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## **National Historic Context for DoD Installations, 1790-1940, Volume II**

R. Christopher Goodwin and Associates, Inc.

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Baltimore District**

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**NATIONAL HISTORIC CONTEXT FOR  
DEPARTMENT OF DEFENSE INSTALLATIONS, 1790 - 1940**

**Volume II of IV**

**August 1995**

**R. Christopher Goodwin and Associates, Inc.  
337 East Third Street  
Frederick, Maryland 21701**

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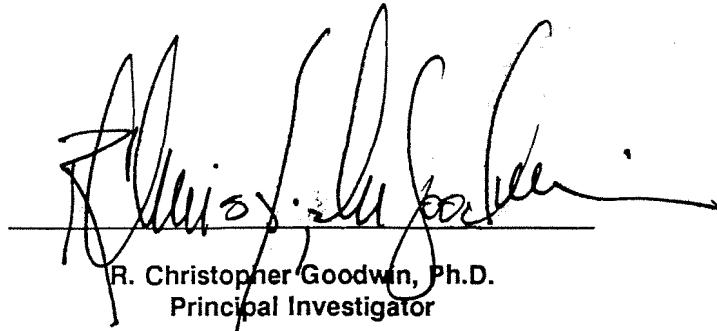
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P.O. Box 1715  
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NATIONAL HISTORIC CONTEXT FOR  
DEPARTMENT OF DEFENSE INSTALLATIONS, 1790 - 1940

FINAL REPORT



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## INTRODUCTION TO PART III - PROPERTY TYPES

The *National Historic Context for Department of Defense (DoD) Installations, 1790 - 1940* is a Legacy Program demonstration project designed to assist the Department of Defense in executing its responsibilities for cultural resources under the National Historic Preservation Act of 1966, as amended, applying the Secretary of the Interior's Standards for Preservation Planning and the guidelines of the National Register of Historic Places. The purpose of the project is to examine the complex historical and architectural relationships among DoD construction on a nationwide basis to provide comparative information on the historic significance of military construction in the contiguous United States between 1790 and 1940.

The National Military Context integrates the three components of an historic context - time period, geographic area, and theme. The overall study is organized into five sections:

- Part I - Chronological Overview;*
- Part II - Theme Studies;*
- Part III - Property Types;*
- Part IV - Installation Site Reports; and,*
- Part V - National Register Nomination forms.*

**Part III - Property Types** is presented in the following section. This section identifies groups of properties that share common physical and associative characteristics. The analysis of property types identified ten major categories of buildings typically found on pre-1940 military installations:

- Chapter 1: Administration
- Chapter 2: Communications
- Chapter 3: Education
- Chapter 4: Health Care
- Chapter 5: Industrial
- Chapter 6: Infrastructure
- Chapter 7: Recreation/Social/Cultural/Religion
- Chapter 8: Research and Development
- Chapter 9: Residential
- Chapter 10: Transportation

These categories correspond to the National Register program's system for classifying properties by historic function. The categorization of buildings by property type helps to link historic properties to historic contexts and aids the comparison of related historic properties.

Each major category of property types is divided into sub-categories that describe specific building types, such as barracks, hangars, or stables. The sub-categories include descriptions of the property type, a summary of the historical evolution of the property type, discussion of historical associations, and guidance on assessing the integrity of examples of the property type.

The categories of property types are related to the historic functions of buildings on military installations, not to their current uses. For example, comparative information for a building that was built as a barracks, but now serves as an office, is located in Chapter 9, Residential.

Facilities that currently are managed by the Air Force are discussed under the Army and Army Air Corps sections of each sub-category, since during the time period included in this study, pre-1940, what later became the Air Force was under the War Department.

Property types that display a great degree of variation and individuality, such as research facilities, are discussed briefly, since few generalizations are possible for facilities that were designed for site-specific purposes. Other examples of property types display great consistency nationwide and are discussed in more detail.

The *Property Types* are cross-referenced with the *Chronological Overview* and *Theme Studies* in the accompanying matrix (Table III-1). This matrix provides a guide to identifying the chronological periods and themes most closely associated with specific types of properties. Each installation site report in *Part IV - Installations Site Reports* lists the property types identified at that installation. This information enables comparison among specific buildings and installations.

TABLE III-1. INDEX OF PROPERTY TYPES WITH CHRONOLOGICAL OVERVIEW AND THEMES.			PROPERTY TYPES									
			Administration	Communication	Education	Health Care	Industrial	Infrastructure	Recreation/Social/Cultural/Religion	Research and Development	Residential	Transportation
CHRONOLOGICAL OVERVIEW	1790-1860	Army	•				•				•	
		Navy and Marine Corps	•			•	•				•	
	1860-1890	Army	•		•	•	•				•	•
		Navy and Marine Corps	•		•	•	•				•	
	1890-1918	Army	•	•	•	•	•				•	•
		Navy	•		•	•	•		•		•	
		Marine Corps	•		•						•	
	1918-1940	Army	•	•	•	•	•	•	•	•	•	•
		Army Air Corps	•	•	•	•	•	•	•	•	•	•
		Navy	•	•	•	•	•	•			•	•
		Marine Corps	•		•	•		•	•		•	•
	THEMES	Communications		•						•		
Education				•								
Medicine					•							
Planning and Architecture		•		•	•	•	•	•		•	•	
Technology						•			•		•	
Transportation											•	



**CHAPTER 1**  
**ADMINISTRATION**  
**Fire Stations**

**Description**

The fire station housed fire fighting equipment to protect military installations from the threat of fire. Building size varied depending on the size of the installation and type of fire fighting technology. Examples of fire stations include one- and two-story buildings. A characteristic architectural feature of all fire stations is the large door openings that accommodated the fire fighting apparatus, first wagons and later trucks. Fire stations constructed before 1917 contained hose towers that projected above the roof and were used to dry the cotton fire hoses. During the 1930s, hose drying areas were incorporated into the interior of the building, which eliminated the exterior towers. When electric dryers were installed, the need for the hose tower was eliminated entirely. All fire stations identified during this study were of masonry construction.

**Evolution**

Army and Army Air Corps

Fire stations evolved as a separate property type during the late nineteenth century and reflected the development fire fighting technology. At temporary cantonments, soldiers used buckets of water or sand to fight fires. By 1876, the Quartermaster Department provided fire extinguishers as part of general provisions.<sup>1</sup> The consolidation of troops into larger, more substantial installations during the 1880s and 1890s required the Quartermaster Department to plan for fire emergencies. With more buildings to protect, the Quartermaster Department acquired fire fighting equipment and designed buildings to house it. The earliest Quartermaster-standardized plans for a separate firehouse date from 1894.<sup>2</sup> These fire stations were small buildings with a hose tower and two major door openings (Figure III-1). Larger installations often had two or more of these small firehouses to provide adequate protection in an era of fire fighting equipment drawn by horse or human power. A one-story firehouse contained only the fire fighting apparatus, while two-story buildings also contained personnel quarters for personnel on the upper floor.<sup>3</sup> The two-story firehouse was constructed from the late nineteenth century through the 1930s.

In 1916, the Quartermaster Department issued a standardized plan that combined the functions of fire station and guardhouse.<sup>4</sup> This combination became the prevalent design during the late 1920s and the 1930s. During the 1930s, the Army introduced motorized fire fighting equipment and consolidated fire stations at central locations on installations. Often the fire station commanded a prominent location at the junction of major streets. During the widespread rebuilding of Army posts and airfields during the 1930s, the fire station became a major element of the overall installation plan and reflected the installation's architectural character (Figure III-2).

Navy and Marine Corps

Fire stations appeared at naval shipyards during the late nineteenth century. This development reflected post-Civil War improvements in fire fighting techniques and equipment and the increased risk of fire at Navy yards. As yards were upgraded and expanded to accommodate

steel warships, modern ship production and repair processes increased the threat of fire. Consequently, Navy engineers began to plan for fire emergencies. Portsmouth Navy Yard had a fire station by 1880. Navy fire stations generally were placed in a location that did not interfere with construction and repair of ships, but was close enough to the shops to be useful in an emergency. As with most construction at Navy yards, fire stations reflected contemporary and regional architectural trends and are not standardized buildings (Figure III-3).

With the construction of permanent on-shore training facilities and air stations during the twentieth century, the Navy began to construct complete complexes using a single contemporary architectural style. On these installations, the fire station was included in the installation master plan and reflected the architectural character of the installation (Figure III-4).

Marine Corps reservations during the nineteenth century were located on naval installations and were comprised generally of a barracks, officer housing, and support buildings. The neighboring shipyard or station supplied other necessary support functions, such as fire protection. Not until the twentieth century, when the Marine Corps began to operate separate installations, were fire stations constructed at Marine Corps installations.

### **Association**

Fire stations are associated with the development and modernization of permanent military installations, starting in the late nineteenth century. Fire stations located on installations established before the Civil War probably were added during the late nineteenth century. During the twentieth century, fire stations became a standard feature of military installations. Often fire station design reflects the military's adaptation of contemporary architectural styles to installation construction.

Fire stations are support facilities for an installation, and are not related directly to the installation mission. Fire stations generally are not associated with significant historical events and usually do not possess individual historical significance, but can be a contributing building to an historic district. If the building has a prominent location in the overall plan of the installation, it can be a major architectural element that contributes to the architectural character of the installation.

### **Integrity**

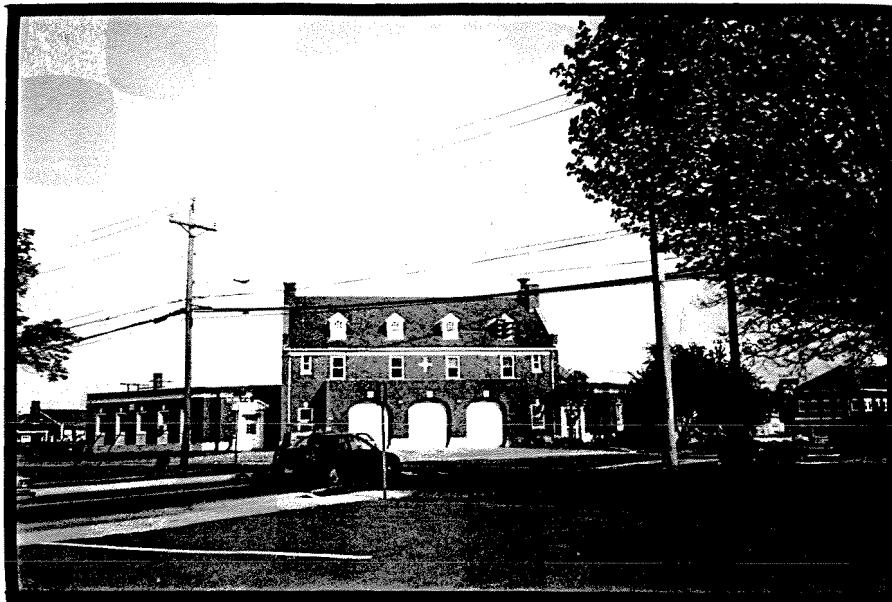
To possess the integrity necessary to convey its significance, a fire station should retain most of its original design, materials, workmanship, and setting from its period of construction. Character-defining features of fire stations include hose towers in pre-1917 buildings, wide door openings, original doors, and the overall pattern of openings. In addition, fire stations built as part of installation master plans, as was common during the 1930s, possess design features common to the architectural character of the installation that are important elements to the building's integrity. Typical alterations to this building type include infilling original doorways and replacement of original doors. In cases of subsequent additions or renovations, the building may have integrity if it has retained the majority of its character-defining features, particularly its setting in an overall plan, basic form, materials, and pattern of openings.



**Figure III-1.** 1909 Fire station, Quartermaster standardized plan no. 98-G (Building 305, F.E. Warren AFB [formerly Ft. D.A. Russell], Wyoming)

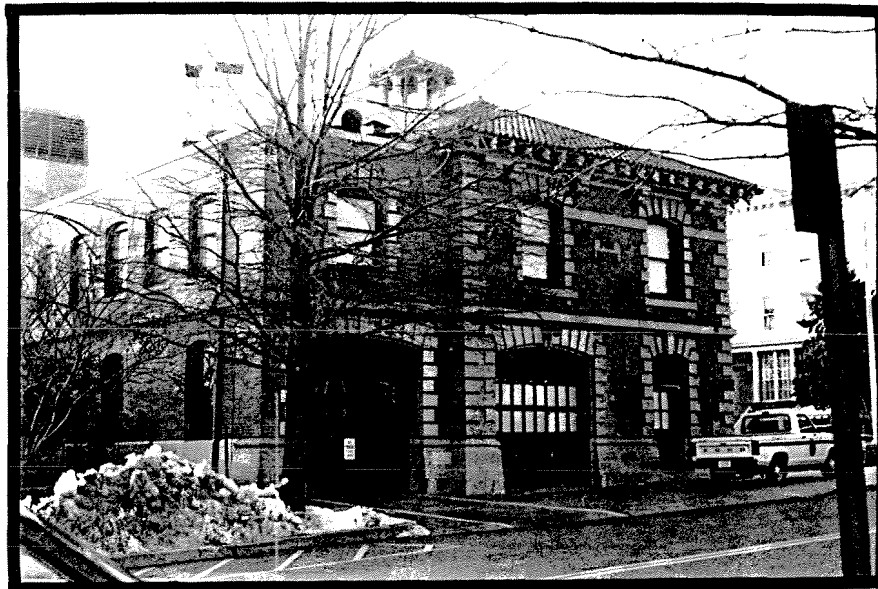
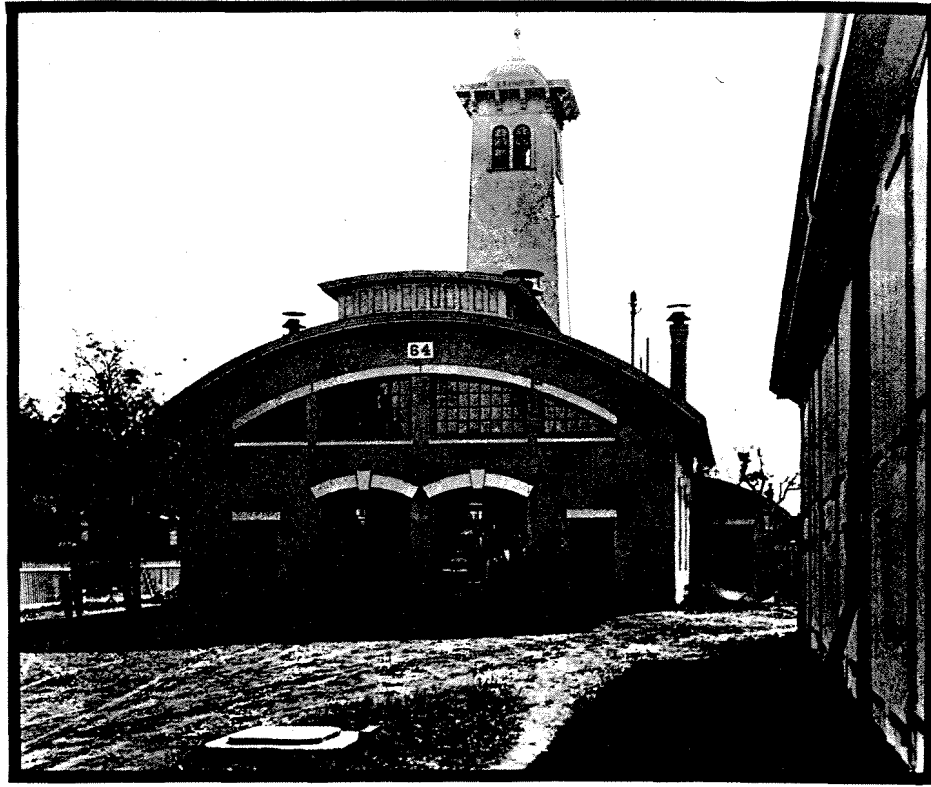






**Figure III-2.** 1932 Spanish Colonial Revival fire station (Building 301, March AFB, California), *above*. 1934 Georgian Colonial Revival combined fire station and guardhouse (Building 469, Ft. Knox, Kentucky), *below*





**Figure III-3.** Historic photograph of Portsmouth Naval Shipyard fire station, ca. 1880, *above*. 1904 fire and telephone station (Building 122, Washington Navy Yard, Washington, D.C.), *below*





**Figure III-4.** 1930s Fire station (Building 33, Naval Air Station North Island, San Diego, California)



## Guardhouses/Gatehouses/Sentry Boxes

### Description

Guardhouses served as installation prisons and the office of the guard. Separate guardhouses were common components of Army posts. They were generally one story, rectangular buildings, often with a basement, and a large hipped roof. Few Navy installations had separate guardhouses; ships' brigs served as prisons, or rooms in the marine barracks served as the disciplinary barracks. Gates, gatehouses, and sentry boxes are structures placed at major access points, often along roadways, to monitor the entrances to an installation; they usually are one-story buildings. Military prisons are discussed in a separate chapter in this volume.

### Evolution

#### Army and Army Air Corps

The guardhouse evolved as a separate building type, notably at frontier posts, after the Army stopped the construction of walled or fortified installations during the mid-nineteenth century. Access at permanent masonry fortifications was controlled through sally ports or gates. Without surrounding fortifications, the free-standing guardhouse evolved to serve as the central point to guard the post and hold prisoners. Guardhouses contained the office of the Officer of the Guard, the guard room for men assigned to guard duty, and the prison. The guardhouse often was located near the main entrance to the post. At frontier forts, where the isolated post could be approached from many directions, the guardhouse was located apart from the main parade ground, often behind the barracks.

Proposed plans for a guardhouse published in 1860 unofficial Army regulations depict a one-story building with a horizontal emphasis similar to other one-story buildings suggested by these proposed regulations. Proposed plans designed by Quartermaster General Montgomery C. Meigs in 1872 illustrate a guardhouse with two separate portions joined together by a sally port. No examples of this Meigs' standardized guardhouse design were located during the course of this study.<sup>5</sup>

The typical guardhouse constructed during the late nineteenth century was a one-story, square or rectangular building with a hipped roof and a full-facade veranda (Figure III-5). Guardhouses without basements sometimes were constructed as imposing two-story buildings. During the 1880s, the basic guardhouse design incorporated a porch under the principal roof, dormer windows, and spindle woodwork that echoed the decorative features popular in late Victorian designs (Figure III-5).

At the beginning of the twentieth century, the guardhouse retained the same basic shape as those of earlier times, but Colonial Revival details replaced the earlier Victorian-era details (Figure III-6). In general, the size of the building increased as the sizes of individual installations increased.<sup>6</sup>

By the 1930s, the guardhouse served primarily as a detainment center and was located near the center of the installation. The Army during this period often combined guardhouses and fire stations in one building (Figure III-6). The earliest Quartermaster-standardized plan combining the two functions in one building is dated 1916.<sup>7</sup>



When guardhouses were combined with fire stations, separate gatehouses and sentry boxes were constructed to monitor the entrances to an installation. The earliest Quartermaster-standardized plan for a gate lodge appeared in 1911.<sup>8</sup> During the late 1920s and 1930s, gatehouses proliferated as automobile traffic increased. Gatehouses generally were small, unassuming buildings constructed in the installation's prevalent building style, generally Georgian Colonial Revival or Spanish Colonial Revival (Figure III-7).

### Navy and Marine Corps

Buildings that served solely as guardhouses were not regular elements of nineteenth and early twentieth-century naval installations. Other facilities housed guards and held prisoners. The Marine Corps guarded Navy yards and stations and were housed in barracks on separate reservations near the shipyard. The Navy relied on ships' brigs and prison ships to detain prisoners.

Before 1850, masonry walls often surrounded shipyards. Gateways through the walls sometimes served as the focal point for the shipyard's public expression of its architecture. In other cases, simple one-story gate houses guarded yard entrances (Figure III-8). When the Navy expanded or constructed new yards around the turn of the century, encircling walls were not always constructed, though gates still controlled access to the yards. Though historic maps indicate the presence of gatehouses at shipyard entrances, modern expansions have removed those structures. Few gatehouses at shipyards were identified in this study.

During the early twentieth century, the Navy developed permanent on-shore training and air stations through the expansion of existing facilities or construction of new complexes that featured a consistent contemporary architectural style. Guardhouses either used existing facilities or were housed in new buildings. For example, the old Marine barracks at Puget Sound Navy Yard were turned over to the Navy for use as disciplinary barracks after the construction of new marine barracks in 1912.<sup>9</sup> New installations often incorporated gatehouses and guardhouses as minor components of the overall installation plan (Figure III-9). After World War II, gatehouses became larger and served as visitor centers and administration offices to provide security checks for visitors to the installation.

### **Association**

Guardhouses, gatehouses, and sentry boxes are associated directly with the development of military installations after the Civil War and are minor installation building types. Their importance to the overall installation plan depends on their location and architectural prominence. If situated in a central location or along a defining boundary, these buildings can contribute to an historic district. Walls around naval activities serve as distinct remnants of historic boundaries; sometimes the gatehouse is the only remnant of these historic boundaries. Isolated sentry posts or guardhouses may not possess important associations with historic events or trends, but they may be a contributing element in a discontinuous historic district. If they retain a high degree of integrity, they may embody the distinctive characteristics of the building type.

### **Integrity**

To possess the integrity necessary to contribute to an historic district or to convey its individual significance, guardhouses and gatehouses should retain most of their original design, materials, workmanship, and setting from the period of their construction. Where buildings have

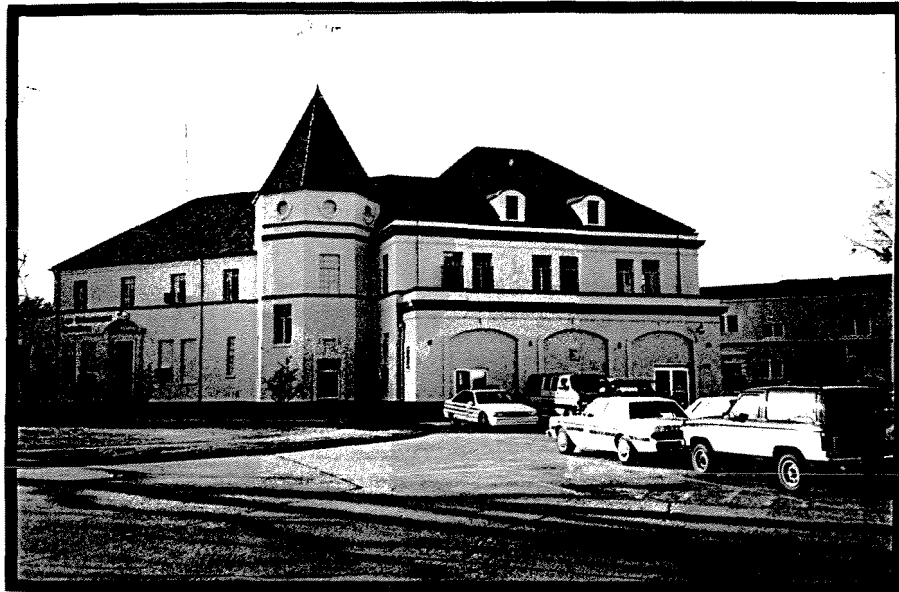
undergone subsequent additions, renovations, or removal of architectural elements, the buildings still can possess integrity if they retain the majority of their historic features, such as materials, basic form, roof shape, and porch.





**Figure III-5.** 1870 Guardhouse (Building 336, Ft. Sill, Oklahoma), *above*. 1893 Guardhouse, Quartersmaster standardized plan no. 9 (Building 51, Ft. McPherson, Georgia), *below*





**Figure III-6.** 1909 Guardhouse, Quartermaster standardized plan no. 206 (Building 234, F.E. Warren AFB, [formerly Ft. D.A. Russell], Wyoming), *above*. 1932 French Colonial Revival combined fire station and guardhouse (Building 5676, Barksdale AFB, Louisiana), *below*



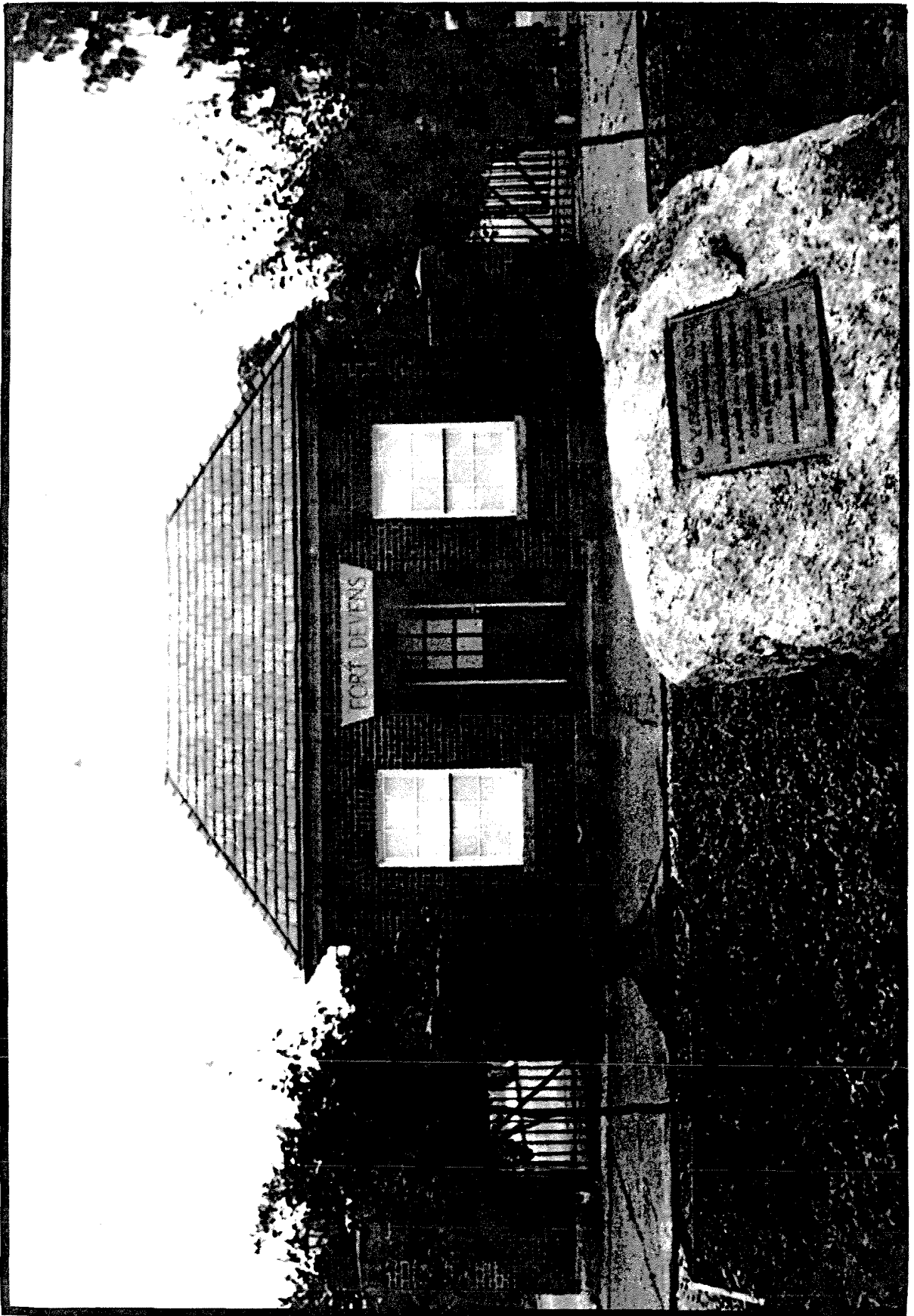
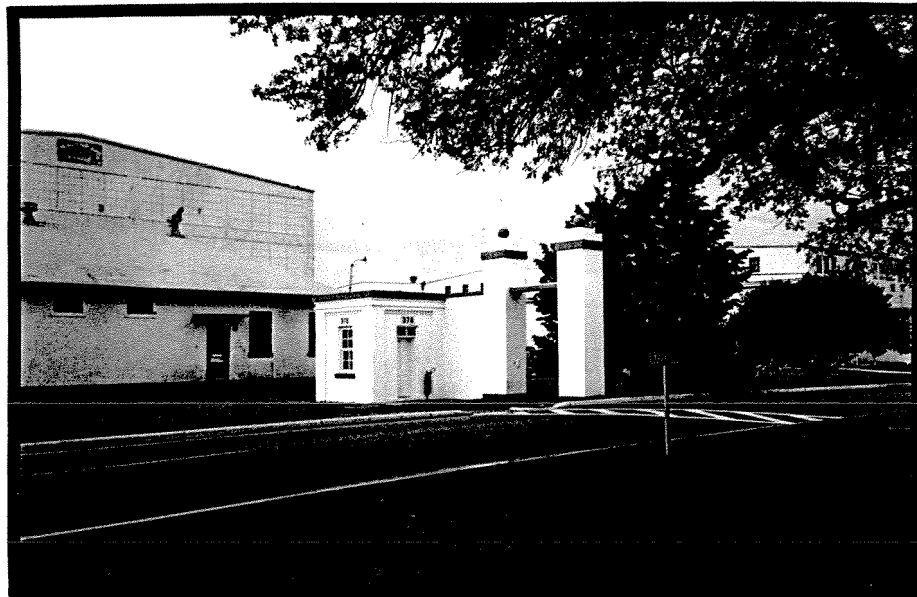


Figure III-7. 1934 Georgian Colonial Revival gatehouse (Building P-7, Ft. Devens, Massachusetts).







**Figure III-8.** 1805 - 1806 Latrobe gate at Washington Navy Yard, Washington, D.C. (Marine barracks over the gate were constructed in 1880), *above*. 1837 Gatehouse (Building 378, Naval Complex, Pensacola, Florida), *below*.





**Figure III-9.** 1923 Gatehouse (Building 20-21, Naval Training Center, San Diego, California).



## Headquarters Buildings, Administration Buildings, and Office Buildings

### Description

The headquarters building was the main office building of the installation and represented its administrative center. The administration building generally was placed in a prominent location that reflected its position as the center of command. At nineteenth- and early twentieth-century Army posts, the headquarters building was built facing the parade ground. At Navy yards, the headquarters building usually was near the commander's quarters. The headquarters building usually was among the most elaborate buildings at permanent military installations and often exhibited high-style architectural design typical of its period of construction.

### Evolution

#### Army and Army Air Corps

Early and mid nineteenth-century administration buildings on Army posts contained multiple uses. The unofficial Army regulations published in 1860 recommended that administration buildings contained one office for the commanding officer, an office for other staff, a court-room, and a library. The 1860 regulations depict a small, one-story administration building constructed of locally-available materials with little architectural adornment (Figure III-10).<sup>10</sup>

When the Army consolidated troops at larger installations during the 1880s and 1890s, the administration building increased in size to accommodate more administrative functions. The headquarters building reflected the Army's permanent presence in a locality. The building generally was located in a prominent position overlooking the parade ground. The architectural character of the building matched contemporary architectural design and embodied the general architectural character of the installation.

The Quartermaster Department developed standardized plans for administration buildings for these new permanent installations. During the 1880s and early 1890s, the Quartermaster Department designed administration buildings using the popular Victorian aesthetic (Figure III-10). In 1894, the Quartermaster Department introduced Colonial Revival and Classical Revival designs for administration buildings. The popularity of Colonial Revival and Classical Revival continued until 1940 (Figure III-11). Some exceptions to the Georgian Colonial Revival also were built. In 1910, the Quartermaster Department issued a Spanish Colonial Revival design for administration buildings for use in the Southwest.<sup>11</sup>

During the twentieth century, administration buildings continued as multiple-use structures and grew in size to accommodate the oversight of larger installations. The required staff offices increased to include separate offices for a post adjutant, a sergeant major, and several clerks. Additional rooms were added to contain specific functions, including a records room and a court-martial room. The second story included a variety of other uses, including library, school room, reading room, or assembly hall. Quartermaster standardized plans dated 1905 show the introduction of post office. In 1909, telegraph and telephone rooms were included in the administration building. Basements were used for storage rooms and other support rooms.<sup>12</sup>

The consolidation of troops on larger installations led to multiple headquarters buildings at posts. During the early and mid-nineteenth century, each post usually served a single mission.

When the Army assigned troops with different missions to one installation, they often constructed the equivalent of two separate posts side by side with separate facilities, that included separate administration buildings. At Ft. Riley, for instance, the cavalry post and artillery post each had a headquarters building.

During the late nineteenth century, some Army installations housed two command structures: post-level and regional- or district-level. At Ft. Leavenworth, one building was built to serve as post headquarters, while a former ordnance building was adapted for the offices of the Department of the Missouri. After the reorganization of the Army at the beginning of the twentieth century, administration buildings were designed purposely to contain offices for overlapping levels of jurisdiction, such as the district administration and the post administration. The increasing volume of administrative duties required the enlargement of administration buildings.

By the 1930s, the expansion of multiple levels of administrative duties again resulted in the construction of separate buildings to house the organizational hierarchy. At Barksdale AFB, for example, separate office buildings were constructed for the post and group headquarters (Figure III-12).

Administration buildings constructed as part of the wave of new construction authorized by Public Law No. 45, enacted in 1926, followed Quartermaster standardized plans for Georgian Colonial Revival, Spanish Colonial Revival, and French Colonial Revival architectural designs (Figures III-13 and III-14). The buildings no longer faced a central parade ground, but commanded a prominent position within a general master plan that divided the post into functional areas connected by a planned street pattern. Room for individuality still remained; the headquarters building at Randolph AFB was designed specifically for the Texas training field and came to symbolize 1930s Army aviation (Figure III-15).

The growth of administrative functions in the years before the Second World War resulted in the construction of additional building types, as headquarters buildings no longer could accommodate the many offices required to administer a post. The Quartermaster Department designed separate buildings for specific functions including recreation, post office, and communications. Construction of new building types to contain these other functions began during the first decade of the twentieth century and continued through the 1930s, leaving the headquarters building to house only offices. This specialization contributed to the growth in size and complexity of installations.

### Navy and Marine Corps

Headquarters buildings at Navy yards were among the most architecturally elaborate buildings at the yards. Headquarters contained the office of the shipyard commander and other offices necessary for the yard's operation (Figure III-16). The yard headquarters often was located away from the industrial area, sometimes near the commanding officer's house. As with most permanent construction at Navy yards, headquarters buildings reflected contemporary and regional architectural styles, and were not standardized buildings. A prominent architectural feature of nineteenth-century administration buildings was a clock tower or a cupola (Figures III-16 and III-17). At the turn-of-the-century, administration buildings increased in size to accommodate increasing levels of administrative duties. Beaux Arts architecture usually was adopted and this more formal style accompanied the Navy's increased funding, technological sophistication, and international role (Figure III-18).

With the construction of permanent on-shore training facilities and air stations during the twentieth century, the Navy constructed complete complexes using a single contemporary

architectural style. The administration building was located in a prominent position as a major architectural component of the overall installation plan (Figure III-19). In some cases, administration buildings contained additional functions to support personnel assigned to these permanent on-shore facilities.

Marine Corps reservations during the nineteenth century were located on Navy installations and were comprised generally of a barracks, officer housing, and support buildings. Any necessary administrative function was contained in the barracks building. The Marine Corps began to acquire separate installations during the early twentieth century that required separate administration buildings. Where new installations were constructed, the administration building tended to be a major architectural component in the overall plan (Figure III-19).

### **Association**

The headquarters building of an installation may be individually eligible for the National Register or may be a major contributing building to an historic district. The headquarters building is a major building type that may possess significance because of historical associations with significant events or individuals or because of architectural merit. As the administrative center, the headquarters building is associated closely with the historical significance of the installation and its role in U.S. history. Administration buildings are associated directly with the chronological overviews (Part I of this study) related to the installation's period of operation and with the theme studies (Part II) related to the installation's mission or design. Examples of this property type also may represent the work of significant architects, embody the distinctive characteristics of a type or period of construction, or have artistic merit. Headquarters buildings often displayed high-style architectural design reflecting their periods of construction; they were among the most elaborately ornamented buildings constructed at permanent installations and were placed at a prominent location in an overall installation plan, particularly at installations that were built according to a master plan over a short span of time.

### **Integrity**

To possess the integrity necessary to convey its significance, a headquarters building should retain most of its original design, materials, workmanship, and setting from its period of significance. The period of significance may extend over the many years that the headquarters building served as the administrative and symbolic center of the installation. Modifications to the building may have acquired significance if they are related to the building's period of significance. As a result of the increased size and complexity of administrative functions, few pre-1940 headquarters buildings continue to serve as the current installation or activity headquarters. Where subsequent additions or renovations have modified or removed architectural elements, the building still can possess sufficient integrity if it retains the majority of the features that compose its design, including massing, spatial relationships, proportion, pattern of openings, materials, and ornamentation.





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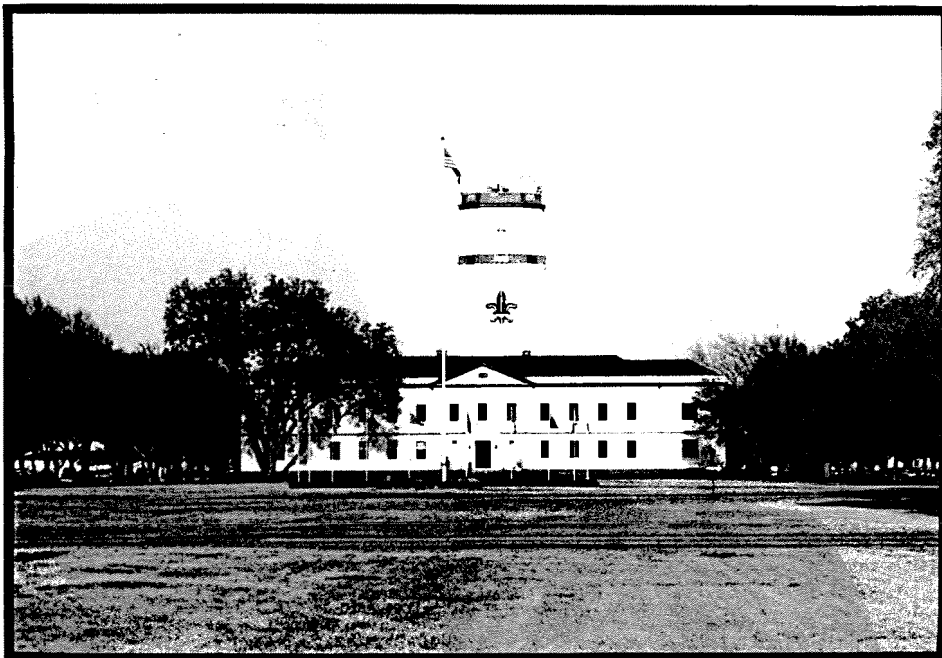
**Figure III-10.** 1870 Headquarters (Building 348, Ft. Sill, Oklahoma), *above*. 1891 Headquarters (Building 41, Ft. McPherson, Georgia), *below*.





**Figure III-11.** Two examples of early Quartermaster Colonial Revival headquarters plans at F.E. Warren AFB [formerly Ft. D.A. Russell], Wyoming: 1894 Headquarters (Building 210), *above*, and 1911 Headquarters, Quartermaster standardized plan no. 112-F (Building 246), *below*.





**Figure III-12.** Example of different headquarters buildings for different levels of administration at Barksdale AFB, Louisiana: 1934 Group headquarters and operations building (Building 6249), *above*, and Post headquarters (Building 3435), *below*.





Figure III-13. 1934 Georgian Colonial Revival headquarters building (Building 1, Ft. Devens, Massachusetts).

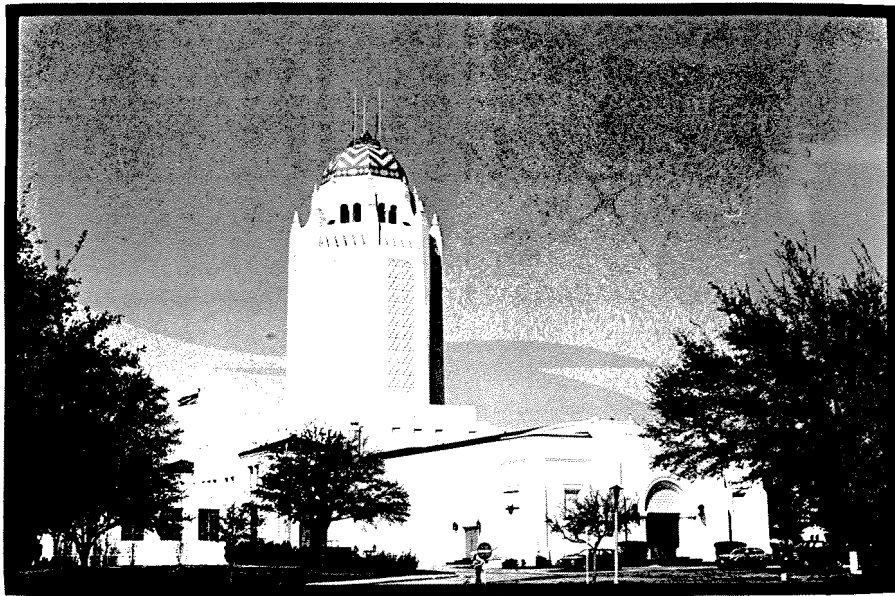






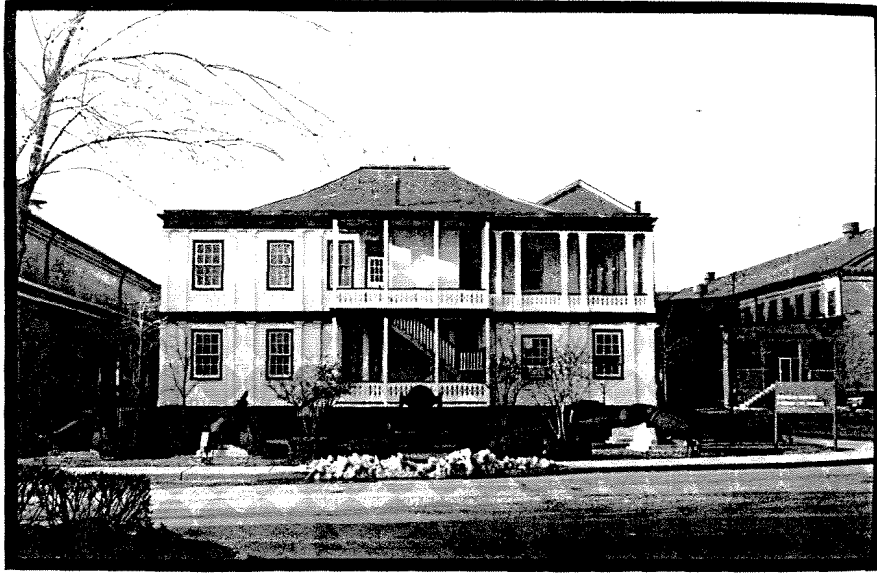
**Figure III-14.** Spanish Colonial Revival designs: 1929 Combined headquarters and control tower (Building 470, March AFB, California), *above*, and 1935 McNair Hall (Building 455, Ft. Sill, Oklahoma), *below*.





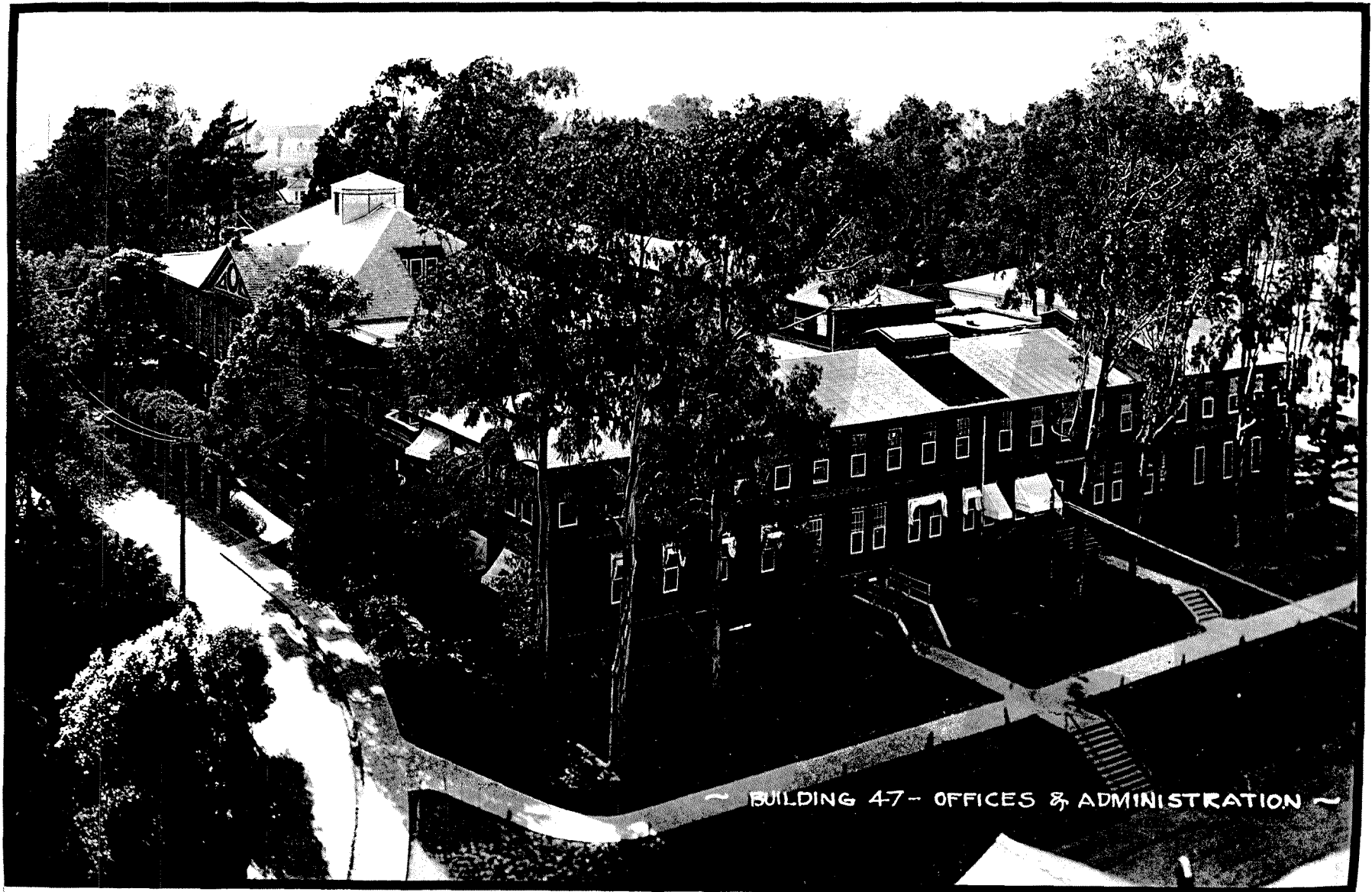
**Figure III-15.** 1931 Headquarters building, with water tower and theater (Building 100, Randolph AFB, Texas).





**Figure III-16.** 1838 Commandant's Office, with 1895 veranda (Building 1, Washington Navy Yard, Washington, D.C.), above. Some commandant's offices were housed in converted buildings; the headquarters at Portsmouth originally was constructed in 1855 as a machine shop and steam engineering house, but was converted to a post office and administration building (Building 15, Portsmouth Naval Shipyard, Maine), below. (Courtesy U.S. Navy)





**Figure III-17.** Headquarters building, originally constructed in 1855 (Building 47, Naval Activities Mare Island, California). The building was altered in 1870 and lost its cupola in the 1898 earthquake. This photograph shows a large addition constructed during World War II that has since been removed. (Courtesy U.S. Navy)







**Figure III-18.** 1901 Headquarters (Building 6, Naval Base Philadelphia, Pennsylvania), *above*. 1905 Headquarters for Charleston Navy Yard (Building H-1 [currently used as quarters], Naval Base Charleston, South Carolina), *below*.



## Post Offices

### Description

Military post offices received and distributed installation mail. Until the early 1900s, most installation post offices were housed within the headquarters or administration building. Post offices constructed before 1940 generally were one-story buildings with minimal stylistic references.

### Evolution

#### Army and Army Air Corps

Separate buildings to house communications functions did not appear at Army installations until the twentieth century. Until that time, the central administration building could handle the volume of mail received on an installation. Mail was delivered to the main headquarters building and distributed by hand to the troops. During the twentieth century, the post administration grew more complex as the installation expanded, and the function of handling mail was shifted out of the administration building into a specialized post office building type. In 1905, the Quartermaster Department included a separate room for use as a post office in standardized plans for administration buildings. In 1906, the Quartermaster Department issued a standardized plan for a post/telegraph office. In 1907, a separate Quartermaster standardized plan was issued for a post office (Figure III-20).<sup>13</sup> Despite the post office standardized plan, the construction of separate post office buildings was not widespread, even during the 1930s construction era. In some cases, the post office was combined with another use, for example the combined post office-Masonic Hall at Ft. Leavenworth, Kansas.

#### Navy and Marine Corps

The Navy did not construct separate post office buildings until it invested in the construction of permanent on-shore training facilities, operating bases, and air stations. Navy planners included amenities such as post offices for the resident populations in the construction of these installations, such as North Island Naval Air Station and the San Diego Naval Training Center. Few representatives of this building type were identified on naval or Marine Corps facilities during this study.

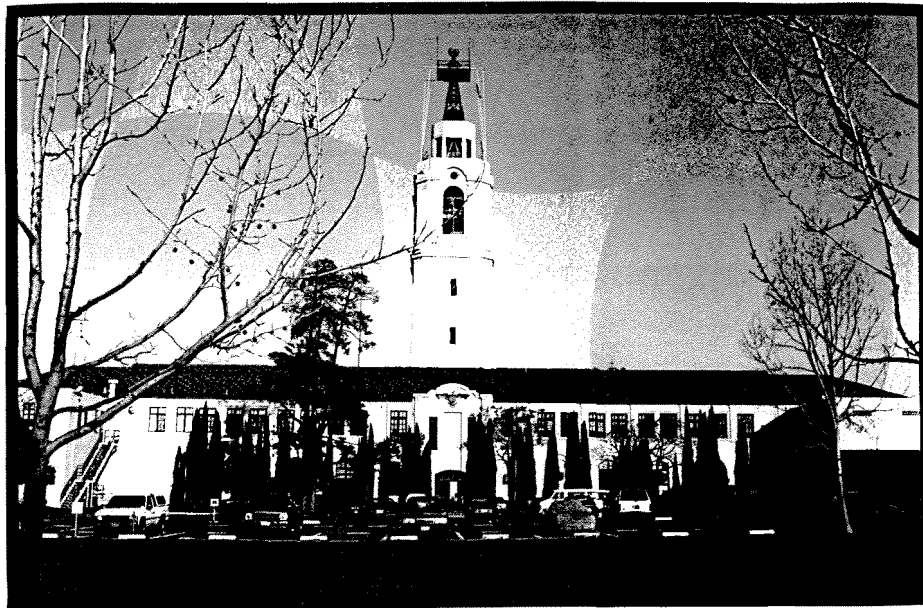
### Association

Post office buildings are associated with the growth of administration needs on military installations after the turn of the century. A post office was one of a number of support facilities constructed to house the expanding administrative functions of an installation. Post offices located on nineteenth-century installations were added to the installation. The post office architecture reflected the military's adaptation of contemporary architectural styles to installation construction.

As a support facility for an installation, a post office generally does not possess individual significance. It can be a contributing element in an historic district when it is part of a concentration of historically significant buildings and retains integrity. In other cases, the building may be isolated from a potential historic district, and then should be evaluated for its individual significance.

## **Integrity**

To possess sufficient integrity to be considered a contributing building in an historic district, post office buildings should retain most of their original design, materials, workmanship, and setting from the period of significance of the historic district. In the case of subsequent additions or renovations, the building still may possess integrity if it retains the majority of its character-defining features, including overall form, materials, proportion of openings, relationship to its setting, and architectural details.



**Figure III-19.** 1920 Headquarters building, Bertram G. Goodhue, architect (Building 8, Naval Air Station, North Island, California), *above*. 1943 Headquarters building (Building 31, Marine Corps Recruit Depot, San Diego, California), *below*.





**Figure III-20.** 1907 Post and Telegraph Office, Quartermaster standardized plan no. 177 (Building 211, F.E. Warren AFB [formerly Ft. D.A. Russell], Wyoming), *above*. 1928 combined Post Office and Masonic Hall, non-standardized plan (Building 342, Ft. Leavenworth, Kansas), *below*.





## NOTES, CHAPTER 1

1. David A. Clary, "These Relics of Barbarism: A History of Furniture in Barracks and Guardhouses of the United States Army, 1800-1880" (MSS, U.S. Department of the Interior, National Park Service, Harpers Ferry Center, West Virginia, 1983), 165-166.
2. National Archives and Records Administration, Cartographic Branch, Record Group 77, Standard Plans of Army Post Buildings, 1891 - 1918, (P.I. NM - 19, Entry 411), Plan 98.
3. NARA, Cartographic Branch, RG 77, Standard Plans of Army Post Buildings, 1891 - 1918, Plan 232.
4. NARA, Cartographic Branch, RG 77, Standard Plans of Army Post Buildings, 1891 - 1918, Plan 421.
5. War Department, *Regulations Concerning Barracks and Quarters for the Army of the United States, 1860* (Washington, D.C.: George W. Bowman, 1861), 4; War Department, *Report of the Quartermaster-General* (Washington, D.C.: Government Printing Office, 1872), 280.
6. NARA, Cartographic Branch, RG 77, Standard Plans of Army Post Buildings, 1891-1918, Plan 421.
7. NARA, Cartographic Branch, RG 77, Standard Plans of Army Post Buildings, 1891 - 1918, Plan 296.
8. NARA, Cartographic Branch, RG 77, Standard Plans of Army Post Buildings, 1891 - 1918.
9. Secretary of the Navy, *Annual Report* (1912), 588. As cited in "Marine Reservation Historic District" (MSS, National Park Service, National Register of Historic Places, Washington, D.C., 1986).
10. War Department, *Regulations Concerning Barracks and Quarters for the Army of the United States, 1860*, 4.
11. NARA, Cartographic Branch, RG 77, Standard Plans of Army Post Buildings, 1891 - 1918, Plans 76, 84, 99, 122, 169, 392.
12. NARA, Cartographic Branch, RG 77, Standard Plans of Army Post Buildings, 1891 - 1918, Plans 99-C, 99-D, 254.
13. NARA, Cartographic Branch, RG 77, Standard Plans of Army Post Buildings, 1891 - 1918, Plans 99-C, 177, 177A.



## CHAPTER 2

### COMMUNICATIONS

#### Radio Buildings

##### Description

Military communications buildings fall into two categories: those that served basic communications needs on and between installations, such as telephone and telegraph offices, radio buildings, and radio control towers; and those that housed the communications facilities of specialized activities or branches, such as Navy radio stations or Army Signal Corps posts or detachments. Radio buildings constructed to support installation communications needs were generally small, one-story buildings with minimal stylistic references. Installations with specific communications missions had a communications complex of radio tower, transmitting station, housing, and support buildings. In all cases, radio buildings were located at a distance from a main cantonment or urban area so that radio operators received minimal disturbances in sending and receiving messages.

##### Evolution

###### Army and Army Air Corps

Radio buildings followed the development of radio technology during the early twentieth century. In 1906, the Signal Corps began to experiment with wireless telegraph. During World War I, the Army experimented with radio, and continued to develop the military application of radio after the war. In 1916, the Quartermaster Department issued a plan for a one-story radio station that included a power room, passage, and operator room.<sup>1</sup> During the 1930s, the Quartermaster Corps developed a standardized plan for radio buildings. The one-story, T-shaped building became a typical feature at Army and Army Air Corps installations (Figure III-21).

Radio buildings and control towers housed facilities vital to the operation of Army Air Corps installations, where communications were needed between aircraft and ground support. In some cases, these functions were contained in separate buildings. In other cases, control towers were incorporated into hangars or administration buildings (Figure III-14).

###### Navy and Marine Corps

The Navy began to experiment with radio communications technology in 1899 and slowly adopted the radio during the first decade of the twentieth century. In 1903, the Navy started to construct low-powered radio transmitting stations on shore. These transmitting stations generally included a radio tower and supporting buildings for radio operators. Beginning in 1915, as radio technology improved, the Navy began to construct high-powered receivers along the Atlantic and Pacific coasts and replace wooden antennae with metal structures (Figure III-22).<sup>2</sup> Radio stations were established on isolated portions of existing shipyards and at strategic locations outside of naval installations. Naval radio stations included transmitting facilities and quarters for the operators.

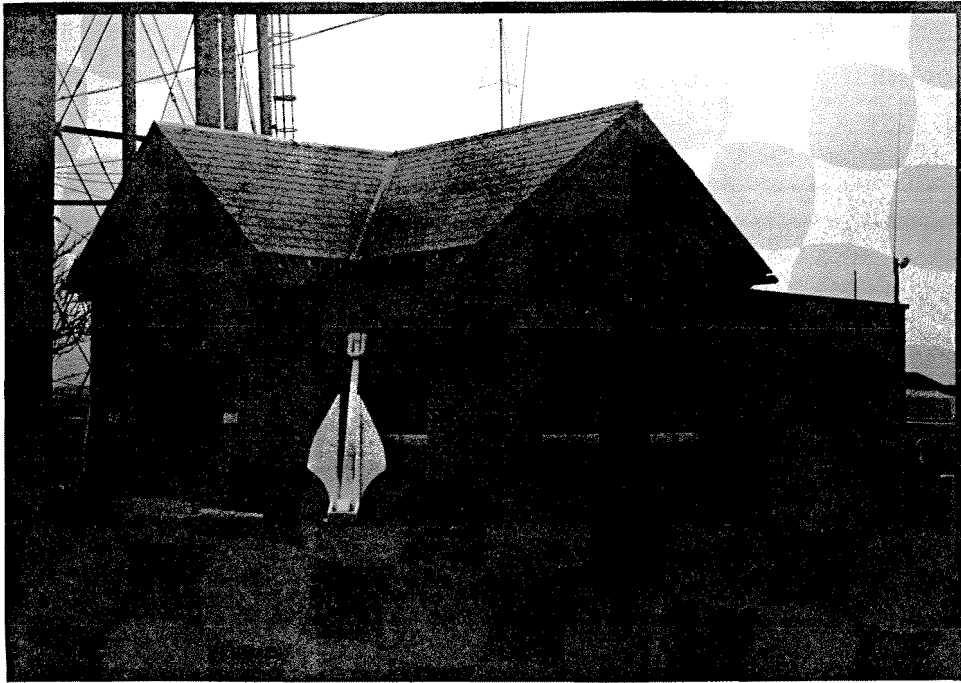
During the twentieth century, the Navy and Marine Corps established training facilities and air stations. Naval air stations required radio buildings and control towers for communications between aircraft and ground support.

### **Association**

Radio buildings are associated directly with the communications theme and illustrate the military's adoption of radio technology. (For further information, refer to Part II, Chapter 1, "Communications.") Radio buildings fall into two categories, installation communication services and specialized communications facilities. Installation communication services buildings generally do not possess individual historic significance, but may be contributing buildings to an historic district. If a supporting facility is isolated from the concentration of historic buildings and structures, it may not have sufficient visual continuity with the historic district to be a contributing element to the district. However, when visual continuity is not a factor in historic significance, an historic district may contain noncontiguous areas. Specialized communications facilities may be eligible for the National Register as individual structures or as historic districts for their historical association with military communications technology, historical events or trends associated with the communications theme, or because they represent an important type, period, or method of construction.

### **Integrity**

To possess the integrity necessary to convey their significance, radio buildings should retain most of their original design, materials, workmanship, and setting from their period of significance. Structures associated with communications facilities, such as radio transmitter towers, should retain their basic structural design, original configuration, and materials. In cases of subsequent additions or renovations, the building may possess integrity if it retains the majority of its character-defining features, particularly its setting in an overall plan, basic form, materials, and pattern of openings.



**Figure III-21.** 1931 Radio Building (Building 607, Langley AFB, Virginia), *above*. 1934 Radio Building (Building 517, Ft. Knox Kentucky), *below*.



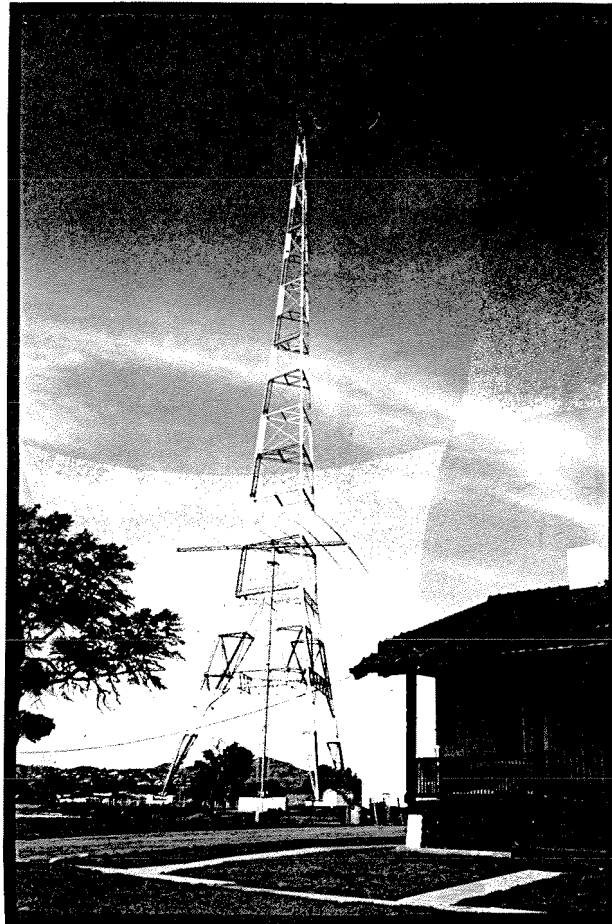
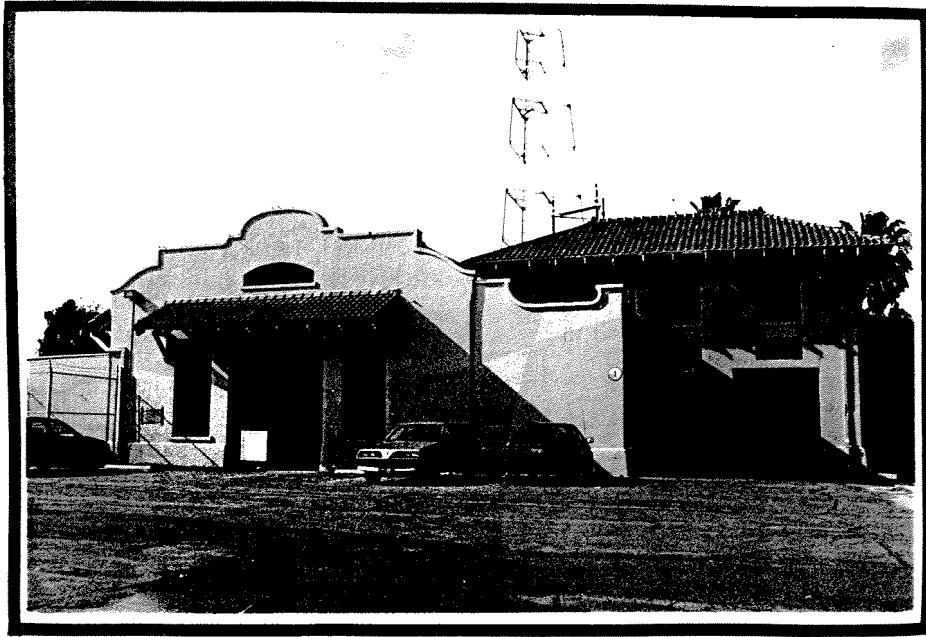


Figure III-22. Transmitter building constructed 1915 - 1917 (Building 1), *above*, and 1916 Transmitting Tower (Naval Radio Transmitting Facility, Chollas Heights, California), *below*.





## Telegraph and Telephone Buildings

### Description

Military communications buildings fall into two categories: those that served the basic communications needs on installations and between installations and those that housed the communications facilities of specialized activities or branches. In general, telegraph and telephone buildings fall into the first category of support buildings that facilitate communications on the installation level. Telephone and telegraph buildings generally were located near the main cantonment or administrative area. They usually were constructed as part of major building campaigns and reflected the architectural style of the other installation buildings.

### Evolution

#### Army and Army Air Corps

Separate buildings to house installation communication facilities did not appear at Army installations in large numbers until the twentieth century. Until that time, the minimal space occupied by communications facilities, such as telegraph, signal, or telephone offices, could be contained in the administration building. During the 1870s and 1880s, the Army connected posts in the western territories with telegraph lines. Forts in regions such as Arizona or the Dakotas were so isolated that contact with commercial telegraphs was not feasible; however, the post commanders recognized the need for fast, reliable communications, and the Army began to construct its own telegraph lines, usually with cavalry or infantry soldiers performing the labor under the supervision of Signal Corps officers or non-commissioned officers. Since only a single line reached an Army post, a room in a pre-existing building was sufficient for the telegraph office. It was, therefore, unnecessary for the Quartermaster Department to issue a separate standardized building plan for telegraph offices.

The military adopted the newly invented telephone at the end of the nineteenth century. By 1892, 59 of 99 garrisons had some type of telephone equipment.<sup>3</sup> As in the case of telegraph offices, a room in an existing building was sufficient to house the telephone office.

During the twentieth century, the Army's use of communications technology expanded, and the Quartermaster Department began to plan for the proliferation of communications services. In 1905, the Quartermaster Department designated separate rooms for these functions in their standardized plans for administration buildings. In 1906, the Quartermaster Department issued a standardized plan for a combined post office-telegraph office.<sup>4</sup> As the telephone gained popularity during the twentieth century, the Quartermaster Department designed a separate building to house the main switchboard. During the 1930s, Army and Army Air Corps installations received separate exchange buildings, constructed according to Quartermaster standardized plans (Figure III-23).

#### Navy and Marine Corps

The main communications buildings identified in this study for the Navy and Marine Corps are related to the development of radio technology. Telephone communications technology was adopted slowly by the Navy. The Navy built few separate buildings to house telephone equipment. The only building identified as a telephone exchange building during this study is a multi-purpose structure located at the Portsmouth Naval Shipyard, Maine.

## **Association**

Telephone and telegraph buildings are associated directly with the communications theme and illustrate the military's adoption of different communications technologies. (For further information, refer to Part II, Chapter 1, "Communications.") Telegraph and telephone buildings illustrate the development of installation communications services. These types of communications buildings generally do not possess individual historic significance, but can be contributing buildings to an historic district if the supporting facility is located near the concentration of historic buildings and structures and retains integrity.

## **Integrity**

To possess the integrity necessary to convey their significance, telegraph and telephone buildings should retain most of their original design, materials, workmanship, and setting from their period of significance. The architecture of most telegraph and telephone buildings is consistent with the general architectural character of the other installation buildings constructed at the same time. In cases of subsequent additions or renovations, the building may possess integrity if it retains the majority of its character-defining features, particularly its setting in an overall plan, basic form, materials, and pattern of openings.



**Figure III-23.** 1934 Communication and Telephone Exchange building (Building 24, Ft. Leavenworth, Kansas), *above*. 1939 Telephone Exchange building, Quartermaster standardized plan (Building 303, Ft. Bragg, North Carolina), *below*.



## NOTES, CHAPTER 2

1. David L. Wood, *A History of Tactical Communication Techniques* (Orlando: Martin Marietta Corporation, 1965), 192-200; National Archives and Records Administration, Cartographic Branch, Record Group 77, Standard Plans of Army Post Building, 1891-1918, (P.I. NM-19, Entry 411) Plan 411.

2. Linwood S. Howeth, *A History of Communications - Electronics in the Navy* (Washington: Government Printing Office, 1963), 49, 64-65, 167-169, 208-210.

3. Maurice Matloff, *American Military History* (Washington, D.C.: Government Printing Office, 1969), 295.

4. NARA, Cartographic Branch, RG 77, Standard Plans of Army Post Buildings, 1891-1918, Plans 99-D, 177, 177A. Identification of a standardized plan for 1930 telephone exchange buildings was based on field survey at military installations undertaken during 1992.



## CHAPTER 3

### EDUCATION

#### Classroom Buildings

##### Description

Classroom buildings on military installations fall into two general categories: buildings constructed as schools and existing buildings that either served several purposes, including classrooms, or that were adapted as classrooms. In the first case, the buildings built as educational buildings often are imposing architectural monuments in prominent locations on the installation. Apart from major military schools, classrooms often were combined with other uses, such as barracks or administration buildings. The military did not develop standardized plans for classroom buildings, resulting in great variety among the educational facilities as they proliferated after the turn of the century. Buildings built as classrooms generally were long, two-story buildings, with the primary entrance on the long side of the building. They share a similar typology with academic buildings on college campuses and other educational institutions.

##### Evolution

###### Army

Before the Civil War, classroom instruction was not considered an important part of military service. Beyond the U.S. Military Academy at West Point, New York, the Army provided little formal training. Most military training was gained on the job. For the ordinary soldier, the nature of military service required outdoor training or instruction. Recruits first learned to drill on outdoor parade grounds. For general military training, no specialized education buildings were needed. For example, the Artillery School of Practice, established for artillerists at Ft. Monroe, Virginia in 1824, did not require a separate building during its early years; the first mention of a dedicated school building is on the 1889 map of the installation.<sup>1</sup>

The oldest military education institution is the U.S. Military Academy, which was established in 1802 to train officers primarily in engineering. Design and construction of buildings at West Point was under the jurisdiction of the Corps of Engineers with funding supplied directly by the U.S. Congress. Its original buildings were typical Federal and Greek Revival public buildings; none of the original classrooms survive. After 1830, most new construction at West Point was Gothic Revival. The Army's selection of Gothic Revival design for the U.S. Military Academy was part of a popular preference during the mid-nineteenth century for Gothic Revival architecture at college campuses.

After the Civil War, military education evolved into a more formal system. The Army instituted the foundations of a military school system in the spirit of a growing sense of military professionalism. Service schools included: the School of Application for artillerists at Ft. Monroe, Virginia (1824; closed in 1860, re-established in 1868); the School of Application for Infantry and Cavalry at Ft. Leavenworth, Kansas (1881); the Engineer School of Application at Ft. Totten, New York (1885); and, the Cavalry and Light Artillery School at Ft. Riley, Kansas (1892).

These schools required few separate buildings. Older buildings often served combined headquarters, administration, and training functions. At Ft. Leavenworth, the post headquarters



served as classroom space for the School of Application (Figure III-24). An 1889 map of Ft. Monroe indicates a building outside of the fortifications labeled "school." This building, smaller than the average officers' quarters duplex, may have housed the Artillery School; it no longer stands.<sup>2</sup> During this period, the Army also began to provide libraries and classrooms as regular components in Quartermaster-designed administration buildings and barracks as the Army instituted post schools for the instruction of junior officers. Classroom buildings were not differentiated clearly from administration buildings during these formative years of the professional military education system.

During the first decade of the twentieth century, the Army expanded its education and training systems. The Army established large, senior officer schools and expanded its officer education system to instruct junior officers in the requirements of their respective branches or departments. The Army's increased emphasis on professional education was reflected in the design and construction of educational buildings. Classroom buildings, both those adapted from earlier uses and those designed as classrooms, became architectural focal points in prominent locations on installations. An example of adaptation of previously existing building stock is located at Ft. Leavenworth. In 1890, the General Services Schools, the successor to the School of Application, was moved to remodeled ordnance warehouses. In 1904, the buildings were remodeled once more to include the prominent clock tower that is the current symbol of the school (Figure III-24).<sup>3</sup>

Another sign of the increased emphasis on professional education was the selection of prominent civilian architects to design military campuses. After a 1902 national competition, the Army selected the firm of Cram, Goodhue and Ferguson to develop a master plan and design eleven new buildings at the U.S. Military Academy at West Point. Charles McKim, of the preeminent architectural firm of McKim, Mead and White, designed the monumental Army War College (1902-1908), the capstone of the Army's senior education system, at Ft. McNair, in Washington, D.C. (Figure III-25).

As the Army established more specialized service schools during the beginning of the twentieth century, the Quartermaster Department began constructing separate classroom buildings and libraries, though it did not develop standardized plans for these building types as it did for headquarters buildings, barracks and other installation structures. For example, a complex of officers' classroom building, enlisted classroom building, and library was constructed at Ft. Monroe in 1909 for the Coastal Artillery School.<sup>4</sup>

In response to the tremendous training needs of World War I, the Army constructed temporary classrooms to train new recruits at mobilization camps. No examples of these classrooms were identified during this study.

During the 1930s, the Army continued to expand its specialized education system. These new classrooms were designed both by civilian architects and by the Construction Division of the Quartermaster Corps. The firm of McKim, Mead and White designed the Infantry School at Ft. Benning in 1935. The Infantry School is located in a central location in the Ft. Benning master plan and exhibits Colonial Revival architectural influences (Figure III-26). Philadelphia architect Harry Sternfield designed Russel Hall, completed in 1936, for the post headquarters and Signal Corps School at Ft. Monmouth (Figure III-26). Russel Hall exhibits the streamlined, stripped classicism popular for public buildings during the 1930s.

The Quartermaster Corps designed classroom buildings as part of their overall installation planning and construction duties. The classroom buildings of this era were larger than their predecessors to accommodate the larger populations and increased amount of training necessary for a modern army. By the 1930s, Quartermaster architects provided designs for educational

buildings using both Georgian Colonial Revival and Spanish Colonial Revival architectural styles. These plans were consistent with the architecture of the new permanent installations constructed by the Quartermaster Corps during that time period. Even with the increase of classroom construction, the Army did not develop standardized plans for educational buildings.

### Army Air Corps

With the advent of military aviation, the military developed an entirely new education program to train pilots and ground crews. Early training programs relied on hands-on flight and mechanical training. During World War I, temporary airfields were established across the country to train pilots and ground crews. The only permanent training facilities were a flight school at Rockwell Field, North Island, San Diego, California, and an aerial photography school at Langley Field, Virginia.

Permanent training facilities for the Army Air Corps were constructed after the passage of the Air Corps Act of 1926. Among other provisions, the law authorized additional men and aircraft, and directed the Chief of the Air Corps to develop a five-year plan for implementing the legislation. Although the law did not mention new installations, the expansion of Army aviation implied new facilities. In 1931, the Air Corps Training School and Aviation Medicine School was moved from temporary facilities at Brooks Field to newly-constructed Randolph Field, in San Antonio, Texas. The entire training complex at Randolph Field was designed using the Spanish Colonial Revival architectural style. The educational buildings were part of a complete instructional facility, unified in both purpose and architectural style (Figure III-27).

The Army Air Corps established specialized training facilities at other air fields, including the 1931 Air Corps Tactical School at Maxwell Field, Alabama (Figure III-27). Balloon and dirigible training was located at Scott Field, Illinois. In general, classroom buildings constructed for the Army Air Corps training centers continued the Army's tradition of multi-purpose buildings. Classrooms often shared the same building as barracks or administration offices. Because most Army Air Corps installations were constructed during the late 1920s and 1930s, these installations were built according to master plans that integrated the classroom buildings into cohesive architectural designs.

### Navy

Throughout the nineteenth century, the Navy relied on ship-based experience to train sailors and officers. Other than the U.S. Naval Academy, established in 1845 at the abandoned Ft. Severn in Annapolis, Maryland, the Navy provided little formal education for its officers or sailors before the Civil War.

During the late nineteenth century, the growing recognition of the importance of the study of military science prompted the Navy to establish educational programs beyond the Naval Academy. In 1884, the Navy established the U.S. Naval War College at Newport, Rhode Island, to train naval and marine officers in the art of warfare. The Naval War College was housed first in an existing building, but then was moved to Luce Hall, completed in 1892 (Figure III-28). The three-story, rusticated-stone building was located in a prominent site overlooking the Coaster's Harbor. The Naval War College building's long rectangular form and eclectic architecture of Flemish-style cross gables would have been suitable to a New England college campus.

