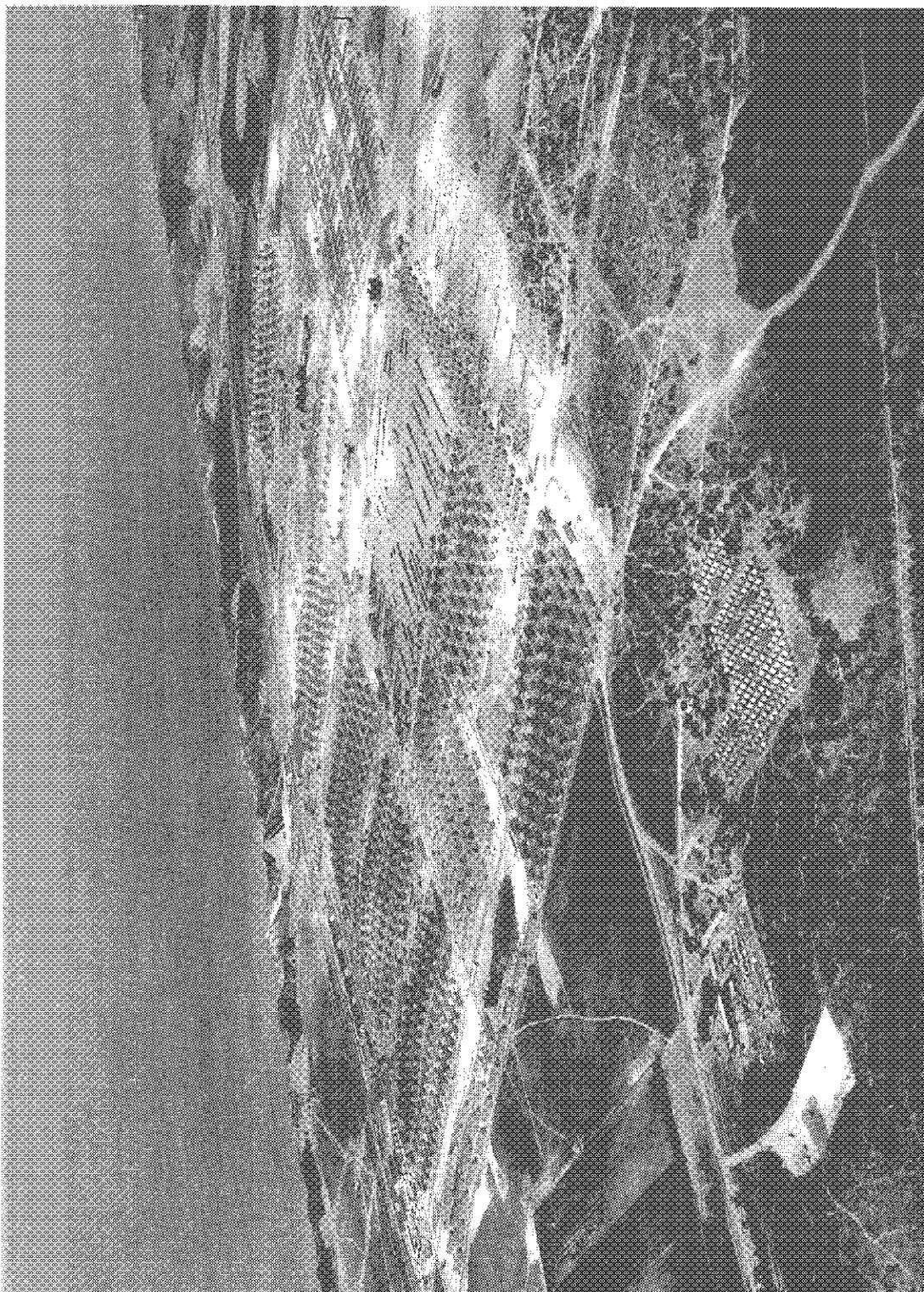


Figure 23. Aerial view of Fort Ord, Monterey County, ca. 1940. (Source: National Archives.)

time, the Presidio of Monterey remained the headquarters for the combined Presidio-Ord complex. In 1944, the Presidio of Monterey was declared a sub-post to Ford Ord. Little by little, the old cavalry base at the Presidio was transformed into a language school, while Fort Ord became one of the Army's most important training centers for armored units. Also associated with Fort Ord were the huge Fort Hunter Liggett (Figure 24) and Camp Roberts, located in adjoining counties. The latter units were sub-posts to Fort Ord. The buildings on these forts were consistently of the temporary, standardized types built in great numbers throughout the United States. A second group of central coast Army training camps were established for infantry and armored units in Camp San Luis Obispo and Camp Cooke. A third major group was a desert warfare complex that included much of modern Camp Irwin in the Mojave Desert in eastern San Bernardino and Riverside counties. The desert camps did not require a large number of buildings, as was the case with the infantry training centers. While highly important militarily, these remote camps left behind relatively few cultural resources dating to the World War II era.¹⁵⁷ The Army established other training camps in isolated locations in the state. Camp Beale was established in Yuba County in early 1942 as an infantry post. It was deactivated at the end of the war but later reactivated as Beale Air Force Base in the late 1940s.¹⁵⁸

While there were many subsidiary installations, the Marine Corps training capabilities in California were (and are) centered on its great facility at Camp Pendleton. Camp Pendleton was initially planned in 1939, although the purchase of a Mexican land grant rancho (Rancho Santa Margarita y Las Flores) was not completed until 1942. Camp Pendleton was one of the largest military installations in California, in area (125,000 acres) and in numbers of recruits (it had a capacity of 38,000 men and women, the largest of any Marine Corps installation in the United States).¹⁵⁹ Designed to train a Marine Division, Camp Pendleton was also the Marine Corps' primary site for amphibious landing training, a crucial factor for a branch of the military so heavily involved with amphibious assault throughout the war in the Pacific. The establishment of Camp Pendleton during the war provided a West Coast equivalent of Camp Lejune in North Carolina, which was established just before the attack on Pearl Harbor. Both were established chiefly to provide sites for amphibious assault training. In addition, the famous Navajo "Code Talkers" were trained in great secrecy on Camp Pendleton.¹⁶⁰ The Marine Corps-built buildings on this huge installation were constructed rapidly, most along the lines of standardized BuDocks

¹⁵⁷ John S. Lynch, John W. Kennedy, and Robert L. Wooley, *Patton's Desert Training Center* (Fort Myer, VA: Council on America's Military Past, ca. 1982).

¹⁵⁸ Dames & Moore, "Historic Architectural Study of Beale Air Force Base, Yuba County, California" (1994).

¹⁵⁹ The history of Camp Pendleton is summarized in Robert M. Witty and Neil Morgan, *Marines of the Margarita: The Story of Camp Pendleton and the Leathernecks Who Train on a Famous Rancho* (San Diego: Fryc & Smith, 1970.)

¹⁶⁰ Doris A. Paul, *The Navajo Code Talkers* (Pittsburgh: Dorrance Publishing Co., Inc., 1969).

plans. Because it was so large, however, Camp Pendleton was always more than a training station. In a manner analogous to Mare Island and the Navy during the 19th century, Camp Pendleton became a multiple purpose home for the Marine Corps. It was fitted with diverse sub-installations, as might be needed by the Marine Corps or the Navy. It had a major Naval Hospital, for example, as well as a Construction Battalion (Seabee) base. It served as a major supply depot for both the Marines and the Navy. A small air field was also constructed during the war.

In a sign of its importance to the Marine Corps, Camp Pendleton was graced with many wartime buildings that defy the usual, temporary and standardized plans. For example, the Navy hired Myron Hunt's architectural firm to design buildings in the original central area of the camp (Figure 25). The presence of these Hunt-designed buildings, however, should not mislead one about the general character of World War II-era construction at Camp Pendleton; the vast majority of the buildings from that period were standard issue Yards and Docks designs or prefabricated buildings such as Quonset huts. Although the Navy expanded greatly in California during World War II, it generally did not do so in the area of training. The Navy entered the war with only the station at San Diego among its training facilities in California, although specialized training was accomplished at other facilities. No new general purpose training station was built in California during the war. The Navy did, however, invest greatly in specialized operational training schools throughout the state. These included an amphibious training school at Coronado, a series of specialized schools at Treasure Island, advance base schools (Seabee units) at San Bruno and Port Hueneme, anti-aircraft schools in Point Montara, and others.¹⁶¹

7.3 AVIATION FIELDS

The large number of air fields that were built in California during World War II reflects the importance of air power to that war, as well as the accommodating weather in California and ease of access to the heart of the nation's aircraft manufacturing industry in southern California. The Army Air Forces and the Navy entered the war with limited assets in this area, generally restricted to the old NAS North Island, the new NAS Alameda, and the 1920s Army Air Forces bases in Riverside and Marin counties, as well as the new supply and maintenance depot in Sacramento. The Marine Corps had no separate aviation facilities in California in 1941. By the end of the war, however, the California landscape was dotted with dozens of new Navy, Marine, and Army Air Forces airfields.

¹⁶¹ Bureau of Yards and Docks, *Building the Navy's Bases*.

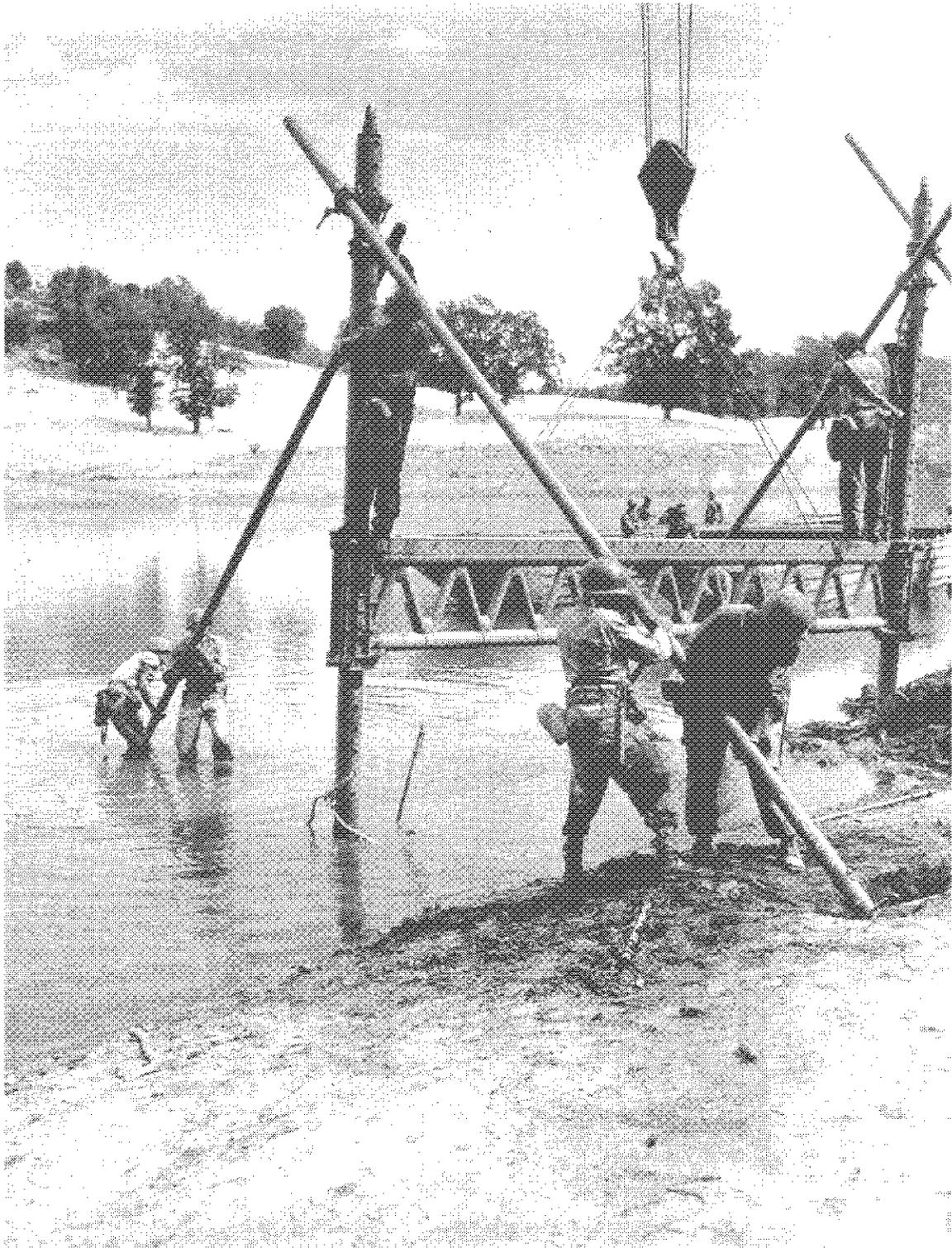


Figure 24. Troops training at Fort Hunter-Liggett, Monterey County, during World War II. (Source: National Archives.)



Figure 25. World War II-era Headquarters building at Camp Pendleton, San Diego County.
(Source: JRP Historical Consulting Services.)

The Navy and Marine air stations were particularly important because the war in the Pacific was, to a large extent, a Navy and Marine Corps war. Throughout the war, Navy and Marine air training was centered on three major stations: NAS North Island; NAS Alameda; and the new Marine Corps Air Station (MCAS) El Toro in Orange County. NAS North Island, as discussed in an earlier chapter, was fitted with hundreds of buildings before the start of the war, including buildings it had inherited from the Army Air Forces' Rockwell Field. Although much construction did occur, North Island was able to make do for the most part with its older buildings. NAS Alameda was not actually completed by December 7, 1941, although the majority of the planned buildings were in place by that time. The 1939-1941 permanent building stock was supplemented by dozens of wood frame temporary structures. MCAS El Toro was not established until 1942 and its building stock was entirely the product of World War II-era temporary construction.¹⁶² Even the permanent buildings at El Toro, such as the hangars and engine test cells, were derived from standardized BuDocks plans. It is difficult to overstate the military importance of NAS North Island, NAS Alameda, and MCAS El Toro to the operations of Navy and Marine aviation during the war. Most of the pilots that served on aircraft carriers and in the long "island hopping" campaign in the Pacific were trained in one of these three stations.

In addition to these three large stations, the Navy and Marine Corps operated dozens of smaller auxiliary or dedicated fields, to support specialized functions. Most of these were simply landing strips with minimal services. A few, however, were built to last, but for exotic purposes. The Navy, for example, had huge, wooden blimp hangars in Santa Ana (now MCAS Tustin) and at Moffett Field in Sunnyvale in the Bay Area. The blimp hangars, the largest wooden buildings in the world, were built at MCAS Tustin, Moffett Field, and Coos Bay (six in all and nearly identical; Figure 26). Moffett Field also had the only dirigible hangar (Hangar 1).

A few of these auxiliary fields survived the war: Miramar, an auxiliary field for the Marines, for example, became an NAS before being returned to the Marines in more recent years. A small NAS was also completed at Long Beach. Most of these smaller fields became municipal airports or were simply abandoned after the war. (The Navy station at Inyokern, or China Lake, and the Navy facility at Salton Sea were aviation-related, but are discussed below under Specialty Installations.)

¹⁶² The history of North Island is summarized in *Jackrabbits to Jets*. The history of El Toro is presented in; JRP Historical Consulting Services, "Inventory and Evaluation of National Register of Historic Places Eligibility for Buildings and Structures at Marine Corps Air Station (MCAS) El Toro, Santa Ana, Orange County, California" (April 1998).

As noted earlier, the Army Air Forces entered the war with bases at Hamilton in Marin County and March Field in Riverside County, as well as the maintenance depot in Sacramento. Mather Field, also in Sacramento, was a World War I-era base that had been de-activated after the war. The Mather Field that was used during World War II was essentially the product of construction in 1940. The Army Air Forces also had a gunnery range, which had been established at Muroc Army Air Base, that would become Edwards AFB in later decades; this range is discussed below under Specialty Installations.

All of the older Army Air Forces bases grew enormously during World War II. McClellan AFB, which was not entirely completed to its original plan by December 7, 1941, was expanded through construction of hundreds of temporary buildings, including massive wood frame warehouses.¹⁶³ Both March Field and Hamilton grew at an accelerated pace during the war.

The Army Air Forces, which had a lesser role in the Pacific than in the Atlantic, made it through the war with these major assets, supplemented by dozens of smaller bases scattered in every part of the state. A few of these smaller bases would be retained and expanded by the Air Force after the war. Travis AFB near Fairfield, George AFB near Victorville, and Castle AFB near Merced had their origins as relatively small World War II-era bases. NAS Lemoore also had its origins as a small Army Air Forces facility. The vast majority of these little bases, however, were deactivated after the war. Their presence is commemorated chiefly through dozens of small municipal airports throughout the state.

7.4 SUPPLY DEPOTS

Supply depots were government-operated warehousing operations that linked the troops with the output of civilian industry. While seemingly prosaic in their function, these bases were essential to success in the war. Both the Army and Navy maintained substantial supply depots in California during the war, including general supply depots and specialized depots for ammunitions and fuels.

Reflecting the fact that the war in the Pacific was primarily a Navy and Marine Corps war, there were far more Navy than Army depots in California. Before the war, the Navy had only one dedicated supply depot in California: the Supply Depot in San Diego, which was one of two nationwide. Elsewhere, this function was accomplished by sub-units within larger Navy stations. Naval supply depots represent one of the areas of fastest growth of the military in California during World War II.

¹⁶³ Maurice A. Miller, *McClellan Air Force Base, 1936-1982* (Sacramento: McClellan Air Force Base, 1982) Chapter 2.

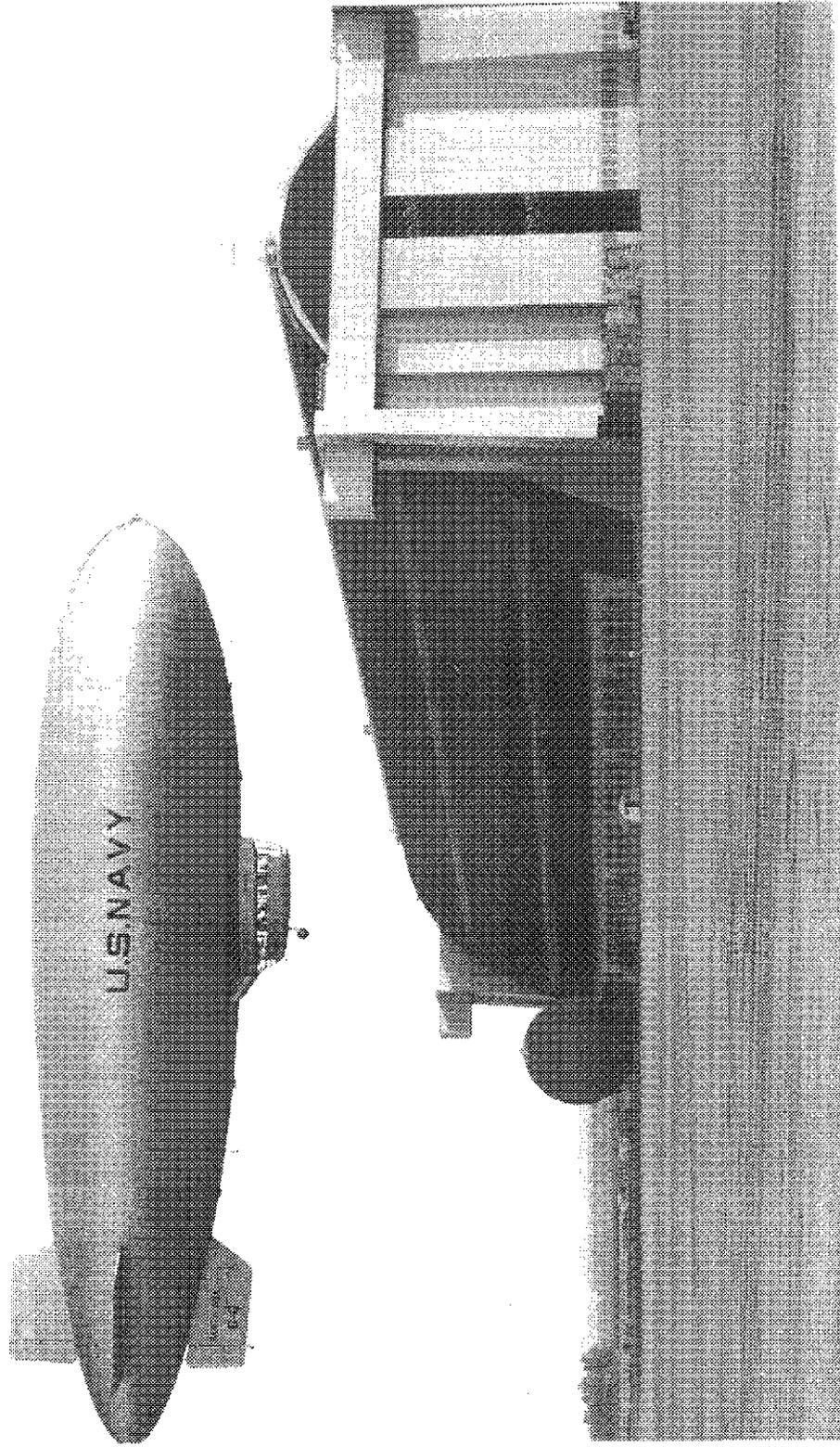


Figure 26. Massive lighter-than-air hangar at NAS Santa Ana, later the Marine Corps Air Station, Tustin. (Source: National Archives.)

The Naval Supply Depot in San Diego, although the oldest of California facilities, actually grew less than the newer depots, owing to limitations on expansion at its site. The major focus for supply depot efforts in California was the great facility built on the waterfront in Oakland Harbor, where work had begun in 1940. The facility at Oakland continued to grow throughout the war, spilling over to Alameda and other annexes in the Bay Area. With each new generation of warehouses at Oakland, the Navy experimented with different types of buildings that corresponded with different methods of cargo handling. By the end of the war, planners at the Oakland Supply Depot had concluded that “palletization” (cargo stored on standardized pallets and moved with forklifts) was the best of several alternative means of storing and moving cargo. Unfortunately, most of the big, two-story concrete warehouses at the Oakland site were not adaptable to this process. In 1944, the Navy decided to build an annex to the Oakland Supply Depot at Rough and Ready Island near the Port of Stockton. This new annex, which was nearly as large as the Oakland facility, was designed specifically to facilitate cargo movement on pallets and forklifts.¹⁶⁴ The supply depot in San Pedro was built just before the war as part of the general Navy complex at Long Beach, which included Roosevelt Base and the Long Beach Naval Shipyard.¹⁶⁵

The Army’s supply depots were scattered throughout the state, many on older Army facilities. The San Francisco Port of Debarkation was centered on Fort Mason and was the principal Army supply center in California. The Oakland Army Base was planned and partially constructed before December 7, 1941. Located alongside the Navy’s Supply Depot, the Oakland Army Base was, in many respects, an equivalent facility. It operated as a sub-installation to the Fort Mason Port of Debarkation.¹⁶⁶

A distinct sub-group of the supply depots were the ammunition depots, maintained in California by both the Army and the Navy. The Army expanded its old depot at the Benicia Arsenal, although it was restricted by lack of space. It built new depots at various locations in the state, including Sacramento, Sharpe (near Stockton), and the remote Sierra facility near Susanville. The Army’s Riverbank Army Ammunition Plant, which was a major munitions factory during the Cold War, was an aluminum plant during World War II. The Navy began the war with a major ammunition depot on the south end of Mare Island. It built major new ordnance and ammunition handling installations at Port Chicago and Seal Beach during the war, while

¹⁶⁴ The history of the Stockton Annex is presented in detail in: JRP Historical Consulting Services, “Historic American Buildings Survey, Naval Supply Annex, Stockton,” HABS No. CA-2682 (1997).