The Navy also invested in new buildings at the U.S. Naval Academy at Annapolis, Maryland. Between 1899 and 1908, many of the older academy buildings were demolished and

replaced with French Renaissance stone buildings designed in the Beaux-Arts tradition by the noted architect Ernest Flagg. The new plan included new classroom buildings, library, and large barracks complex in a formal plan oriented toward the river. The new construction reflected the Navy's prominence in establishing the United States as a world power.<sup>5</sup>

Despite the increased construction of schools for officers, the Navy hesitated to expand shore facilities for enlisted sailors. The Navy established ship-based recruit training squadrons at Coasters Island, in Newport, Rhode Island, in 1883 and at Yerba Buena in San Francisco, California, in 1898. However, by the turn of the century, the Navy required sailors with technical knowledge and training to man its modern steel ships. In 1904, the Navy established shore-based training stations at Newport, Norfolk, and San Francisco. No buildings built as classrooms were identified at these locations. In 1905, the Navy opened the Great Lakes Training Station near Chicago, Illinois. This new station was a completely planned training facility that provided facilities for administration, recruit housing, drill hall, officer housing, and medical care. The instruction building, a monumental-scale, red brick building with classically-inspired terra cotta ornament, included a lecture hall, classrooms, reading rooms, and athletic facilities (Figure III-28).

In 1919, Congress approved the selection of a site in San Diego, California, and in 1923, the Navy opened the U.S. Naval Training Center, San Diego, to train new recruits and fleet personnel. The Navy Public Works staff, including some of the same architects who prepared plans for the Naval Air Station at North Island, designed the original buildings. The station started with four schools, Preliminary Radio, Yeoman, Bugler, and Band, and expanded to include eleven schools by the end of the 1920s.<sup>6</sup> No buildings were identified specifically as classrooms, indicating that the schools were conducted in multi-purpose buildings and aboard ship.

The Navy also established specialized training centers. The Navy renovated the old Naval Observatory in Foggy Bottom, Washington, D.C. for the U.S. Naval Medical School in 1902. The renovated building contained classrooms, library, laboratory, and museum.

During the 1930s, the Navy added a new campus to its aviation training facility at Naval Air Station, Pensacola, Florida. This major expansion included classrooms, specialized training facilities, barracks, instructor housing, and new flight line support buildings, executed in Georgian Colonial Revival architecture (Figure III-29). The new campus was known as the "Annapolis of the Air."<sup>7</sup>

### Marine Corps

During the nineteenth century, the Marine Corps did not operate separate educational facilities. Marine Corps officers attended Navy or Army schools, and recruit training was conducted at the Navy yards at Norfolk and Mare Island.

The first Marine Corps school was the School of Application opened at the end of the nineteenth century at the Marine Corps Headquarters in Washington, D.C. Around 1910, the government established a Marine Officers School at Port Royal, South Carolina. Between 1900 and World War I Marine Corps schools operated at various times in various locations, including the Advanced Base School in Philadelphia, a Field Artillery School in Annapolis, and a Machine Gun School in Pensacola.<sup>8</sup> These early Marine Corps schools utilized existing buildings. One exception was the Marine Corps Headquarters, which was rebuilt between 1903 and 1907 to form an enclosed quadrangle lined by brick barracks and officers' housing.

As the role of the Marine Corps as an expeditionary force developed, its recruit training needs grew. In 1915, the Marine Corps acquired the old Port Royal navy yard and established

the Parris Island recruit depot. To meet the demands of World War I, the Marine Corps established another base at Quantico, Virginia, for advanced training of officers and enlisted men. During the war, Quantico consisted of tents mired in mud. For the most part, the marines received their training in the field or in temporary buildings. Permanent construction was initiated at these two installations during the late 1920s and early 1930s.

Quantico became a center of Marine Corps education and included both vocational and professional schools. By 1921, the officer courses were consolidated into the Marine Corps School, which offered a company officer and a field officer course. The Marine Corps Institute, which produced correspondence courses for the service, began in 1921. With all of this activity came a concurrent increase in construction, as the Navy Department built new, permanent, brick barracks, administrative buildings, and support facilities in Colonial Revival architecture.

In 1921, the Marine Corps established a second recruit depot in San Diego, California. The Navy retained well-known architect Bertram G. Goodhue to design the installation. The recruit depot included large barracks with messes and classrooms in a master plan that resembled a college campus. The barracks, designed in a simplified Spanish Mission Revival style, were prominent elements in the master plan.

### **Association**

Classroom buildings may be associated with several important historic contexts: the development of military education and training and the rise of military professionalism; the history and development of individual installation; architectural design; and, installation planning. Buildings associated with the military's educational system may have been built to serve multiple uses, or have been adapted from existing buildings. Thus, when evaluating an installation's role in education and the remaining properties that represent that role, buildings other than those built specifically as classrooms must be examined. The Chronological Overview (Part I of this report) and the Education Theme (Part II) provide background information necessary to evaluate the historical significance of this property type.

The contexts of architectural design and installation planning are relevant to buildings and installations built specifically as educational facilities. The Planning and Architecture Theme (Part II) provides the historic context for military architecture and planning. Military properties related to education often were designed by prominent architects or received high levels of design from military architects and engineers. An individual school building may be the work of a master or may embody the distinctive characteristics of its period of construction. Installations designed as schools and constructed as part of a single effort under a master plan can be significant examples of community planning and should be evaluated as entire complexes. Additional research in non-military sources may be necessary to develop fully the appropriate historic context for assessing a property associated with an important architect or important developments in community planning.

### **Integrity**

To possess the integrity necessary to convey their significance, educational and classroom buildings should retain most of their original design, materials, workmanship, and setting from their periods of construction. Character-defining features of the majority of extant military classroom buildings include the ornamentation and materials defining the particular architectural style of the building, regular pattern of exterior windows and doors, and multi-story height. Educational

buildings on military installations often are prominent buildings in key locations in the installation plan.

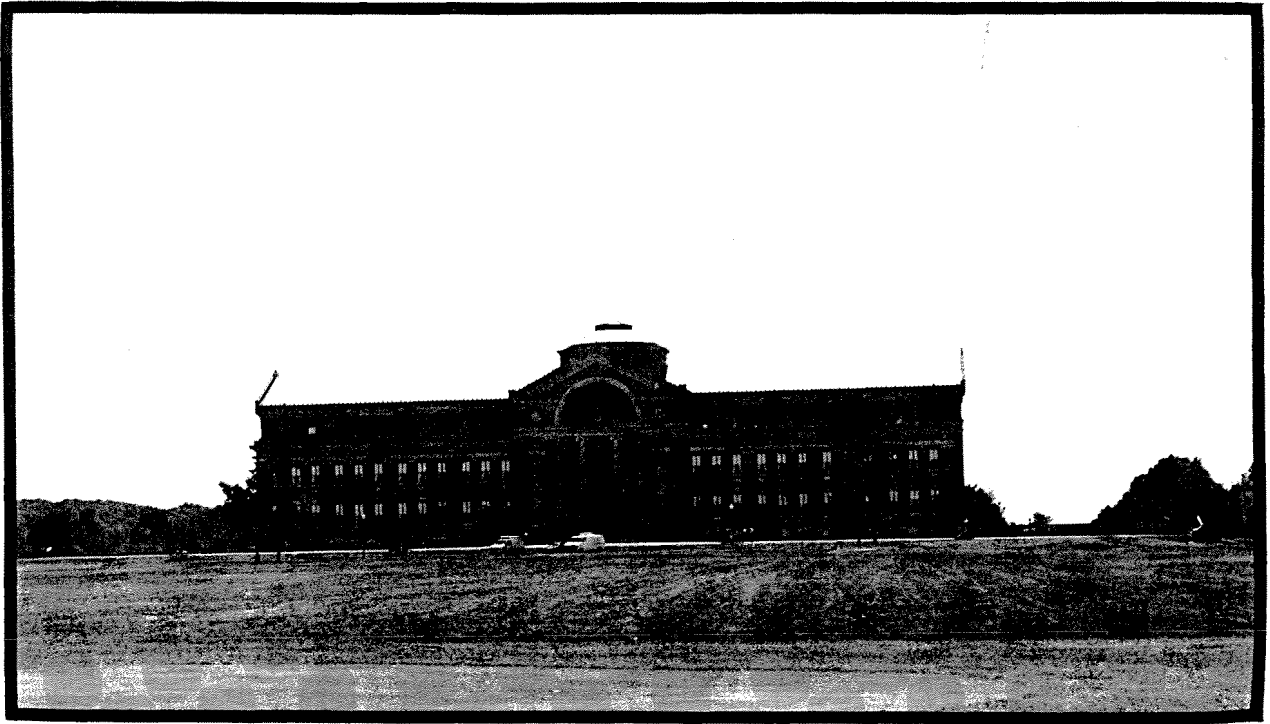
On installations built as unified "campuses" with an educational mission, classroom buildings share design features in common with the other installation buildings. These features also should remain intact for the building to convey its period of significance. In addition, the relationship among buildings in a campus installation plan should remain relatively intact.

Typical alterations to this building type include replacing or covering original windows and doors. In cases of subsequent additions or modifications, the building may retain integrity if it retains the majority of its character-defining features, particularly its setting in an overall plan, basic form, materials, and pattern of openings.



**Figure III-24.** 1881 Post Headquarters, also served as School of Application for Infantry and Cavalry (Building 44, Ft. Leavenworth). The building originally had a two-story veranda on the east elevation, as well as the existing veranda on the south elevation, *above*. Grant, Sheridan, Sherman, and Wagner Halls, comprised of two former Ordnance storehouses constructed in 1859 with clock tower added in 1904 (Building 52, Ft. Leavenworth, Kansas), *below*.

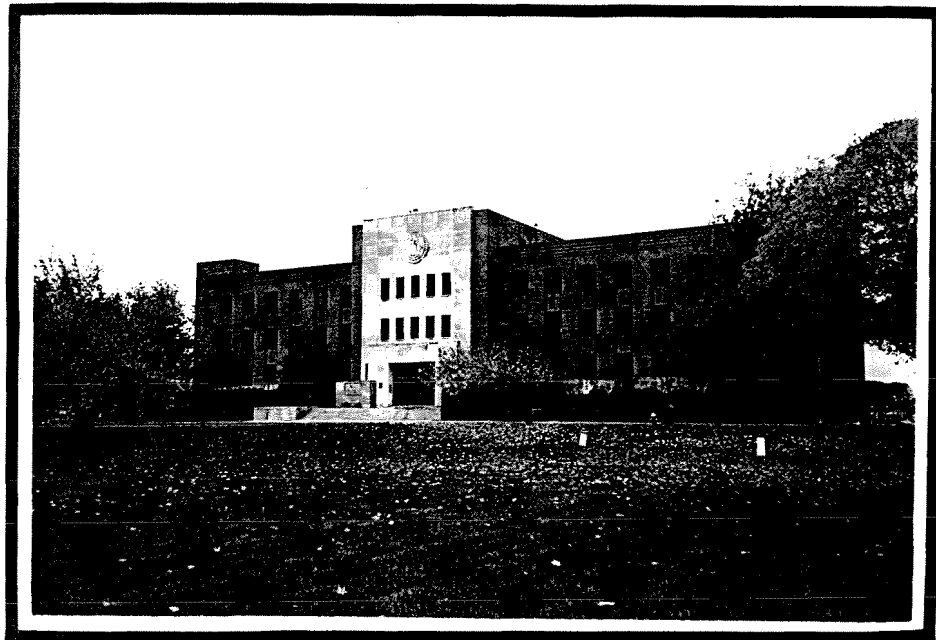
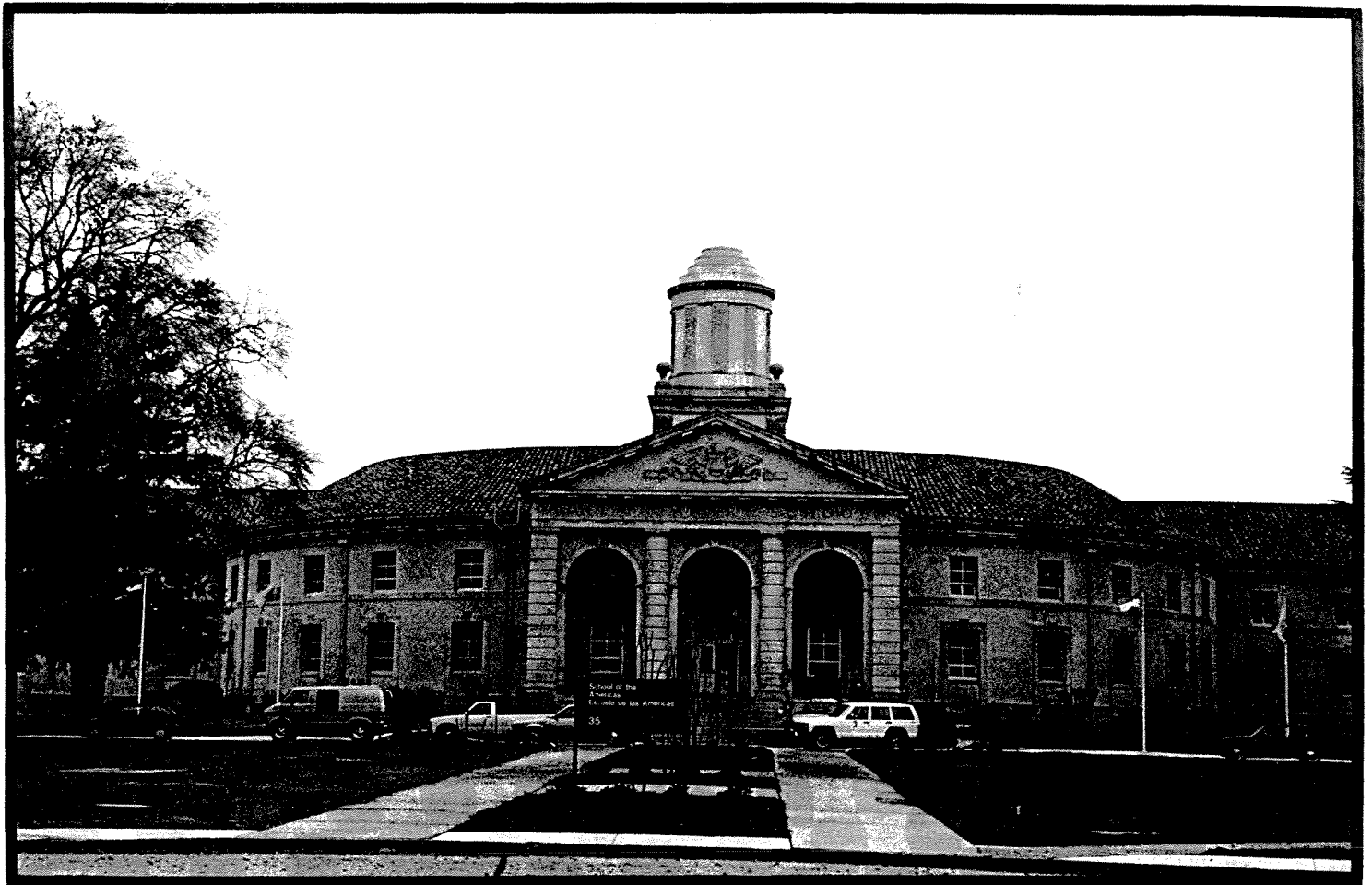




**Figure III-25.** Army War College, constructed 1902-1908 and designed by Charles McKim, at Ft. McNair, Washington, D.C.

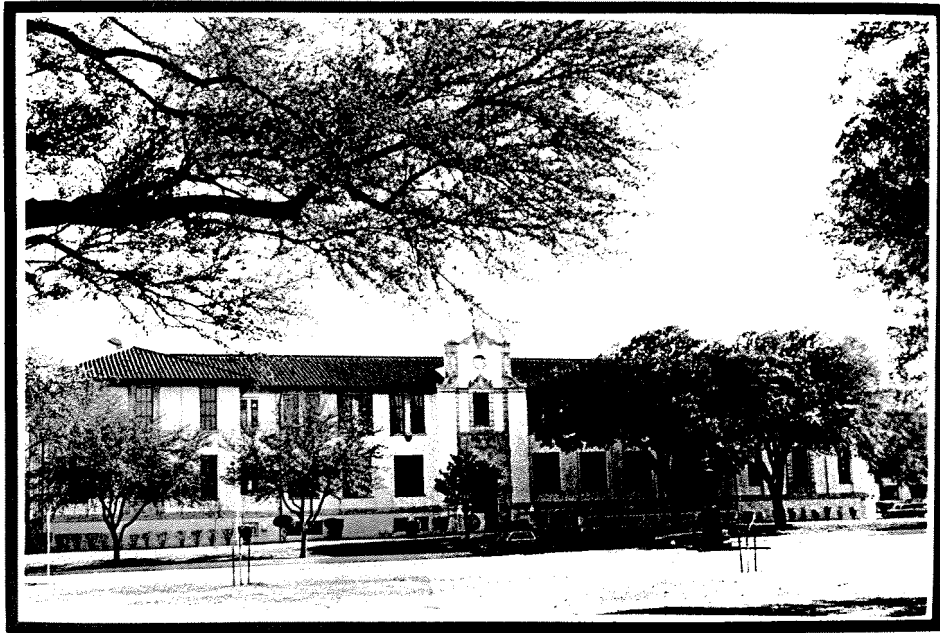






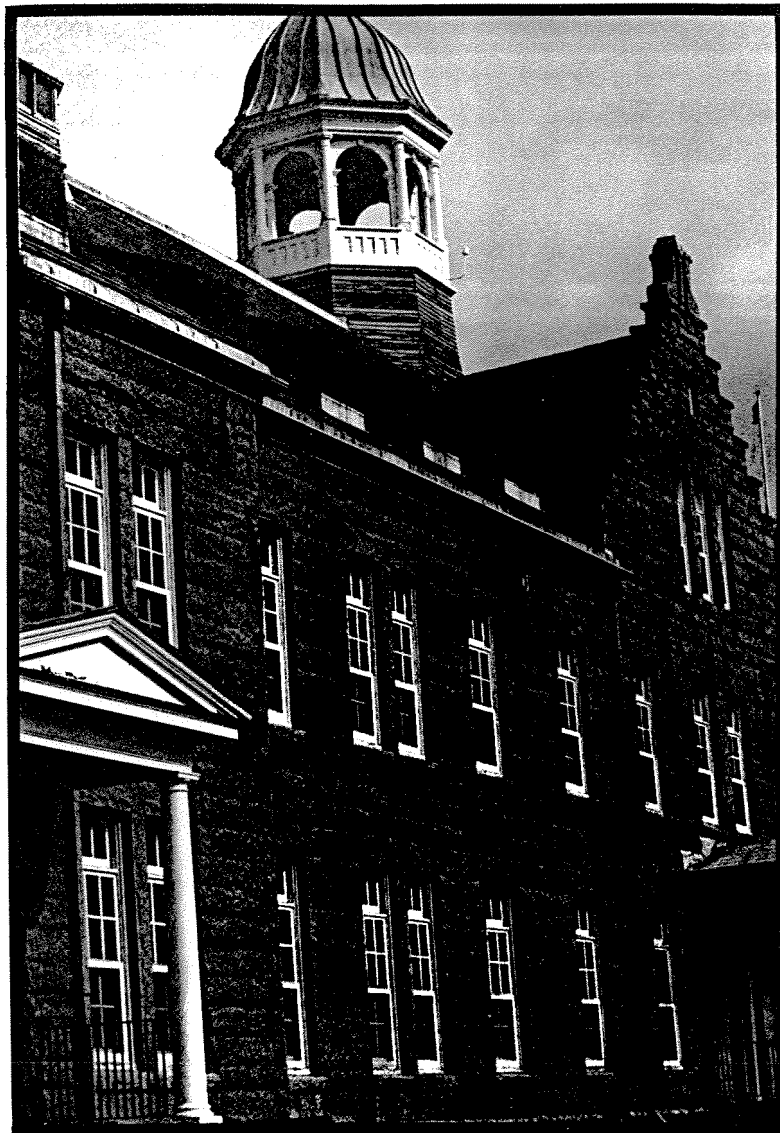
**Figure III-26.** 1935 Infantry School (Building 35, Ft. Benning, Georgia), *above*. Russel Hall designed by architect Harry Sternfeld and constructed in 1936 (Building 286, Ft. Monmouth, New Jersey), *below*.





**Figure III-27.** 1931 Cadet School (Building 900, Randolph AFB, Texas), *above*. 1931 Air Corps Tactical School (Building 800, Maxwell AFB, Alabama), *below*.





**Figure III-28.** Luce Hall constructed in 1892 for the Naval War College (Building 1, Naval Education and Training Center, Newport, Rhode Island), *above*. 1906 Instruction Building (Building 3, Great Lakes Naval Training Center, Illinois), *below*.





**Figure III-29.** 1940 Auditorium/Chapel building (Building 634, Naval Air Station Pensacola, Florida)





## Drill and Riding Halls

### Description

Drill and riding halls were constructed to provide indoor facilities for training activities. These buildings are large rectangular structures enclosing a great expanse of open interior space. Drill halls are not a typical property type found on all installations; they usually are limited to Army cavalry posts, or in at least one instance, Navy training stations. Cavalry riding halls were located near stable complexes, while drill halls were located near barracks.

### Evolution

#### Army

The cavalry riding hall was introduced on Army posts when the Army consolidated cavalry units on larger installations and expanded facilities for the maintenance, care, and training of horses. The Quartermaster Department issued plans for riding halls during the 1880s. The earliest drill halls were rectangular buildings with large double doors at each gable end. The buildings were lit by windows along the sides and in the gable ends. Often the long gable roof was punctuated by dormers. The earliest examples identified in this study were constructed in 1889 (Figure III-30). During the first decade of the twentieth century, the Quartermaster Department revised its drill hall plan to include cross gables, a clerestory, and shaped gable ends (Figure III-31).<sup>9</sup> At posts with two riding halls, each served a different function. For example, a 1916 map of Ft. Riley indicates that the smaller 1889 riding hall was used as the post riding hall, while the 1908 riding hall was designated as the school riding hall.<sup>10</sup> Other cavalry posts that did not have riding halls often were located in areas with weather suitable for year-round outdoor training, such as Ft. Bliss, Texas and Ft. Huachuca, Arizona.

The Army continued to construct cavalry drill halls through the 1930s; however, the purpose of the building was changing. The riding halls constructed during the inter-war years reflect local interest in recreational horse-related activities, such as polo, rather than cavalry drill.

No extant examples of infantry drill halls were identified during this study. The infantry generally trained on outdoor parade grounds. An enclosed infantry drill hall was constructed at Plattsburgh Barracks, New York, in 1895, but burned in 1917. After 1900, the Quartermaster Department issued one standardized plan for a combined drill hall and gymnasium; however, the infantry drill hall was not a prevalent building type on Army installations.<sup>11</sup>

#### Navy and Marine Corps

The most dramatic changes to naval education came with the development of shore-based facilities for the training of recruits. Until 1904, the Navy operated a training squadron at Newport, where recruits received a combination of land-based training combined with cruises aboard sailing ships. In 1904, the Navy finally recognized that sailing ships could not train new recruits in the technically complex duties of the modern Navy. After abolishing the Training Squadron, the Navy established three training stations at Newport, Norfolk, and San Francisco. In 1905, it opened its new facility at Great Lakes, Illinois. Henceforth, recruits received four months training on shore, and then joined the fleet. With minor variations, this system has remained.<sup>12</sup>

The first fully planned and architecturally cohesive recruit center was the Great Lakes Training Station. A drill hall was constructed in the recruit training area. The drill hall is a prominent building in the station's master plan, located along the main parade field. The building was constructed with a steel frame, though it was clad in brick with ornate, Beaux-Arts classical architecture (Figure III-32). The steel frame enabled the architect to create a large span without vertical supports that provided a wide open area for drill. The building also housed an armory, dispensary, classroom, and doctor's office.<sup>13</sup> Later naval training stations and marine recruit depots, including San Diego, Parris Island, and Quantico, conducted drill outdoors and did not construct drill halls.

### **Association**

Drill and riding halls are related to the development of military training and to an installation's mission. Nineteenth- and early twentieth-century riding halls are associated with cavalry training, while mid twentieth-century riding halls are associated with recreational uses. Drill halls are associated with the training of soldiers and sailors, often new recruits.

Drill and riding halls may possess the significance necessary to meet the criteria for listing as a building in the National Register of Historic Places for their association with military education and training and as representatives of a distinctive type. They also should be evaluated as possible contributing elements in a potential historic district related to the installation's educational mission, historical development, or design as a significant and distinguishable entity.

### **Integrity**

To possess the integrity necessary to convey their significance, drill halls should retain most of their original design, materials, workmanship, and setting from their periods of construction. Character-defining features of drill halls include their exterior form, ornamentation evoking a particular architectural style, and pattern of exterior windows and doors. If the building is evaluated as a single building, it also should retain its interior integrity, which is defined by clear, open space. If a drill or riding hall is evaluated as part of an historic district, it should retain the design features that define the architectural character of the installation. Typical alterations to this building type include the replacement of original windows and doors. In cases of subsequent additions or renovations, the building still may possess integrity if it retains the majority of its character-defining features, particularly its setting, exterior form, materials, and pattern of openings.



**Figure III-30.** 1889 Cavalry Riding Halls at Ft. Riley, Kansas (Building 202), *above*, and at Ft. Leavenworth, Kansas (Building 86), *below*.





**Figure III-31.** 1907-1908 Cavalry Riding Halls, Quartermaster standardized plan no. 97-A: F.E. Warren AFB [formerly Ft. D.A. Russell], Wyoming (Building 314), *above*, Ft. Riley, Kansas (Building 127), *middle*, and Ft. Leavenworth, Kansas, (Building 302), *below*.





**Figure III-32.** 1906 Drill Hall (Building 4, Great Lakes Naval Training Center, Illinois).





### NOTES, CHAPTER 3

1. Maps of Ft. Monroe from 1830, 1843, and 1869 do not indicate a school building. National Archives and Records Administration, Cartographic Branch, Record Group 77, Fortifications File, Ft. Monroe, Virginia.

2. NARA, Cartographic Branch, RG 92, Blueprint File, Ft. Monroe, Virginia, "A Plan of Fort Monroe, Virginia" (1889).

3. Arthur J. Stanley, "Fort Leavenworth: Dowager Queen of Frontier Posts," *The Kansas Historical Quarterly*, Vol. XIII, No. 1 (Spring 1976).

4. John Paul Graham, Mary Beth Gatzka, and E. Kipling Wright, *The Architectural Heritage of Fort Monroe: Inventory and Documentation of Historic Structures Undertaken by the Historic American Buildings Survey*, vol. 1 (Washington, D.C.: Historic American Buildings Survey, National Park Service, Department of the Interior, 1987), 29. "Building Location List" (MSS, Directorate of Engineering and Housing, Ft. Monroe, Virginia, n.d).

5. Jack Sweetman, *The U.S. Naval Academy* (Annapolis, Maryland: The Naval Institute Press, 1979), 141-144.

6. Paolo E. Coletta, ed., *United States Navy and Marine Corps Bases, Domestic* (Westport, Connecticut: Greenwood Press, 1985), 559-560. Kaplan and Associates, Architects, "The Historical/Architectural Significance of Buildings on the Naval Training Center, San Diego, California (MSS, U.S. Naval Training Center, San Diego, 1989), 11-12.

7. Historic Property Associates, "Architectural and Historical Survey of the Naval Air Station, Pensacola" (MSS, Public Works Department, Naval Complex Pensacola, 1986), 34.

8. Alan R. Millet, *Semper Fidelis: The History of the United States Marine Corps* (New York: Macmillan Publishing Company, 1980), 119; Secretary of the Navy, *Annual Reports*, (1910), 802; (1915), 765.

9. NARA, Cartographic Branch, RG 77, Standard Plans of Army Post Buildings, 1891-1918, (P.I. NM-19, Entry 411), Plans 97, 97-A.

10. NARA, Cartographic Branch, RG 92, Post and Reservation File, Ft. Riley, Kansas, "Post Map of Ft. Riley, Kansas" (Revised to September 1916).

11. NARA, Cartographic Branch, RG 77, Standard Plans of Army Post Buildings, 1891-1918, Plans 96, 225.

12. John D. Alden, *The American Steel Navy* (Annapolis: Naval Institute Press, 1972), 266; Navy Department, *Annual Report* (1915), 376-378.

13. Hasbrouck Peterson Associates, "Comprehensive Historic Buildings Survey Great Lakes Naval Training Center" (MSS, Naval Training Center, Great Lakes, Illinois, 1987), 94.



## CHAPTER 4

### HEALTH CARE

#### Dispensary/Infirmary

##### Description

The dispensary or infirmary was a small medical facility constructed near the central area of an installation to provide primary short-term care for military personnel. Dispensaries and infirmaries supplemented the post hospital or naval hospital. The dispensaries and infirmaries were generally small, rectangular, one- or two-story buildings constructed of permanent materials.

##### Evolution

###### Army and Army Air Corps

At Army installations, small post hospitals originally provided both long-term and short-term medical care. Hospital plans included a room designated as the dispensary. Hospitals often were located a short distance away from the parade ground to prevent the spread of contagious diseases and to isolate the unpleasant odors accompanying nineteenth-century medicine at isolated posts. As the Army began to consolidate its troops in larger installations during the 1880s and 1890s, hospital complexes increased in size and were located even farther away from the main cantonments. The dispensary apparently evolved as a separate building type located closer the barracks to provide immediate and primary medical care to the larger garrisons of troops at the consolidated installations. The level of care available at dispensaries was similar to the basic care provided in the earlier frontier hospitals.

The earliest dispensary identified in this study was located in Ft. Riley, Kansas (Building 28), constructed in 1889. The Quartermaster Department issued its first standardized plans for dispensaries in 1908 and again in 1910 and 1911 (Figure III-33).<sup>1</sup> The Office of the Quartermaster constructed dispensary buildings only at larger installations. Examples of inter-war era dispensaries were identified at Ft. Leavenworth, Kansas (1927) and at Ft. Benning, Georgia (1931).

###### Navy and Marine Corps

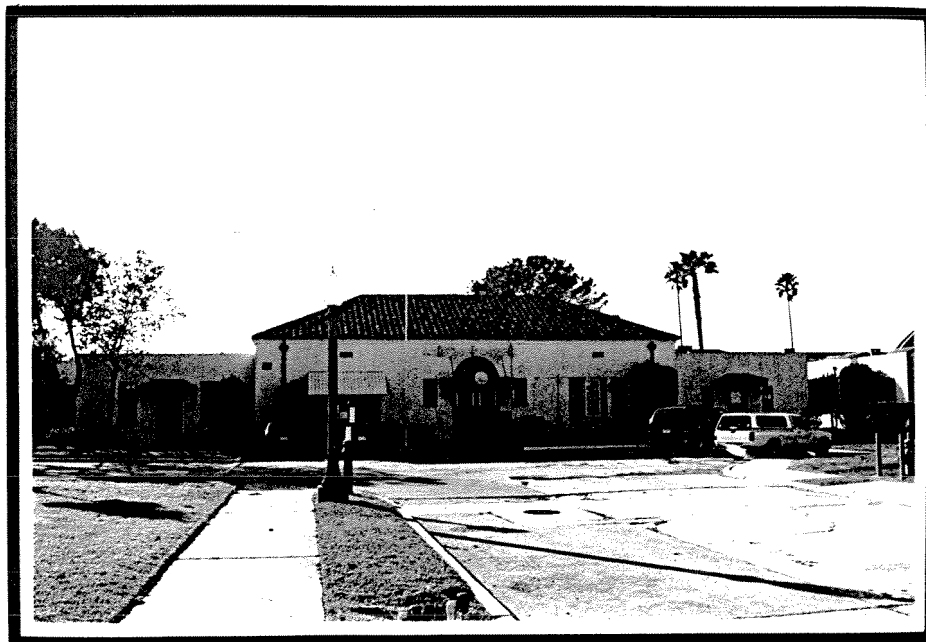
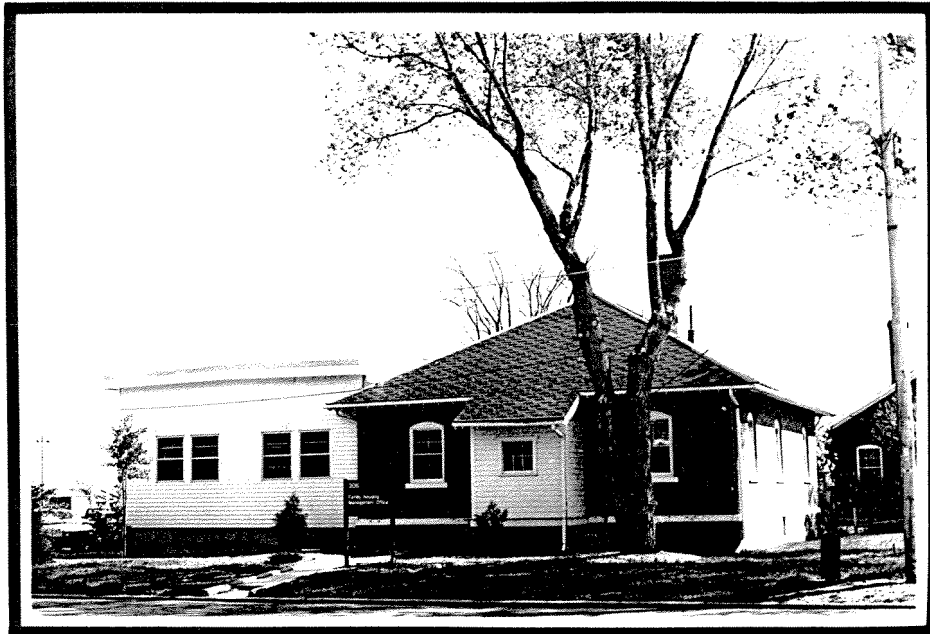
The Navy also used infirmaries to supplement hospitals. The Navy established its hospitals as separate installations, usually near a shipyard, to serve the Navy and Marine Corps personnel of a region and of the fleet. During the twentieth century, the Navy began to construct permanent shore-based training stations, naval air stations, and operating bases with large resident populations. Infirmaries provided primary medical care for the residents of these installations and for the civilian workers at shipyards. Infirmaries also were used to provide medical services while major naval hospitals were under construction, as was the case at Puget Sound, Washington and Charleston, South Carolina navy yards and at the marine base in Quantico, Virginia. The infirmaries generally were simple, one-story structures, often with an architectural treatment similar to the general architectural character of the installation. For example, the dispensary at the Naval Air Station, North Island has the red tile roof and white stucco walls of the air station's more prominent Spanish Mission Revival buildings (Figure III-33).

## **Association**

Dispensaries and infirmaries are associated with the growth of medical services as military installations grew larger and the military provided more services to its personnel and their dependents. They are related to the historic context of military medicine, which is discussed in Part II, Chapter 3 of this report. Dispensaries and infirmaries are minor building types constructed to provide primary medical care and to supplement larger military hospitals. These buildings are not likely to possess individual significance, but may be contributing buildings to an historic district if they retain sufficient integrity from the period of significance of the historic district.

## **Integrity**

No character-defining features specific to infirmaries and dispensaries were identified during this study. Therefore, the standards for assessing the integrity of examples of this building type are the same standards as for evaluating the integrity of any building. To possess architectural integrity, dispensaries and infirmaries should retain most of their original materials, design, and setting. Few pre-1940 dispensaries and infirmaries remain in use as medical facilities; most have been adapted for other uses. In cases of additions or renovations, the building still may possess integrity if it retains the majority of the features that constituted its basic design, including materials, building form, roof shape, porches, pattern of windows and doors, and ornament.



**Figure III-33.** 1909 Dispensary, Quartermaster standardized plan no. 247 (Building 306, F.E. Warren AFB [formerly Ft. D.A. Russell], Wyoming), with addition on the left, *above*. 1919 Dispensary (Building 14, Naval Air Station North Island, California), *below*.



## Hospitals

### Description

Military hospitals are buildings or building complexes constructed for the medical care of military personnel, civilian employees, and dependents. The size of the hospital facility is related directly to the size of the installation or to the geographical area it served. Installation hospitals generally were set apart from the other buildings within the installation plan. Hospitals that served larger regions were located on separate installations devoted exclusively to a medical mission. The architecture of hospitals reflected contemporary medical philosophies of medical care and often included high-style architectural ornamentation typical of the period of construction. Nineteenth-century military hospitals generally had a central block with ward wings and two-story verandas around the building. Early twentieth-century military hospitals followed the same design, but with Colonial Revival or Classical stylistic references. By the 1930s, hospital plans no longer included open verandas. By 1940, the multi-story tower design was adopted as the preferred design for Army general hospitals and for regional naval hospitals.

### Evolution

#### Army and Army Air Corps

Army hospitals fall into two categories: post hospitals and general hospitals. Post hospitals served the personnel at specific installations, while general hospitals served a larger population of troops, regardless of unit. Post hospitals were constructed at most Army forts throughout the nineteenth and twentieth centuries. As the Army grew in size and as medical science improved, the Army constructed general hospitals to better care for the increased number of soldiers, particularly during and immediately after wartime.

Post hospitals evolved from the early system of Army medical care. In 1818, the Army established the office of Surgeon General to oversee the medical treatment of soldiers. Though doctors were assigned to regiments or posts, the condition of medical facilities remained poor. Before the Civil War, post hospitals often were housed in a single room of an existing post buildings or in the damp, stone casements of coastal fortifications. Separate hospital buildings, when built, resembled the quarters or barracks buildings.

By the eve of the Civil War, the Army Quartermaster Department began developing standardized building plans for many building types, including hospitals. Army construction regulations published in 1861, though never officially adopted, influenced Army construction. The unofficial regulations depicted a recommended hospital plan that resembled an enlisted men's barrack with a rear ward wing. This hospital plan could be expanded by the construction of additional ward wings. The Army hospital contained most functions, including dispensary, kitchen, mess room, and hospital steward quarters, within a single building. Support buildings for the hospital complex often included smaller buildings such as a sink (latrine) and a dead house (morgue). The unofficial regulations included a typical post plan, with the hospital located apart from the cantonment.<sup>2</sup>

During the Civil War, the medical treatment and care of Army personnel improved. After the war, the Army continued to try to improve the general medical care received by troops. In 1867, the Surgeon General issued a circular describing the ideal post hospital: a central two-story block, containing administration offices, flanked by two, one-story ward wings that accommodated 24 beds, with a rear kitchen wing and surrounding veranda. Garrison size determined the size of the post hospital. Most troops were scattered in small installations ranging in size between two



and ten companies of men. For smaller Army installations, the plan could be modified to include only one ward wing. The plan also could be expanded to accommodate 48 beds by extending the ward wings.<sup>3</sup>

In 1870, the Surgeon General published a report on barracks and hospitals in which he praised the 1867 plan as the embodiment of the true principle of hospital construction and a great step forward. Yet, he rated the actual state of Army barracks and hospitals as deplorable. In many cases, older hospitals were still in use. Where new hospitals had been constructed, the Quartermaster Department had ignored the 1867 hospital plan. To control hospital construction, the Secretary of War issued regulations in 1870 that directed the Quartermaster Department to construct post hospitals using specified appropriations, not general construction funds.<sup>4</sup>

Regulations for Army post hospital design were issued regularly throughout the late nineteenth and early twentieth centuries (1871, 1877, 1888, and 1906). In general, these plans remained remarkably similar to the 1867 plans (Figure III-34). For example, in 1871, the Surgeon General issued plans for permanent and temporary hospitals. The standard post hospital design consisted of a two-story central block flanked by two one-story wings and accommodated 24 beds. The regulations also included two plans for a two-story, 12-bed hospital and a plan for a provisional hospital for temporary posts. A character-defining feature of these hospitals is the wide surrounding veranda. The Army hospitals of this era also incorporated Victorian design elements, such as bay windows and wood spindlework. Examples of these hospital plans can be found at many Army posts active during the late nineteenth century (Figure III-35).<sup>5</sup>

In one instance, the Army built a large hospital to care for veterans. In 1875, the Barnes Hospital at the Soldiers' Home near Washington, D.C. contained 50 beds and had a three-story central block flanked by two-story ward wings. The building was an elaborate, French Second Empire style building with a tall mansard roof, bracketed cornices, and hooded, arched windows (Figure III-36). Though the Barnes Hospital was much larger than the post hospitals of the time, it followed the basic plan of post hospitals.

During the 1880s and 1890s, the Army began to consolidate troops into larger, permanent posts. The size of post hospitals increased to serve the larger garrisons. During the same era, concerns about poor living conditions for Army personnel led to improvements in Medical Corps housing. Before 1888, medical personnel lived in rooms located in the hospital. In 1888, the Army authorized separate housing for the hospital steward, and the Quartermaster Department subsequently issued standardized plans. After this time, the Army provided separate housing and barracks for medical personnel. Many nineteenth- and early twentieth-century post hospitals have detached hospital stewards quarters next to the hospital.

Post hospitals during the early twentieth century retained the basic arrangement of the late nineteenth-century hospital plan, the two-story central administration block, flanked by two ward wings with porches along the wings, but were enlarged. The increase in size was accommodated through raising the height of the ward wings from one to two stories and constructing additional rear wings. The architectural character of the hospitals reflected Colonial Revival or Classical Revival design (Figure III-37). One significant change in hospital interior layout was that doctors could concentrate more patients in a single ward as they learned more about the causes of the spread of diseases and the importance of disinfectants. As the size of post hospitals increased, the number of medical personnel increased, and more buildings were needed to maintain the hospital complex. Post hospitals often grew into multi-building complexes, with a main hospital accompanied by an isolation hospital, kitchen, morgue, laundry, power plants, and hospital stewards quarters (Figure III-38).

By 1917, the Army had 131 post hospitals and five base hospitals. Base hospitals were expanded versions of post hospitals that provided more surgical and medical services and often comprised building complexes. Base hospitals, such as those at Ft. Sam Houston and Ft. Bliss, contained 200 beds each; with the addition of pavilion wards, these hospitals could be increased to a capacity of 700 and 900 beds respectively.<sup>6</sup>

During the nationwide Army construction program initiated in 1926, the Army built many new, permanent posts and airfields. Hospitals were constructed at all new installations. The standard design still retained the characteristic central block with flanking wings, though the height was increased to three stories (Figure III-39). The long, open verandas characteristic of nineteenth- and early twentieth-century hospitals disappeared from the basic plan and sometimes were replaced with smaller sun porches. Medical Corps and Nurses Corps barracks often were constructed next to the hospital (Figure III-39).

The second type of Army hospital was the general hospital. General hospitals were established to treat general and specialized medical problems and all injuries. The staff at post hospitals sent personnel suffering from obscure or serious illnesses to general hospitals. The system of general hospitals evolved slowly from a series of temporary wartime hospitals to a system of permanent general hospitals.

During the Second Seminole War, the Medical Department established general hospitals near the most important supply depots. General hospitals also followed the armies during the Mexican War. These general hospitals occasionally were housed in a building, but more were placed in tents.<sup>7</sup>

The overwhelming medical needs of the Civil War resulted in the construction of buildings that were designed specifically as Army general hospitals to care for all soldiers regardless of unit. The Army utilized a "pavilion" type of hospital, which consisted of wards that were physically separated from one another and connected by corridors or covered walkways (Figure III-40). Because doctors mistakenly believed that diseases were transmitted through "vapors," they believed the pavilion design would prevent the spread of disease. Though their understanding of epidemiology was wrong, the physical separation of patients in these hospitals produced a low death rate for the time. By the close of the war, the Army had 204 general hospitals, with a total of 136,894 beds. The first pavilion-type hospital was built at Parkersburg, West Virginia, followed by hospitals at Louisville, Memphis, Chattanooga, and Jeffersonville, Indiana.<sup>8</sup>

In 1887, the military created the first peacetime general hospital at Hot Springs, Arkansas. However, most soldiers still were treated at post hospitals until the Spanish-American War and the Philippine Insurrection. The Army established general hospitals to treat the troops returning from those conflicts. During the Spanish-American War, the Army had built a temporary general hospital at Washington Barracks. In 1908, the Army relocated the temporary facility to the northern part of the District of Columbia to form a permanent peacetime general hospital, which later was renamed the Walter Reed Army Medical Center (Figure III-41). Sick and wounded soldiers returning from the Philippines were treated at Letterman General Hospital at the Presidio of San Francisco. At Ft. Bayard, New Mexico, the Surgeon General established a specialized general hospital to care for the increased number of tuberculous cases. General hospitals continued to follow the pavilion plan of a main hospital surrounded by a series of detached individual wards. By 1917, the Army had four general hospitals.

The demands of World War I again caused the Army to expand its general hospital system. Post hospitals were expanded to serve as regional general hospitals. For example, Ft. Benjamin Harrison, Indiana, was designated General Hospital No. 25 in 1918. The wartime general hospital at Ft. Benjamin Harrison was housed in existing buildings and in temporary, wood-frame

mobilization buildings, and was returned to post hospital status in 1919. The Army also established new general hospitals. By 1918, the number of tuberculosis patients overwhelmed the hospital at Ft. Bayard, which was transferred to a site near Denver, Colorado, and named General Hospital No. 21. It later became Fitzsimons General Hospital. The early plan of Fitzsimons clearly illustrates the dispersed wards typical of the pavilion-plan general hospitals (Figure III-42). By 1929, the general hospital system had expanded to eight Army general hospitals with the addition of Fort Sam Houston, Texas; Beaumont, El Paso, Texas; Sternberg Hospital, Manila, Philippines; and, Tripler Hospital, Honolulu, Hawaii.

During the 1930s, the design of hospitals changed dramatically. Consolidated buildings with massive multi-storied towers replaced the dispersed pavilion plan. This significant change reflected the better understanding of epidemiology. The pavilion plan had developed in answer to concerns that stale air or "vapors" caused disease; now that doctors understood the bacterial causes of disease transmission and the importance of antiseptics, the dispersed pavilion plan was obsolete. The consolidated, tower hospital plan minimized the distances between wards, resulting in savings of staff time and infrastructure, i.e. lighting and heating ducts. The new hospital plan type was developed in the United States; the first example was the Columbia Presbyterian Medical Center, New York, started in 1928.<sup>9</sup> The military quickly adopted this civilian precedent. In 1936, the Surgeon General ordered military planners to develop plans for a new hospital building, with all wards concentrated in a single building, at Fitzsimons. In 1938, Congress approved funds for construction of the new 610-bed hospital, which at the time was the largest single hospital structure ever built by the Army; the building was finished in 1941 (Figure III-43). The building displays the stripped, Art Moderne style popular for large public buildings of the 1930s. The construction of a new general hospital at Ft. Sam Houston, Texas, also was started during the late 1930s and also followed the consolidated, multi-story plan with Art Moderne exterior design.

### Navy and Marine Corps

Health care for Navy and Marine Corps personnel began in 1798 when Congress authorized a Marine Hospital Fund to care for Navy personnel and members of the merchant marine. In 1811, the Navy authorized a separate hospital fund. In 1812, Benjamin Henry Latrobe drew plans for a marine hospital in Washington, D.C., though it was never constructed. For its early hospitals, the Navy converted existing buildings to provide medical care. For example, at Norfolk Navy Yard, a converted storehouse served as a hospital in 1813.

The Navy began to build hospitals during the 1820s. The typical naval pattern for establishing hospitals was to locate them near major ports, often in the same cities as naval shipyards. Naval hospitals were intended to serve the fleet, not just the small resident population at yards. The Navy acquired land for hospitals near its yards in Washington, D.C. (1821); Chelsea, Massachusetts (1823); Brooklyn, New York (1824); Philadelphia, Pennsylvania (1826); and, Norfolk, Virginia (1827). The Pensacola, Florida yard had sufficient land for a hospital. In 1827, the Navy began permanent hospital construction at Norfolk, Pensacola, and Philadelphia. Throughout the 1820s, funding for hospital construction was uneven, resulting in construction delays. The Norfolk Naval Hospital, only partially complete, finally opened in 1830. In 1832, Congress made additional appropriations to build hospitals at Chelsea, opened in 1836, and at Brooklyn, and to continue hospital construction at Pensacola.

During the nineteenth century, the Navy commissioned professional architects to design hospitals. Philadelphia architect John Haviland designed the Norfolk Naval Hospital, and Philadelphia architect William Strickland designed the Philadelphia hospital and asylum, opened in 1833 (Figure III-44). These architect-designed hospitals generally were monumental, masonry public buildings with strong classical references. For example, the hospital at Norfolk was

constructed of stone and had a three-story central block with a Doric portico of ten columns, flanked by two side wings. It was designed to accommodate between 300 to 500 beds. Fireproofing was also a concern; the U.S. Naval Asylum at Philadelphia was the second building in the United States to use cast iron columns, while the Norfolk Naval Hospital had arched brick ceilings.<sup>10</sup>

During the nineteenth century, naval hospital construction continued slowly. By 1894, the Navy had twelve hospitals containing 823 beds. Naval hospitals were located at Widows Island, Maine (closed); Portsmouth, New Hampshire; Boston, Massachusetts; Brooklyn, New York; Philadelphia, Pennsylvania (constructed in 1866); Washington, D.C. (originally located on Pennsylvania Avenue and 10th Street, SE; moved to Old Naval Observatory in 1906); Annapolis, Maryland; Norfolk, Virginia; Pensacola, Florida; Mare Island, California (established 1869); Sitka, Alaska (closed); and Yokohama, Japan. Prevalent hospital plans included the block plan, represented by the Brooklyn and Norfolk hospitals, the corridor plan, represented by the Portsmouth hospital, and the pavilion plan, represented by the Philadelphia and Mare Island hospitals (Figure III-45).<sup>11</sup>

The Navy recognized that the total capacity of beds and the existing hospital buildings were inadequate to serve the expanding, modern Navy and were obsolete in design and equipment. Between 1893 and 1913, older naval hospitals underwent extensive renovation, or were replaced by new buildings. Some examples of hospital renovations included the Norfolk Naval Hospital, which received large rear wing additions between 1907 and 1910 designed by Washington architects Wood, Donn and Deming. The hospital at Mare Island was rebuilt in 1900 because of earthquake damage suffered in 1898. The new hospital was designed by Washington, D.C., architect W.M. Poindexter (Figure III-46). New hospitals were designed not only to meet the medical needs of station personnel, but also to serve as strategic points for mobilization of naval forces in warfare. Therefore, naval hospitals were designed to handle extensive expansion of bed capacity in times of emergency.<sup>12</sup> In addition, the design of the new hospitals incorporated up-to-date heating and electrical systems and medical facilities, including laboratories and X-ray and operating rooms.

In 1903, Congress appropriated money to construct a new Washington Naval Hospital on Observatory Hill in Washington, D.C. The complex included a three-story administration building, a subsistence and operating building, four small one-story pavilion wards, a power plant, laundry, and stable. Architect Ernest Flagg designed the plans and construction began 1904. The complex also included the contagious disease hospital, quarters for hospital corpsmen, sick officers' quarters, nurses' quarters, and three houses for junior and senior officers.<sup>13</sup> Ernest Flagg also designed a second hospital pavilion plan at the Naval Academy at Annapolis, constructed in 1907 (Figure III-47).

Between 1900 and World War I, the Navy introduced a plan called the "'type' naval hospital plan" with the construction of additional new hospitals at Newport, Rhode Island; Portsmouth, New Hampshire; and, Chelsea, Massachusetts (Figure III-48). This plan consisted of the main hospital of 134 beds; a contagious disease hospital of 40 beds; a power, laundry, and disinfecting plant; and, quarters. The general arrangement of the building resembled a T with a central administration block flanked by two ward wings, and the operating wing towards the rear. Solariums were incorporated into the plan. Hospitals constructed at Great Lakes, Illinois, and Puget Sound, Washington, also followed this plan, with some modifications.<sup>14</sup>

As the Navy expanded shipyards, training stations, and naval air stations, more hospitals were constructed to serve the expanded resident populations. Hospitals opened at Hospital Point, Pearl Harbor, Hawaii (1915); Charleston, South Carolina (recommended in 1913, constructed

during World War I and rebuilt during World War II); Balboa Park in San Diego, California (1922); Moffett Naval Air Station, California (1930s); and, Pensacola Naval Air Station (1942).

The naval hospitals served both Navy and Marine Corps personnel. As the Marine Corps began to establish its own bases during the early twentieth century, dispensaries were built on the bases to provide immediate, primary care. For example, at Quantico Marine Base, Virginia, the medical facilities, an outpatient dispensary, sick quarters, family hospital and dental clinic, were located in temporary wooden structures. In 1939, the Navy constructed a 270-bed, brick, Georgian Revival hospital at Quantico. The hospital had a central, three-story block with a two-story portico, flanked by two, two-story wings. The cost of construction was one million dollars.<sup>15</sup>

By the late 1930s, the Navy had outgrown the 1904 Washington Naval Hospital on Observatory Hill and began construction of a new naval hospital in Bethesda, Maryland. The Navy also abandoned the pavilion plan in favor of modern concepts of hospital design. Like the Army general hospitals of the same decade, the new hospital design followed the consolidated, multi-story plan of modern hospitals. The Bethesda Naval Hospital tower is a landmark of streamlined, Art Moderne architecture; it was dedicated in 1942.

### **Association**

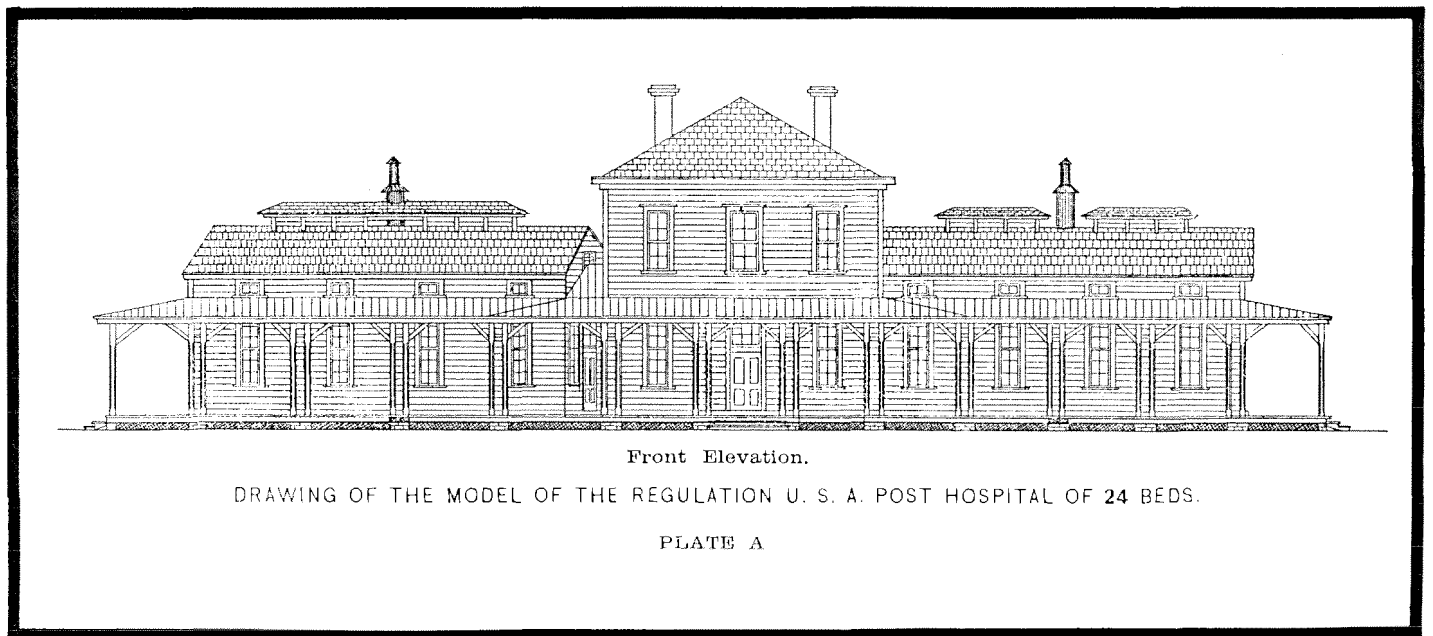
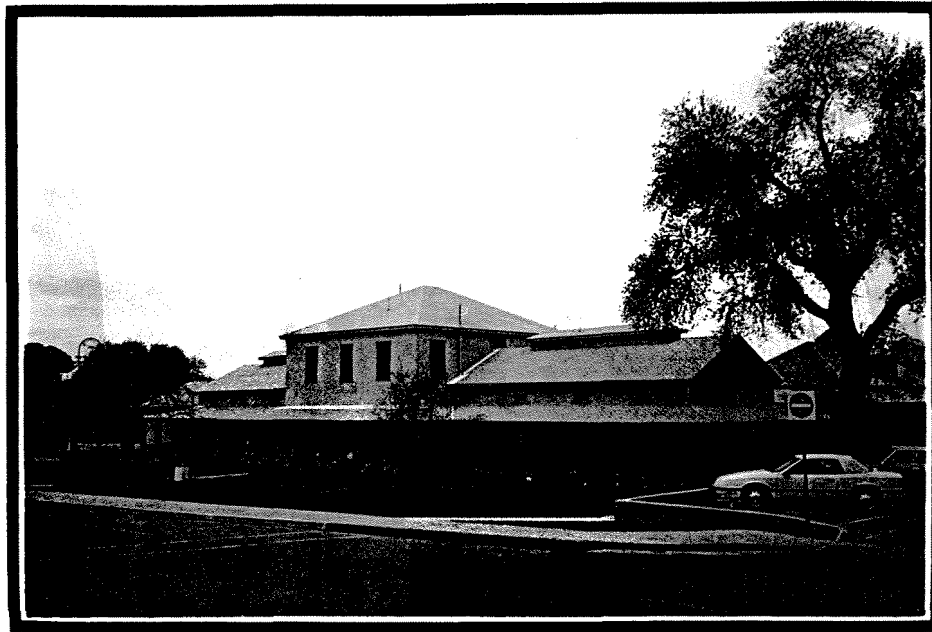
Hospitals are associated intimately with the historical context of military medicine, which is discussed in Part II, Chapter 3 of this report. They represent the medical treatment philosophies of the nineteenth and twentieth centuries, the military's concern for adequate health care for its personnel, and, in some cases, medical research. Hospitals also may be associated with important architects or be good examples of a type of construction or possess high artistic values.

Hospital buildings are major building types. A hospital may possess individual significance because of historical associations or architectural merit, and may be a major contributing building to an historic district. Army post hospitals often were a major element of the installation plan, while naval hospitals usually were located in separate areas and may be considered as separate historic districts.

### **Integrity**

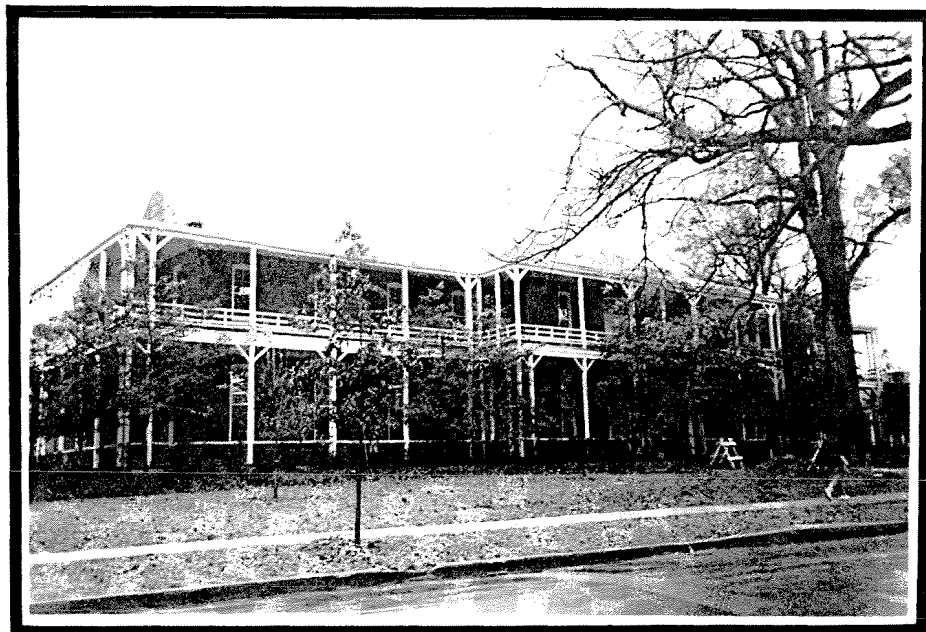
To possess integrity, hospitals should retain most of their design, setting, materials, from their period of significance. However, hospital buildings often are among the most modified of military building types. Hospitals were subject to modifications, additions, and renovations to keep them up to date with medical technology and the growing number of patients. The additions themselves may have attained significance if they illustrate the evolution of medical care and hospital design, or represent a type or method of construction.

Many military hospitals constructed before 1940 no longer function as hospitals. Army post hospitals often have been adapted for use as headquarters buildings, e.g. Forts Myer, Riley, Leavenworth, and Benjamin Harrison. In some cases, character-defining features, including entries, window openings, and porches have been modified. Even in cases of modern additions and renovations, the building still may possess integrity if it retains the majority of its character-defining features. To determine what the character-defining features are, the type of hospital plan represented and the building's original appearance must be identified. Important elements to evaluate when assessing integrity are building plan and exterior shape, materials, roof shape, verandas, pattern of openings, architectural features such as columns, brackets, trim that represent the period of construction, and setting.



**Figure III-34.** Post hospital constructed between 1885 and 1887 (Building 41408, Ft. Huachuca, Arizona), *above*. Typical mid-nineteenth century Army post hospital (From Army Medical Department, "Description of the Models of Hospitals and Tents," prepared for the World's Industrial and Cotton Centennial Exposition in New Orleans, Louisiana, 1884), *below*.





**Figure III-35.** 1883 Post hospital (Building 55, Ft. Leavenworth, Kansas), *above*. 1889 Post hospital (Building 171, Ft. McPherson, Georgia), *below*.







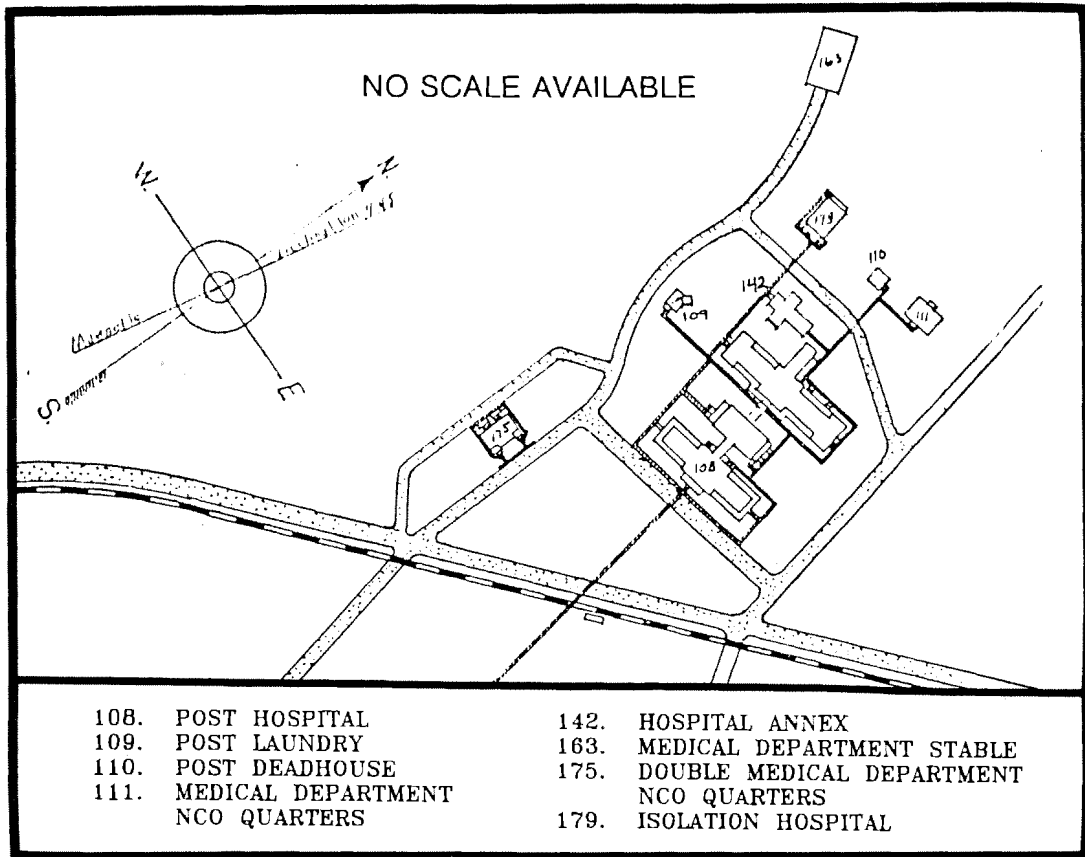
Figure III-36. Drawing of Barnes Hospital at Soldier's Home, Washington, D.C. (From War Department. Surgeon General's Office. *Circular 8. A Report on the Hygiene of the United States Army with Descriptions of Military Posts*. Washington, D.C.: Government Printing Office, 1875.)





**Figure III-37.** 1902 Post hospital (Building 198, Ft. Leavenworth, Kansas), *above*; compare with 1883 post hospital. 1908 Post hospital (Building 600, Ft. Benjamin Harrison, Indiana), *middle*. 1908 Base Hospital (Building 2000, Ft. Sam Houston, Texas), *below*.





**Figure III-38.** Ft. Riley hospital complex in 1916 (From *Post Map of Fort Riley, Kansas* in National Archives, Cartographic Branch, RG 92, Fort Riley), above. Isolation hospital (Building 509, Ft. Riley, Kansas), below.

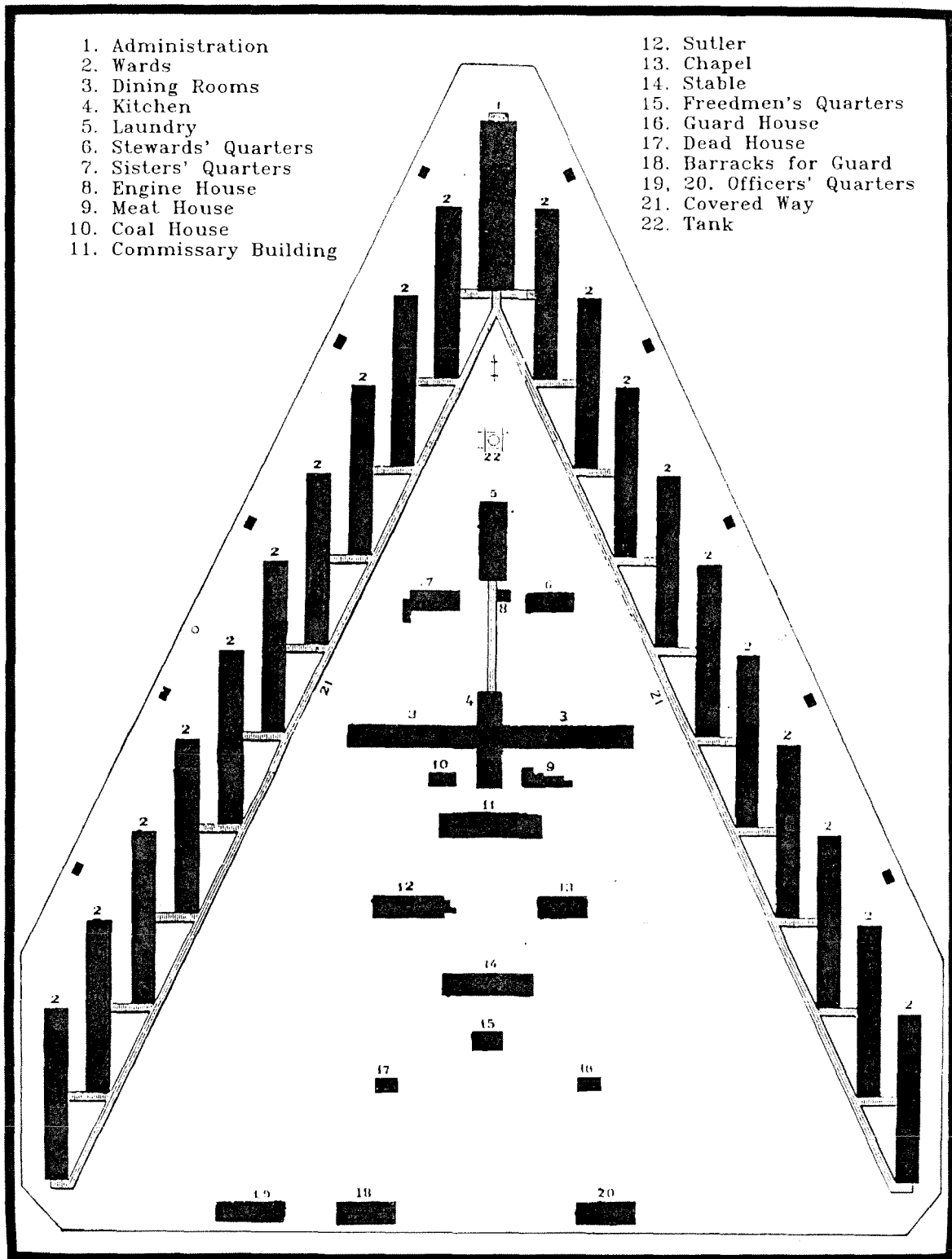




**Figure III-39.** 1932 Post hospital (Building 558, Langley AFB, Virginia), *above*. 1934 Medical detachment barracks (Building 566, Langley AFB, Virginia), *below*.

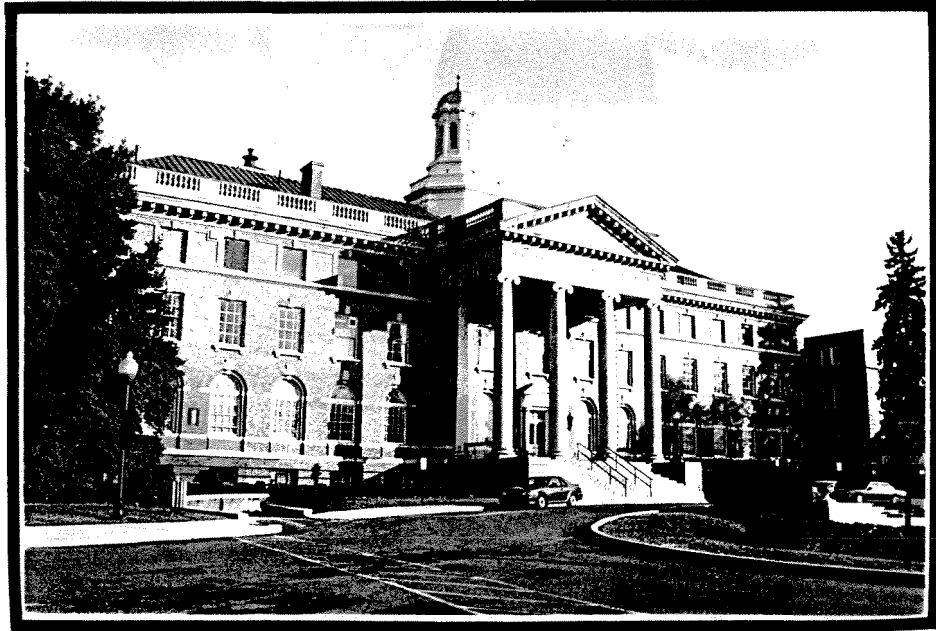






**Figure III-40.** Plan of wartime mobilization hospital, Lincoln General Hospital, Washington, D.C. (From Surgeon General's Office, *International Exposition of 1876. Hospital of Medical Department, United States Army. Description of the Models of Hospitals.* Washington, D.C.: Government Printing Office, 1876.)





**Figure III-41.** Main hospital building of Walter Reed General Hospital, constructed in 1908 (Building 1, Walter Reed Army Medical Center, Washington, D.C.).



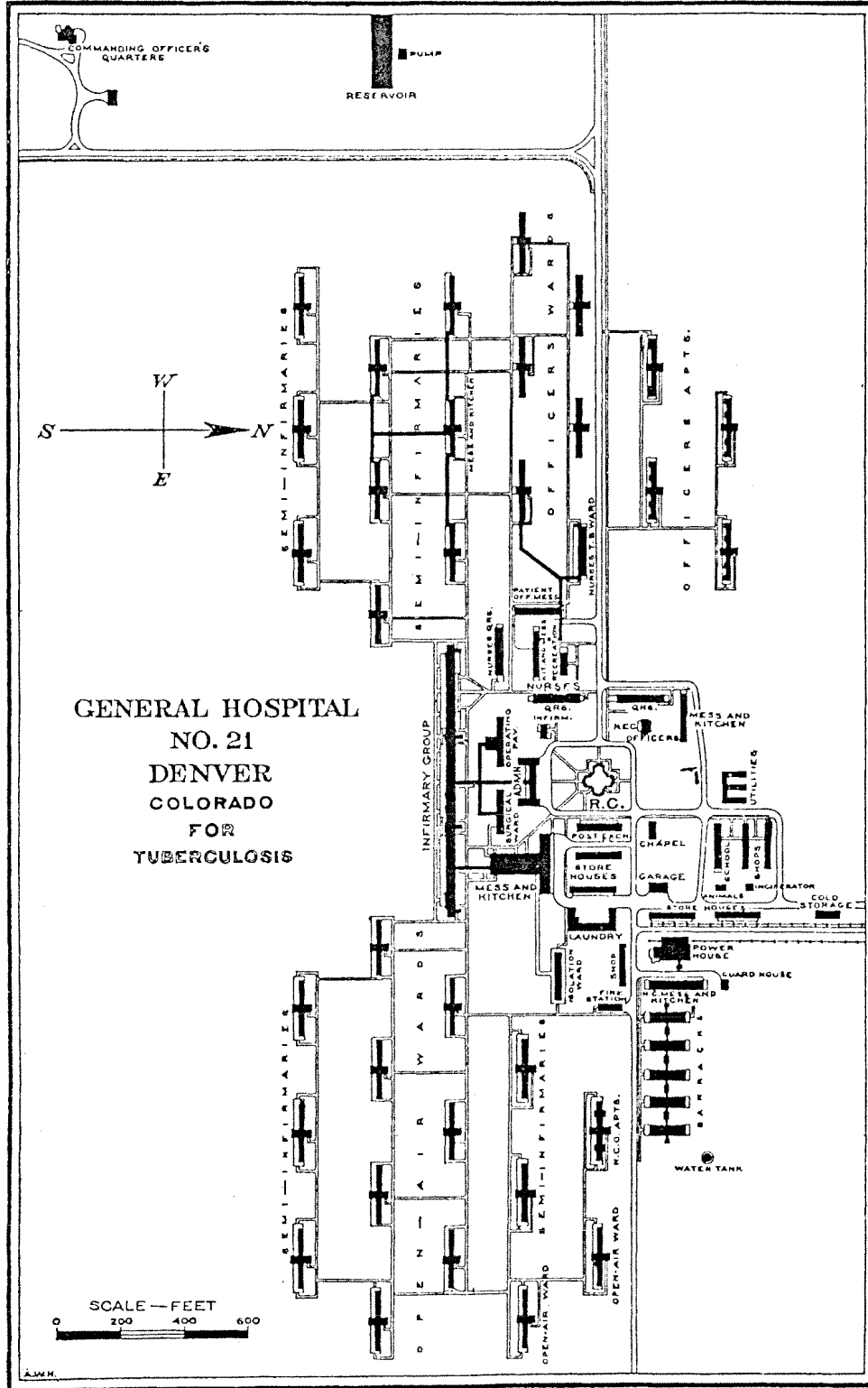


Figure III-42. General Hospital No. 21, Denver, Colorado, later renamed Fitzsimons Army Medical Center. (From Frank W. Weed, *The Medical Department of the Army in the World War: Military Hospitals in the United States*, vol. 5. Washington, D.C.: Government Printing Office, 1923.)