¹⁶⁵ Department of the Navy, “Phase I Cultural Resource Survey for Fleet Industrial Supply Center, Long Beach and Cold War Era Building Survey for Long Beach Naval Shipyard” (January 1997).

¹⁶⁶ Gregory King, “Oakland Army Base, Part VII, D, Historic Architectural Survey Report, IV-Ala-880,” (August 1990).

maintaining smaller ammunition depots on many older stations.¹⁶⁷ A Naval Ammunition Depot was also established within the boundaries of the Marine Corps Camp Pendleton, called the Fallbrook Depot.

Fuel depots were also built at various sites in California. Perhaps the most colorful of these was a Naval Fuel Depot at Richmond's Point Molate, at the site of an early 20th century winery building that had closed during Prohibition. The Navy retained the historic buildings in an unmodified condition until the facility was closed in the 1990s.¹⁶⁸

7.5 SHIPYARDS

While small in number—there were only three—shipyards were so important and distinctive in their function that they must be discussed separately. The Navy entered the war with only two shipyards on the West Coast: the pre-Civil War facility at Mare Island and the turn-of-the-century shipyard at Bremerton, Washington in Puget Sound. The Navy had long recognized that these two older bases were inadequate for their purposes. The massive increases in appropriations prior to and during World War II allowed it to expand into new facilities at Hunters Point in San Francisco and at Long Beach.

Mare Island did not disappear during the war; indeed, its busiest and most productive years were during World War II. With massive ship construction underway elsewhere in California, however, Mare Island lost its long position of supremacy on the West Coast and instead was assigned somewhat specialized missions during the war. As discussed elsewhere, the distinctive quality of the station at Mare Island is that it was always much more than a shipyard: it was also an ammunition depot, a hospital, a Marine Corps encampment, and so forth. All of these non-shipyard functions increased during the war. The Mare Island workforce, which grew to more than 40,000 during World War II, performed many important tasks, including the repair of battle-damaged ships, construction and repair of submarines, and building thousands of landing craft.¹⁶⁹

The new shipyard at Long Beach was part of an integrated complex that included Roosevelt Base and the supply depot at San Pedro. The shipyard was approved as part of a \$25 million package,

¹⁶⁷ JRP Historical Consulting Services, "Inventory and Evaluation of Cold War Era and Selected Other Buildings and Structures, Naval Weapons Support Facility, Seal Beach, Detachment Concord." (June 1998). It was at Concord (then known as Naval Magazine, Port Chicago) that one of the largest losses of life during World War II (on U.S. soil) occurred, when on July 17, 1944, an explosion sunk two ammunition ships at the facility pier. The blast killed more than 320 naval personnel, and injured 390 military and civilian personnel and nearby residents, scattering shrapnel and debris over a wide area and severely damaging the town of Port Chicago.

¹⁶⁸ JRP Historical Consulting Services, "Historic American Buildings Survey, Point Molate Naval Fuel Depot, Richmond, California" (1996).

¹⁶⁹ JRP, "Mare Island."

which also included funds sufficient to purchase the old Bethlehem Steel drydocks at Hunters Point. The principal objective in establishing the base at Long Beach was to provide a drydock that could accommodate an aircraft carrier. This was accomplished in April 1942, when the massive 1,100' x 150' concrete Drydock 1 was completed.¹⁷⁰ The Navy built modern machine shops and metal working buildings at Long Beach, repeating the “curtain wall” building plans that had been perfected decades earlier at Norfolk, Philadelphia, and Mare Island.

The shipyard at Hunters Point had been, in many respects, a competitor to Mare Island for many years. The private shipyard, which had gone through numerous owners since the 19th century, was located off a shelf in San Francisco Bay that was deep enough to accept many ships that could not manage the shallows in and around Mare Island (Figure 27). The Navy bought the property in 1940 but initially did little to develop it. Indeed, through the early years of the war, the shipyard was operated by Bethlehem Steel under a lease from the Navy.¹⁷¹ Although construction continued throughout the wartime years, the Hunters Point shipyard did not achieve its full operational capacity during the war. The large shops built at Hunters Point during the war were nearly identical to those at Long Beach and Mare Island.

7.6 SPECIALTY INSTALLATIONS

The categories treated earlier—training bases, aviation bases, supply depots, and shipyards—account for the vast majority of military facilities that operated in California during World War II. Other specialized functions account for the remainder of such wartime installations.

Research, development, test, and evaluation (RDT&E) facilities were small in number but highly important in that they pointed the way toward a high technological emphasis among military activities in California during the Cold War. RDT&E was a relatively tiny part of the military experience during World War II, being restricted to activities at the Naval Ordnance Test Station (NOTS) at Inyokern as well as minor activities at Point Mugu in Ventura County, Muroc Army Air Base in Kern and San Bernardino Counties (now Edwards Air Force Base), and the Navy’s range at the Salton Sea.

The Navy established NOTS Inyokern, which became the Naval Air Weapons Station (NAWS), China Lake, in 1943 to accommodate research being conducted by the California Institute of Technology (Caltech). This connection between the Navy and Caltech points to one of the driving forces behind California’s high technology growth during the Cold War. While the

¹⁷⁰ “Phase I Cultural Resource Survey for Fleet Industrial Supply Center, Long Beach and Cold War Era Building Survey for Long Beach Naval Shipyard.”, January 1997, 11.

¹⁷¹ JRP Historical Consulting Services, “Historic Context and Inventory and Evaluation of Buildings and Structures, Hunters Point Shipyard, San Francisco, California” (July 1997).

connection between the military and the aerospace industry has often been noted, the close connection between the military and California's universities was equally vital in establishing a high technology base in weapons development after the war.¹⁷² The specific work to be conducted at Inyokern was the testing of rockets and rocket propellants, a fact that also pointed the way to post-war developments. If there was one area in which Californians excelled during the Cold War, it was the development of guided missiles and related systems. NOTS was planned as a permanent station from the outset. Navy planners realized that the research was not likely to be completed during the war and built a permanent facility that could continue this effort long after V-J Day. Among the many important things about NOTS Inyokern is the fact that the buildings were built to permanent standards during the war and reflect the architectural fashions of the war years, a rarity among military bases anywhere in the United States. Although numerous other high technology bases would be built in California during the Cold War, the wartime NOTS Inyokern showed the way.¹⁷³ Point Mugu was used as a minor training facility for Seabees during most of the war. Near the end of the war, however, the Navy set up a temporary group of structures to test a group of "pilotless aircraft," essentially prototype cruise missiles, patterned after German V-1 "buzz bombs." Although little permanent construction and no successful tests occurred during the war, the Point Mugu site had shown its usefulness for missile testing purposes. During the late 1940s, the Navy established a formidable missile T&E facility, now called NAWS Point Mugu.¹⁷⁴

Edwards Air Force base, called Muroc Army Air Base during the war, had its beginnings in the high technology nexus between the military and private aircraft manufacturers designing and building military craft. The land at Muroc was initially reserved in 1933 to provide a bombing range for pilots at March Field. In 1942, the facility was renamed Muroc Army Air Base and was used for testing highly-secret new aircraft, including the XP-59A Bell Airacomet, held by some to be the prototype jet-powered aircraft. The XP-59A, a twin-engine turbojet, was tested at Muroc in 1942. Throughout the war, emerging prototypes were taken to Muroc for testing by Air Force personnel as well as pilots for the manufacturers. While this work resulted in limited construction at the base, it established the base's high-technology orientation, laying the

¹⁷² The mutually beneficial relationships between weapons manufacturers, military bases, and university research has been treated in many sources. The specific impact on California is addressed in James L. Clayton, "The Impact of the Cold War on the Economies of California and Utah, 1946-1965," *Pacific Historical Review* (November, 1967).

¹⁷³ JRP, "Inventory and Evaluation of Cold War-Era Buildings at NAWS China Lake, California" (1996).

¹⁷⁴ JRP Historical Consulting Services, "The Navy's Pacific Guided Missile Sea Range 1946- 1991: Historic Context for Cold War-Era Buildings and Structures at Naval Air Weapons Station Point Mugu" (February 1997).

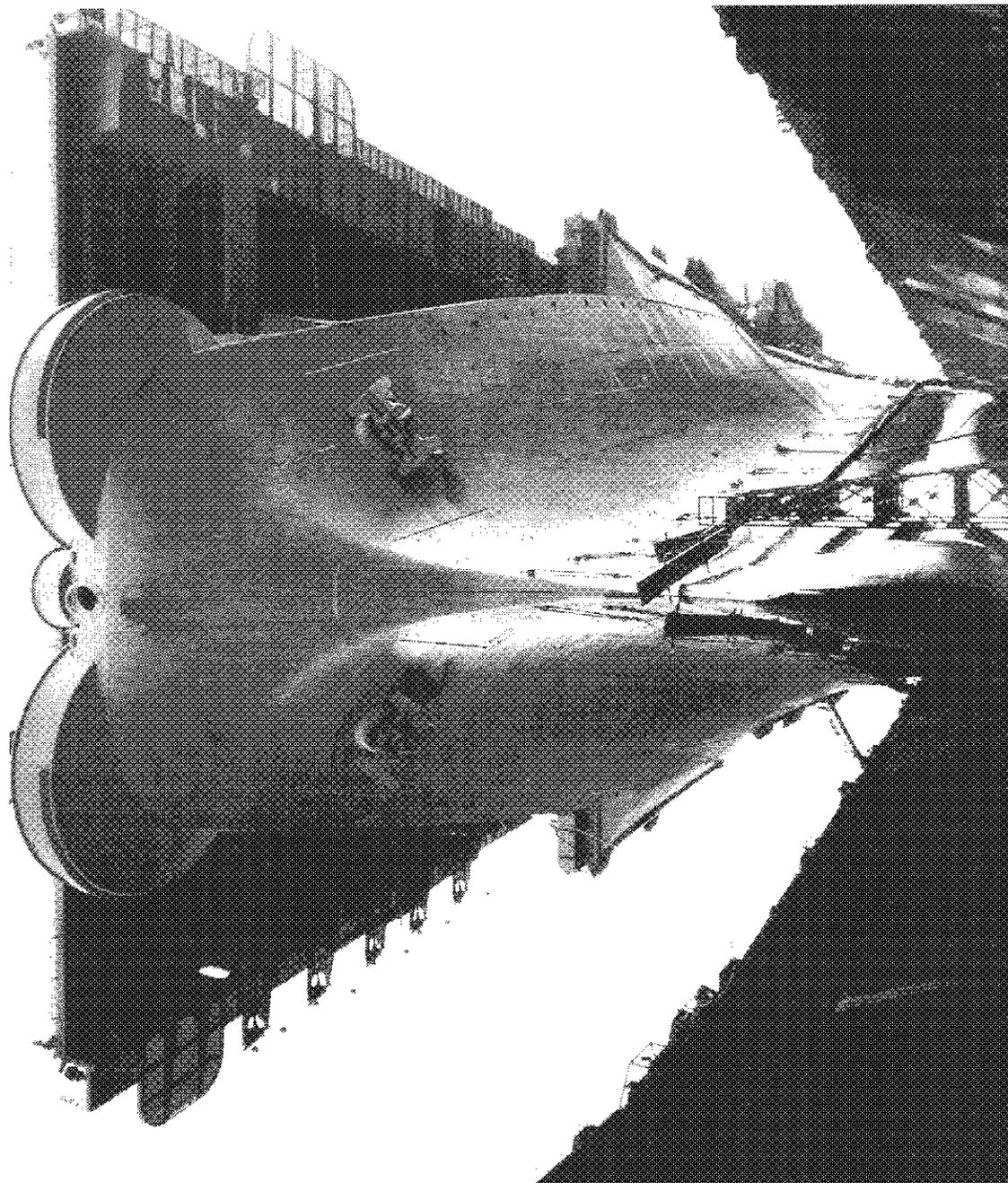


Figure 27. *USS Yorktown* in drydock at Hunters Point Naval Shipyard, 1954. (Source: National Archives.)

groundwork for a wide range of experimental work that would be accomplished at Muroc (Edwards) AFB during the Cold War.¹⁷⁵

The Navy facility at Salton Sea was not so much a high technology area as the recipient of high technology tests. NOTS Inyokern had been built in the Mojave Desert to reserve wide open spaces for testing missile systems. Some tests, however, were too large to be accommodated, even in the huge NOTS reservation. For these tests, the Navy's land at Salton Sea was used. The Salton Sea base began as a seaplane training facility. By the end of the war, it was used most commonly as a bomb target, including numerous tests on non-nuclear components of the "Fat Man" atomic bomb that would be dropped on Nagasaki.¹⁷⁶

Another specialty group of facilities was dedicated prisoner-of-war camps. Prisoner-of-war facilities were built at Camp Eyres near Chino and at Fort Bragg. Many established bases were also asked to house some prisoners of war. The Navy's supply annex near Stockton, for example, had a German prisoner-of-war camp whose prisoners of war (POWs) built stone masonry flood control canals.¹⁷⁷ The Japanese internment camps at Tule Lake and Manzanar were also military facilities, often serving as training stations for the soldiers, as well as secure camps for the internees.

Finally, the various military hospitals were at high states of readiness during World War II. Most of these hospitals were attached to permanent installations, including Letterman Hospital at the Presidio of San Francisco and Naval Hospitals at Mare Island and Camp Pendleton. Others, however, were freestanding institutions, including Naval Hospitals in Oakland and San Diego. The various military hospitals had their finest hour during World War II.¹⁷⁸

7.7 CONCLUSIONS

There were so many different military facilities established in California during World War II that it is difficult to draw a set of general conclusions about them. Any generalization is subject to so many exceptions that it is tempting to say that no reliable conclusions may be drawn. Recognizing that many exceptions exist, the following generalizations are useful in

¹⁷⁵ John D. Ball, Jr., *Edwards: Flight Test Center of the U.S.A.F.* (New York: Duell, Sloan, and Pearce, 1962); Thomas Parrish, ed., *The Encyclopedia of World War II* (New York: Simon and Shuster, 1978), 470.

¹⁷⁶ The Salton Sea tests are discussed in JRP Historical Consulting Services, "Historical Context for Evaluating Buildings and Structures in the Ranges, Naval Air Weapons Station China Lake," September 1997. The Air Force also dropped atomic bomb dummies on Salton Sea on flights from Wendover, Utah.

¹⁷⁷ It appears that prisoner-of-war camps were scattered on military bases throughout California. In addition to the Navy Annex at Stockton and the Navy camp at Coronado, there were Army camps at Camp Cooke, Sharpe, Camp Beale, Angel Island, Tracy, and Benicia. Many prisoners were put to work picking fruit and in other seasonal occupations, which required temporary camp facilities as well.

¹⁷⁸ "Presidio NHL", JRP, "Mare Island."

understanding the impact of the World War II military installations on the economy, landscape, and building stock of California.

The first noteworthy attribute of these facilities is their diversity. Every branch built major installations in California during the war and these reflect the wide array of facilities that were needed to prosecute an “all out” war. While it is justifiable to focus on the very large installations like Fort Ord, Camp Pendleton, or NAS North Island, the war was won through the coordinated efforts of all of the diverse types, from shipyards to ammunition depots to small Navy and Army Air Forces training fields. While there is no reliable count, it is likely that the World War II effort left behind hundreds of thousands of buildings in California, a great number of which have been outside the control of the military for many years. Moreover, these reflect every conceivable building type.

The second characteristic of these installations is that most were, with major exceptions, “low-technology” in their use. This point is worth noting in contrast with the decidedly “high-technology” orientation of many California facilities during the Cold War era. While the Navy’s station at Inyokern or the Army Air Forces’ field at Muroc pointed the way to Cold War developments in California, the vast majority of bases during World War II hewed to their mission to handle basic functions needed to deliver millions of troops and tons of supplies to the overall war effort, and in particular to the Pacific Theater. This was true of the huge training camps and supply depots. While the aviation bases were arguably more associated with advanced technology, including testing new aircraft built by California manufacturers, their essential mission was to produce as many trained pilots as possible, as quickly as possible, for the war effort.

A third characteristic was a differential impact on regions of the state. It is true that the military scattered installations everywhere and the impact of even a small facility was great when it was situated in a rural area. The Sierra Army Depot near Susanville, for example, had an enormous impact on that community, as did the Navy’s test station at Inyokern on that remote, sparsely settled area. The fact remains, however, that the war had its greatest impact on three regions: the San Francisco Bay Area; Los Angeles-Long Beach; and the greater San Diego area. The effects were huge, but different, in each area. The Los Angeles-Long Beach area was arguably most thoroughly transformed as a result of World War II, owing to the impact of the growth of war industries -- particularly aircraft manufacturing -- that dwarfed the direct impact of military base construction. San Diego was arguably affected most by the direct impact of base construction and operation, although it too benefited from huge wartime industries. The many installations in the San Francisco Bay Area had a very real impact on that region. The fact that the area did not develop a long-term civilian industry devoted to military production, however, lessened the dependence of the Bay region on the military after the war.

Fourth, the temporary nature of construction during the war decreased the impact of the war effort on the building stock of California military bases. There can be no doubt that World War II had a greater impact on the California economy and society than any other military effort in the state's history. That momentous event, however, is generally not well represented by important buildings and structures, at least not in a manner proportional to importance in military history. This discordance between important historic events and important buildings may be explained by the fact that many of the buildings were hastily built and were not meant to last beyond the end of the war.

Finally, the temporary nature of wartime construction would have a profound impact on post-war construction, as well. Military designers and builders had placed a high premium on quality of design and construction in the years before 1941. This emphasis on permanence was shared with the designers of all other types of Federal buildings; which, from courthouses to post offices to barracks, were built to last.¹⁷⁹ The World War II experience brought that tradition into question. The greatest war in the history of mankind had been won by troops that had been housed, trained, and fed in flimsy, essentially temporary buildings. After the war, the military would never return to its older model for military base construction. This is not to suggest that military buildings from the Cold War are in any manner unsafe or poorly built. The Cold War facilities, however, would never repeat the total base design that characterized the 19th and early 20th century bases, as well as some of the 1939-1941 bases such as NAS Alameda and McClellan AFB. The Cold War emphasis on flexibility and practicality in design was influenced to a very large degree by the World War II experience.

¹⁷⁹ This emphasis on high quality of design and construction by Federal agencies is detailed in Lois Craig, *The Federal Presence*.

8.0 COLD WAR ERA (1946-1989)

If one term can be used to define the mission and accomplishment of the military in California during the Cold War, that term is technology. The American military ended World War II with crude versions of many of the weapons and systems that would dominate the Cold War, including radar, the proximity fuze, jet aircraft, guided missiles, and the atomic bomb. Each of these technologies, however, was at the start of the developmental curve in 1945. To a significant degree, the Cold War was spent perfecting these and other areas of technological advancement, with a large part of that work occurring in California. It may be argued whether California earned the bulk of this work because it was a high technology center, or whether it became a high technology center as a result of this military work. Both interpretations have merit. There can be no doubt that California contributed more than its share to the making of a technologically advanced military and that the military in turn contributed greatly to the emergence of California as arguably the greatest center of advanced technology in the United States.¹⁸⁰

This dramatic role for Californians in advancing military technology could not have been foreseen on V-J Day. For the most part, California had been the site of routine training camps during World War II. This was true of the very large facilities that would survive through the Cold War, such as the Marine Corps' Camp Pendleton, NAS Alameda, the Army's Fort Ord, and Army Air Forces bases at Mather, and elsewhere.¹⁸¹ Many other wartime functions had also been routine in nature, such as the warehousing activities in the huge supply depots in Oakland, Stockton, San Pedro, and the "Seabee" facility at Port Hueneme. This was also true for most of the smaller camps scattered throughout the state, many of which would close shortly after the war ended. These training and supply bases were scaled back as soon as the war ended; many were

¹⁸⁰ California's high technology advantages were not restricted to its military bases but extended to its private industry and university systems as well. Between 1951 and 1965, California firms were awarded 20 percent of all military procurement contracts nationwide. In the view of one historian, this advantage relates to the high technology advantage of California firms, which "emphasized experimental and developmental projects which later led to production contracts." James L. Clayton, "The Impact of the Cold War on the Economics of California and Utah," 452. California's universities, particularly the California Institute of Technology, Stanford University, and the University of California, Berkeley, were also major contributors to the growth in defense-related high technology growth in the state, receiving millions in research grants and producing many of the best employees for military bases and private industry.

¹⁸¹ The term "routine training" is not intended to diminish the importance of this work but rather to distinguish between bases that train for the use of established technologies and those bases involved in the development of new technologies. The distinction begins to blur when dealing with bases that must train personnel in the use of new or emerging weapons or systems.

closed and never reopened. In some respects, 1945 seemed like any other post-war year, to be followed by massive retrenchment and reductions in force.

Three things kept the post-war from being a typical demobilization: the overarching competition with the Soviet Union for control of the post-war political landscape, which predated the end of World War II; the development of high technology installations in California; and the start of the Korean War. The competition with the Soviet Union was at the heart of the Cold War and was the underlying source of all friction during the period, from the Korean War to the Vietnam War to post-Vietnam developments. The conflict centered, first, on the fate of devastated European nations but spread quickly to all parts of the globe. Flashpoints in this conflict flared up in late 1945, giving the United States little chance to relax its wartime positions.¹⁸²

The major military bases in California during the Cold War period of 1946-1989 are shown in Figure 28.

8.1 HIGH TECHNOLOGY INSTALLATIONS

The high technology facilities that were established in California early in the Cold War era were scattered throughout the state, in many cases, through conversion of wartime training stations. Most were located in remote areas, where land or sea ranges were available. “High technology” is an elusive term but certainly should be applied to the R&D and T&E facilities in California, as well as to the older facilities that acquired discrete high technology missions to supplement their more routine functions. The heart of this effort was controlled by the small group of installations that were set up specifically to develop and test emerging weapons systems and aircraft design. Chief among these were the Navy’s RDT&E station at China Lake, the Navy’s T&E station at Point Mugu, and the Air Force’s T&E facility at Edwards AFB. These RDT&E facilities were active and growing even before the start of the war in Korea. [The Air Force’s important T&E facility at Vandenberg AFB would not be established until well after the Korean War.] The Navy station at China Lake, as noted, was established as NOTS Inyokern during World War II. The Navy station at Point Mugu was used briefly during World War II to test rockets. The test station at Point Mugu was formally established in the late 1940s and built up during the early 1950s. China Lake and Point Mugu were well positioned to garner the lion’s share of the Navy’s appropriations for work on guided missiles in the immediate post-war period. These stations experienced their greatest period of growth in the first decade after V-J Day. Because they were

¹⁸² The general history of the Cold War is presented in many sources. A succinct summary, emphasizing the historic preservation implications of the Cold War is: Department of Defense Legacy Cold War Project, *Coming in from the Cold: Military Heritage in the Cold War* (Washington, D.C.: Government Printing Office, 1993).