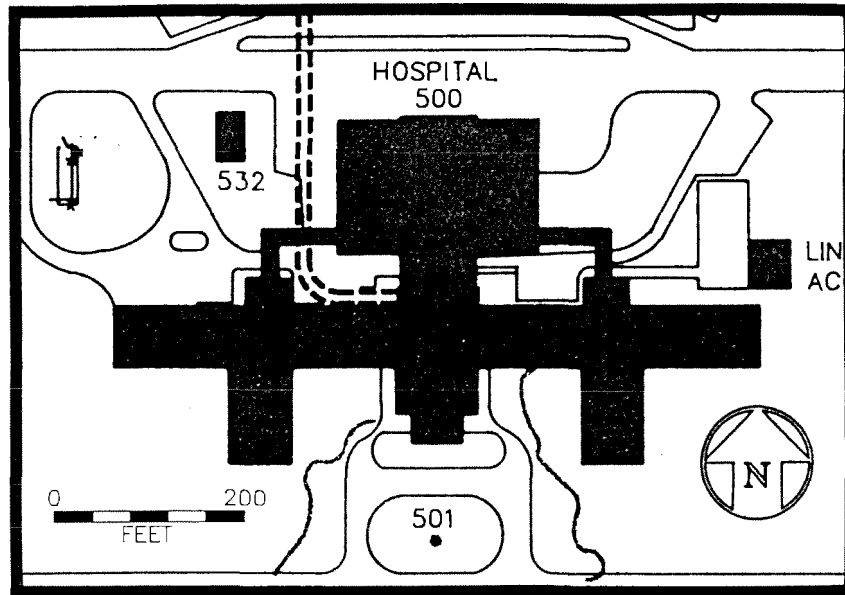
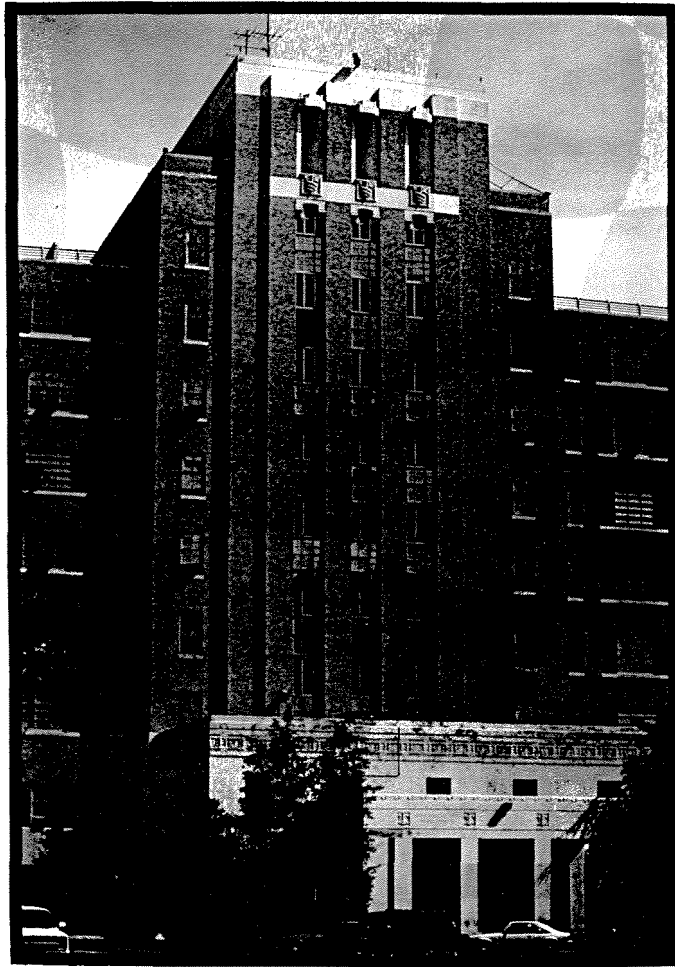
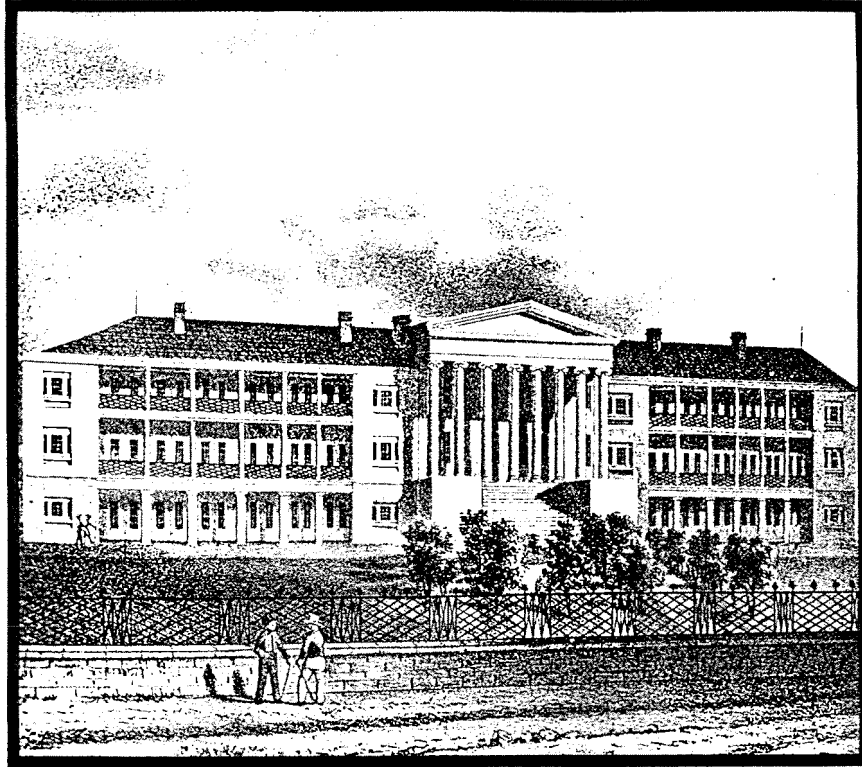


Figure III-43. 1941 General Hospital, front elevation of central tower, *above*, and plan, *below* (Building 500, Fitzsimons Army Medical Center, Colorado).

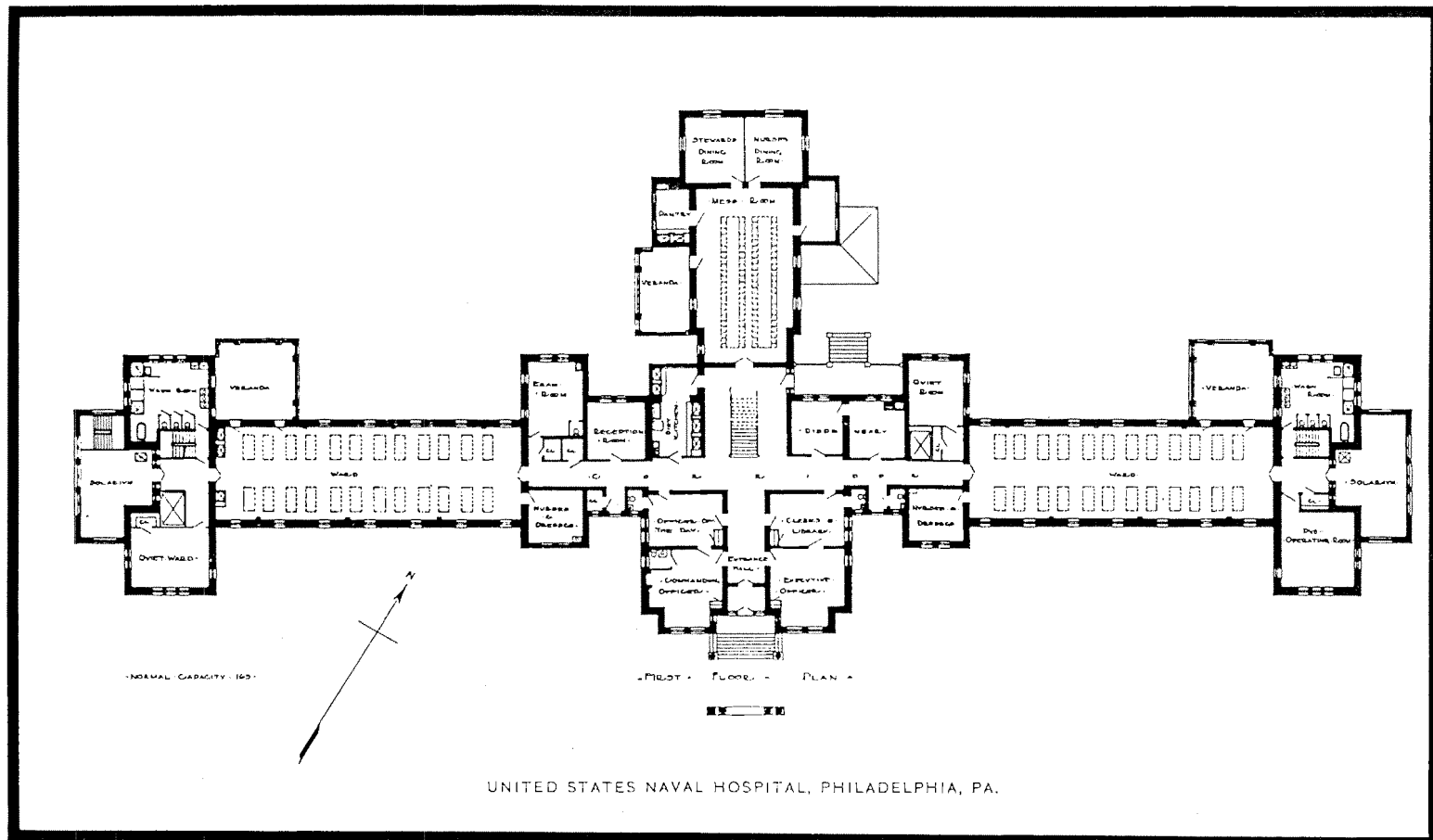






**Figure III-44.** 1833 view of U.S. Naval Asylum, designed by William Strickland, Philadelphia, Pennsylvania. (From Lois Craig, et. al. *The Federal Presence: Architecture, Politics, and National Design*. Cambridge: The MIT Press, 1984.)





**Figure III-45.** Plan of U.S. Naval Hospital, a pavilion plan hospital constructed in 1866 at Philadelphia, Pennsylvania. (From A.W. Dunbar. *A Description of Recent Hospital Construction in the United States Navy*. Washington, D.C.: 1913.)

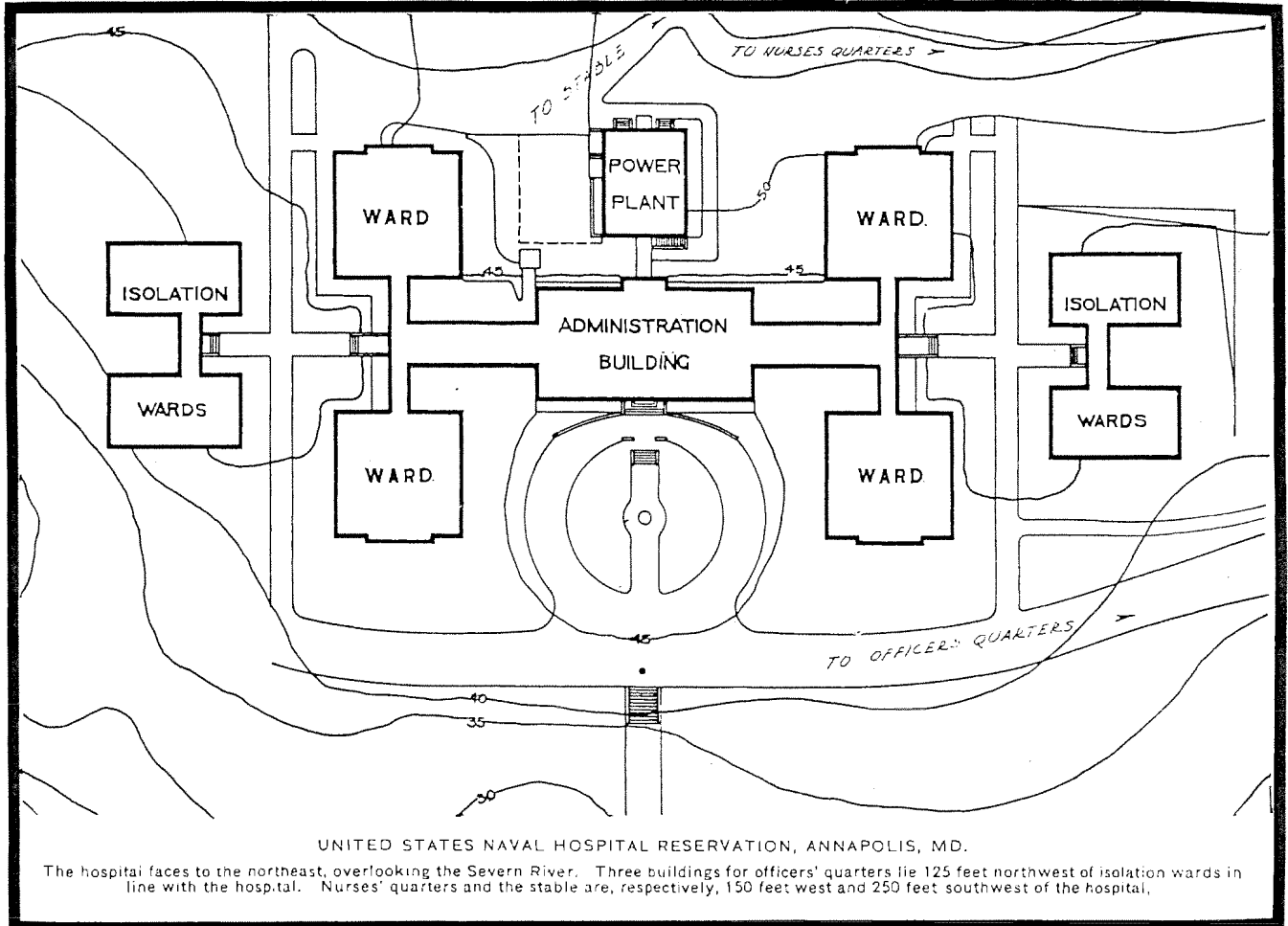


U.S. NAVY OFFICIAL PHOTOGRAPH



**Figure III-46.** 1899 Mare Island Naval Hospital, designed by W.M. Poindexter (Building 47, Naval Activities Mare Island, California). (Courtesy U.S. Navy)

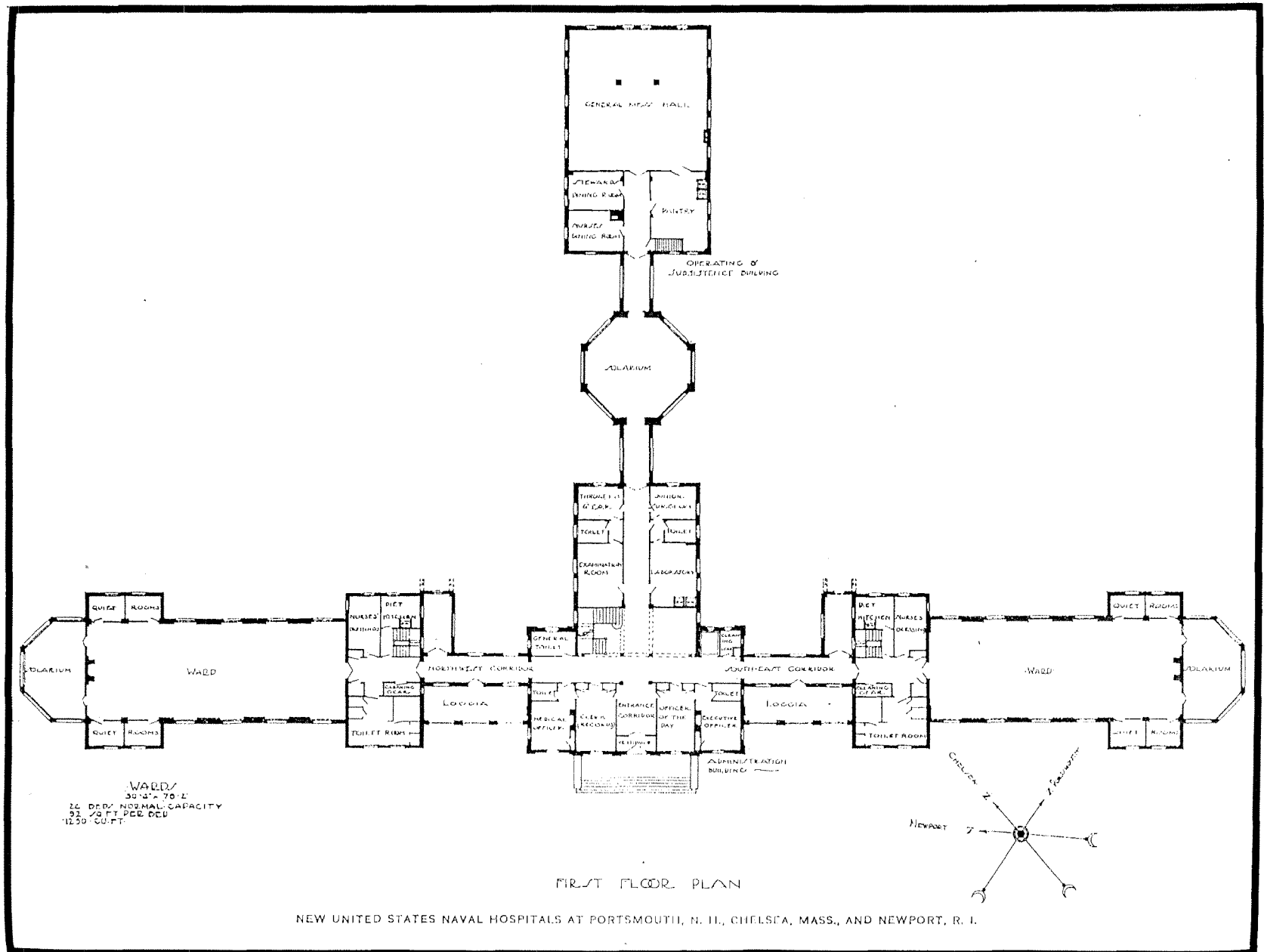




**Figure III-47.** Plan of pavilion-plan medical complex designed by Ernest Flagg and constructed in 1907 (U.S. Naval Academy, Annapolis, Maryland). (From A.W. Dunbar. *A Description of Recent Hospital Construction in the United States Navy.*)







**Figure III-48.** Plan of naval hospitals constructed at Newport, Rhode Island; Portsmouth, New Hampshire; and, Chelsea, Massachusetts. (From A.W. Dunbar, *A Description of Recent Hospital Construction in the United States Navy*.)



## NOTES, CHAPTER 4

1. National Archives and Records Administration, Cartographic Branch, Record Group 77, Standard Plans of Army Post Buildings, 1891-1918, (P.I. NM - 19 Entry 411), Plans 247, 279.
2. War Department, *Regulations Concerning Barracks and Quarters for the Army of the United States, 1860* (Washington, D.C.: George W. Bowman, 1861), 3-4.
3. U.S. Surgeon General's Office, *Plan for a Post Hospital of 24 Beds* (Circular No. 4), (Washington, D.C.: Government Printing Office, 1867), passim.
4. War Department, Surgeon General's Office, *A Report on Barracks and Hospitals with Descriptions of Military Posts* (Circular No. 4), (Washington, D.C.: Government Printing Office, 1870), 21; Erna Risch, *Quartermaster Support for the Army: A History of the Corps 1775-1939*, (Washington, D.C.: Government Printing Office, 1962), 486.
5. U.S. Surgeon General's Office, *Approved Plans and Specifications for Post Hospitals* (Circular No. 2), (Washington, D.C.: Government Printing Office, 1871), passim.
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## CHAPTER 5

### INDUSTRIAL

#### Maintenance and Repair Shops

##### Description

Maintenance and repair shops were support facilities needed to maintain an installation's buildings, livestock, and equipment. Maintenance and repair shops were built at all installations; the type of shops varied and depended on the installation mission, the technology of the time, and the evolution of logistical support. Maintenance and repair facilities were usually small, one-story, utilitarian buildings that housed a variety of functions and provided work space for maintenance tasks. Maintenance and repair shops generally were located in a secondary service area on Army posts, apart from the main cantonment area. On naval facilities, the shops were located near the industrial production and repair facilities. The maintenance and repair shops described in this section are those necessary for the daily operation of installations with non-manufacturing missions; the specialized maintenance and repair shops required for industrial manufacturing are described in the next section of this chapter.

##### Evolution

###### Army and Army Air Corps

The earliest general maintenance and repair shops at Army posts were blacksmith, carpenter, wheelwright, and saddler shops. For example, an 1828 plan of Ft. Leavenworth, Kansas, indicates a smith's shop, and an 1867 plan of Ft. Riley, Kansas, depicts carpenter, saddler, and blacksmith shops.<sup>1</sup> Generally, the Quartermaster Department was charged with maintaining supplies, buildings, and animals. During the mid-nineteenth century, the most important shop was the blacksmith shop where horses were shod and a variety of metal implements mended. Second in importance to the blacksmith, was the wheelwright, who mended wagon wheels. Wagon trains transported supplies to the dispersed western fortification. Field survey conducted for this project did not identify examples of mid-nineteenth-century or earlier Army shop buildings.

The Quartermaster Department did not include plans for maintenance and repair shops in regulations proposed in 1860 or 1872. The early and mid-nineteenth century shop buildings generally were constructed of wood frame and were not intended to be permanent buildings. As the Army consolidated its troops into larger garrisons at the end of the nineteenth century, masonry shops buildings were built at selected installations (Figure III-49). In 1892, the Quartermaster Department issued a standardized plan for a Quartermaster Shop. The same utilitarian plan for shop buildings continued in use until World War I and was issued with 23 variations (Figure III-50). Masonry was the preferred material, though wood frame also was used. The one-story shop buildings had gable or hipped roofs, regular openings, and interior brick chimneys. The late nineteenth- and early twentieth-century shops usually featured segmental-arch window and door frames, while the later shops displayed rectangular openings. In 1915, the Quartermaster Department issued a standard plan for a shop with galvanized corrugated steel roof and walls with paired, swinging doors in one gable end.<sup>2</sup>

Maintenance and repair shops varied in size and functions. In general, shop buildings were designed as utilitarian structures that could serve multiple functions. During the late nineteenth and early twentieth centuries, maintenance and repair shops could serve the blacksmith, wheelwright, carpenter; the blacksmith alone; or, the blacksmith, plumber and tinner, painter, and carpenter. The same building type could be used as an artillery workshop for the blacksmith, saddler, and wheelwright, or as an ordnance workshop with a forge and workshop space.

The functions of Quartermaster shops evolved between the late nineteenth century and the end of the 1930s. By the turn-of-the-century, railroads had replaced wagon trains and wheelwrights were no longer needed. During the inter-war period, the Army began to use trucks to transport supplies. The construction of blacksmith shops and quartermaster garages illustrates that both horses and motorized vehicles had roles on Army posts during the 1930s (Figures II-50 and III-51).

During the wave of construction following the enactment of Public Law 45 in 1926, which authorized the Secretary of War to deposit funds from the sale of unneeded installations into a Military Post Construction Fund for new construction, the appearance and size of maintenance and repair shops underwent noticeable changes. Maintenance and repair shops of this era generally were brick utilitarian structures with industrial sash windows; they were bigger than their predecessors to accommodate the repair of larger equipment or motorized vehicles. The Army posts of this era often required several shop buildings to service the increased numbers of structures and amount of equipment. The basic maintenance and repair shop building design could accommodate a variety of uses, including motor vehicle repair shops, aviation repair facilities, and utility buildings (Figure III-51). On Army posts, maintenance and repair buildings continued to be located in a separate service area, while on Army Air Corps fields, maintenance and repair shops were integrated into the installation plan along the flight line near the airplane hangars.

### Navy and Marine Corps

During the nineteenth century, most of the Navy's shore installations were shipyards. The industrial buildings associated with shipyards are discussed in the next section of this chapter. The Navy and Marine Corps first developed facilities to house large numbers of shore-based personnel when they began constructing training stations, air stations, and operating bases during the twentieth century. The Navy and Marine Corps constructed repair and maintenance shops to support the activities of these shore installations, particularly at air stations.

Maintenance and repair shops were utilitarian buildings that supported both the installation's buildings and its mission. Aircraft repair buildings often resembled unornamented hangars, with low-pitched gable roofs, metal or concrete construction, and large expanses of industrial sash windows (Figure III-52). Other maintenance and repair shops typically were small utilitarian structures that housed a variety of functions, such as sheet metal shops and carpenter shops (Figure III-52). At installations built according to master plans, the shop buildings often echo in a simplified manner the architectural character of the installations' major buildings.

### **Association**

The construction of maintenance and repair shops was related directly to the evolution of logistical support for military missions. The types of maintenance and repair activities depended on installation maintenance needs, transportation technology, and weapons technology.

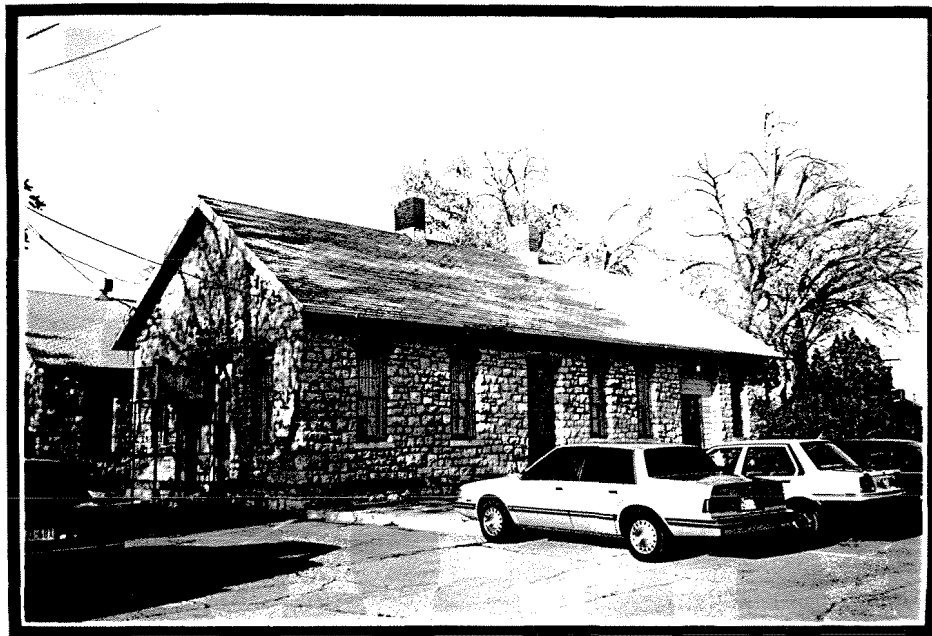
Maintenance and repair buildings generally are utilitarian structures located in the service areas of an installation. They usually do not possess individual historic or architectural significance; however, they may be contributing buildings in an historic district if they are within the boundaries of a concentration of buildings from the district's period of significance and retain sufficient exterior integrity to convey the period of significance. The significance of the historic district is the key factor in determining how important support facilities, such as repair and maintenance shops, are to the character of the district. For a district eligible for its design the shop buildings may have less relevance, whereas for a district eligible for its ability to represent a development in military technology, such as aviation, then the shop buildings, such as airplane repair shops, are more relevant to the district's significance.

### **Integrity**

To possess integrity as defined by the National Register, maintenance and repair shops should retain most of the design features and external construction materials from their periods of construction. Character-defining features of surviving nineteenth- and early twentieth-century shops include rectangular shape, gable or hip roof form, masonry exterior materials, chimneys, and regular patterns of openings, often set in segmental-arch frames. Twentieth-century maintenance and repair shops exhibit more variations. Army motor vehicle and aircraft repair shops from this later period generally are rectangular, masonry buildings with gable roofs, corner piers, and industrial sash windows. Navy and Marine Corps vary widely, though most are utilitarian structures with simple forms and materials. Twentieth-century shops often retain their original functions, but usually have undergone modifications to accommodate changes in equipment. Exterior elements that may have been modified include original window and door openings. In the event of subsequent additions or renovations, the building may have integrity if it retains the majority of the features that illustrate its design in terms of massing, proportion, pattern of windows and doors, materials, and architectural details.







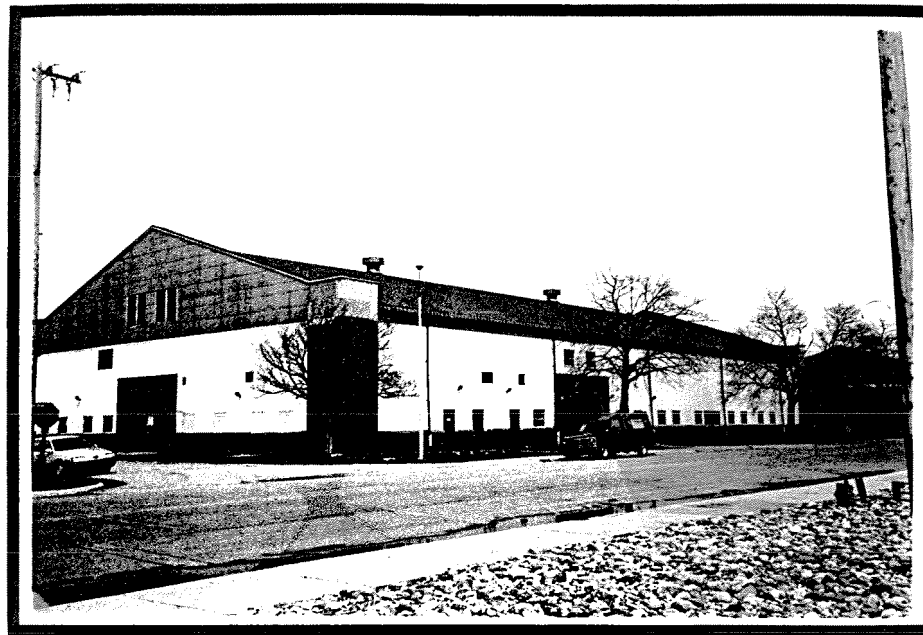
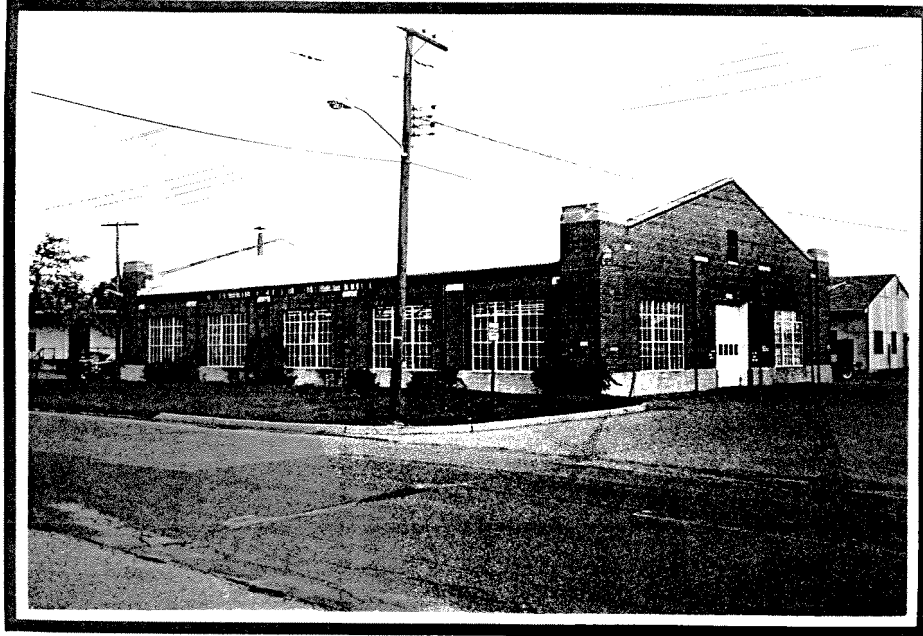
**Figure III-49.** Quartermaster shop constructed in 1893 to house blacksmith, tinsmith, plumber, paint, carpenter, and wheelwright shops (Building 44, Offutt AFB [formerly Ft. Crook], Nebraska), *above*. 1895 Quartermaster shop (Building 2009, Ft. Bliss, Texas), *below*.





**Figure III-50.** 1908 Blacksmith shop (Building 30, Ft. Benjamin Harrison, Indiana), *above*. 1934 Blacksmith shop, with garage doors added later (Building 281, Ft. Monmouth, New Jersey), *below*.





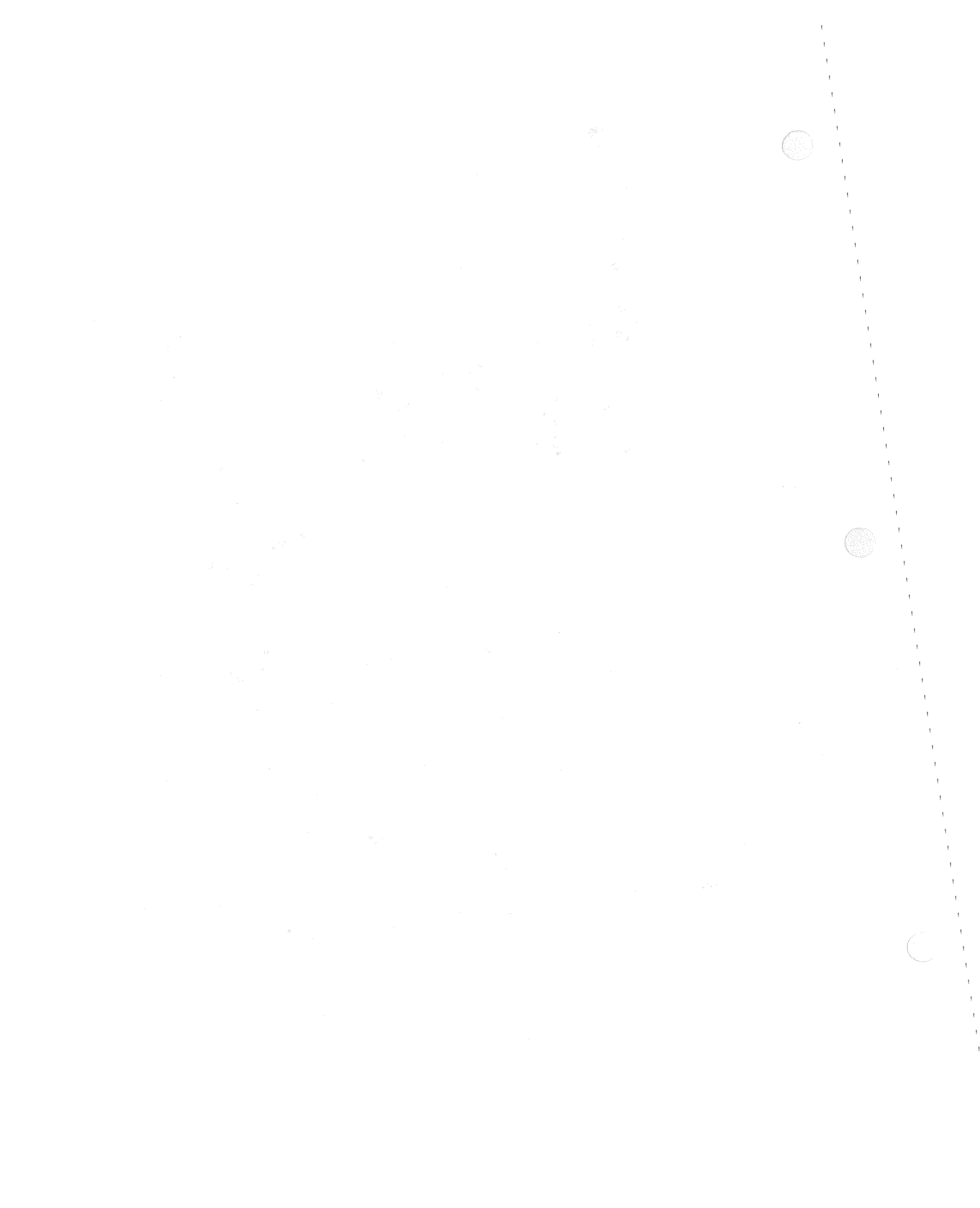
**Figure III-51.** 1934 Quatermaster garage (Building 279, Ft. Monmouth, New Jersey), *above*. 1932 Army Air Corps repair shop, with subsequent modifications covering original window openings (Building 117, Selfridge ANG, Michigan), *below*.





**Figure III-52.** ca. 1935 Final Engine Overhaul and Assembly Shop (Building 94, Naval Air Station North Island, California), *above*. 1919 Shops and Tool Room (Building 3, Naval Air Station North Island, California), *below*.





## Manufacturing Complexes

### Description

Between 1790 and 1940, the military constructed manufacturing complexes to supply needed equipment, weaponry, weaponry supplies, and capital items. For most of the time period included in this study, military-operated manufacturing complexes consisted of two types: weapons production and shipbuilding facilities. Functional design characterizes military manufacturing complexes. Such complexes were arranged to facilitate manufacturing processes, from acquiring and storing raw materials, through the manufacturing processes, to storage and shipping of final products. Nineteenth-century industrial buildings that housed different manufacturing processes, except for some specialized processes such as the manufacture of gunpowder, exhibited little exterior differentiation. Nineteenth-century industrial buildings sometimes exhibited classically-inspired architectural ornamentation typical of the era. By the late nineteenth century, as both production technology and the items produced became more complex, industrial buildings grew larger, were tailored to specific manufacturing processes, and exhibited functional designs. Technological developments required either the continual improvement and alteration of older facilities or the construction of new facilities. In general, few manufacturing industrial complexes were designed as complete entities at one time. Generally, they were the result of the evolution of technological advancements over a period of time through the addition of new, larger buildings that embody construction techniques and architectural expressions popular at the time of their construction.

### Evolution

#### Army and Army Air Corps

*Arsenals and armories.* Between 1790 and 1940, the Army's manufacturing complexes generally consisted of ordnance production, that is weapons and ammunition. The Ordnance Department controlled two types of installations: armories and arsenals. Armories produced small arms, while arsenals stored, repaired, or manufactured other forms of ordnance. When used for manufacturing, arsenals generally concentrated on secondary ordnance items such as cannon carriages or kits for artillerymen. The earliest two armories were located at Springfield, Massachusetts and Harpers Ferry, West Virginia. These two armories were the principal production facilities for muskets, rifles, and other small arms. By the 1840s, the duties of the arsenal had been expanded to powder proofing, repair of guns, weapons testing, and production of percussion caps. The Ordnance Department constructed several arsenals during the nineteenth century including Washington Arsenal, Washington, D.C. (operational between 1802 and 1861), Frankford Arsenal, Pennsylvania (established 1816), Watervliet Arsenal, New York (1813), Watertown Arsenal, Massachusetts (1816), and Rock Island Arsenal, Illinois (1862).

Nineteenth-century industrial buildings generally were characterized by two-story masonry buildings, most often brick or stone, with large window openings to allow light. Little exterior differentiation was needed for buildings housing different manufacturing processes, except for some specialized processes such as the manufacture and storage of gunpowder. Nineteenth century industrial buildings were surprisingly generic no matter what was produced inside of them.

Perhaps the most talented arsenal designer in the Ordnance Department was T. J. Rodman who designed Watertown Arsenal and Rock Island Arsenal. Rodman organized the arsenal buildings to facilitate production lines for ordnance manufacturing. At Rock Island Arsenal, Rodman's plan consisted of ten shops symmetrically arranged: five shops for an armory to

manufacture small arms, and five shops for an arsenal to support a general ordnance manufacturing complex (Figure III-53).<sup>3</sup> The shop buildings were constructed over a period of twenty years. The earliest buildings were load-bearing masonry. Rodman's design for the arsenal was unified through the use of monumental, classically-inspired design elements, such as temple-fronts, pilasters, cornices, and quoins, on the ten shop buildings, as well as the residential and administration buildings.

During the late nineteenth century, weapons production technology increased in complexity. In 1888, Watervliet Arsenal was designated as the Army's gun foundry for seacoast and field artillery. The gun factory used new technology in weapons manufacture to produce steel breech-loading artillery; the new technology involved constructing guns in sections, rather than casting a single piece. New facilities were constructed to contain the new processes. Between 1888 and 1892, the Ordnance Department constructed a large two-story, brick seacoast gun factory (Figure III-53). It was constructed in sections and organized with a center section flanked by two wings; it contained a shrinkage pit, boiler-house, engine-room, and lathes, bores and other machinery employed in the process of "built-up" gun construction. The building was ornamented with large segmentally-arched windows and a corbelled cornice.<sup>4</sup>

The Army constructed other industrial complexes during the early twentieth century. Picatinny, a storage depot in New Jersey, was converted into an arsenal to produce smokeless powder in 1907. Its original production buildings resembled typical, masonry nineteenth-century industrial buildings. They are symmetrical, rectangular, one- and two-story, gable-roofed, brick buildings with regular fenestration.

World War I was a turning point in the evolution of industrial architecture. After World War I, industrial buildings were constructed of steel frame or reinforced concrete and displayed extreme functionalism. The exterior ornamentation often found on nineteenth and early twentieth century industrial buildings was no longer a design element. The materials and design of post-World War I industrial buildings was determined by the production process inside the building. Concrete frame with concrete or clay tile infill was used for buildings with heavy machinery or that contained explosive materials, while steel frame construction often was used when large, open, high spaces were required (Figure III-54).

After World War I, production technology at industrial complexes became more complicated. Edgewood Arsenal, Maryland, was constructed during World War I as the Army's first chemical weapons manufacturing plant. The deadly nature of the chemicals required specially designed production techniques that could not be adapted to existing building stock. The chemical weapons production facilities at Edgewood were housed in unadorned, one or one-and-one-half story, structural clay tile buildings with industrial sash windows. Structural clay tile became a common construction material for industrial facilities due to its durability, availability, and low cost. Picatinny Arsenal was expanded after World War I. Like Edgewood, it featured specialized production buildings constructed on structural clay tile and arranged in a logical sequence to facilitate the production lines (Figure III-55).

*Industrial Storage Facilities.* Storage facilities were prominent and essential components of manufacturing complexes. Storage facilities housed raw materials needed for the production process, products in various stages of production, and the finished products before their shipment to final destinations. Industrial storage facilities generally were built specifically for the installation where they are located; standardization of industrial storage facilities is rare. At some installations, such as Rock Island Arsenal, the Ordnance Department designed and constructed storehouses as major buildings in the manufacturing complex; the similarity in design and materials make the nineteenth-century storehouses nearly identical in exterior appearance to the actual production facilities.

Special warehouses and storage facilities were developed at manufacturing facilities such as Picatinny and Edgewood Arsenal. Both installations were involved in highly technical and specific processes: at Picatinny Arsenal, the production of smokeless powder; at Edgewood Arsenal, chemical weapons. The volatility of the raw materials and final products mandated storage facilities that were of fireproof construction that would contain explosions (Figure III-55).

## Navy

*Shipyards.* During the time period included in this study, the Navy's primary manufacturing facilities were shipyards, where ships were constructed and repaired. Before 1890, the Navy maintained a wooden fleet. The industrial processes needed to build wooden ships included timber working, and the production of ropes, masts, nails, and metal fittings. The Navy constructed its first shiphouse, built of wood frame, to contain the entire ship construction process at Portsmouth Navy Yard in 1814. A second wood-frame enclosure to house ship construction was constructed at the Washington Navy Yard. In 1827, the first masonry dry docks were begun at the Norfolk and Boston shipyards.<sup>5</sup>

Construction of wooden ships was a labor intensive process that required the production of many different components. Buildings were needed for mast production, sail production, boat shops, timber sheds, workshops for capstans, rudders and other heavy work, cooperages, and storehouses (Figure III-56). The two-story masonry buildings were utilitarian structures that spanned wide interior spaces with little exterior differentiation related to their specific function.

At the beginning of the 1880s, the U.S. Navy still relied on wooden ships, with the exception of a few Civil War ironclads. During the 1880s, the U.S. Navy took its first steps toward modernization with the construction of steel cruisers. These cruisers were constructed at civilian yards because no Navy yard was capable of constructing modern steel ships. The adoption of a steel ship fleet radically altered the Navy's yards. Between 1880 and 1910, the Navy began a long process to upgrade its industrial facilities to match the changing shipbuilding technology. As the Navy began to modernize its fleet at the end of the nineteenth century, new industrial buildings at Navy yards began to incorporate high-style architectural references into their exterior design. At the Philadelphia Navy Yard at League Island, constructed in the early 1870s, industrial buildings were designed in both the Second Empire and neoclassical architectural styles (Figure III-56). A construction boom at Navy yards followed the naval build-up of the turn-of-the-century (Figure III-57).<sup>6</sup>

The buildings constructed at Norfolk Navy Yard, the site of launching of the first steel battleship from a U.S. naval yard in 1893, were indicative of the kinds of facilities required by steel ships. New facilities constructed included a foundry, erection shops, metal steel working/plating shops, and a crane for lifting armor plate. By 1905, the Brooklyn Navy Yard was the first government yard to build a complete steel warship. At the Philadelphia Navy Yard in 1911, the shop complex included a foundry, power station, angle smithery and sawmill, smithery, machine shop, and shops for coppersmiths, electrical workers, shipfitters, joiners. The Navy expanded and upgraded the infrastructure at its yards, including piers, dry docks, pumphouses, and power houses, to support its new ship building capabilities (Figure III-58). By 1900, building construction technology changed from load-bearing masonry buildings to steel frame encased in brick piers (Figure III-58).<sup>7</sup>

The Navy experienced a great surge of national pride as the "Great White Fleet" of 1907 sailed across the Pacific, in a culmination of over two decades of modernization of strategy, ships, and shore facilities. The surge of naval power is reflected in increasingly complex and ornate shore facilities immediately after the turn of the century. The Navy constructed its new industrial

shops and other shipyard support buildings employing many different architectural styles, including neoclassical and Italian Renaissance Revival (Figure III-59).

During and after World War I, the ornate architecture of the early twentieth century was abandoned in favor of functional design. Two types of construction defined naval industrial design: steel and concrete. The Navy used structural steel frame construction for its large buildings, such as foundries and pattern shops, and reinforced concrete frame construction for its industrial buildings of smaller spans (Figure III-60). These new construction technologies allowed greater expanses of unobstructed interior space.

During the 1920s, naval appropriations were reduced, but during the mid and late 1930s, efforts to upgrade shipyard construction capacity were renewed and yards received new construction. Large, reinforced-concrete buildings with little architectural ornament characterize this phase of shipyard construction (Figure III-61). At all yards, the industrial buildings were arranged to facilitate ship construction and repair and the proper storage of raw materials and supplies required in the shipbuilding process.

*Specialized industrial processes.* During the time period covered in this study, the Navy also constructed and operated specialized industrial plants. The buildings at these facilities were designed specifically for the purpose of the installation. They follow the same basic design evolution found at shipyards of the same periods; the construction displays an evolution from load-bearing masonry construction, sometimes with classically inspired stylistic references, to functional, modern concrete and steel construction.

The Washington Navy Yard, though originally a shipyard, developed into the Navy's premier gun factory starting in 1854. The gun complex was constructed between 1855 and 1858 and consisted of a boiler house, machine shops, smithery, erecting shop, and foundry. A copper rolling mill was added before 1865. All of these buildings were constructed of load-bearing brick. During the 1880s, the gun factory was expanded to produce heavy weapons.<sup>9</sup>

In 1889, the Navy acquired property at Indian Head, Maryland. This facility originally was acquired to field test weapons and was the Navy's first proving ground. After the Spanish-American War, the Navy constructed a manufacturing plant to produce its own smokeless gunpowder. The manufacturing process required specialized buildings and structures organized along production lines. In addition, specialized storage facilities were constructed to house raw materials used in the production processes, as well as finished processed powder.<sup>9</sup>

In 1917, the Navy established a Naval Aircraft Factory at the Philadelphia Naval Shipyard. The factory was intended to build some of the Navy's aircraft, to construct experimental prototypes, and to provide cost data to the Navy; it was the first government-owned aircraft factory. After its authorization in July 1917, the Navy quickly constructed buildings for the new factory. The aircraft factory buildings were constructed of reinforced concrete frames infilled with red brick and industrial sash windows.<sup>10</sup>

## **Association**

Military manufacturing complexes are associated with the technological and industrial development of the military and of civilian industry. Manufacturing complexes produced needed supplies and equipment to support various military missions. The kind of manufacturing processes and the types of buildings constructed at a specific site are related directly to the purpose of the facility and the time period of its operation. Military manufacturing complexes also are related to the broader historic context of industrial history.

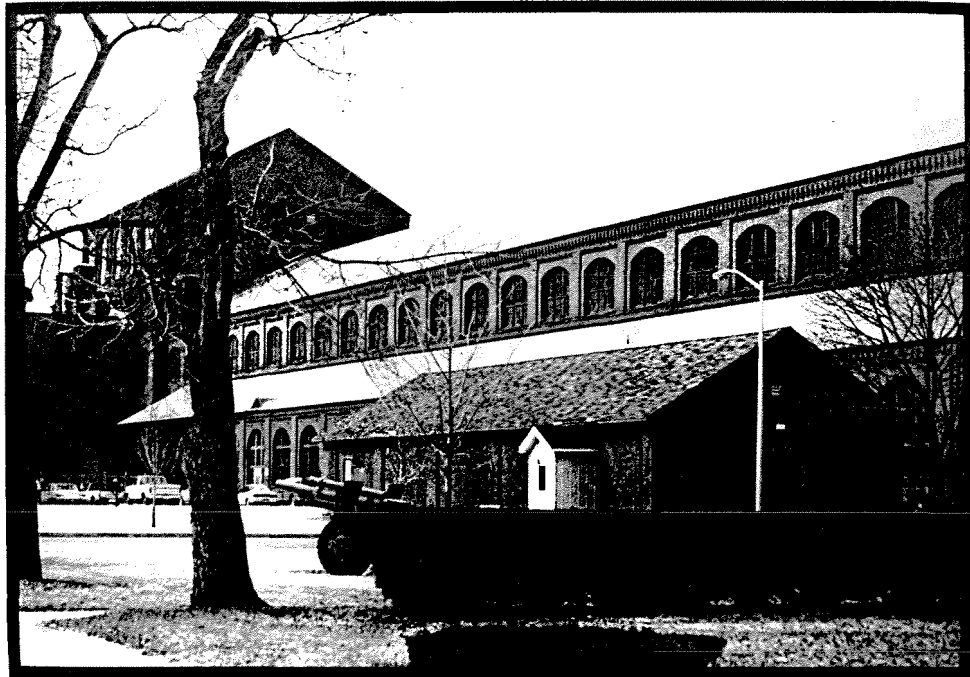
Industrial complexes rarely were planned and constructed during a single time period. Most industrial facilities evolved over time and reflect subsequent technological improvements, both in production and construction technologies. Original buildings often have been modified, while at the same time new buildings have been added. An important factor in assessing the historic significance of properties associated with a military manufacturing complex is the degree to which the facility represents the manufacturing process, which often was housed in several buildings that formed an interrelated complex. In some cases, individual buildings may possess significance because of architectural merit, but industrial buildings often will contribute to an historic district because of their relationship to the entire complex.

### **Integrity**

Most industrial buildings have been modified to keep them as vital elements in a production facility. In some cases, new technology is introduced into existing buildings, while in other cases, buildings are modified radically through additions or alterations. The nature of evolving technology required the constant modernization of production facilities. The first step in assessing integrity is to define the significance of the property. If the property is significant for a particular manufacturing process at a certain point in time, then the elements of that process, including buildings and structures and their relationship to one another in the process, should retain sufficient integrity to convey the nature of the industrial process as it appeared during the period of significance. If the property is important as a representative of an industrial process that evolved over time, then subsequent modifications to the property may have acquired their own significance and do not necessarily diminish the property's integrity. In cases where the property possesses architectural significance, then the integrity of the buildings' design, materials, and workmanship assumes primary importance over the industrial process housed in the buildings.

To possess integrity, industrial buildings should retain most of the elements of design, materials, workmanship, and location from their periods of significance. Where subsequent additions, or modifications have occurred, the property still may have integrity if it retains the majority of the features that illustrate its design and industrial process in terms of massing, spatial relationships, pattern of windows and doors, materials, and ornament.





**Figure III-53.** Shop building constructed between 1867 and 1893 (Rock Island Arsenal, Illinois), *above*. Seacoast Gun Shop constructed between 1888 and 1893 (Building 110, Watervliet Arsenal, New York), *below*.





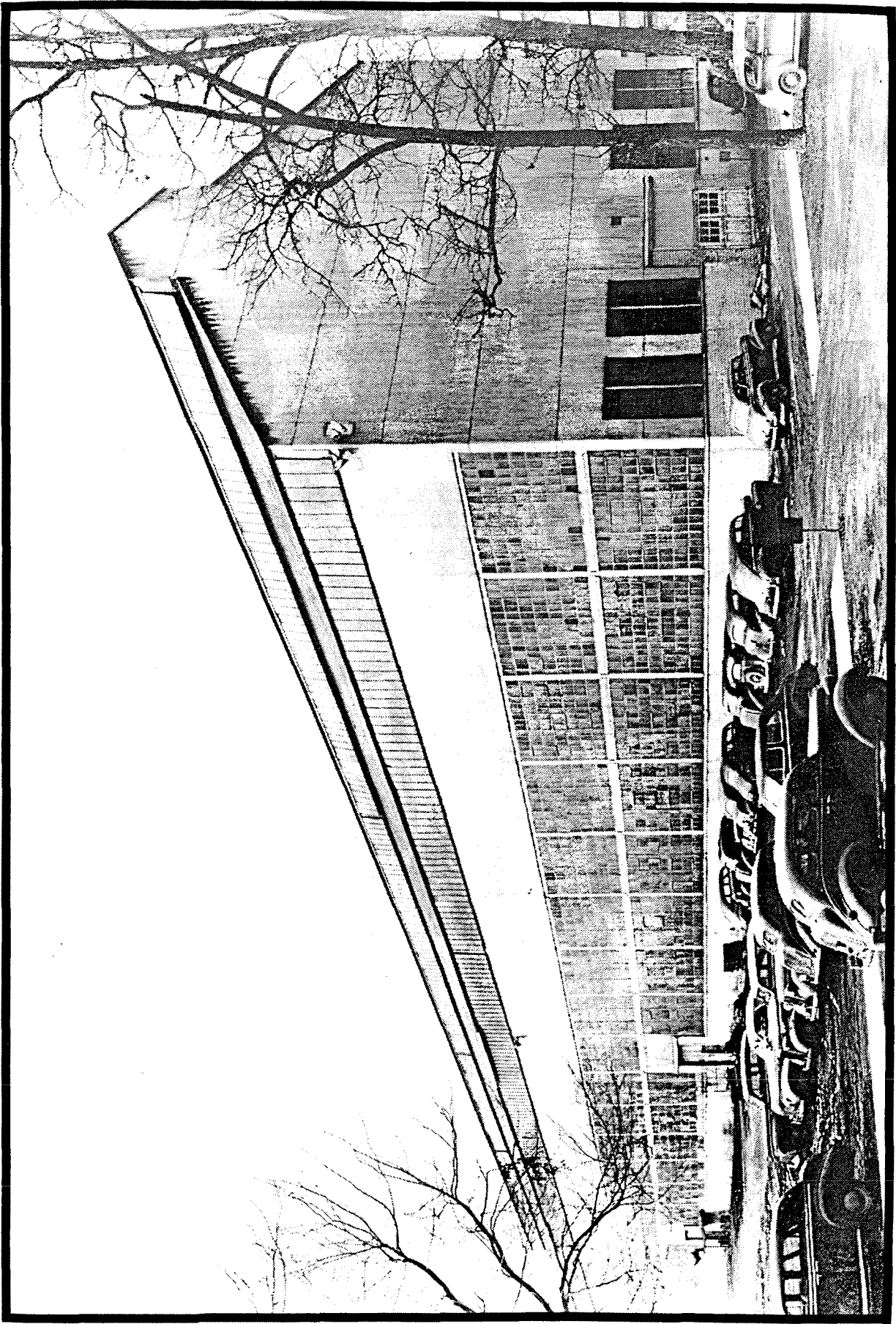
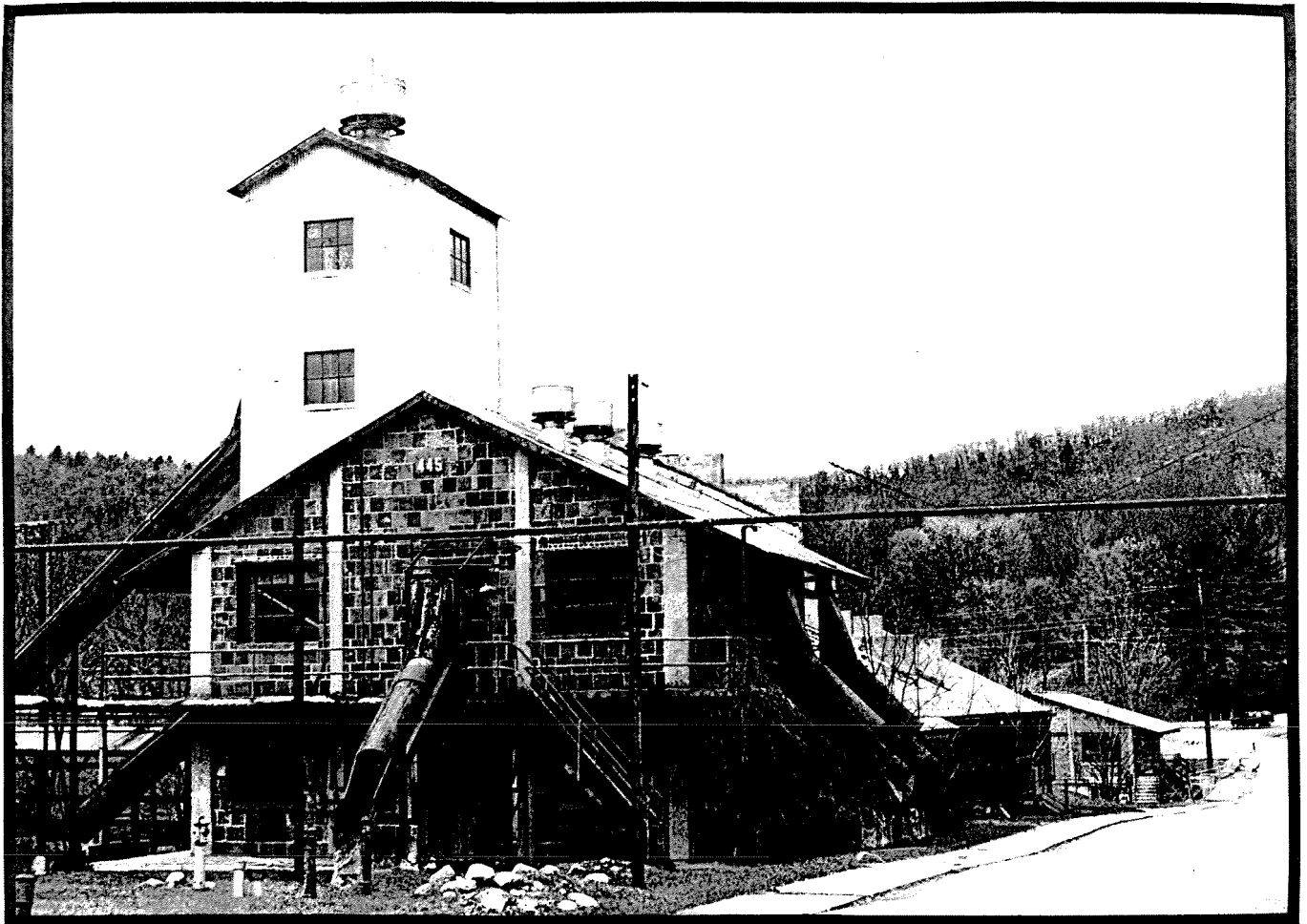


Figure III-54. 1920 Machine Shop (Building 230, Rock Island Arsenal, Illinois).



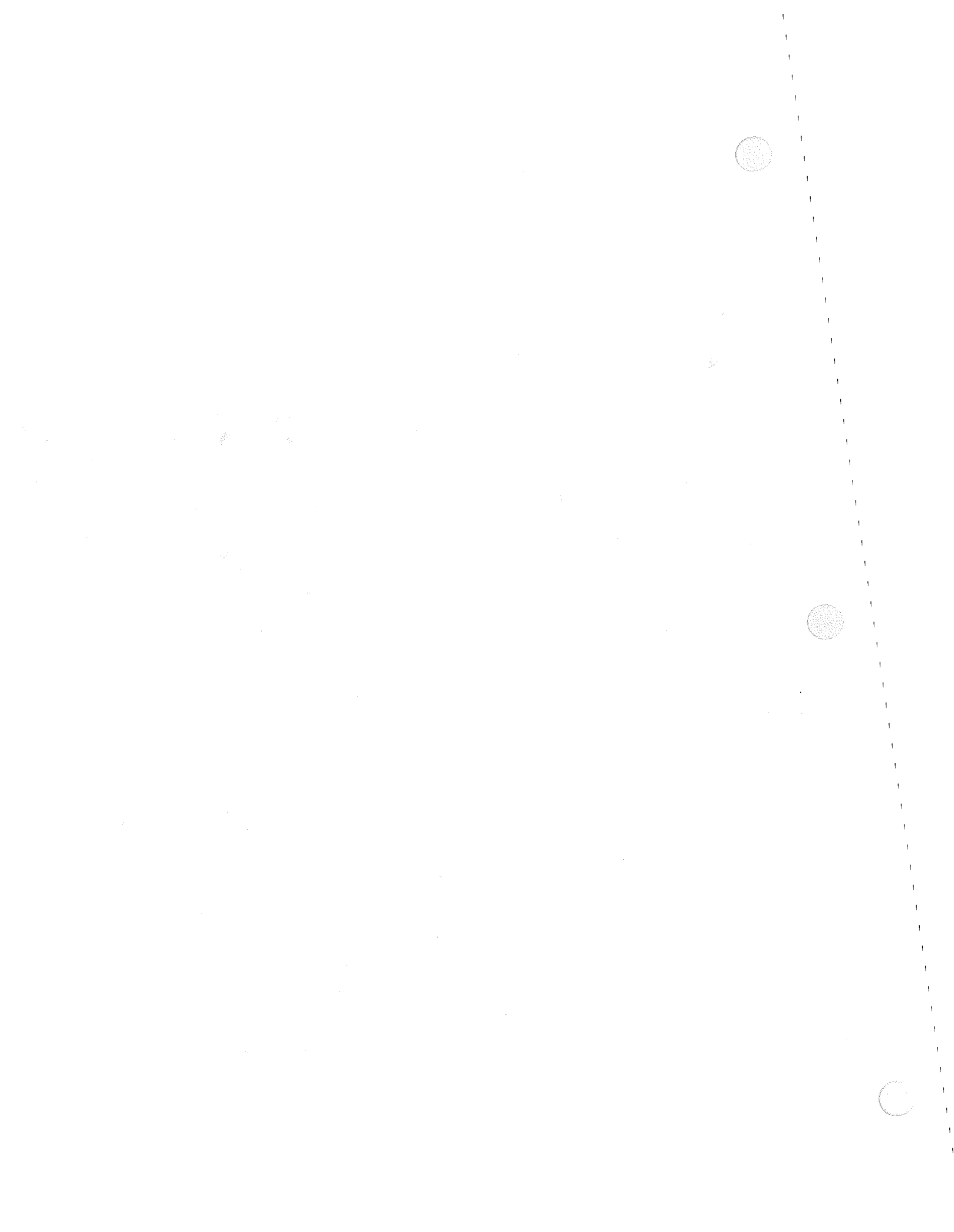


**Figure III-55.** 1908 Sodium nitrate storage buildings (Buildings 315 and 316, Picatinny Arsenal, New Jersey), *above*. 1930 Gun Bag Loading Building (Building 445, Picatinny Arsenal, New Jersey), *below*.





**Figure III-56.** Overview of buildings 28, 29 and 30, which originally served, respectively, as mast house, boat shop and boat house, and timber shed, constructed between 1832-1836 and reconstructed after the Civil War (Norfolk Naval Shipyard, Virginia), *above*. 1874 Shop (Building 3, Philadelphia Naval Base, Pennsylvania), *below*.



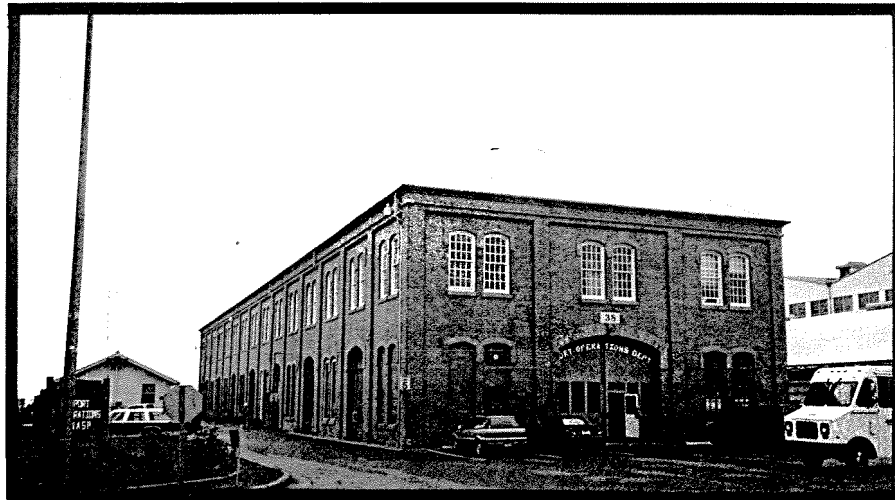
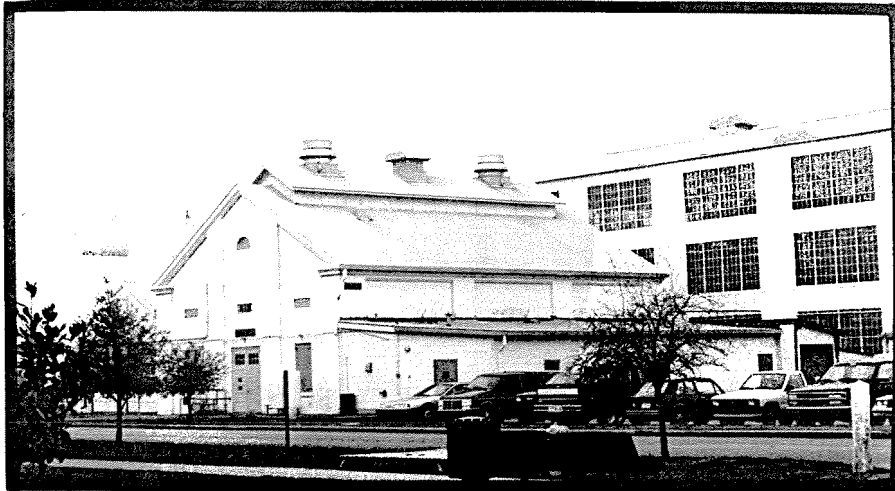
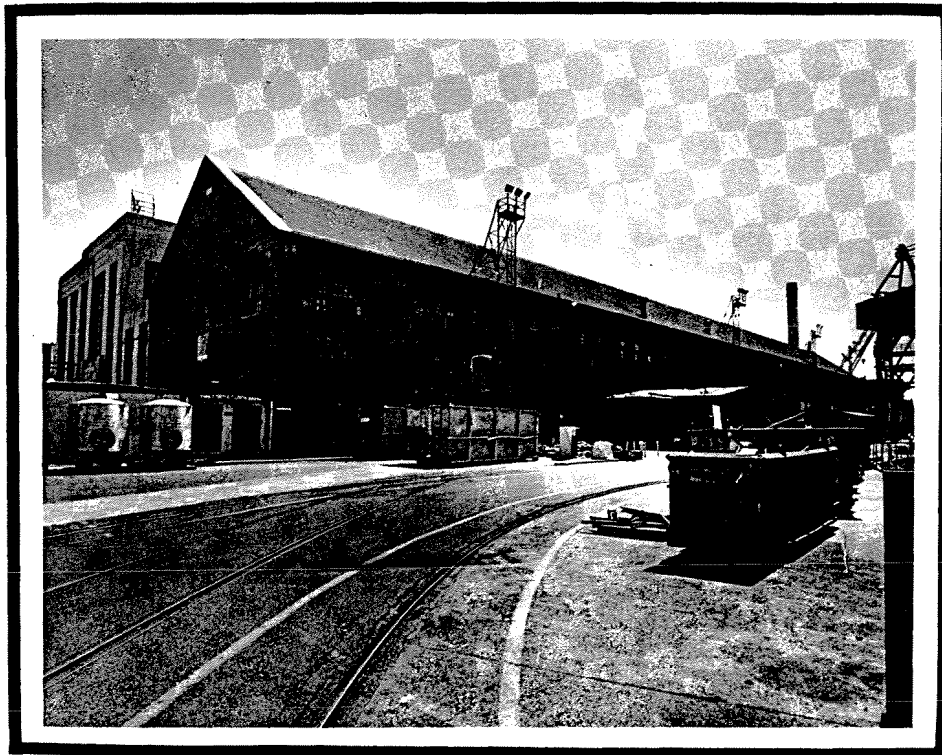


Figure III-57. 1882 Foundry (Building 26, Naval Complex Pensacola, Florida), *above*. 1882 Machine shop (Building 38, Naval Complex Pensacola, Florida), *middle*. 1897 Shop buildings (Buildings 10 and 11, Marine Corps Recruit Depot, Parris Island [formerly Port Royal Navy Yard], South Carolina), *below*.

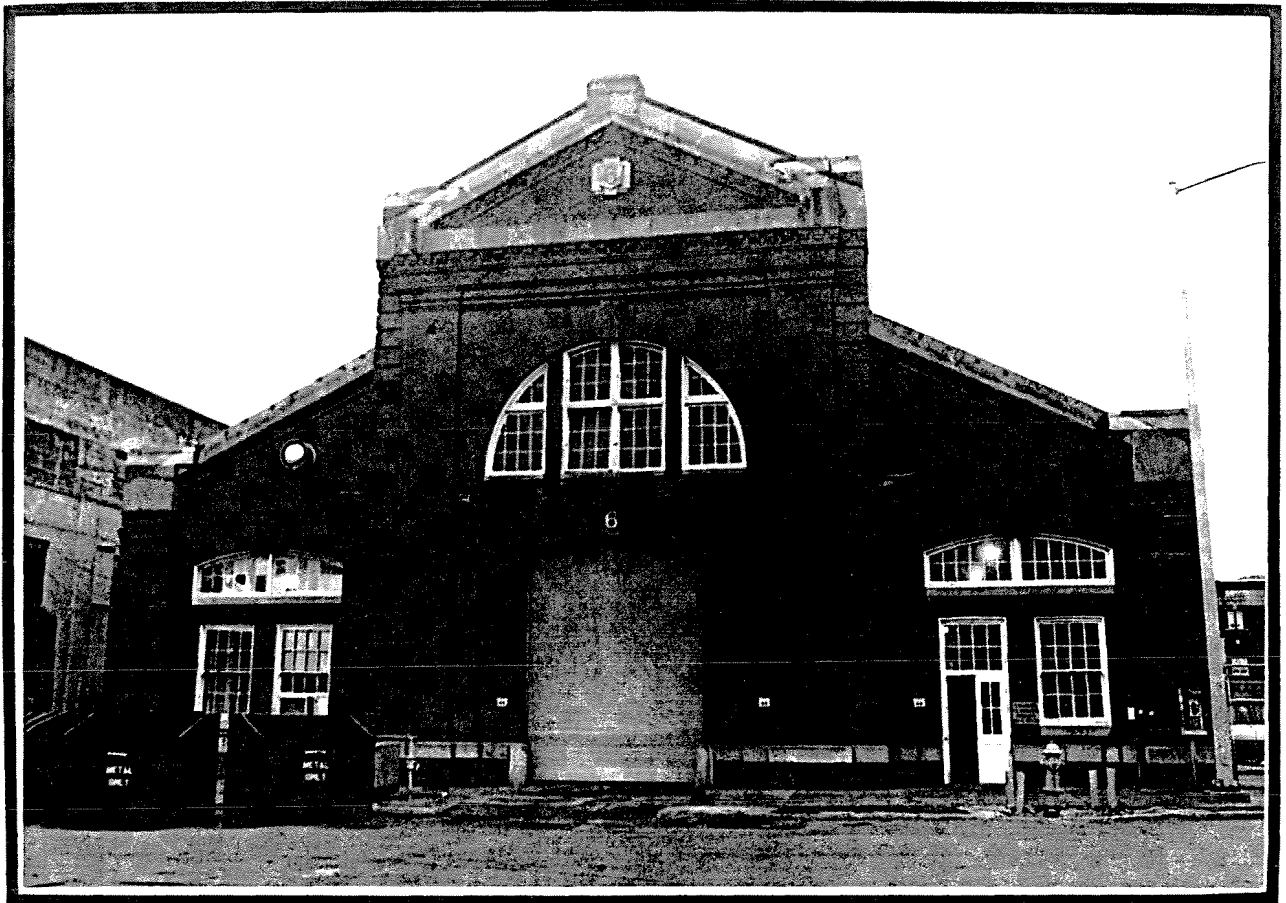






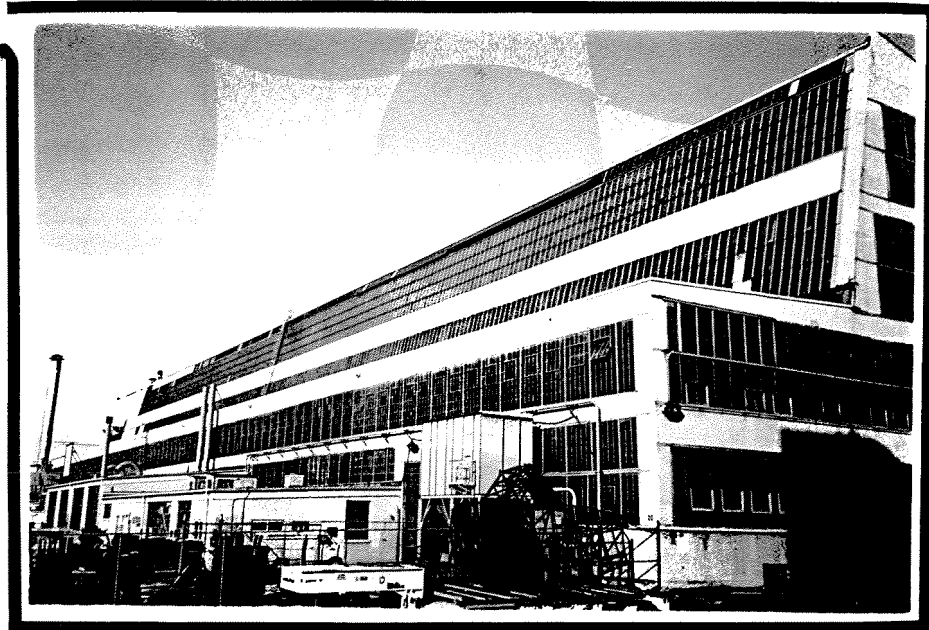
**Figure III-58.** 1908 Pumphouse (Building 168, Naval Shipyard Puget Sound, Bremerton, Washington), *above*. 1898 Machine shop, constructed of brick-encased steel frame (Building 58, Naval Shipyard Puget Sound, Bremerton, Washington), *below*. (Courtesy U.S. Navy)





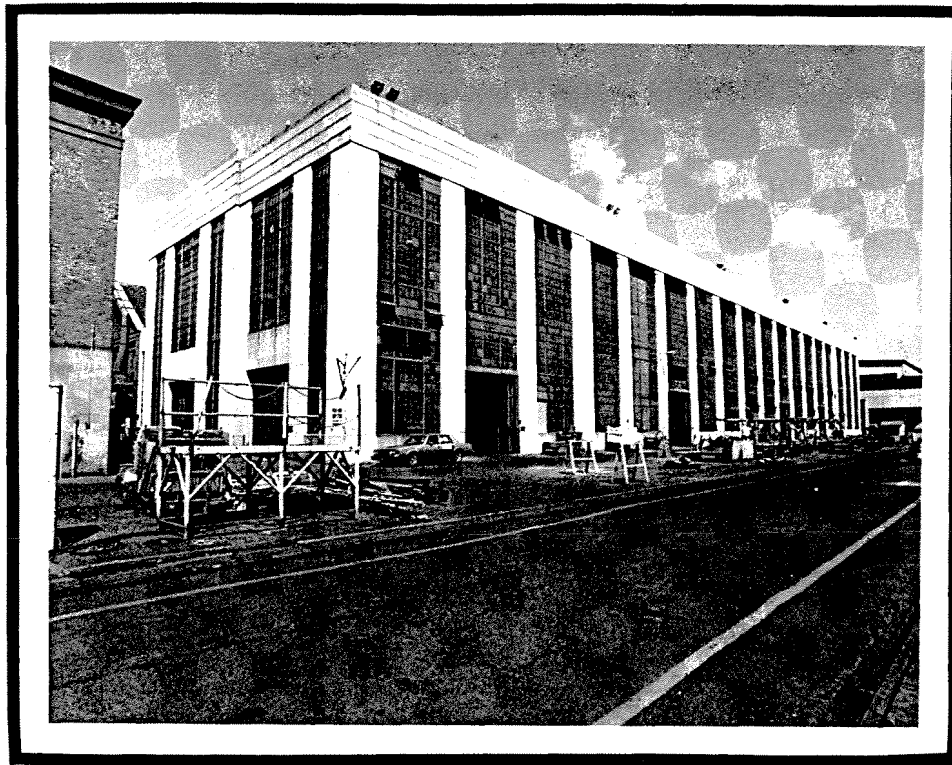
**Figure III-59.** 1905 Foundry (Building 17, Philadelphia Naval Base, Pennsylvania), *above*. 1906 Foundry and blacksmith shop (Building 6, Naval Base Charleston, South Carolina), *below*.