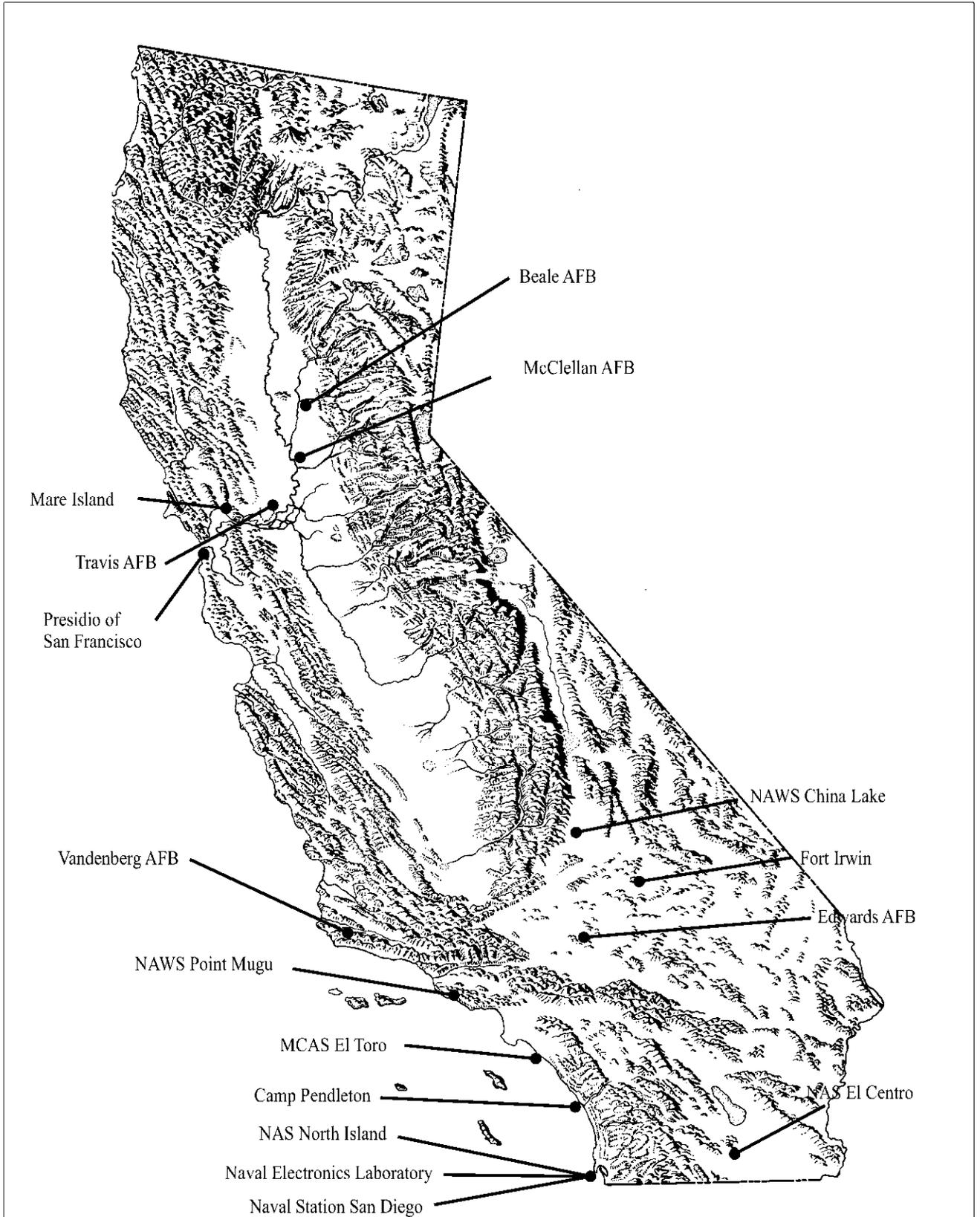


Figure 28. Major military bases in California during the Cold War, 1946-1989.

established so early, the two stations also participated in development of the most important early missile programs of the Navy. Edwards AFB was built from the World War II-era Muroc Army Air Base, which had been used, among other things, to test experimental aircraft during the war. In the immediate post-war decade, Edwards AFB emerged as one of the preeminent Air Force high technology complexes and made internationally significant contributions in three areas: experimental flight testing; captive flight testing (test tracks), and rocket propulsion RDT&E.¹⁸³

High technology was not restricted, however, to this small group of specialized RDT&E installations. The older installations, with seemingly routine missions, often shared in the rapid evolution of weapons, ships, planes, and other craft. Mare Island, established in 1854 to work on sailing ships, launched its first nuclear-powered submarine in 1957, and specialized in work on nuclear-powered crafts until it was closed in the early 1990s.¹⁸⁴ All of the air stations—Air Force, Navy, and Marine Corps—were transformed by the need to train pilots in the use of new jet aircraft. NAS North Island, for example, was the site of the first Navy training squadron dedicated to training for the use of jet aircraft; this squadron was organized in 1948.¹⁸⁵ The establishment of the inland NAS Lemoore in Fresno County in the early 1950s reflected a trend that continued throughout the Cold War, in which air fields were moved into remote areas, where land was available for the larger runways and interference with urban land uses was minimized.¹⁸⁶ Both the Army and Marine Corps established stations dedicated to training pilots in the use of helicopters, which became operational between World War II and the Korean War. The Marine Corps' facility at Tustin, acquired from the Navy after the war was a dedicated helicopter station, needed to separate training for these craft from fixed wing training at nearby MCAS El Toro.¹⁸⁷ Aircraft maintenance facilities like McClellan AFB were similarly transformed through the introduction of sophisticated jet aircraft; McClellan was one of the first facilities to perform maintenance on the F-86, the Air Force's top jet aircraft at the time of the Korean War.¹⁸⁸ New installations were established to train troops in the small but critical aspects of the use of these new technologies. The Naval Air Facility in El Centro, for example,

¹⁸³ For a history of NAWS China Lake, see: JRP, "Historical Context for Evaluating Buildings and Structures in the Ranges, Naval Air Weapons Station China Lake;" For a history of NAWS Point Mugu, see: JRP, "Historical Context for Point Mugu;" For a history of Edwards AFB, see: Ball, Jr., *Edwards: Flight Test Center for the U.S.A.F.*; The broader contexts for Navy and Air Force missile development and testing are provided in: Goodwin, *Navy Cold War Guided Missile Context*; and Lonquist and Winkler, *To Defend and Deter*.

¹⁸⁴ Sue Lemmon and E. D. Wichels, *Sidewheelers to Nuclear Power: A Pictorial Essay Covering 123 Years at the Mare Island Naval Shipyard* (Annapolis: Leeward Publications, 1977).

¹⁸⁵ *Jackrabbits to Jets*, 266.

¹⁸⁶ JRP Historical Consulting Services and Far Western Anthropological Research Group, "Naval Air Station Lemoore, Historic and Archeological Resources Protection (HARP) Plan, 1997-2002" (February 1997).

¹⁸⁷ The Tustin facility is discussed in Jackson Research Projects, "Maintenance-Management Guide Lighter-Than-Air Hangars MCAS, Tustin" (February 1991).

¹⁸⁸ Miller, *McClellan Air Force Base*, 68-69.

was used chiefly to train pilots in how to eject and parachute from very fast-moving jet aircraft, a training function that would later be extended to astronauts.¹⁸⁹ Thus, even seemingly routine training facilities were forced to address emerging technologies in the immediate post-war period.

8.2 KOREA

The Korean War had its most immediate impact on the older training bases and supply depots. Many facilities that had been shut down in 1945 were reactivated. The Marine Corps established MCAS Tustin during the Korean War, taking over the Navy's Lighter-Than-Air Station with its titanic hangars. The Army reopened large training camps in San Luis Obispo and Camp Cooke (later Vandenberg AFB) during the Korean conflict. The major training installations, such as Camp Pendleton and Fort Ord, were brought to a level of activity that approximated that of World War II. All of the support facilities, such as supply depots and ammunition depots, were put back into action during the war. The Navy supply annex at Stockton, for example, was slated for closure in 1950 but was retained to deal with shipments to Korea.¹⁹⁰

A somewhat unexpected effect of the Korean War was a decrease in the rate of construction of buildings on the California facilities. A glance at a database of dates of construction on any active California installations reveals a gap from the early 1950s. The explanation is simple: DoD resources were being spent in Korea, not in California. What little construction occurred during these years was dominated by essentially temporary buildings, such as Butler Buildings, which were the functional equivalents to World War II temporary structures. The Korean experience, however, was quite important in terms of understanding how the emerging technologies, from jet aircraft to helicopters to proximity fuzes to guided missiles, worked under wartime conditions. This experience had a post-war impact on the training stations as well as the RDT&E facilities, which had some of their most productive years in the mid- to-late 1950s.

Two distinct paths were followed in weapons development in the years after 1946: conventional and nuclear. For California as a whole, the conventional weapons program was far more important than work on nuclear weapons. Most of the R&D and T&E work at China Lake, Edwards, and Point Mugu was oriented toward development of conventional weapons, with a very heavy emphasis upon work with air-to-air and surface-to-air guided missiles. Some of the greatest achievements of these early RDT&E bases occurred during the 1950s. China Lake, for example, built some of its most important test facilities in the years shortly after the end of the

¹⁸⁹ Andrew Pigniolo and Christy Dolan, "Cultural Resource Inventory of the Weapons Impact Scoring Set (WISS) Project, Naval Air Facility, El Centro, Imperial County, California," (July 1977).

¹⁹⁰ The history of the Stockton Annex is presented in detail in: JRP, "Historic American Buildings Survey, Naval Supply Annex, Stockton."

Korean War. One of the most important of these was the Supersonic Naval Ordnance Research Track or SNORT, built in 1953. That track, patterned to some degree after a shorter track built by the Air Force at Edwards in 1948 (Figure 29), was used on several generations of missile systems as well as miscellaneous other tests, including ejection systems for jet aircraft and capsules for the space program. China Lake also built an innovative test facility at Randsburg Wash for testing proximity fuzes; it was completed in 1953. The great Michelson Laboratory, completed in 1948, was based on plans that were developed during World War II. The infrared-guided Sidewinder missile, China Lake's greatest single accomplishment, was developed there in the late 1950s.¹⁹¹

The facility at Point Mugu was upgraded to permanent status in the early 1950s and many of its most sophisticated elements were completed early in that decade.¹⁹² Building 55, for example, was an unusual permanent missile launching pad, a heavily-reinforced concrete building that took the place of dozens of scattered, temporary launchers elsewhere on the station.

The test program at Edwards AFB flowered during the first two decades after 1945, gaining fame for the testing of supersonic aircraft, work that had little or no involvement with the emerging nuclear program. Indeed, the early testing at Edwards had as much impact on the Man in Space program as it did on the development of Air Force craft, although it was highly significant in both areas.¹⁹³

8.3 CONVENTIONAL VS. NUCLEAR WEAPONRY

Although the testing of conventional weapons occupied the bulk of the RDT&E efforts in California throughout the Cold War, the nuclear threat posed by the Soviet Union was a distinct sub-plot throughout the Cold War period. This threat affected the activities of all branches, but none more so than the Air Force. The Air Force had three distinct nuclear roles. First, it was responsible for the early warning system, the great web of radar that would be incorporated into the North American Air Defense (NORAD). Second, until the early 1960s, only the Air Force Strategic Air Command (SAC) bombers were capable of delivering a nuclear weapon to the Soviet Union or any other potential target. Third, during most of the Cold War the Air Force had primary responsibility for development of intercontinental ballistic missile (ICBM) and intermediate range ballistic missile (IRBM) systems, which had a nearly exclusively nuclear application. The Army and Air Force competed for appropriations for development of long range missiles, as did the Navy. The dominant position of the Air Force in matters nuclear does not

¹⁹¹ JRP, "Historical Context for Evaluating Buildings and Structures in the Ranges, Naval Air Weapons Station, China Lake."

¹⁹² JRP, "Point Mugu."

¹⁹³ Ball, *Edwards: Flight Test Center of the U.S.A.F.*

diminish the importance of the nuclear program to the other branches. The Army and Navy spent a great deal of time and money during the Cold War defining their respective roles in nuclear deterrence.¹⁹⁴

The nuclear history of the Cold War may be seen as being affected most profoundly by events in 1949 and 1957. In 1949, the Soviet Union successfully tested its first atomic bomb. Also in that year, Communist forces in China overran those of Chaing Kai-Shek, raising the possibility that Western forces might face a combined army of half a billion troops, were the Soviet and Chinese communists to fight in concert. A powerful nuclear arsenal was seen as a technological equalizer in combating an American numerical disadvantage.

The events of 1957 were even more ominous than those of 1949 from the American perspective. In that year, the Soviet Union successfully launched an ICBM, as well as the unmanned space satellite, Sputnik. Russian advances in long-range missiles scrambled all aspects of the American nuclear defense. Radar arrays had been built on the assumption that any in-coming nuclear weapons would arrive on Soviet bombers, not ICBMs. The entire early warning system had to be re-designed, leading to Semi-Automatic Ground Environment (SAGE) and NORAD, as discussed below. While the United States had made tremendous strides in short-range missiles and guidance systems, very little effort had gone into development of surface to surface ICBMs or IRBMs. The problem was described succinctly as a “missile gap.”¹⁹⁵

There followed one of the most concentrated periods of technological innovation in the history of weaponry, as the U.S. military undertook a crash program to develop its ICBM and IRBM program and to widen radar and other early warning capabilities. These two efforts would affect all of the branches and dozens of bases in California, but none more so than the Navy’s China Lake and Point Mugu stations and the Air Force’s Vandenberg AFB.

The most tangible results of the concentrated RDT&E program of the late 1950s and 1960s were the Air Force’s Thor missile, the Navy’s Polaris missile, and the SAGE program, the predecessor of the NORAD early-warning program. The program to develop these technologies was so vast, however, that dozens of other new technologies came in its wake. The spin-off technological advances were so numerous that only a few examples may be listed succinctly. The submarine-launched Polaris, for example, required a system by which the Navy could help submarine commanders know their position without reliance upon sonar, which gave away the vessel’s

¹⁹⁴ Lonquest and Winkler, *To Defend and Deter*.

¹⁹⁵ The significance of the events of 1957, particularly for the Air Force, is discussed in detail in: Lonquest and Winkler, *To Defend and Deter*. The emerging air defense program is discussed and analyzed in David F. Winkler, *Searching the Skies: The Legacy of the United States Defense Radar Program* (Air Force, Headquarters Air Combat Command, 1997).

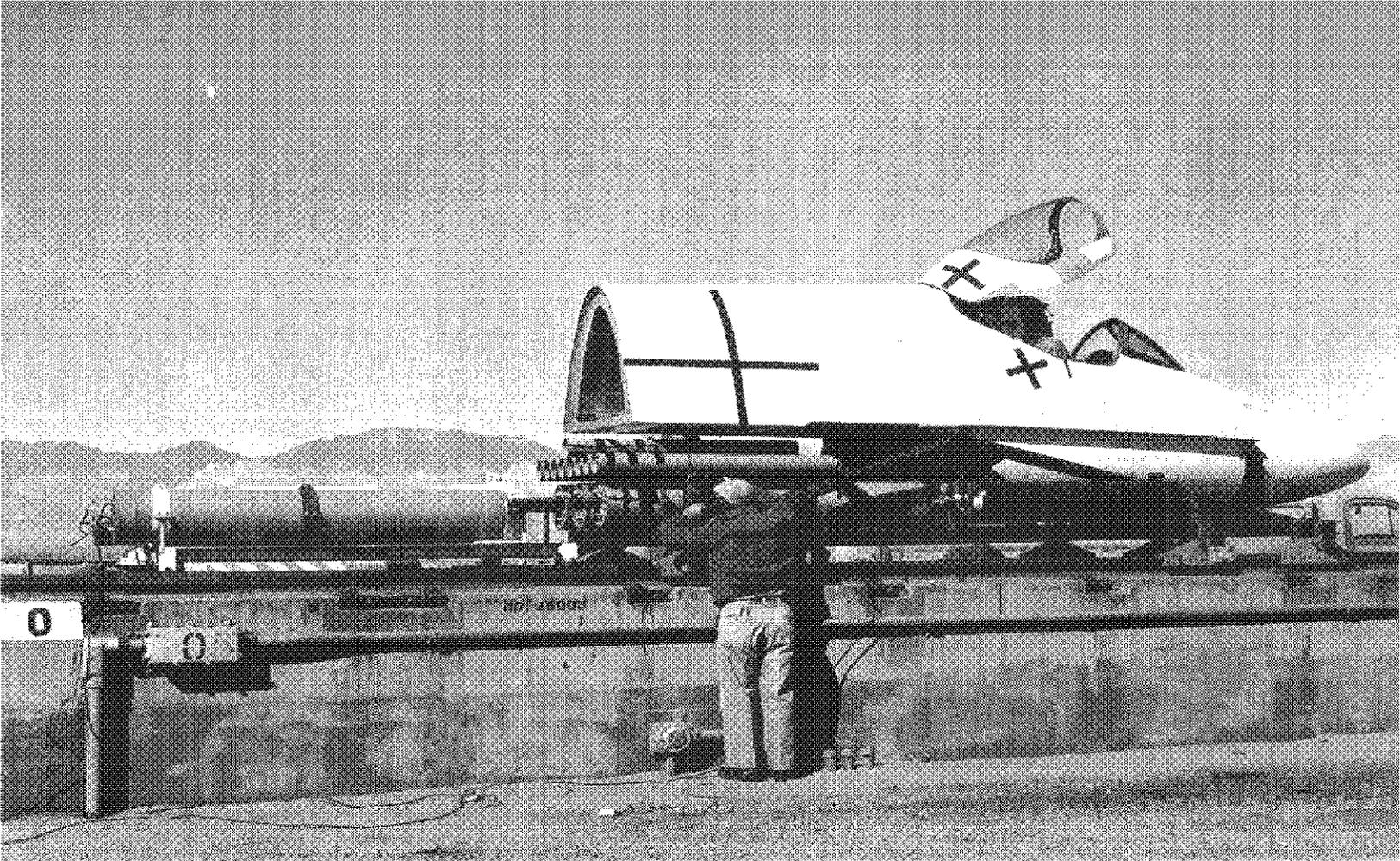


Figure 29. Crew prepares for ejection seat test on the Supersonic Naval Ordnance Research Track (SNORT) at Naval Air Weapons Station, China Lake, Kern County, California. (Source: National Archives.)

location. The answer was Transit, arguably the first satellite positioning system, a precursor for the modern Global Positioning System, or GPS.¹⁹⁶ The Transit System was headquartered at NAWS Point Mugu. The rush to develop a radar warning system thrust the Air Force into a massive effort to develop a computer to run it. The result was the Semi-Automatic Ground Environment, or SAGE, considered a landmark in the development of mainframe computer design, civilian as well as military.¹⁹⁷ All of the testing on IRBMs and ICBMs propulsion systems also laid the groundwork for the Man in Space program of National Aeronautics and Space Administration (NASA). The test facilities used for components of Polaris or Thor were also used for the space program. Not surprisingly, the bases that were involved in RDT&E for ICBMs were also heavily involved in RDT&E for NASA, particularly Vandenberg, China Lake, and Edwards.

These developments also had tangible impacts on the physical plant of the military in California. Arguably the most important single development was creation of Vandenberg AFB in Santa Barbara County, one of the key facilities for testing and launching Thor and subsequent generations of IRBMs and ICBMs (Figure 30). The Atlas, a California-made ICBM, was thoroughly tested at Vandenberg. Vandenberg also served as the principal training facility in the use of ICBMs by Air Force personnel.¹⁹⁸ The Air Force ballistic missile program, in California and elsewhere, was directed from the little known Los Angeles Air Force Base in coastal Los Angeles. Point Mugu grew at its fastest pace during the late 1950s and early 1960s, when it was the headquarters for the Pacific Missile Range, with responsibility for tests by all services in the Pacific. China Lake developed Skytop, its principal static rocket motor test facility, in the late 1950s chiefly to test Polaris motors. The SNORT track at China Lake was also used heavily in testing components for Polaris, as well as components for the Man in Space program. All of the RDT&E bases in California were influenced by the rapid evolution of mainframe computers, which may be attributed, to a large degree, to advances associated with the Navy's Project Whirlwind and the Air Force's SAGE.

Beale AFB, near Marysville, was, in many respects, a quintessential post-1957 base. In the late 1950s and 1960s, it acquired numerous missions, all related to the American response to Soviet ICBMs. Beale was designated a SAGE Direction Center, a second-order facility in the vast

¹⁹⁶ The importance of Transit in developing satellite positioning systems is analyzed in Henry M. Sopolsky, *The Polaris System Development: Bureaucratic and Programmatic Success in Government* (Cambridge, MA: Harvard University, 1972).

¹⁹⁷ The importance of SAGE in the history of the American computer industry is documented in various sources. See, for example: James W. Cordata, *The Computer in the United States: From Laboratory to Market, 1930 to 1960* (Armonk, NY: M.E. Sharpe, 1993).

¹⁹⁸ Lonquest and Winkler, *To Defend and Deter* summarizes the various missile installations in California and elsewhere.

SAGE system. As such, it was fitted with one of the original International Business Machines (IBM) SAGE computers, which was housed in a heavily reinforced “fallout proof” building (as were all SAGE centers). It was also designated a SAC Alert center, in which bomber pilots were on a 24-hour readiness. It was fitted with Titan missiles in 1959, making it one of the earliest ICBM bases.¹⁹⁹

The Titan missiles installed at Beale AFB reflect the fact that the nuclear program in California was not restricted to RDT&E work. Equally important were the various installations where nuclear weapons were stored or where the various other devices were installed to deter against nuclear attack. The SAGE facility at Beale also falls into that category; were there no nuclear threat, the SAGE complex would not have been built. Nike missiles were installed on bases and in non-military sites throughout California. National responsibility for constructing these missile sites fell to the U.S. Army Corps of Engineers, Ballistic Missile Construction Office, headquartered in Los Angeles.²⁰⁰ Nike installations were short-lived. Most were in service from the late 1950s through the late 1960s or early 1970s.

8.4 VIETNAM

The war in Vietnam represented a distinct chapter in the long history of the Cold War. The Vietnam War, 1963-1975, occupied nearly a quarter of the Cold War era and represented a growth period for all California installations. Because it was such a long war, it affected every type of base, including training facilities, high technology centers, and supply depots. It was also a multi-faceted war effort, with an extremely active air war component, as well as a protracted ground war. The Vietnam War stimulated some aspects of high technology weapons development. In other respects, however, it had the same type of effect as World War II in that the older training bases were called into duty to prepare the millions of troops who would be sent to the war, each for a relatively short period of time.

Training facilities in California experienced exceptional growth during the Vietnam War years, none more so than the Marine Corps’ Camp Pendleton and MCAS El Toro. The Marine Corps shouldered more than its fair share of duty in Vietnam and suffered more than its share of casualties; 28 percent of the U.S. personnel killed and 33.5 percent of those wounded in Vietnam between 1961 and 1972 were Marines.²⁰¹ The Marines were assigned the hardest duty of the war,

¹⁹⁹ Dames & Moore, “Historic Architectural Study of Beale Air Force Base, Yuba County, California: A Preliminary Survey and Historic Overview of World War II and Cold War Era Properties.”

²⁰⁰ Brig. Gen. Alvin C. Welling, “Constructing Missile Bases,” *Army Information Digest* (April 1961), 41-46.

²⁰¹ Major General John P. Condon, USMC (Ret.) *U.S. Marine Corps Aviation* (Washington, D.C.: Deputy Chief of Naval Operations (Air Warfare) and the Commander, Naval Air Systems Command 1987), 39.

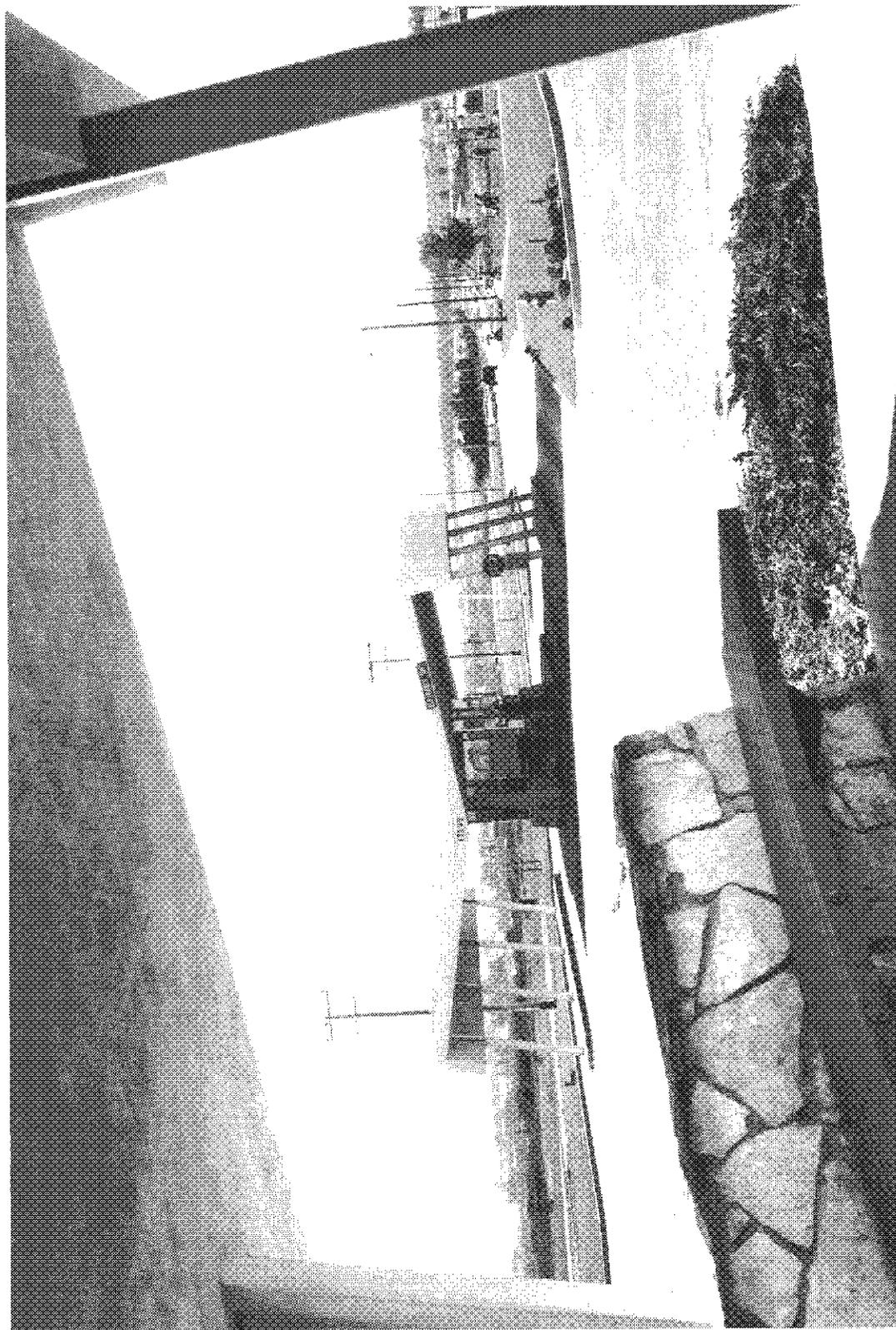


Figure 30. Guard house at entrance to Vandenberg Air Force Base, Santa Barbara County, 1961. (Source: National Archives.)

occupying and pacifying the northern provinces closest to North Vietnam and Laos. This led to a huge expansion of the Corps manpower with a commensurate need for training. Much of that training occurred at Camp Pendleton.²⁰² This training involved the use of some new weapons, including the M-16. It also involved training to defend against decidedly low technology weapons, such as the poison-laced bamboo stick booby traps the Marines encountered. At MCAS Tustin, Marine aviators were trained for what has been called its “helicopter war.”²⁰³ This included transport helicopters, including the CH-46, and the light helicopters used as gunships and for evacuation, including the Army’s UH-1, or Huey.

Most military bases in California experienced some degree of growth related to the war in Vietnam. Often this growth included discrete sub-units, attached to a base in a manner unrelated to its main mission. At Mare Island, for example, there was a special riverboat training center to help train the Navy boat pilots that patrolled Vietnamese rivers.²⁰⁴ The scientists at China Lake set up a special Vietnam research institute to develop on short notice any devices that might be needed; virtually none of this research related to the main missile work at the station. A similar program was established at the Naval Electronics Laboratory at Point Loma, now the Space and Naval Weapons Systems Center. The Navy called this the Vietnam Laboratory Assistance Program, or VLAP. The supply depots were affected because this was a war in the Pacific. Naval Weapons Station, Concord, for example, was an entrepot for tons of weapons sent to it from all parts of the United States. Naval Weapons Station, Concord, along with the Oakland Army Base, were also sites for some of the most spirited protests against the Vietnam War, particularly after 1968. Although they were not unique in this regard, the protests at California military bases were among the most disruptive of any such demonstrations nationally.

The California high technology centers were called upon to develop or improve weapons or technologies that were useful in the unusual theater of war in Vietnam. Dozens of new weapons or systems may be attributed to the war in Vietnam. None was more important than the series of technologies within the general field of Electronic Warfare, or EW. EW was especially important during Vietnam because it was an air war as much as a ground war and took a staggering toll on Air Force, Marine, and Navy pilots who were shot down over North Vietnam. EW refers to many things but the heart of the field is concerned with radar and radar jamming. The field advanced rapidly during the Vietnam War as American scientists, particularly those in the military in California, attempted to find ways of minimizing the loss of American aircraft over North Vietnam. Virtually every high technology installation in the state, from China Lake

²⁰² Witty and Morgan, *Marines of the Margarita*; Allan R. Millett, *Semper Fidelis: The History of the United States Marine Corps* (New York: Macmillan Publishing Company, 1980), 579.

²⁰³ Major General John P. Condon, *U.S. Marine Corps Aviation*, 36.

²⁰⁴ JRP, “Mare Island.”

to Point Mugu to Vandenberg, was involved in this crash program and most continue to support on-going EW research and testing projects.²⁰⁵ EW training exercises have also become a major part of the pilot training programs on all Navy, Air Force, and Marine Corps air bases.

It would be a mistake, however, to conclude that all military efforts in California and the rest of the United States between 1963 and 1975 were geared toward the war in Vietnam. The Vietnam War was but one part of a much larger “containment” policy, designed to limit expansion of the Soviet Union or China. The standoff, in Vietnam or anywhere else, was ultimately between the United States and the Soviet Union, and a great deal of work on military bases in California was geared toward development of other tools to contain the Soviets. Perhaps the most important deterrence work was geared toward improvements to long-range missiles and anti-missile missiles. The solid-fuel Minuteman ICBM, for example, was tested, and deployed during the Vietnam War, with much of that work occurring at Vandenberg. Projects Sentinel and Safeguard, the first generation of Anti-Ballistic Missiles (ABM) were also planned and deployed during the Vietnam War. These systems were tested but not deployed in California.²⁰⁶

8.5 AFTER VIETNAM

The post-Vietnam Cold War may be seen as comprising two distinct periods: one of retrenchment between 1975 and 1981, and a period of accelerated growth between 1981 and 1989. Although the earlier period was one of retrenchment, it was also a time of rebuilding, as all branches sought to restructure to adjust to the all-volunteer forces and to develop new ways of building morale after disheartening results in Vietnam.

Several new strategies emerged to “rebuild” our armed forces.²⁰⁷ The most obvious change was to end the draft and move to an “all volunteer” Army after 1973. With the change to an all-volunteer force was the commitment to upgrade the preparedness of trainees and to draw from a wider pool of potential recruits. After 1973, for example, the percentage of recruits with high school diplomas rose from 55 percent to nearly 100 percent by the mid-1990s.²⁰⁸ The percentage of women in the various branches rose dramatically. Without the draft, these recruits had to be induced to join. One of the seemingly prosaic but nonetheless crucial adjustments to all volunteer forces was rebuilding the housing stock for enlisted personnel. The new barracks, now

²⁰⁵ There is a growing body of literature on the history of EW, which remains the most closely-guarded area of RDT&E on most bases involved with the field. See: Mario de Arcangelis, *Electronic Warfare: From the Battle of Tsushima to the Falklands and Lebanon* (New York: St. Martin's Press, 1991).

²⁰⁶ These developments are summarized in Lonquest and Winkler's *To Defend and Deter*.

²⁰⁷ James F. Dunnigan and Raymond M. Macedonia, *Getting It Right: American Military Reforms After Vietnam to the Gulf War and Beyond* (New York: William Morrow and Company, 1993).

²⁰⁸ Tom Clancy, *Into the Storm: On the Ground in Iraq* (New York: Berkley Books, 1998) 90.

called bachelor enlisted quarters (BEQs), were far more like college dormitories than the old open bay sleeping barracks.²⁰⁹ Greater emphasis was also placed on physical fitness, and fitness buildings proliferated on installations everywhere, including California. A substantial part of the post-Vietnam building stock at California military bases falls in what the Navy calls MWR—Morale, Welfare, and Recreation. Construction of so many buildings of this sort may be attributed to the effort to recruit and retain personnel.

Another element of the post-Vietnam strategy was the emphasis on the “total Army,” in which regular forces, reserves, and National Guard units were seen as part of a unified fighting force. Military bases throughout California increasingly made their assets available to reserve and National Guard units to ensure joint training possibilities. Many new buildings were also constructed on regular bases to accommodate the needs of the reserve and National Guard units.

The build-up during the 1980s, like most of the Cold War, was oriented toward building on America’s technological superiority in its weapons systems. There were few fundamentally new weapons developed during these years but existing technologies advanced considerably. China Lake, Point Mugu, and Vandenberg were tasked to develop and test whole new generations of missiles. Vandenberg was one of the key test facilities for the MX, or Peacekeeper missile, the most advanced ICBM, with most of this work occurring during the 1980s. The Tomahawk, a cruise missile with nuclear capabilities, was first developed in the 1970s but greatly improved during the 1980s, with some of the testing occurring at Point Mugu. The Trident I and II ballistic missiles were products of the post-Vietnam era. Built in California, these missiles were tested chiefly at China Lake and Point Mugu. The Strategic Defense Initiative, or SDI, was seen as an improvement over Sentinel and Safeguard ABM program in the 1970s. Although billions were spent of R&D for SDI, much of it in California, the system was largely abandoned after the collapse of the Soviet Union in 1989.

The build-up of the 1980s had an even deeper impact on civilian California than on its military installations. In 1984, when the weapons build-up was still picking up steam, California firms were awarded 22 percent of all weapons contracts, or \$26.4 billion. The impact was felt chiefly in Southern California. Los Angeles County firms received about 50 percent of these contracts, Orange County firms 12 percent, and San Diego County firms eight percent. Santa Clara County accounted for about 12 percent.²¹⁰

²⁰⁹ Elizabeth A. Palmer, “Building Barracks,” *Congressional Quarterly* (December 7, 1991), 119-124.

²¹⁰ “Megabuck for Defense,” *Plowshare Press* (March-April 1984).

The end of the Cold War resulted in the dismantling of much of the military assets that had been built up in California. The most immediate impact was closure of a significant number of bases under the BRAC processes. The San Francisco Bay Area suffered more direct employment losses than any other region in the state, losing more than 40,000 jobs.²¹¹ A proportionally large loss was felt in Sacramento, which lost all three of its military bases (McClellan and Mather AFBs and the Sacramento Army Depot) through the BRAC process. Cutbacks in procurement deeply affected the aerospace industry in Southern California. Even those installations that survived BRAC closures found their missions changed and, in many instances, reduced. The long Cold War nexus between the private high technology firms, technological universities, and the military was all but destroyed in the late 1980s and 1990s. The ascendant economic vitality of high technology firms and universities in California make it unlikely, however, that the state will lose altogether its role in preserving the technological advantages of the American military.

8.6 CONCLUSIONS

The Cold War was dominated by technological innovation in California. The buildings and structures that were constructed during this period exist at the extremes of temporary and permanent construction. To a very large degree, the buildings from this period lack the permanency of building materials and methods that characterized military construction in California from the 1840s to World War II. The difference between pre- and post-World War II construction may be readily appreciated on any base that retains buildings from both periods. One can compare, for example, the 1930s warehouse buildings at McClellan AFB with those built in the 1980s. The older warehouses are heavy, reinforced concrete structures, while the newer buildings are pre-engineered metal sheds. The same juxtaposition may be seen at Mare Island, NAS North Island, or just about any base that existed before the attack on Pearl Harbor. The difference may be seen as well in the design of office buildings, residences, or recreational buildings.

As suggested in an earlier chapter, military designers may have learned the advantages of flexibility during World War II. As an example, the Navy's Supply Depot in Oakland was built of sturdy reinforced concrete warehouses just before the war to handle cargo in a wasteful bulk handling method that was replaced by palletization processes during the war. The palletization process, in turn, was replaced by containerization, which had little need for warehouses at all. The disadvantage of permanent construction was the inability of these sturdy buildings to be reused with the advent of new technologies. The pre-engineered shops of the Cold War are by no

²¹¹ "Live by the Sword, Die by the Sword," *The Economist* (March 13, 1993), 32-33.

means temporary in design; they meet all applicable standards. But they are relatively inexpensive and may be replaced more easily in response to rapid changes in technology, which was the fundamental trend of the Cold War in California.

At the other extreme, however, the Cold War resulted in construction of some of the most permanent buildings ever devised by mankind. The SAGE control buildings, for example, or their closely-related Backup Interceptor Center (BUIC) buildings, are built to withstand near-miss nuclear attacks and are built to standards rarely attempted in the past. Although they were built during World War II, the propulsion laboratory buildings at NAWS China Lake are extraordinarily sturdy concrete buildings. Building 55, the rocket launcher building at NAWS Point Mugu, is similarly a remarkably sturdy concrete building, fitted with missile launch pads on its roof. Other such examples exist throughout California, such as the test track facilities at Edwards AFB and NAWS China Lake, which took railroad track design to new heights, and the many static test stands at various bases, through which missile propellants could be tested in a captive position (Figure 31).

The examples mentioned above were permanently built chiefly because they were protected against explosions of ordnance or propellant or, in the case of the BUIC, against nuclear attack. Highly permanent construction was also used for buildings that housed the most valuable functions in the high technology work of the California military installations. Perhaps the best example—and in many respects the quintessential Cold War building in the state—is the Michelson Laboratory at NAWS China Lake (Figure 32). True, the building houses some potentially dangerous experiments but this alone does not explain the permanent standards to which it was built. The most dangerous tests occur elsewhere, on the vast ranges of China Lake. Rather, the Michelson Laboratory was built to permanent standards at the beginning of the Cold War because military planners understood the value of R&D to the success of the United States during the Cold War. From V-J Day forward, American military planners placed their faith in the ingenuity of scientists and artisans to develop weapons that could compensate for the numerical inferiority of American troops. They understood that an R&D facility like the Michelson Laboratory would be needed for the long run, not only for the first generation of guided missiles that were developed there, but for a very long period of time. These permanent facilities were the focus of Cold War expenditures by the military in California.

The architecture of the Cold War in California, then, is somewhat disjointed, with relatively few highly permanent buildings joined by hundreds of essentially standardized buildings constructed to a lesser degree of permanence. The first casualty of this design approach was the “total base” concept that had governed military base design for a century in California, in which all buildings were laid out according to a consistent architectural program or theme. This concept remained in

place to the eve of World War II. In a sense, the World War II bases were also consistently designed, although built around highly temporary buildings.

The Cold War bases, by contrast, rarely exhibit this kind of continuity. At NAWS Point Mugu, the Navy attempted to impose some order on the total base by developing a master plan that included model designs for offices, residences, shops, hangars, and so forth. That plan, which was developed in 1948, was discarded by the early 1950s as the Navy sought to accommodate rapidly-changing missile and aircraft designs. Consistency of design is not a notable characteristic of Cold War military design.

If the Cold War did result in a notable architecture, it is to be found in the permanent high technology buildings—the Michelson Laboratory, the BUIC buildings, and the other examples mentioned earlier. These buildings are significant chiefly for the importance of the work that was accomplished there, the technological advances that cumulatively led to American ascendancy during the Cold War. The buildings are also of interest, however, for the unique qualities of their design. The more sophisticated the technology involved, the more likely that a building will be unique. The many generations of technological advances made at California military bases during the Cold War left behind a large body of such unique permanent buildings, and these represent the most lasting architectural legacy of the Cold War.

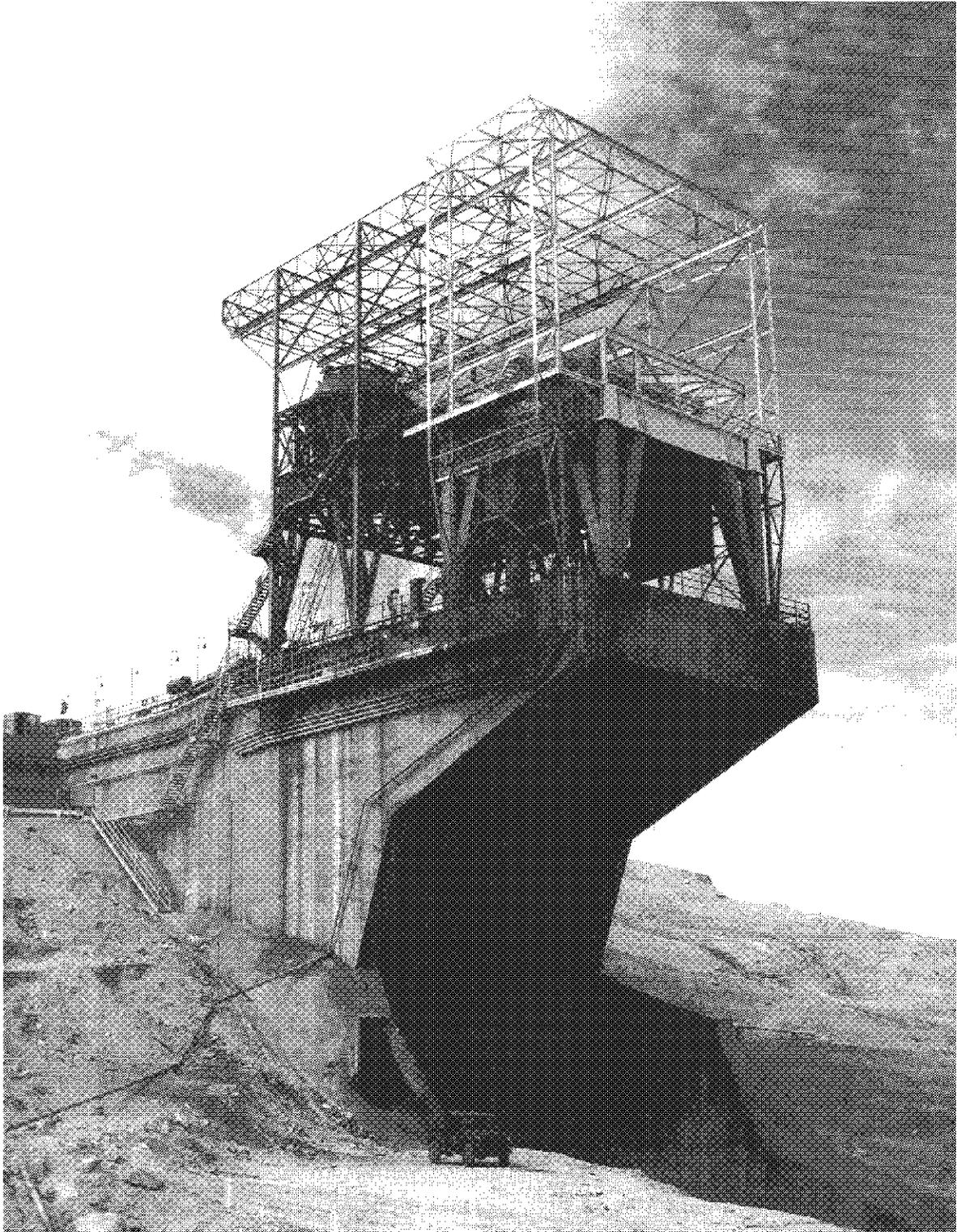


Figure 31. Large propellant test stand at Edwards Air Force Base, Kern County, California.
(Source: National Archives.)