**Figure III-60.** 1919 Foundry (Building 20, Philadelphia Naval Base, Pennsylvania), *above*. 1918 Pattern shop (Building 10, Naval Base Charleston, South Carolina), *below*





**Figure III-61.** 1938-1939 Forge shop (Building 452, Naval Shipyard Puget Sound, Bremerton, Washington), *above*. 1937 Pipe and copper shops (Building 56, Naval Base Charleston, South Carolina), *below*. (Courtesy U.S. Navy)





## Service Facilities: Bakeries

### Description

The bakery was the central facility for large-scale bread production for installation personnel. It generally was a one-story, masonry building with large chimneys or vents for baking ovens. The size of installation bakeries depended on the size of the installations they served. In some cases, bakeries were combined with mess halls or other uses. Bakeries generally were utilitarian structures with little exterior ornament.

### Evolution

#### Army and Army Air Corps

The construction of free-standing bakeries on Army posts during the late nineteenth century was the result of efforts to consolidate food preparation at Army installations. During most of the nineteenth century, mess, or eating facilities, were provided in the barracks. Bread baking was a daily task that required constant attention. The Army determined that a separate post bakery would free mess rooms for other uses and provide larger amounts of bread more cost effectively.

The Quartermaster Department first issued a standardized plan for a bakery in 1872. The plan depicts a one-story, rectangular building with ovens and a store room along one wall, and the remainder of the interior open (Figure III-62). By the end of the nineteenth century, bakeries were standard components of Army posts and had increased in size to meet the needs of larger garrisons (Figure III-63). Army regulations placed the bakery under the supervision of the post treasurer; the Quartermaster Department was charged with the responsibility of providing the building and equipment for the post bakery.<sup>11</sup>

Between 1891 and 1906, the Quartermaster Department designed the bakery to include more rooms, such as a bedroom for the cooks, proof room, boiler room, fuel room, and lavatory, as well as specialized rooms for mixing, rising, and baking bread. Ventilation was always a concern. In 1892, the Quartermaster Department issued a plan for a bakery with a monitor roof. By 1898, standardized plans depicted metal vents in the roof.<sup>12</sup>

The Army continued to construct separate bakeries throughout the 1930s. They were often located in the Quartermaster Department warehouse use and support area of the installation. By the 1930s, bakeries typically were constructed of masonry on concrete foundations, and were capped by shallow gable roofs with metal vents and parapet gable ends. Often the building reflected the prevailing architectural vocabulary, such as Georgian Colonial Revival, of the installation, though with simplified, scaled-back detailing (Figure III-63).

#### Navy and Marine Corps

The Navy's shipyards, stations, and other installations of the nineteenth century had only small numbers of personnel based at the installation. The Navy and Marine Corps did not develop shore facilities that housed large numbers of permanent personnel until the construction of training stations, recruit depots, air stations, and operating bases during the twentieth century. As part of the construction of these new installations, the Navy began to provide shore-based services, such as bakeries, for their long-term resident populations. Often Navy planners combined the bakery

into a multiple-use utilitarian support buildings. For example, the Navy planned Moffett Naval Air Station, California, which opened in 1933, to include a combination bakery, commissary, and refrigeration plant. A combination bakery and mess hall was constructed at North Island Naval Air Station, California. These structures were not built according to standardized plans, but usually were constructed of materials and simplified design consistent with the primary buildings at the installation.

### **Association**

Bakeries are associated with the increasing diversity of functions on military installations during the late nineteenth and early twentieth centuries as they grew in size and in the number of services the military provided to installation personnel. Bakeries are secondary, support facilities of utilitarian design located in the storage and support area of installations. They may contribute to an historic district, but rarely possess sufficient significance to merit listing in the National Register as individual buildings.

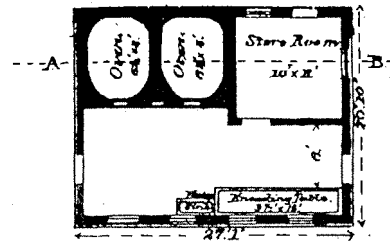
### **Integrity**

To possess integrity, bakeries should retain most of their design, materials, materials, association, location, and workmanship to reflect the periods of significance of the historic district. In general, bakeries no longer function as such and have been modified heavily for new uses, usually maintenance buildings. Common modifications include alterations of original window and door openings. The building still may possess integrity if it retains the majority of its original features, including the overall shape of the building and roof, exterior materials, chimney, roof vents, and patterns of door and window openings.

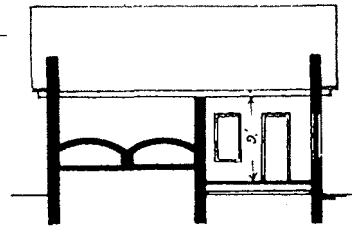
Nº 10.

BAKE HOUSE.

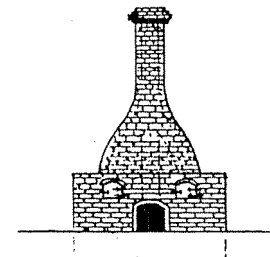
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Ground Plan.



Section through.  
A.B.



Front of Oven.

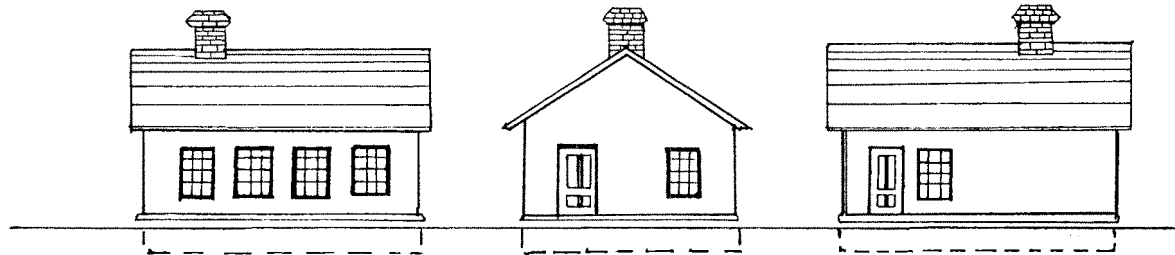


Figure III-62. 1872 Quartermaster bakery plan. (From War Department. *Annual Quartermaster Report*. Washington, D.C.: Government Printing Office, 1872.)





**Figure III-63.** 1889 Bakery (Building 102, Ft. McPherson, Georgia), *above*. 1903 Bakery (Building 235, Ft. Leavenworth, Kansas), *middle*. 1934 Bakery (Building 276, Ft. Monmouth, New Jersey), *below*.



## Service Facilities: Laundries

### Description

Laundries were utilitarian, one-story structures that served as the central laundry facility for an installation. Surviving examples of laundries are of masonry construction. Laundries generally were located in the support area of an installation.

### Evolution

#### Army and Army Air Corps

At Army posts during the nineteenth century, laundresses washed the troops' laundry by hand. Laundry was washed in various places at different posts. Laundresses often would wash clothes outdoors at a nearby body of water. At some installations, such as Ft. Sill, Oklahoma, "wash houses" were located behind each barracks and behind the hospital near the laundress' quarters. Some early barracks included a wash room. Most frontier posts included quarters for laundresses at the edges of the post.

During the 1890s, separate quarters for laundresses began to disappear. The Quartermaster Department began to issue plans for officers' quarters that included a laundry and servant's quarters. During the early 1890s, barracks still were designed to include wash rooms, but, by 1894, wash rooms no longer appeared in barracks plans.<sup>13</sup>nn

The Quartermaster Department issued standardized plans for consolidated laundry facilities between 1908 and 1915. The plans depict a one-story building with a large boiler room. The building included the laundry, a sorting room, and an office. A variation on this plan was a two-story building with a one-story boiler room attached. In 1915, a standard laundry plan depicted a building two stories in height that contained a single tall interior space, with a one-story boiler room attached.<sup>14</sup>

Laundry facilities continued to grow in size to match the increasing size of installations. During the wave of new construction during the late 1920s and the 1930s, newly constructed laundries were large rectangular buildings with a gabled parapet roof (Figure III-64). Dry cleaning facilities begin to appear during the late 1930s and 1940s.

#### Navy and Marine Corps

During the nineteenth century, the Navy's shore facilities primarily consisted of shipyards that did not house large numbers of military personnel. The Navy and Marine Corps did not develop installations with large numbers of shore-based personnel until the construction of training stations, recruit depots, operating bases, and air stations during the early twentieth century. As part of the construction of these types of installations, the Navy began to provide full services for the long-term resident populations. Often Navy planners combined laundries into a multiple-use utilitarian support buildings. No buildings specifically built as laundries were identified on Navy or Marine Corps installations during the field survey conducted as part of this study.



## **Association**

Laundries are associated with the increased complexity of military installations after the end of the nineteenth century and the growing number of services that were provided for installation personnel. Large centralized laundry facilities were constructed to house institutional-sized laundry equipment and replaced small wash houses and hand washing by non-military personnel. Laundries are one of many service buildings that were secondary support facilities at military installations. Laundries rarely possess historical significance as individual buildings; however, a laundry may be a contributing building in an historic district.

## **Integrity**

Laundries are utilitarian buildings, usually located in the support areas of an installation. To possess integrity, laundries should retain most of the elements of their design, materials, workmanship, setting, and location. Laundry buildings usually no longer function as laundries and have been modified extensively for new uses, often maintenance buildings or commissaries. Elements that generally have been modified include original window and door openings. Where subsequent additions or renovations have occurred, the building may have integrity if it retains the majority of its massing, shape, pattern of openings, materials, and ornament.



Figure III-64. 1939 Laundry (Building 79, Ft. Knox, Kentucky).



## Storage: General Storage

### Description

Storage facilities were constructed to store needed supplies. The military distributed supplies from central depots to individual installations. This resulted in two large groups of storage facilities: complexes of storage buildings at supply depots that served regions, and warehouses to store the supplies needed at specific installations. Typical supplies included subsistence, clothing, raw materials, equipment, and other general supplies. Storage facilities were generally utilitarian buildings constructed of a variety of materials, including wood, stone, brick, structural clay tile, or corrugated metal. Storage buildings usually were one- or two-story, long rectangular buildings with pitched roofs, regular openings, and little ornament. In cases where installations were planned and constructed at one time, the military generally constructed storage facilities that reflected the overall architectural character of the installation. Ordnance storage is discussed in the next section of this chapter; storage associated with manufacturing complexes is discussed in a previous section of this chapter.

### Evolution

#### Army and Army Air Corps

*Installation storage.* During the nineteenth century, the Subsistence Department and the Quartermaster Department were the two primary users of storage facilities. The Subsistence Department provided basic food rations; the Quartermaster Department issued clothing and equipment to men and provided fodder for animals. The Quartermaster Department proposed standardized plans for a general storehouse in 1860 and for a commissary store house in 1872 (Figure III-65). Both proposed plans showed one-story buildings with large open interior spaces.<sup>15</sup> Little differentiation between the two buildings is apparent, suggesting that the same building easily could be used by either department. Storehouses or warehouses were located in an area separate from the main cantonment. The typical warehouse was a one- or two-story rectangular building with a pitched roof and regular openings, often with bars over the windows for security (Figure III-65).

In 1866, Congress authorized the Army to sell food from the government stocks to officers, enlisted men, and their dependents. Although the Army initially limited sales to those items already purchased for issue to soldiers, eventually soldiers and their families were allowed to special order other items. Later, the post commissary warehouse began to stock items specifically for retail trade. The Quartermaster Department designed a commissary warehouse plan with a separate retail counter. This sales counter was the birth of the modern day commissary. The commissary warehouses were similar to other warehouses in the post warehouse area.<sup>16</sup>

During the nineteenth century, usually one or two storehouses fulfilled the needs of individual Army posts. As the Army consolidated its troops into larger, more permanent installations during the 1880s and 1890s, support facilities also were expanded. The Army continued to place the utilitarian functions of the Quartermaster and Subsistence Departments in a separate area from the main parade ground and cantonment. The utilitarian functions needed to operate the post formed a complex of storage, transportation support, and repair and maintenance facilities. For example, wagon trains originally transported supplies to Army posts. The Quartermaster Department's complex contained housing for teamsters, fodder for draft animals, and a blacksmith shop. During the last quarter of the nineteenth century, the railroad

supplanted the wagon train as the primary means of transportation and the Quartermaster complex was linked directly to railroad lines.

In 1892, the Quartermaster Department issued standardized plans for a combined Quartermaster and Commissary storehouse. When the Quartermaster and Subsistence Departments shared a warehouse, the interior was divided down the middle; each end of the building had its own set of offices and issue counters. Generally, the building had a loading platform along one long side of the building. This basic Quartermaster warehouse design remained the same from 1892 until the end of the 1930s (Figure III-66). The only major change was that the building grew from one-and-a-half stories to two stories with attic (Figure III-66).<sup>17</sup>

During the twentieth century, there was a dramatic increase in the number of storage facilities required to store the supplies of a modern army. During World War I, the Army established larger warehouse districts at its training camps. Warehouse districts comprised rows of one-story, temporary wooden storehouses located along railroad sidings. After the war ended, the increasingly mechanized Army continued to require more storage facilities to store unused materiel returned from the war front (Figure III-67). For example, eleven flat-roofed storage buildings were constructed at Rock Island Arsenal, Illinois, between 1919 and 1921, for storage of artillery vehicles and equipment. To meet the post-war storage needs, the Army sheathed some World War I temporary frame warehouses structural with clay tile or brick.

During the 1930s, some individual Army installations continued to require large warehouse districts, particularly posts with large numbers of soldiers, such as Forts Knox, Benning, Bliss, and Sill. Warehouse districts comprised rows of utilitarian, one-story buildings separated by projecting brick fire walls.

Storage facilities constructed at Army Air Corps installations sometimes did not follow the same design and site patterns as the Quartermaster Department warehouses on other Army posts. Army Air Corps storage facilities were similar in design to the hangars and the maintenance and repair shops built at the same time at airfields. Airfield storage facilities were located near the flight line with the maintenance and repair shops and airplane hangars, rather than in a separate warehouse district. The typical storage buildings were one-story, rectangular, masonry buildings with gable roofs and industrial sash windows (Figure III-67). They generally shared the same architectural character and motifs as the surrounding buildings of the flight line area.

When special storage facilities were required at a post, the Quartermaster Department often issued separate plans, designed according to the type and size of materiel requiring storage and the department requesting storage facilities. After the Army first issued oil lamps to troops, the Quartermaster Department built oil houses to store oil. During the first decade of the twentieth century, the Quartermaster Department issued separate plans for buildings to store special engineering, signal, and photographic equipment and supplies. These specialized storage facilities are less common building types not found on every installation.

*Depots.* In addition to the general storage facilities that were a standard component of every Army post no matter its purpose, the Army operated supply depots to serve as regional storage and distribution centers. After the Civil War, the Quartermaster Department adopted a system of depots to facilitate supplying Army installations. The Quartermaster Department controlled general depots, while department or division commanders controlled regional depots. The spread of railroad lines made the delivery of supplies easier and a central location for assembling supplies more advantageous. By 1869, the Quartermaster Department had four general depots, at New York, Philadelphia, Washington, and Jeffersonville, Indiana.<sup>18</sup>

In 1878, the Quartermaster Department established the San Antonio Depot, now part of Ft. Sam Houston, Texas, as a regional storage facility for the Department of Texas. Supplies were distributed from the depot by rail to other forts in the Southwest. Quartermaster General Montgomery C. Meigs designed the San Antonio depot as a quadrangle with stone storehouses facing an interior courtyard. A tall stone water tower marked the center of the quadrangle (Figure III-68).

During the twentieth century, regional storage depots proliferated as the Army developed more complex logistical systems to serve its larger number of troops and amount of equipment. This trend was particularly important during World Wars I and II. Specialized storage depots were established for specific materials. During World War II, Edgewood Arsenal became the Eastern Chemical Depot, the first and only chemical storage facility on the East Coast. Edgewood required an extensive number of warehouses and storage igloos. Other large storage facilities were constructed at ports of embarkation, such as Ft. Mason in San Francisco, where massive architect-designed warehouses were constructed during World War II.

The Army also developed a system of aviation depots to serve as central distribution points for supplies to individual airfields. One example was the Fairfield Aviation Depot, Ohio, now part of Wright-Patterson AFB. The depot began operation in 1917 and provided logistics support to the four Signal Corps Aviation Schools operating in the Midwest. Other aviation depots included the Engine and Repair Depot, now Maxwell AFB, Alabama, and Sacramento Depot, now McClellan AFB, California. The aviation depots were characterized by rows of utilitarian warehouses.

### Navy and Marine Corps

*Installation storage.* Storage buildings were essential components of Navy yards. These buildings were used to store both general supplies for the fleet, and raw materials and equipment for ship repair and construction. During the nineteenth century, storage buildings for general supplies and for industrial supplies were similar in appearance and were interchangeable as needed. Nineteenth-century storage buildings were two-story, long, rectangular, brick buildings with regular patterns of openings and open interior space (Figure III-69).

General purpose warehouses were located at each Navy yard and were used to store sundry provisions to resupply ships. The three major distribution points during the nineteenth century were the Boston, New York, and Norfolk Navy yards, but other yards contained at least one general storehouse. The Navy built industrial storage facilities at Navy yards to support specific processes of ship construction. Many raw materials and finished products were stored in the open air. Warehouses at navy yards generally were multi-storied, masonry buildings that display the architectural vocabulary and technology of their period of construction. Late nineteenth- and early twentieth-century storage buildings received the same neoclassical architectural treatment as other shipyard buildings of the era (Figure III-70). Nineteenth-century storage buildings were built using brick load-bearing construction, while those built after the turn-of-the-century were built of steel frame clad in brick. After World War I, the Navy turned to using reinforced concrete construction for its storage and industrial buildings. General warehouses were located in the heart of the yards' waterfront area during the nineteenth and early twentieth century.

During the twentieth century, the Navy also established facilities with the primary purpose of providing storage for the fleet. The Navy established a series of refueling stations at strategic points to satisfy the demand for coal and oil created by an expanded, modern steel fleet. By 1905, the Navy had created coal depots at or near existing naval facilities on the East and West Coasts, as well as in Alaska, the Caribbean, and the Pacific islands. Many coal depots consisted

of open piles of coal or, in some cases, open storage sheds. In 1910, the Navy began to establish fuel oil depots to supply the needs of submarines and destroyers. The Navy established its first fuel oil facilities at Key West, Charleston, Norfolk, and Newport.<sup>19</sup>

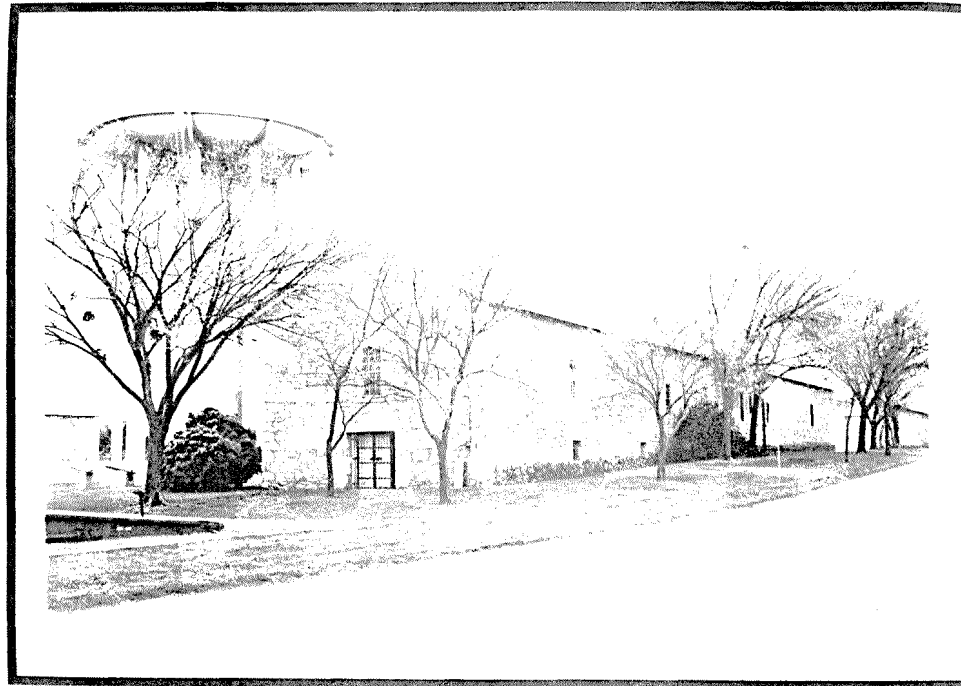
*Supply Centers.* During the early twentieth century, the Navy began to concentrate its supply operations at specified depots. The expanded needs of the fleet during World War I caused the Navy to establish fleet supply bases at Norfolk, Virginia, and at Brooklyn, New York. In 1922, the Chief of Naval Operations commissioned the Naval Supply Depot, San Diego, to service Navy vessels in the Pacific. Rows of multi-story, reinforced concrete or metal warehouses characterized these supply bases during the inter-war period and during World War II (Figure III-70).<sup>20</sup>

## **Association**

Storage buildings are support facilities required to sustain the operations of a military installation. The size, extent, and purposes of storage facilities illustrate the evolution of military logistics, supply, and technology. The construction of the buildings, including architectural ornamentation and siting, reflect the period of construction. These buildings can be minor utilitarian buildings or major architectural elements on an installation. Storage facilities, in general, do not possess individual historic significance, but may be contributing elements to an historic district. They can be secondary facilities that supported the installation's primary mission, whether it was a shipyard, frontier fort, or airfield, or storage facilities can compose the bulk of the installation. Within various types of installations, the storage facilities may be interspersed with other types of buildings or may form a distinct warehouse district.

## **Integrity**

To possess integrity, storage facilities should retain most of the design, location, setting, materials, and workmanship from the period of significance of the historic district. Character-defining features of this building type include the building form, original materials, pattern of openings, and relationship with a complex of other storage facilities. An isolated storage building that once was part of a complex is not as good a representative of the building type as an intact complex. Storage facilities often have been modified or altered for other uses. Where a building has undergone subsequent additions or renovations, the building still may have integrity if it retains the majority of its setting, massing, proportion, pattern of windows and doors, materials, and ornamentation.



COMMISSARY STORE HOUSE.  
Scale . 20 feet to 1 inch.

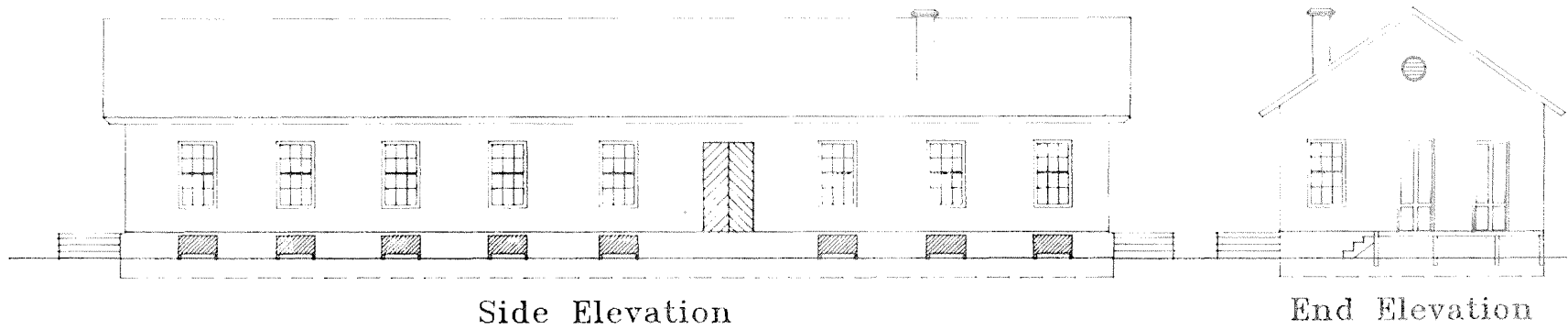


Figure III-65. 1870 Quartermaster store house (Building 346, Ft. Sill, Oklahoma), *above*. 1872 Quartermaster commissary store house plan, *below*. (From War Department. *Annual Quartermaster Report*. Washington, D.C.: Government Printing Office, 1872)





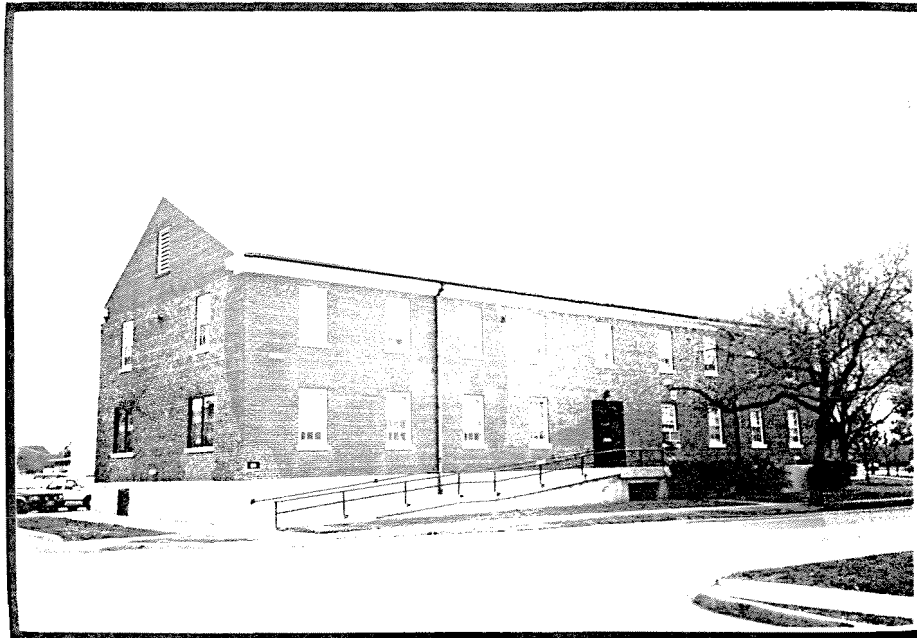
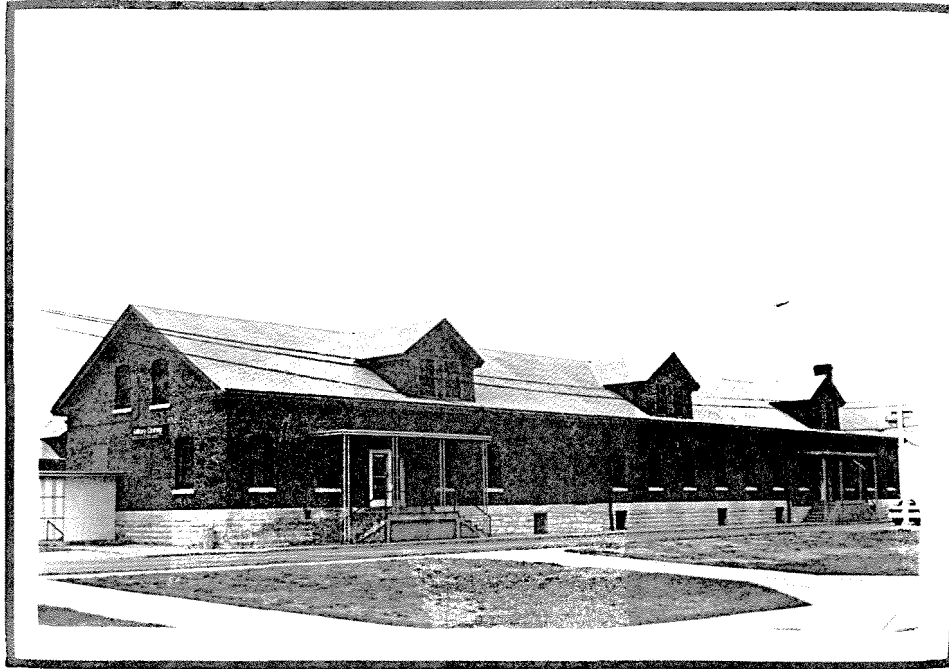


Figure III-66. 1908 Quartermaster/Commissary warehouse (Building 17, Ft. Benjamin Harrison, Indiana), *above*. 1939 Quartermaster warehouse, standardized plan (Building 52, Scott AFB, Illinois), *below*.



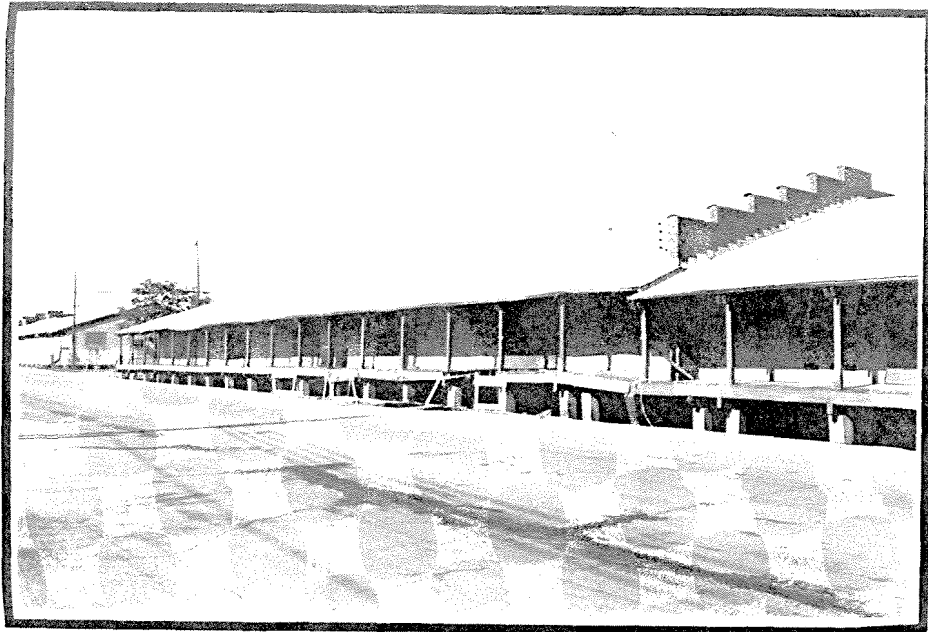


Figure III-67. 1919 Warehouse in warehouse district (Building 61, Ft. Knox, Kentucky), *above*. 1940 Warehouse (Building 60, Scott AFB, Illinois), *below*.



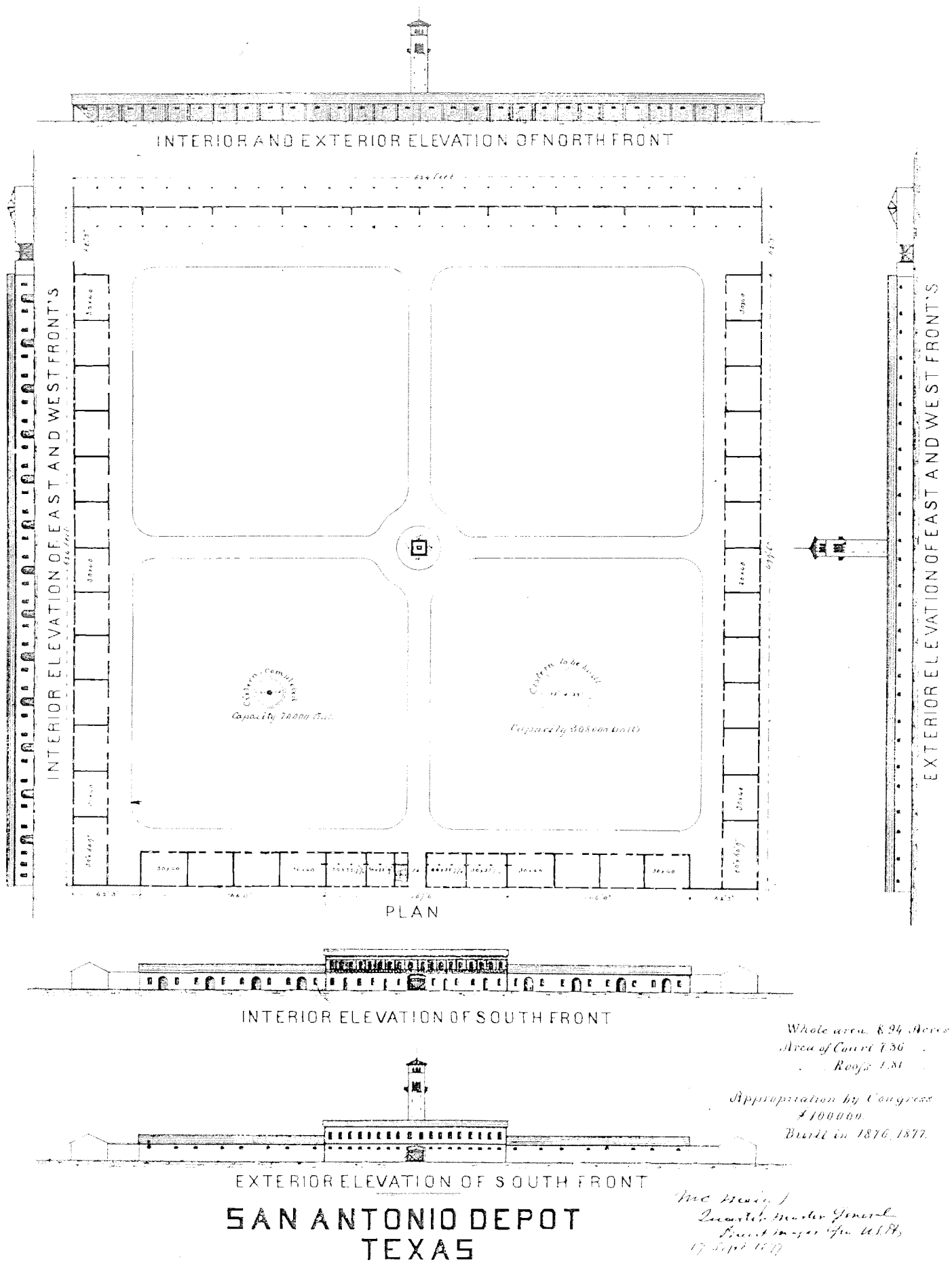
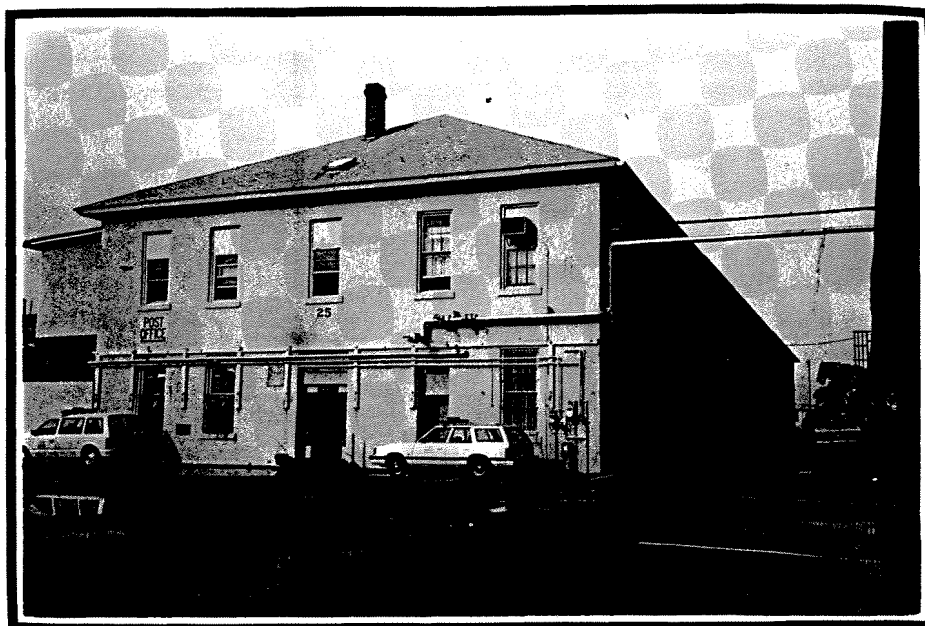


Figure III-68. 1877 Plan of San Antonio Depot. (From War Department. *Annual Quartermaster Report*. Washington, D.C.: Government Printing Office, 1878.)

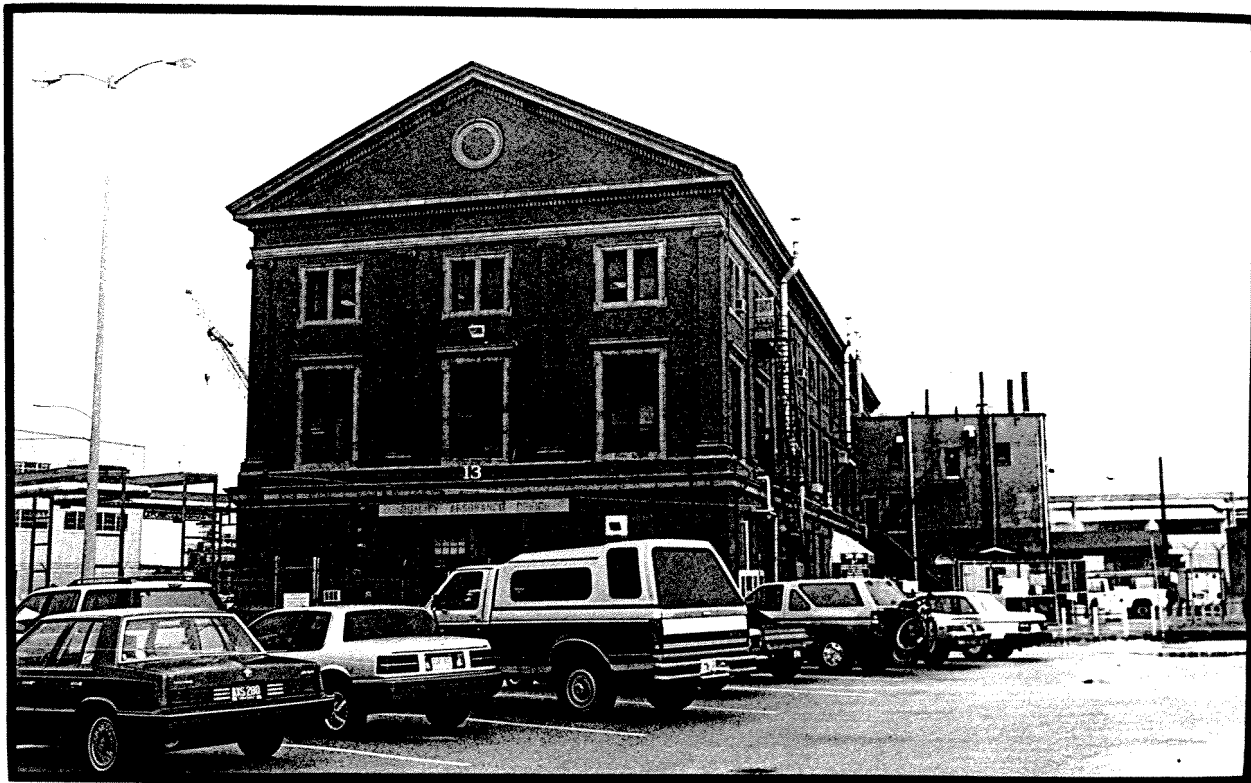




**Figure III-69.** Nineteenth-century naval storehouse buildings (Building 25 (1874), above. Building 40 (1875), below, Naval Complex Pensacola, Florida) . . .







**Figure III-70.** 1906 Equipment building (Building 13, Naval Base Charleston, South Carolina), *above*. 1942 Warehouses (Buildings 64, 66, and 67, Naval Base Charleston, South Carolina), *below*. (Courtesy U.S. Navy)



## Storage: Ordnance

### Description

Ordnance storage facilities are a specialized form of storage facilities that generally are recognizable as a separate building type from general storage. They form a large part of the military's storage facilities. The military constructed ordnance storage buildings to contain weapons, ammunition, and related equipment. In general, the military distributed ordnance from central depots to individual installations. This resulted in two types of ordnance storage facilities: concentrations of storage buildings at the central depots and a few isolated buildings at most installations to store the ordnance needed at that installation. Ordnance storage facilities generally were one-story, utilitarian buildings with thick masonry walls. In some cases, ordnance storage facilities did incorporate architectural motifs if designed as part of an installation master plan.

### Evolution

#### Army and Army Air Corps

*Installation storage.* The Army constructed ordnance storage facilities on Army posts throughout the time period examined during this study, 1790 and 1940. During the nineteenth century, powder magazines generally were isolated, small, windowless, one-story, masonry buildings (Figure III-71). The typical garrison post was stocked with only one or two powder magazines. When the Army began to consolidate its troops on larger, permanent posts during the 1880s and 1890s, the Quartermaster Department issued standardized plans for ammunition storehouses that depicted one-story, masonry buildings with dormers, windows, and doors; these ammunition storehouses were similar in design to Quartermaster warehouses (Figure III-71). The Quartermaster Department designed the buildings to allow proper ventilation of ammunition.<sup>21</sup>

In July 1926, the Navy's Ammunition Depot at Lake Denmark, New Jersey, suffered a disastrous explosion that destroyed the depot, portions of the Army's Picatinny Powder Depot, and nearby towns. After this, both the Army and Navy adopted a policy of constructing semi-circular concrete and steel "igloo" storage structures set into the ground surface and with surrounding earthen walls. However, funding limitations prevented the military from implementing this policy on a wide scale.<sup>22</sup> On average installations, the typical small individual ordnance storehouse did not vary greatly in appearance from the pre-1926 above-ground ordnance storehouses. During the 1930s, the Army adopted structural clay tile as the favored construction material for ordnance storage buildings; the typical non-igloo storage building of this era was a one-story, above-ground, structural clay tile structure with a vented gable roof.

On Army installations not specifically designated as ordnance production or storage facilities, the growth in garrison size and amount of ordnance used can be seen in the evolution of ordnance storage facilities from a single powder magazine at nineteenth-century western posts to entire complexes of magazines located several miles away from the main cantonment area by the end of the 1930s. The installation mission determined the number of ordnance storage facilities required at the installation. For example, artillery installations used more ordnance and thus were supplied with more extensive ordnance storage buildings.

*Depots and Arsenals.* The Ordnance Department operated ordnance production facilities and regional ordnance storage depots. The storage buildings at nineteenth-century ordnance production and regional depots were two-story, masonry, gable-roofed buildings that were much larger than the single powder magazines at garrison posts. The storage facilities at Watervliet

Arsenal, New York, were large, windowless, stone buildings. The Ordnance Department operated an ordnance depot for the Department of the Missouri during the mid-nineteenth century at Ft. Leavenworth, Kansas. The depot was housed in two, two-story, brick warehouses, with regular window openings and simple decorative brickwork, including pilaster strips and corbelled cornice (Figure III-72).

After the 1926 Lake Denmark Ammunition Depot explosion, new ordnance storage buildings were constructed at Picatinny Arsenal, New Jersey. Different types of storage facilities were constructed for different types of ordnance. For stable materiel, above-ground, rectangular, structural clay tile or brick buildings with loading docks along the long side were built (Figure III-72). For more volatile ordnance and raw materials, igloo storage structures were built. The post-1926 ordnance storage buildings were dispersed to prevent the spread of explosions. Dispersed ordnance storage facilities of these two types -- either above-ground, brick or structural clay tile magazines or partially below-ground, concrete igloos -- were the prevalent pattern of layout and design at large-scale ordnance storage installations.

### Navy and Marine Corps

During the nineteenth century, the Navy stored ordnance supplies at the Navy yards as part of the general provisions for resupplying ships. Ordnance storage buildings generally were one-story buildings with thick masonry walls (Figure III-73). One exception was an octagonal building built in 1854 at Pensacola Navy Yard that served the combined function of armory and chapel.

As the Navy modernized and increased its fleet at the end of the nineteenth century, it required greater ordnance storage capacity. Concerns about safety caused the Navy's Ordnance Bureau to establish separate ordnance storage complexes called naval magazines near Navy yards and other locations. Naval magazines in operation by the late nineteenth century were located at Mare Island, California; Ft. Mifflin, Pennsylvania; Lake Denmark, New Jersey; and, near Norfolk, Virginia. Nineteenth-century ammunition storage buildings, such as those at Mare Island, were rectangular, one-story, stone structures with a central door and no windows. Simple ornament occasionally was used to highlight the doorways of these buildings. By 1915, the Navy operated ammunition depots at Hingham, Massachusetts; Iona Island, New York; Lake Denmark, New Jersey; Ft. Lafayette, New York; Ft. Mifflin, Pennsylvania; St. Juliens Creek, Virginia; Mare Island, California; and, Puget Sound, Washington. The early twentieth-century ammunition storage buildings, for instance those at St. Juliens Creek, are simple, long, rectangular, brick buildings with windows and without ornament. By World War I, these installations were referred to as ammunition depots.<sup>23</sup>

In July 1926, the Lake Denmark Ammunition Depot suffered a disastrous explosion that destroyed the depot and nearby towns. In response, the Army and Navy began constructing semi-circular concrete and steel "igloo" storage structures for ordnance storage.<sup>24</sup> The Hawthorne Navy Ammunition Depot, Nevada, established in 1930, incorporate the new ordnance storage guidelines and became the archetypal naval ordnance storage facility of widely dispersed, small, storage igloos. Large numbers of ordnance storage igloos were constructed during World War II (Figure III-73).

The Navy also sometimes constructed small ammunition storage facilities at its air stations. These ammunition storage facilities differed in design from the storage buildings at ammunition depots. For example, at Moffett Naval Air Station, California, the Navy constructed small one-story ammunition storehouses with red tile roofs and stuccoed finish to complement the Spanish Colonial/Mission Revival architectural theme of the installation.

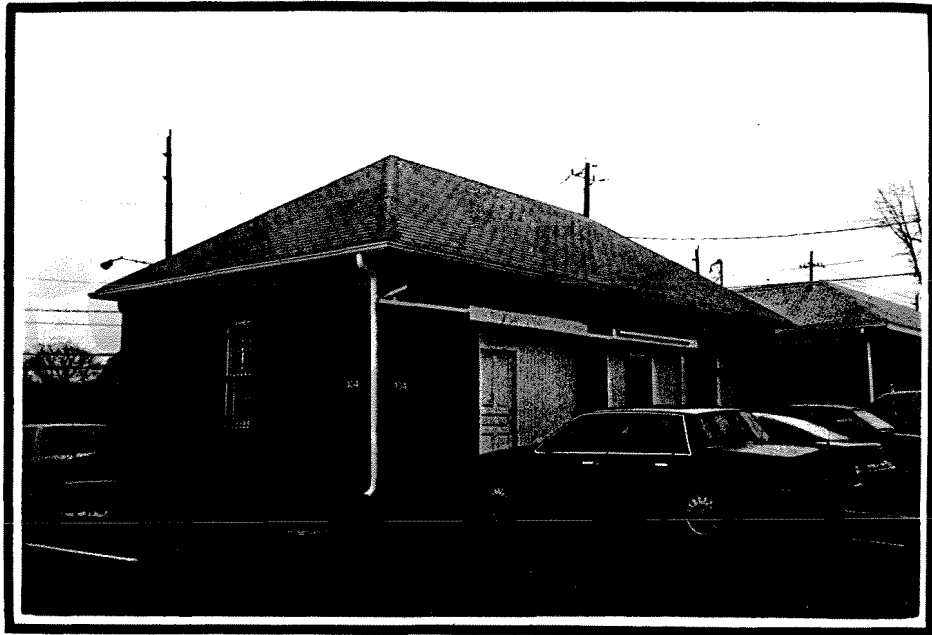
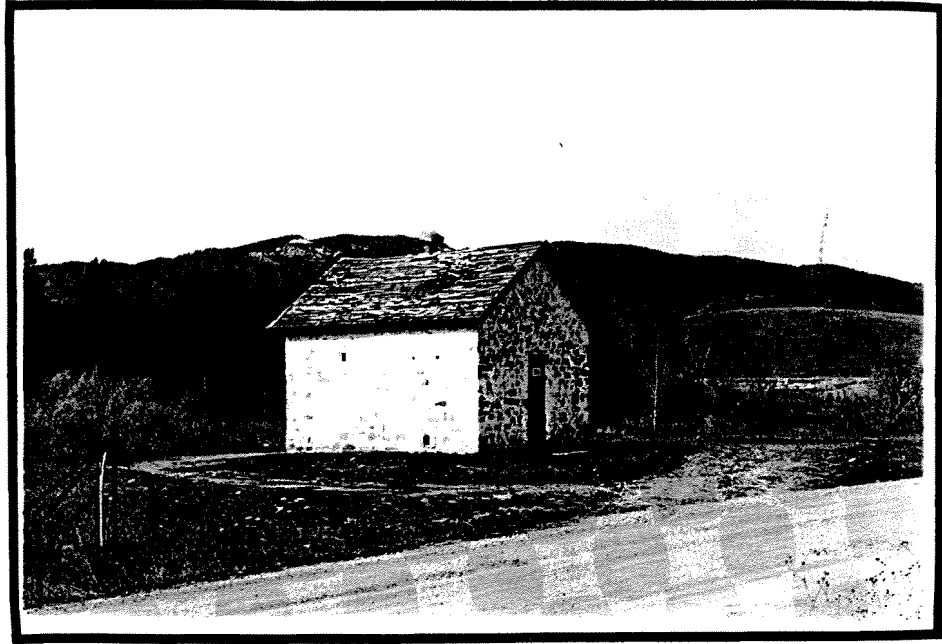
## **Association**

Ordnance storage buildings are associated with the evolution of weapons technology and illustrate the general evolution of military logistics and supply in relation to weaponry. Ordnance storage buildings, in general, do not possess individual historic or architectural significance. The storage of ordnance alone is not an historically significant context; however, ordnance storage facilities may be associated with other significant historic contexts, such as a significant method or type of construction or a significant ordnance production activity. Ordnance storage buildings may contribute to an historic district if they are part of a cohesive concentration of buildings that possess historical or architectural significance, particularly if the historical significance of the district is related to military ordnance. A complex of ordnance storage buildings on an installation with the primary mission of ordnance production and storage may form a distinctive district, while the few ordnance storage buildings on other types of installations may be contributing support buildings in an historic district, if they are physically related to the district. The dispersed layout of twentieth-century ordnance storage facilities affects their ability to contribute to historic districts.

## **Integrity**

To possess integrity, ordnance storage facilities should retain most of their design, setting, and exterior construction materials from the period of significance of the historic district. Nineteenth-century ordnance storage facilities usually have undergone the most substantial modifications and may have been adapted for use for other types of storage or, in cases of large ordnance depots, even for offices. Ordnance storage facilities from the 1920s and 1930s often have undergone little modification due to their specialized design.

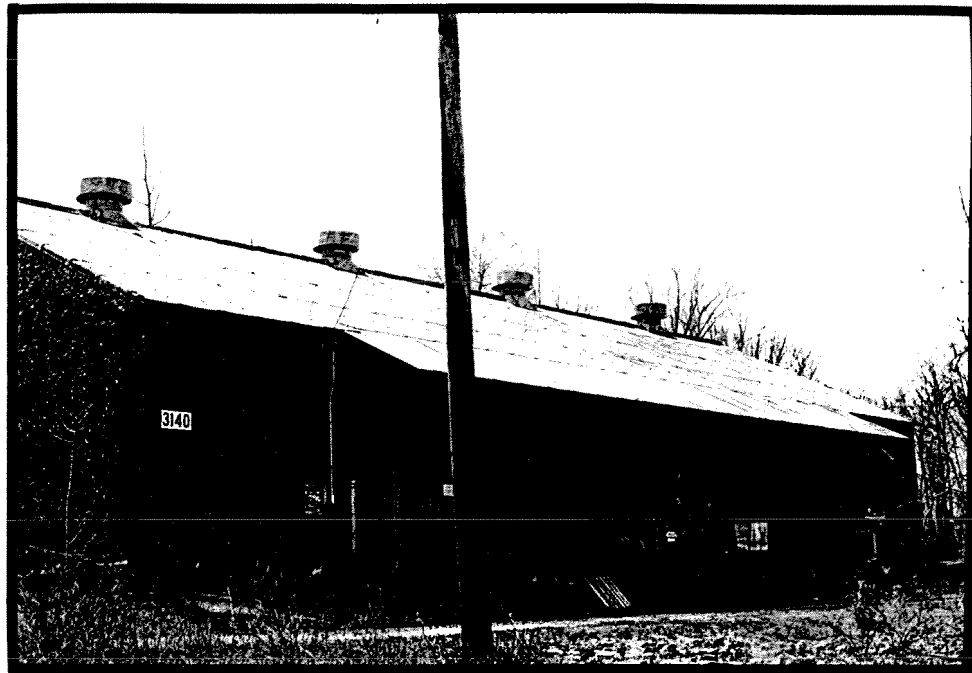
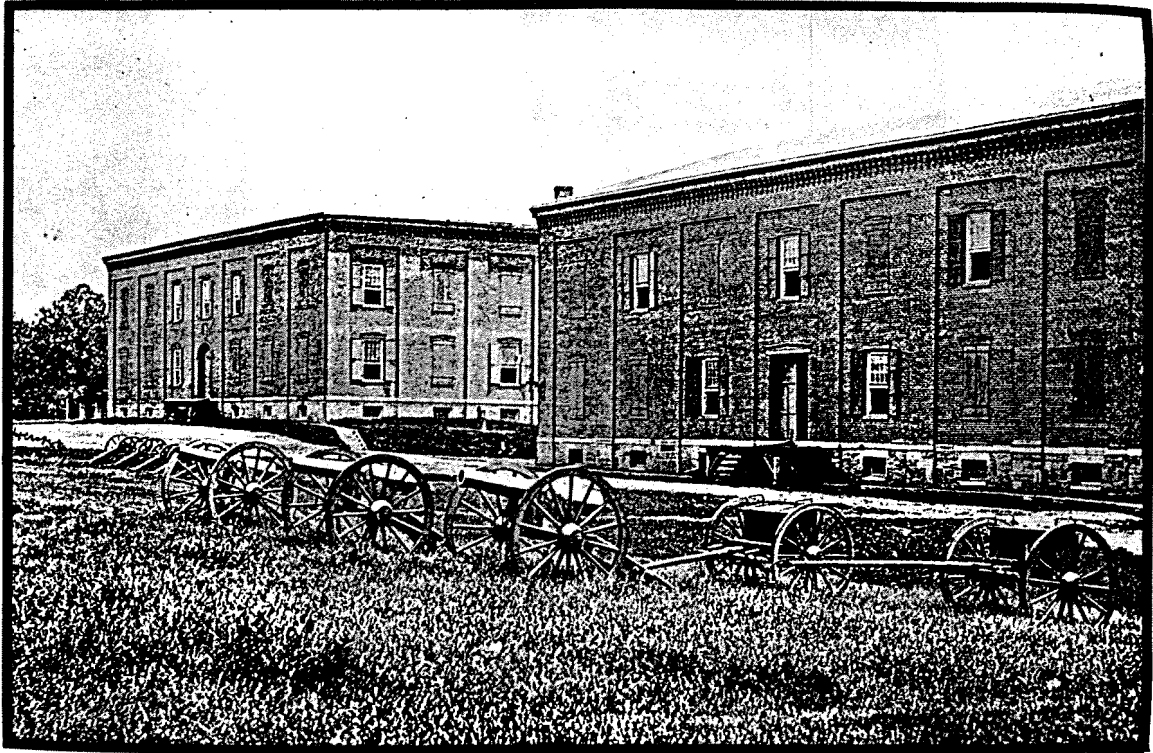




**Figure III-71.** Typical post powder magazine constructed in 1878 (Building 334, Ft. Missoula, Montana), *above*. 1897 Ordnance storage building (Building 104, Ft. McPherson, Georgia), *below*.

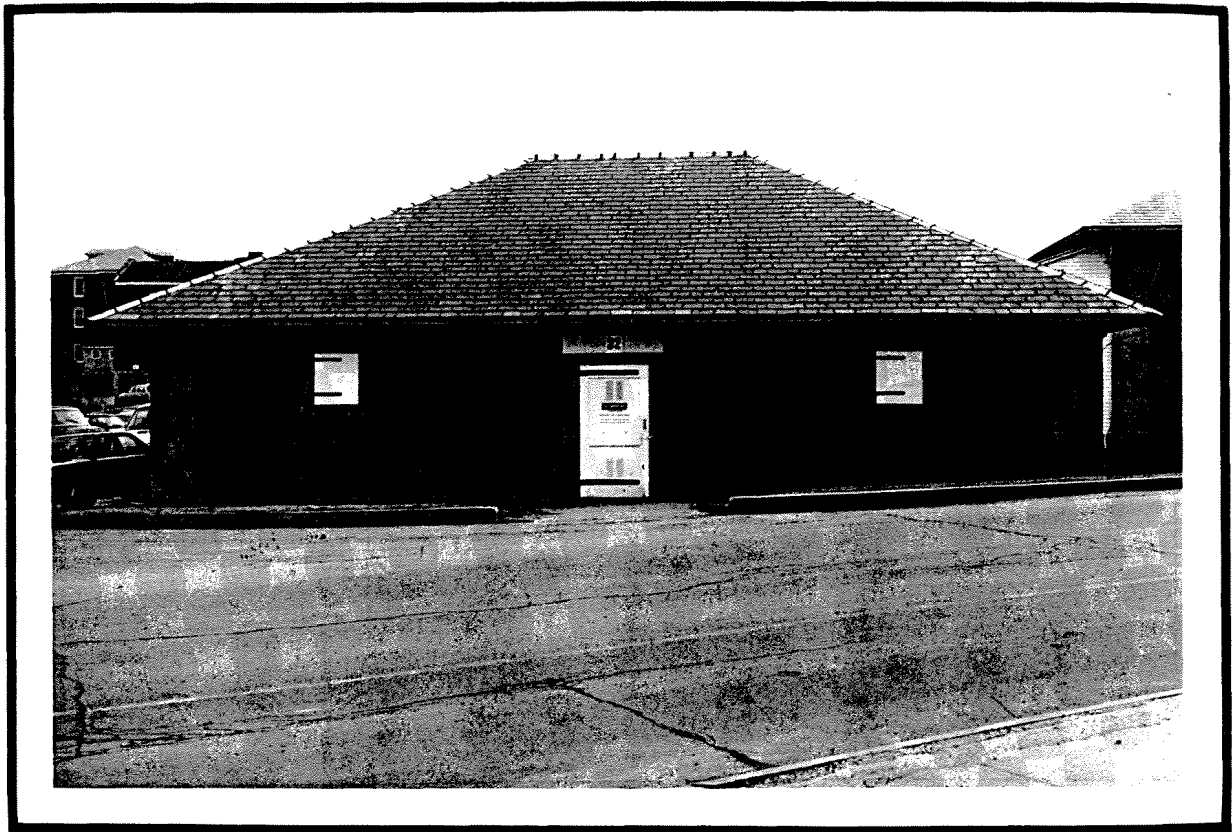






**Figure III-72.** 1859 Ordnance warehouses (Sherman and Sheridan Halls, Ft. Leavenworth, Kansas), *above*. (Courtesy Ft. Leavenworth Museum) 1934 Ordnance storage (Building 3140, Picatinny Arsenal, New Jersey), *below*.





**Figure III-73.** 1848 Ordnance storage (Building 32, Portsmouth Naval Shipyard, Maine), *above*. (Courtesy of U.S. Navy) Typical example of igloo ammunition storage constructed during World War II (Building X55, Naval Base Charleston, South Carolina), *below*.



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8. Paolo E. Coletta, ed., *United States Navy and Marine Corps Bases, Domestic* (Westport, Connecticut: Greenwood Press, 1985), 184.
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13. NARA, Cartographic Branch, RG 77, Standard Plans of Army Post Buildings, 1891 - 1918, Officers' Housing; David A. Clary, "A Life Which is Gregarious in the Extreme: A History of Furniture in Barracks, Hospitals, and Guardhouses of the United States Army, 1880-1945" (MSS, U.S. Department of the Interior, National Park Service, Harpers Ferry Center, Harpers Ferry, West Virginia, 1983), 134; David A. Clary, "These Relics of Barbarism: A History of Furniture in Barracks and Guardhouses of the United States Army, 1800-1880" (MSS, U.S. Department of the Interior, National Park Service, Harpers Ferry Center, Harpers Ferry, West Virginia, 1983), 115, 346.
14. NARA, Cartographic Branch, RG 77, Standard Plans of Army Posts, 1891 - 1918, Plan 234, 234-A, 234-B, 402.
15. War Department, *Regulations Concerning Barracks and Quarters for the Army of the United States, 1860* (Washington, D.C.: George W. Bowman, 1861); War Department, *Annual Reports of the Quartermaster-General* (Washington, D.C.: Government Printing Office, 1872).

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18. Erna Risch, *Quartermaster Support of the Army 1775-1939*, (Washington, D.C.: Government Printing Office, 1962. Reprint 1989), 457.

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22. Harry Thompson and Lida Mayo, *The Ordnance Department: Procurement and Supply* (Washington, D.C.: Government Printing Office, 1960), 360-361.

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## CHAPTER 6

### INFRASTRUCTURE

#### Power Plants/Electrical Systems

##### Description

Power plants and their attendant distribution systems on military installations provided power to manufacturing establishments and heating and electricity to residential communities. Central power plants generated power that was distributed through a system of substations. The central power plants generally were large industrial buildings, while the supporting substations were small, utilitarian buildings. Both power plants and substations were constructed of masonry. In some cases, the central power plants were placed in prominent locations and given high-style architectural treatment. The location and prominence of power plants depends on the installation mission and date of construction. Power plants for garrison posts and training stations usually were located away from the main area of the installation and were unadorned, utilitarian structures. Late nineteenth- and early twentieth-century industrial installations, such as shipyards and arsenals, received large, prominent power plants that symbolized the military's growing industrial power. Mid twentieth-century power plants usually display more utilitarian, functional design, and usually were located away from the main area of the installation.

##### Evolution

###### Army and Army Air Corps

During the late nineteenth century, the Army consolidated its troops in larger installations with permanent construction and improved the living standards on its posts. During the 1880s and 1890s, the Quartermaster Department began to experiment with integrated steam heating systems on installations. The first integrated system was installed at Ft. Riley, Kansas, during the 1880s. Ft. Riley's central steam heating plant used four miles of pipe to send steam throughout the post. This plant also captured and recondensed the steam to avoid a build-up of calcium in the boilers.<sup>1</sup>

The Army introduced electric lighting into barracks in 1891. The need for power stations grew as the Army expanded electrical service at its installations. Installations constructed after the 1890s were equipped automatically with a power plant.<sup>2</sup> Power plants were added onto older installations as systems and facilities were modernized. Power plants usually were one-story, masonry buildings with tall chimney flues (Figure III-74). During the wave of new installation construction during the 1930s, the Army constructed larger, two-story, masonry power plants (Figure III-74). Smaller complexes within an installation, such as a hospital complex, sometimes were equipped with a separate power plant. Substations were constructed to aid the distribution of power around the installation through a system of electrical substations and transformer huts (Figure III-75).

###### Navy and Marine Corps

At the beginning of the 1880s, the U.S. Navy still relied on wooden ships as the backbone of its fleet. After the advent of steel, steam-powered vessels at the end of the nineteenth century, power plants became vital elements at naval shipyards. As the Navy modernized its fleet, power



to operate machinery, machine shops, and foundries became crucial to the development of Navy yards. At first, each shipyard division established its own power facilities. In 1904, Congress gave the Bureau of Yards and Docks responsibility for the construction of central power plants at each shipyard to provide electricity, steam power, heat, and compressed air. The Bureau of Yards and Docks contracted with the industrial architecture firm of Stone and Webster to study centralized power at six naval installations located along the Atlantic Coast.<sup>3</sup> Over the next ten years, central power plants were constructed at the Navy's yards. These buildings were massive structures, generally prominently located and architecturally imposing (Figure III-76). During and after World War I, power plants at naval shipyards increased in size in response to the increasing size of the yards. In some instances, the power plant design echoed the overall architectural character of the installation, as in the case of North Island Naval Air Station, California, while in other cases, the design was a strictly functional, industrial design (Figure III-77). Overall, the trend was toward utilitarian power house designs after World War I.

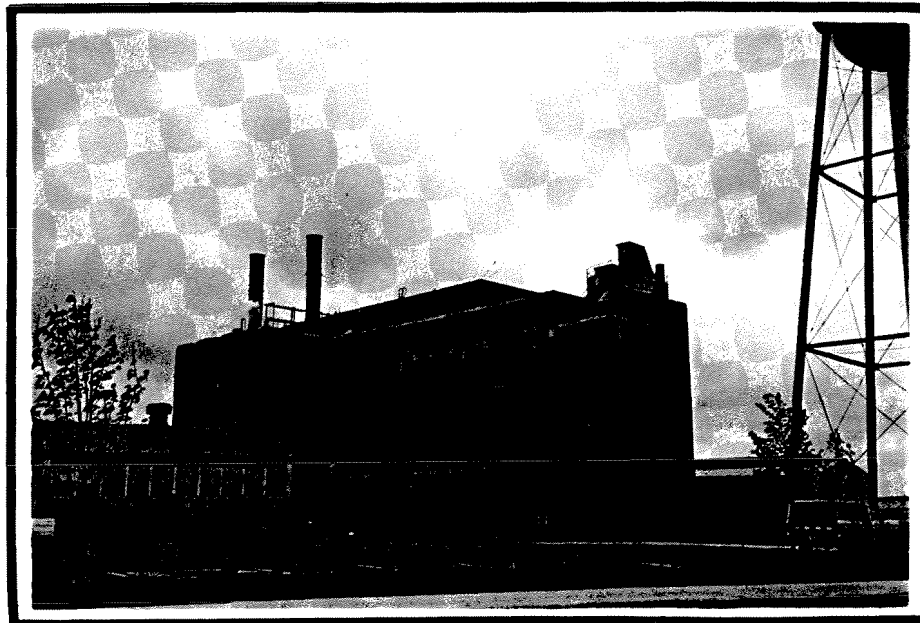
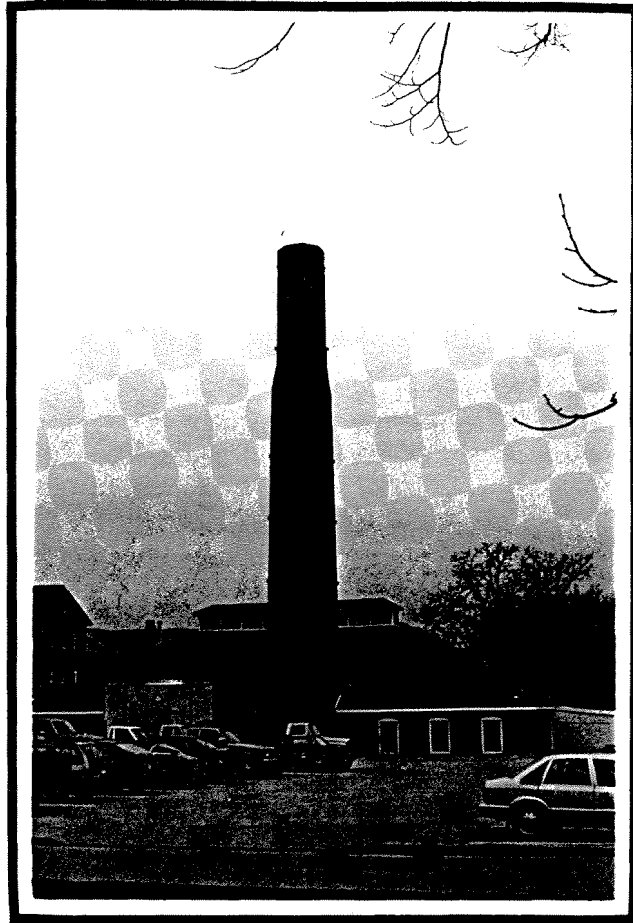
During the twentieth century, as the Navy expanded its permanent shore facilities, heating and power plants were included as part of the new installations. Training stations needed power plants to heat and light education buildings. At the navy's lighter-than-air aviation stations, such as Moffett and Lakehurst, power plants were constructed to generate the lifting gas needed to fill the lighter-than-air balloons or dirigibles.

### **Association**

Power plants either are associated with the primary mission of an installation, such as at shipyards, manufacturing facilities, and some air fields, or are secondary support structures that provided heat and electricity to housing and administration areas. Power plants also are related to the developing technology of the industrial and machine ages. Power plants associated with the primary mission of installations often are prominent buildings in central locations that illustrate their relationship to the industrial process at the installations. This type of power plant should be evaluated for its association with the mission of the installation and for its architectural significance. Power plants that provided power to residential and administrative buildings are not related to the primary mission of the installation; their role as secondary, support structures is reflected in their utilitarian designs and isolated locations. Power plants in this second category usually are not associated with a significant historic context and thus do not possess historical or architectural significance as individual buildings; however, they may contribute to an historic district if they are in an area with a concentration of historic properties.

### **Integrity**

To possess sufficient integrity to contribute to an historic district, power plants and their attendant support structures should retain most of the exterior design features, materials, and setting from their period of significance. If the building is under consideration as an individual historic property, then the interior also should retain sufficient integrity of materials, spatial arrangement, and equipment to represent the period of significance. Often power plants have been upgraded or expanded. Common modifications include changes to original window and door openings and the construction of additions. Character-defining features of power plants include the pattern of openings, the distinctive tall chimney stacks of many early power plants, construction materials, and the architectural vocabulary specific to the power plant. For example, the monumental neoclassical design elements of turn-of-the-century power plants at Navy yards are important elements of the buildings' character, while Art Deco or modern architecture elements are defining features of 1930s power plants. These facilities still may possess integrity if they retain the majority of their design, setting, materials, association, and workmanship from their period of significance.



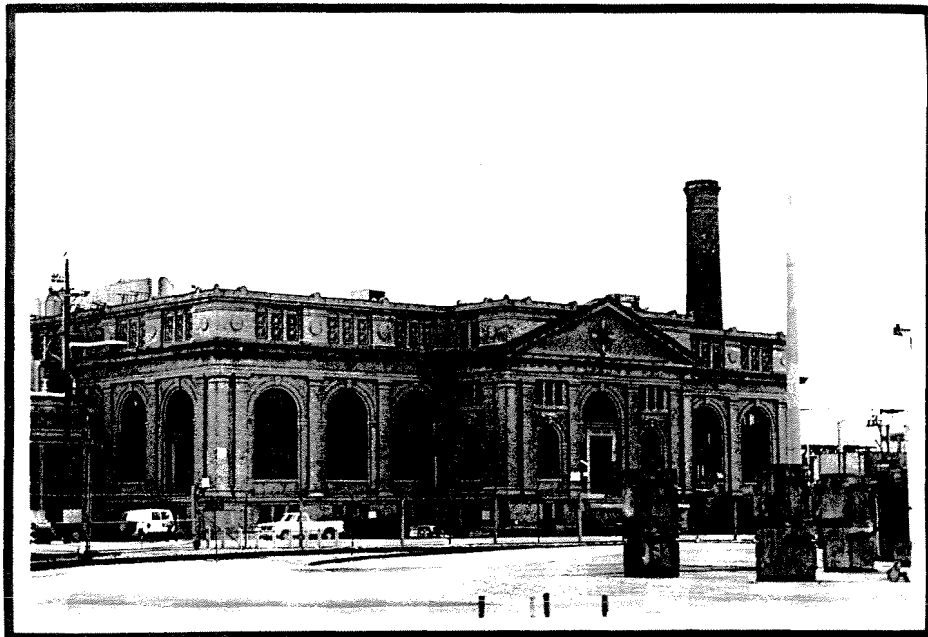
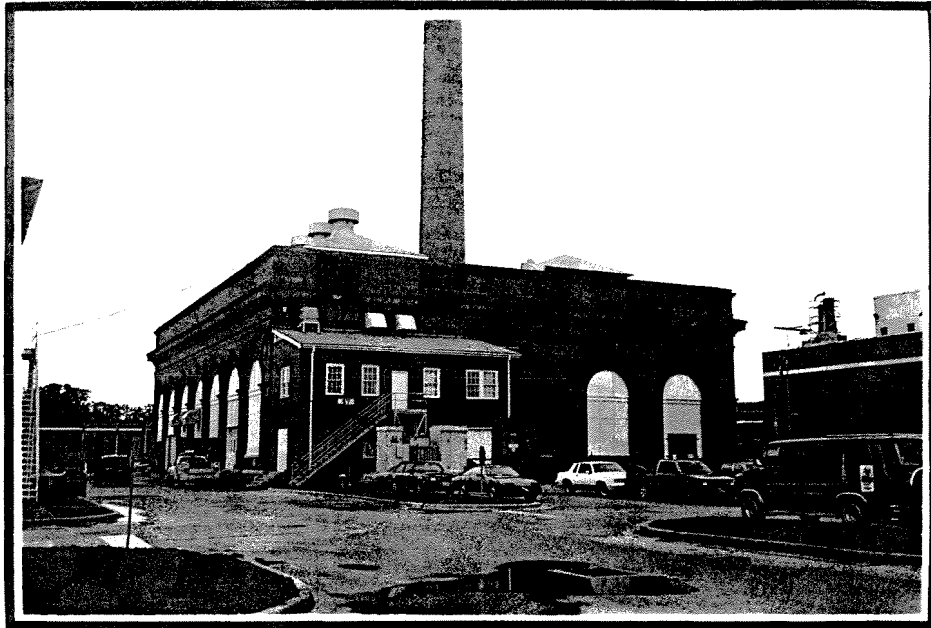
**Figure III-74.** 1892 Heating plant (Building 72, Ft. Leavenworth, Kansas), *above*. 1937 Heating plant (Building 10170, Wright-Patterson AFB, Ohio), *below*





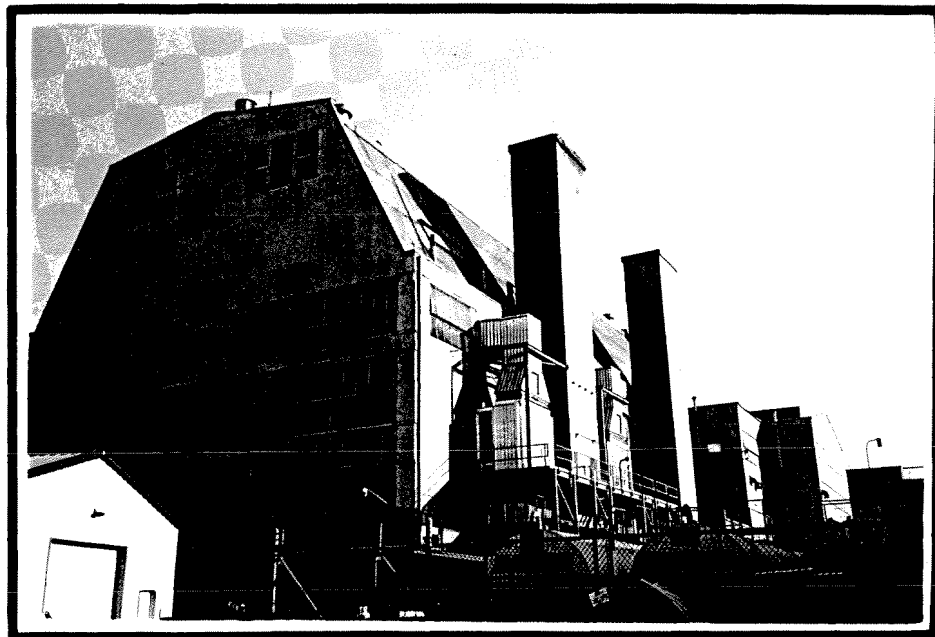
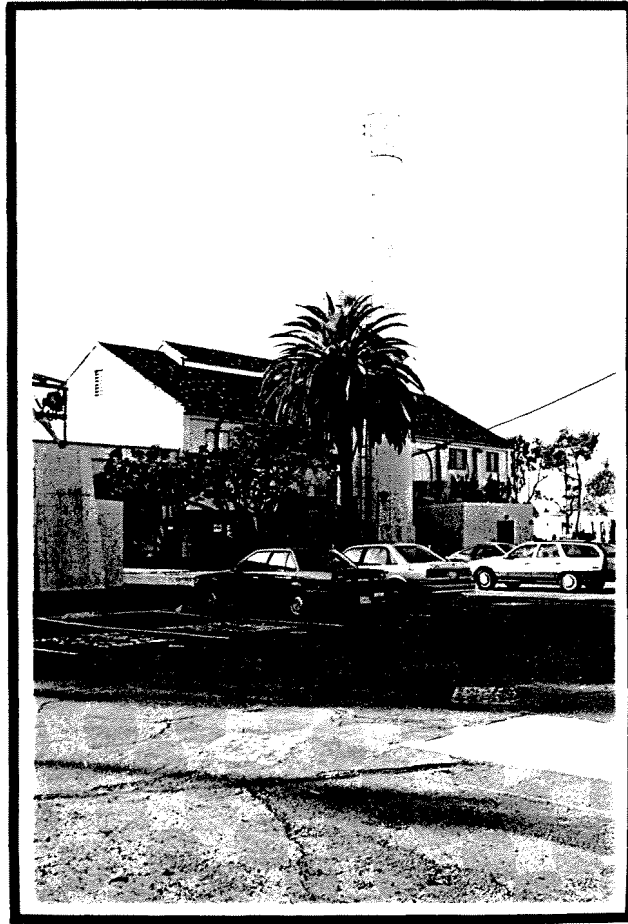
**Figure III-75.** 1923 Electrical substation (Building 7, Scott AFB, Illinois), *above*. Typical Distribution Transformer constructed by the Quartermaster Department during the 1930s (Building 5103, Ft. Knox, Kentucky), *below*





**Figure III-76.** 1907 Central power plant (Building 47, Naval Complex Pensacola, Florida), *above*. 1909 Central power plant (Building 32, Naval Base Charleston, South Carolina), *below*.