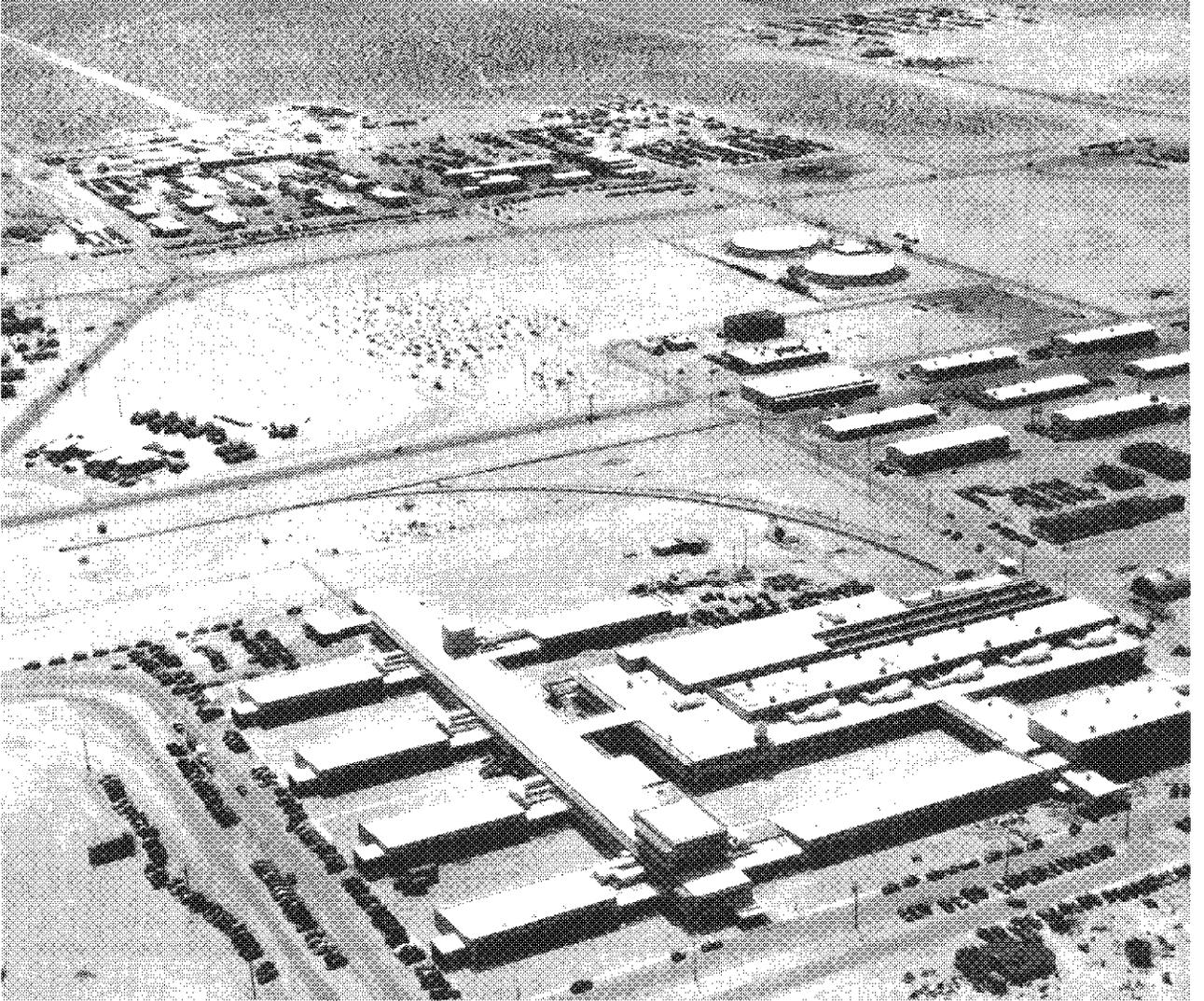


Figure 32. Aerial view of the Michelson Laboratory at Naval Air Weapons Station, China Lake shortly after it was completed in 1948. (Source: National Archives.)

9.0 CONCLUSIONS

This historical context focuses on the broad trends in the history of the military in California and has necessarily summarized and omitted many of the more interesting details of that history. That omission was intentional. This context was designed to focus on “big picture” developments and to establish long-term trends.

The details do, however, mean a great deal in understanding how and why the larger trends occurred as they did. The larger trends in this document lead one to the smaller contexts in which individual properties may be evaluated. For example, it was observed in Chapter 6 that the Navy’s supply depot operations were revolutionized by the “palletization” process and that buildings at the Naval Supply Annex, Stockton, were built specifically to accommodate that process. That is a “big picture” trend but the specifics of the building design to accommodate that process can only be understood by examining the buildings themselves or the design documents of the builders. In another example, Chapter 4 emphasizes the degree to which the Navy modernized its physical plant in the early decades of the 20th century, and emphasizes that Building 271 at Mare Island, a curtain wall industrial building from 1918, is an important example of that trend. The context for curtain wall design, however, is not discussed in detail and would need to be explored to understand the importance of the building.

Another fact about “big picture” trends is that they sometimes do not leave behind physical resources. It is known, for example, that General George Patton conducted highly significant tank training in the California desert before going to fight in Africa, early in the American involvement in World War II. The character of that training, however, was such that it left behind few resources. The test flights at Edwards AFB were of incomparable value both to military aircraft development and the Man in Space Program. While some buildings were needed to support those flights, the most important artifacts are the aircraft themselves rather than buildings or structures.

These caveats aside, it is always useful to have a sense of the larger picture before attempting to analyze properties according to smaller, more discrete contexts. The discussion below addresses how the themes outlined in this context may be used to address the potential significance of individual military properties.

9.1 HOW TO USE THIS CONTEXT TO EVALUATE HISTORIC PROPERTIES

Federal guidelines for historic preservation planning have long emphasized the need to evaluate historic significance in historic context.²¹² As the term is used in Federal guidelines, a context is a three-dimensional framework that takes into account time, place, and historic themes. A fourth dimension is what is called a “property type,” which is a type of building, structure, or site that may reflect the historic theme for a particular time and place.

While these concepts are complex when stated in the abstract, they are quite simple in their application. The present historic context may be used to illustrate how contexts operate in general. This historic context has assumed a place: California. In terms of time, this context is broken into seven chronological periods, which reflect major milestones in the development of the military in California. Numerous historic themes are involved in this history. A single overarching theme governs the entire context: the development of the military in California. Numerous discrete themes, however, have been called out in the various chapters. Each discrete theme in each chapter represents a separate context within this larger statewide context. For example, the adoption of the submarine by the Navy in the period, 1903-1918, is a discrete context that encompasses an event of considerable importance to the development of the modern Navy. A property type is simply some type of building, structure, or site that is reflective of that context. There exist at Mare Island Naval Shipyard several individual buildings that reflect the importance of early submarine work there; the aforementioned Building 271 is one.

Not all properties are significant simply because they represent a property type that is reflective of a particular context. Building 271 appears to be significant in several contexts; it was associated with the early submarine work and is a very early curtain wall industrial building. The military continued to build curtain wall shops through the early Cold War. Later curtain wall buildings are thus of lesser significance, from an architectural standpoint, than the pioneering buildings. A context is used as a device to compare and contrast different examples of property types that might be associated with a particular theme. Unfortunately, even the best-constructed context does not relieve one from exercising judgment; historic significance will also involve some degree of subjective judgment and opinion. A good context, does, however, ensure that the judgment is made on an informed and thoughtful basis.

This context is intended to be used as a reference in evaluating trends in different time periods and involving the different military branches. The most helpful way of using the context is to read the text in full when confronting a particular type of property. If a person, for example, is

²¹² An historic context is formally defined in: Department of the Interior, “Archeology and Historic Preservation: Secretary of the Interior’s Standards and Guidelines,” *Federal Register*, 48, No. 190, September 29, 1983.

asked to evaluate an Air Corps hangar from the interwar years, it is useful to re-read the chapter on the interwar years to appreciate the dominant trends that governed Air Corps construction activities during those years, and determine on that basis the proper context for its evaluation.

10.0 BIBLIOGRAPHY

GENERAL HISTORY

Books

- Aaseng, Nathan. *Navajo Code Talkers*. New York: Walker Publishing Company, 1992.
- Abbott, Carl. *The New Urban America: Growth and Politics in Sunbelt Cities*. Chapel Hill: S.n., 1981.
- Adams, Benson D. *Ballistic Missile Defense*. New York: American Elsevier Publishing Company, Inc., 1971.
- Aeronautical Chamber of Commerce of America. *The Aircraft Industry Prepares for the Future*. Washington, DC: ACCA, Inc., 1944.
- Alden, Carroll Storrs. *The United States Navy*. Chicago: J.B. Lippincott Company, 1943.
- Ambrose, Stephen E. ed. *The Military and American Society: Essays and Readings*. New York: The Free Press, 1972.
- Anderson, Roy A. *A Look at Lockheed*. New York: Newcomen Society in North America, 1983.
- Baker, David. *The Rocket: the History of Rocket Missile Technology*. New York: Crown Books, 1978.
- Ball, John D., Jr. *Edwards: Flight Test Center of the U.S.A.F.* New York: Duell, Sloan & Pearce, 1962.
- Bannon, John Francis. *The Spanish Borderlands Frontier, 1513-1821*. Norman: University of Oklahoma Press, 1974.
- Bauer, K. Jack, ed. *The New American State Papers, Naval Affairs. Vol. 6, Administration*. Wilmington, Delaware: Scholarly Resources, Inc., 1990.
- Baxter, James Phinney. *Scientists Against Time*. Cambridge: M.I.T. Press, 1945, reprint 1968.
- Beaubois, Henry. *Airships: Yesterday, Today and Tomorrow*. New York, N.Y.: Two Continents Publishing Group, 1973.
- Beigel, Harvey M. *Battleship Country: The Battle Fleet at San Pedro-Long Beach, California, 1919-1940*. Missoula, MT: Pictorial Histories Publishing Company, 1983.
- Bernard, Richard M., and Bradley R. Rice, eds. *Sunbelt Cities: Politics and Growth Since World War II*. Austin: University of Texas Press, 1983.
- Binkin, Martin and Shirley J. Bach. *Women and the Military*. Washington, DC: The Brookings Institute, 1977.
- Bolton, Roger. "Impacts of Defense Spending on Urban Areas." In *The Urban Impact of Federal Policies*, ed. Norman Glickman. Baltimore: Johns Hopkins University Press, 1979.
- Boync, Walter J. *Silver Wings: A History of the United States Air Force*. New York: Simon and Schuster, 1993.
- Braistad, William R. *The United States Navy in the Pacific, 1897-1909*. Austin: University of Texas Press, 1958
- _____. *The United States Navy in the Pacific, 1909-1922*. Austin: University of Texas Press, 1971.

- Bright, Charles D. *The Jet Makers: The Aerospace Industry from 1945 to 1972*. Lawrence: Regents Press of Kansas, 1978.
- Brown, Jerold E. *Where Eagles Land: Planning and Development of U.S. Army Airfields, 1910-1940*. New York: Greenwood Press, 1990.
- Browning, Robert S. III. *Two if By Sea: The Development of American Coastal Defense Policy*. Westport, CT: Greenwood Press, 1983.
- Bruegmann, Robert. *Benicia: Portrait of an Early California Town*. San Francisco: 101 Productions, 1980.
- Bureau of Yards and Docks. *Building the Navy's Bases in World War II*. Washington, D.C.: Government Publishing Office, 1947.
- Carlisle, Rodney P. *Management of the US Navy Research and Development Centers during the Cold War*. Washington, DC: Naval Historical Center, 1996.
- Carrison, Daniel J. *The United States Navy*. New York: Frederick A. Praeger, 1968.
- Carter, Ashton B., and David N. Schwartz, eds. *Ballistic Missile Defense*. Washington, DC: The Brookings Institution, 1984.
- Carter, William H. *Our Coast Defenses*. Washington, DC: Government Printing Office, 1903.
- Champie, Elmore A. *A Brief History of the Marine Corps Base and Recruit Depot, San Diego, California, 1914-1962*. Washington, DC: Historical Branch, USMC, 1962.
- Cherny, Robert W., and William Issel. *San Francisco: Presidio, Port and Pacific Metropolis*. San Francisco: Boyd and Fraser, 1981.
- Clancy, Tom. *Into the Storm: On the Ground in Iraq*. New York: Berkley Books, 1998.
- Clarfield, Gerard H., and William M. Wiecek. *Nuclear America: Military and Civilian Nuclear Power in the United States, 1940-1980*. New York: Harper and Row, 1984.
- Clifford, Lt. Col. Kenneth J. *Progress and Purpose: A Developmental History of the United States Marine Corps, 1900-1970*. Washington, DC: History and Museums Division Headquarters, United States Marine Corps, 1973.
- Coletta, Paulo E., ed., and K. Jack Bauer, assoc. ed. *United States Navy and Marine Corps Bases, Domestic*. Westport, CN: Greenwood Press, 1985.
- Condit, Kenneth W., and Turnblad, Edwin T. *Hold High the Torch*. Washington, D.C.: United States Marine Corps, 1960.
- Condon, Maj. Gen. John P. *U.S. Marine Corps Aviation*. Washington DC: Naval Air Systems Command, 1987.
- Conn, Stetson, Rose C. Engelman, and Byron Fairchild. *The US Army in World War II: Guarding the United States and Its Outposts*. Washington, D. C.: Department of the Army, Office of the Chief of Military History, 1964.
- Coons, Arthur Gardiner. *Defense Industries and Southern California's Economy*. Los Angeles: 1941.

- Cordata, James W. *The Computer in the United States: From Laboratory to Market, 1930-1960*. Armonk, NY: M.E. Sharpe, 1993.
- Cosmas, Graham. *An Army for an Empire: The United States Army in the Spanish-American War*. Columbia: University of Missouri Press, 1971.
- Cragg, Dan, ed. *The Guide to Military Installations*. 2nd ed. Harrisburg, PA: Stackpole Books, 1988.
- Cutter, Donald C. *California in 1792: A Spanish Naval Visit*. Norman Oklahoma: University of Oklahoma Press, 1990.
- Daniels, Josephus. *The Wilson Era: Years of Peace, 1910-1917*. Chapel Hill: University of North Carolina Press, 1944.
- Dardia, Michael and McCarthy, Kevin. *The Effects of Military Base Closures on Local Communities*. Santa Monica, CA: RAND Co., 1996.
- Davis, Edward J. P. *The United States Navy and U.S. Marine Corps at San Diego*. San Diego: Pioneer, 1955.
- Dawson, Joseph G. *The Late 19th Century US Army, 1865-1898: A Research Guide*. Westport, CT: Greenwood Press, 1990.
- De Areangelis, Mario. *Electronic Warfare: From the Battle of Tsushima to the Falklands and Lebanon*. New York: St Martin's Press, 1991.
- Delgado, James P. *To California By Sea*. Columbia, South Carolina: University of South Carolina Press, 1990.
- Dumke, Glenn S. *The Boom of the Eighties in Southern California*. San Marino, CA: Huntington Library, 1944.
- Dunnigan, James F. and Raymond M. Macedonia. *Getting It Right: American Military Reforms After Vietnam to the Gulf War and Beyond*. New York: William Morrow and Company, 1993.
- Dupuy, R. Ernest, and Trevor N. Dupuy. *Military Heritage of America*. New York: McGraw-Hill Company, 1956.
- Ebbert, Jean and Marie-Beth Hall. *Crossed Currents: Navy Women from WWI to Tailhook*. Washington: Brassey's, 1993.
- Fletcher, Marvin. *The Peacetime Army, 1900-1941: A Research Guide*. New York: Greenwood Press, 1988.
- Floyd, Dale E., comp. *United States Coast Defense, 1775-1950: A Bibliography*. Washington DC: Historical Division, Office of the Chief of Engineers, Government Printing Office, 1985.
- Fogelson, Robert. *Fragmented Metropolis: Los Angeles, 1850-1930*. Cambridge: Harvard University Press, 1967.
- Fowler, Arlen. *Black Infantry in the West, 1869-1891*. Westport, CT: Greenwood Press, 1971.
- Frazer, Robert W. *Forts of the West: Military Forts and Presidios and Posts Commonly Called Forts West of the Mississippi River to 1898*. Norman: University Oklahoma Press, 1963.
- Gebhard, David, and Harriette von Breton. *Los Angeles in the Thirties: 1931-1941*. Los Angeles: Hennessey & Ingalls, Inc. 1989.
- Gellen, Martin. *The History of Urban Planning in the United States*. Chicago: CPL Bibliographies, 1983.

- Goetzmann, William H. *Army Exploration in the American West, 1803-1863*. New Haven: Yale University Press, 1959.
- Gottlieb, Robert, and Peter Wiley. *Empires in the Sun: The Rise of the New American West*. New York: Putnam, 1982.
- Griswold, A. Whitney. *The Far Eastern Policy of the United States*. New Haven: Yale University Press, 1938.
- Groueff, Stephanie. *Manhattan Project*. Boston: Little, Brown, and Company, 1967.
- Hagwood, Joseph J. Jr. *Engineers at the Golden Gate; A History of the San Francisco District, U.S. Army Corp of Engineers, 1866-1980*. San Francisco: U.S. Army Corp of Engineers, San Francisco District. SD D103.2:G56/866-980.
- Harlow, Neil. *California Conquered: The Annexation of a Mexican Period*. Davis: University of California Davis, 1982.
- Hart, Robert A. *The Great White Fleet: Its Voyage Around the World, 1907-1909*. Boston: Little, Brown, and Company, 1965.
- Hedel, Chuck, Christopher Raven, and Butch Ascherman. *Fort Bidwell: The Land, the Indians, the Settlers*. Fort Bidwell: Butch Ascherman, 1981.
- Heilbron, Carl H. *History of San Diego County*. San Diego: San Diego Press Club, 1936.
- Heinl, Robert Debs, Jr. *Soldiers of the Sea: The United States Marine Corps, 1775-1962*. Annapolis: United States Naval Institute, 1962.
- Hewlett, Richard G., and Oscar E. Anderson, Jr. *A History of the United States Atomic Energy Commission*. Volume 1: The New World, 1939-1946. University Park, PA: Pennsylvania State University Press, 1962.
- Higham, Robin. *A Guide to the Sources of United States Military History*. Hamden, CT: Archon Books, 1975. See also *Supplement I* (1981) and *Supplement II* (1986), both edited by R. Higham and Donald J. Mrozek.
- _____. *Air Power: A Concise History*. New York: St. Martin's Press, 1972.
- Hopkins, H. C. *History of San Diego, its Pueblo Lands and Water*. S.l.: S.n, 1929.
- Horne, Kibbey M. *A History of the Presidio of Monterey: 1770-1970*. S.l.:S.n.
- Howeth, Captain L. S., USN. *History of Communications-Electronic in the United States Navy*. Washington, D.C.: Government Printing Press, 1963.
- Huie, William Bradford. *Can Do! The Story of the Seabees*. New York: E.P. Dutton & Co., Inc., 1944.
- Huntington, Samuel P. *The Soldier and the State: The Theory and Politics of Civil-Military Relations*. Cambridge: Belknap Press of Harvard University Press, 1957.
- _____. *The Common Defense: Strategic Programs in National Politics*. New York: Columbia University Press, 1961.
- Huston, James A. *The Sinews of War: Army Logistics, 1775-1953*. Washington, D.C.: Office of the Chief of Military History, 1966.

- Isenberg, Michael T. *Shield of the Republic: The United States Navy in an Era of Cold War and Violent Peace*. Volume 1: 1945-1962. New York: St. Martin's Press, 1993.
- Jackrabbits to Jets: The History of Naval Air Station North Island, San Diego, California, Part I*. San Diego: San Diego Publishing, 1992.
- Johnson, Edward C. *Marine Corps Aviation: The Early Years, 1912-1940*. Washington, D.C.: History and Museums Division, U.S. Marine Corps, 1977.
- Johnson, Kenneth M. *Aerial California: An Account of Early Flight in Northern and Southern California, 1849 to World War I*. Los Angeles: Dawson's Book Shop, 1961.
- Johnson, Robert E. *Thence Round Cape Horn*. Annapolis: United States Naval Institute, 1963.
- Joyce, Barry Alan. *A Harbor Worth Defending: A Military History of Point Loma*. Cabrillo Historical Society, 1995.
- Kemble, John Haskell. *San Francisco Bay: A Pictorial Maritime History*. New York: Bonanza Books, 1979.
- Kettner, William. *Why it Was Done and How*. San Diego: Fry & Smith, 1923.
- Kinder, Frank L., and Philip Neff. *An Economic Survey of the Los Angeles Area*. Los Angeles: Haynes Foundation, 1945.
- King, R. W., Rear Admiral, USN. *Naval Engineering and American Sea Power*. Baltimore: The Nautical & Aviation Publishing Company, 1989.
- Kinnard, Lawrence. *History of the Greater San Francisco Bay Region*. New York: Lewis Historical Publishing Co., 1966.
- Kraft, Herman F., and Walter B. *Sea Power in American History: The Influence of the Navy and Merchant Marine upon American Development*. New York: Century, 120.
- LaFerber, Walter. *The New Empire: An Interpretation of American Expansion, 1860-1898*. Ithaca: Cornell University Press, 1963.
- Lemmon, Sue, and E.D. Wichels. *Sidewheelers to Nuclear Power: A Pictorial History Covering 123 Years at the Mare Island Naval Shipyard*. Annapolis, MD: Leeward Publishing, 1977.
- Lewis, Emanuel Raymond. *Seacoast Fortifications of the United States: An Introductory History*. Annapolis: Naval Institute Press, 1993.
- Liddell-Hart, B. H. *History of the Second World War*. New York: Putnam, 1970.
- Lotchin, Roger W. *Fortress California, 1910-1961: From Warfare to Welfare*. New York: Oxford University Press, 1992.
- _____. *The Martial Metropolis: U.S. Cities in War and Peace*. New York: Praeger, 1984.
- Lott, Arnold S. *A Long Line of Ships: Mare Island's Century of Naval Activity in California*. Annapolis: US Naval Institute, 1954.
- Lynch, John S., John W. Kennedy and Robert L. Wooley. *Patton's Desert Training Center*. Fort Myer, VA: Council on America's Military Past, ca. 1982.

- Macksey, Kenneth. *Tank Warfare: A History of Tanks in Battle*. London: Rupert Hart-Davis, 1971.
- Mahan, A.T., Cpt. *The Influence of Sea Power Upon History, 1660-1783*. Boston: Little, Brown, and Company, 1898.
- Markusen, Ann. *The Rise of the Gunbelt: The Military Remapping of Industrial America*. Oxford: Oxford University Press, 1991.
- Marti, Werner. *Messenger of Destiny, The California Adventures of Archibald Gillespie, 1846-1847*. San Francisco: John Howell, 1960.
- Matloff, Maurice, ed. *American Military History*. Revised edition. Washington, D. C.: US Army, Office of the Chief of Military History, 1973.
- Maurer, Maurer. *Aviation in the US Army: 1919-1929*. Washington, DC: Office of Air Force History, USAF, 1987.
- May, Ernest R. *Imperial Democracy: The Emergence of America as a Great Power*. New York: Harcourt, Brace, and World, 1961.
- Mayo, Elton. *Teamwork and Labor Turnover in the Aircraft Industry of Southern California*. Boston: Harvard University, Bureau of Business Research, [1944].
- McDowell, Don. *The Beat of the Drum: The History, Events and People of Drum Barracks*. Santa Ana: Graphic Publishers, 1993.
- McGloin, John B. *San Francisco: The Story of a City*. San Rafael: Presidio Press, 1978.
- McPhail, Elizabeth C. *The Story of New San Diego and Its Founder, Alonzo E. Horton*. San Diego: Pioneer Printers, 1969.
- McWilliams, Carey. *Southern California Country: An Island on the Land*. New York: Duell, Sloan & Pearce, 1946.
- Miller, Maurice A. *McClellan Air Force Base, 1936-1982*. Sacramento: McClellan Air Force Base, 1982.
- Millett, Allan R. *Semper Fidelis: The History of the United States Marine Corps*. New York: Macmillan Publishing Co., Inc, 1980.
- Millis, Walter. *Arms and Men: America's Military History and Military Policy from the Revolution to the Present*. New York: Capricorn Books, 1956.
- Moskin, Robert J. *The Marine Corps Story*. Boston: Little, Brown, and Company, 1992.
- Mueller, Robert. *Air Force Bases*. "Volume 1: Active Air Force Bases Within the United States of America on 17 September 1982." Washington, DC: Office of Air Force History, USAF, 1989.
- Munro, Dana G. *Intervention and Dollar Diplomacy for the Caribbean, 1900-1921*. Princeton: Princeton University Press, 1964.
- Nash, Gerald D. *The American West in the Twentieth Century: A Short History of an Urban Oasis*. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1973.
- _____. *The American West Transformed: The Impact of the Second World War*. Bloomington: Indiana University Press, 1985.

- _____. *World War II and the West: Reshaping the Economy*. Lincoln: University of Nebraska Press, 1990.
- Nunis, Doyce B., Jr., ed. *Los Angeles and Its Environs in the Twentieth Century*. Los Angeles: Ward Ritchie Press, 1973.
- Parker, James. *The Old Army: Memories, 1872-1918*. Philadelphia: Dorrance, 1929.
- Parrish, Thomas, ed. *The Encyclopedia of World War II*. New York: Simon and Shuster, 1978.
- Parzen, Julia. *The Aerospace Industry in California*. San Francisco: State of California, Office of Economic Policy, Planning, and Research, 1981.
- Paul, Doris A. *The Navajo Code Talkers*. Pittsburgh: Dorrance Publishing Co., Inc., 1973.
- Payne, Walter A., ed. *Benjamin Holt: The Story of the Caterpillar Tractor*. Stockton: University of the Pacific, 1928.
- Peirce, Neal R. *The Pacific States of America: People, Politics and Power in the Five Pacific Basin States*. New York: W.W. Norton, 1972.
- Perret, Geoffrey. *Winged Victory: The Army Air Forces in World War II*. New York: Random House, 1993.
- Pierce, Philip N. and Hough, Frank O. *The Compact History of the United States Marine Corps*. New York: Hawthorn Books, 1964.
- Platt, Fletcher. *Compact History of the United States Navy*. New York: Hawthorne Press, 1962.
- Potter, E.B. *The United States and World Seapower*. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1955.
- Pourade, Richard F. *Gold in the Sun, Volume 5 of The History of San Diego*. San Diego: Union-Tribune Publishing Co., 1965.
- _____. *The Rising Tide, Volume 6 of The History of San Diego*. San Diego: Union Tribune Publishing Co., 1967.
- _____. *City of the Dream, Volume 7 of The History of San Diego*. La Jolla: Copley Press, 1977.
- Rac, John B. *Climb to Greatness: The American Aircraft Industry, 1920-1980*. Cambridge: Mass. Institute of Technology (MIT) Press, 1968.
- Ravenstein, Charles A. *The Organization and Lineage of the United States Air Force*. USAF Warrior Studies. Washington, DC: Office of Air Force History, USAF, 1986.
- Rawlins, Eugene W. *Marines and Helicopter: 1946-1962*. Washington D.C.: History and Museums Division, U.S. Marine Corps, 1976.
- Risch, Erna. *Quartermaster Support of the Army: A History of the Corps, 1775-1939*. Washington, DC: Center of Military History, USA, 1989.
- Roberts, Robert B. *Encyclopedia of Historic Forts: The Military, Pioneer, and Trading Posts of the United States*. New York: Macmillan Publishing Company, 1988.

- Robinson, Douglas H., Charles L. Keller. *Up Ship!: A History of the U.S. Navy's Rigid Airships, 1919-1935*. Annapolis, Maryland: Naval Institute Press, 1982.
- Robinson, Willard B. *American Forts: Architectural Form and Function*. Urbana: University of Illinois Press, 1977.
- Rowland, Buford and William B. Boyd. *US Navy Bureau of Ordnance in World War II*. Washington, DC: GPO, 1953.
- Schwendinger, Robert. *International Port of Call: An Illustrated Maritime History of the Golden Gate*. Woodland Hills, CA: Windsor Publications, 1984.
- Scott, Mel. *The San Francisco Bay Area: A Metropolis in Perspective*. Berkeley: University of California Press, 1985.
- Simpkin, Richard W. *Race to the Swift: Thoughts on Twenty-first Century Warfare*. London: Brassey's Defense, 1985.
- Smith, Merritt R. *War, Business, and American Society: Historical Perspectives on the Military-Industrial Complex*. ed. Benjamin F. Cooling, Port Washington, N.Y.: Kennikat Press, 1977.
- Smith, Richard K. *The Airships Akron and Macon: Flying Aircraft Carriers of the United States Navy*. Annapolis, Maryland: United States Naval Institute, 1965.
- Smith, Vi. *From Jennies to Jets: The Aviation History of Orange County*. Fullerton: Sultana Press, 1985.
- Smyth, Henry de Wolf. *Atomic Energy for Military Purposes: The Official Report on the Development of the Atomic Bomb under the Auspices of the United States Government, 1940-1945*. Princeton: Princeton University Press, 1945.
- Soderbergh, Peter A. *Women Marines: The World War II Era*. Westport, Connecticut: Praeger Publishers, 1992.
- Spinardi, Graham. *From Polaris to Trident: The Development of the US Fleet Ballistic Missile Technology*. Cambridge: Cambridge University Press, 1994.
- Starr, Kevin. *Material Dreams: Southern California Through the 1920s*. New York: Oxford University Press, 1990.
- _____. *The Dream Endures: California Enters the 1940's*. New York: Oxford University Press, 1997.
- Steiner, George A. *National Defense and Southern California, 1961-1970*. Los Angeles: Committee for Economic Development, 1961.
- Tate, Michael L. "The Multi-Purpose Army on the Frontier: A Call for Further Research," in Ronald Lora, ed., *The American West: Essays in Honor of W. Eugene Hollon*, 171-208. Toledo: University of Toledo, 1980.
- Terrett, Dulany. *The Signal Corps: The Emergency*. Washington, DC: Office of the Chief of Military History, Department of the Army, 1956.
- Thompson, Erwin N. *The Guns of San Diego: San Diego Harbor Defenses, 1796-1947*. Historic Resources Study, Cabrillo National Monument. San Diego: National Park Service, 1991.
- _____. *The Rock: A History of Alcatraz Island, 1847-1972: Historic Resource Study, Golden Gate National Recreation Area*. National Park Service, Denver Service Center, nd.

- _____. *Seacoast Fortifications, San Francisco Harbor, Golden Gate National Recreation Area, California*. Historic Resources Study, Denver Service Enter. S.I.: National Park Service, 1979.
- Thompson, George Raynor, Dixie R. Harris, Pauline M. Oakes, and Dulany Terrett. *The Signal Corps: The Test*. Washington, DC: Office of the Chief of Military History, Department of the Army, 1957.
- Thompson, Gerald. *Edward F. Beal & the American West*. Albuquerque: University of New Mexico Press, 1983.
- Todd, Daniel. *Defense Industries: A Global Perspective*. London: Routledge, 1988.
- _____. *Navies and Shipbuilding Industries: The Strained Symbiosis*. Westport, CN: Praeger, 1996.
- Turhollow, Anthony F. *A History of the Los Angeles District, US Army Corps of Engineers, 1898-1965*. Los Angeles: LAD, USACE, 1975.
- United States Air Force. *The Aircraft Industry*. Photo Industrial Study No. 5. [Washington, DC]: United States Forces, [1945].
- U.S. Arms Control and Disarmament Agency. *World Military Expenditures and Arms Trade 1963-1973*. Washington, DC: U.S. Government Printing Office, 1975.
- _____. *World Military Expenditures and Arms Trade 1973-1983*. Washington, DC: U.S. Government Printing Office, 1985.
- _____. *World Military Expenditures and Arms Trade 1984-1994*. Washington, DC: U.S. Government Printing Office, 1995.
- Utley, Robert M. *Frontier Regulars: The United States Army and the Indians, 1866-1890*. New York: Macmillan, 1973.
- _____. *Frontiersmen in Blue: The United States Army and the Indians, 1848-1865*. New York: Macmillan, 1967.
- Walker, M. *The Cold War*. New York: Henry Holt & Company, 1994.
- Weber, David J. *New Spain's Far Northern Frontier: Essays on Spain in the American West*. Albuquerque: University of New Mexico Press, 1979.
- Webster, Julie. *Searching the Skies: The Legacy of the United States Defense Radar Program*. Air Force Headquarters, Air Combat Command, 1997.
- Weighley, Russell F. *History of the United States Army*. New York: MacMillan Co., 1967.
- Weigley, Russel F. *History of the United States Army*. Bloomington: Indiana University Press, 1984.
- Whitehurst, Clinton H. *The United States Shipbuilding Industry*. Annapolis: Naval Institute Press, 1986.
- Winter, Robert. *The California Bungalow*. Los Angeles: Hennessey & Ingalls, 1980.
- Witty, Robert M. and Neil Morgan. *Marines of the Margarita: The Story of Camp Pendleton and the Leathernecks who Train on a Famous Rancho*. San Diego: Frye and Smith, 1970.
- Wolf, R. I. *The US Air Force: Basic Documentation on Roles and Missions*. Washington, DC: Office of Air Force History, 1987.

Woodbridge, Sally. *California Architecture: Historic American Buildings Survey*. San Francisco: Chronicle Books, 1988.

Wooster, Robert. *The Military and United States Indian Policy, 1865-1903*. New Haven: Yale University Press, 1988.

Yenne, B. *The History of the United States Air Force*. New York: Exeter Books, 1984.

York, Herbert. *Race to Oblivion: A Participant's View of the Arms Race*. New York: Simon and Schuster, 1970.

Zinn, Howard. *Postwar America: 1945-1971*. Indianapolis: Bobbs-Merrill, 1973.

Articles, Theses, Papers, Speeches, etc.

Air Power Disbursement Maps. *San Francisco Chronicle* (June 29, 1941).

Allen, Thomas Lee. "Aerospace Cutbacks: Impact on the Companies and Engineering Employment in Southern California." Ph.D. diss. Massachusetts Institute of Technology, 1972.

"Army Housing: A National Disgrace." *Literary Digest* 95 (November 5, 1927): 10-11

Auster, Bruce B. "Uncle Sam's Fire Sales: The Scramble for Ways to Use California's Closing Military Bases." *U.S. News and World Report* 118 (January 9, 1995): 28.

Bartel, Brad. "Archaeological Excavation and Education at the San Diego Royal Presidio, 1987-1990." *Journal of San Diego History*, 37, No. 1, Winter 1991.

Bartlett, Tom. "Coronado: Landing Force Training." *Leatherneck* 65 (July 1982): 38-41

_____. "Posts of the Corps: Barstow, CA." *Leatherneck* 66 (April 1983): 34-39.

_____. "Posts of the Corps: MCAS El Toro, CA." *Leatherneck* 66 (May 1983): 34-39.

_____. "Posts of the Corps: Lemoore, CA." *Leatherneck* 64 (August 1981): 26-31.

_____. "Posts of the Corps: Twenty-Nine Palms, CA." *Leatherneck* 66 (February 1983): 16-21.

_____. "A School for all Seasons: Pickel Meadows, CA." *Leatherneck* 64 (July 1981): 34-39.

Beigel, Harvey M. "The Battle Fleet Home Port, 1919-1940." *U.S. Naval Institute Proceedings* III (March 1985): 54-63.

Brubaker, Sterling J. "The Impact of Federal Government Activities on California's Economic Growth." Ph.D. diss. University of California, Berkeley, 1959.

Butowsky, Harry A. "Vandenberg Air Force Base." *Spacework* 1289 (January 1988): 29.

"California Air Power Map." *San Francisco Chronicle* 152 (June 29, 1941): 2

Campbell, Leon G. "The Spanish Presidio in Alta California During the Mission Period , 1769-1784." *Journal of the West*, 16, 1977.

- Campbell, Scott. "The Transformation of the San Francisco Bay Area Shipping Industry and Its Regional Impacts." Working Paper. Institute of Urban and Regional Development, University of California, Berkeley: 1986.
- Campbell, Scott. "National Defense Migration: Labor Migration in the United States During the Second World War." *Annals of Regional Science*. (1990).
- Cathcart, Commander William L. "The Achievements of Naval Engineering in this War." *Journal of the American Society of Naval Engineers* 31 (February 1919): 16.
- Chiles, James R. "The Ships that Broke Hitler's Blockade." *Invention and Technology* (Winter 1988).
- Clayton, James. "Defense Spending: Key to California's Growth." *Western Political Quarterly* 15 (1962): 280-93.
- Clayton, James L. "The Impact of the Cold War on the Economies of California and Utah, 1945-65." *Pacific Historical Review* 36 (November 1967).
- "Contrasts in Navy Missile Testing and Evaluation." *Naval Research Reviews* 14 (December 1963): 18-20.
- Crump, Jeffrey R. "Spatial and Temporal Patterns of Military Prime Contract Awards in the United States, 1941-1944 and 1951-1985." *Growth and Change* 20: 50-62.
- Dales, Douglas. "State Sets Drive for US Contracts." *New York Times* (April 18, 1959): 1.
- Darlington, David. "Grab All You Can; the Army Declares War on the Mojave Desert." *Sierra* 82:4 (July-August 1997): 24.
- "Debate Surrounds Presidio's Future." *National Parks* 68 (January-February 1994): 10.
- Deems, Clarence. "Should Our Harbor Defenses Be Controlled by the Navy?" *United Service N.S.* 7 (January 1892): 58-67.
- Duvall, Lucille Clark. "San Diego's Dynamic Congressman." *Journal of San Diego History* 25 (Summer 1979): 191-207.
- Elliott, Arlene. "The Rise of Aeronautics in California, 1849-1940." *Southern California Historical Quarterly* 52 (March 1970): 1-32.
- "End of Plant Dispersal Asked." *New York Times* (April 4, 1958): 36.
- Evans, Gy Sgt. "Posts of the Corps: Camp Pendleton, CA." *Leatherneck* 55 (February 1971): 26-31.
- Field, Edward. "Our Coast Defenses." *United Service* 3 (January 1890): 1-10; (February 1890): 164-78.
- Findley, James. "The Economic Boom of the 1920's in Los Angeles." Ph.D. diss., Claremont Graduate School, 1958.
- Fredericks, Edward H.C. Captain, USN RET. "The US Navy in San Diego Prior to World War II." 1979. (MS. on file with the San Diego Maritime Museum.)
- Gary E. *Building American Submarines, 1914-1940*. Washington, D.C.: Naval History Center, 1991.
- Gertcher, Franklin L. "Military Family Housing Compared to Private Housing: Alternate Amounts of Housing Service Consumption." *Review of Social Economy* 41. (October 1983.)

- Gordon, Martin K. "The Marines Have Landed and San Diego is Well in Hand: Local Politics and Naval Base Development." Paper delivered to 13th Annual Military History Conference, Boston, Mass. April 28, 1979.
- Gray, A. A. "Camels in California." *California Historical Society*, IX.4. (December 1930).
- Greene, Francis V. "Our Defenseless Coast." *Scribner's Magazine* 1 (January 1887): 51-66.
- Griffin, Eugene. "Our Sea-Coast Defense." *Journal of the Military Service Institution* 7 (December 1886): 405-65.
- _____. "Our Sea-Coast Defenses." *North American Review* 147 (July 1888): 64-75.
- Hains, Peter C. "Should the Fixed Coast Defenses of the United States be transferred to the Navy?" *Journal of the Military Service Institution* 15 (March 1894): 233-56.
- Hamburger, Kenneth E. "The Technology, Doctrine, and Politics of U.S. Coast Defenses, 1880-1945: A Case Study in U.S. Defense Planning." Ph.D. diss. Duke University, 1986.
- Hawthorne, Harry L. "Our Coast Defense." *Journal of the Military Service Institution* 18 (May 1896): 693-94.
- Hennessey, Greg. "San Diego, the US Navy, and Urban Development: West Coast City Building, 1912-1929." *California History* (Summer 1993).
- Hersum, Leroy. "Protective Designs for Airports." *Civil Engineering* 10 (1940): 764-767.
- Hunt, Fred. "Yerba Buena Island Naval Training Station." *Overland Monthly*, XLII, 1913.
- James, Larry. "Posts of the Corps: Santa Ana, CA." *Leatherneck* 57 (September 1974): 24-29.
- _____. "Posts of the Corps: Bridgeport, CA." *Leatherneck* 57 (September 1974): 26-31.
- Kettner, William. "The Army and Navy's Conquest of San Diego." *San Diego Magazine* (November 1927): 3.
- Kirchner, D.P., and Lewis, E.R. "American Harbor Defenses: The Final Era." *United States Naval Institute Proceedings* 94:1 (1968): 84-98.
- Kitfield, James. "Going Private." *National Journal* 27:45 (Nov 11, 1995): 2792.
- _____. "Baseless Concerns." *National Journal* 29:15 (April 12, 1997): 703.
- Koistinen, Paul A.C. "The 'Industrial-Military Complex' in Historical Perspective: The Inter War Years." *Journal of American History* 55 (1970): 819-839.
- Letts, Truman. "San Francisco Looks Ahead." *California Magazine of the Pacific*. 35:9 (September 1945): 27-29.
- Levenson, Leonard. "Wartime Development of the Aircraft Industry." *Monthly Labor Review* 59 (November 1944): 919.
- Liebert, Larry. "Base-Closing Roulette." *California Journal* 24 (April 1993): 48.
- "Live By the Sword, Die By the Sword: California." *Economist* 326:7802 (March 13, 1993): A32.
- Lively, Bruce R. "Naval and Marine Corps Reserve Center Los Angeles." *Southern California Quarterly* (Fall 1987): 241-273.
- "Loring, Charles C. "American Combat Airdromes." *Architectural Record* 45 (April 1919): 311-24.

- Lotchin, Roger W. "The City and the Sword in Metropolitan California, 1919-1941." *Urbanism Past and Present* 7 (Summer/Fall 1982): 1-16.
- _____. "The City and the Sword: San Francisco and the Rise of the Metropolitan Military Complex, 1919-1941." *Journal of American History* 65 (March 1979): 996-1020.
- _____. "The Metropolitan Military Complex in Comparative Perspective: San Francisco, Los Angeles, and San Diego, 1919-1941." *Journal of the West* 18 (July 1979): 19-30.
- _____. "The Political Culture of the Metropolitan-Military Complex." *Social Science History* 16 (Summer 1992): 25-99.
- _____. "The Darwinian City: The Politics of Urbanization in San Francisco Between the World Wars." *Pacific Historical Review* 48 (August 1979): 363.
- "The Mare Island Navy Yard." *Scribner's Monthly*. 3 (April 1872): 641-650.
- Markusen, Ann R., et. al. "Military Spending and Urban Development in California." *Berkeley Planning Journal* 1 (1985a): 54-68.
- "The McClellan Factor." *Economist* 336:7923 (July 15, 1995): 17.
- McFie, Maynard. "Pinning Faith to a Growing Harbor," *Southern California Business* 3:1 (February 1924): 70-78.
- McKee, Bradford. "Military Base Conversions; Architects Begin Returning Sequestered Defense Complexes to their Urban Surroundings." *Architecture* 83 (August 1994): 99.
- McWilliams, C. "Boom Nobody Wanted." *New Republic* (June 30, 1941):
- "Megabuck for Defense." *Plowshare Press* (March-April, 1984.)
- Menken, Arthur. "Why Navy's Missile Range is Ready to Grow." *Armed Forces Management* (November 1958): 10-11.
- Miles, Nelson A. "Our Coast Defense." *Forum* 24 (January 1898): 513-19.
- Moore, Jamie W. "National Security in the American Army's Definition of Mission, 1865-1914." *Military Affairs* 46 (October 1982): 127-31.
- Morin, Howard E. "Uncle Sam Builds a Naval Base." *San Diego Business* (August 1925) 7.
- "Navy's Importance in San Diego Increases 50%." *San Diego Magazine* (November 1927): 18-19.
- "The Navy's Relationship to San Diego's Business." *San Diego Magazine* (February 1930): 7-11.
- Oliver, Richard P. "Increase in Defense-Related Employment During Viet Nam Buildup." *Monthly Labor Review* (February 1970): 3-10.
- Ordano, Jo-Ann. "Changing of the Guard." *National Parks* 67 (March-April 13): 30.
- Palmer, Elizabeth A. "Building Barracks; Housing Troops and Storing Weapons is Parochial Work Conducted in the Shadow of the Grander Debate over Pentagon Spending." *Congressional Quarterly Weekly Report* 49:49 (December 7, 1991): 119.

- Paxson, Fredric. "The Naval Station at Alameda, 1916-1940." *Pacific Historical Review* 13 (September 1944): 236-250.
- _____. "Opponents Lose Final Bid to Save Installations." *Congressional Quarterly Weekly Report* 49:31 (August 3, 1991): 2190.
- Pearson, Clifford A. "Case Study: Reinventing Alameda." *Architectural Record* 181 (October 1993) 98.
- "Plant Dispersal Plan Scored." *New York Times* (March 13, 1958): 8.
- "Reconversion in the San Francisco Bay Area." *Downtowner* (September 12, 1945).
- Rhode, Paul. "The Aircraft Industry in California." Paper presented to the Triangle Area Economic History Workshop. November 5, 1990.
- Richardson, Herb. "Posts of the Corps: Barstow, CA." *Leatherneck* 62 (December 1979): 40-43.
- Richardson, Herb. "Posts of the Corps: San Diego MCRD." *Leatherneck* 62 (March 1979): 34-41.
- Rolle, Andrew. "Regulars in the Redwoods: The U.S. Army in Northern California, 1852-1861." *Pacific Historical Review* 64:4 (November 1995): 617.
- Sample, Herbert A. "Downsizing California Military-Industrial Complex." *California Journal* 56 (September 1995): 39.
- Schulimson, Jack. "Military Professionalism: The Case of the Marine Officer Corps, 1880-1898" *Journal of Military History* 60 (April 1996): 231-242.
- Schulimson, Jack. "Daniel Pratt Mannix and the Establishment of the Marine Corps School of Application, 1889-1894" *Journal of Military History* 55 (October 1991): 469-484.
- Scott, Allen J. "The Aircraft and Parts Industry in Southern California: Continuity and Change from the Inter-War Years to the 1990s." *Economic Geography* 65 (January 1989).
- Shragge, Abraham. "A New Federal City: San Diego during World War II." (Fortress California at War: San Francisco, Los Angeles, Oakland, and San Diego, 1941-1945) *Pacific Historical Review* 63:3 (August 1994): 333.
- Smalley, H.A. "A Defenseless Sea-Board." *North American Review* 138 (March 1884): 233-45.
- Soja, Edward W., Rebecca Morales, and Goetz Wolff. "Urban Restructuring: An Analysis of Social and Spatial Change in Los Angeles." *Economic Geography* 59 (1983): 195-230.
- Sorenson, David Scott. "A Multi-Method Analysis of Defense Policymaking: Military Construction Expenditures, 1963-1971." Ph.D. diss. University of Denver, 1977.
- Southwick, George N. "Our Defenseless Coasts." *North American Review* 162 (March 1896): 317-27.
- Thompson, PL. "Posts of the Corps: San Diego, CA." *Leatherneck* 65 (November 1982): 38-41.
- _____. "Posts of the Corps: Moffett Field, CA." *Leatherneck* 66 (March 1983): 34-37.
- Tilsner, Julie. "Under the Gun." *Business Week* 3322 (June 7, 1993): 40.
- Tilton, L. Deming. "San Francisco Plans its Future." *California Magazine of the Pacific*. 33 (December 1943): 15.