**Figure III-77.** Mission-revival heating plant, ca. 1918 (Building 93, Naval Air Station North Island, California), *above*. 1919 Power house (Building 23, Philadelphia Naval Base, Pennsylvania), *below*





## Water and Sewage Systems

### Description

Water and sewage systems comprise buildings and structures that provided clean water and disposed of waste water on military installations. In some cases, elements of the water system, such as water towers, were incorporated into the installation design as prominent architectural features. In other cases, they were simple utilitarian buildings. Water and sewage system facilities usually were constructed of permanent materials. Other than the water towers, the remainder of the water and sewage system buildings and structures usually were located away from the main area of the installation.

### Evolution

#### Army and Army Air Corps

During the first three-quarters of the nineteenth century, water supplies were collected through reservoirs, roof catchments, cisterns, and wells. The growing sophistication of urban life was epitomized by the introduction of indoor plumbing and electricity at the end of the nineteenth century. When the Army consolidated its troops in larger and more permanent installations during the 1880s and 1890s, the Quartermaster Department included plans for water storage and distribution systems at the new and expanded posts. The earliest water tower identified in this study was constructed between 1876-1878 as part of the quartermaster depot at Ft. Sam Houston, Texas (Figure III-78). The 90-foot high structure contained a watchman's room, a 6,400-gallon water tank, and a four-faced clock. The water tower was part of a water distribution system in conjunction with rain cisterns and a reservoir.

The inclusion of indoor plumbing and steam heat in Army housing during the 1880s increased the complexity of the water supply and distribution. By 1892, all but 130 company barracks had hot and cold running water. By 1893, most posts included planned sewer systems. This necessitated the development of water supply infrastructure. By 1896, the Quartermaster Department spent more than \$250,000 on water supply, plumbing, sewerage and drainage. These technological advances required more complex engineering answers to the problems of water distribution and waste removal.<sup>4</sup>

The Quartermaster Department issued standardized plans for metal water tanks raised on wood trestle towers during the 1890s.<sup>5</sup> These utilitarian water towers were probably the most common type of water towers found on Army installations (Figure III-78). Other facilities required for water distribution systems included pumping stations (Figure III-79).

In some cases, water towers were designed as prominent elements in the installation plan. At Ft. Sheridan, Illinois, the 1890 water tower is a Romanesque stone tower that joins two barracks and serves as an important landmark on the installation. Water towers again were used as features of installation design during the nationwide construction program of the 1930s. Barksdale AFB, Louisiana, and Randolph AFB, Texas, are examples of installations with unique water towers that serve as architectural landmarks, as well as water storage facilities (Figures III-15 and III-79). The water tower at Barksdale originally was a plain standpipe, but in 1934, it was encased in cladding to resemble a castle tower.

The Quartermaster Department also engineered sewage and water treatment systems. Generally these facilities were located apart from the rest of the installation. In some instances,

the early sewage treatment plants, though originally located far from the main parade ground, have been overtaken by subsequent post development. At the World War I training camps, the water and sewage facilities were among the only buildings of permanent construction, and thus may pre-date much of the rest of the permanent construction (Figure III- 80). By the 1930s, sewage and water treatment plants were basic elements of installation planning. The results of the field survey conducted for this project indicated that the water and sewage facilities constructed during this prolific building period were not built according to standardized plans. Building designs were the result of site requirements and installation size. In rare instances, architectural elements were incorporated into the design to produce more than the basic, functional structure (Figure III-80).

### Navy and Marine Corps

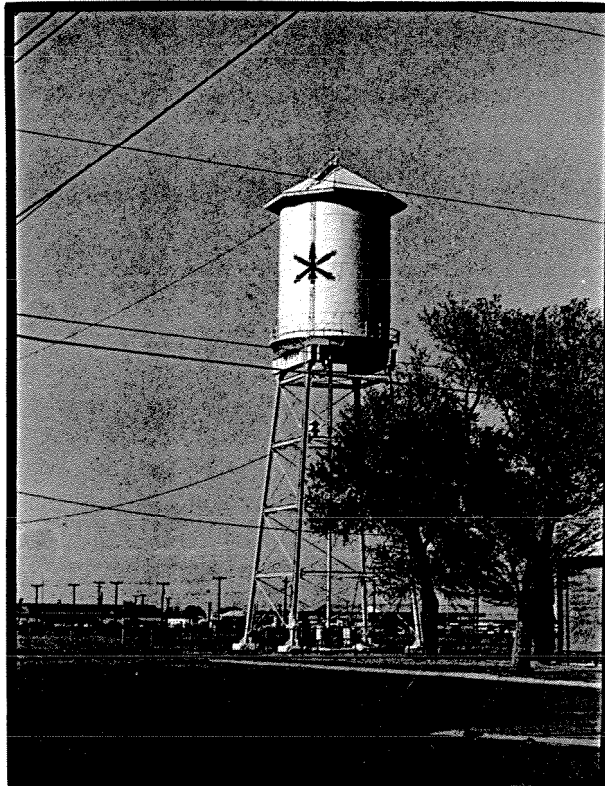
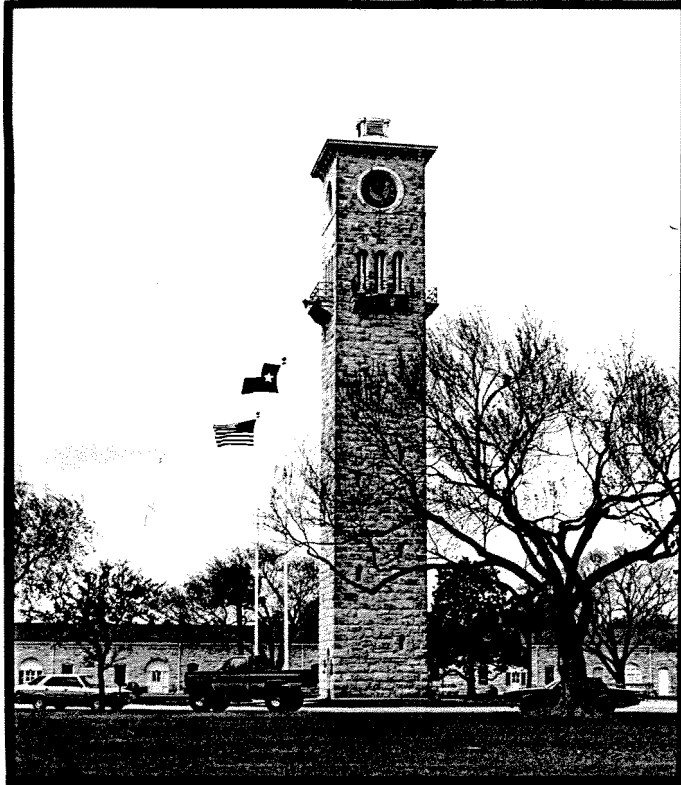
After the advent of indoor plumbing, the Navy began to provide water distribution systems and sewage treatment facilities at its installations. Because the Navy and Marine Corps housed relatively few marines, sailors, and officers on shore, the number of water and sewage plants remained small. When the Navy and Marine Corps began to improve and expand their shore facilities during the early twentieth century, Navy planners incorporated water and sewage systems as part of the infrastructure of the new and expanded installations. These facilities usually were located in a separate area, apart from the primary activities of the installations. Few pre-1940 water or sewage system facilities were identified during the field survey of Navy and Marine Corps facilities conducted as part of this study.

### **Association**

Water distribution and sewage treatment facilities are associated with the development of an infrastructure on military installations comparable to that of contemporary cities. These facilities usually are support structures that do not possess historical or architectural significance, and often are located apart from the main area of the installation, and thus are physically isolated. However, they may be contributing resources in an historic district if they are located in an area with a concentration of historic properties. In some instances, the buildings may possess architectural significance as representatives of important types or methods of construction. In several cases, installation water towers possess high artistic merit, are integral elements in the installation plan, and have become symbols of the installations; in these cases, they may be individually eligible.

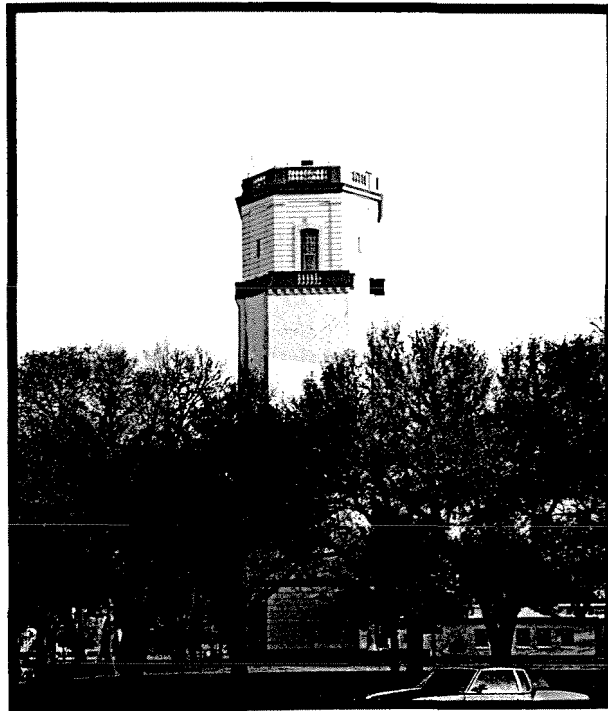
### **Integrity**

If the water and sewage treatment facilities possess significance, then their integrity, that is, their ability to convey that significance, must be evaluated. If the structure is significant for its architectural merit, then the important features of the structure must be identified. Since these structures were not the result of standardized design, no universal list of character-defining features was derived from examination of the existing examples. To possess architectural integrity, water distribution and sewage treatment facilities should retain most of their design and external construction materials from their periods of construction. Setting also is an important element of integrity, particularly if the structure was part of an installation master plan, as in the case of some water towers. Other important elements of integrity for these buildings include shape, height, pattern of openings, materials, and ornament.



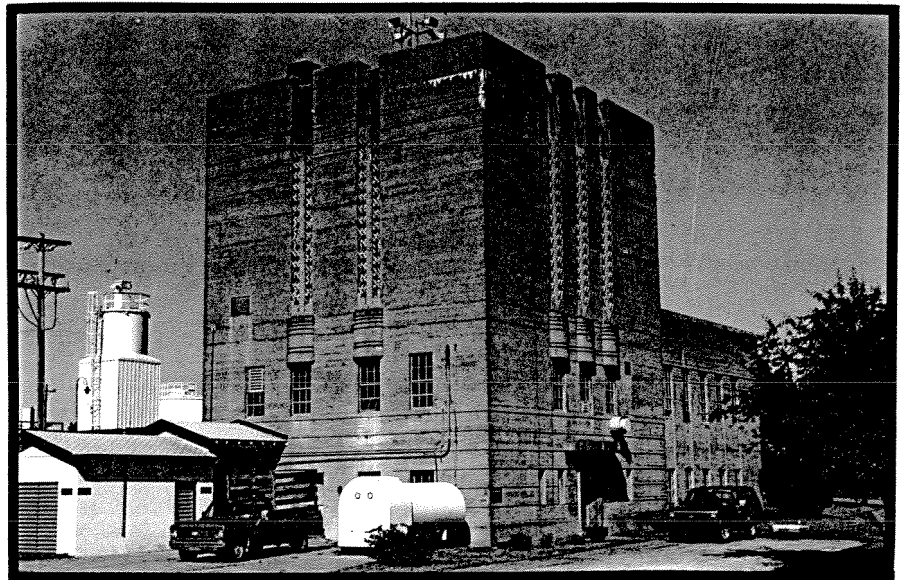
**Figure III-78.** Water tower with clock designed by Quartermaster General M.C. Meigs and constructed in 1876 (Ft. Sam Houston, Texas), *above*. 1910 Elevated water storage tank (Building 129, Ft. Bliss, Texas), *below*.





**Figure III-79.** 1908 Pumping station, originally built by the Army as part of Ft. Barrancas (Building 1536, Naval Complex Pensacola, Florida), *above*. 1934 Water tower (Building 3454, Barksdale AFB, Louisiana), *below*.





**Figure III-80.** Ca. 1911 Sewage treatment plant (Building 1346, Ft. Bliss, Texas), *above*. 1918 Water treatment plant (Building V3308, Ft. Bragg, North Carolina), *middle*. 1938 Water treatment plant (Building 1205, Ft. Knox, Kentucky), *below*





## NOTES, CHAPTER 6

1. National Archives and Records Administration, Record Group 92, Office of the Quartermaster General, Consolidated Correspondence File, Boxes 909 - 916, Ft. Riley.

2. David A. Clary, "A Life Which is Gregarious in the Extreme: A History of Furniture in Barracks, Hospitals, and Guardhouses of the United States Army, 1880-1945" (MSS, U.S. Department of the Interior, National Park Service, Harpers Ferry Center, Harpers Ferry, West Virginia, 1983), 34.

3. R. W. Reinhold, *The Organization of the Bureau of Yards and Docks* (Washington, D.C.: Bureau of Yards and Docks, Department of the Navy, 1954), II-19 - II-21.

4. David A. Clary, "A Life Which is Gregarious in the Extreme: A History of Furniture in Barracks, Hospitals, and Guardhouses of the United States Army, 1880-1945," 21-22.

5. NARA, Cartographic Branch, RG 77, Standard Plans of Army Post Buildings, 1891-1918, (P.I. NM-19, Entry 411), Plan 16.



## CHAPTER 7

### RECREATION/SOCIAL/CULTURAL/RELIGION

#### Assembly Halls

##### **Description**

Assembly halls were built during the late nineteenth and early twentieth centuries to provide an indoor facility to assemble enlisted personnel for lectures and for live entertainment. They pre-date the construction of movie theaters on military installations. The buildings constructed for this purpose generally were one- or two-story buildings rectangular buildings, often with the front entrance in the gable end. Assembly halls often had stages along the rear wall. They often were built of wood frame construction.

##### **Evolution**

###### Army and Army Air Corps

During most of the nineteenth century, Army posts had few buildings specifically devoted to educational or recreational purposes. Quartermaster Department standardized plans for administration buildings often included rooms for use as libraries, chapels, assembly rooms, and school rooms. Following recommendations in 1878 from a board of officers, installation commanders were allowed to use post funds to construct separate buildings for schools, chapels, reading rooms, and libraries. The Quartermaster's Department furnished an increasing number of posts with these types of buildings. The Quartermaster Department issued a standardized plan for a separate assembly building during the 1890s. The plan depicts a one-story building with windows along the sides; the interior contained an open assembly area facing a stage at the end of the building. This basic plan was constructed until the early twentieth century (Figure III-81). Assembly halls provided space to assemble troops for lectures and also for entertainment such as amateur theatricals and dances.<sup>1</sup>

The assembly hall as a separate building on Army posts was short-lived. It was subsumed into the broader range of recreational buildings constructed during the twentieth century, such as movie theaters and gymnasiums. Movie theaters were constructed at most installations during the 1930s. The Quartermaster Corps often included assembly rooms in their plans for gymnasiums during the 1930s. Red Cross and YMCA buildings also were used to provide much of the same entertainment functions of assembly halls.

###### Navy and Marine Corps

The Navy provided few recreation buildings at its installations until the 1930s, at which time movie theaters were the preferred auditorium buildings. Red Cross buildings also sometimes included an auditorium and gymnasium. The only building built specifically as an assembly hall identified during the field work conducted for this study was built in 1921 at the Naval Proving Ground at Dahlgren, Virginia. Dahlgren was an isolated installation with a resident population of both military personnel and civilian workers, and was one of the few naval construction projects during the early 1920s.<sup>2</sup>

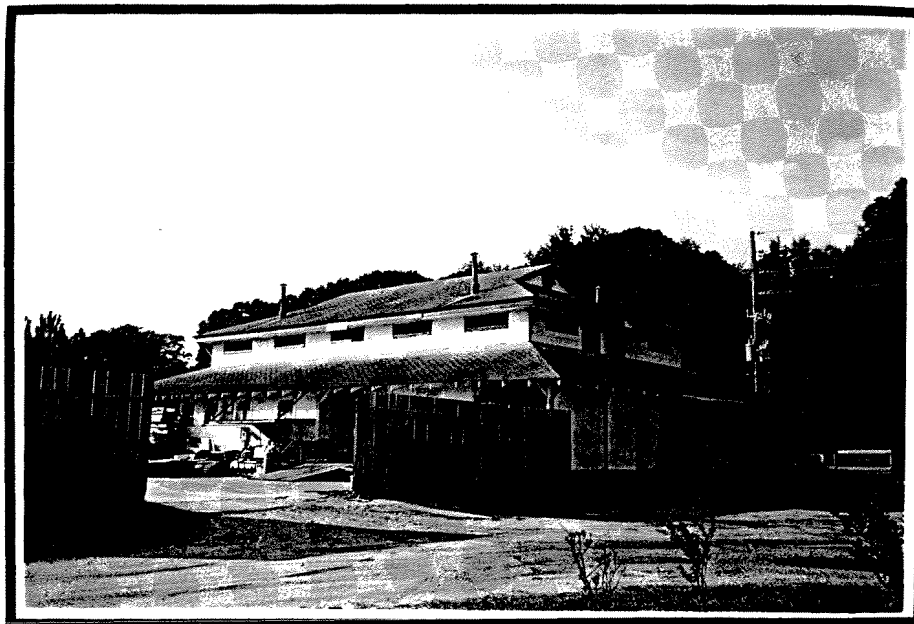
At other installations, pre-existing buildings were adapted to serve as recreational assembly halls. At the Marine Corps Recruit Depot, Parris Island, South Carolina, the Marine Corps converted a ca. 1900 machine shop remaining from the old Navy yard that previously had occupied the site into a lyceum. The lyceum housed lectures, sporting events, dances, and eventually also was used as a movie theater.

### **Association**

Assembly halls are associated with the growth of social and cultural amenities provided on military installations during the late nineteenth and twentieth centuries. They may not possess historic significance as individual buildings, but can be contributing buildings in an historic district. As part of an historic district, they may help to convey the character of early twentieth-century military life and the character of the installation's layout and architecture.

### **Integrity**

To possess integrity, assembly halls should retain the majority of its design, materials, workmanship, location, setting, and, association from its period of significance. In cases where an existing building was adapted to serve as an assembly hall, the alterations may have attained significance and should be evaluated within their appropriate context. Character-defining features of assembly halls can include porticos, ticket vestibules, and marquees. Architectural ornamentation is concentrated on the front facade of most assembly halls and may include a Colonial or Mission Revival portico, depending on the region. If the building is under evaluation for historic significance as an individual building, then the interior integrity also must be assessed. Character-defining elements of the interior include the original configuration of interior space, materials, and workmanship.



**Figure III-81.** 1910 Assembly hall, converted to theater (Building 208, Presidio of Monterey, California), *above*. 1929 Assembly hall (Building 1570, Naval Complex Pensacola [formerly Ft. Barrancas], Florida), *below*.



## Athletic Facilities

### Description

Athletic facilities on military installations included gymnasiums, bowling alleys, and outdoor facilities, such as swimming pools, golf courses, playing fields, and stadia. These facilities usually followed the same design traditions as the same types of civilian facilities of the same era.

### Evolution

#### Army and Army Air Corps

During the late nineteenth century, the Army devoted increased attention to the improvement of living conditions on its posts. The health, morale, and well-being of troops were considered as factors in Army performance. The Army began to encourage recreational activities and exercise. For instance, Quartermaster General M. C. Meigs supported the construction of bowling alleys, though no funds were available for this purpose. Meigs published an article, distributed widely among post libraries, on how troops could make their own billiard table and bowling alley. By the early twentieth century, some bowling alleys had been built at various posts. The Quartermaster Corps issued a standard plan for bowling alleys in 1908.<sup>3</sup>

By the early twentieth century, the Army had incorporated athletic facilities into its building program. Often athletic facilities were combined with other functions such as the post exchange. The Quartermaster Department began to issue standardized plans for a combined gymnasium, bowling alley, and post exchange in 1903 (Figure III-82). The Quartermaster Department issued a separate standardized plan for a gymnasium building in 1904 (Figure III-82). Though the Quartermaster Department issued plans for gymnasiums and exchanges, 1904 Quartermaster regulations stated that "post exchanges, gymnasiums, bowling alleys, and other places of amusement" could be constructed only with materials at hand, and must incur no cost to the government and must utilize the labor of troops.<sup>4</sup> Until World War I, gyms and post exchanges often were combined in a single building.

During the 1920s, the Army received few funds for new construction. Recreational facilities were funded through private means. For instance, the Secretary of War authorized the establishment of a Recreational Center Board at Ft. Benning, Georgia. The board raised funds and oversaw the planning and construction of athletic and recreational facilities. Athletic facilities constructed by the Board included the Doughboy stadium, outdoor playing fields, and a swimming pool (Figure III-83).<sup>5</sup>

During the wave of new, permanent construction during the 1930s, athletic facilities became typical features of Army installations. The results of the field survey conducted as part of this study indicate that the type, design, and size of athletic facilities did not follow standardized plans and varied from installation to installation. Gymnasiums were common buildings on posts this period. They usually were masonry, rectangular buildings that were designed in the same regional architectural style as the other buildings of the installation.

Outdoor sporting facilities also were common elements of Army posts. Polo remained a popular sport, in keeping with the equestrian culture of the Army. A few riding halls were constructed for indoor equestrian training. Golfing became a popular sport and the number of golf courses proliferated. Where land permitted, new golf courses were laid out; if land was scarce,



the parade ground was adapted to a nine-hole golf course. During the late 1930s and early 1940s, golf clubhouses were constructed. Other outdoor sports included tennis, swimming, and boating. Swimming pools were constructed using both appropriated funds and non-appropriated funds. Those swimming pools constructed by the Quartermaster Department generally included one-story bathhouses.

### Navy and Marine Corps

The Navy began to provide athletic facilities on its installations during the early and mid-twentieth century as it expanded its shore facilities to include training stations, aviation stations, and operating bases that housed larger numbers of shore-based personnel. Often Navy planners combined athletic facilities with other needed functions. For example, at the Naval Training Station Great Lakes, Illinois, the 1906 instruction building for recruits contained a gymnasium, as well as a natatorium, boxing ring, pistol range, fencing room, and bowling alley.<sup>6</sup> At Naval Air Station, Moffett Field, the Navy constructed a recreation building as part of the original 1933 installation plan. In some cases, older buildings were adapted for athletic facilities (Figure III-83). Desired recreational facilities listed for training stations included a recreation building and auditorium, tennis and handball courts, baseball and football fields, and running track.<sup>7</sup> Other athletic facilities identified at naval installations included shooting ranges, golf courses, docks for recreational boats, and playing fields (Figure III-83).

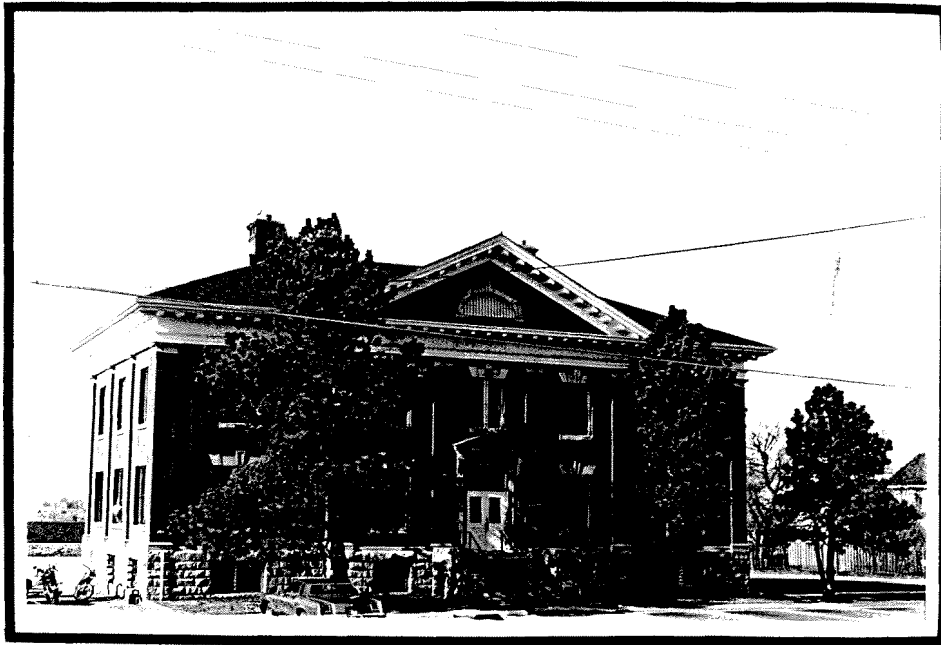
After the Marine Corps began operating and constructing separate installations during the early twentieth century, the Marine Corps began providing athletic facilities at its installations. These facilities did not follow standardized plans or types and were unique to each installation. At Parris Island Marine Corps Recruit Depot, South Carolina, an old machine shop was adapted into the Lyceum, which hosted both recreational and sporting events. The large football stadium at Quantico Marine Base, Virginia, was started in 1919 and not completed until after World War II. Marines stationed at Quantico completed the construction, using primarily donated and salvaged materials.<sup>8</sup>

### **Association**

Athletic facilities are associated with the growth of social and cultural amenities provided to military personnel during the twentieth century. They also are associated with the general rise of interest in organized sports and fitness during the early twentieth centuries, which is evident from the construction of buildings, structures, and fields specifically for sports in towns, on college campuses, and on military installations. Athletic facilities are recreational facilities that are located typically at military installations with large numbers of resident military personnel. Athletic facilities generally do not possess individual historic significance, but can be contributing features to an historic district. The athletic facilities on military installations often are functional structures without significant historical associations. Selected examples may be may architecturally significant for their design or construction or may have developed into symbols of an installation or service branch.

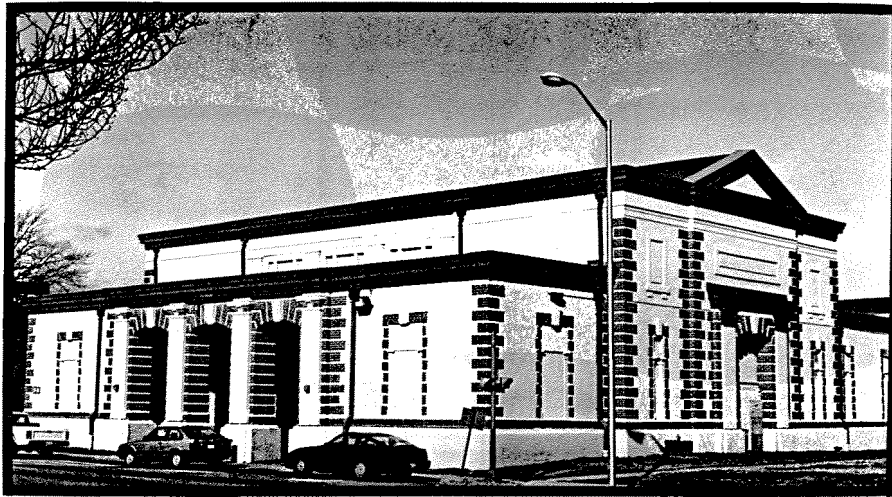
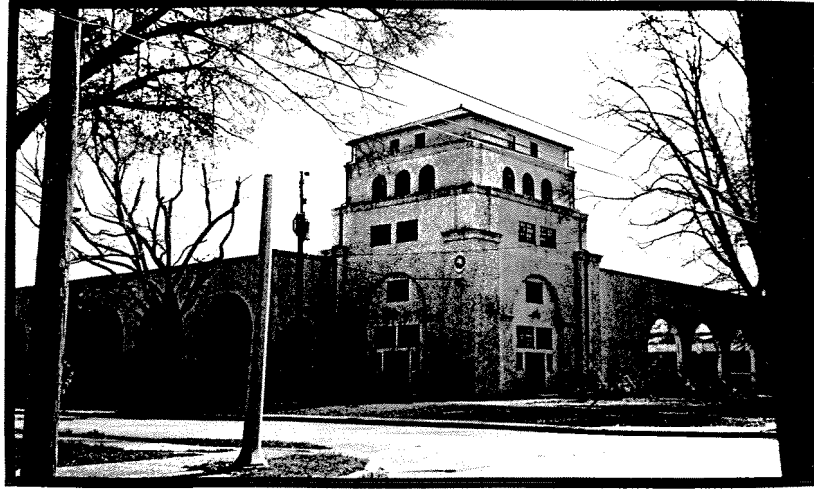
### **Integrity**

To possess architectural integrity, athletic facilities should retain most of their architectural ornamentation, design features, and exterior materials from the period of significance. Where subsequent additions or renovations have occurred, the building may have integrity if it retains the majority of its character-defining features, such as its location in the installation plan, materials, workmanship, and design, including exterior openings, proportions, and massing.



**Figure III-82.** 1905 Post exchange and gymnasium, Quartermaster standardized plan no. 158 (Building 284, F.E. Warren AFB [formerly Ft. D.A. Russell], Wyoming) *above*. 1904 Gymnasium, Quartermaster standardized plan no. 159 (Building 208, Presidio of Monterey, California), *below*.





**Figure III-83.** Doughboy Stadium at Ft. Benning, Georgia, constructed in 1925 under Recreational Center Board, *above*. Jamestown Tricentennial Exhibition Building, constructed in 1907, converted for use as gymnasium (Building N24, Naval Base Norfolk, Virginia), *middle*. 1918 Playing field grandstand (Building M050, Naval Base Norfolk, Virginia), *below*.



## Chapels

### Description

Military chapels usually are non-denominational buildings designed for religious services. Chapels constructed at military installations reflect a variety of architectural expressions. Gothic Revival was the predominant style on Army posts, though neoclassical chapels also were built. The design of chapels was not standardized, thus chapels were individually designed and varied among installations. They are similar in typology to university chapels and community churches of the same eras.

### Evolution

#### Army and Army Air Corps

Chapels first appeared as separate buildings on Army installations during the second half of the nineteenth century. Chaplains first worked in an unofficial capacity. In 1838, Congress enacted legislation authorizing seventy Army chaplains. During most of the nineteenth century, the actual number of chaplains fluctuated between fifteen and thirty-six. Chaplains were assigned to posts considered "most destitute of instruction." At many posts, chaplains performed services in barracks or in administration buildings, not in separate chapels.<sup>9</sup>

At posts where chapels were constructed, funding was raised through private subscriptions. At some posts, the post council of administration provided special funds for chapel construction. Though some officers believed that the Quartermaster Department should fund construction, appropriated funds were not used for chapels and private funding remained the primary means of funding chapel construction.<sup>10</sup>

Early military chapels followed the various traditions of American church design. The earliest chapel identified during this study was the Old Cadet Chapel, a stone Greek Revival chapel completed in 1837, at the U.S. Military Academy at West Point (Figure III-84). Other early chapels are located at Ft. Riley, Kansas, and Ft. Monroe, Virginia. Ft. Riley's small stone chapel was constructed about 1855. The wood-frame, board-and-batten Chapel of the Centurion at Ft. Monroe was completed 1857 and dedicated in 1858. It is similar to published designs for rural churches by Richard Upjohn, an architect noted for his Gothic Revival church architecture.

Chapels became more common on Army posts during the years after the Civil War. Proposed Army construction regulations published in 1861 included estimates for a chapel and depicted a chapel design similar to a company barracks. After the Civil War, Congress authorized the establishment of schools at posts, garrisons, or permanent camps to instruct enlisted men. When no suitable room or buildings were available for educational or religious purposes, the Secretary of War directed the Quartermaster Department to construct them. The Quartermaster Department submitted plans and detailed estimates of cost to the Secretary of War; however, by 1878, few buildings for educational or religious purposes had been constructed. A board of officers convened to implement the policy of providing buildings for educational and religious purposes recommended the use of post funds to construct such buildings and the wider use of Quartermaster appropriations. Consequently, the Quartermaster Department began to construct an increasing number of schools, chapels, reading rooms, and libraries (Figure III-85). In some cases, existing buildings were converted to chapels. For example, at Ft. McPherson, Georgia, a building originally constructed as a guardhouse was converted to a chapel in 1893.<sup>11</sup>

Despite the apparent availability of appropriated funds for chapel construction, private funds remained the main source of funding for chapel construction. Construction of Catholic churches on Army posts was funded through private or Church funds. After the construction of the Chapel of the Centurion at Ft. Monroe, the Catholic Church received permission to build a chapel outside of the walls of the fortifications and constructed a simple wood-frame church in 1860. After its destruction by fire, the original church was replaced by a more elaborate Gothic Revival stone church in 1903. In 1889, a brick, Gothic Revival church was built at Ft. Leavenworth, Kansas (Figure III-85). Chapel construction was often an opportunity for the post and the civilian community to work together to establish strong connections. At Ft. Sam Houston, Texas, a group of community leaders and members of the military garrison formed a committee to raise funds for the construction of a post chapel on land donated by the City of San Antonio. The 1909 chapel was an elaborate, neoclassical building designed by local architect Leo M. J. Dielman (Figure III-86).<sup>12</sup>

Chapels offered an opportunity for landmark architecture and sometimes were major examples of high artistic expression. The chapel constructed between 1906 and 1910 at the U.S. Military Academy at West Point is the most striking chapel on an Army installation. This impressive Gothic Revival building was designed by the architectural firm of Cram, Goodhue, and Ferguson as a major element of their new plan for the U.S. Military Academy. The chapel dominates the silhouette of West Point and overlooks the Plain from its prominent location (Figure III-84).

The Quartermaster Department issued standardized plans for chapels during the first decade of the twentieth century. Francis B. Wheaton, Advisory Architect in the Office of the Quartermaster, designed plans for a chapel reminiscent of small, English country parish churches.<sup>13</sup> No examples of this plan were identified during this study, but the 1931 chapel at Walter Reed Medical Center is similar to Wheaton's design (Figure III-87).

During the wave of new construction at army posts and air fields during the late 1920s and the 1930s, military chapels often were constructed as part of installation construction programs. Gothic Revival remained an accepted idiom for chapel design; an example was the 1935 chapel at Langley AFB, Virginia (Figure III-87). Chapels from the 1930s also often reflected the architectural character of the rest of the installation, usually either Georgian Colonial Revival or Spanish Mission Revival (Figures III-88 and III-89). Chapels built during this era remained individually designed buildings that followed accepted traditions of American church design. Private funds remained a source for chapel construction. For example, the Churchwomen's League for Patriotic Service provided the funds for the construction of the 1933 brick chapel at Plattsburgh Barracks, New York (now Plattsburgh AFB).

During World War II, standardized, temporary, wood frame, chapels were included routinely as part of World War II mobilization cantonments. Since World War II, chapels have been added to most military installations.

### Navy and Marine Corps

The Navy generally did not build chapels until it began to increase the size and number of its shore installations after the turn of the century. The Navy's primary installations, its shipyards, were located near cities, in which yard personnel could attend religious services. The Navy constructed a few chapels at isolated locations, such as Pensacola and Mare Island Naval Shipyards. At Pensacola, an octagonal brick building constructed in 1854 served as both the armory and chapel (Figure III-89). At Mare Island, St. Peter's Chapel was constructed in 1901 after receiving funding in the Naval Appropriation Act of 1900.<sup>14</sup>

Chapels became more common at naval installations during the twentieth century. A chapel was included in the 1904 Naval Training Station at Great Lakes, Illinois; the chapel later was destroyed by fire. At other installations, existing buildings were renovated for use as chapels. For example, the chapel at Norfolk Navy Yard was built in 1901 as a stable and was later used as a fire station; it was converted into a chapel at some point between 1931 and 1947 (Figure III-90).<sup>15</sup>

The Navy's most magnificent chapel is located at the U.S. Naval Academy at Annapolis. In 1899, architect Ernest Flagg was commissioned to redesign the Naval Academy. He incorporated a domed, neoclassical chapel in a prominent location in the Beaux Arts plan for the Academy. The chapel originally had a Greek cross plan that was extended later by the construction of a longer nave.

During the late 1930s and the 1940s, naval chapels sometimes were constructed as part of the expansion of training facilities, air stations, and naval stations. Chapels were either free-standing buildings or were incorporated into a multiple-use personnel support building. Chapels of this era generally reflected the architectural style of the rest of the installation. The chapel at Moffett Naval Air Station, California, completed in 1945, exemplified the Spanish Mission Revival style. A wood-frame chapel with Classical Revival architectural motifs was constructed at Naval Base Charleston, South Carolina, in 1942. A brick chapel that incorporated both traditional, Colonial Revival and modern, streamlined architectural elements was constructed at the Marine Corps Recruit Depot at Parris Island, South Carolina in 1942. No pre-1940 chapels were identified on Marine Corps installations during the course of this study.

### **Association**

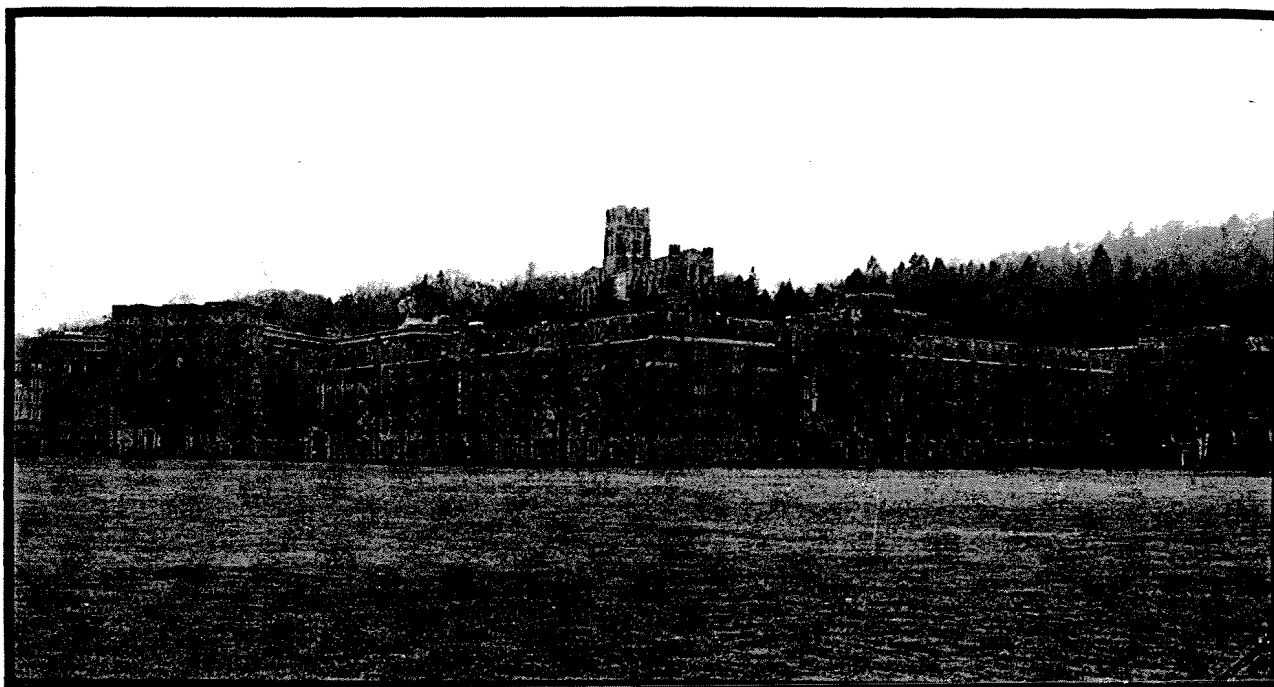
Chapels are associated with the growth of social and cultural amenities provided to military personnel starting in the mid-nineteenth century. Chapels also often represent particular types of architectural design associated with the development of American architecture. Military chapels display a range of architectural expressions: from small, wood frame, Carpenter Gothic chapels, to larger, stone Gothic Revival designs with prominent towers, to neoclassical designs, to period revivals. Since the building of chapels usually fell outside of the normal military channels of funding and design, they often were the work of talented local or, in some cases, national architects, and may represent the work of a master designer. Chapels may display high artistic values in their design and craftsmanship. Chapels should be evaluated for their potential significance as an individual building and as a contributing building in an historic district. Chapels often were located in important locations within the installation plan and may be a key element of an historic district.

### **Integrity**

To evaluate the integrity of a chapel, the reason for its significance and its period of significance must be identified clearly. If a chapel is significant as an individual building, then it must retain exterior and interior integrity. If it is significant as a contributing element in an historic district, then only the exterior integrity must be evaluated. For a building that is significant for its architecture, the character-defining features of that type or period of architecture must be defined. Important elements of integrity for all chapels of any period or type include exterior form, materials, pattern of openings, types of windows and doors, roof shape, workmanship, and ornament.

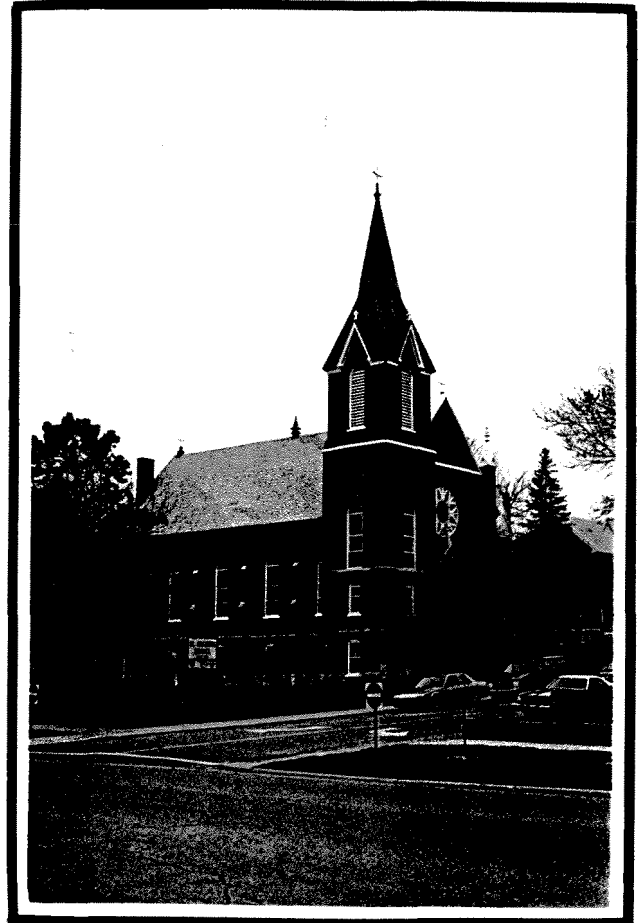
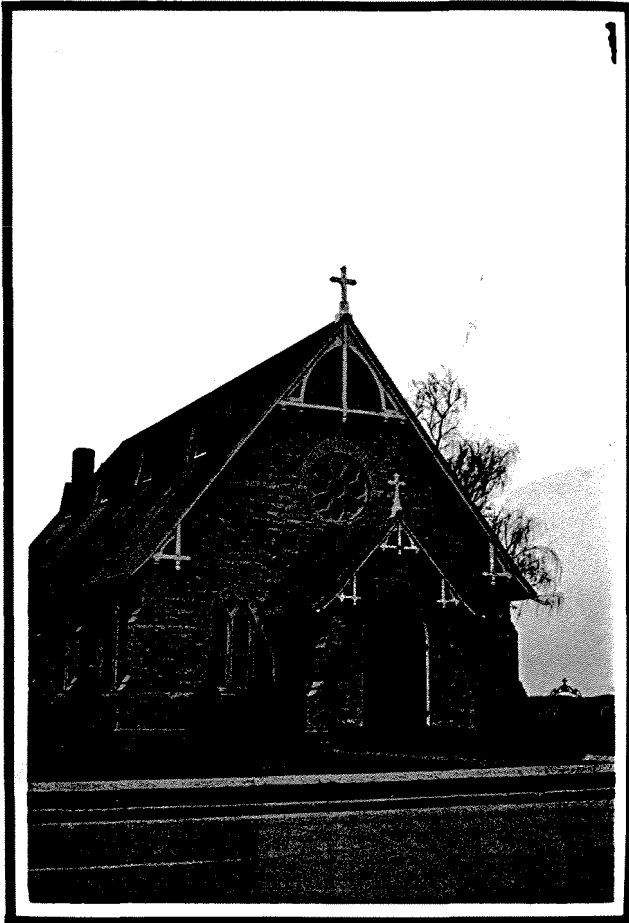






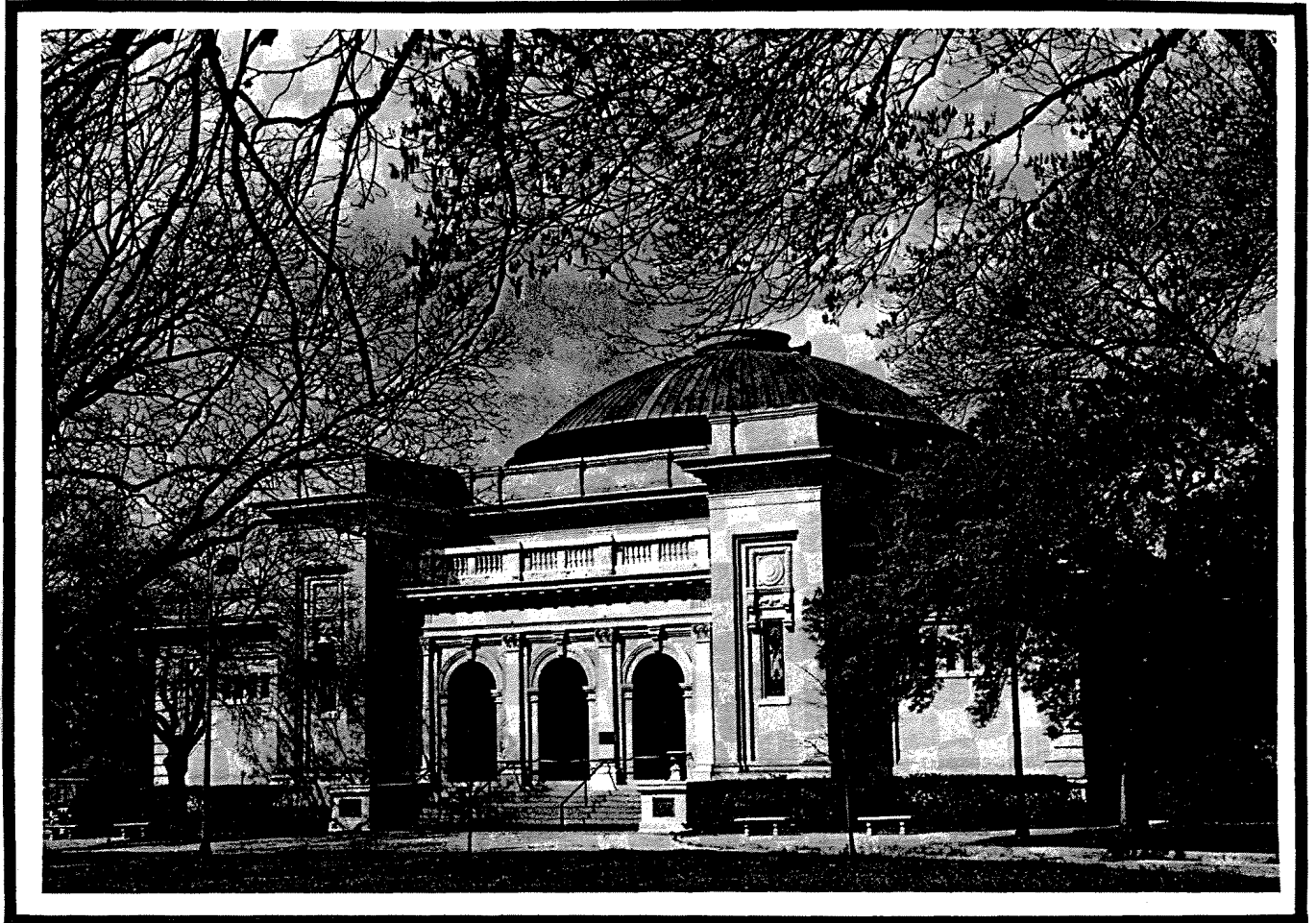
**Figure III-84.** Old Cadet Chapel at U.S. Military Academy, West Point, New York, constructed 1836 - 1837, *above*. 1906 - 1910 Chapel, center of photo, designed by Cram, Goodhue, and Ferguson during Gothic Revival rebuilding of the U.S. Military Academy, *below*.





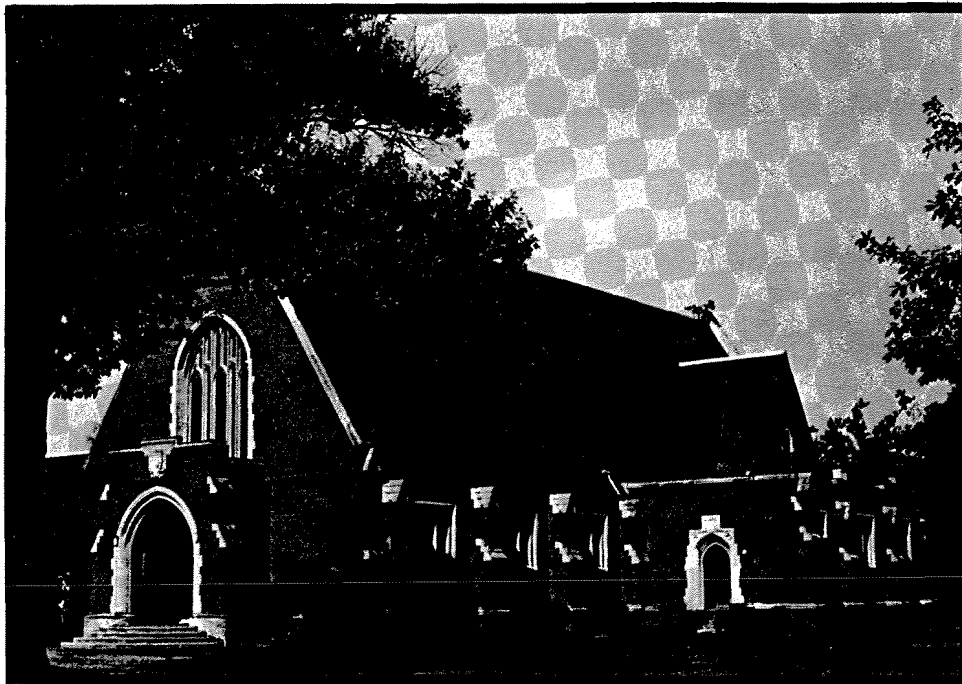
**Figure III-85.** 1878 Chapel (Building 54, Memorial Chapel, Ft. Leavenworth, Kansas), *left*. 1889 Catholic chapel (Building 170, St. Ignatius, Ft. Leavenworth, Kansas), *right*.





**Figure III-86.** 1909 Chapel (Building 2200, Ft. Sam Houston, Texas), above.

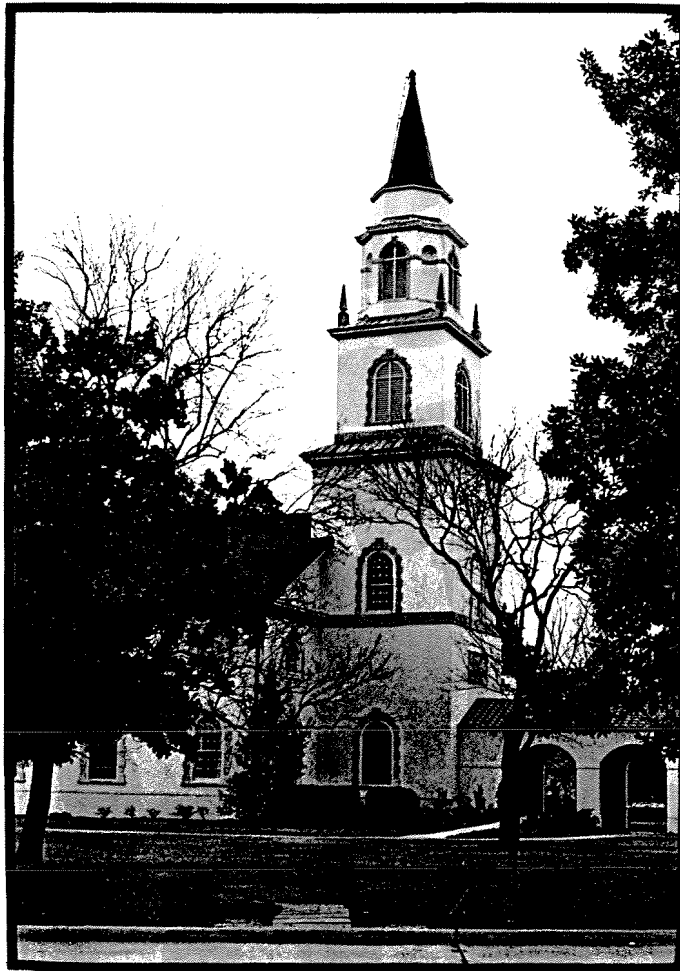




**Figure III-87.** 1931 Chapel (Building 57, Walter Reed AMC, Washington, D.C.), *above*. 1935 Chapel (Building 520, Langley AFB, Virginia), *below*.

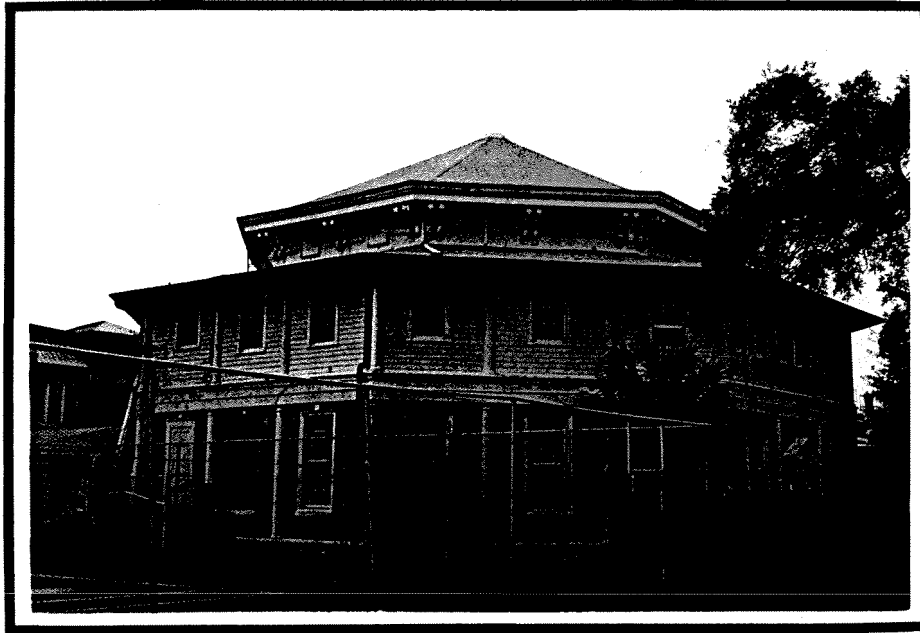
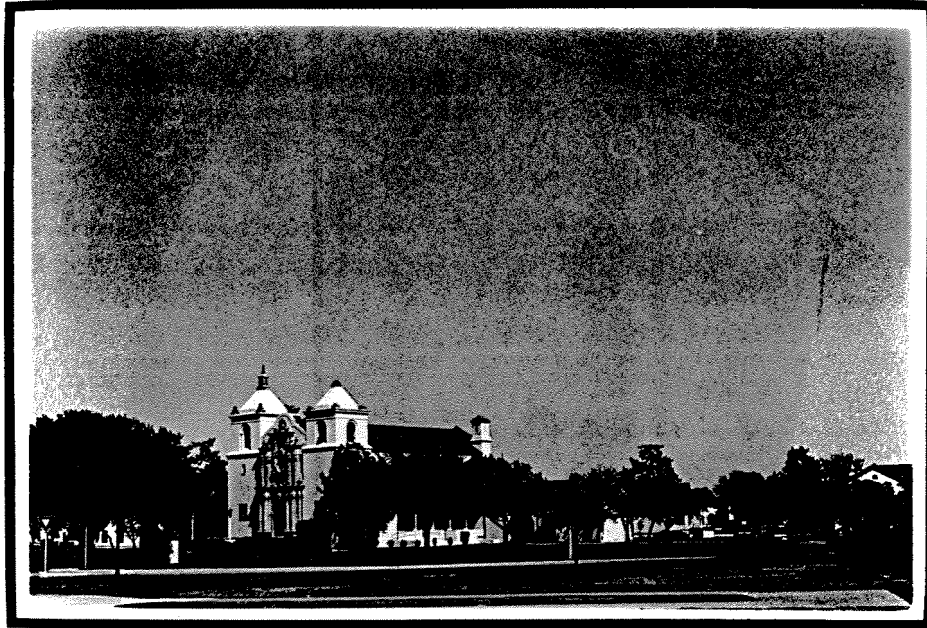






**Figure III-88.** 1935 Chapel designed by regionally-noted architects Hentz, Adler, and Schutze (Building 101, Ft. Benning, Georgia), *above*. 1935 Chapel, same design as Ft. Benning chapel (Building 11510, Ft. Bragg, North Carolina), *below*.





**Figure III-89.** 1934 Spanish Mission Revival chapel (Chapel 1, Randolph AFB, Texas), *above*. Armory and chapel building constructed in 1854 (Building 16, Naval Complex Pensacola, Florida), *below*.



## Clubs (Officer and NCO)

### Description

Clubs for officers and non-commissioned officers provided dining facilities and social and recreational opportunities. Service clubs generally were one-story buildings detailed in contemporary architectural styles from their period of construction. Officers clubs often are located in prominent sites in or near officer housing areas; non-commissioned officers (NCO) clubs generally have less prominent locations.

### Evolution

#### Army and Army Air Corps

Officers clubs evolved from the officers mess and from unofficial organizations of officers. The hierarchical nature of military life required separate living and dining facilities for officers and enlisted personnel. Officers typically ate in their family quarters or in mess rooms within the bachelor officer quarters. Officers were responsible for paying for their own subsistence. Few free-standing officers mess buildings were built during the nineteenth century.

At Ft. Totten, at Willets Points, New York, an officers club developed from an informal organization that provided both professional and social activities. In 1869, the post commander had organized a scientific club called the "Essayons Club of the Corps of Engineers." In 1870, Ft. Totten was designated as the Engineers Depot for the East. By 1870, the Essayons Club had its own wood frame building. The club was composed of all officers on duty at the engineer depot and became a professional forum for military engineers. In 1885, the club received official recognition and became the "Engineer School of Application." The club building was renovated to its present appearance in 1887 (Figure III-91).<sup>16</sup>

By the first decade of the twentieth century, post plans depict officers clubs at the Presidio of Monterey, California, and at Ft. Sam Houston, Texas. Officers messes were depicted on 1906 maps of Ft. Sheridan, Illinois, and Ft. McNair, Washington, D.C.<sup>17</sup> No standard building plans for officers clubs or messes were located in the Quartermaster Department 1891 - 1918 standardized plan files. Officers messes and clubs may have been housed in pre-existing buildings originally built for other uses. For example, at Ft. Monroe, Virginia, officers utilized the Flagstaff Bastion of the old fortifications as their club. In at least one instance the Army built a structure specifically for an officers club. At Ft. McNair (formerly Washington Barracks), the officers club was designed by the architectural firm of McKim, Mead and White, which the Army had commissioned to design the Army War College; the Georgian Revival officers club was placed in a prominent location, facing the parade ground, at the end of the officers housing row (Figure III-91).

During World War I, service clubs proliferated, particularly at installations with few recreational outlets off the installation. Both NCO and officers clubs were constructed at Edgewood Arsenal, Maryland, during World War I.

During the 1930s, officers clubs were standard components of installations. In general, the Quartermaster Corps constructed officers clubs in prominent locations near the officers housing area. As the standard of living improved for enlisted personnel, NCO clubs became more common. During the same period, the Army constructed large numbers of NCO family housing

quarters for the first time. NCO clubs were smaller buildings than officers clubs with simpler architectural treatment and usually were located in less prominent locations of the installation, near NCO family housing. Ft. Monroe opened an NCO club in 1934. The Army Air Corps originally built two small, one-story enlisted mens clubs, one near each area of NCO family housing, at the new Randolph Field, Texas, opened in 1931. The clubs of this era were constructed in the prevailing architectural styles, usually Georgian Colonial, Spanish Mission, or Tudor Revival, of the installation.

### Navy and Marine Corps

Officers clubs were not constructed as separate facilities on naval installations until the 1930s. As part of the construction of training stations and air stations, the Navy began to provide personnel support services for their long-term resident populations. Naval stations during the inter-war period usually had quarters for bachelor officers that contained mess facilities, reading and lounging room, and a card and billiard room (Figure III-92).<sup>18</sup> In some cases, older buildings were adapted for officers clubs, but few buildings built before 1940 specifically as officers clubs or messes were located on naval installations during this study.

The Marine Corps constructed officers clubs during the 1930s as it developed and expanded its recruit depots and bases. Officers clubs usually were designed in the same architectural style as the other buildings of the installation. At Quantico, Virginia, the Marine Corps built a large, brick, Colonial Revival officers mess and bachelor officers quarters (Figure III-92). At the Marine Corps Recruit Depot, San Diego, the marines built a Spanish Colonial Revival officers club in 1938. These facilities were constructed during a decade that saw the growth of these important Marine Corps training installations; the provision of additional residential and recreational facilities for installation personnel is indicative of the facilities' growth.

### **Association**

Service clubs are associated with the growth of social and cultural amenities provided to military personnel during the late nineteenth and twentieth centuries. Service clubs generally became part of the overall military installation planning process during the twentieth century and may be additions to installations established before 1900. Service clubs can be both major and minor building types on installations. These buildings often reflect the military's adaptation of contemporary architectural styles to installation construction. Service clubs may possess individual architectural merit. They also can be contributing elements to an historic district. Service clubs generally have a prominent location in the overall plan of the installation and can be a major architectural element representing the overall architectural character of an installation.

### **Integrity**

To possess architectural integrity, service clubs should retain most of their design, materials, workmanship, and setting from their periods of significance. The field survey conducted for this project revealed that service clubs are among the most altered of pre-1940 buildings. Very few retain their original form, due to numerous additions. As installation populations grew far beyond pre-1940 levels, mess and club facilities were expanded to accommodate the increased numbers of personnel. In instances of subsequent additions or renovations, the building still may have integrity if it retains the majority of its design in terms of massing, roof, proportion, pattern of openings, materials, and ornamentation.

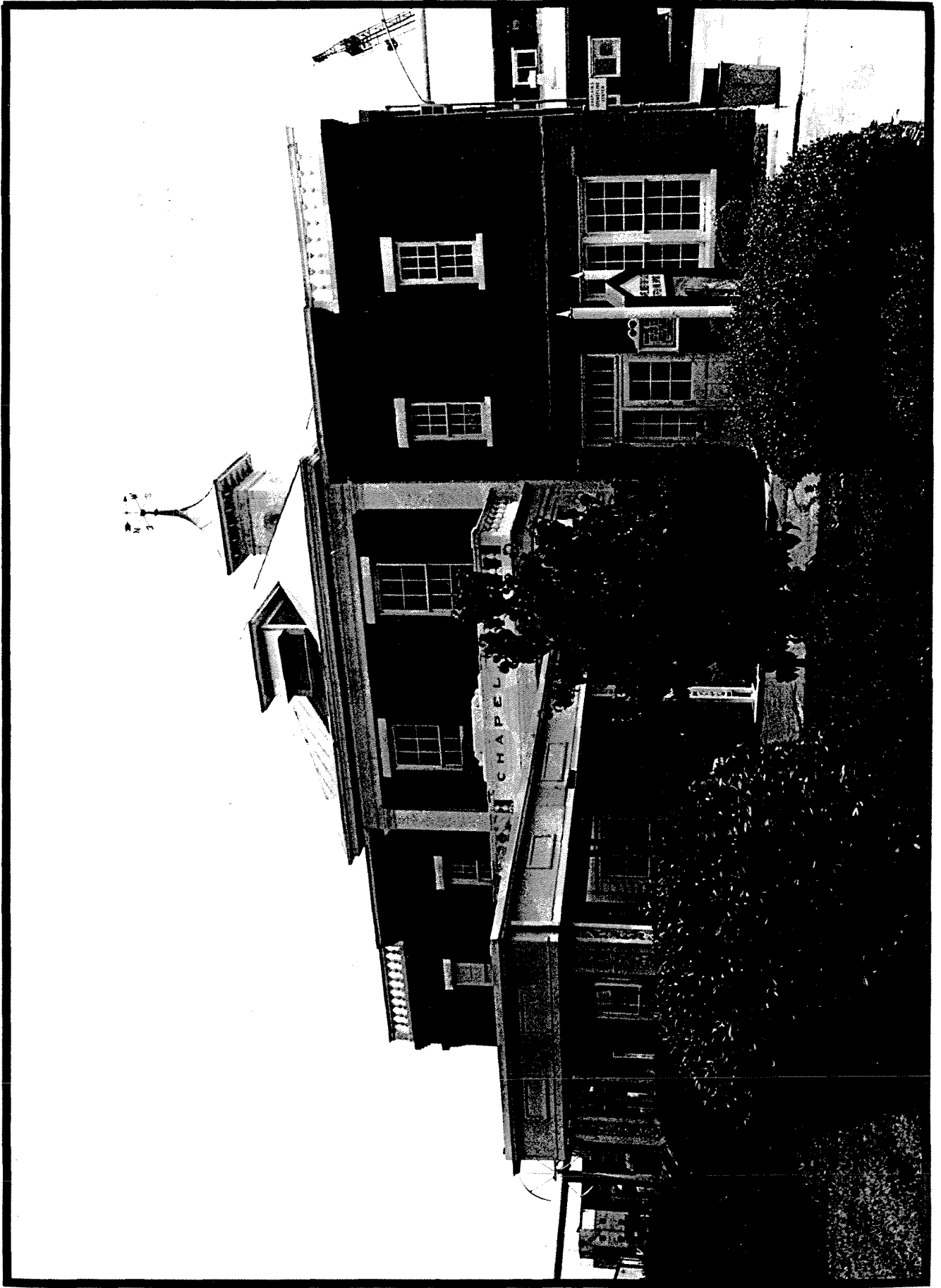
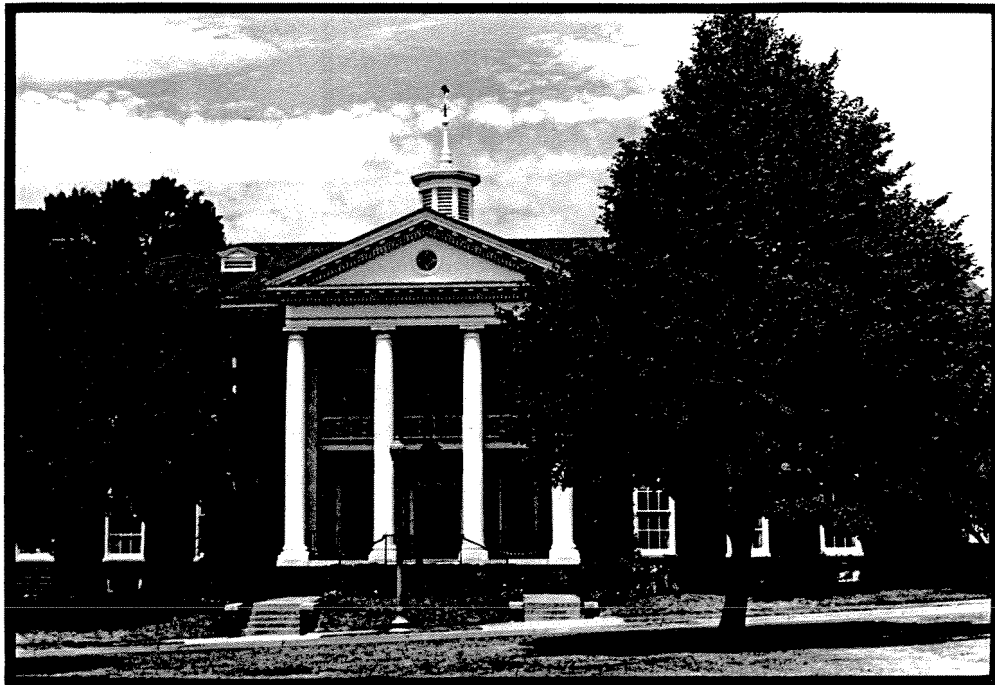


Figure III-90. 1901 stable and fire station converted to a chapel (Building 73, Norfolk Naval Shipyard, Virginia)







**Figure III-91.** Officers' Club originally constructed in 1870 and remodeled to its current appearance in 1887 (Ft. Totten, New York), *above*. 1903 officers club, designed by McKim, Mead, and White (Building 60, Ft. McNair, Washington, D.C.), *below*.



## Elementary Schools

### Description

The elementary school building was constructed as a classroom facility for school-age children living on military installations. They followed the typical design of schools of the same era in the civilian community.

### Evolution

#### Army and Army Air Corps

After the Civil War, the U.S. Congress provided for the establishment of schools at posts, garrisons, or permanent camps to instruct the enlisted men in "the common English branches of education, and especially in the history of the United States." As the nineteenth century progressed, there also was a growing concern for the education of school-age children living on post, particularly at isolated installations. Rooms in existing buildings were used as classrooms; the chapel often served as a classroom during the week. Children of families living on the post received instruction during the day; enlisted personnel received instruction in basic subjects after their duties were completed. The chaplain often served as the teacher for both the children and the troops.<sup>19</sup>

Not until the twentieth century did the Army start to provide separate buildings to serve as post school houses. In 1907, the Quartermaster Department issued a standard plan for a two-story post school house which included classroom facilities. Another plan was issued in 1913 for construction at Ft. Leavenworth, Kansas.<sup>20</sup>

During the inter-war period, the education of children of families living on the post and the instruction of troops in basic subjects were separated. The training and education of enlisted troops became an integral part of the military; formal education programs were developed and classroom buildings constructed. After the mid-1920s, more families began to live on post as both the size of garrisons and the number of enlisted men allowed to marry increased. Elementary schools for children living on post, though not a standard component of inter-war construction, were built on some installations that had large populations and were isolated from communities with civilian schools. Elementary schools on Army posts during this period generally were designed in period revival styles, either Georgian Revival or Spanish Mission Revival, depending on the region (Figure III-93). They are similar to the designs for elementary schools in civilian communities.

#### Navy and Marine Corps

No pre-1940 schools for the children of installation personnel were identified on Navy and Marine Corps installations during the field survey undertaken for this project. Naval and Marine Corps installations tended to have small resident populations and fewer resident families due to the earlier policy against marriage for enlisted men. Thus, these services perceived little need for elementary schools on the installation during the pre-World War II period.

## **Association**

Elementary school buildings are associated with the growth of social and cultural amenities provided to military personnel and the increased emphasis on providing services for the families of Army personnel after the turn of the century. Schools for children living on post grew out of informal arrangements during the nineteenth century; during the 1930s, some installations operated elementary schools similar to those found in civilian communities. Elementary schools are support buildings that may contribute to an historic district, but usually are not individually significant. Elementary schools generally reflect the architectural character of the installation design from the 1930s.

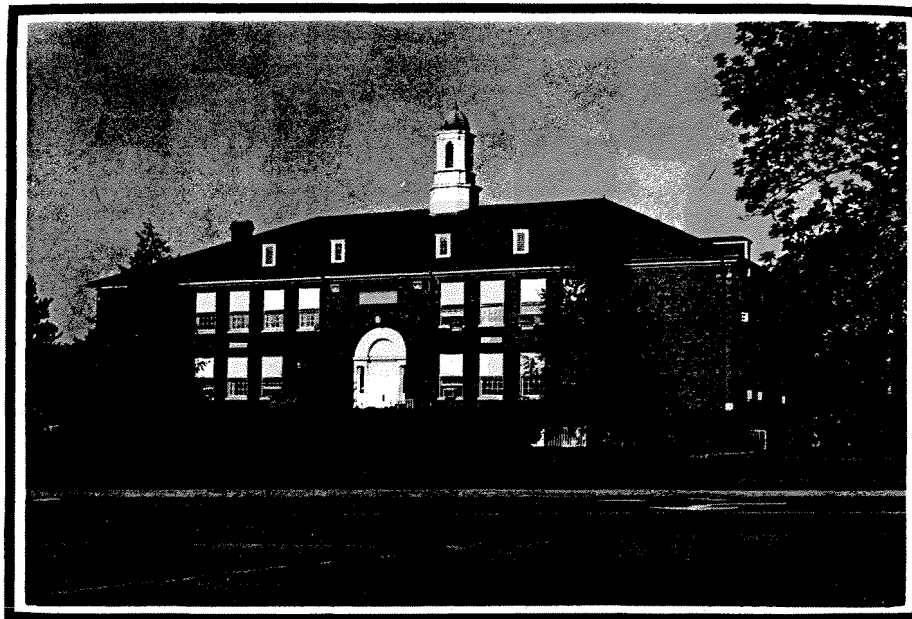
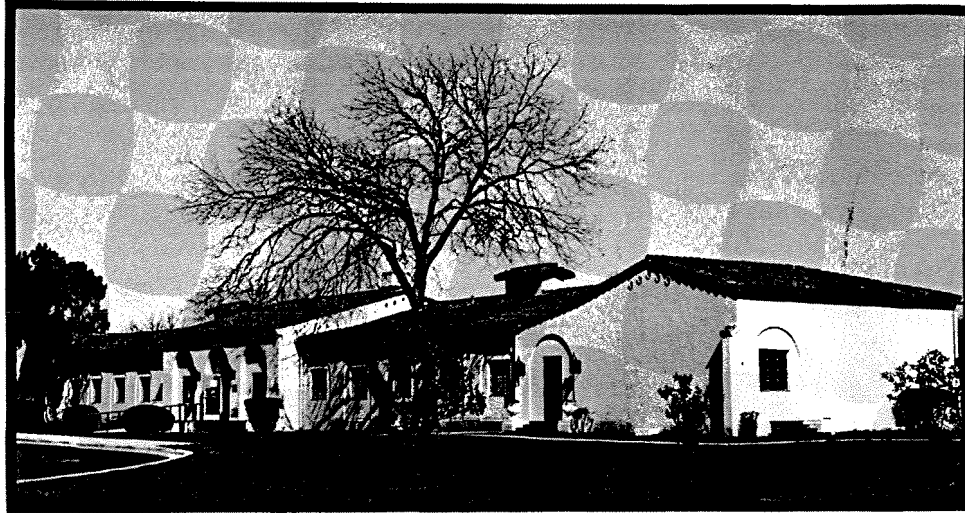
## **Integrity**

Elementary schools built before 1940 were designed and built for the individual installation. They possess the same character-defining features found in civilian schools of the same period: interior space defined by function -- classrooms, offices, hallways, and auditorium; architectural emphasis on the front facade; small scale; and, period revival designs. The integrity of these buildings should be evaluated in the context of their appearance during the period of significance of the building or of the historic district. To possess architectural integrity, elementary school buildings should retain most of their design, setting, and exterior materials from the period of significance. In cases of subsequent additions or renovations, the building may have integrity if it retains the majority of its design, including the building shape, massing, pattern of openings; materials; workmanship, including architectural details; location; and, setting.