- Wadsworth, Cmdr. A. S. C. "Rockets and Guided Missiles: A Comparison of Past and Present Types." *CEC Bulletin* (July 1948): 183-188.
- Wagner, Arthur L. "The Military Necessities of the United States and the Best Provision of Meeting Them." *Journal of the Military Service Institution* 5 (September 1884): 237-71.
- Wagner, Ray. "San Diego and Aviation." *Journal of the West* 30 (January 1991): 80.
- Warner, Gary A. "Casualty of Peace; the Construction Industry is the First Major Casualty of O.C. Base-Closure Plans," *The Orange County Register*, October 28, 1993, p.1.
- "Wartime Expansion of the California Airframe Industry" *Monthly Labor Review* 61 (October 1945): 721-727.
- Weiss, R. A. "The Story of Yerba Buena." *Sunset Magazine*, XI. 1903.
- Welling, Alvin C. "Constructing Missile Bases." *Army Information Digest* 16 (April 1961): 40-47.
- Wells, Henry P. "The Defense of Our Sea-Ports." *Harper's Monthly* 71 (November 1885): 927-37.
- Wheaton, Lt. Col., Francis Wheaton. "The Architecture of the Army Posts." *Quartermaster Review*. September-October 1928.
- White, Douglas. "Boy Blue Jackets of Yerba Buena." *Sunset Magazine*, XI. 1903.
- Whitehead, Richard S. "Alta California's Four Fortresses." *Southern California Quarterly* (Spring 1983):67.
- Wilburn, James Richard. "Social and Economic Aspects of the Aircraft Industry in Metropolitan Los Angeles During World War II." Ph.D. diss. University of California at Los Angeles. 1971.
- Winslow, Eben E. "Notes on Seacoast Fortification." Occasional Papers No. 1, Engineer School, United States Army. Washington, DC: Government Printing Office, 1920.
- Young, James. O. "The Golden Age at Muroc-Edwards." *Journal of the West* 30 (January 1991): 69.

Government Reports

- Annual Report of the Navy Department for the year 1921.*
- Annual Report of the Navy Department for the year 1925.*
- Association of Bay Area Governments. *Regional Plan 1970-1990: San Francisco Bay Region*. Berkeley: S.N., 1970.
- California Employment Development Department. *Summary of Employment: Aerospace, California and Areas, Part B, 1949-1971* Sacramento. 1976.
- California, Office of Economic Policy, Planning, and Research. *The Effect of Increased Military Spending in California*. Sacramento: Department of Economic and Business Development. 1982.
- Center for Air Force History. *Coming in from the Cold: Military Heritage in the Cold War*. Washington, DC: USAF, Center for Air Force History, 1994.

- California State Reconstruction Reemployment Commission. *Richmond, California: A City Earns the Purple Heart, A Report ...* Sacramento: 1944.
- City of Los Angeles. Bureau of Community Analysis. *The Economic Development of Southern California, 1920-76*. Los Angeles: City of Los Angeles, 1976.
- City of Los Angeles. Chamber of Commerce. Industrial Department. "The Basis of the Los Angeles Metropolitan Economy." By Dr. D. F. Pegrum. n.d.
- City of San Diego. Chamber of Commerce. Committee for Economic Development. "Blueprinting San Diego's Future." July 7, 1944.
- _____. "Post War San Diego: Report of the Temporary Post War Plans Committee." December 3, 1942.
- City of San Diego. Office of the Mayor. Planning Department. "The Responsibility of the Federal Government in the Transition from War to Peace." n.d.
- City of San Diego. San Diego Harbor Department. *The Port of San Diego: The Southwest Terminal for Navigation, Transportation and Aviation. Naval Operating Base*. San Diego: S.n., 1928.
- _____. *The Port of San Diego: Harbor and Industrial Data*. Various years.
- City of San Francisco. Postwar Planning Committee. "Report to Mayor Roger Latham." August 20, 1945.
- City of Vallejo. Board of Planning Commissioners. *Master Plan*. San Francisco: 1945.
- Committee on Naval Affairs, Report, H. Doc. 41, 64:1. 1961.
- Memoranda of the Navy-Yard Commission, 6 June 1883, Sen. Doc. 1, 48th Congress, 1st Session.
- United States. Bureau of Labor Statistics. *Impact of the War on the San Diego Area: Working Notebook*. Washington, DC: Bureau of Labor Statistics, 1944.
- United States. Congress. Joint Committee on Pacific Naval Base Sites. *Report of the Joint Committee: Naval Base, San Francisco Bay*. 64th Cong., 2nd sess. Washington, DC: GPO, 1921.
- United States. Senate. Post War Economic Policy and Planning, Hearings before a Subcommittee of the Special Senate Committee on Post-War Economic Policy and Planning. S. Res. 102. 78th Cong., 1st sess. 1943.
- United States. War Department. "Post and Harbor Defenses Near San Diego: Letter from the Acting Secretary of War." 52d Cong., 1st Sess., House, Ex. Doc no. 14. 1891.

ARCHITECTURAL HISTORY

Books

- Billings, John S. *A Report on Barracks and Hospitals, with Descriptions of Military Posts*. Washington: GPO, 1870.
- Brice, Martin H. *Stronghold, A History of Military Architecture*. New York: Schocken Books, 1985.
- Bruce, Alred, and Harold Sandbank. *A History of Prefabrication*. New York: John D. Peirce Foundation, 1944.

- Craig, Lois. *The Federal Presence: Architecture, Politics, and National Design*. Cambridge: MIT Press, 1994.
- _____. *The Federal Presence: Architecture, Politics, and Symbols in United States Government Building*. Cambridge: MIT Press, 1978.
- Fine, Lenore and Jesse A. Remington. *The Corps of Engineers: Construction in the United States, vol. 6, part 6, vol. 3, in U.S. Army in World War II*. Washington: GPO, 1972.
- Garner, John. *World War II Temporary Military Buildings: A Brief History of the Architecture and Planning of Cantonments and Training Stations in the United States*. Champaign, IL: US Army Construction Engineering Research Laboratory, 1990.
- Gebhard, David. "The Spanish Colonial Revival in Southern California." *Journal of the History of Architectural Historians* 26:2 (March 1967).
- Grashof, Bethany C. *A Study of United States Army Family Housing, Standardized Plans, 1866-1940. Vol. 1*. Atlanta: Center for Architectural Conservation, College of Architecture, Georgia Institute of Technology, 1986.
- Great Lakes Steel Corporation, Stran-Steel Division. *Quonset Building Manual*. Detroit: Great Lakes Steel Corp., n.d.
- Hughes, Quentin. *Military Architecture*. London: Hugh Evelyn, 1974.
- Kilner, W.G. and A.J. MacElroy. *The Cantonment Manual*. New York: D. Appleton and Co., 1918.
- Manning, John J. *Building the Navy's Bases in World War II: History of the Bureau of Yards and Docks and the Civil Engineering Corps, 1940-1946*. Washington: GPO, 1947.
- Peltier, Eugene J. *The Bureau of Yards and Docks of the Navy and the Civil Engineering Corps*. Princeton: The Newcomen Society, 1939.
- Wasch, Diane Shaw, Perry Bush, Kieth Landreth, and James Glass. *World War II and the US Army Mobilization Program: A History of the 700 and 800 Series Cantonment Construction*. Washington, DC: US Department of Defense Legacy Management Program, USDI NPS Historic American Building Survey (HABS)/Historic American Engineering Record (HAER), 1992.

Architectural History Articles, Theses, Papers, Speeches, etc.

- "A Building Every 54 Minutes at Fort Ord," *Engineering News-Record*, 126 (March 1941) p 75-76.
- "A Thousand Buildings in Five Months." *Engineering News-Record* 126 (March 1941): 72-75.
- "Army Housing: A National Disgrace." *Literary Digest* 95 (November 5, 1927): 10-11.
- Bash, Brig. Gen. Louis H. "Construction -- Present and Future." *Quartermaster Review* (November-December 1929).
- Beardslee, Clarence G. "Development of Army Camp Planning." *Civil Engineering* 12 (September 1942).
- "Blimp Hangars Set New Timber Arch Record." *Engineering News-Record* (October 22, 1942).
- Bowers, N. A. "New Barrack(s) Design Saves Lumber." *Engineering News-Record* 133 (November 1944): 68-69.
- "Building for Defense." *Architectural Forum* 74 (April 1941): 16, 94.

- Chambers, Lt. Col. John S. "Quarters for Our Army." *Quartermaster Review* (March-April 1928).
- Coast Defense Study Group. "The Harbor Defenses of San Diego: Summary Histories and Reports of Completed Works." Tenth Annual Meeting of the Coast Defense Study Group, August 15-18, 1992.
- Combs, Lewis B. "Functions of the Civil Engineer Corps in the Naval Establishment." *Civil Engineering* 12 (June 1942): 320-323.
- "Hospitals In Wartime: Emergency Hospitals for the U.S. Navy." *Architectural Record* 92 (August 1942): 59-60.
- "Erect Company Barracks in Three Hours." *Engineering News-Record* 79 (September 1917): 614.
- "5,000 Houses in 5 Months." *Engineering News-Record* 129 (August 1942) 80-85.
- Ford, George B. "New Army Posts for Old." *Quartermaster Review* (November-December 1929).
- "Glued, Laminated Wood Arches for Defense Projects." *Engineering News-Record* 130 (April 1943): 513.
- Horton, Brig. Gen. William E. "The Work of the Construction Service, Quartermaster Corps." *Quartermaster Review* (September-October 1928).
- "Housing the Army." *Federal Architect* (July 1937).
- "Housing the Navy Ashore." *Engineering News Record* 79 (July 1917): 4-7.
- "Housing the New Army." *Engineering News-Record* 125 (October 1940): 43-47.
- Langelier, John Philip and Daniel Bernard Rosen. "Historic Resource Study: El Pueblo de San Francisco, a History Under Spain and Mexico, 1776-1846." National Park Service, Golden Gate National Recreational Area, 1992.
- Manning, J.J. "Work of the Civil Engineer Corps of the Navy." *Civil Engineering* 12:2 (February 1942), 73-76.
- "Military and Naval Buildings." *Architectural Forum* 70 (November 1940): 342-71.
- Morell, Ben. "The Bureau of Yards and Docks." *The Military Engineer* 35 (July 1943): 345.
- "Navy Camp Contracts Let." *Engineering News-Record* 79 (July 1917): 93.
- "Navy Goes Into Action on Housing." *Engineering News Record* (October 1940): 40-42.
- Neuhaus, Herbert M. "Fifty Years of Naval Engineering In Retrospect: Part III, 1908-1921." *Journal of the Society of Naval Engineering* (November 1938): 540-557.
- _____. "Fifty Years of Naval Engineering In Retrospect: Part IV, 1921-1938." *Journal of the Society of Naval Engineering* (November 1938): 540-557.
- Nurse, 1st Lieut. H. B. "The Planning of Army Posts." *Quartermaster Review* (September-October 1928).
- Pitz, Lt. Col. Hugo E. "Construction Activities of the Quartermaster Corps." *Quartermaster Review* (January-February 1936).
- "Plan to Hold 1943 Building to Two-Thirds of 1942 Rate." *Engineering News-Record* 129(October 1942): 1-2.

“Plans for Army’s Big Training Camps Made Public.” *Engineering News-Record* 79 (July 1917) 8-10.

“War-Front Type Barracks Built in Record Time.” *Engineering News Record* 129 (July 1942): 68-69.

Yachnis, Michael. “fifty-year Development of Naval Facilities Construction,” *Journal of the Construction Division, ASCE* 101 (March, 1975).

Government Reports

Activities of the Bureau of Yards and Docks, Navy Department, World War, 1917-1918. Washington: GPO, 1921.

Activities of the Bureau of Yards and Docks, Navy Department, World War, 1941-45. Washington: GPO, 1947.

Advisory Council on Historic Preservation. *Balancing Historic Preservation Needs with the Operation of Highly Technical or Scientific Facilities.* Washington, DC: Advisory Council on Historic Preservation (ACHP), 1992.

_____. With the National Park Service. *Identification of Historic Properties: A Decision-Making Guide for Managers.* Washington, DC: ACHP, 1988.

_____. With the GSA Interagency Training Center. *Introduction to Federal Project and Historic Preservation Law: Participant’s Course Book.* Washington, DC: ACHP, 1995.

_____. *Public Participation in Section 106 Review: A Guide for Agency Officials.* Available upon request from the ACHP, 1100 Pennsylvania Avenue NW1, Washington, DC 20004.

_____. *Section 106, Step-by-Step.* [Washington, DC]: ACHP, 1986.

_____. With the National Park Service. *The Section 110 Guidelines: Annotated Guidelines for Federal Agency Responsibilities under Section 110 of the National Historic Preservation Act.* Washington, DC: ACHP, 1988.

United States. Department of the Interior. National Park Service. *National Register Bulletin 15: Guidelines for Applying National Register Criteria for Evaluation.* Washington, DC: NPS, 1982.

_____. *National Register Bulletin 16A: How to Complete the National Register Registration Form.* Washington, DC: NPS, 1991.

_____. *National Register Bulletin 22: Guidelines for Evaluating and Nominating Properties that Have Achieved Significance within the Last 50 Years.* Washington, DC: NPS, 1982.

_____. *Secretary of the Interior’s Standards for Rehabilitation with Illustrated Guidelines for Rehabilitating Historic Buildings.* Washington, DC: GPO, 1992.

_____. Corps of Engineers. *Construction in the United States.* Washington DC. GPO, 1972

_____. Navy Department. *Activities of the Bureau of Yards and Docks, Navy Department: World War, 1917-1918.* Washington, DC: GPO, 1921.

_____. United States. Navy. *Building the Navy’s Bases in World War II: History of the Bureau of Yards and Locks and the Civil Engineer Corps.* Washington, DC: GPO, 1947.

_____. *150 Years of Doing it Right: The Bureau of Yards and Docks, The Naval Facilities Engineering Command, 1842-1992*. Washington DC: GPO, 1992.

US Naval Administration in World War II: DCNO (AIR) Aviation Shore Establishments, 1911-1945. Navy Department Library.

US Naval Administration in World War II: Administrative History, Eleventh Naval District. Washington, DC: Naval History Center.

Archival Material

Pendleton Papers, PC 136. History and Museums Division, Marine Corps, Washington D.C.

Records of the Army Air Forces. RG 18. National Archives and Records Administration, Washington, D.C. Central Decimal Files, Project Files. March Field, 1917-1938. Central Records, File No. 600. San Nicolas Island.

Records of the Bureau of Yards and Docks. RG 71. National Records Center, Suitland, Maryland. Contracts, 1917-1925. Entry 43. General Correspondence Files, Shore Establishments, 1918-1925. Naval Property Case Files, 1941-1958.

Records of the Bureau of Aeronautics. RG 72. National Archives and Records Administration, Washington, D.C. Confidential Correspondence, 1922-1944. General Correspondence, 1943-1945.

Records of the Office of the Chief of Engineers. RG 77. National Archives and Records Administration, Washington, D.C. Historical Record of Buildings and Records of Equipment and Condition of Buildings at Active Army Posts, 1905-1942. Military Post Completion Reports. 1926-1940. Entry 393.

Records of the Office of the Quartermaster General. RG 92. National Records Center, Suitland, Maryland. Construction Division, Completion Reports. 1917-1919. General Correspondence, Geographic File. 1922-1935. Entry 1891.

Records of the Judge Advocate (Navy). RG 175. National Archives and Records Administration, Washington, D.C. Court of Inquiry, Case 7038.

Records of the Naval Districts and Shore Establishments. RG 181. National Archives and Records Administration Records Center, San Bruno, CA. Correspondence, 1854-1910. Entry 168. 11th ND Commandant's Office, General Correspondence, 1924-1955.

Records of the Naval Districts and Shore Establishments. RG 181. National Archives and Records Administration Records Center, Laguna Niguel, CA. Central Subject Files, 1946-1958. 11th Naval District, District Planning Officer, General Correspondence, 1925-1952. 11th ND Commandant's Office, General Correspondence, 1924-1955. Naval Petroleum Reserves

MISSILE/SPACE TECHNOLOGIES

Books

Adams, Gordon and David Gold. *Defense Spending and the Economy: Does the Defense Dollar Make a Difference?* Washington, D.C.: Budget Project, 1987.

Alward, Maurice and John W. R. Taylor. *ABC Rockets & Missiles*. London: Ian Allan, 1960.

- Anderton, David A. *Strategic Air Command: Two Thirds of the Triad*. New York: Charles Scribner's Sons, 1976.
- Arnett, Eric H. *Sea-Launched Cruise Missiles and U.S. Security*. New York: Praeger, 1991.
- Baar, James, and William E. Howard. *Polaris!* New York: Harcourt, Brace and Company, 1960.
- Barnett, Haynes, Barnett. *Travis Air Force Base: Small Arms Ammunition Building, Elevations, Details and Plans*. San Francisco: Barnett, Haynes, Barnett, Inc. June 1952.
- Bergaust, Erik. *Rockets of the Navy*. New York: GP Putnam's Sons, 1959.
- Betts, Richard K, ed. *Cruise Missiles: Technology, Strategy, and Politics*. Washington, D.C.: Brookings Institution, 1981.
- Blake, Bernard, ed. *Jane's Weapon Systems, 1987-1988*. London: Janes Publishing Co., Ltd., 1988.
- Boyer, P. *By the Bomb's Early Light: American Thought and Culture at the Dawn of the Atomic Age*. London: University of North Carolina Press, new preface, 1994.
- Bureau of Naval Personnel. *Principles of Guided Missiles and Nuclear Weapons*. Washington, D.C.: Government Printing Office, 1989.
- Burrows, William E. *Deep Black: Space Espionage and National Security*. New York: Random House, 1986.
- Caidin, Martin. *Rockets and Missiles, Past and Future*. New York: McBride, 1954.
- Christman, Albert B. *Sailors, Scientists, and Rockets: Origins of the Navy Rocket Program and of the Naval Ordnance Test Station, Inyokern*. Washington, D.C.: U.S. Government Printing Office, 1971.
- Colby, Carrol B. *Our Space Age Navy: Carriers, Aircraft, Submarines, and Missiles*. New York: Coward-McCann, Inc., 1962.
- Crockatt, R. *The Fifty Years War: The United States and the Soviet Union in World Politics, 1941-1991*. Routledge, London, and New York. 1995.
- Dalglish, D. Douglas, and Larry Schweikart. *Trident*. Carbondale: Southern Illinois University Press, 1984.
- Difilippo, Anthony. *From Industry to Arms: The Political Economy of High Technology*. New York: Greenwood Press, 1990.
- Edwards, John. *Superweapon: The Making of MX*. New York: W. W. Norton and Co., 1982.
- Emmc, Eugene M., cdt. *The History of Rocket Technology: Essays on Research, Development and Unity*. Detroit: Wayne State University Press, 1964.
- Epley, William E. *America's First Cold War Army, 1945-1950*. Arlington: Association of the United States Army, 1993.
- Feldbaum, Carl B. and Ronald J. Bee. *Looking the Tiger in the Eye: Confronting the Nuclear Threat*. New York: Harper and Row, 1988.
- Fox, J. Ronald. *Arming America: How the U.S. Buys Weapons*. Cambridge: Harvard University, 1974.
- Friedman, Norman. *U.S. Naval Weapons*. Annapolis: Naval Institute Press, 1988.

- Gatland. *Development of Guided Missile*. London: Illife & Sons, Ltd., 1954.
- Gerrard-Gough, J. D., and Albert B. Christman. *The Grand Experiment at Inyokern: Narrative of the Naval Ordnance Test Station During the Second World War and the Immediate Postwar Years*. Washington, D.C.: U.S. Government Printing Office. 1978.
- Goodwin, Jacob. *Brotherhood of Arms: General Dynamics and the Business of Defending America*. New York: Times Books, 1985.
- Gold, David, Christopher Paine, and Gail Shields. *Misguided Expenditure: An Analysis of the Proposed MX Missile System*. New York: Council on Economic Priorities, 1981.
- Goldman, Eric F. *The Crucial Decade - And After: America, 1945-1960*. New York: Vintage Books, 1960.
- Graebner, Norman A. *Cold War Diplomacy: American Foreign Policy 1945-1960*. New York: Van Nostrand, 1962.
- Gross, C. J. *Prelude to the Total Force: The Air National Guard, 1943-1969*. Office of Air Force History, Washington, D.C.
- Halperin, Morton H., Jacob A. Stockfish, and Murray L. Weidenbaum. *The Political Economy of the Military-Industrial Complex*. Berkeley: University of California at Berkeley, 1973.
- Hansen, Chuck. *U.S. Nuclear Weapons: The Secret History*. New York: Orion Books, 1988.
- Hartmann, Frederick H. *Naval Renaissance: The U.S. Navy in the 1980s*. Annapolis: Naval Institute Press, 1990.
- Hewlett, Richard G. and Francis Duncan. *Nuclear Navy, 1946-1962*. Chicago: University of Chicago Press, 1974.
- Hewlett, R. G., and O. E. Anderson. *A History of the United States Atomic Energy Commission: Atomic Shield, 1947/1952*. University Park: Pennsylvania State University Press, 1969.
- Howard, William E. and James Baar. *Spacecraft and Missiles of the World, 1966*. New York: Harcourt, Brace & World, Inc., 1966.
- Isenberg, Michael T. *Shield of the Republic; The United States Navy in an Era of Cold War and Violent Peace, 1945-1962*. New York: St. Martin's Press, 1993.
- Jockel, J. T. *No Boundaries Upstairs: Canada, the United States, and the Origins of North American Air Defense, 1945-1958*. Vancouver: The University of British Columbia Press, 1987.
- Jasani, Bhupendra and Toshibomi Sakata, ed. *Satellites for Arms Control and Crisis Monitoring*. New York: Oxford University Press, 1987.
- Kaplan, Fred. *The Wizards of Armageddon*. Stanford: Stanford University Press, 1991.
- Korb, Edward L., ed. *The World's Missile Systems*. California: General Dynamics, Pomona Division, 1982.
- Lonnquest, John and David Winkler. *To Defend and Deter: The Legacy of the Army and Air Force Guided Missile Programs [Draft] 1996*. Manuscript on file at U.S. Army Construction Engineering Research Laboratories, Champaign, IL.
- Luttwak, Edward and Stewart L. Koehl. *The Dictionary of Modern War*. New York: Harper Collins, 1991.

- MacKenzie, Donald A. *Inventing Accuracy: A Historical Sociology of Nuclear Missile Guidance*. Cambridge: MIT Press, 1990.
- Merkley, Jeffrey A. *Trident II Missiles: Capability, Costs, and Alternatives*. Washington, D.C.: Government Printing Office, 1986.
- Mickelson, Roger W. *Theater Cruise Missile: Concepts and Considerations*. Newport: U.S. Naval War College, 1979.
- Neufeld, Jacob. *The Development of Ballistic Missiles in the United States Air Force, 1945-1960*. Washington, D.C.: Government Printing Office, 1990.
- Newhouse, John. *War and Peace in the Nuclear Age*. New York: Alfred A. Knopf, 1989.
- Nicholas, Ted and Rita Rossi. *U.S. Historical Military Aircraft and Missile Data Book*. Fountain Valley, CA: Data Search Associates, 1991.
- Oliver, James K. and James A. Nathan. *The Future of United States Naval Power*. Bloomington: Indiana University Press, 1979.
- Peebles, Curtis. *Battle for Space*. New York: Beaufort Books, Inc., 1983.
- Polmar, Norman. *Strategic Weapons: An Introduction*. Revised Edition. New York: Crane, Russak and Company, Inc., 1982.
- Polmar, Norman and Thomas B. Allen. *Rickover*. New York: Simon and Schuster, 1982.
- Pretty, Ronald, ed. *Janes Pocket Book of Missiles*. London: Mac Donald and Jane's, 1978.
- Richelson, Jeffrey T. *America's Secret Eyes in Space: The U.S. Keyhole Spy Satellite Program*. New York: Harper & Row, 1990.
- Sapolsky, Harvy M. *The Polaris System Development: Bureaucratic and Programmatic Success in Government*. Cambridge: Harvard University Press, 1972.
- Scarboro, C. W. *Twenty Years in Space: The Story of the United States' Spaceport*. Cape Canaveral, FL: Scarboro Publications, 1969.
- Schaffel, K. *The Emerging Shield: The Air Force and the Evolution of Continental Air Defense, 1945-1960*. Washington, D.C.: Office of Air Force History, 1995.
- Schapiro, Ray. *ABC's of Missile Guidance*. New York: Howard W. Sams & Company, 1962.
- Schwiebert, Ernest G. *A History of the U.S. Air Force Ballistic Missiles*. New York: F. A. Praeger, 1965.
- Sorrels, Charles A. *U.S. Cruise Missile Programs: Development, and Implications for Arms Control*. New York: McGraw-Hill, 1983.
- Travis Air Force Base. *Travis Air Force Base, the Gateway to the Pacific*. San Diego: MARCOA Publishing Inc., 1993.
- United States Department of the Interior, National Park Service. *Man in Space: Study of Alternatives*. Washington, D.C.: Department of the Interior, 1987.

- United States. Controller General. *Status of the Trident Submarine and Missile Programs*. Washington, D.C.: Government Printing Office, 1977.
- United States. House of Representatives. Armed Services Committee. *The Trident II Strategic Weapons System: A Program Review*. Washington, D.C.: U.S. Government Printing Office, 1988.
- United States. General Accounting Office. *The Navy's Submarine Launched Ballistic Missile Force is Highly Ready: Report to Congress*. Washington, D.C.: General Accounting Office, 1978.
- United States Navy. *Ordnance Systems Command*. NAVORD OP 3594, Surface Missile Systems. Washington D.C.: Ordnance Systems Command, 1970.
- United States Navy. Bureau of Naval Personnel. *Principles of Guided Missiles and Nuclear Weapons*. Washington, D.C.: United States Navy, 1969.
- United States Navy. Surface Missiles System Project. *SMS Navy Surface Missiles Systems*. Washington, D.C.: Government Printing Office, 1965.
- Von Braun, Wernher, and Frederick I. Ordway III. *History of Rocketry & Space Travel*. London: Thomas Nelson, Inc., 1966.
- Werrell, Kenneth P. *The Evolution of the Cruise Missile*. Maxwell AFB: Air University Press, 1985.
- White, Maxwell. *An Interpretive History of the Pacific Missile Test Center*. Point Mugu: Naval Air Warfare Center Weapons Division, 1992.
- _____. *Datelines: A History of Navy Missile Testing at Point Mugu, California*. Point Mugu: Naval Air Warfare Center Weapons Division, 1992.
- _____. *Days of Challenge/Years of Change: A Technical History of the Pacific Missile Test Center*. Washington, D.C.: U.S. Government Printing Office, 1989.
- Whinkler, Alan M. *Life Under a Cloud: American Anxiety About the Atom*. New York: Oxford University Press, 1993.
- Whitfield, S.J. *The Culture of the Cold*. Baltimore: Johns Hopkins University Press, 1991.

Articles

- "AF Group Prepares, Equips ICBM Sites." *Aviation Week and Space Technology* (September 1961): 150-59.
- "Air Force Plans to Begin Stacking Solid Motor Segments at Vandenberg." *Aviation Week & Space Technology* (February 17, 1986): 27-28.
- "Air Force Presses to Mothball Vandenberg Shuttle Complex." *Aviation Week & Space Technology* (July 28, 1986): 16-17.
- Aldbridge, Robert C. "The Blueprint for the Trident: The Ultimate First-Strike Weapon." *Nation*, 4 (February 1978): 111-14.
- _____. "Cruise Missiles: More Pentagon Mischief." *Nation* (June 14, 1975).
- _____. "Trident: American Roulette." *Nation* (November 22, 1975): 531-32.

- _____. "The Trident Fiasco: Obstacles on the Way to Doomsday." *Nation* (August 16, 1975): 115-16.
- "All-SAC Crew Fires Initial Atlas ICBM." *Aviation Week* (September 14, 1959): 32.
- Andrews, Walter. "Air Force to Develop New ICBM Silo." *Aviation Week & Space Technology* (January 15, 1968): 14-15.
- "Antiship Missiles and Surface Vessels." *NATO's Fifteen Nations*, 20 (February-March 1975): 101-03.
- "Atlas Ground Support Equipment Installed." *Aviation Week* (April 4, 1960): 70.
- "Atlas ICBM Geared to Total Deployment." *Aviation Week and Space Technology* (September 25, 1961): 143-49.
- "Bids Sought to Build Atlas Silo." *Aviation Week* (September 14, 1959): 27.
- "Bigger Role for Military in Space." *U.S. News & World Report* (April 26, 1976): 86-87.
- Blair, Clay, Jr. "Our Hottest New Weapon: The Missile Launching Submarine." *Saturday Evening Post*, 22 (February 1958): 36+.
- Braybrook, Roy. "Air-to-Surface Missiles." *Military Technology* (June 1982): 13-15+
- Brown, David A. "Navy Stresses Carrier Missile Systems." *Aviation Week and Space Technology* (February 5, 1973): 20-21.
- Burke, Gerald K. "The Need for Trident." *U.S. Naval Institute Proceedings* (November 1978): 32-41.
- _____. "The Trident Missile: America's Future Deterrent." *U.S. Naval Institute Proceedings* (March 1980): 131-134.
- Clark, David G. "Cruise Missiles: Offensive-in Breadth Added to Defense in Depth." *Naval War College Review*, 30 (Winter 1978): 64-69.
- Eliot, Christian. "Ship-to-Ship Missiles." *U.S. Naval Institute Proceedings* (November 1972): 108-14.
- Elson, Benjamin M. "Western Shuttle Facility Plan Changed." *Aviation Week & Space Technology* (March 5, 1978): 40-42.
- Fahrney, Delmar S. "The Birth of Guided Missiles." *U.S. Naval Institute Proceedings* (December 1980): 54-60.
- Glawin, Sidney W. "Missile Armament for the FPB." *U.S. Naval Institute Proceedings* (March 1970): 111-13.
- "GAO Study Supports Need for SCL-6 Facility." *Aviation Week & Space Technology* (December 15, 1986): 25.
- Gettings, Hal. "Navy Saves Money on Missile Tests." *Missiles and Rockets* (November 2, 1959).
- Halbrook, M.E. "Rocket-Firing Submarines." *U.S. Naval Institute Proceedings* (January 1951): 46-51.
- Hughes, W.R. "By the Rocket's Red Glare: Inyokern." *U.S. Naval Institute Proceedings* (November 1949): 1206-15.
- Johnsen, Katherine. "USAF Promises House Committee Action on Missile Base Problems." *Aviation Week* (March 6, 1961): 30.

- Johnson, Paul G. "Tomahawk: The Implications of Strategic/Tactical Mix." *U.S. Naval Institute Proceedings* (April 1982): 26-33.
- Kozicharow, Eugene. "Six Year Program Will Modify Minuteman Launch, Control Facilities." *Aviation Week & Space Technology*. (February 4, 1985): 93.
- Marriot, John. "Naval Missiles." *International Defense Review*, 3 (1969): 245-48.
- Meller, R. "The Harpoon Missile." *International Defense Review*, 8 (February 1975): 61-66.
- Miller, B.W. "Harpoon Antiship Missile Development to Accelerate." *Aviation Week and Space Technology* (January 4, 1971): 18-19.
- _____. "Improved Reliability of Missiles a Primary Aim of the Navy." *Aviation Week and Space Technology* (January 31, 1977): 164-167+.
- "Military Use of Space: What Top Powers are Doing and Not Doing." *U.S. News & World Report* (June 23, 1969): 10.
- "Minuteman II Emplacement Cost to Top \$1 Billion." *Missile and Rockets* (May 24, 1965): 12-13.
- "New Missile Test Range." *Naval Aviation News* (August 1949).
- "New MX Facilities Developed at Vandenberg AFB." *Aviation Week & Space Technology* (March 8, 1982): 46.
- "New Pad for the Space Shuttle." *Time* (March 5, 1984): 40-42.
- Norman, Lloyd. "The Shipborne Missile." *Ordnance* (March-April 1957): 799-802.
- Prina, L. Edgar. "Tomahawk: The Greatest Change in the Role of Navies that has Ever Occurred." *Sea Power*, 24 (October 1981): 68+.
- Raborn, William F. "The Polaris Missile." *Ordnance* (July-August 1959): 44-48.
- _____. "Rocketry in the '50s: A Navy within a Navy." *Astronautics and Aeronautics*, 10 (October 1972): 63-65.
- Reed, William S. "Vandenberg Trains USAF Missile Crews." *Aviation Week* (October 26, 1959): 69-87.
- Robinson, Clarence A. "USAF Beginning ICBM Modernization." *Aviation Week & Space Technology* (August 29, 1983): 18-19.
- Robinson, Clarence A. Jr. "Navy Spurs Cruise Missiles Pace." *Aviation Week and Space Technology* (November 24, 1975): 12-15.
- _____. "Navy to Act on Cruise Missiles." *Aviation Week and Space Technology* (August 13, 1973): 12-15.
- _____. "Single Cruise Missile Set for Varied Use." *Aviation Week and Space Technology* (February 1975): 19-21.
- _____. "Tomahawk Clears Crucial Test." *Aviation Week and Space Technology* (November 22, 1976): 14-16.
- Rosenberg, D. A. "U.S. Nuclear Stockpile, 1945-1950." *Bulletin of the Atomic Scientists*. Vol. 38. (May 1982): 25-30.

- “Shuttle Facility Completion at Vandenberg Postponed.” *Aviation Week & Space Technology* (September 20, 1982): 108-13.
- Smith, Bruce A. “Space Shuttle Launch Support Equipment Installed at Vandenberg.” *Aviation Week & Space Technology*. (December 10, 1984): 52-53.
- Smith, Bruce A. “USAF Prepares West Coast Site for Space Shuttle Processing.” *Aviation Week & Space Technology* (May 5, 1986): 42-51.
- Smith, Levering. “All Eyes Focus on the Navy’s Poseidon Missile.” *Navy* (December 1966): 24-27.
- “Spaceport West.” *Aviation Week & Space Technology* (April 14, 1986): 11.
- Stone, Irving. “Work Begins on First IRBM-ICBM Base.” *Aviation Week* (May 27, 1957): 68-69.
- Sweeney, Richard. “Ground Support Stresses Silos, Hard Site.” *Aviation Week* (March 7, 1960): 135-39.
- “The Space Shuttle and Vandenberg Air Force Base.” *Space World* (February 1977): 29-36.
- “Third Atlas Radio Guidance Site Now Operational.” *Aviation Week* (November 21, 1960): 27.
- “Thor Launching Site at VAFB Becomes Operational.” *Aviation Week* (December 29, 1958): 46-47.
- “Trident Missile Capabilities Advance: A Special Report.” *Aviation Week and Space Technology* (June 16, 1980): 91-93.
- “USAF Inspecting Vandenberg Launch Facilities.” *Aviation Week & Space Technology* (September 3, 1984): 46.
- “USAF May Gain Stronger Role in Space: Proposed Change Would Give Development of Payloads Almost Exclusively to Air Force; Army, Navy, Object.” *Aviation Week* (March 6, 1961): 26-28.
- “USAF Plans Six Hardened Atlas Sites.” *Aviation Week* (February 22, 1960): 54-55.
- “Vandenberg Coordinates Ballistic Effort.” *Aviation Week and Space Technology* (September 25, 1961): 179-83.
- “Vandenberg Shuttle Complex Will Go into Mothball Status.” *Aviation Week & Space Technology* (May 2, 1988): 27 & 31.
- “Vandenberg Shuttle Facilities Blocked.” *Aviation Week & Space Technology* (June 23, 1980): 171-74.
- Whitmore, William F. “The Origin of Polaris.” *U.S. Naval Institute Proceedings, 106* (March 1980 vol. 106/3/925): 55-59.
- Yaffee Michael. “Missile Support Becomes Prime Cost Item.” *Aviation Week* (April 4, 1960): 65-70.

Unpublished Manuscripts/Dissertations

- Bruins, Berend D. “U.S. Naval Bombardment Missiles, 1940-1958: A Study of the Weapons Innovation Process.” Ph.D. diss., Columbia University 1981.
- “Command History, Naval Weapons Center, China Lake, CA,” 1959-1970. Washington, D.C.: Naval Historical Center, Operational Archives Branch.

“Command History, U.S. Naval Air Missile Test Center, Point Mugu, CA,” 1953-1966. Washington, D.C.: Naval Historical Center, Operational Archives Branch.

Miscellaneous

Buss, L. H. *Fifteen Years of Air Defense*. NORAD Historical Reference Paper No. 5. ADC, Ent AFB, Colorado. Archived at the HRA, Maxwell AFB, Alabama.

Earl and Wright. *Beale, Mather, and Travis Air Force Bases, California; Compressed Air Additions to SAC Missile Facilities, Site Plan Travis Air Force Base*. San Francisco: Earl and Wright, Inc., 1961. On File at the Engineering Office, Travis AFB, California.

Homffman, A. M. *History of Headquarters Air Material Command Participation in the Atomic Energy Program*. Air Material Command, Wright-Patterson AFB, Ohio. January-June. Archived at the HRA Maxwell AFB, Alabama. (Note: Title/author/date, unclassified; document contains restricted data; remains classified. Essential for infrastructure information pertinent to Q Areas.

King, Gregory. “Naval Supply Center, Oakland, Historic Architecture Survey Report, Part VII. E., IV-Ala-880.” Caltrans. August 1990.

King, Gregory. “Oakland Army Base, Part VII, D, Historic Architectural Survey Report IV, Ala-880.” August 1990.

Loving, B. “History of Travis AFB.” Speech delivered at Mitchell Library, Travis AFB, May 28, 1986, on file at Solano County Library, Fairfield, CA.

McMullen, R. F. *Interceptor Missiles in Air Defense*. Air Defense Command Historical Study No. 30. Archived at the HRA Maxwell AFB, Alabama.

McMullen, R. F. *An Overview of Air Defense Command Weapons, 1946-1972*. Air Defense Command History. Archived at the HRA Maxwell AFB, Alabama.

National Park Service. *Minuteman Missile Sites: Management Alternatives Environmental Assessment*. National Park Service, Denver. Submitted to the Department of Defense United States Air Force Legacy Resource Management Program.

Ray, T. W. *The Air National Guard Manned Interceptor Force, 1946-1964*. Air Defense Command Historical Study No. 23. Archived at the HRA, Maxwell AFB, Alabama.

Snow, C. E. *Travis AFB. 40 Years on Active Duty*. Travis AFB Historical Society. On file at the Environmental Management Office, 60th Air Mobility Wing, Travis AFB, California.

Strobel and Salzman. *Hanger Readiness with Shops Optional Construction*. Stroble & Salzman: New York, April 1954. On file at the Engineering Office, Travis AFB, California.

U.S. Army Corps of Engineers, Sacramento District. *Travis Air Force Base. AAA Tactical Facilities*. U.S. Army Corps of Engineers, Sacramento. February 1955. On file at the Engineering Office, Travis AFB, California.

USAF, Air Defense Command. *History of Air Defense Command. Air National Guard. Vol. 4 and 5*. July 1947 and November 1948. Archived at the HRA, Maxwell AFB, Alabama.

- USAF, Air Defense Command. *History*. March 1946 and June 1947, Air Defense Command. November 1948. Ent AFB, Colorado. Archived at the HRA, Maxwell AFB, Alabama.
- USAF, Air Defense Command. *History of Air Defense Command*. Air Defense Command, ENT AFB, Colorado. January - June 1961. Archived at the HRA, Maxwell AFB, Alabama.
- USAF, Air Defense Command. *History of Air Defense Command*. Air Defense Command, ENT AFB, Colorado. January - June 1966. Archived at the HRA, Maxwell AFB, Alabama.
- USAF. *History of the First Air Force*. Historical Branch, First Air Force, Fort Slocum, New York, 1946. Archived at the HRA, Maxwell AFB, Alabama.
- USAF. *History of the First Air Force*. Historical Branch, First Air Force, Fort Slocum, New York, 1947. Archived at the HRA, Maxwell AFB, Alabama.

Section 106 Documents

- Butowsky, Harry A. *Man in Space: National Historic Landmark Theme Study*. Washington, D.C.: Department of the Interior, 1984.
- Cardwell, Kenneth. *Historical Survey of Mare Island Naval Complex, Final Report*. Berkeley: Migheto and Youngmeister, 1985.
- Center for Air Force History. *Coming in from the Cold: Military Heritage in the Cold War*. Washington, D.C.: Center for Air Force History, 1994.
- Dames & Moore. "Historic Architectural Study of Beale Air Force Base, Yuba County, California." 1994.
- Department of the Navy. "Phase I Cultural Resource Survey for Fleet Industrial Supply Center, Long Beach and Cold War Era Building Survey for Long Beach Naval Shipyard." January 1997.
- Environmental Research Archaeologists. "A Cultural Resource Reconnaissance and Overview, Fort Hunter Liggett, California." 1978.
- Garner, John S. *World War II Temporary Military Buildings: A Brief History of the Architecture and Planning of Cantonments and Training Stations in the United States*. USACERL Technical Report CRC-93/01, 1993.
- Goodwin, R. Christopher. *Navy Cold War Guided Missile Context: Resources Associated with the Navy's Guided Missile Program, 1946-1989*. Prepared by Goodwin & Associates for US Navy, Atlantic Division, Naval Facilities Command, 1995.
- Jackson Research Projects. "Maintenance-Management Guide to Lighter-Than-Air Hangers MCAS, Tustin." February 1991.
- Jackson Research Projects. "The Presidio of Monterey." National Register Inventory and Evaluation, 1985.
- JRP Historical Consulting Services. "Before the Navy: A Contextual Overview of Naval Air Weapons Station, China Lake Kern, Inyo, and San Bernardino Counties, California Prior to its Acquisition by the U.S. Navy." 1997.
- _____. "Cultural Resource Inventory and Evaluation Investigations: Yerba Buena Island and Treasure Island Naval Station, Treasure Island, California." January 1997.

- _____. "Guide to Preserving the Character of the Naval Air Station, Alameda Historic District." April 1997.
- _____. "Historic American Buildings Survey. Naval Supply Annex, Stockton." HABS No. CA-2682. 1997.
- _____. "Historic American Buildings Survey, Point Molate Naval Fuel Depot, Richmond, California." 1996.
- _____. "Historic American Engineering Record: Salinas Dam." February 1997.
- _____. "Historic Context for Evaluating Buildings, Structures, Historic Archeological Sites and Landscape features at Mare Island, Vallejo, California." November 1995.
- _____. "Historic Context for Evaluating Buildings and Structures in the Ranges, Naval Air Weapons Station, China Lake." September 1997.
- _____. "Historic Context and Inventory and Evaluation of Buildings and Structures, Hunters Point Shipyard, San Francisco, California." July 1997.
- _____. "Inventory and Evaluation of Cold War-Era Buildings at NAWS China Lake, California." 1996.
- _____. "Inventory and Evaluation of Cold War and Selected other Buildings and Structures, Naval Weapons Support Facility, Seal Beach, Detachment Concord." June 1998.
- _____. "Maintenance Plan for Historic Buildings and Structures: Naval Air Station North Island, San Diego, California." April 1995.
- _____. "Marine Corps Recruit Depot Historic District: Nomination for Listing in the National Register of Historic Places." 1990.
- _____. "The Navy's Pacific Guided Missile Sea Range 1946-1991: Historic Context for Cold War-Era Buildings and Structures at Naval Air Weapons Station Point Mugu." February 1997.
- _____. "National Register Evaluation and Nomination: Mare Island Naval Shipyard, Vallejo, California." Tetra Tech, for Engineering Field Authority West, U.S. Navy. 1996.
- _____. "National Register Nomination: Santa Margarita Ranch, Camp Pendleton, San Diego County, California." 1993.
- _____. "National Register Form for March Field Historic Nomination." April 1992.
- _____. "Summary Report on Historical Significance and Historic Preservation Management for the March Field Historic District." 1992.
- JRP Historical Consulting Services and Far Western Anthropological Research Group. "Naval Air Station Lemoore, Historic and Archeological Resources Protection (HARP) Plan, 1997-2002." February 1997.
- Landmark 129, Fort Tejon, October 1954.
- Landmark 169, Drum Barracks. 1935.
- Landmark 317, Fort Jones. July 12, 1939.
- Landmark 349, Camp Independence (Fort). October 9, 1939.

Landmark 379, Fort Reading. January 3, 1944.

Landmark 430, Fort Bidwell. March 16, 1949.

Landmark 482, Fort Wright. November 9, 1950.

Landmark 544, Fort Ter Wer. January 27, 1956.

Landmark 806, Fort Yuma. June 28, 1965.

PAR Environmental Services, Inc. "National Register of Historic Places Evaluation of 12 Buildings on Hamilton Army Air Field, Marin County, California." June 26, 1991.

"Phase I Cultural Resource Survey for Fleet Industrial Supply Center, Long Beach and Cold War Era Building Survey for Long Beach Naval Shipyard." January 1997.

Pigniolo, Andrew and Christy Dolan. "Cultural Resource Inventory of the Weapons Impact Scoring Set (WISS) Project, Naval Air Facility, El Centro, Imperial County, California. July 1997.

Prichard, William E. "Preliminary Archeological Investigations at El Casillo, Presidio of Monterey, Monterey, California." Central Archeological Foundation, 1968.

"Presidio of San Francisco, National Historic Landmark District." Prepared by the National Park Service, 1992.

Roberts, Lois J., and Jack L. Zahniser. "Cultural Resources: Literature Search and Overview, Fort Ord, California. nd.

The Terre Group. "Architectural and Historical Significance of Selected Buildings at the Naval Training Center, San Diego, California." February 1993.

Thompson, Erwin. "Historic Resource Study, Seacoast Fortifications, San Francisco Harbor, Golden Gate National Recreation Area, California. National Park Service, 1979.

_____. "Presidio of San Francisco: An Outline of its Evolution as a U.S. Army Post, 1847-1990." National Park Service, Denver Service Center. 1992.

NEWSPAPERS

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