**Figure III-92.** 1921 Officers mess and bachelor quarters (Building 33, Naval Air Warfare Center Aircraft Division Lakehurst, New Jersey), *above*. 1935 Officers club and bachelor quarters (Building 17, Harry Lee Hall, Marine Corps Development and Education Command, Quantico, Virginia), *below*.





**Figure III-93.** 1930 Elementary School (Building 584, Randolph AFB, Texas, *above*. 1939 Elementary School (Building 1174, Ft. Knox, Kentucky), *below*.





## Exchange

### Description

The post exchange developed as an officially-sanctioned retail store to sell goods not issued to military personnel by the government. The post exchange is not funded through monies appropriated for military expenditures. Between the late nineteenth century and 1940, the post exchange was generally a small, one-story building, constructed from a variety of materials. During the 1930s construction era, post exchanges became standard components of Army posts that were integrated into the master plan of installation layout. Their physical appearance often reflected the contemporary design of the installation.

### Evolution

#### Army and Army Air Corps

During the nineteenth century, private individuals called sutlers were licensed to sell goods to troops. Sutlers usually were attached to a particular regiment and followed the unit, setting up a tent outside the soldiers' encampment. For permanent Army posts, the sutler built a store where he sold a variety of articles, including canned goods, clothing, and newspapers. In 1866, Congress abolished the office of sutler and mandated the Subsistence Department to furnish troops with items designated as necessary by the Inspectors-General of the Army. The supplies were priced at cost and purchased on credit if needed. Though the office of sutler was abolished, the practice of civilian retail commerce on Army posts was not. Civilian businessmen who performed this function were known as post traders. Post traders were appointed by the Commanding General of the Army (Figure III-94).<sup>21</sup>

In 1880, officers at Vancouver Barracks, Oregon, conceived the idea of improving the soldiers' morale by opening a "canteen" where soldiers could eat, play games, and relax. As the canteen evolved, it began to stock beer and general merchandise; profits from the sale of these items went into a post morale fund. Gradually, canteens began to displace post traders. Canteens spread slowly throughout the Army during the 1880s and 1890s. By 1903, the Quartermaster Department issued a standardized plan for the post exchange. The first post exchanges incorporated many functions into one building, including a lunch room with kitchen, reading room, school room, assembly hall, and billiard room (Figure III-94). In some cases, the post exchange was combined with a gymnasium; combination post exchanges-gymnasiums were built in 1905 at Ft. Monroe, Virginia, and Ft. D. A. Russell, Wyoming (Figure III-82).<sup>22</sup>

During the 1930s, the Army constructed new installations, particularly air fields, that housed many more troops than the old pre-World War I permanent posts. During the inter-war period, the Army also provided more recreational and social amenities to military personnel at installations. Separate buildings exclusively for use as post exchanges became typical features of the new installations built during the inter-war period. The Quartermaster Corps developed a standardized plan for post exchanges: a one-story building with two projecting wings connected by a colonnade (Figure III-95). The detailing of post exchanges reflected the overall architectural character of the installation, generally Georgian Colonial Revival or Spanish Colonial Revival.

## **Navy and Marine Corps**

The Navy and Marine Corps began to incorporate exchanges into installation construction programs during the period between the First and Second World Wars. The construction of exchanges fit into the overall pattern during the twentieth century of increased recreational and social amenities on naval installations, particularly the new air stations, training stations, and recruit depots. The retail functions of exchanges were often combined with recreational and social functions, thus few buildings specifically built as exchanges were identified on naval facilities during this study. The Bureau of Yards and Docks grouped "post exchanges and welfare and Red-Cross buildings" together as buildings suitable for housing a variety of functions, such as the canteen, lunch counter, bowling alley, billiard room, library, reading room, and barber shop. In some case, exchanges were combined with gymnasiums and auditoriums.<sup>23</sup>

The Navy built both temporary and permanent exchange buildings. At the training station at Hampton Roads, Virginia, a temporary exchange was built. An early example of a permanent post exchange was built in 1922 at the Marine Corps Recruit Depot, San Diego, California. The exchange was one of the original depot buildings, and was a two-story, stucco building built in the simplified Spanish Mission Revival style of the other depot buildings. At Moffett Naval Air Station, California, a single building, constructed in 1933, housed the exchange, theater, and other personnel support facilities.

## **Association**

Exchanges are associated with the growth of social and cultural amenities provided to military personnel during the late nineteenth and early to mid-twentieth centuries. Exchanges did not become typical features of Army posts until after 1905 and of Navy and Marine Corps facilities until after 1920. Exchanges usually are minor support buildings that do not possess individual significance, but can contribute to an installation historic district. They can represent the institutional development and the architectural character of the installation.

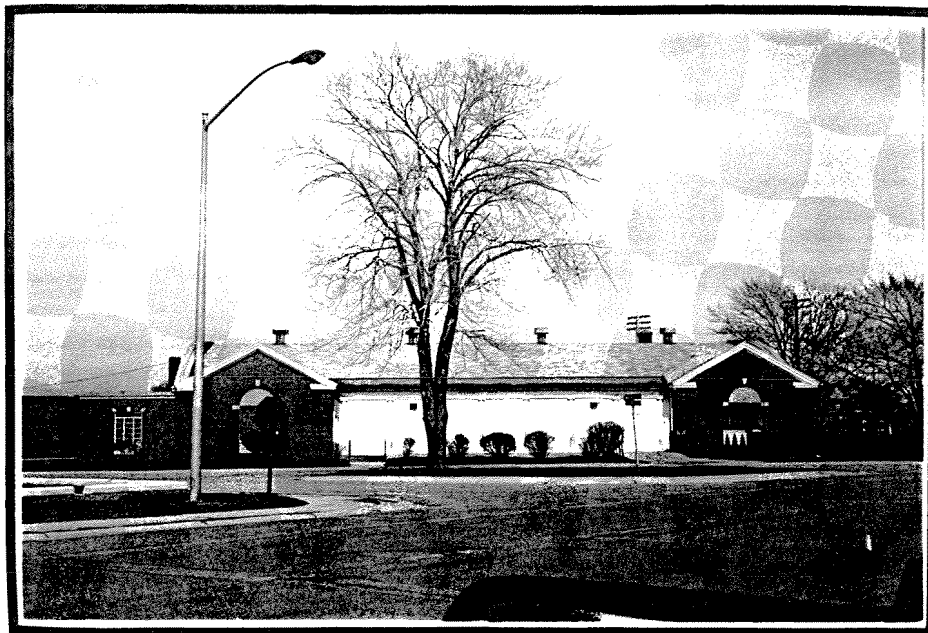
## **Integrity**

Pre-1940 exchanges that have continued to serve in that function are among the most heavily altered of installation buildings due to the vastly increased size of the exchange retail facilities. Early exchanges that were adapted for another use are more likely to retain their original design features. To possess architectural integrity, an exchange should retain most of its design features and exterior materials from the district's period of significance. The building may have integrity if it retains the majority of its design, including form, pattern of openings, porches, and arcades, materials, workmanship, and setting.



**Figure III-94.** 1888 Post trader's house (Building 74, Ft. Leavenworth, Kansas), *above*. 1910 Post exchange, Quartermaster standardized plan no. 122-B (Building 247, F.E. Warren AFB [formerly Ft. D.A. Russell], Wyoming), *below*.





**Figure III-95.** 1933 Post exchange, Quartermaster standardized plan, with later alterations (Building 160, Selfridge ANG, Michigan), *above*. 1939 Post exchange, same plan as above (Building 8, Scott AFB, Illinois), *below*.



## Theaters

### Description

Movie theaters usually were one-story, rectangular, front-gabled buildings with long, unfenestrated side walls. The focus of the design was the front facade and entrance, which often featured a projecting vestibule or display marquee. Movie theaters on military installations did not display the ornate ornament of the civilian movie palaces of the same era. Most military movie theaters built for that purpose were brick buildings with simplified Georgian Colonial Revival or Spanish Mission Revival details.

### Evolution

#### Army and Army Air Corps

The Army began to build movie theaters at its installations as the movie industry evolved and became a popular form of entertainment. At first, older buildings were adapted for use as movie theaters. During the wave of new construction of the late 1920s and the 1930s, movie theaters became typical features of Army installations. Theaters were added to older installations and were standard components of new post plans. The construction of theaters reflected the Army's increasing concern with the well-being and morale of military personnel. Theaters were located within the heart of the cantonment area, near the barracks. The majority of theaters were constructed from similar Quartermaster standardized plans: gable-roofed, rectangular building, with the entrance on the gable end, sometimes with a projecting vestibule that housed the lobby and ticket office. The same basic plan was executed in both Georgian Colonial and Spanish Colonial Revival designs (Figures III-96 and 97). A few individually-designed theaters also were built. The theater at Randolph AFB, Texas, was incorporated into the central administration building (Figure III-15), while the theater at Ft. Sam Houston, Texas, is a prominent building with a corner tower that faces the central parade ground (Figure III-97).

#### Navy and Marine Corps

As the Navy began to increase the size, number, and type of its shore installations after the turn of the century, it also increased the recreational and social facilities for station personnel. As the movie industry gained in popularity during the 1930s, movies were introduced as entertainment for the sailors and marines. The earliest building identified as a theater at a naval installation located during this survey was at the Puget Sound Receiving Station. The brick, Colonial Revival building (Building 424) was constructed in 1930. At most other Navy and Marine Corps installations, existing auditoriums or gymnasiums were used to show movies in addition to other recreational activities. At Parris Island Marine Corps Recruit Depot, South Carolina, an old machine shop was adapted into the Lyceum, which hosted both sports and entertainment, including movies (Figure III-98). The Navy began to erect more buildings designed specifically as movie theaters during the early 1940s to entertain the enormous number of men enlisted in the Navy in the years immediately before and during World War II. For example, in 1942, movie theaters were built at both Norfolk Naval Shipyard and Norfolk Naval Base.



## **Association**

Theaters are associated with the growth of social and cultural amenities provided to military personnel during the late 1920s and 1930s and with the appearance of the movie industry. During the 1930s, movie theaters and athletic facilities provided the major sources of recreation and entertainment on installations. Often the theater reflects the military's adaptation of contemporary architectural styles to installation construction. They generally do not possess individual historic significance, but can be contributing buildings in an historic district.

## **Integrity**

To possess integrity, theaters should retain most of their architectural ornamentation, design features, and exterior materials from their period of construction. Buildings originally built for other purposes and adapted for use as movie theaters may still possess integrity; the modifications may have acquired their own significance. Character-defining features of movie theaters can include the overall shape of the building, ticket and lobby vestibules, blank side and rear facades, marquees, and ornament on the front facade. Theaters are not generally used currently for their original purpose and have been modified for new uses, including museums, storage facilities, or even incorporated into a hospital complex. The building may have integrity if it retains the majority of its design, materials, workmanship, and location.

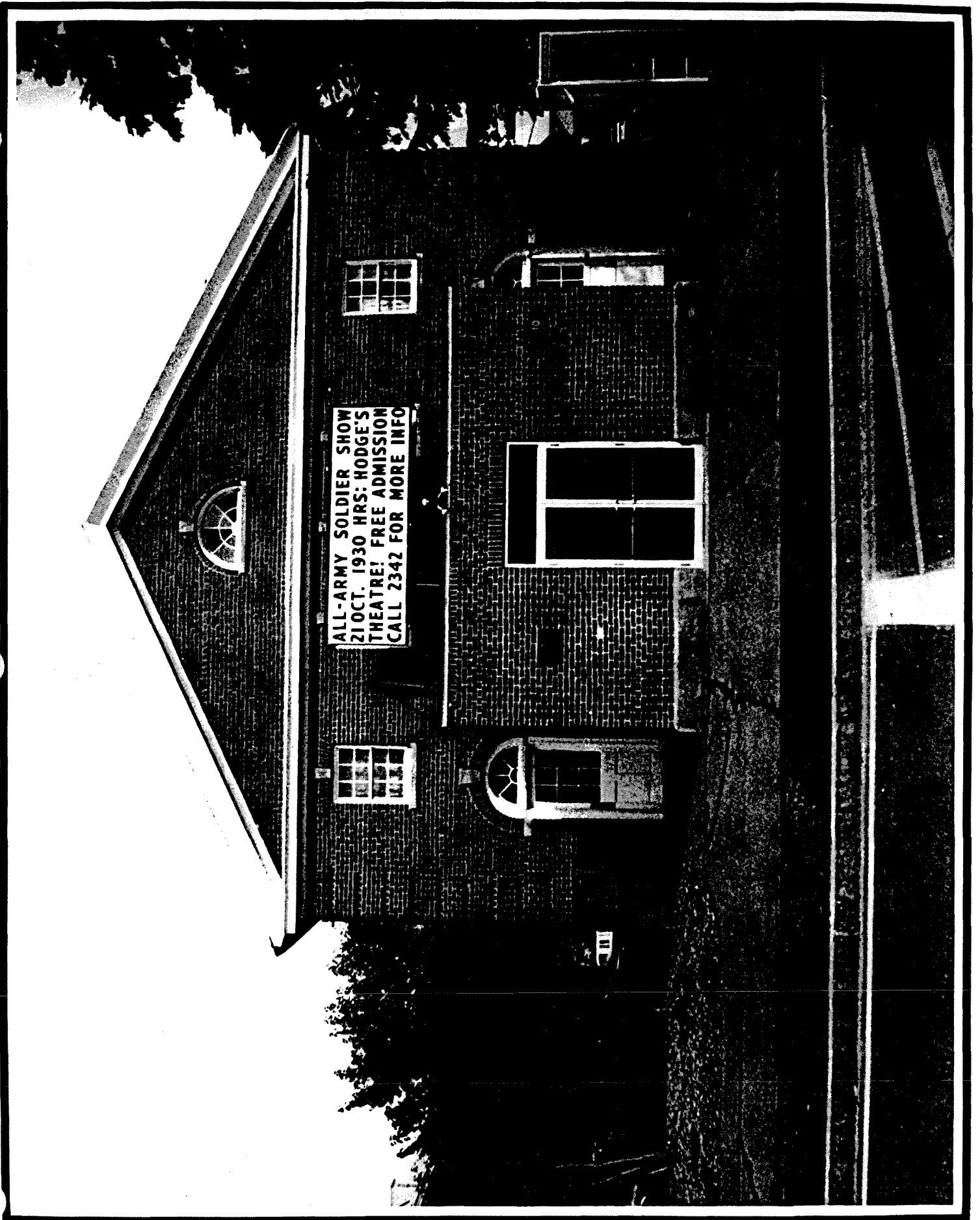
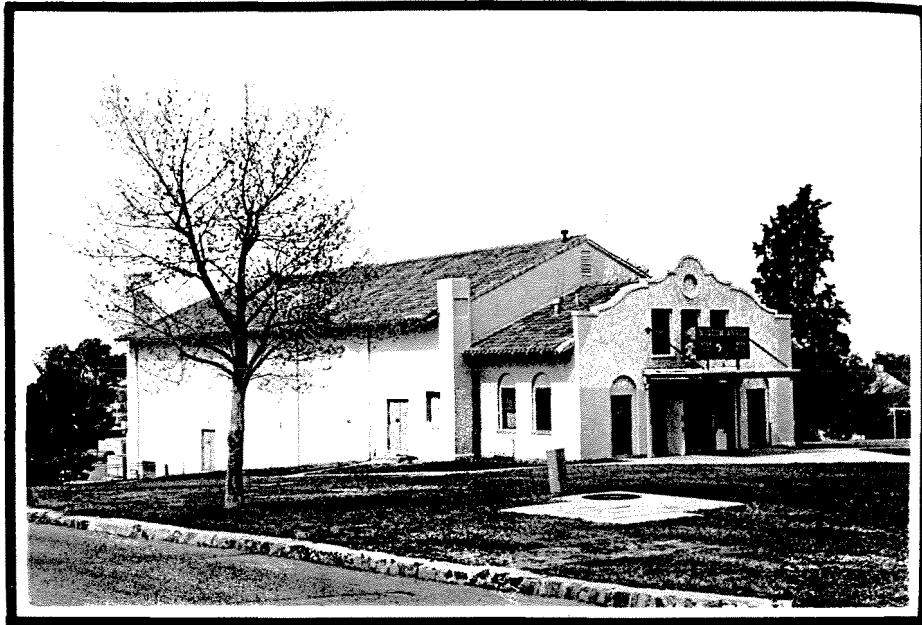


Figure III-96. 1932 Georgian Colonial Revival theater (Building P10, Ft. Devens, Massachusetts).





**Figure III-97.** 1934 Spanish Colonial Revival theater (Building 41305, Ft. Huachuca, Arizona), *above*. 1935 Theater (Building 2270, Ft. Sam Houston, Texas), *below*.





**Figure III-98.** Former machine shop (1900), converted to lyceum and theater (Building 18, Marine Corps Recruit Depot, Parris Island, South Carolina).



## YMCA and Red Cross Buildings

### Description

The YMCA and Red Cross built recreation halls, sometimes known as welfare buildings, to provide wholesome recreational activities for enlisted men, starting in the early twentieth century. Though the military authorized these facilities, they were funded privately. Most YMCA and Red Cross buildings were the results of individual designs and reflected institutional architecture of the period of construction. Early twentieth century examples display elaborate historical revival architecture, while those of the 1930s are marked by either simple Colonial Revival architectural references or functional, modern architectural design.

### Evolution

#### Army and Army Air Corps

During the late nineteenth and twentieth centuries, the Army began to provide social and cultural amenities to military personnel. During the Progressive Era, private groups such as the Young Men's Christian Association (YMCA) and the Red Cross began to provide military men with wholesome entertainment. YMCA buildings began to appear at Army posts during the early twentieth century (Figure III-99). After the Army began to construct gymnasiums and other recreational buildings from appropriated funds, the YMCA built fewer facilities on Army posts.

During World War I, private organizations were very active at military installations. Training cantonments commonly contained recreation buildings operated by the Red Cross, YMCA, Masons, Knights of Columbus, and Salvation Army. Construction of these facilities was subject to War Department approval and under the authority of camp commanders. Wartime hospitals typically featured Red Cross buildings. World War I-era welfare buildings usually were of temporary construction and few are extant. One exception is the Red Cross building (Building 524) at Fitzsimons Army Medical Center, Colorado, a two-story, wood frame and stucco building with parapet end walls and central cupola, built in 1918 to serve the convalescing tuberculosis patients at Fitzsimons.<sup>24</sup>

During the inter-war years, the Red Cross and other morale-boosting and welfare organizations continued to serve troops, but few buildings specifically built by these private organizations at Army posts were located during the course of this study. In 1926, a YMCA was built on Fort Totten, at Willets Point, New York (Figure III-100). In 1927, the Red Cross built a facility (Building 41) at Walter Reed Army Medical Center, Washington, D.C., to serve the patients at the general hospital. After the start of World War II, a wave of Red Cross buildings were built at Army posts and air fields.

#### Navy and Marine Corps

During World War I, the Red Cross and other private organizations operated recreation facilities at naval installations for the benefit of sailors and marines' morale and welfare. The YMCA, active in major cities, began programs to assist sailors coming into port. After World War I, the Secretary of the Navy acknowledged the efforts of civilian groups and publicly thanked them:



During the war and in peace, too, the welfare organizations have rendered a service to the young men of the Navy of a value too great to be computed. For many years the Young Men's Christian Association at all cities where young men have been trained has made them welcome in its large and well-appointed and well-conducted buildings...In many places that young men gathered to train or to fight, since the beginning of the war, the Knights of Columbus have maintained homes for young men and been helpful in giving recreation, diversion, and have contributed to the betterment of the young men to whom they ministered. In like manner the Young Men's Christian Association, the Salvation Army, the Library Association, the Commission on Training Camp Activities, the Red Cross, and the churches of every creed have stimulated right living and been spiritual leaders.<sup>25</sup>

Few buildings associated with the services provided by these civilian groups during World War I survive on Navy or Marine Corps installations. Most probably were housed in temporary or pre-existing buildings.

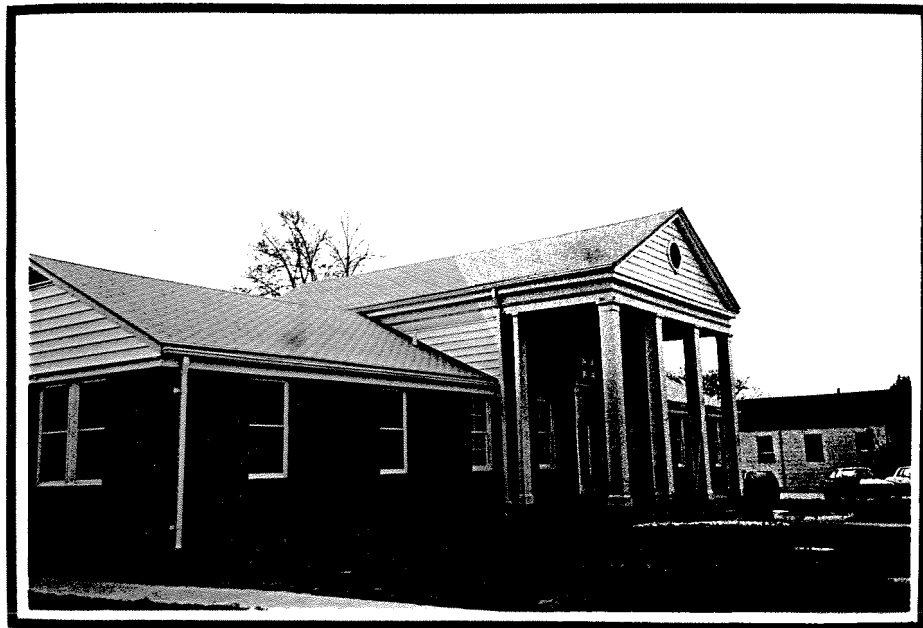
During the inter-war period, civilian morale and welfare organizations remained active on Navy and Marine Corps installations. The construction of welfare buildings operated by the Red Cross or other civilian organizations on naval property was funded by the private organizations themselves, while Navy officials supervised the construction contracts. Hospitals typically had Red Cross buildings of permanent construction, while training stations might have welfare buildings of temporary construction. These buildings housed a variety of recreation activities, such as canteens, billiard rooms, and reading rooms.<sup>26</sup>

### **Association**

Privately-funded recreation facilities are associated with the growth of social and cultural amenities provided to military personnel during the late nineteenth and early twentieth centuries. The private organizations that provided these services also are associated with Progressive Era social reform and temperance movements. The buildings associated with these efforts may be minor support buildings on an installation that may contribute to an historic district, or may be individually eligible. Some examples of Red Cross or other morale and welfare buildings may possess architectural significance as representatives of a particular type or period of construction.

### **Integrity**

Red Cross and other civilian morale and welfare organization buildings built before 1940 were designed and built for the individual installation. No shared, character-defining features were identified during the course of this study. The integrity of these buildings should be evaluated in the context of their appearance during the period of significance of the building or of a historic district. To possess architectural integrity, privately-funded recreation facilities should retain most of their design, setting, and exterior materials from the period of significance. In cases of subsequent additions or renovations, the building may have integrity if it retains the majority of its design, including the building shape, massing, pattern of openings; materials; workmanship, including architectural details; location; and, setting.



**Figure III-99.** YMCA building constructed between 1905-1907 (Building 345, Ft. Leavenworth, Kansas), *above*. 1930s Red Cross building (Building 21, Scott AFB, Illinois), *below*.



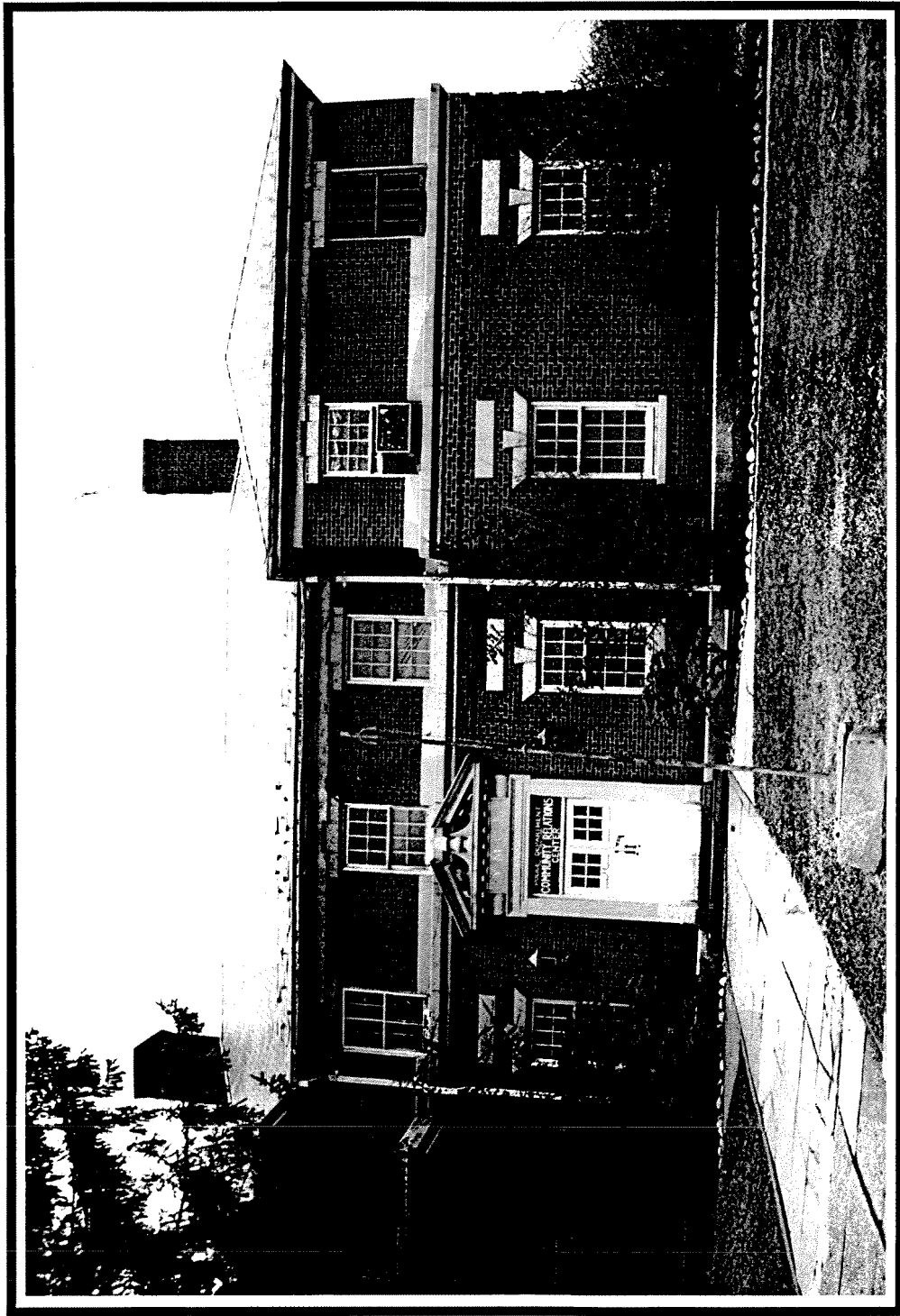


Figure III-100. 1926 YMCA building (Building 318), Ft. Totten, New York



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## CHAPTER 8

### RESEARCH AND DEVELOPMENT

#### Laboratories/ Research and Testing Facilities

##### Description

Laboratories and research buildings are specialized facilities constructed for specific purposes to research, test, or monitor a particular technology. Laboratories and research facilities usually were one-of-a-kind buildings unless that function was replicated at another installation. Buildings built for research functions were constructed of permanent materials and were of functional design.

##### Evolution

###### Army

The Army developed laboratories to support production facilities at arsenals, to assist experimentation with production processes, and to test production results. An early powder laboratory was constructed at Watervliet Arsenal, New York, in 1840. During the nineteenth century, the Army constructed few facilities specifically for testing or research. After the Army established its first smokeless powder plant at Picatinny Arsenal, New Jersey, in 1908, Picatinny became an important center for ammunition research. Many of the earliest buildings at Picatinny were destroyed in the 1926 explosion at the neighboring Navy Ammunition Depot at Lake Denmark. The installation was rebuilt during the late 1920s and the 1930s with a specific area, set apart from the production facilities, for administration and research buildings built of permanent brick construction (Figure III-101).

As the Army expanded its interest in the application of various technologies to warfare, it established laboratories to promote and test direct applications of those various technologies. After the turn of the century, the Signal Corps constructed laboratories to conduct research in the fields of photography and communications. Photographic laboratories were constructed at posts where the Signal Corps experimented with the use of photography, particularly for reconnaissance activities. During the 1920s and 1930s, the Army constructed many air fields; photographic laboratories were common components of these air fields as the military experimented with aerial photographic reconnaissance. The standard photographic laboratories were one-story, brick buildings without architectural ornament.

The Signal Corps also experimented with communications technology. During World War I, it established a radio laboratory at Camp Monmouth, New Jersey, in temporary buildings. In 1935, the Signal Corps constructed a permanent communications laboratory at Ft. Monmouth. Designed by Rodgers and Poor, architects from New York City, the laboratory is a two-story, L-shaped building consisting of two parts: an administration and laboratory section and a shop section at the rear (Figure III-101).

During the late nineteenth and the twentieth centuries, the Army developed proving grounds to test weapons and ammunition. The Army established Sandy Hook Proving Ground in New Jersey in 1874. The Army established Aberdeen Proving Ground, Maryland, in 1918 when



it outgrew the Sandy Hook installation. At Aberdeen, the Army constructed specialized permanent buildings to prepare proofing tests, monitor firing methods, and calculate projectile trajectories and velocity. These utilitarian buildings were constructed to shelter and protect personnel performing proof testing.

In general, between 1800 and 1940, the Army required a limited number of laboratory and specialized test facilities. In the years preceding and during World War II, the number of laboratories and test facilities expanded to meet the increased schedules of production, proofing, testing, and technological advances.

### Army Air Corps

The Army Air Corps developed research and testing facilities in response to technological advances in aircraft. Langley AFB, Virginia, originally was established in 1917 as a joint National Advisory Committee for Aeronautics (NACA), Army, and Navy aviation experimentation center. In 1919, the Army Aeronautical Laboratory opened (Figure III-102). Other specialized research facilities constructed at Langley AFB included wind tunnels constructed in 1921 and 1923 and an NACA laboratory. The construction at Langley was designed specifically for the facility by architect Albert Kahn.

The Army expanded its aviation experimental facilities after World War I. The Army Air Corps moved its testing and experimental activities to temporary facilities at McCook Field, Ohio, in 1918. In 1927, Wright Field, now Wright-Patterson AFB, Ohio, was established as the Army's primary experimental aircraft research facility. During the 1920s and 1930s, the Army Air Corps constructed a variety of individual laboratory and test facilities at Wright Field. These facilities included a radio laboratory to improve ground to air communication, a materials laboratory to test new aircraft materials, an armament laboratory to test the effects of ammunition discharges on aircraft, a propeller laboratory to test the speed and strength of aircraft propellers, and a wind tunnel to test airplane designs (Figure III-102). All of these buildings were utilitarian designs engineered to meet special needs. These buildings often represented the precepts of contemporary industrial architecture: use of concrete and steel, and an emphasis on functional designs.<sup>1</sup>

### Navy and Marine Corps

Naval laboratories first were developed to support production facilities at arsenals, through experimentation with production processes and testing production results. In 1820, Navy officials established an ordnance laboratory at the Washington Navy Yard, Washington, D.C., to further the development of naval ordnance. During the nineteenth century, the Washington Navy Yard grew into a large ordnance factory. After the Spanish-American War, the role of the Washington Navy Yard turned to research and development. One research facility constructed at the yard in 1896 was a model ship basin, to test ship designs. The first submarine design accepted for use by the Navy was tested there in 1899.

During the first decade of the twentieth century, the Navy began the production of smokeless powder at Indian Head, Maryland. The production facilities required supporting laboratories to assist production and monitor the final product. These buildings were masonry, utilitarian industrial buildings.

During the twentieth century, the Navy expanded its proving grounds to test weapons and ammunition. At Dahlgren, Virginia, the Navy established a naval proving ground (now the Naval

Surface Warfare Center). At Dahlgren, the Navy constructed specialized permanent buildings to prepare proofing tests, monitor firing methods, and calculate projectile trajectories and velocity. These buildings were utilitarian, one-story buildings constructed of reinforced concrete to shelter and protect personnel performing proof testing.

In general, between 1800 and 1940, the Navy required a limited number of laboratory and testing facilities for specific purposes. Testing usually was related to developments in ordnance or ship design. In the years immediately preceding and during World War II, the number of laboratories and testing facilities grew to meet the expanded needs of technological advances, increased schedules of production, proofing, and testing.

The Navy constructed one notable specialized research complex in the nineteenth century, the Naval Observatory in Washington, D.C. The observatory, originally established in 1830, was moved to its current site in 1888. The observatory was established to provide the Navy with information about winds, currents, whale sightings, depth soundings, and to compile wind and current charts to aid navigation. The office also made important astronomical observations. The new facility was constructed based on plans drawn by Leon Dessez, a Washington, D.C. architect, and Richard Morris Hunt, a nationally prominent architect. The observatory complex included an administration building with telescope dome, transit telescope building, clock house, east and west transit circle telescope structures, prime vertical building, and 26-in telescope dome (Figure III-103).

### **Association**

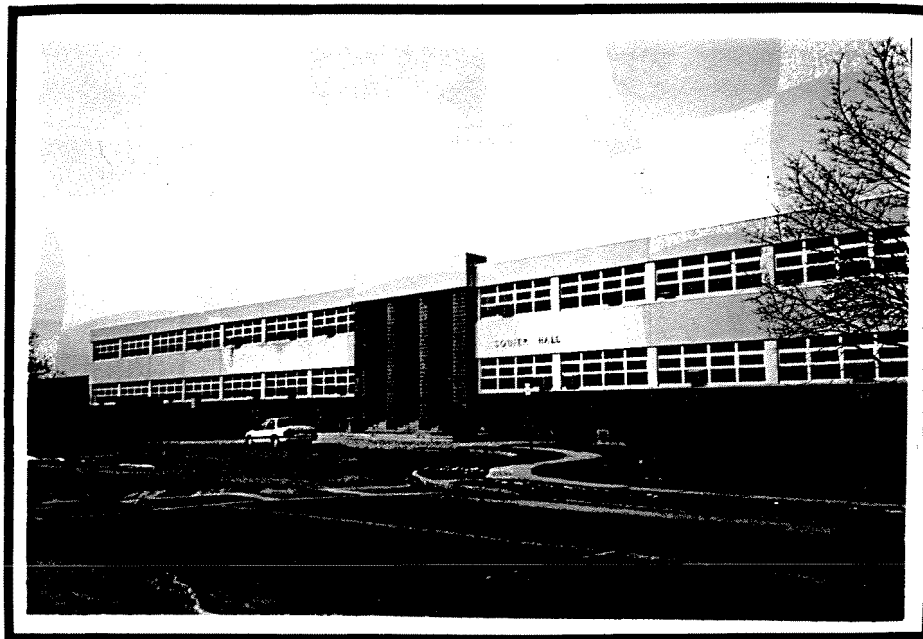
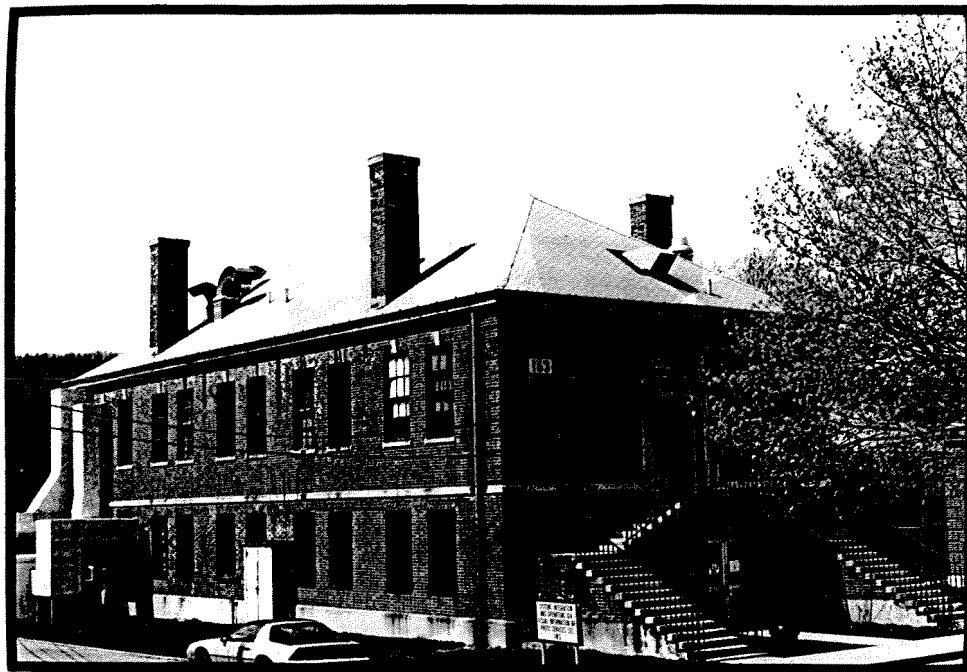
Research and development buildings, including laboratories and test facilities, are associated with themes of technology, transportation, and communications. These facilities are associated with the development of new technologies, the military application of technology, and scientific research. They may be associated with specific technological breakthroughs or with the general development of military technology over time. Research and development facilities often were buildings designed to meet specific research or testing purposes. In other cases, the buildings associated with research and development may have been simply structural shells or office buildings that housed research activities, without any relationship between the building design and the activity within the building. Research facilities may have testing ranges and firing ranges that also were associated with important weapons development; these areas should be considered for inclusion within historic districts along with associated buildings and structures.

Research and testing facilities may possess historic significance and meet the criteria for listing on the National Register of Historic Places, either as individual buildings or as districts. Research and development facilities may represent important elements in a research complex or production facility and contribute to an historic district.

### **Integrity**

To possess the integrity necessary to convey significance, research and development facilities should retain most of their original design, materials, workmanship, and setting from their periods of significance. Character-defining features of research and development facilities may include their overall shape, their relationship to other buildings in the complex, materials, features specific to the research conducted at the facility, and overall pattern of exterior windows and doors. Buildings that housed research and development activities often were altered to accommodate new research missions or technological advances. Typical alterations include replacement of original testing equipment, alterations to window and door openings, and

enlargement of interior space through building additions. In cases of subsequent additions or renovations, the building may have integrity if it retains the majority of its character-defining features, particularly any features specific to the research or testing activity, its setting, basic form, materials, and pattern of openings.



**Figure III-101.** 1930 High explosives research laboratory (Building 163, Picatinny Arsenal, New Jersey), *above*. 1935 Squier Laboratory (Building 283, Ft. Monmouth, New Jersey), *below*.





**Figure III-102.** 1919 Army Aeronautical Laboratory (Building 693, Langley AFB, Virginia), *above*. Five-foot wind tunnel constructed in 1927 (Building 20019, Wright-Patterson AFB, Ohio), *below*.



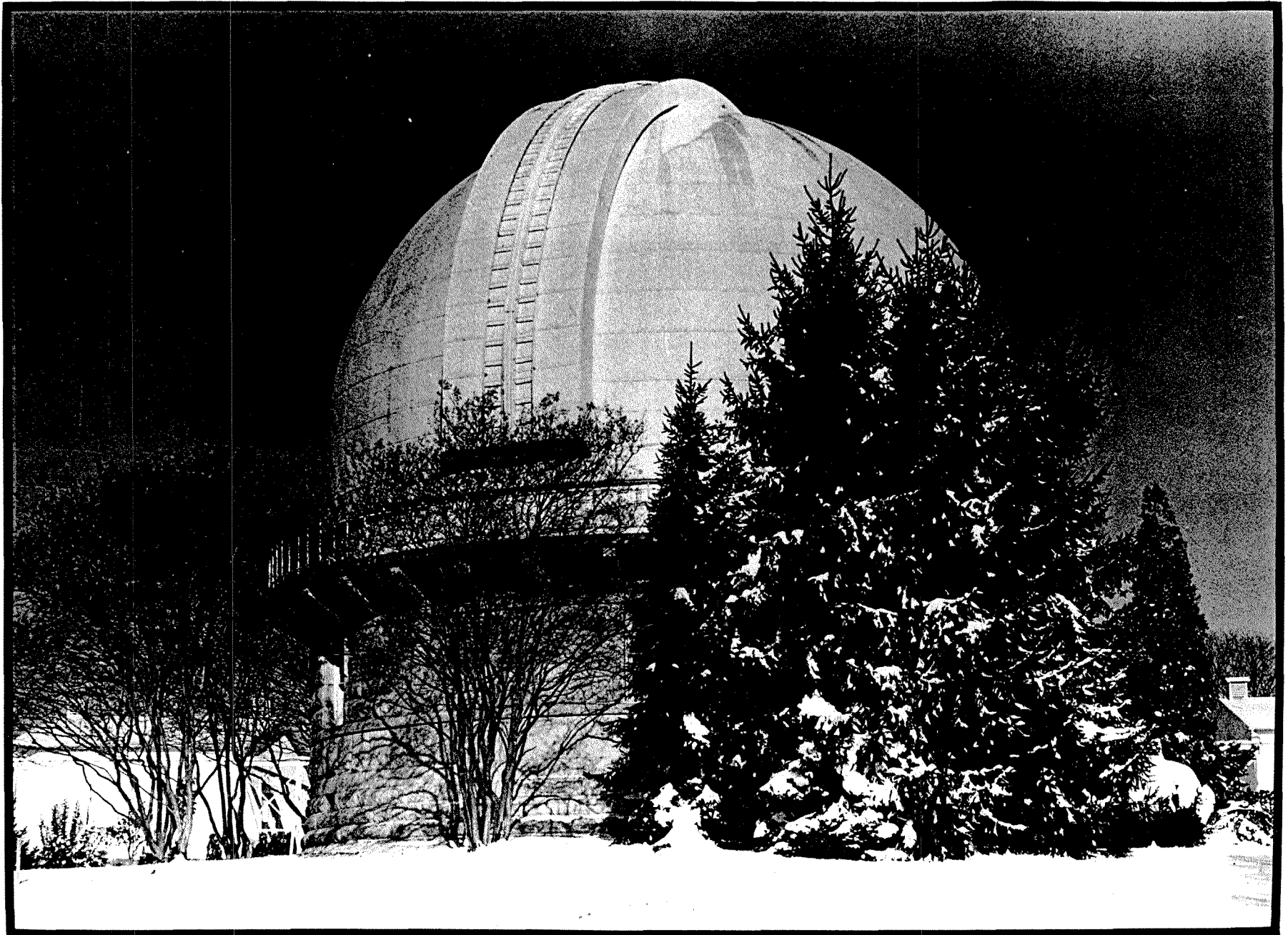


Figure III-103. 26-inch telescope dome constructed during 1890s (Naval Observatory, Washington, D.C.).





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## CHAPTER 9

### RESIDENTIAL

#### Institutional Housing:

#### Bachelor Officers Quarters (BOQs)

##### Description

The military constructed bachelor officers quarters (BOQs) to house unmarried officers or those officers stationed at an installation without their families. Bachelor officers quarters usually were rectangular, two-story structures that contained living quarters and mess facilities for officers. Bachelor officers quarters were standard components of Army permanent cantonments. They usually were located near the parade ground or near the officer family housing. During the last quarter of the nineteenth century, the military designed bachelor officers quarters using Victorian architectural motifs. During the early twentieth century, bachelor officers quarters were constructed to reflect the Georgian Revival and the Spanish Colonial Revival styles. The evolution of quarters design illustrates the military's interest in and adaptation of contemporary civilian architectural trends to the military's construction program.

##### Evolution

###### Army and Army Air Corps

The Army has the longest history of providing housing for military personnel because of its history of maintaining permanent garrisons. The strict hierarchical nature of rank required separate quarters for officers and enlisted men. During the early nineteenth century, many officers were either unmarried or lived without their families on posts, due to harsh conditions. Free-standing family housing was provided for the commander, but not for most of the other officers. The early officers housing resembled small barracks, but contained private quarters for each officer. Examples of this type of housing survive at Carlisle Barracks, Pennsylvania, and Ft. Monroe, Virginia. The Carlisle Barracks officers housing, built during the 1830s and rebuilt after the Civil War, was a two-story stone building with a two-story veranda that served as exterior corridors with entries into each room. At Ft. Monroe, two sets of quarters known as the "Tuilleries," built in 1823, originally housed eight officers each; these officers were allotted a bedroom and sitting room.

Bachelor officers quarters evolved as a distinct building on Army posts after the Army began to construct more duplex and single-family officers quarters. When the Army consolidated its troops into larger, permanent posts during the 1880s and 1890s, the Army built rows of officers family housing and usually one bachelor officers quarters at each permanent post (Figure III-104). In 1891, the Quartermaster Department issued a standardized plan for a BOQ. The typical BOQ contained sleeping rooms, sitting rooms, dining room, reading room, kitchen, and rooms for recreation including billiards and cards. Quartermaster plans illustrate the standard plan ornamented with Victorian decoration.<sup>1</sup> During the first decade of the twentieth century, the Quartermaster adapted the Colonial Revival style to BOQs, as it did with other building types (Figure III-104).

Bachelor officers quarters constructed during the 1930s reflected the prevailing architectural styles used by the Quartermaster Corps: the Georgian Colonial Revival and the Spanish/Mission Colonial Revival styles (Figure III-105). At a few installations, BOQs were designed in special regional architectural styles, such as the French Provincial Colonial styles at Barksdale AFB, Louisiana, Maxwell AFB, Alabama, or Ft. Benning, Georgia.

### Navy and Marine Corps

Most naval personnel lived on ship during the nineteenth century. The Navy required housing only for senior officers and other personnel necessary to supervise construction and repair work at naval yards. The Navy did not build bachelor officer quarters or barracks until it established permanent on-shore training and air stations beginning in the early twentieth century. Training stations, such as Great Lakes Naval Training Station, Illinois, were built with dormitories for enlisted personnel and family housing for senior officers. Air stations had larger concentrations of junior officers, and consequently often were built with bachelor officer quarters. For example, the Navy constructed bachelor officer quarters, which resembled barracks, at Lakehurst Naval Air Station, New Jersey, and at Pensacola Naval Air Station, Florida, during the 1930s (Figure III-106).

The same pattern also applies to the Marine Corps. The Marine Corps traditionally housed marines in barracks on Navy yards; senior officers lived in residences near the barracks. For most of the time period included in this study, the Marine Corps did not require bachelor officers quarters. Immediately before and after World War I, the Marine Corps constructed recruit depots, but did not provide separate housing for bachelor officers. Not until the expansion of permanent facilities at Quantico, San Diego, Parris Island, and Norfolk Naval Base during the late 1930s and early 1940s did the Marine Corps construct bachelor officers quarters (Figure III-92).

### **Association**

Bachelor officers quarters are associated with the evolution of living standards for military personnel and with the mission of the installation personnel who were housed in the quarters. The buildings reflect the history and status of the military at the time of their construction. The design of bachelor officers quarters often reflects the influence of civilian architecture on military construction and the military's self-perception of its image and presence. Bachelor officers quarters usually are part of a cantonment or a housing area and can be contributing elements in an historic district. Bachelor officers quarters usually were built as part of a larger construction program of installation buildings with similar architecture.

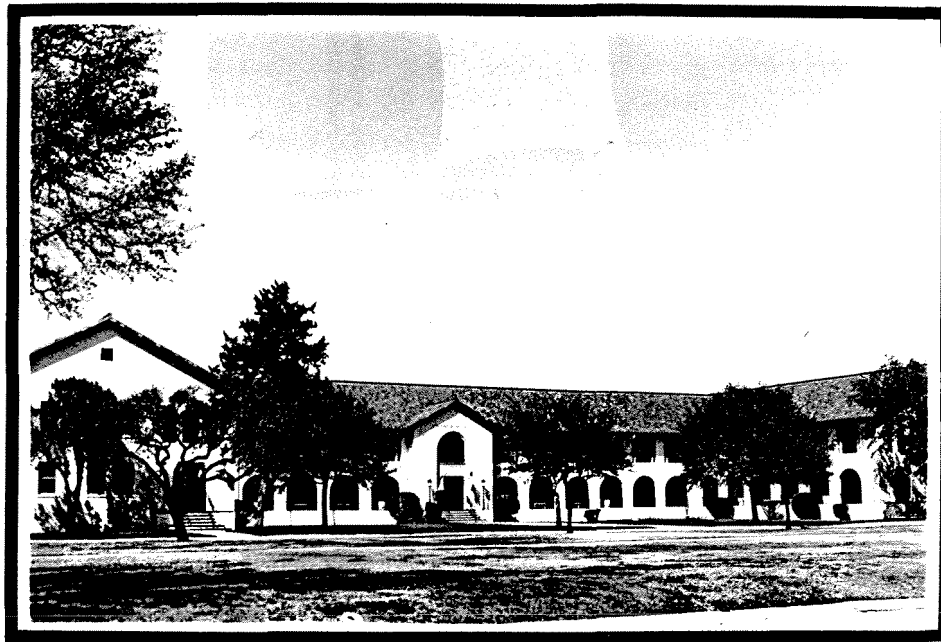
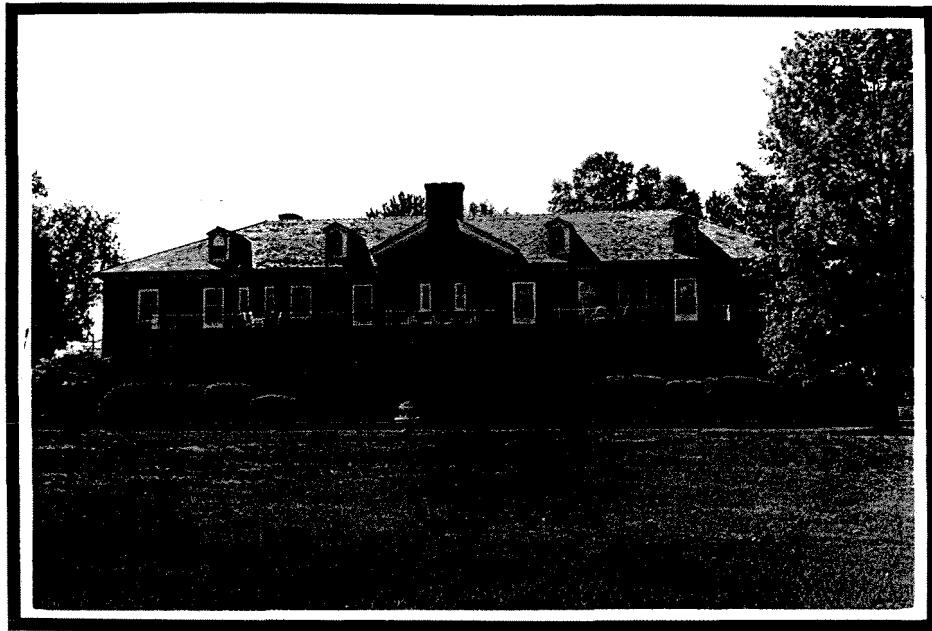
### **Integrity**

To possess integrity, bachelor officers quarters should retain their setting and location, and the majority of their design, materials, workmanship, association, and feeling from their period of significance. Buildings originally built as bachelor officers quarters now often serve as visiting officers quarters or as office buildings. In some case, porches have been removed or enclosed; window and door openings, modified. In cases of subsequent additions or renovations, bachelor officer quarters may possess integrity if they retain the majority of their shape, massing, materials, pattern of openings, and architectural features. Additions subsequent to the date of construction may have acquired their own significance and do not necessarily detract from the integrity of building if they were added during the building or historic districts' period of significance.



**Figure III-104.** 1894 Bachelor officers quarters (Building 13, Offutt AFB [formerly Ft. Crook], Nebraska), *above*. Typical bachelor officers quarters constructed during first decade of twentieth century (Building 40, constructed 1904, Ft. McPherson, Georgia), *below*.





**Figure III-105.** 1935 Bachelor officers quarters, original front facade (Building 1117, Ft. Knox, Kentucky), *above*. 1931 Bachelor officers quarters (Building 120, Randolph AFB, Texas), *below*.







**Figure III-106.** 1937 Bachelor officers quarters (Building 600, Naval Complex Pensacola, Florida).



## **Institutional Housing:**

### **Barracks/Dormitories**

#### **Description**

The military constructed barracks to house units of enlisted personnel. Barracks are found on all installations where permanent military enlisted personnel resided. Barracks are located in prominent sites, generally in groups facing the parade ground or drill field. Barracks were usually one- to three-story, rectangular buildings, with the primary entrance on the wider elevation. Verandas were a common feature until the 1930s.

Permanent barracks are a major building type on many installations. Their architecture reflects their period of construction. Barracks exhibited utilitarian designs for most of the nineteenth century; however, during the last quarter of the nineteenth century, the military designed barracks using Victorian architectural motifs. In subsequent years, various period revival styles of architecture were employed in barracks design. The size of the military unit originally intended to reside in the barracks determined the building size. The average size of barracks and dormitories increased over time, from small buildings that housed a dozen men, to buildings that housed hundreds; the number of barracks also increased, reflecting the growing size of the standing military.

#### **Evolution**

##### Army and Army Air Corps

The Army constructed few permanent barracks before the Civil War due to the small number of permanent garrisons. Most early-nineteenth century Army posts were either coastal fortifications or temporary frontier garrisons. The troops stationed at the masonry coastal forts of the Third System (1814 - 1861) were housed in the damp, stone casemates of the fortifications, eliminating the need for separate barracks buildings. In a few instances, the Army built permanent garrisons that required barracks. The officers quarters at Carlisle Barracks, Pennsylvania (constructed ca. 1838; burned; rebuilt 1863-1864), typifies the appearance of these early buildings: a narrow, rectangular, two-story, unornamented brick building with a two-story veranda along the front facade. The Army also constructed permanent barracks at Plattsburgh Barracks, New York, in 1838; two, two-story, rectangular, stone buildings with verandas were built. Buildings of this type were constructed for both enlisted and officer housing.

Most western forts had temporary barracks constructed by troop labor from materials at hand. The Army's mid nineteenth-century policy of establishing and abandoning western posts as needed inhibited the construction of permanent barracks. The typical barracks housed one company of men and contained sleeping quarters, a kitchen, and a mess room; it usually was a one-story, narrow, rectangular building with a porch. A barracks design of this type appeared in the unofficial 1860 Army regulations and is exemplified by examples of barracks identified at early frontier posts constructed before and after the Civil War (Figure III-107).<sup>2</sup> The basic building type used for barracks easily was adapted for use as a headquarters building or hospital. The 1870 headquarters building at Ft. Sill, Oklahoma, is an example of the basic barracks design adapted for use as the post headquarters (Figure III-10).

During the late nineteenth century, the U.S. Army had the reputation for being the best fed, but worst housed Army in the world.<sup>3</sup> Efforts to improve living accommodations began after the Civil War, but were limited by budgetary constraints. In 1872, Quartermaster General Montgomery C. Meigs issued standardized plans for a one-company barracks (Figure III-108).<sup>4</sup> The plan depicted a two-story building: the first floor contained day room, library, clothes washroom, kitchen, mess room, and offices; the second floor, sleeping quarters. Meigs' plan offered better accommodations than in the past, as the Army tried to make quarters, reading rooms, and mess rooms more attractive to the soldier than the sutler's shop and the groggery.<sup>5</sup>

During the 1880s and 1890s, the Army consolidated its troops into larger, permanent posts. The Army constructed its new posts with more attention to planning and to contemporary architectural detailing. The barracks, traditionally located along the edge of the central parade ground, became important elements in the installation plan and often were impressive buildings that defined the architectural character of the installation. During this era, the Army built larger, two-company barracks. They typically had a central block flanked by wings with two-tiered porches (Figure III-109). Porches served as corridors and provided ventilation. A second form of two-company barracks was created through connecting two T-shaped, one-company barracks to form an H-shaped building. On installations that served more than one branch of the Army, the barracks were designated as cavalry, artillery, or infantry barracks.

During the late nineteenth and early twentieth centuries, the two-company barrack remained the typical barracks design. Only in a few instances did the Army experiment with larger barracks (Figure III-109). Often the Constructing Quartermaster developed the plan for larger barracks by incorporating the several one-company barracks plans under one roof, with partitions separating the company quarters. For example, the Army constructed multiple-company barracks at Ft. Crook, Nebraska, and at Ft. Sam Houston, Texas. Ft. Monroe, Virginia, also had a barracks, since demolished, with a central block and long wings that were divided into company units by interior partitions.

The Army adapted architectural fashions to the basic form of the barracks, depending on the popular fashion of the era. During the 1880s and 1890s, the detailing of barracks incorporated simplified versions of features from contemporary architectural styles, such as the Romanesque and Queen Anne (Figure III-109). Between 1900 and 1917, the Army applied Colonial Revival architectural motifs to the basic barracks designs of the previous century (Figure III-110). In 1911, the Quartermaster Department issued barracks plans using Spanish Colonial Revival motifs; these were built at the Presidio of San Francisco, California, Ft. Sill, Oklahoma, and Ft. Missoula, Montana (Figure III-110).<sup>6</sup>

During the Spanish-American War, the Army established a series of encampments across the country to hold troops waiting for transport to Cuba. The hastily constructed tent camps lacked adequate sanitation facilities and fostered the spread of disease among the troops. The Army, determined not to repeat that disastrous experience, developed standardized plans for mobilization camps. In 1914, the Construction Division of the Quartermaster Corps produced a set of drawings for mobilization camp buildings, usually called the 600 series of drawings. The plans depicted one-story, rectangular, light-weight wood-frame, barracks based on 20 ft. by 7 ft. modules (Figure III-111). The vast number of troops mobilized during World War I overwhelmed the existing supply of Army housing, and the Construction Division put the 600 series drawings to use in the construction of large training camps.<sup>7</sup> No surviving examples of World War I temporary barracks were identified during the field survey conducted for this study.

After World War I, military spending slowed dramatically. Thousands of troops continued to live in World War I temporary barracks, which were deteriorating rapidly. Public Law 45, enacted in 1926, authorized the War Department to sell excess property and to use the funds to

improve military posts. The War Department singled out barracks as one of the primary building types to receive construction funds. The law was enacted primarily to improve living and medical conditions for enlisted personnel. The Construction Service of the Quartermaster Corps designed the new installations constructed under this act as cohesive facilities; the buildings were placed in ordered relationships within a master plan and shared a unifying architectural treatment. Barracks buildings were a major element within the installation plans and were located in distinct enlisted housing areas.

Barracks constructed during the 1930s reflected the prevailing architectural styles used by the Quartermaster Corps: the Georgian Colonial Revival and the Spanish or Mission Colonial Revival styles (Figure III-112). At a few installations, barracks were designed in special regional architectural styles, such as the French Provincial Colonial at Barksdale AFB, Louisiana. The standard barracks design remained a two- or three-story, rectangular building, but was larger than ever before. Between 1928 and 1930, the Army constructed its first regimental barracks, designed by the architectural firm of McKim, Mead, and White, at Governors Island, New York. Other equally large and larger barracks later were built at Ft. Benning, Georgia, and McChord AFB, near Tacoma, Washington.

Barracks design during the 1930s was not as standardized as officer housing; the basic form was modified to suit the needs of particular installations. One universal design change, however, was the elimination of porches along front facades. This left the main front facade as a flat surface; architectural ornamentation such as stone surrounds around doorways, corner quoins, and cornice moldings relieved the blank facades. Porches were incorporated into the rear of the buildings.

The Army also constructed barracks for specialized troops. The most widespread specialized barracks was the band barracks (Figure III-113). The band barracks housed a fewer number of men and included music practice rooms and special storage rooms for musical instruments. The band barracks at the Infantry Post at Ft. Sam Houston, Texas, included a tower at its gable end; musicians played from the roof of the tower. Between 1880 and 1890, the Army constructed band barracks at many Army installations for regimental and post bands. The Army did not build band barracks during the 1930s construction era.

In addition to band barracks, the Army sometimes constructed barracks for specific Army detachments. The Quartermaster Department might have a separate barracks for its own personnel, near the Quartermaster warehouse area; barracks for medical corps soldiers sometimes were located near the hospital. These specialized barracks were constructed only at large posts, and typically were smaller than standard troop barracks.

The Army, upon occasion, constructed barrack-type housing for civilian employees. The Army provided civilian housing only at isolated posts where no local accommodations were available for needed civilian employees.

## Navy

The vast majority of naval personnel lived aboard ship during the nineteenth century. The Navy typically built housing only for yard commanders and a few other officers necessary for supervising the operation of its shipyards and hospitals. The Navy housed transient sailors and new recruits on decrepit warships, called "receiving ships," anchored at each Navy yard. The one exception to this practice was a brick Sailors' Ordinary, or lodging house, constructed at Portsmouth Navy Yard between 1828 and 1829. The only other nineteenth-century shore installation with barracks was the U.S. Naval Academy at Annapolis, Maryland.

As the Navy began to transform its fleet from one of aging wooden sailing ships into a modern, steam-powered, steel fleet that could challenge the European naval powers, it began to develop technical training programs for sailors and recruits. However, even this shift in emphasis on enlisted training did not prompt the construction of barracks. At the first recruit training squadron was established in 1895 at Newport, Rhode Island, on Coasters Harbor Island, all training was conducted aboard ship. No men of the training force were quartered on shore except in case of sickness. In 1900, the first Barracks at Newport were constructed; however, no early barracks buildings remain extant.

Barracks did not become a major component of the Navy's shore establishment until the Navy began to establish permanent shore-based training facilities at the beginning of the twentieth century. Following the military reorganization after the Spanish-American War (1898-1899), the Navy began a major expansion program to upgrade existing facilities. The number of training facilities grew to four: Newport; Yerba Buena Island, California; Great Lakes, Illinois; and, Norfolk, Virginia.

Between 1900 and 1910, the Navy funded construction of two important educational facilities that included dormitories as major building types: the Naval Training Station at Great Lakes, Illinois, and the rebuilding of the U.S. Naval Academy. The Great Lakes Naval Training Station was Navy's first complete shore-based recruit training facility based on a comprehensive master plan. Jarvis Hunt, a Chicago architect, designed the master plan and buildings. The station contained dormitories, mess halls, classrooms, a drill hall, and recreational facilities for the recruits. The dormitories were divided into two groups, the receiving dormitories and the main training dormitories. The dormitories were massive brick buildings designed in a classical, Roman Revival architectural idiom. At the U.S. Naval Academy, the Navy demolished the existing academy buildings and constructed a new officer education facility designed by noted architect Ernest Flagg. Bancroft Hall, an impressive, high-style, stone building based on French Classical precedents was the new dormitory for the midshipmen. Both Hunt and Flagg were influenced by the Ecole des Beaux-Arts in their choice of architectural design and in the formal planning of each installation.

During World War I, the Navy housed new recruits and shore personnel in temporary buildings at mobilization camps on its existing installations. No extant examples of World War I-era Navy dormitories were identified during the field survey conducted for this project.

After World War I, the Navy continued to expand its shore establishment and to develop additional training facilities, which required the construction of dormitories. During the 1920s, the Navy established the Naval Training Station at San Diego, California. The Training Station was designed according to a master plan and executed in the Spanish Colonial Revival architectural style. The barracks were constructed in two rows facing each other, with an arcade linking the barracks within a row (Figure III-114). Each barracks contained two twenty-five man dormitories on each floor, officers quarters, and wash rooms.

Naval air stations were another type of naval installation that required barracks to house shore-based personnel. Naval personnel assigned to air stations were assigned to either BEQs (bachelor enlisted quarters) or BOQs (bachelor officers quarters), depending on their rank. Starting in 1935, the Navy rapidly expanded the Naval Air Station at Pensacola, Florida, and developed an aviation training complex as part of the station. A complex of brick, Colonial Revival barracks was constructed to house the personnel undergoing training. These buildings had two-story central porticos and two-story verandas (Figure III-114). The Navy built whole new naval air stations, such as North Island in San Diego, California, and Moffett in Sunnyvale, California, which were designed according to master plans and included rows of barracks for shore personnel.

## Marine Corps

The Marine Corps has a long tradition of barracks construction. A primary mission of the Marine Corps during the nineteenth century was to protect naval shipyards. A complement of marines was assigned to each navy yard; separate marine reservations, typically with a barracks and one or two officers' quarters, were established near the shipyards. Thus, marine barracks are a typical feature of navy yards. The earliest extant Marine Corps barracks (1827) is located at the Portsmouth Navy Shipyard (Figure III-115). Another surviving nineteenth-century marine barracks is located at the Washington Navy Yard, where the barracks were constructed above the original shipyard gate.

Following the Marine Corps' expanded role as an expeditionary force after the Spanish-American War (1898-1899), the Marine Corps began a major expansion program. Between 1900 and 1910, the Marine Corps completed a major building program. The Marine Corps began to hire civilian architects to design marine reservations. For example, the Marine Corps Barracks, the headquarters of the Marine Corps, in Washington, D.C., were rebuilt. The Washington, D.C. architectural firm of Hornblower and Marshall designed the new barracks (Figure III-116). Other Marine Corps barracks were constructed at Norfolk Navy Shipyard, Virginia; U.S. Naval Academy, Annapolis; and, Philadelphia Navy Yard, Pennsylvania (Figures III-116 and 117). The Chicago architect Henry Ives Cobb designed the marine barracks at Annapolis and Philadelphia. Cobb's designs display the transition from the robust Richardson Romanesque to the more delicate neoclassical designs of the early twentieth century. The barracks share similar features: two stories, a central block flanked by wings, arcades, and high-style architectural design.

The Marine Corps began to operate separate installations, independent of Navy yards, before World War I when the Marine Corps Recruit Depot at Parris Island, South Carolina, was established. Marine barracks constructed during the inter-war years exhibited simpler designs than those constructed at the beginning of the twentieth century. The inter-war marine barracks are similar to the barracks built for Navy personnel during the same era; Colonial Revival styles dominated the designs. During the 1920s, a recruit training depot was established at San Diego. Like the Navy installations built near San Diego around the same time, the installation, including the barracks, was designed in a contemporary interpretation of the regional Spanish Colonial Revival style (Figure III-118). During the 1930s, the Marine Corps expanded the marine base at Quantico, Virginia, and the Parris Island recruit depot. These East Coast facilities were designed in Georgian Colonial Revival architectural styles. The new barracks were large, two- and three-story, red brick buildings, with central blocks and side wings, hip or gable roofs, and limited Colonial Revival references. The barracks at Parris Island incorporated two-story verandas due to the hot, humid climate. The Parris Island barracks, built in 1940 to replace wood-frame barracks, illustrate the growing simplification of military design as the stylistic references were reduced to minimum (Figure III-118).

## **Association**

Barracks are a major building type on many military installations. They provided housing for enlisted personnel and are associated with the evolution of living standards for military personnel. The construction of barracks directly reflects the chronological history and status of the military during their period of construction. Barracks are integral components of Army posts and airfields and illustrate the growth in the size of permanent garrisons. On naval installations, barracks or dormitories are related to the development of shore-based training programs and to the adoption of new technologies, such as aviation, that required shore-based personnel. Barracks are the most prominent single property type associated with the Marine Corps. Barracks design often reflects the influence of civilian architecture and the military's self-perception.

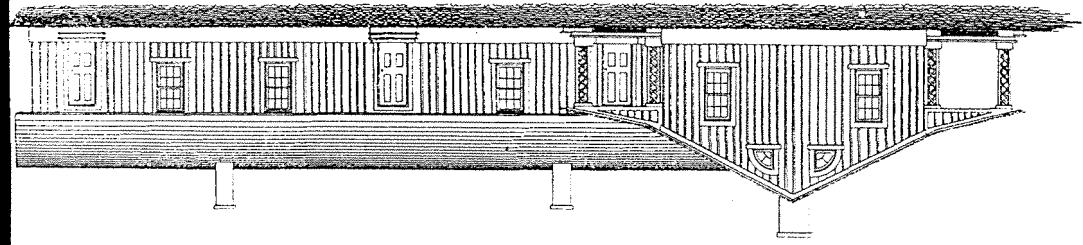


Barracks buildings are often major elements in an installation plan that establish the character of an area and define the edge of a significant open space, such as a parade ground or drill field. Barracks may possess individual architectural significance because of their design or their ability to represent a type of construction. In many cases, barracks will be major contributing elements to an installation historic district.

### **Integrity**

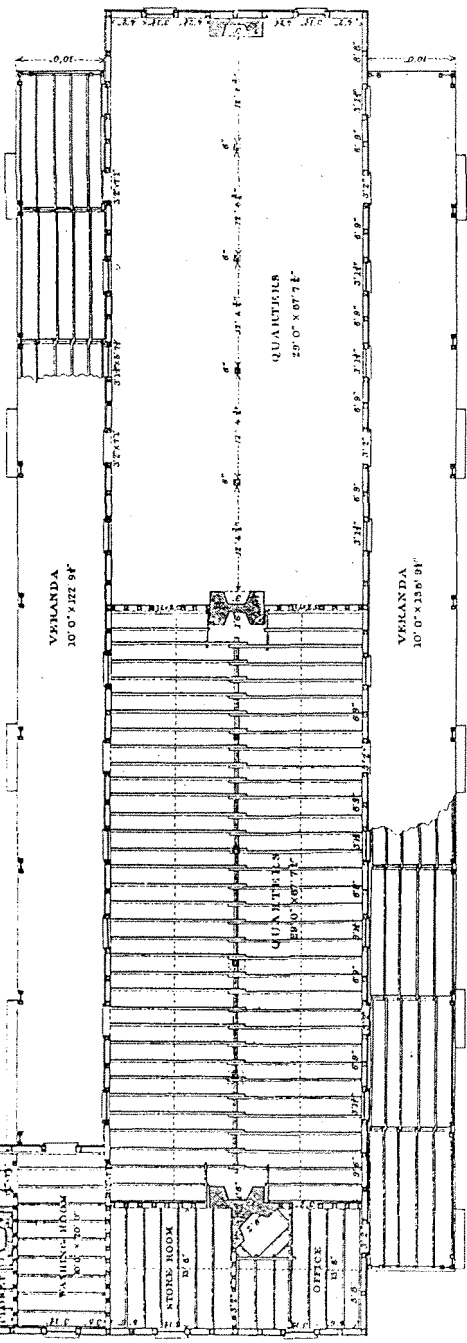
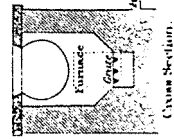
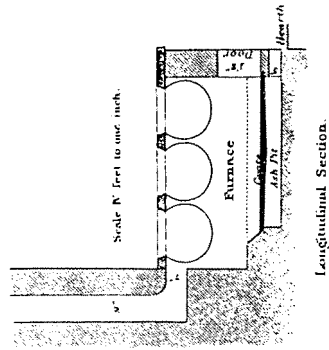
To possess integrity, barracks should retain most of their overall exterior form, architectural ornamentation, and construction materials from their periods of significance. Many pre-1940 barracks have been converted to office use. Porches may have been removed or enclosed; window, door, and roof materials often have been modified. Where subsequent additions or renovations have occurred, barracks still may have integrity if they retain the majority of their character-defining features, including setting, overall shape, pattern of openings, materials, and architectural details. In many cases, even with major modification, a barracks complex will contribute to the character of an historic district.

SIDE ELEVATION.

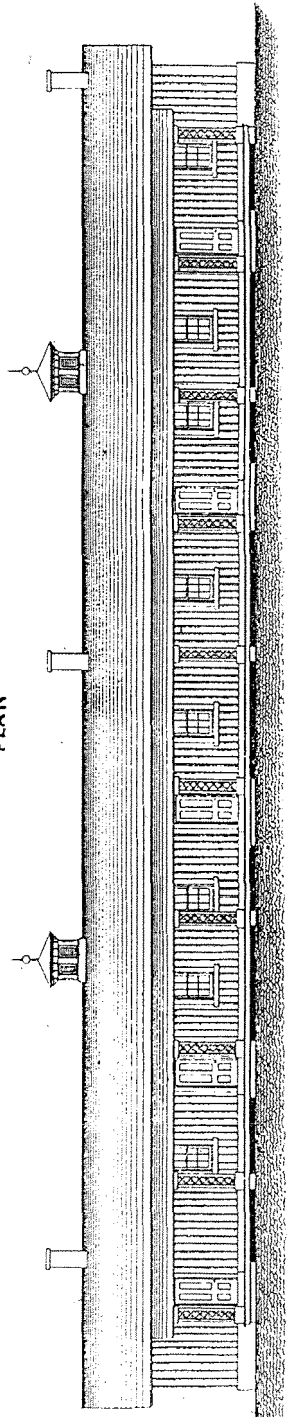


Note.  
Thin single posts as in the Guard House (Plate 14) may be used in  
stead of the iron or lattice pillars for the terminals.  
Only the interior dimensions of apartments are laid  
down. The outside dimensions of the buildings excepting win-  
dows will vary according to the materials used - the plan  
being applicable to all materials.  
The dimensions given for doors and windows include 3  
inches (1/4 on either side) for the thickness of the frames.  
The cross dimensions of timbers will vary according to cir-  
cumstances, within certain prescribed limits, and therefore  
are not laid down in the drawings.  
For details of construction see plate 12.  
When the ground slopes considerably from front to rear, and  
other circumstances make the arrangements more unusual, and con-  
venient, the Kitchen, Mess room, and Washing room will be placed in  
a basement under the main building and the back building will be  
omitted. In that case also a portion of the basement may be com-  
municated into Landrats quarters. This design is applicable also to  
third quarters, by using only one chimney and reducing the  
length of main and back building, see regulations.

COOKING RANGE.



PLAN



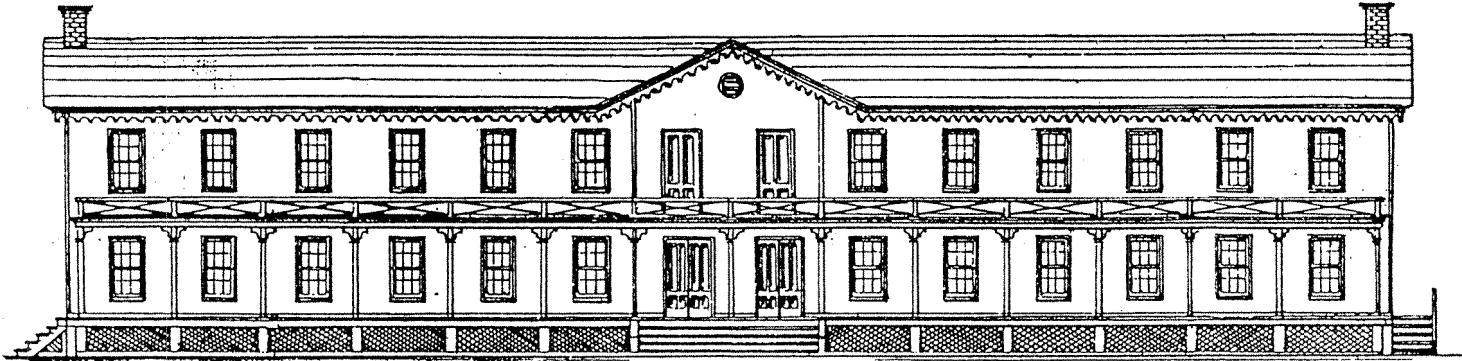
FRONT ELEVATION.

Scale 1/4" = 1 foot

Figure III-107. Proposed one-story barracks (From Regulations Concerning Barracks and Quarters for the Army of the United States, 1860. Washington, D.C.: George W. Bowman, 1861)



COMPANY QUARTERS.



Front Elevation.  
Scale, 20 feet to linch.

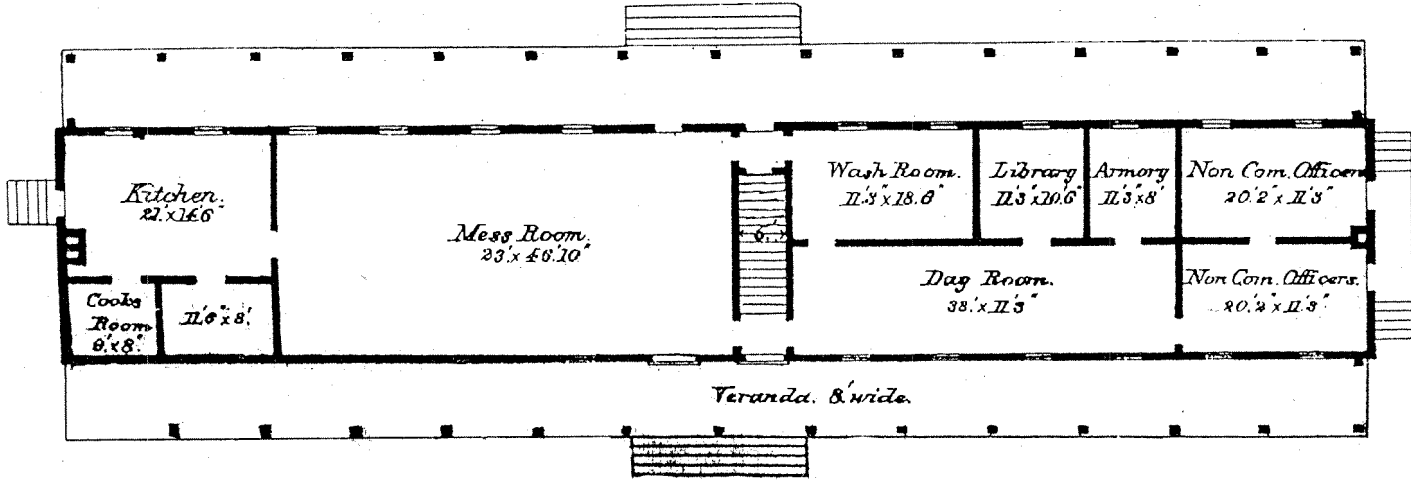
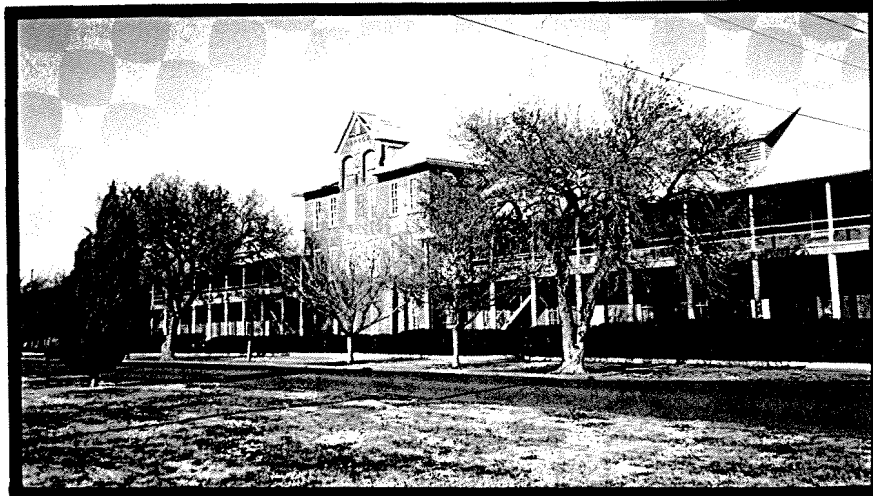
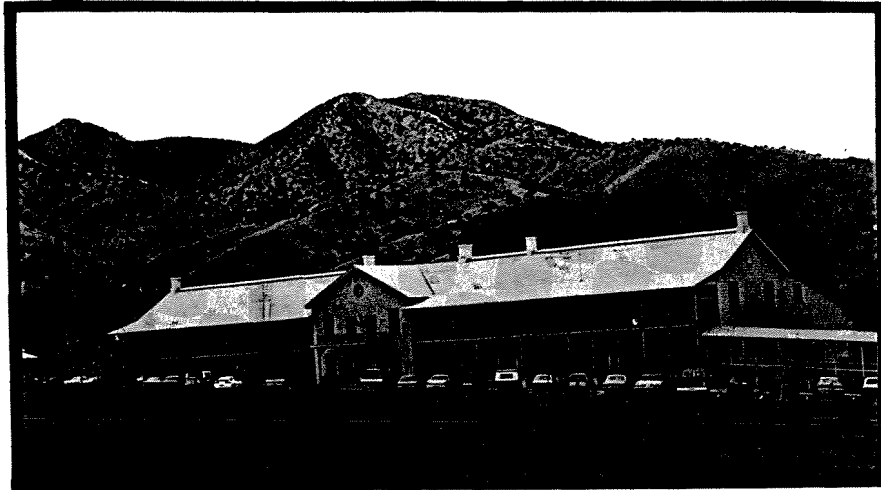


Figure III-108. Proposed 1872 Quartermaster plan for barracks (From War Department. *Annual Report of the Quartermaster-General*. Washington, D.C.: Government Printing Office, 1872)





**Figure III-109.** 1883 Wood-frame barracks (Building 22208, Ft. Huachuca, Arizona), *above*. 1893 Multiple-company barracks (Building 111, Ft. Bliss, Texas), *middle*. 1891 Barracks with simplified Queen Anne and Stick style detailing (Building 58, Ft. McPherson, Georgia), *below*





**Figure III-110.** 1910 Cavalry barracks, Quartermaster standardized plan no. 75-M (Building 236, F.E. Warren AFB [formerly Ft. D.A. Russell], Wyoming), *above*. 1911 Barracks designed in the Spanish Colonial Revival style (Building 1607, Ft. Sill, Oklahoma), *below*





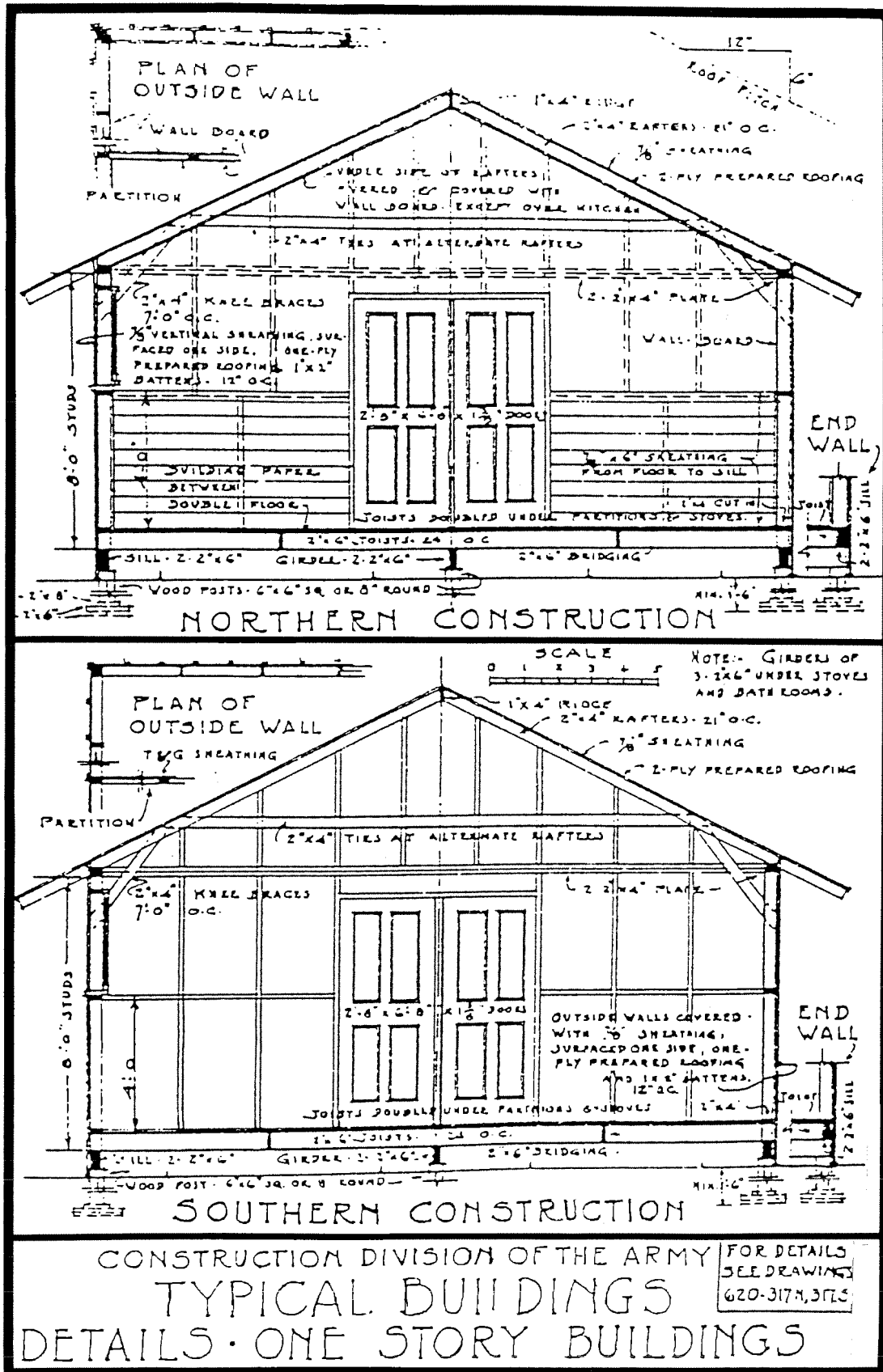


Figure III-111. 600 Series Mobilization Construction Plans (From John S. Garner. *World War II Temporary Military Buildings*. Champaign, Illinois: U.S. Army Construction Engineering Research Laboratory, 1993)





**Figure III-112.** 1931 Georgian Colonial Revival barracks (Building 40, Scott AFB, Illinois), *above*. 1931 Spanish Colonial Revival barracks (Building 835, Maxwell AFB, Alabama), *below*





**Figure III-113.** Typical Army band barracks constructed in 1909 from Quartermaster standardized plan no. 61-F (Building 240, F.E. Warren AFB [formerly Ft. D.A. Russell], Wyoming)





**Figure III-114.** 1924 Navy barracks (Building 26, Naval Training Center, San Diego, California), *above*. Barracks constructed during the 1930s expansion of the Naval Complex, Pensacola, Florida (Buildings 623, 602, 601), *below*

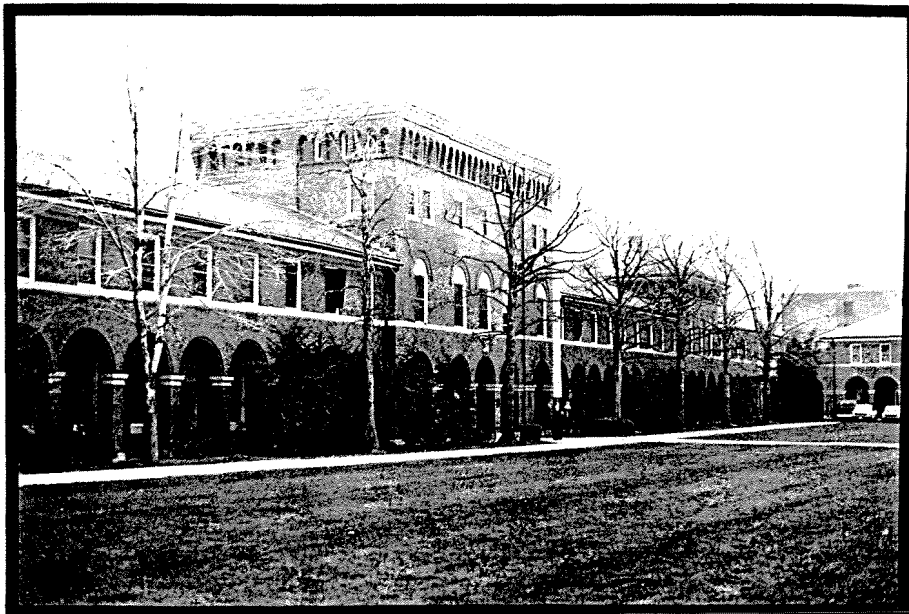
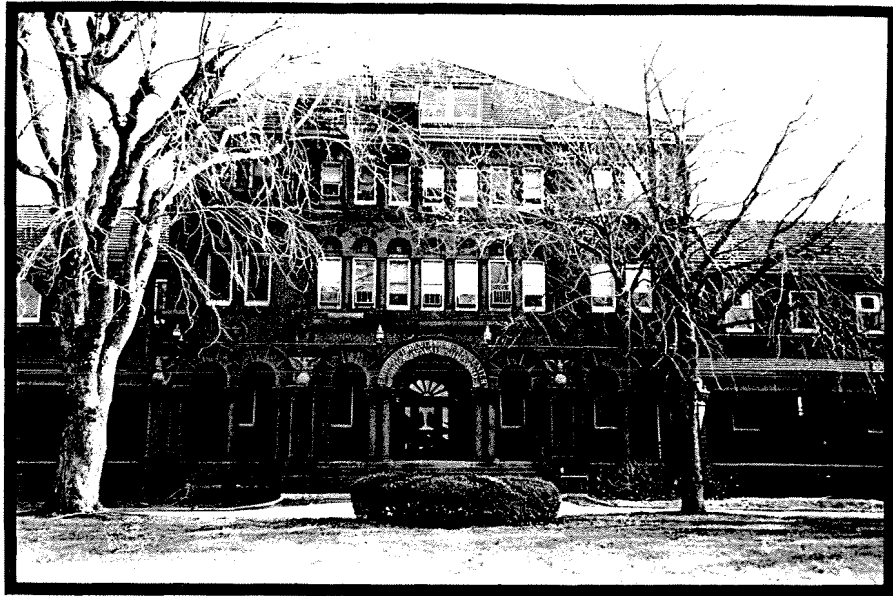






**Figure III-115.** Marine Corps barracks originally constructed in 1827; the third story of the center section was added later (Building M-1, Portsmouth Naval Shipyard, Maine). (Courtesy of U.S. Navy)





**Figure III-116.** 1901 Marine barracks designed by Henry Ives Cobb (Building 100, Philadelphia Naval Base, Pennsylvania), *above*. Marine Corps barracks designed by Hornblower and Marshall, constructed between 1903 and 1907 (U.S. Marine Corps Barracks, Washington, D.C.), *below*



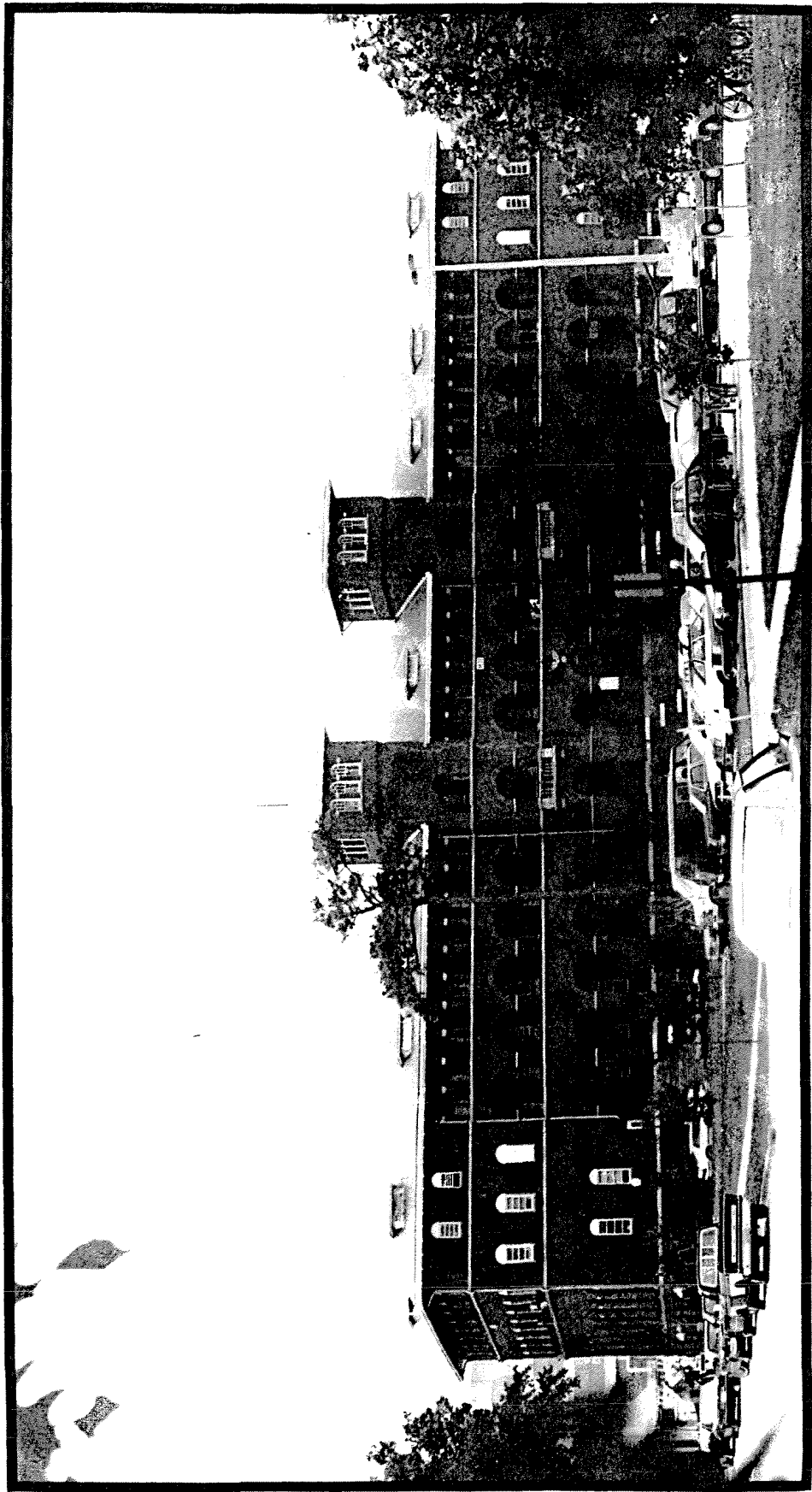


Figure III-117. 1905 Marine Corps barracks (Building M-32, Norfolk Naval Shipyard, Virginia)





**Figure III-118.** 1921 Barracks with central mess, Bertram G. Goodhue, architect (Building 6, Marine Corps Recruit Depot, San-Diego, California), *above*. 1940 Barracks (Building 146, Marine Corps Recruit Depot, Parris Island, South Carolina), *below*





## **Institutional Housing Support Buildings:**

### **Detached Lavatories/Bathhouses**

#### **Description**

Detached lavatories, sinks (latrines or outhouses), and bathhouses are support structures to barracks and family housing. These one-story, utilitarian structures generally were located near housing facilities. During the nineteenth and early twentieth centuries, detached lavatories, outhouses, and bathhouses were common property types. Few remain due to the incorporation of indoor plumbing in military housing.

#### **Evolution**

##### Army

Army Regulations issued in 1821 set minimum standards of personal cleanliness for the troops; they were required to have clean uniforms and to wash their faces and hands daily.<sup>8</sup> Despite these regulations, the Army provided no appropriations to fund the construction of latrines or bathhouses. The Secretary of War routinely rejected all plans and estimates for such facilities; troops, rather than the government, were expected to pay for their personal cleanliness.<sup>9</sup> The earliest sinks built of permanent materials identified during this study were stone facilities constructed at Ft. Sill, Oklahoma, during the 1870s. Buildings labeled as wash houses on nineteenth-century post plans were for clothes washing, not bathing. Officer quarters usually had an individual latrine, while the soldiers living in the barracks shared a larger facility.

Communal detached latrines and bathhouses became prevalent for barracks, particularly in the West at such places as Fts. Huachuca, Bliss, and Riley, during the late nineteenth and early twentieth centuries (Figure III-119). These buildings contained indoor plumbing for toilets and bathing facilities. They were located behind the barracks, and often served the residents of two barracks. On some western posts, permanent detached lavatories were not constructed until World War I.

After 1891, new officer housing and barracks were constructed with indoor bathrooms and toilets. Officer quarters had a room with a bathtub, wash basin, and water closet and occasionally a servant's bathroom and water closet in the basement. However, not all regions of the country received indoor plumbing at the same time. At older posts, such as at the Department Headquarters post at Ft. Sam Houston, Texas, the officers and their families continued to use detached outhouses behind the quarters. Individual water closets behind officer quarters were still common in 1904 according to post plans from that year.<sup>10</sup> The most popular addition to older residences was a bathroom with indoor toilet.

Surviving lavatories are generally one-story utilitarian buildings located behind officer housing and barracks complexes. They were constructed of permanent materials such as brick or stone, and match the barracks or housing complex. By the 1930s, indoor bathrooms and toilets were included automatically in the designs of barracks and housing.

## Navy and Marine Corps

Because the Navy maintained few permanent barracks and officer quarters, the numbers of detached outhouses remained small. No examples of this property types were identified on naval facilities or Marine Corps installations during the field survey conducted for this study. When the Navy and Marine Corps began to upgrade and expand their shore facilities during the early twentieth century, the new buildings included indoor plumbing.

### **Association**

Detached lavatories are a minor property type associated with housing complexes that pre-date the widespread construction of indoor plumbing. They are associated with the improvement of living standards for military personnel as the military began to construct larger, more permanent facilities. The construction of detached lavatories and bathhouses also is related to improvements in plumbing and the growing awareness of the connection between hygiene and health. These buildings do not possess individual significance, but may be contributing elements in an installation historic district if they are related physically to a barracks or housing area.

### **Integrity**

To possess integrity, detached lavatories and bathhouses should retain most of their exterior features from the period of significance of the historic district. Most detached lavatories and bathhouses no longer serve their original functions. They often have been converted into storage facilities. Exterior elements that may have been modified include window and door openings. Where subsequent additions or renovations have occurred, detached lavatories and bathhouses still may have integrity if they retain their location and the majority of their setting, association, materials, and design.

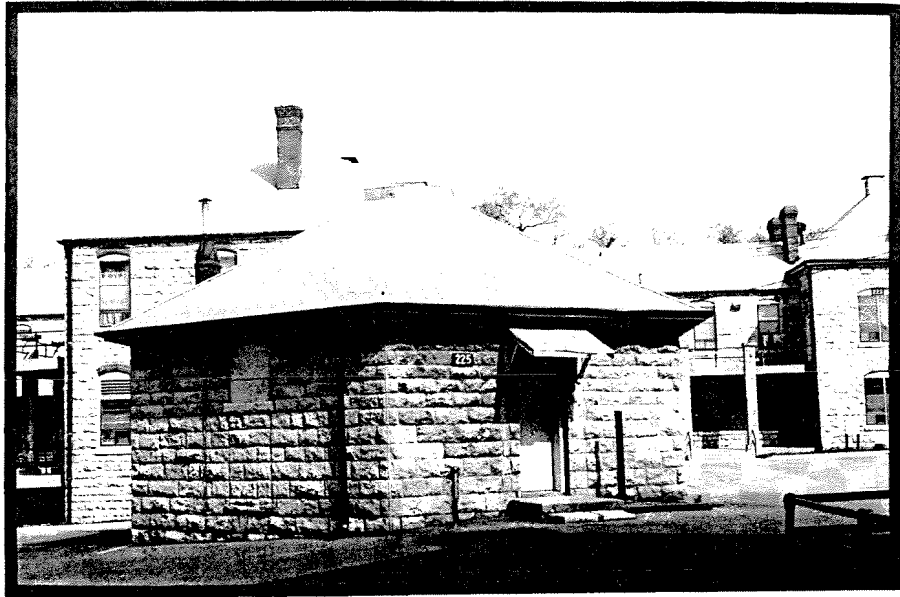


Figure III-119. 1889 Latrine (Building 225, Ft. Riley, Kansas), *above*. 1903 Detached lavatory (Building 22322, Ft. Huachuca, Arizona), *below*



## Institutional Housing Support Buildings:

### Mess Halls

#### Description

Mess halls housed kitchens and dining facilities for military personnel. Mess hall buildings included a dining room, kitchen, cook's room, dish pantry, and storerooms. Mess halls were built near barracks complexes. Mess halls shared the same construction materials and architectural character as the adjacent barracks. The buildings were usually one story, though they often had high ceilings that gave them the exterior appearance of a two-story building.

#### Evolution

##### Army and Army Air Corps

The Army provided enlisted personnel with food rations through the mess system. Officers paid the officers mess for their own food. Officers dined in the officers mess in the bachelor officers quarters, or in the case of married senior officers, in their family quarters. The mess halls and kitchens for enlisted men were contained in the barracks. In a one-story barracks, the kitchen and mess room were located in a rear wing; in a two-story barracks, on the first floor. Food distribution generally was organized by company, with each company living and eating together.

As the Army consolidated its troops into larger, permanent posts during the 1880s and 1890s, the Quartermaster Department experimented with the idea of a single mess for all enlisted personnel in one building. The Army constructed its first consolidated mess at the recruiting depot at David's Island, New York, in 1888. Common mess halls were adopted at a number of larger posts by 1893. Advantages of the consolidated mess over the company mess included better cooking and greater economy of meal preparation.<sup>11</sup>

In 1893, the Quartermaster General reported that mess halls existed at Ft. Bliss, Ft. Brady, Davids Island, Jefferson Barracks, Ft. McPherson, Plattsburgh Barracks, Ft. Riley, Ft. Sam Houston, Ft. Sheridan, and Ft. Thomas. In addition, consolidated messes were established at Ft. Myer, Key West Barracks, Ft. Schuyler, Ft. Warren, and Willets Point. In response to critics of the consolidated mess, the Quartermaster General recommended no further construction of the consolidated mess "until time and further trial have removed the objections brought against it." The Quartermaster General maintained that the introduction of "scientific" cooking would improve the health and well-being of the troops.<sup>12</sup>

Examples of the consolidated mess were identified at Forts Bliss, McPherson, and Riley. At Ft. Bliss, Texas, the mess hall building is located between two two-company barracks. The T-shaped building is composed of a two-story principal block and a one-story rear kitchen wing (Figure III-120). A Quartermaster Department plan for a mess hall at Ft. Crook (now Offutt AFB), Nebraska, indicates that the second floor offices held a school room and a library. At Ft. Riley, Kansas, the mess hall was located between two groups of barracks. By 1904, post plans indicate that the building was converted to a post exchange and gymnasium, and that rear wings were added to two of the barracks, probably for the addition of mess rooms and kitchens to the barracks.<sup>13</sup>

The Army generally abandoned consolidated messes after 1896 and returned to the practice of including kitchens and mess rooms for each company within barracks.<sup>14</sup> Consolidated messes did not regain popularity during the 1930s era of Army construction. Permanent barracks constructed during the 1930s contained their own kitchens and mess rooms. One exception was at Randolph AFB, Texas, an Army Air Corps training field, at which a separate mess building was built for the cadets behind the cadet barracks. The Randolph mess hall was designed in the same Spanish Colonial architecture as the other buildings of the airfield (Figure III-120). During mobilization for the First and Second World Wars, the Army constructed separate mess halls at its mobilization cantonments; these mess halls were built according to standardized plans using temporary, wood-frame construction.

### Navy and Marine Corps

During the nineteenth-century, the Navy maintained few shore-based personnel, and consequently built few barracks or mess halls. No nineteenth-century mess halls were identified on naval facilities during the field surveys conducted for this study. The Marine Corps established small reservations near Navy yards with barracks for the marines who provided security for the yard; the mess facilities were located within the barracks.

When the Navy and the Marine Corps began to establish permanent training stations, air stations, and recruit depots, the services began to construct barracks and accompanying mess halls. In some instances, such as at the U.S. Naval Academy in Annapolis and the Marine Corps Recruit Depot in San Diego, the mess hall was located in the barracks. At other installations, such as the Naval Training Station in San Diego, the Navy constructed a separate mess hall at the center of the training complex (Figure III-121). At the Marine Corps Recruit Depot at Parris Island, South Carolina, a separate mess hall was located behind the barracks (Figure III-121). The mess halls displayed architectural design similar to the barracks buildings of the installations.

### **Association**

Mess halls often are major support buildings at installations. Mess halls are associated with the evolution of living standards for military personnel and with the development of installation support facilities. The construction of mess halls is related to the historical development of the services. At Army installations, detached mess halls usually are related to a distinct period of construction during the late nineteenth century. At Navy and Marine Corps facilities, mess halls are part of the expansion of shore-based facilities that accompanied the growth of those services and their missions. The mess hall building often reflects the influence of civilian architecture on military designs and usually is similar to the barracks architecture. Mess halls generally do not possess individual significance, but may be major contributing elements to an installation historic district.

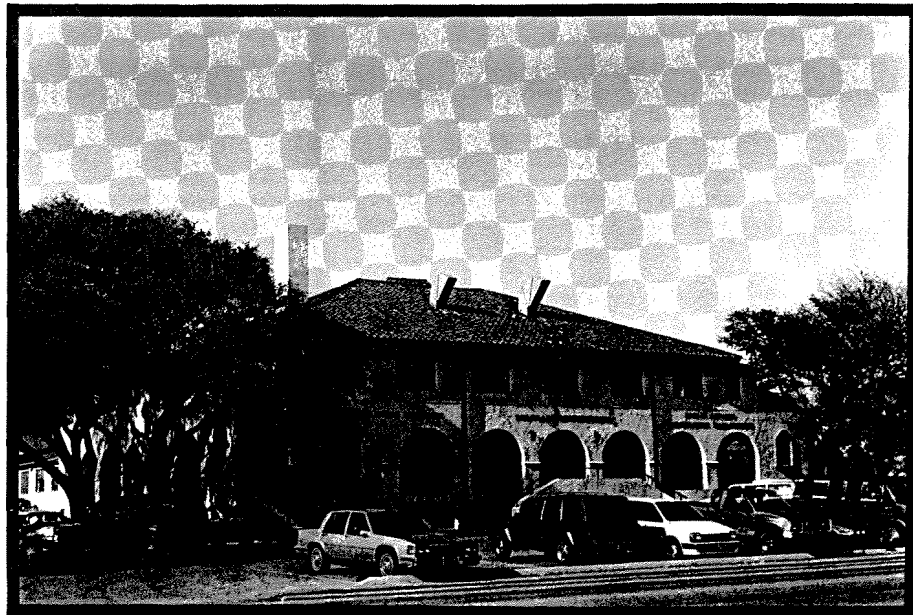
### **Integrity**

To possess integrity, mess halls should retain their physical relationship to adjacent barracks and most of their architectural ornamentation, design features, and external construction materials from the period of significance of an historic district. Few mess halls retain their original use. Most have been modified to serve administrative or recreational uses. Major changes include the removal of porches and the modification of window and door openings and materials. Where subsequent additions or renovations have occurred, mess halls still may have integrity if they retain their location and the majority of their setting, materials, design, and association. In

most cases, even with major modification, mess halls may be contributing elements in an historic district as supporting buildings related to a barracks complex.







**Figure III-120.** 1893 Consolidated mess (Building 21, Ft. Bliss, Texas), *above*.  
1931 Cadet mess (Building 905, Randolph AFB, Texas), *below*





**Figure III-121.** 1921 - 1922 Mess hall (Building 1, Naval Training Center, San Diego, California), *above*. 1939 Mess hall (Building 149, Marine Corps Recruit Depot, Parris Island, South Carolina), *below*.



## Family Housing:

### Non-Commissioned Officers (NCO) Housing

#### Description

The military constructed family housing to serve married officers and non-commissioned officers. By the mid-twentieth century, the Army eventually developed a family housing program for non-commissioned officers, while the Navy discouraged enlisted personnel and even petty officers from marrying. No examples of family housing for Navy or Marine Corps non-commissioned officers or enlisted personnel were identified during this study. Army family housing is stratified according to rank. Non-commissioned officers family housing was located in separate areas on Army posts apart from the officers housing area and the parade ground. The housing generally was designed as simpler versions of the predominant architecture of an installation.

#### Evolution

##### Army and Army Air Corps

The Army provided few quarters for family housing before the Civil War. Permanent barracks and officer housing was constructed at installations, such as coastal fortifications, armament factories, education facilities, and some western posts, intended for use over several years. Non-commissioned officers typically were assigned single rooms within the enlisted mens barracks. Detached houses for non-commissioned officers and their families were not constructed until the second half of the nineteenth century. While the Army tolerated NCO marriages before 1940, it actively discouraged and even prohibited enlisted men from marrying until World War II.

NCO family housing first was provided for specific senior NCOs. The earliest examples included houses for the commissary sergeant, the ordnance sergeant, or the quartermaster sergeant. Early NCO quarters were constructed cheaply of available materials, such as the one-story, frame housing provided to pickets at Ft. Sill, Oklahoma (Figure III-122). Other examples were constructed as simpler versions of the installation officer housing (Figure III-122). In 1888, Congress approved budget allowances for the construction of hospital stewards quarters. Before this time, hospital stewards had lived in a room in the hospital building.<sup>15</sup> After 1888, hospital stewards quarters were a typical component of hospital complexes on Army posts (Figure III-123).

The Army made no systematic effort to provide standardized housing for non-commissioned officers before the 1880s. Plans for NCO housing were not included in the proposed 1860 regulations or in the 1872 proposed Quartermaster plans. The experience of NCOs at Ft. Robinson, Nebraska, from the 1870s through the 1890s may have been typical. The families of enlisted men found housing through a variety of expedients. The soldiers' wives who were employed as laundresses lived in a row of shacks. Other families divided unused barracks buildings. As officer housing was improved, enlisted men and their families moved into abandoned officer quarters.<sup>16</sup>

The Army began to include permanent housing for senior NCOs at the larger consolidated installations constructed starting in the 1880s through the turn-of-the-century. The Quartermaster Department also began to develop standardized plans for NCO housing at this time (Figure III-123). The Quartermaster Department built both detached single-family and duplex NCO housing (Figure III-124). Duplexes were the most common housing type for NCOs between 1890 and

World War I (Figure III-125). Most installations during this era had no more than approximately half a dozen houses for NCOs and their families. NCO housing was next to the area where the resident NCO worked, for example, the hospital steward's house next to the hospital (Figure III-125). NCO housing also was constructed in distinct NCO housing areas, usually a few hundred feet behind the barracks; the NCO housing in these areas typically consisted of a row of three to five houses. Unlike the barracks and officers quarters, NCO housing was not located around the parade ground.

During the 1920s, the Army suffered from a severe nationwide housing shortage. After a Congressional investigation into the living conditions at dilapidated World War I mobilization camps, Congress enacted Public Law 45 in 1926, which allowed the Army to dispose of unneeded property and to use the funds to improve the posts it retained. The initial funds were directed specifically for the construction of hospitals, barracks, and NCO housing. During this period of inter-war construction, the Army built more NCO family housing than ever before in its history.

The installation construction funded by this new program incorporated the ideas of city planning through the organization of the component parts of the installation into distinct hierarchical areas within an overall plan. A planner with the Planning Branch of the Quartermaster Corps compared the NCO housing area to the "office worker area" of a city.<sup>17</sup> NCO family housing areas now constituted entire neighborhoods within increasingly large and complex installation plans. The Construction Service of the Quartermaster Corps developed standardized plans for NCO family housing that were comparable to small civilian suburban cottages and bungalows of the same era. The plans followed regional architectural styles, particularly the Spanish Colonial and Georgian Colonial Revival (Figures III-126 and III-127). The Army generally constructed the Georgian Colonial Revival from the Mid-Atlantic north to New England and west to the Northwest; the Spanish Colonial style housing was constructed in the hotter climates of the Southeast and Southwest. Two-story duplex NCO quarters remained popular, and one-story single-family cottages were introduced (Figures III-126 and III-127).

### **Association**

Non-commissioned officers quarters are associated with the maintenance of a standing Army and with the evolution of living standards for military personnel. The construction of non-commissioned officer housing directly reflects the history and status of the military during their period of construction. Non-commissioned officer housing provides an insight into the hierarchy of the military and contributes to cantonment historic districts. The design of non-commissioned officer housing reflects the influence of civilian architecture on military designs. NCO quarters often are contributing elements in an installation historic district, or may constitute a distinct historic district. NCO quarters also may possess individual significance if it embodies the distinctive characteristics of a type or period of construction.

### **Integrity**

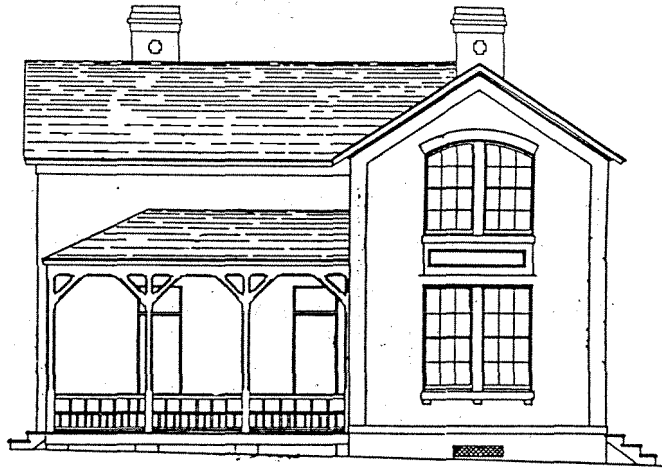
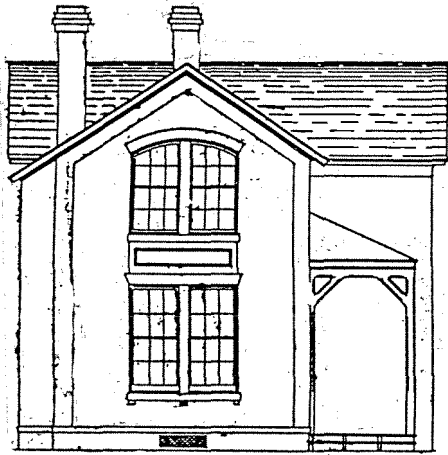
To possess integrity, non-commissioned officer housing should retain its location and most of its design, setting, materials, workmanship, and association from the period of significance of the property. Most NCO quarters have been used as dwellings throughout their history. The buildings often have undergone modifications to meet modern living standards. Typically modified exterior features include porches, windows, and roof materials. In cases of subsequent additions or alterations, NCO housing still may have integrity if it retains its setting, overall design, the majority of its materials, and the majority of its architectural features.



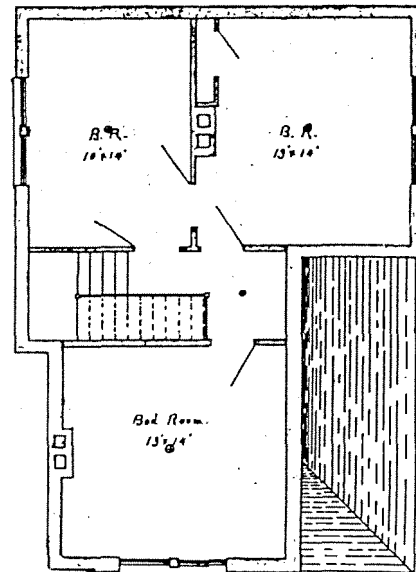
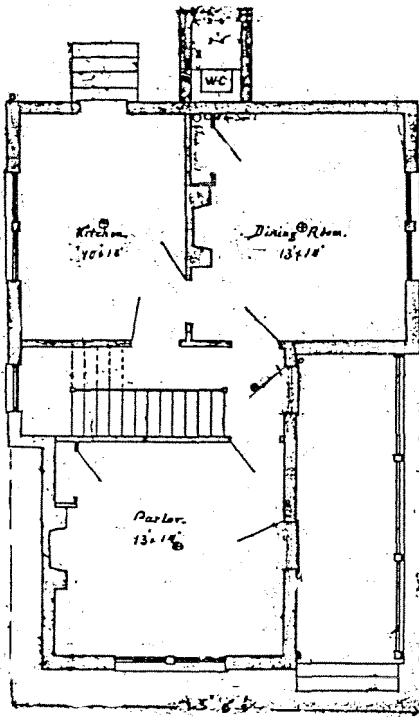
**Figure III-122.** 1870s Pickets quarters (Building 380, Ft. Sill, Oklahoma), *above*.  
NCO quarters constructed between 1870 and 1872 (Building 348, Ft. Sill, Oklahoma), *below*







*Side Elevation.*

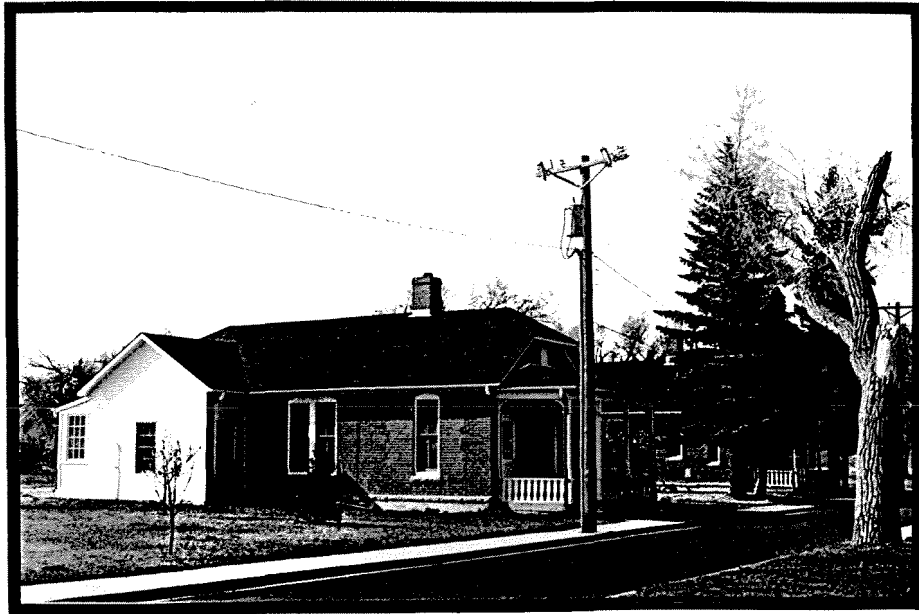


NON COM OFFICERS QUARTERS.

*Scale 3/4 of one inch to one foot.*

**Figure III-123.** 1887 plan for NCO housing issued by the Quartermaster Department. This plan was used both for hospital steward's quarters and for housing for other non-commissioned officers. (From National Archives, Record Group 77, Fortification Files, Ft. McPherson, Georgia)





**Figure III-124.** 1885 One-family NCO quarters (Building 275, F.E. Warren AFB [formerly Ft. D.A. Russell], Wyoming), *above*. 1889 Duplex NCO quarters (Building 166, Ft. Riley, Kansas), *below*





**Figure III-125.** Typical NCO housing constructed from standardized Quartermaster plans during the first decade of the twentieth century (Building 153, constructed in 1903, Ft. Riley, Kansas), *above*. Hospital steward's quarters constructed between 1908 and 1910 (Building 2008, Ft. Sam Houston, Texas), *below*

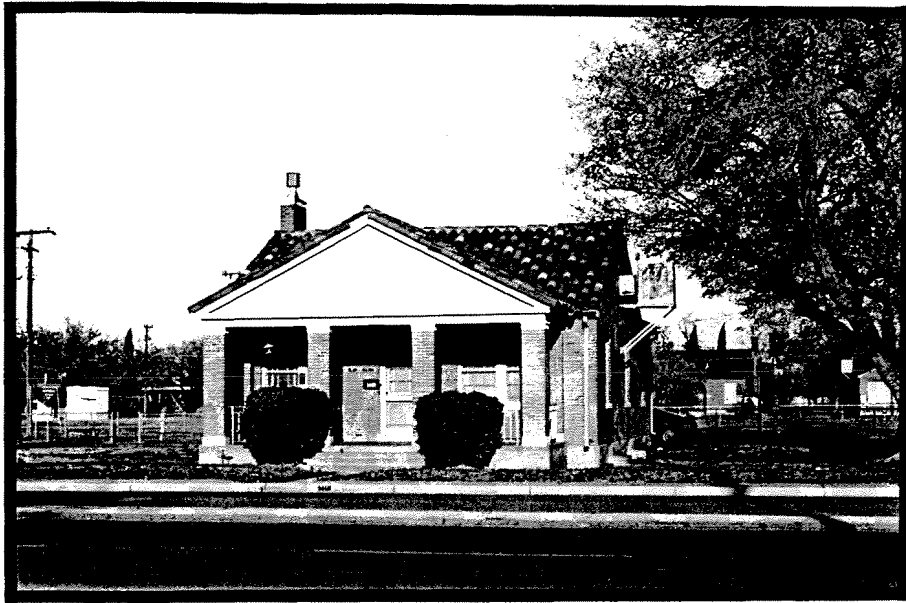




Figure III-126. 1931 NCO quarters duplex, Georgian Colonial Revival standardized plan (Building 671, Scott AFB, Illinois), *above*. 1931 NCO quarters duplex in Spanish Colonial Revival (Building 817, Randolph AFB, Texas), *below*







**Figure III-127.** 1933 NCO quarters, Spanish Colonial standardized plan (Building 1401, Ft. Bliss, Texas), *above*. 1934 NCO quarters, Georgian Revival standardized plan (Buildings 423 and 424, Ft. Knox, Kentucky), *below*



## Family Housing:

## Officer Housing

### Description

The military constructed officer family quarters on the majority of its installations with residential populations. Officer housing is stratified according to rank. Each installation generally had one house for the commanding officer and additional housing for other officers. Officers quarters were a prominent component of military installations and usually were major buildings on installations. Their architectural character reflected their period of construction and the anticipated permanence and importance of the installation. Simple houses were built at frontier posts, while departmental headquarters or shipyards often received larger, more ornate senior officer housing. The evolution of officer housing illustrates the military's adaptation of contemporary architectural trends in the military's construction program.

### Evolution

#### Army and Army Air Corps

The Army began to construct family housing for officers at its permanent installations during the early nineteenth century. The earliest officers quarters were built at permanent installations such as the Third System coastal fortifications, armament factories, education facilities, and permanent western posts. The small size of the garrisons posted to these early installations necessitated few quarters. The earliest quarters display diversity in size and architectural detailing, depending on available funding and the rank of the resident. Installations generally included a single-family dwelling for the commanding officer and multiple-family dwellings for junior officers (Figure III-128). An officer and his wife were assigned two rooms in the quarters, which typically consisted of a two-story building with rooms opening onto a veranda (Figure III-129).

The Army began to develop standardized plans for many basic property types, including officers housing. In 1860, unofficial regulations for Army construction were drafted that included plans for officer housing. The 1860 regulations, though never officially adopted, seem to have recorded existing Army construction and housing practices. The assignment of quarters according to rank is clearly established. The 1860 proposed regulations prescribed single quarters for field officers and captains, and duplex housing for junior officers. The plans depict houses with simple features that could be constructed from a variety of local materials (Figure III-130). The 1860 proposed regulations also contained a prototypical post plan, which depicted officer housing along the side of the parade ground facing the barracks.<sup>18</sup> During the nineteenth century, this was the typical location of officer housing.

In contrast with the concurrent effort at standardization, special branches within the Army were responsible for the construction of their installations and did not employ the Quartermaster Department or Quartermaster plans. For example, officers of the Ordnance Department were responsible for the construction of arsenals. Due to higher levels of funding and lack of standardization, Ordnance Department installations sometimes displayed grander and more varied design than commonly was found at other Army posts. Thomas Rodman designed Watertown Arsenal, Massachusetts, and Rock Island Arsenal, Illinois. The imposing, stqne, Italianate commanding officers residence at Rock Island, completed in 1871, has over fifty rooms and is the largest family quarters owned by the Army (Figure III-131).<sup>19</sup>

In 1872, the Quartermaster General, Montgomery C. Meigs, proposed standardized plans for post construction, including officer housing (Figures III-132 and III-133). Meigs hoped to control costs and to establish consistent construction standards at the expanding number of Army posts. Western frontier posts were particularly notorious for their poor living conditions. The plans for officers quarters in the 1872 proposed plans are larger and show more attention to architectural detailing than the 1860 plans.<sup>20</sup> Quarters were constructed at many western posts, sometimes as depicted in the plans, as at Ft. Sill, Oklahoma, and sometimes with local variations on the exterior, as with the Gothic Revival version of the standard plan built at Ft. Douglas, Utah (Figure III-134).

During the 1880s and 1890s, the Army began to close the numerous small, scattered, temporary western posts and to consolidate its troops into larger, permanent posts. The Army initiated major building projects for new facilities and for expansion of older posts that were retained. The Quartermaster Department made a concerted effort to construct buildings of greater architectural stature that projected an increased awareness of the prestige of the military. In some cases, professional architects were employed to design installations. These architects designed larger, more elegant officer housing in contemporary, nationally popular architectural styles, including Italianate, Romanesque Revival, and Queen Anne (Figure III-135).

During the late 1890s, the Army began another effort to standardize officer housing for better cost control. Beginning in the late 1890s and continuing through the first decade of the twentieth century, the Army constructed the same officer housing designs on most Army posts with very little individual modification. Colonial Revival architecture dominated Army construction of this era. Like their civilian contemporaries, the early examples of Colonial Revival architecture at Army posts are not historically accurate re-creations of early American architecture, but interpretations that mix colonial precedents with some elements of the Queen Anne and other eclectic styles. Character-defining features of Army housing of this era include cornices with dentil molding, pediments, columns, and jack arches over windows (Figure III-136). In the west and southwest, the Quartermaster Department experimented with Spanish Colonial and Mission architectural styles.<sup>21</sup>

The Army also issued regulations in the early twentieth century to standardize the assignment of quarters. These regulations helped to limit the circumstances under which a senior officer could displace a junior officer from his quarters. The regulations directed the post quartermaster to assign quarters to each officer according to his rank. At posts with insufficient housing, the commander could apply to the Secretary of War for the authority to lease the necessary quarters.<sup>22</sup>

During the 1920s, the Army suffered from a nationwide housing shortage. The Quartermaster Corps constructed few officer family quarters, and those constructed were criticized severely. The quarters constructed at Ft. Benning were considered unsuitable for the hot Georgia summers (Figure III-137).<sup>23</sup> After a Congressional investigation into living conditions on Army posts, the U.S. Congress enacted Public Law 45 in 1926, which allowed the Secretary of War to build new installations from money obtained by selling unneeded posts. After passage of this law, the Army embarked on a massive building program. In 1933, the government further expanded the construction program through the appropriations of Depression-era public works funds for additional construction at military installations.

The installations constructed and expanded during the 1930s were much larger than previous installations, and thus were organized differently. The buildings were no longer arranged around a central parade ground. Officers housing, instead of lining one side of the parade ground, was arranged in areas that one planner referred to as "executive living area[s]" arranged in neighborhoods around curving streets and parks.<sup>24</sup>

The Construction Service of the Quartermaster Corps developed standardized plans for this new wave of construction that were designed to respond to the local climate and to reflect local architectural history. The architects also devoted attention to designing comfortable, modern houses. Georgian Colonial Revival was used for installations located from New England to Virginia, in the Midwest, and in the Pacific Northwest (Figure III-138). Spanish Colonial Revival housing was built in the South, Western Plains, Southwest, and California (Figure III-139). Other regional designs included French Provincial in the Gulf States and a few examples of English Tudor Revival (Figure III-140).<sup>25</sup>

The officers housing, though standardized, displayed a variety of types. Two-story quarters were the most common, but the Construction Service also designed one-story bungalow designs (Figure III-141). Duplex housing, which had been the common type for company officers prior to the First World War, was replaced by more single-family housing. The Army also began constructing more small apartment buildings, similar to garden apartment units. During the early 1900s, the Quartermaster Department had started to build apartments, usually four-family buildings, at consolidated, permanent posts (Figure III-142). The quartermaster proposed that apartments would appeal to officer wives because an apartment would not require maid service or major individual cooking facilities. However, the apartments were not a success. Army wives claimed to prefer single-family dwellings. During the 1930s construction era, the Quartermaster again constructed four-family apartment buildings for student officers at training and educational installations (Figure III-142).<sup>26</sup>

The new housing program officially came to an end on June 15, 1940, when the War Department halted all family quarters construction in preparation for the wartime mobilization.<sup>27</sup> Despite these orders, limited family housing construction was completed in the second half of 1940, notably at several Army Air Corps depots, where streamlined, Art Moderne designs were introduced (Figure III-143). These last designs before the start of World War II presaged the more minimalist designs favored during the post-war years.

## Navy

Most Navy personnel lived aboard ship during the nineteenth century. The Navy initially constructed family housing only for commanders and a few other senior officers at Navy yards and hospitals. Nineteenth- and early twentieth-century naval facilities typically have a Quarters A, the residence of the commanding officer, and a few other quarters for officers located either next to the commandant's house or near the installation activity that the resident officer supervised. The Navy did not use standardized plans for its housing construction. Though designs sometimes were repeated at an installation, identical designs were not constructed at different installations. Nineteenth-century naval officer family housing often displays high-style architecture comparable to civilian residential design from the same period.

The earliest housing for naval officers was located at Navy yards. The earliest examples of these quarters are large, two-story buildings executed in Federal or Greek Revival architectural styles. The Commandant's Quarters at the Portsmouth Navy Yard was constructed in 1818; it is a prominent, front-gabled house located on rise with an elaborate gate marking the entrance to the walkway (Figure III-144). The Commandant's house at the Washington Navy Yard in the District of Columbia is a brick Federal-style house constructed in 1837 (Figure III-145). At the Norfolk Navy Yard, Virginia, three senior officers quarters were built between 1827 and 1837; the Flemish-bond brick houses have simple, Greek Revival detailing. The Norfolk quarters were designated as the houses for the Commandant, Master Commandant, and Surgeon.<sup>28</sup>

Throughout the nineteenth century, the Navy followed this practice of constructing only a limited numbers of quarters for senior officers following a variety of architectural styles, depending on the popular architecture of the day. At Pensacola Navy Yard, Florida, the 1874 Commandant's Quarters was executed in an Italianate design (Figure III-146). The Naval War College President's House at Newport, Rhode Island, is an early example (1896) of Colonial Revival design (Figure III-146). At the new Puget Sound Navy Yard, the officers quarters are wood-frame buildings with neoclassical detailing (Figure III-147). The Navy also began to construct duplex housing at the end of the nineteenth century (Figure III-148).

During the early twentieth century, the Navy undertook a major expansion program to improve existing facilities and to construct new installations. Classical Revival designs in the Beaux Arts academic tradition dominated this era of naval construction. Between 1900 and 1910, the Navy selected prominent civilian architects to design new installations, such as the Naval Training Station, Great Lakes, Illinois, and to rebuild the U.S. Naval Academy. These architects were influenced by the contemporary popularity of the Ecole des Beaux-Arts in their choice of architectural design motifs and in the formal planning of each installation. Jarvis Hunt designed the Great Lakes training station in a Beaux Arts master plan with classically-inspired architecture. The officers housing was located in two distinct areas, a row of eleven residences behind the administration buildings overlooking the shore of Lake Michigan and three quarters for medical officers next to the hospital. At the U.S. Naval Academy, the Navy demolished nineteenth-century buildings and constructed a new officer education facility designed by noted architect Ernest Flagg. Flagg's officer quarters also display classical detailing and are located near the main educational area and near the hospital complex (Figure III-149).

The Navy constructed additional new installations after World War I, notably training, air, and ordnance stations. These facilities were designed according to master plans and the building design usually incorporated elements of the region's architecture. The number of officer quarters increased greatly in comparison to nineteenth-century levels. The need for shore-based personnel rose as the Navy expanded, developed more extensive training programs, and adopted new technologies, particularly aviation. During the 1920s, the Navy established several installations in the San Diego area of California; these facilities were designed as cohesive installations with Spanish Colonial Revival architecture (Figure III-150).

During the 1930s, the Navy also added to existing installations. At the Charleston Navy Yard, South Carolina, the Navy adopted Army Quartermaster plans designed for the Panama Canal Zone.<sup>29</sup> The low-pitched roof, wide overhanging eaves, and porches were well suited to the hot, humid South Carolina climate (Figure III-150). During the 1930s, the Navy built a new training complex at Naval Air Station Pensacola. The officers housing for the training complex displays Georgian Colonial Revival architectural motifs and features such as wide verandas to accommodate the hot humid climate (Figure III-151). The Navy also constructed four-family apartment buildings at Pensacola for the student officers and their families (Figure III-151). The Navy did not adopt apartments as a common housing type at its installations.

### Marine Corps

The primary shore mission of the Marine Corps during most of the nineteenth century was to guard naval shipyards. At each naval yard, the Marine Corps maintained small, separate reservations that typically contained a barracks and a senior officer quarters. The senior officer quarters typically was a large, single-family house similar to senior naval officer housing of the same era. The oldest Marine Corps officers quarters is the Marine Corps Commandant's house constructed in 1801 at the U.S. Marine Corps Barracks in Washington, D.C. The house displays the characteristic features of Federal period architecture, such as symmetrical facade, arched door

surround with fanlight, and cornice molding; a mansard roof was added in 1891 (Figure III-152). Few other examples of nineteenth-century marine officers quarters remain extant.

After the Spanish American War (1898-1899), the Marine Corps began a major building program to improve and expand their facilities. This building program coincided with development of the Marine Corps into a separate fighting force that operated in its own formations in foreign expeditions. The Marine Corps began to employ civilian architects to design the buildings on their reservations. For example, the Marine Corps Barracks in Washington, D.C., were rebuilt between 1903 and 1907 according to the designs of the Washington, D.C. architectural firm of Hornblower and Marshall; the firm also may have designed the officer housing at the same time (Figure III-152). New Marine Corps reservations, including barracks and officer housing, were constructed at the U.S. Naval Academy, Maryland; Philadelphia Navy Yard, Pennsylvania; and Norfolk Navy Yard, Virginia (Figure III-153). The housing constructed during this period reflects the influence of classical or Colonial Revival architectural styles.

Following World War I, the Marine Corps expanded existing Installations and established new facilities. The increased size of the Marine Corps led to an expansion of recruit training and advanced educational facilities. These new facilities contained more officers housing than had been built at earlier marine installations. The design of the housing followed the same pattern of the other services: revival styles similar to contemporary suburban designs. During the 1920s, a recruit training depot was established at San Diego, which was built according to a master plan in a consistent Spanish Colonial Revival architectural vocabulary (Figure III-154). The officers housing was located in a separate area and consisted of five single-family residences. During the 1920s and 1930s, the Marine Corps added officer housing to its installations at Parris Island, South Carolina, and Quantico, Virginia. The officer housing at Quantico, designed in the Dutch Colonial Revival style, was arranged along curving, picturesque streets that contrasted with the geometric layout of the barracks housing area (Figure III-154).

### **Association**

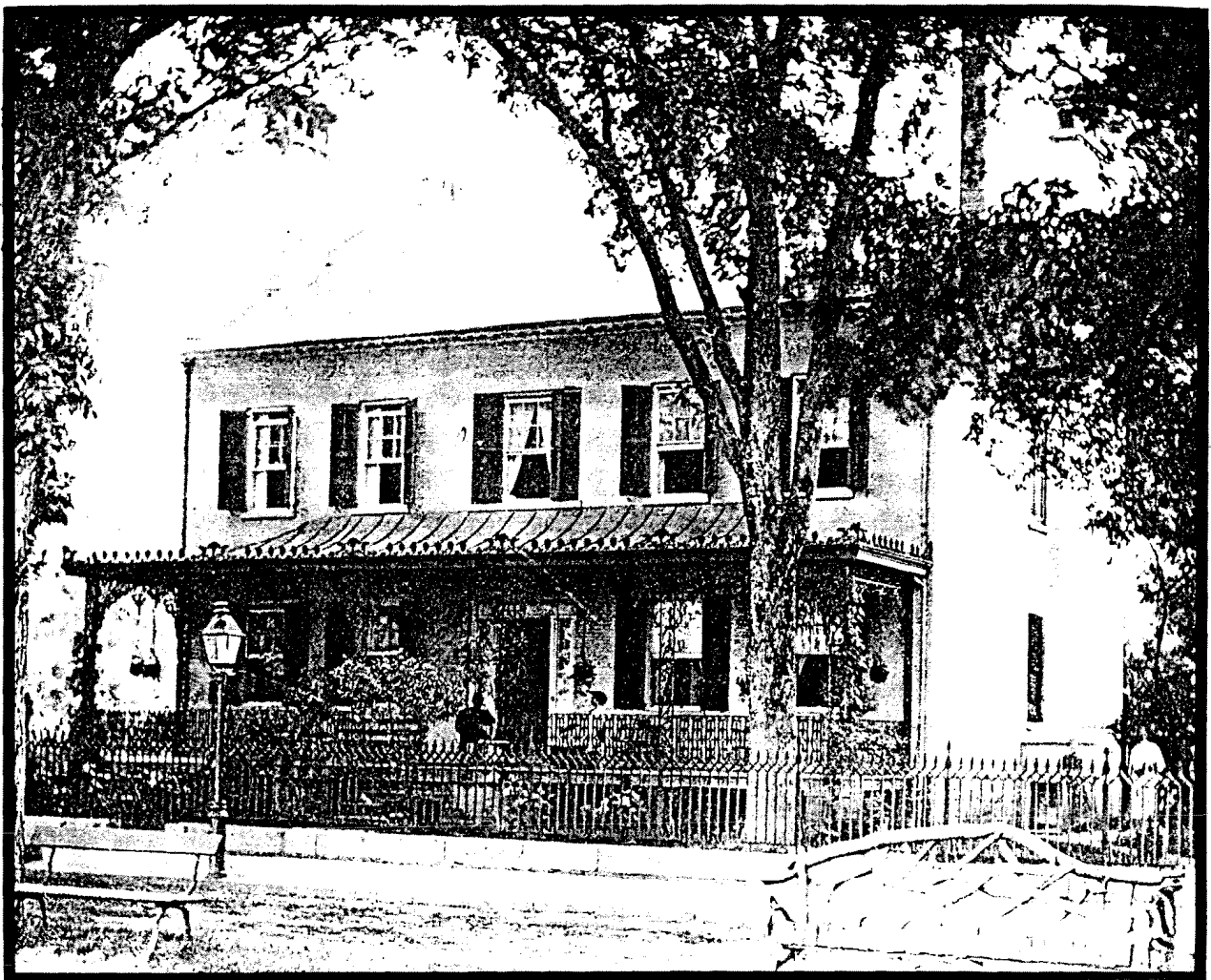
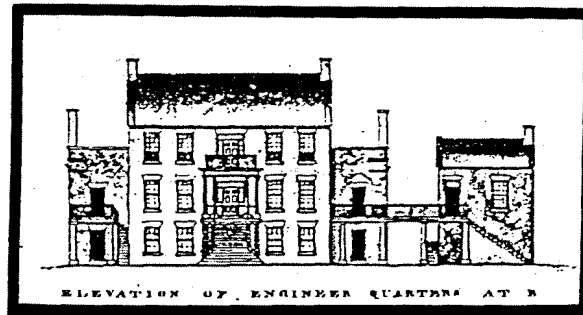
Officers quarters are associated with the evolution of living standards for military personnel. Officer housing construction directly reflects the history and status of the military during the period of construction. The design of officer housing was influenced by civilian architecture and the military's self-perception of its role and prestige. Officers housing typically is a major element in the installation plan and occupies a location that illustrates the hierarchical arrangement of life on military installations. An officers housing usually is a contributing element in an installation historic district, or can itself constitute an historic district. An officers quarters may possess individual significance if it embodies the distinctive characteristics of a type or period of construction, represents the work of a master builder or architect, or possesses high artistic values. In addition, officers housing may be associated with the military careers of important individuals.

### **Integrity**

To possess integrity, officers housing should retain its location and most of its design, setting, materials, workmanship, and association from the property's period of significance. Most officers quarters have been used as dwellings throughout their history, though the buildings often have undergone modifications to meet modern living standards. Typically modified exterior features include porches, windows, and roof and siding materials. In cases of subsequent additions or alterations, the quarters still may have integrity if it retains its setting, overall design,

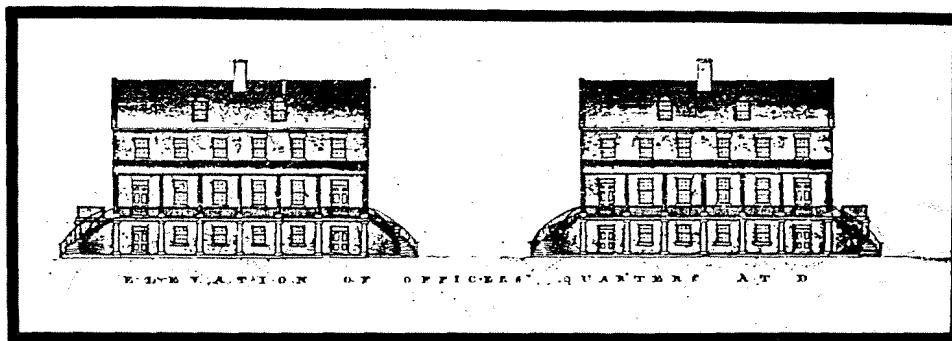
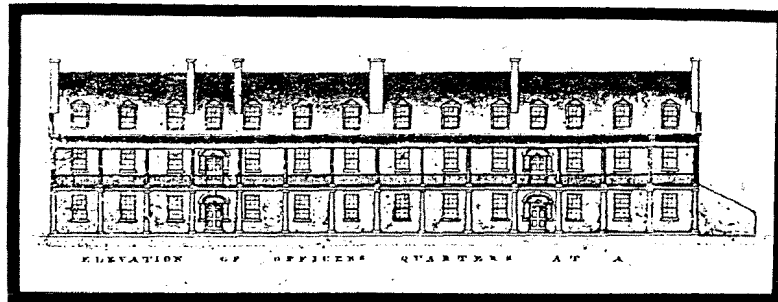


the majority of its materials, and the majority of its architectural features that convey the property's association with the period of significance.



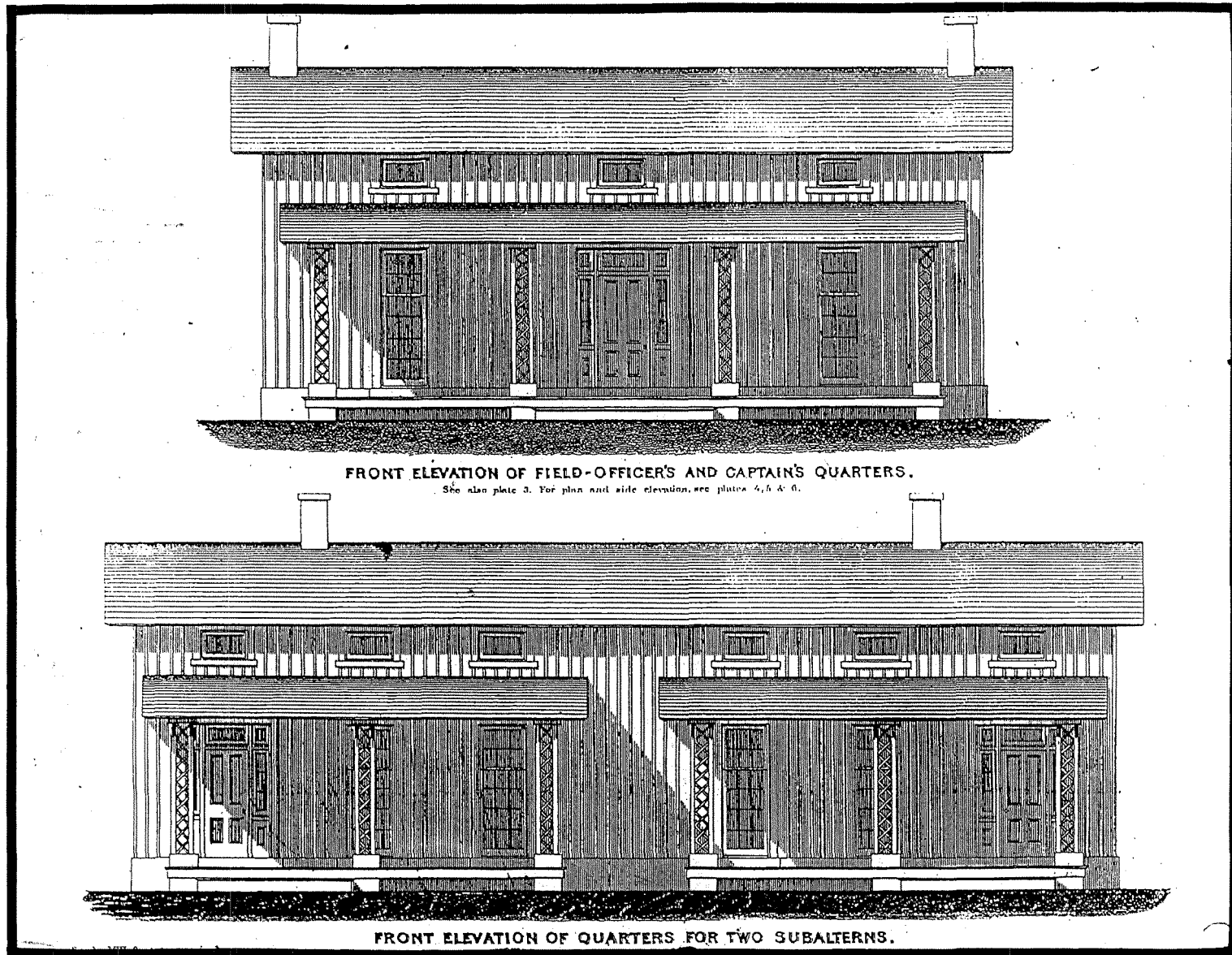
**Figure III-128.** 1819 Engineer Quarters (Building 1, Ft. Monroe, Virginia), *above*. (From National Archives, Record Group 77, Fortifications Files, Ft. Monroe, Virginia.) 1820 Superintendent's Quarters (U.S. Military Academy, West Point, New York), *below*. (Courtesy USMA Archives)





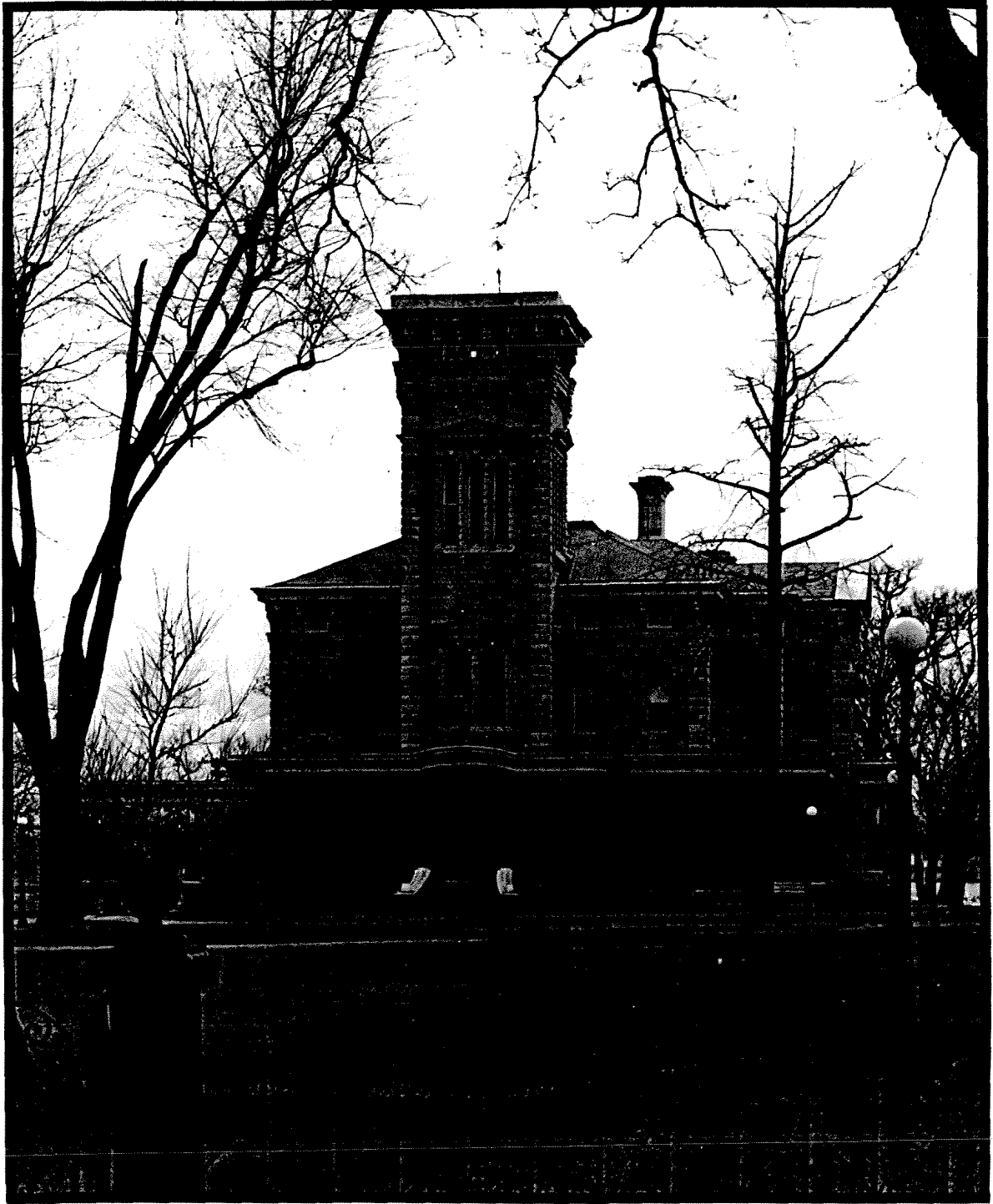
**Figure III-129.** Officers housing at Ft. Monroe, Virginia (no longer extant), *above*, and 1823 Officers quarters (Buildings 17 and 18, Ft. Monroe, Virginia), *middle*. (From National Archives, Record Group 77, Fortifications Files, Ft. Monroe, Virginia.) Ca. 1832 Officer housing (Building 19, Ft. Leavenworth, Kansas), *below*





**Figure III-130.** Proposed 1860 plans for officers quarters. From *Regulations Concerning Barracks and Quarters for the Army of the United States 1860*. Washington, D.C.: George W. Bowman, 1861





**Figure III-131.** 1871 Commanding Officer's quarters (Quarters 1, Rock Island Arsenal, Illinois) (U.S. Army Photograph)





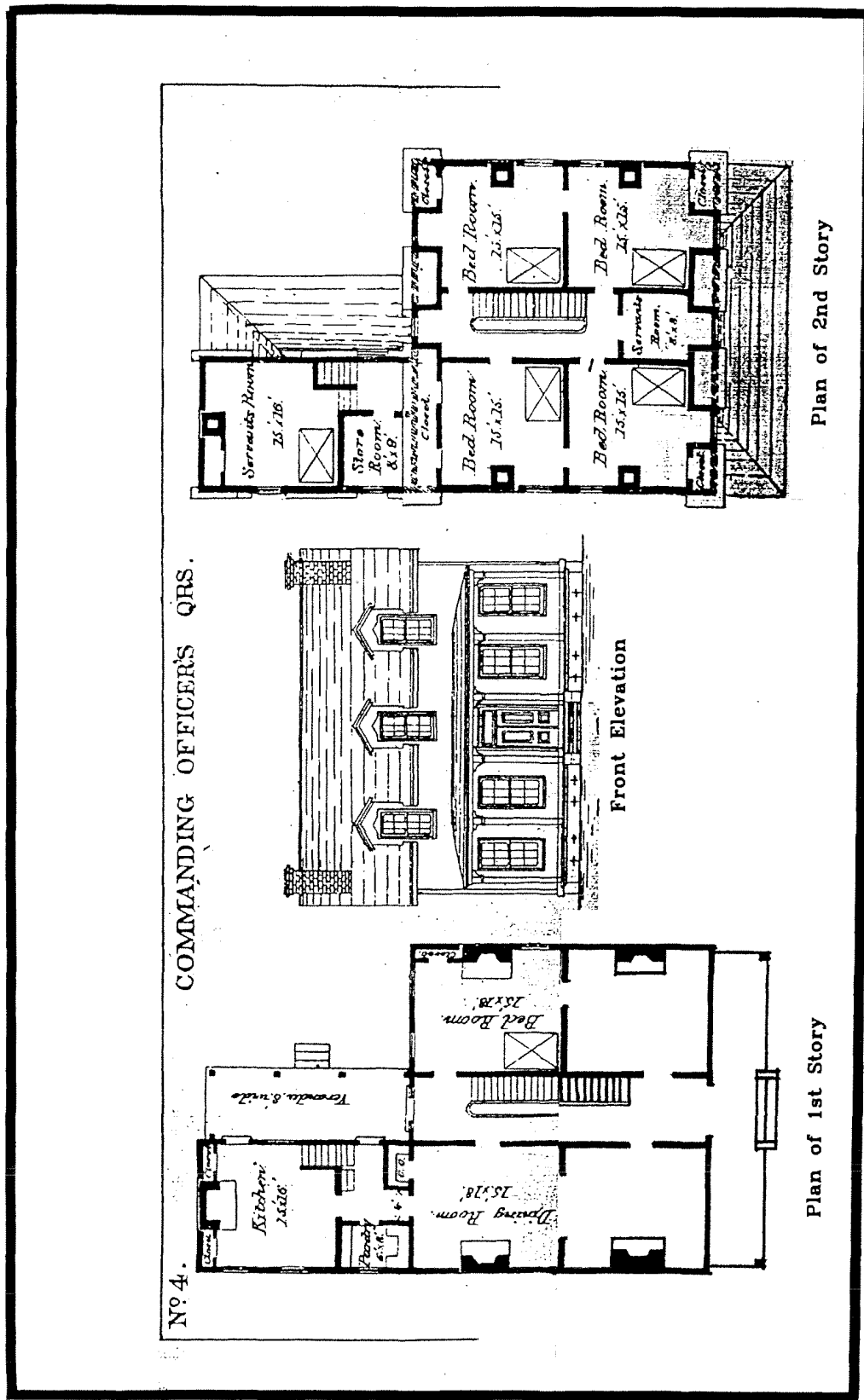


Figure III-132. Proposed 1872 Quartermaster plans for commanding officer quarters. (From War Department. *Annual Quartermaster Report*. Washington, D.C.: Government Printing Office, 1872.)



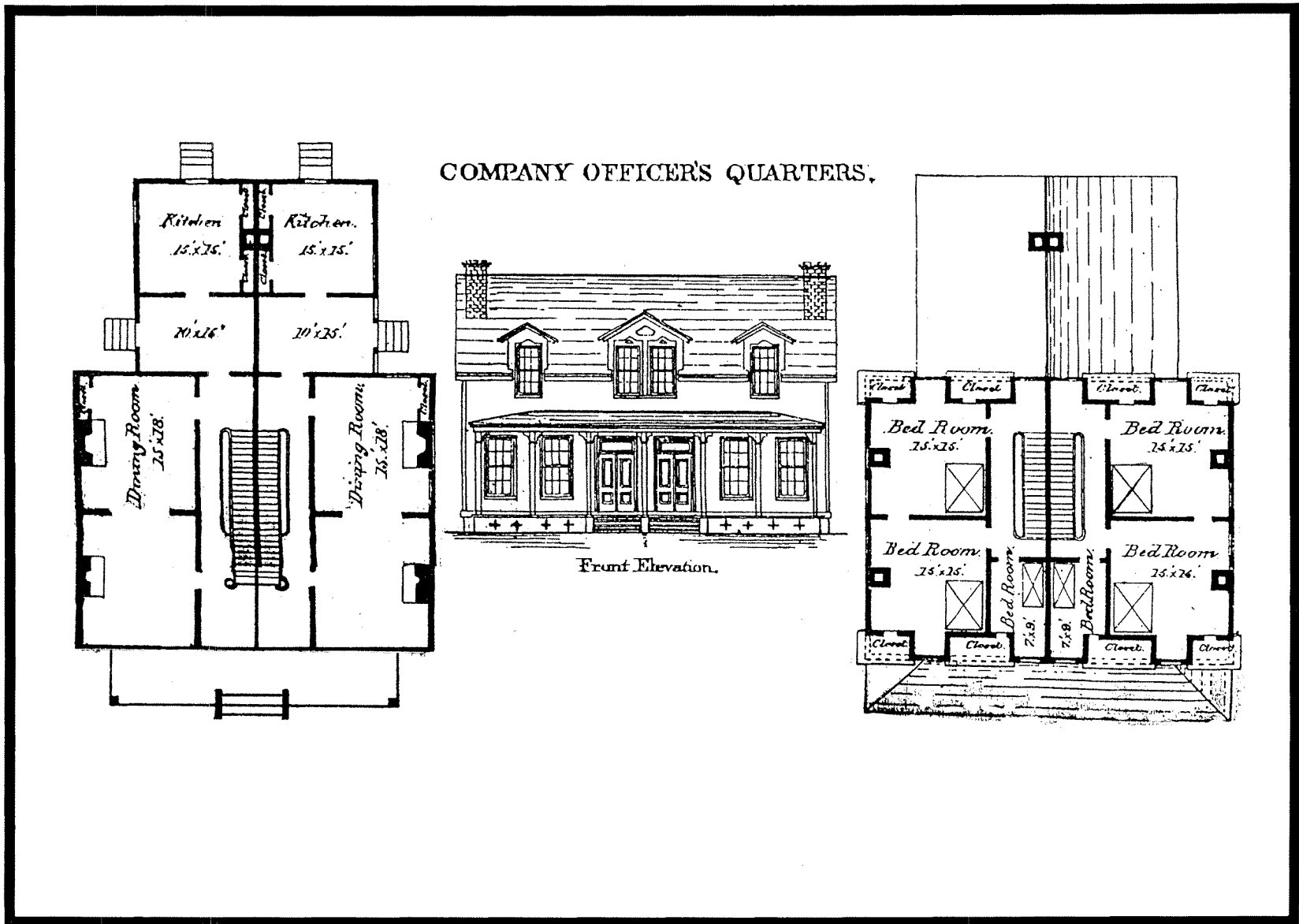
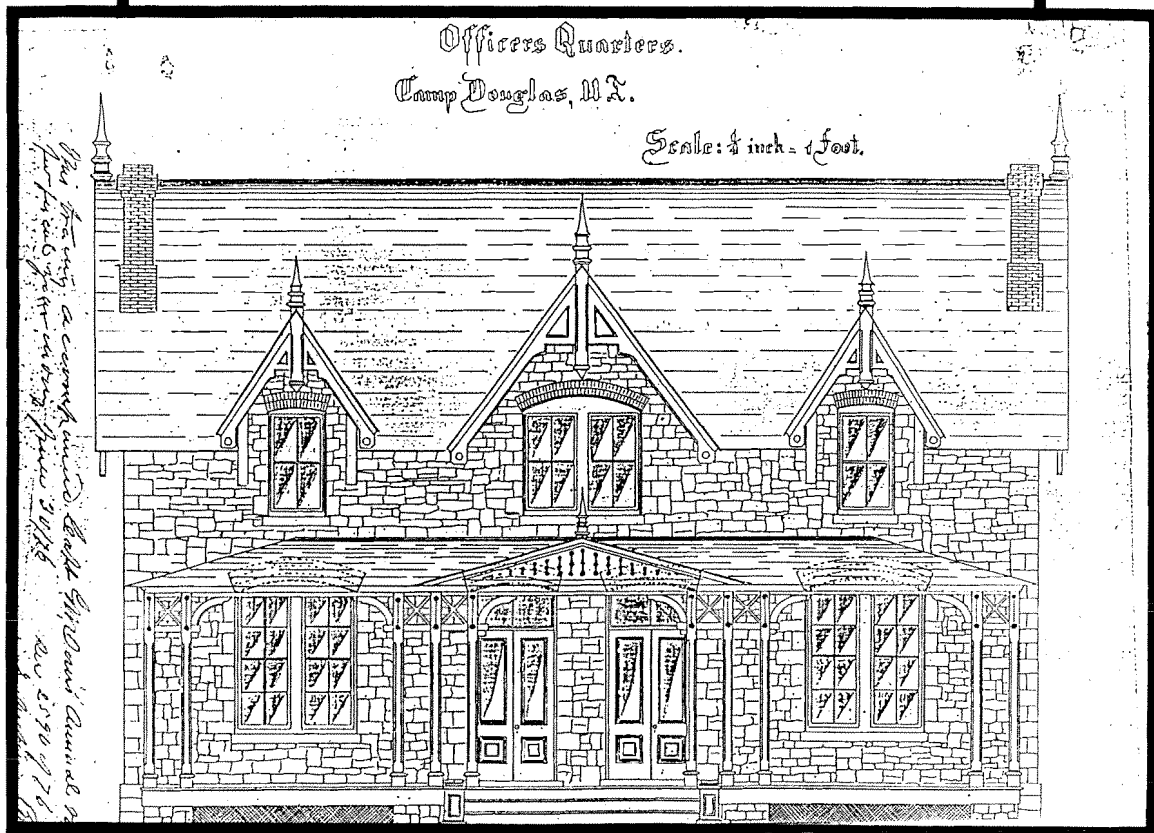
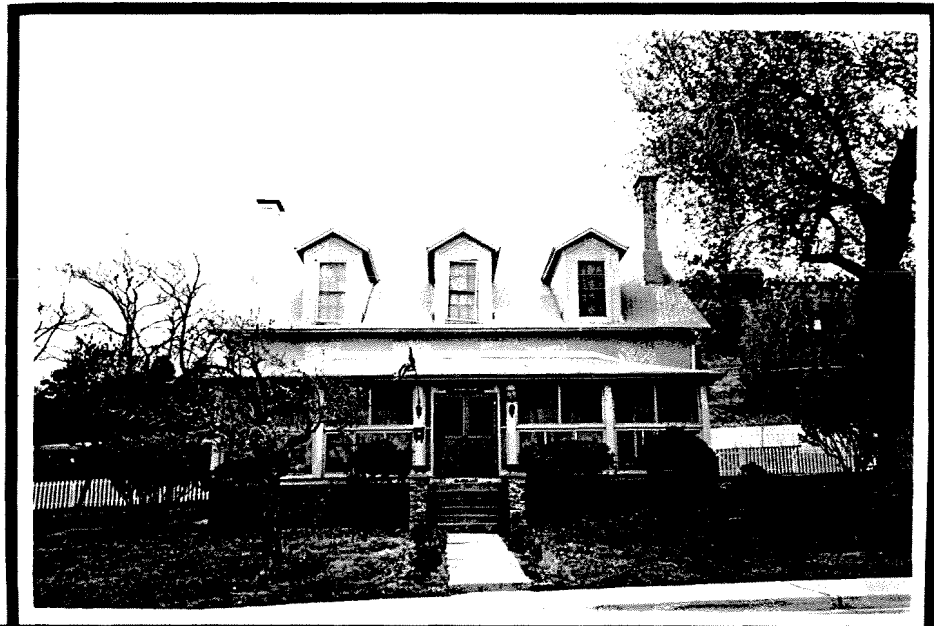


Figure III-133. Proposed 1872 Quartermaster plans for company officer quarters.  
 (From War Department. *Annual Quartermaster Report*. Washington,  
 D.C.: Government Printing Office, 1872.)





**Figure III-134.** 1886 officer housing (Building 22112, Ft. Huachuca, Arizona), *above*. 1876 version of standardized company officers quarters at Ft. Douglas, Utah (From National Archives, Record Group 77, Fortifications File, Ft. Douglas, Utah.), *below*





**Figure III-135.** 1887 Officers housing duplex (Building 25, Ft. Riley, Kansas), *above*. 1891 Italianate officers housing duplex (Building 14, Ft. McPherson, Georgia), *below*







**Figure III-136.** 1896 Commanding officer's quarters (Building 16, Offutt AFB [formerly Ft. Crook], Nebraska), *above*. 1894 Officer housing duplex (Building 14-15, Offutt AFB [formerly Ft. Crook], Nebraska), *below*





**Figure III-137.** 1923 Officers housing duplex in Dutch Colonial Revival style (Building 437, Ft. Benning, Georgia)





**Figure III-138.** 1935 Georgian Colonial Revival officers quarters (Building 408, Selfridge ANG, Michigan), *above*. 1936 Commanding Officer's quarters (Building 230, Ft. Monmouth, New Jersey), *below*





**Figure III-139.** 1931 Spanish Mission Revival officers quarters bungalow (Randolph AFB, Texas), *above*. 1934 Spanish Mission Revival two-story officers quarters (Building 544, Ft. Sam Houston, Texas), *below*

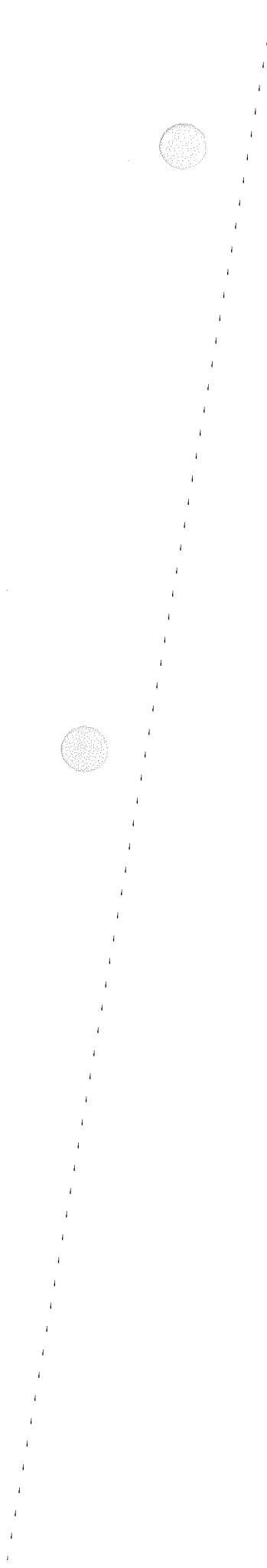


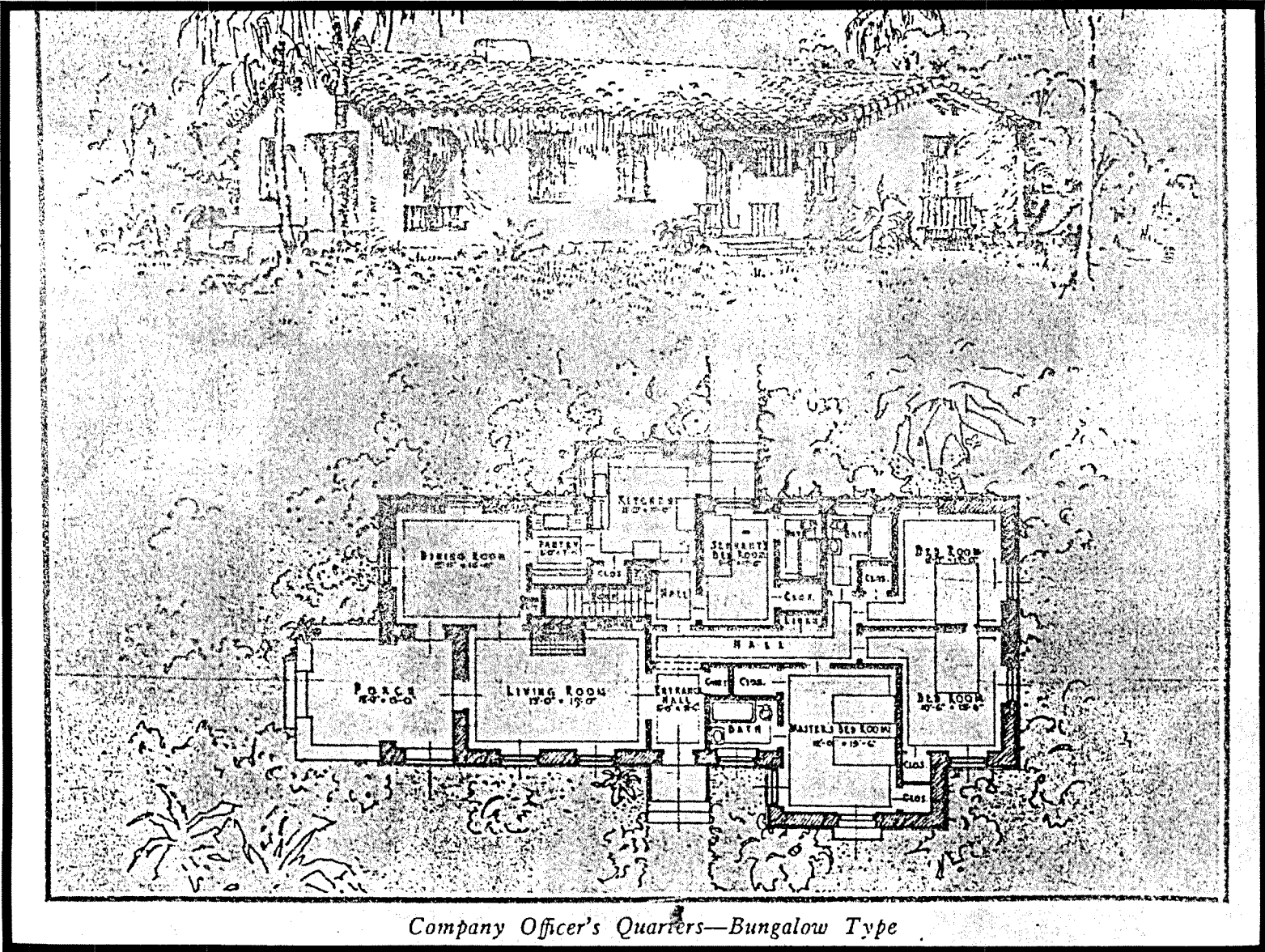




**Figure III-140.** 1935 Tudor Revival officers housing duplex (Building 318, Wright-Patterson AFB, Ohio), *above*. French Provincial officers quarters constructed during the early 1930s at Barksdale AFB, *below*. (Courtesy Louisiana Division of Historic Preservation)

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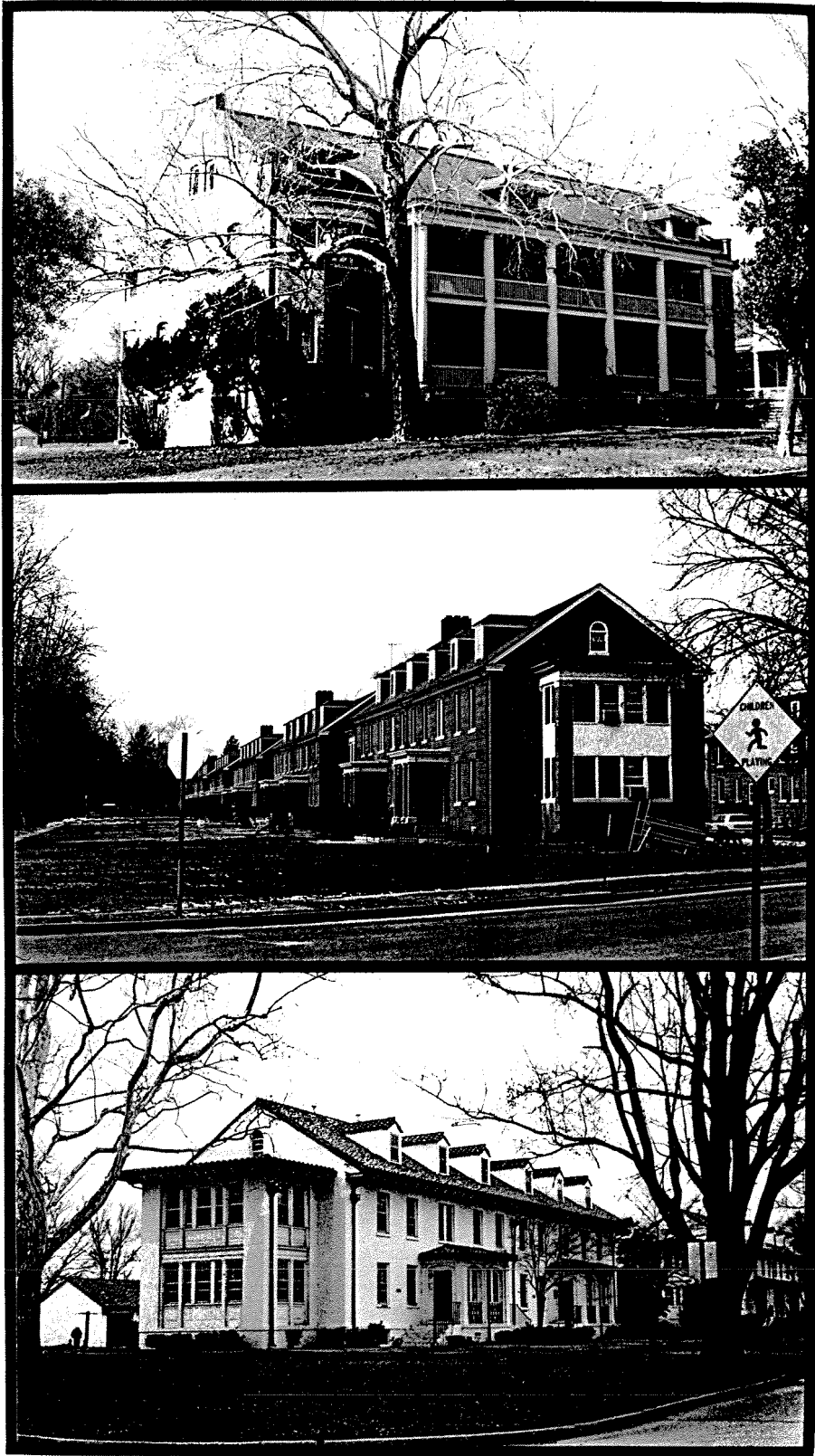




*Company Officer's Quarters—Bungalow Type*

Figure III-141. Company officers quarters -- bungalow type (From John S. Chambers. "Quarters for Our Army." *The Quartermaster Review*. March-April 1928:26.)





**Figure III-142.** 1911 Apartment building (Building 121, Ft. Sam Houston, Texas), *above*. 1930 Student officers apartment buildings (Buildings 261 and 262, Ft. Monmouth, New Jersey), *middle*. 1935 Student officers apartment building (Building 831, Ft. Benning, Georgia), *below*





**Figure III-143.** 1940 Officers quarters (Building 1758, Kelly AFB, Texas)



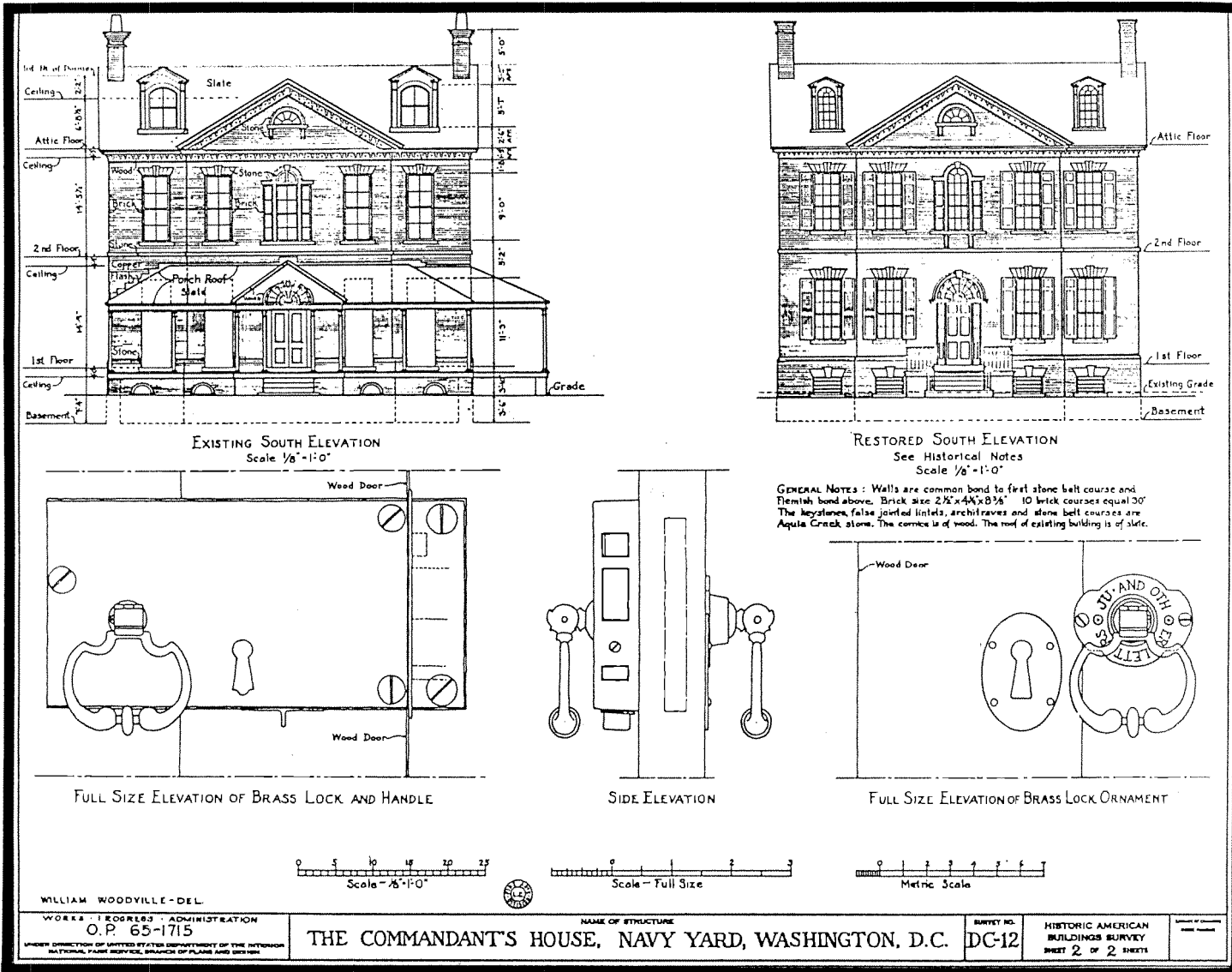




**Figure III-144.** Quarters A, constructed in 1818 at Portsmouth Naval Shipyard, Maine.  
(Courtesy U.S. Navy)



Figure III-145. 1837 - 1838 Commandant's House, Washington Navy Yard, Washington, D.C. (From Prints and Photographs Division, Library of Congress, HABS, DC, WASH, 74A)

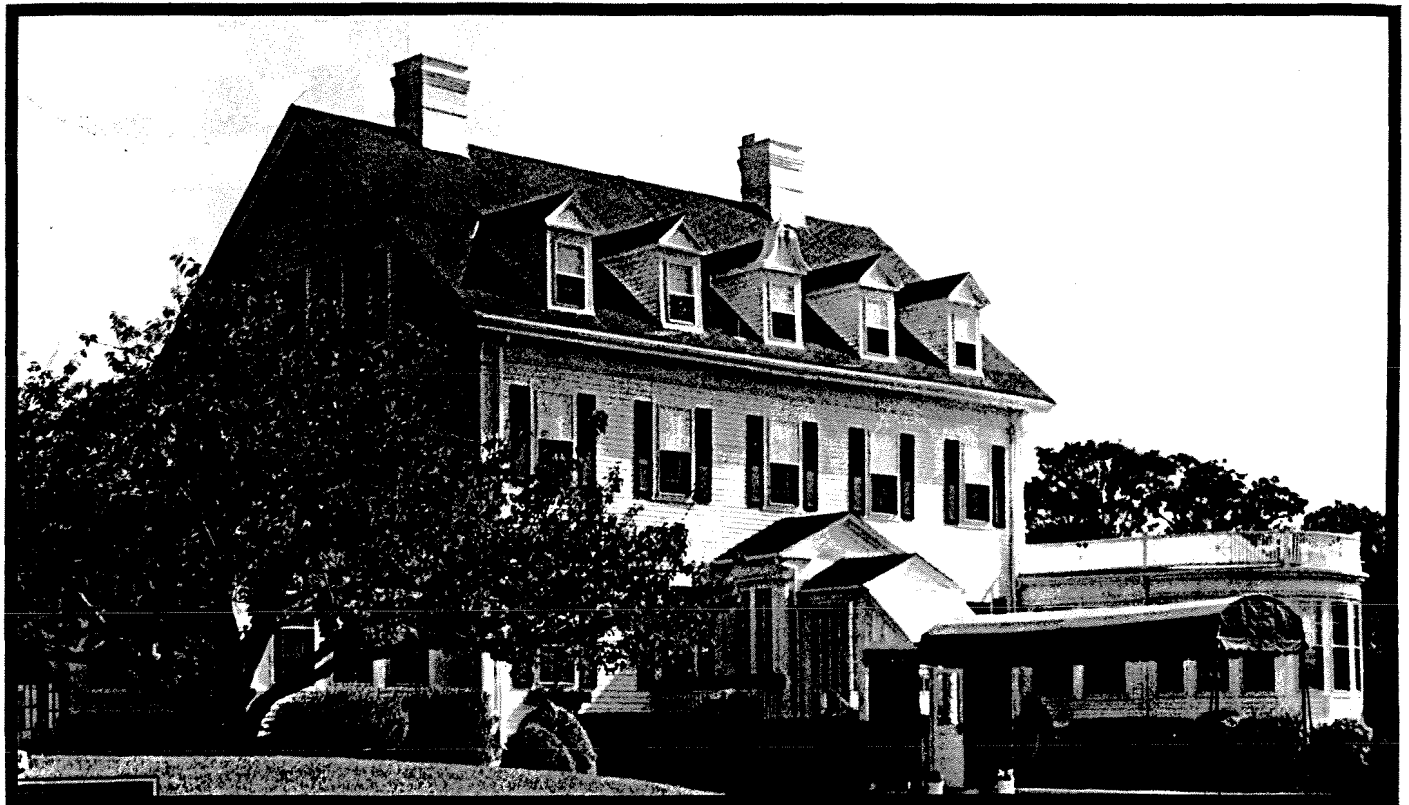


WILLIAM WOODVILLE - DEL.  
 WORKS IN PROGRESS - ADMINISTRATION  
 O.P. 65-1715

NAME OF STRUCTURE  
 THE COMMANDANT'S HOUSE, NAVY YARD, WASHINGTON, D.C.

SURVEY NO.  
 DC-12  
 HISTORIC AMERICAN BUILDINGS SURVEY  
 SHEET 2 OF 2 SHEETS





**Figure III-146.** 1874 Commanding officer's quarters (Quarters 1, Naval Complex Pensacola, Florida), *above*. 1896 Naval War College President's house (Quarters AA, Naval Education and Training Center, Newport, Rhode Island), *below*





**Figure III-147.** 1896 Officers housing (Building 624, Puget Sound Naval Shipyard, Washington). (Courtesy of U.S. Navy)

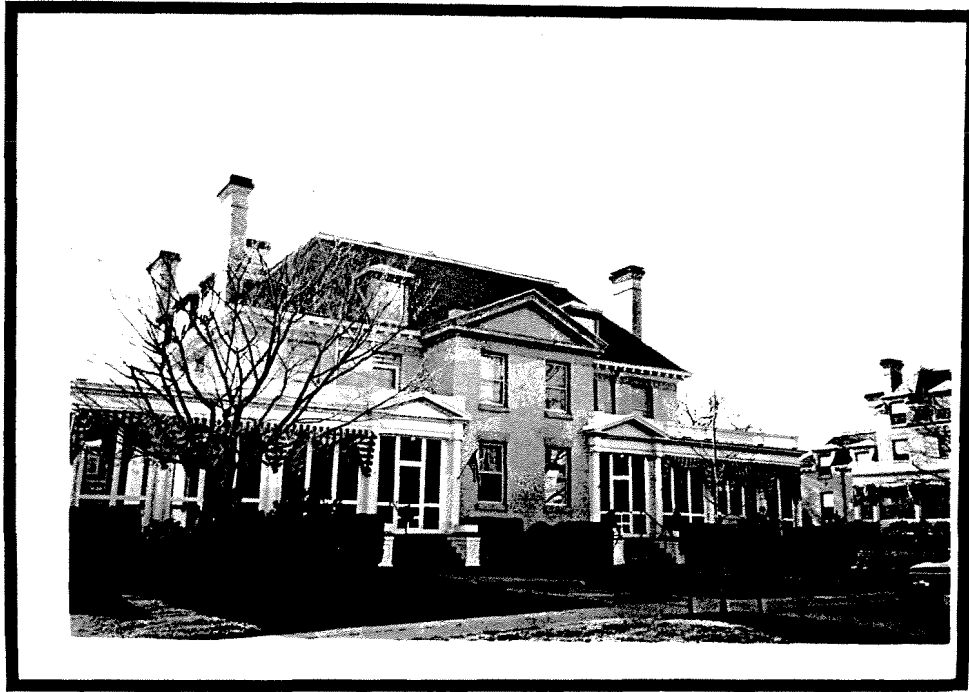






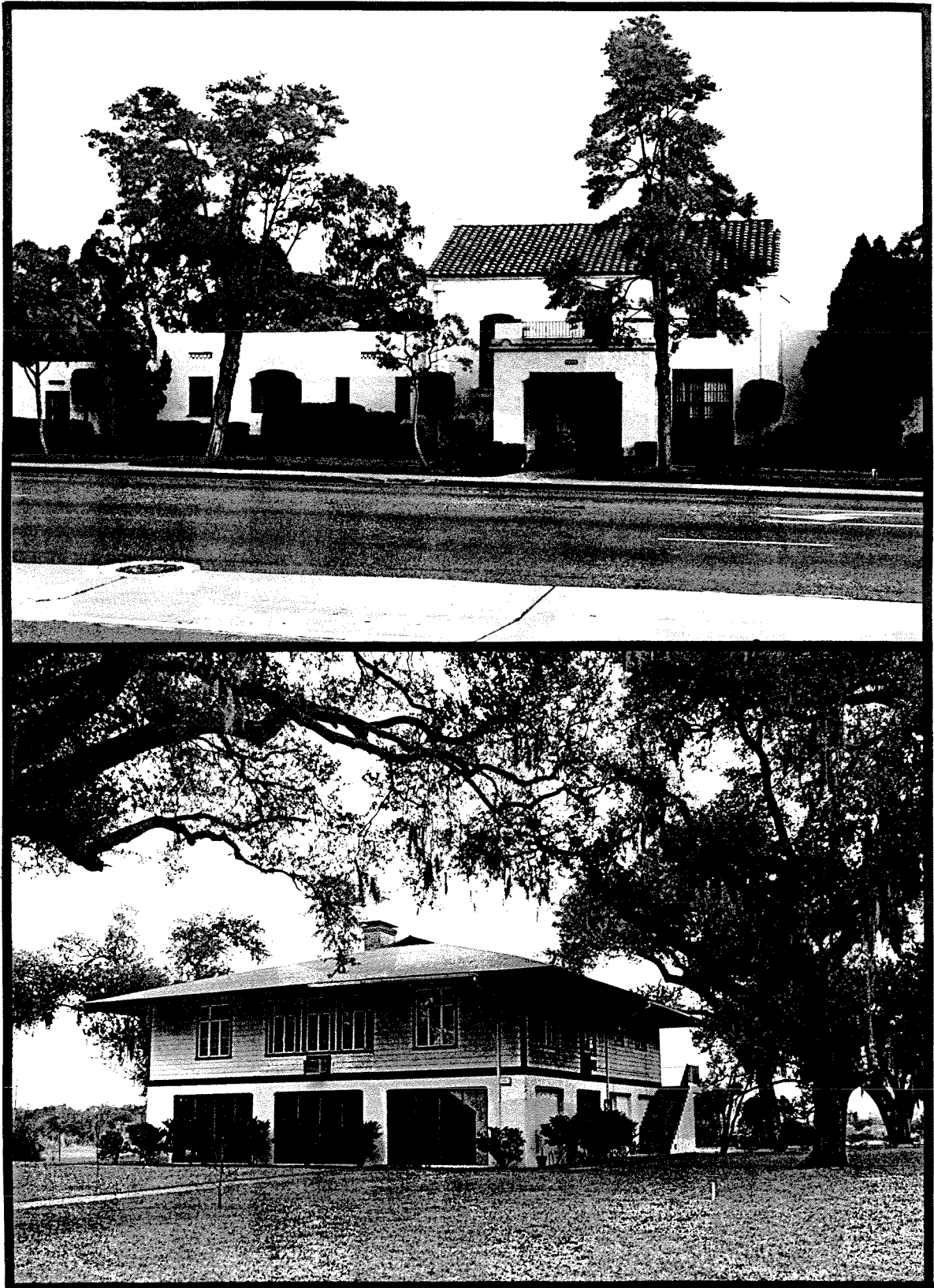
**Figure III-148.** 1891 Duplex officers quarters (Building 704, Norfolk Naval Shipyard, Virginia). (Courtesy of U.S. Navy)





**Figure III-149.** 1905 Officers housing designed by Ernest Flagg (Building 7-8, U.S. Naval Academy, Annapolis, Maryland)





**Figure III-150.** 1922 Officers housing (Quarters A, Naval Training Center, San Diego, California), *above*. "Panama house" constructed in 1938 (Quarters O, Naval Base Charleston, South Carolina), *below*





**Figure III-151.** 1937 Officers housing (Quarters 14, Naval Complex Pensacola, Florida), *above*. 1937 Four-family student officer apartment building at Naval Complex Pensacola, Florida, *below*







**Figure III-152.** 1801 Commandant's house, mansard roof added 1891 (U.S. Marine Corps Barracks, Washington, D.C.), *above*. (Courtesy U.S. Marine Corps) Officers housing constructed between 1903 and 1907 (U.S. Marine Corps Barracks, Washington, D.C.), *below*



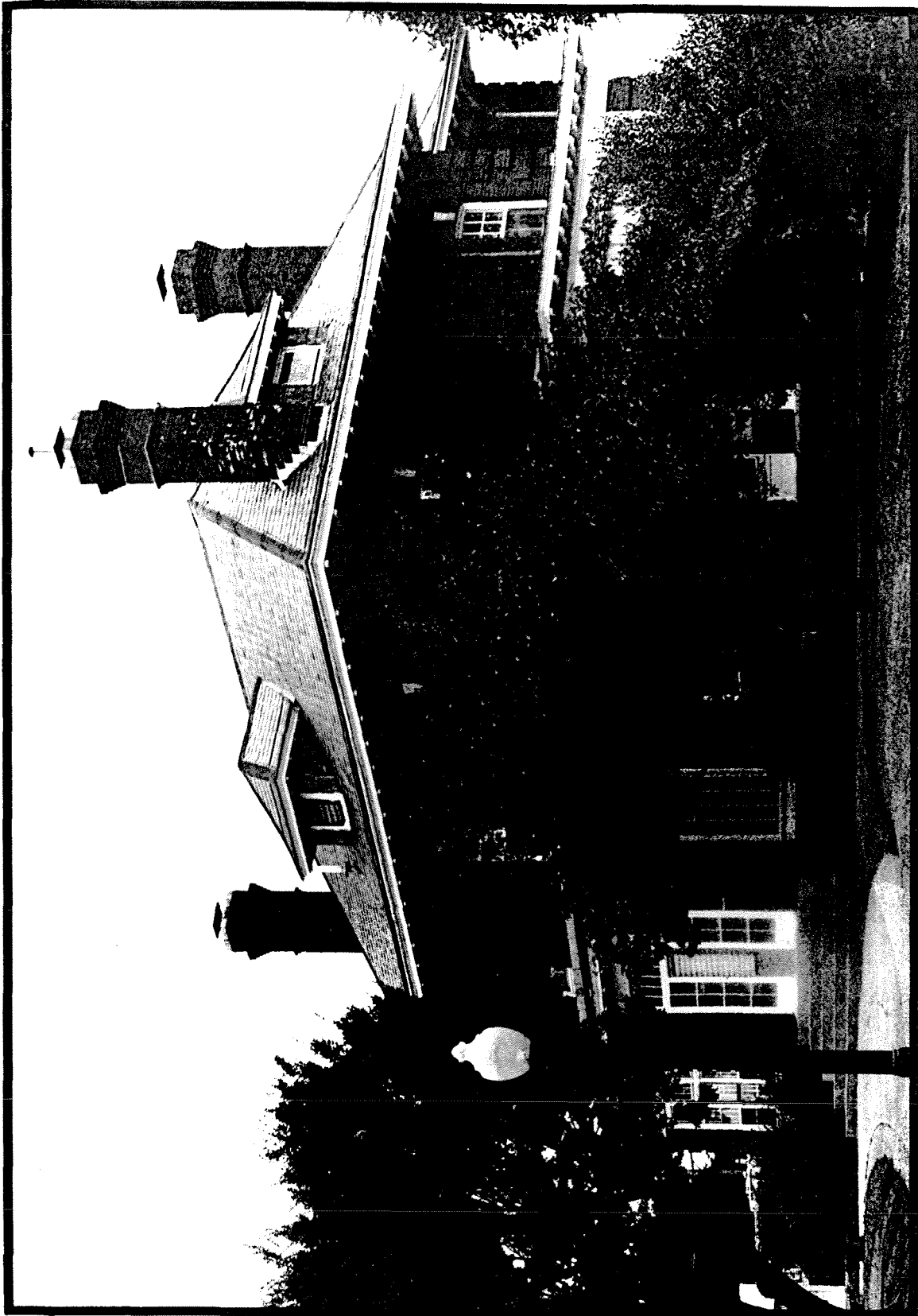


Figure III-153. 1918 Marine officer housing (Building M-1, Norfolk Naval Shipyard, Virginia). (Courtesy U.S. Navy)





**Figure III-154.** 1925 Officers housing (Building M-5, Marine Corps Recruit Depot, San Diego, California), *above*. 1920 Officers housing (Quarters 12, Marine Corps Development and Education Command, Quantico, Virginia), *below*. (Official U.S. Marine Corps Photograph)



## Family Housing Support Buildings:

### Garages

#### Description

Garages were constructed behind family housing quarters starting in the early twentieth century, around the same time that they appeared in civilian communities. The one-story garages often matched the construction materials of the housing and usually displayed minimal architectural character or ornament. One-car, two-car, and shared multiple-car garages were constructed.

#### Evolution

##### Army and Army Air Corps

Private cars became popular during the early years of the twentieth century. By 1913, the Army Quartermaster Corps issued a standardized plan for a two-car garage. The plan depicts a garage clad in corrugated metal with two sets of paired side-hinged swinging doors leading to the interior space, which was open except for a corner storeroom for oil and gasoline. By 1915, the Quartermaster Corps issued a plan for multiple-car garages.<sup>30</sup> The earliest garages associated with private cars identified during the field survey conducted for this study were wood-frame buildings constructed during the 1920s. Often the early garages were constructed of salvage materials.

During the Army's inter-war construction program, private garages were included in family housing complexes of many new Army and Army Air Corps installations. Garages, usually for multiple cars, were constructed of the same materials as family housing and matched, though with simpler details, the general architectural style of the post (Figure III-155). In general, garages were located behind officer and non-commissioned officer housing. During the late 1930s, the Construction Service of the Quartermaster Corps experimented with garages attached to family housing units. The Army also added garages behind officers rows at older posts; these garages usually were simple brick or wood frame structures (Figure III-155).

##### Navy and Marine Corps

As the Navy and Marine Corps began to expand installations and construct more officer housing during the late 1920s and 1930s, detached garages were constructed behind officers housing at some installations. Garages added to existing installations were wood-frame buildings designed to hold multiple cars. At installations that were constructed according to master plans in a single architectural style, garages were constructed as part of the plan and reflect, in a simple fashion, the overall architectural character of the installation.

#### Association

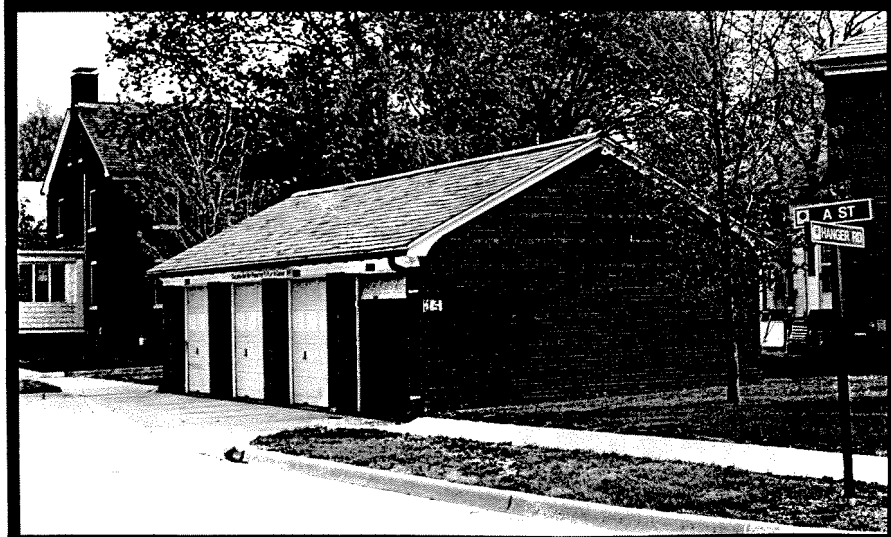
Garages are minor support buildings in housing complexes. They are associated with the widespread use of the private automobile and incorporation of the car into domestic life. Garages do not possess individual significance, but may be contributing elements to an installation historic



district, particularly where the garages were designed and constructed at the same time as the housing area in a compatible design.

### **Integrity**

Garages must retain their location and setting in relation to the housing for which they were built. Garages also should retain most of their design and materials from their period of construction. Garages constructed before 1940 often no longer serve their original function and are used as storage facilities. Exterior elements that may have been modified include roof and wall material and doors. In cases of subsequent additions or modifications, garages still may possess sufficient integrity to contribute to an historic district if they retain the majority of their relationship to the housing area, their overall design, and the majority of their materials and workmanship.



**Figure III-155.** 1934 Four-car garage, with Spanish Colonial Revival-influenced tile roof, behind officer housing (Building 533, Ft. Bliss, Texas), *above*. 1936 Four-car garage behind NCO housing (Building 656, Scott AFB, Illinois), *middle*. 1930 Wood-frame garage (Building 313, Presidio of Monterey, California), *below*



## Family Housing Support Buildings:

### Servants Quarters

#### Description

Detached servants quarters were constructed at installations where officer family housing was too small to permit live-in servants. Servants quarters generally were simple, wood-frame buildings designed in vernacular architectural styles and located near the officer quarters. Detached servants quarters are not a common property type on military installations.

#### Evolution

##### Army and Army Air Corps

Live-in servants were common among officers' families during the 1880s and 1890s at the Army's consolidated, permanent installations. Officer housing constructed during this time period often included specified servants' rooms. The popularity of live-in servants continued through the 1930s. Standardized officer housing designs constructed during the 1930s contained bedrooms and bathrooms designated for servants.<sup>31</sup>

Separate quarters for servants were added to older installations with smaller officer quarters that did not include sufficient space for live-in servants. These installations either were constructed prior to the turn-of-the-century consolidation, or were not intended originally as permanent installations and thus did not receive the large, standardized-plan, officer quarters. At these posts, small wood-frame buildings were constructed behind the main quarters as a separate servant's quarters (Figure III-156). This building type was not prevalent among Army installations. Detached servants quarters were identified during the field survey conducted for this study only at Presidio of Monterey, California, and Ft. Huachuca, Arizona. No standardized plans for detached servants quarters were identified.

##### Navy and Marine Corps

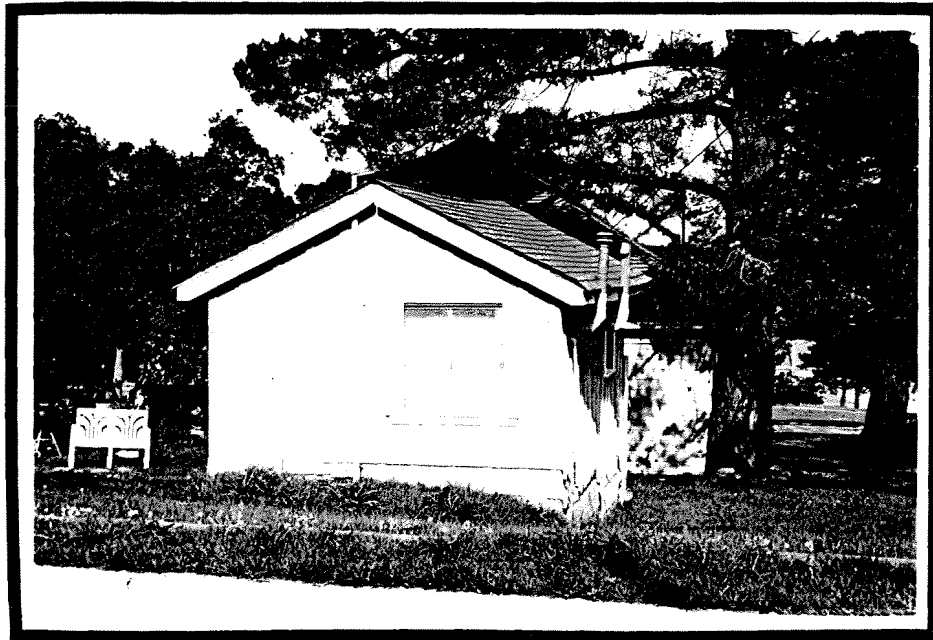
Naval officer housing was generally large enough to accommodate live-in servants. In rare instances, detached servants quarters were constructed near the main house. These quarters generally were simple, small buildings with little architectural ornamentation. Few examples of this building type were identified during the field survey conducted for this study.

#### Association

Servants quarters are minor support buildings in housing complexes. They are associated with the daily life at military installations and evolution of living standards for military personnel. Servants quarters do not possess individual significance, but may be contributing elements to an installation historic district.

## **Integrity**

Servants quarters must retain their location and setting in relation to the housing for which they were built; if the main house is no longer extant, then the servant's quarters no longer retains its historical association. Servants quarters also should retain most of their design and materials from their period of construction. Detached servants quarters no longer serve their original function. Exterior elements that may have been modified include materials, door and window openings, and porches. In cases of subsequent additions or modifications, servants quarters still may possess sufficient integrity to contribute to an historic district if they retain the majority of their relationship to the housing area, overall design, and the majority of their materials and workmanship.



**Figure III-156.** 1932 Servants quarters (Building 329, Presidio of Monterey, California)



## NOTES, CHAPTER 9

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2. War Department, *Regulations Concerning Barracks and Quarters for the Army of the United States, 1860* (Washington, D.C.: George W. Bowman, 1861), 2.

3. War Department, Surgeon General's Office, *A Report on Barracks and Hospitals with Descriptions of Military Posts (Circular 4)* (Washington, D.C.: Government Printing Office, 1870), xxxiii.

4. War Department, *Annual Report of the Quartermaster-General* (Washington, D.C.: Government Printing Office, 1872), plate 3.

5. Erna Risch, *Quartermaster Support of the Army: A History of the Corps 1775-1939* (Washington, D.C.: Government Printing Office, 1962. Reprinted 1989.), 484-485.

6. NARA, Cartographic Branch, RG 77, Standard Plans of Army Post Buildings, 1891 - 1918, Plans 257, 298.

7. John S. Garner, *World War II Temporary Military Buildings* (Champaign, Illinois: U.S. Army Construction Engineering Research Laboratory, 1993), 22-25.

8. David A. Clary, "These Relics of Barbarism: A History of Furniture in Barracks and Guardhouses of the United States Army 1800 - 1880" (MSS, Department of the Interior, National Park Service, Harper's Ferry Center, West Virginia), 58.

9. Risch, *Quartermaster Support of the Army*, 488-489.

10. NARA, Cartographic Branch, RG 92, Post Plans, 1904 - 1905.

11. Risch, *Quartermaster Support of the Army*, 507.

12. War Department, *Annual Reports of the Quartermaster-General* (Washington, D.C.: Government Printing Office, 1893), 10-11.

13. NARA, Cartographic Branch, RG 77, Standard Plans of Army Post Buildings, 1891-1918, Plan 56; NARA, Cartographic Branch, RG 92, Post Plans, Ft. Riley, Kansas.

14. David A. Clary, "A Life Which is Gregarious in the Extreme: A History of Furniture in Barracks, Hospitals, and Guardhouses of the United States Army, 1880-1945" (MSS, U.S. Department of the Interior, National Park Service, Harpers Ferry Center, West Virginia, 1983), 29.

15. Bethanie C. Grashof, *A Study of United States Army Family Housing Standardized Plans 1866 - 1940*, Vol. I (Atlanta: Georgia Institute of Technology, 1986), 19-20.

16. Frank N. Schubert, "Ft. Robinson, Nebraska, the History of a Military Community" (Ph.D. diss., University of Toledo, 1976), 66-73.

17. E. Mack Hallauer, "Landscaping the Army Post," *The Quartermaster Review* (July-August 1939): 28-31.



18. War Department, *Regulations Concerning Barracks and Quarters for the Army of the United States, 1860*, 1-2, 7.

19. Thomas J. Slattery, *An Illustrated History of the Rock Island Arsenal and Arsenal Island, Part Two* (Rock Island, Illinois: Historical Office, U.S. Army Armament, Munitions and Chemical Command, 1990), 44.

20. War Department, *Annual Reports of the Quartermaster-General* (1872), plates 4-7.

21. NARA, Cartographic Branch, RG 77, Standard Plans of Army Post Buildings, 1891 - 1918, Plan 235.

22. War Department, General Staff, *Manual for the Quartermaster's Department, United States Army, 1904* (Washington, D.C.: Government Printing Office, 1904), 102-104.

23. Robinson Fisher Associates, Inc., "Historic Building Survey: Fort Benning, Georgia" (MSS, Ft. Benning, 1987), 16-17, 23.

24. Hallauer, "Landscaping the Army Post," 28-31.

25. Lt. Col. Francis B. Wheaton, "The Architecture of the Army Post," *The Quartermaster Review* (September-October 1928):10-13.

26. J.M. Carson, "Now -- the Army Apartment," *The Quartermaster Review* (July-August 1921):71-73, 81.

27. Grashof, *A Study of United States Army Family Housing Standardized Plans, 1866 - 1940*, Vol. 1, 56.

28. "National Register of Historic Places Registration Form, Quarters A, B, and C Norfolk Naval Shipyard, Virginia" (MSS, National Park Service, National Register of Historic Places, Washington, D.C., 1974).

29. A 1930 Quartermaster drawing for the "*Panama House*" was located in the Navy drawings collection, RG 71, Cartographic Branch, National Archives.

30. NARA, Cartographic Branch, RG 77, Standard Plans of Army Post Buildings, 1891-1918, Plans 313, 396.

31. War Department, *Annual Report* (1883), 47; Grashof, *A Study of United States Army Family Housing Standardized Plans, 1866-1866*, Vol. 1, 48.

## CHAPTER 10

### TRANSPORTATION

#### Air-Related:

#### Airplane Hangars

##### Description

Military aviation before 1940 can be divided into two programs: heavier-than-air (HTA) aircraft, which included land planes and seaplanes, and lighter-than-air (LTA) aircraft, which included balloons, blimps, and dirigibles. Hangars were constructed to store and repair both types of aircraft. Airplane hangars were one-story buildings with gabled roofs, large entrances on the gable end, and large windows along the side elevations. Early hangars generally were constructed of wood frame; as the military aviation program expanded, steel frame and masonry hangars were constructed. Hangar size was related directly to aircraft size. Airplane hangars and their support buildings usually were located in a row near the installation flight line.

##### Evolution

###### Army and Army Air Corps

The U.S. Army Signal Corps first experimented with heavier-than-air craft in 1908 when the Wright brothers demonstrated their airplane for Army officials at Ft. Myer, Virginia. The Wrights opened a flying school in College Park, Maryland, to train a handful of Army aviators. Square, wood-frame, barn-like structures served as the hangars.

In 1911, the Quartermaster Corps issued its first standardized plan for a Signal Corps hangar. The plan depicts a square, 46 by 46 ft., wood-frame building with a segmental arched roof (Figure III-157).<sup>1</sup> The walls were clad in board-and-batten wood siding. One elevation consisted of six large doors: the end doors were hinged, the middle doors slid on overhead tracks. By the end of October 1912, the Army owned eleven planes, nine of which were in operation.<sup>2</sup>

During the early years of Army aviation, despite the existence of standardized plans for hangars, pilots often made do with primitive airfield facilities. In 1913, the Signal Corps moved its flying school from College Park to Glenn Curtis' flying school at North Island, San Diego, California. The Signal Corps Aviation School at North Island first consisted of an "old barn and shed, left over from some earlier activity, and a canvas hangar and lean-to without floors and doors put up by the army to house the...planes."<sup>3</sup>

The National Defense Act of 1916 raised appropriations for military spending. The 1916 National Defense Act included funding for construction of Langley Field, near Hampton, Virginia, which was designed as a testing facility for the National Advisory Committee for Aeronautics and the military. In January 1917, the Signal Corps selected noted industrial architect Albert Kahn as Architect-in-Chief of the Army Signal Corps; Kahn and his firm began work on the design of a permanent airfield at Langley in 1917. On the eve of American involvement in the World War I, the Army had seven flying fields in the continental United States: San Diego, California; Ft. Sam

Houston, Texas; Mineola (Hazelhurst), New York; Ft. Sill, Oklahoma; Chandler Field, Pennsylvania; Langley Field, Virginia; and Kelly Field, Texas. The Army also operated an airfield in the Philippines and one in Hawaii.<sup>4</sup> No structures predating 1917 remain on those installations still under federal ownership.

In April 1917, the United States entered World War I. The rate of permanent construction slowed as resources were devoted to the construction of wartime mobilization cantonments. Albert Kahn developed standardized plans for temporary airfields; he completed the basic airfield design in ten days in May 1917. The plan for a standard single-unit training field required 54 buildings and accommodated 100 aircraft, 150 student pilots, and the training cadre. The airfield layout was based on a one-mile-square section, with all buildings situated in a row on one side of the runway.<sup>5</sup> This basic linear design pattern was implemented for early Signal Corps mobilization fields, such as Scott Field, Illinois, and Selfridge Field, Michigan.

An intact, World War I hangar remains standing at Brooks AFB, Texas. This airfield, originally called Kelly Field #5, was laid out according to a 1917 Albert Kahn plan (Figure III-158). The hangar is a wood-frame building with a gambrel roof and sliding doors on tracks that extend beyond the building (Figure III-159). The Army also constructed metal hangars to supplement wood-frame airfield facilities. At Kelly Field #5, an all-steel, 66-foot wide hangar was constructed. Metal hangars had the advantage of portability and could be mass-produced. The Quartermaster General's Office issued new standard plans for hangars in 1917. These plans depict a metal frame structure with galvanized, corrugated iron walls and doors along the gable and elevations of the building.<sup>6</sup>

In addition to the temporary mobilization camps, the Army proceeded with two permanent airfield projects, Langley Field and Rockwell Field, California, both designed by Albert Kahn. At Langley, permanent brick hangars were completed by 1919 (Figure III-160). These hangars incorporate decorative terra cotta and brickwork similar to other Kahn projects for civilian institutions in Michigan. The Langley hangars display the large corner piers that later became a characteristic feature of Army hangar design. In 1917, a joint Army-Navy board selected North Island in San Diego as the site for an aviation school to train desperately needed pilots. The Army portion was designated Rockwell Field. Kahn designed the buildings in a simplified Spanish Mission revival style. Three hangars were constructed of reinforced concrete and hollow clay tile, finished with stucco, and topped with clay-tile roofs (Figure III-160). Military architects and planners repeatedly used Spanish Mission style elements in the design of hangars, and other utilitarian buildings, during the Inter-war years, particularly in San Diego and throughout the southwest.

After the end of World War I, no appropriations were available for airfield improvements; Langley and Rockwell remained the only airfields with permanent facilities. Army aviators continued to use deteriorating mobilization airfields and wood-frame hangars. The Air Corps Act of 1926 authorized the expansion of Army aviation; the Chief of the Air Corps proposed improvements at 32 fields and construction of two other fields as part of a five-year plan. The years from 1926 to 1932 marked some of the first permanent construction and physical improvements of aviation facilities.<sup>7</sup>

Under this expansion program, World War I wooden hangars were replaced with fireproof hangars constructed of steel frame clad with brick or stucco-covered hollow clay tile. The typical hangar constructed in the early 1930s was rectangular, with a gable roof, distinct corner piers, concrete floor, steel sash windows along the side elevations, and sliding metal doors on overhead tracks at the gable end. The roofs often were painted in alternating light and dark squares. Hangars completed at Randolph Field, Texas, in 1931 were 113 by 220 ft. and had capacity for 30 planes (Figure III-161).<sup>8</sup> Hangars of this type were constructed singly or attached as pairs;

single hangars generally were oriented with their gable ends perpendicular to the flight line, while paired hangars faced the flight line. A double hangar at Barksdale Field, Louisiana, measured 243 by 120 ft. and accommodated 52 planes (Figure III-161).<sup>9</sup>

Army hangars constructed in 1934 and later had segmental-arch roofs supported by steel bowstring trusses (Figure III-162). The arched roof form offered greater interior height. Hangars of this type have larger corner piers than their gable-roofed predecessors. In some cases, the control tower was incorporated into the top of the corner pier nearest the runway. A double hangar of this type at Pope Field, North Carolina, was 333.5 by 124 ft. and contained storage facilities, toilets, locker room, shop, gunnery, and radio room.<sup>10</sup>

By the end of the 1930s, aircraft design had changed greatly as airplanes increased in size and wingspans grew wider. New hangars were larger to accommodate the airplanes' increasing size. By the late 1930s, the Army had simplified some of its hangar designs, deleting stylistic references and the distinctive corner piers. Metal cladding over the steel frame replaced the characteristic masonry of the early and mid 1930s; the sliding doors were steel sash; and, the side elevations were blank (Figure III-163). After the start of World War II mobilization, use of steel was restricted to weapons and other essential industrial production; the Army once again turned to wood-frame hangars to house its rapidly expanding air force. A few airfields received permanent hangars during the early 1940s, including Ft. Knox, Kentucky, and Wright-Patterson, Ohio. These hangars retained the segmental-arch roof, steel-sash sliding doors, and masonry-clad steel frame construction of early hangars; however, their size dwarfed earlier hangar construction (Figure III-163).

The expansion of the Air Corps and its facilities during the 1930s prompted the development of supporting structures around the hangars and flight line. Ground support buildings typically included control tower, repair shops, dope (lubricant or varnish) and paint shops, and storage facilities (Figure III-164). These supporting facilities often were constructed in materials and designs similar to or compatible with the adjacent hangars, though their utilitarian functions were the primary determinant of their design and location.

### Navy and Marine Corps

The Navy established its first naval aviation unit around 1911 at Greenbury Point, near Annapolis, Maryland, where tents served as hangars. In 1914, the Navy moved its aviation training activities to the Pensacola Navy Yard, Florida. Tents also were used as hangars at Pensacola. In 1916, three steel-frame seaplane hangars were constructed (Figure III-165). The hangars were repaired after hurricane damage in 1917 and were doubled in size in 1918. Three additional hangars were constructed in 1918; one of these was a single-bay hangar, while two were triple-bay hangars.

In 1916, the Navy proposed the establishment of 12 naval air installations, each with 7 hydroplanes and an airship; none were established by the start of World War I in April 1917. At the outbreak of the war, the naval aviation program consisted of 54 aircraft and 48 pilots.<sup>11</sup> Aircraft were effective in submarine reconnaissance, and the Navy established air stations along the East Coast to support anti-submarine patrols.

The selection of North Island, San Diego, as the location for Army and Navy aviation training enabled Navy aviation to expand. The Navy first used hangars left from the Curtis flying school that had operated on the site. In 1918, the Navy selected architect Bertram Goodhue to design complete new facilities for the air station. Several seaplane hangars were constructed, with accompanying ramps near the water's edge. The hangars were rectangular structures with three

parapet gables supported by steel trusses on concrete piers (Figure III-165). The side elevations were marked by steel sash windows and decorative buttresses. Goodhue designed the buildings at North Island in a simplified Spanish Colonial Revival architectural style.

Congressional funding legislation in 1919 limited the Navy to 6 heavier-than-air stations on the coasts of the continental United States. This limitation continued until 1940. The Navy retained the following heavier-than-air stations: Rockaway, New York; Anacostia, D.C.; Hampton Roads, Virginia; Pensacola, Florida; Key West, Florida; and San Diego, California. A few additional aviation facilities also were developed. The Marine Corps operated airfields at the Recruit Depot at Parris Island, South Carolina, and at its base at Quantico, Virginia. Between 1919 and 1921, small seaplane facilities were set up at Newport, Rhode Island, and at Dahlgren, Virginia to experiment with test torpedoes, bombs, and guns.<sup>12</sup>

During the 1920s, the Navy began to develop aircraft carriers, which meant acquiring land planes and ground landing fields. The seaplanes in the Navy's inventory were unsuitable for landing on the decks of the aircraft carriers. In 1921, the Navy announced the assignment of land planes to Pensacola. Land planes also were sent to North Island. Starting in the late 1920s, most naval air stations had landing strips and land plane hangars. The hangars and industrial buildings to serve both seaplanes and land planes usually were constructed in one area for greater economy.

Seaplane hangars constructed during the 1930s typically were 160 by 240 ft. and 32 ft. high, while land plane hangars were 200 by 200 ft. and 28 ft. high. In other aspects of design, the two types of hangars were similar (Figure III-166). Hangars were built with steel frame clad in brick, concrete, or corrugated asbestos. Lean-tos were constructed along the sides to house offices, shops, and washrooms; steel sash windows lined the side elevations above the lean-tos. The doors typically were steel sash that opened on overhead sliding tracks; the doors opened from the middle outward and slid into the end bay or projected beyond the hangar walls.<sup>13</sup> Most Navy and Marine Corps heavier-than-air hangars constructed during the 1930s were not embellished with architectural styles or decorative features. The hangars at Pensacola Naval Air Station were one exception. The large, brick, corner piers of the Pensacola hangars are marked by quoins, concrete bands, and molded concrete door surrounds (Figure III-167). This detailing matches the Georgian Colonial Revival architectural character of the other buildings at the Florida air station.

By December 1938, the naval air establishment consisted of seven naval air stations (Lakehurst, Anacostia, Norfolk/Hampton Roads, Pensacola, Seattle, Alameda, and San Diego), four fleet air bases (San Pedro, Coco Solo, Pearl Harbor, and Sitka), thirteen naval reserve air bases or units, three Marine airfields (Quantico, St. Thomas, and Parris Island), and six or seven minor facilities.<sup>14</sup> During World War II, the Navy employed temporary wood-frame construction for hangars, to save precious steel for other essential needs, and also began to construct hangars with segmental arch roofs. The hangar at the Philadelphia Navy Yard was an unusual example of concrete roof construction, but is indicative of the form and increased size of hangars after 1940 (Figure III-167).

As the Navy developed its aviation program, the air stations required facilities to service the planes and equipment. The industrial buildings for planes were located near the hangars, usually on the opposite side of the hangar than the water front or flight line. Typical industrial buildings near hangars during the 1930s included an assembly and repair building, engine overhaul and machine shop, engine test building, and storage buildings.<sup>15</sup>

## **Association**

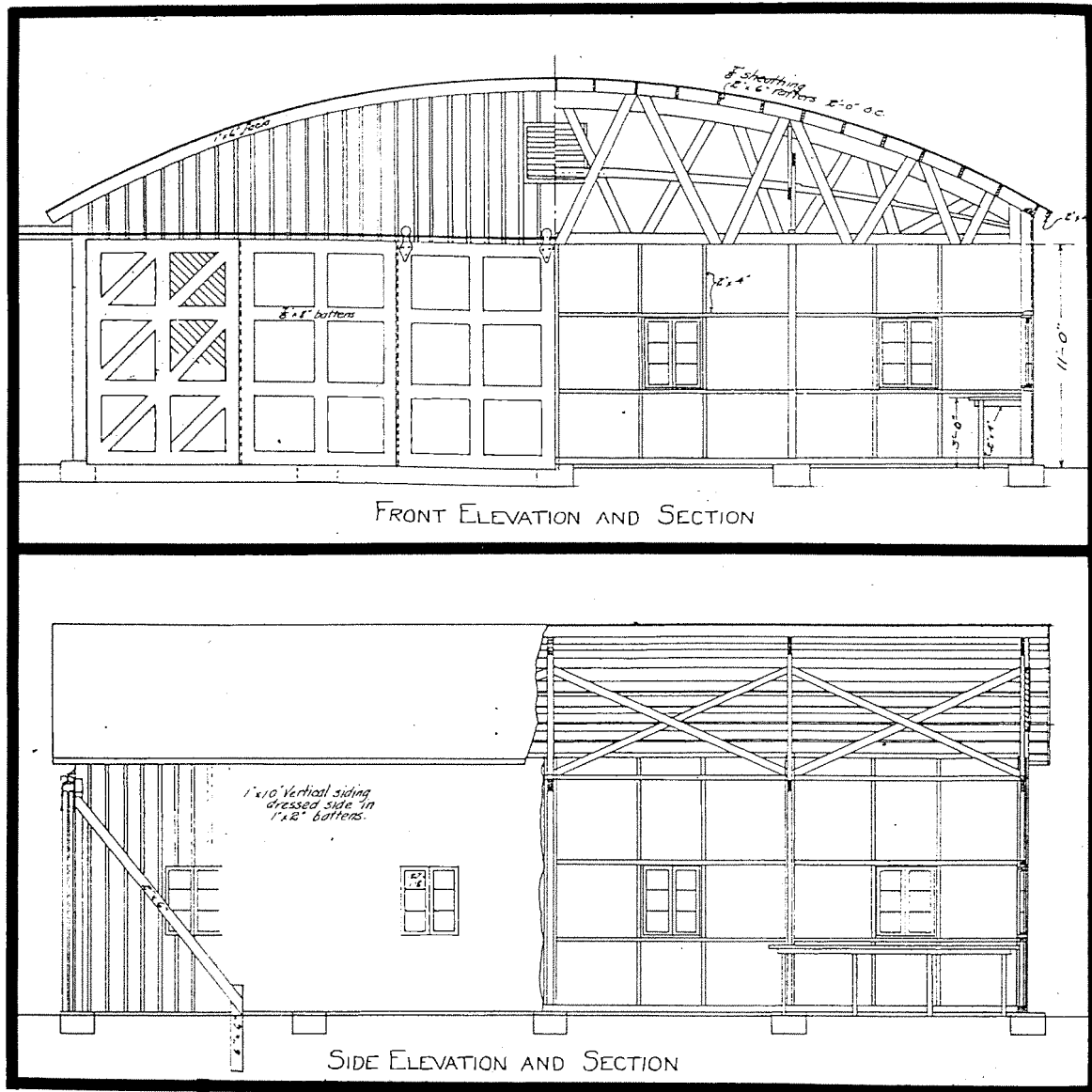
Airplane hangars and their attendant support structures are associated directly with the evolution of military aviation. Aviation is a significant development in military tactics and strategy and is associated with the development of the military starting immediately before World War I. Hangars also are associated with the theme of technology. Hangars are a distinct property type that evolved over time in response to the development of aircraft design.

Many military installations had aviation facilities. Depending on the role of aviation in the installation's historical mission, the hangars and support structures may consist of one or two small, utilitarian buildings or may constitute a major component of the installation. Aviation supported the primary mission at some installations, while at other installations, aviation was the primary installation activity. A hangar may possess individual significance for architectural or engineering merit, or may contribute to an installation historic district that represents the theme of military aviation or a distinguishable entity. Associated support facilities such as storage buildings, repair shops, control towers, aprons, or run ways may constitute important contributing features to an historic district.

## **Integrity**

Many smaller, older hangars have been converted to new uses, while some larger hangars from the late 1930s continue to function as airplane hangars. To possess integrity, hangars and their support structures should retain most of their architectural and engineering design features and external construction materials from their period of construction. Character-defining features include the overall shape of the building, original construction materials, fenestration on the side elevations, large door openings and sliding doors at the end elevations, and corner piers. Exterior elements that may have been modified include doors and windows; if replacement doors and windows retain the same placement and similar materials as the originals, and the hangar still conveys the overall design from the period of significance, it may still possess integrity. Small, ancillary additions that do not overwhelm the basic block of the hangar do not diminish substantially the building's integrity. If the building is under consideration for nomination to the National Register as an individual building, rather than as part of an historic district, the interior should retain sufficient integrity to convey the construction and interior configuration of the hangar during its period of significance. An historic district composed of hangars and their support buildings does not need to retain the interior integrity and may better represent the theme of aviation than isolated hangars that once were part of a complex of buildings.





FRONT ELEVATION AND SECTION

SIDE ELEVATION AND SECTION

SHEET NO. 1. 295. 1. SHEET.  
 HANGAR FOR SIGNAL CORPS.  
 Q.M.G.O. EST. MAY 1911.

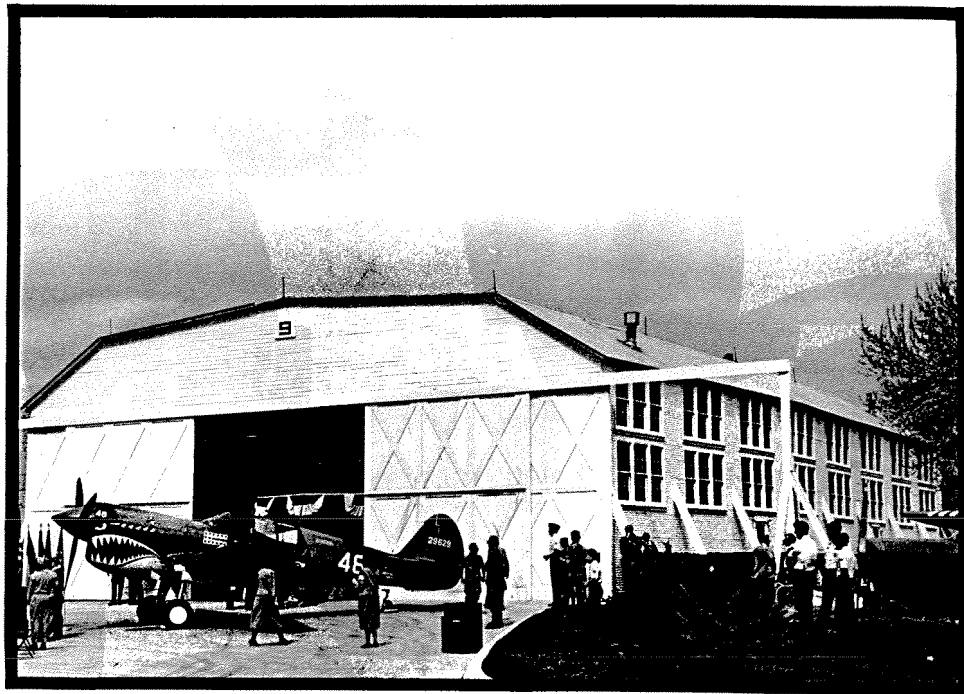
Figure III-157. Quartermaster standardized plan no. 295 for Signal Corps hangar. (From National Archives, Cartographic Branch, Record Group 77, Records of the Chief of Engineers, Standard Plans of Army Post Buildings 1891-1918.)





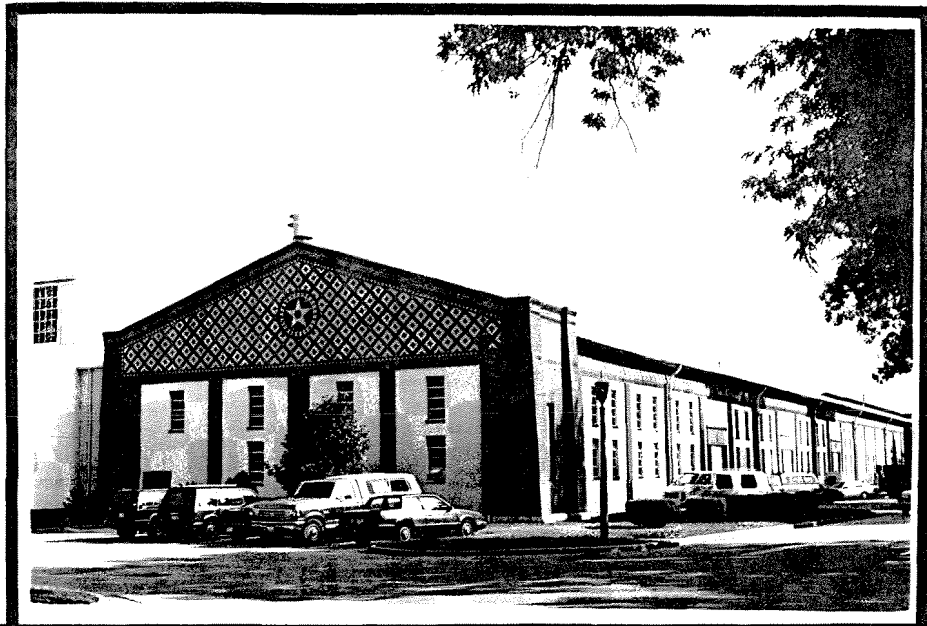






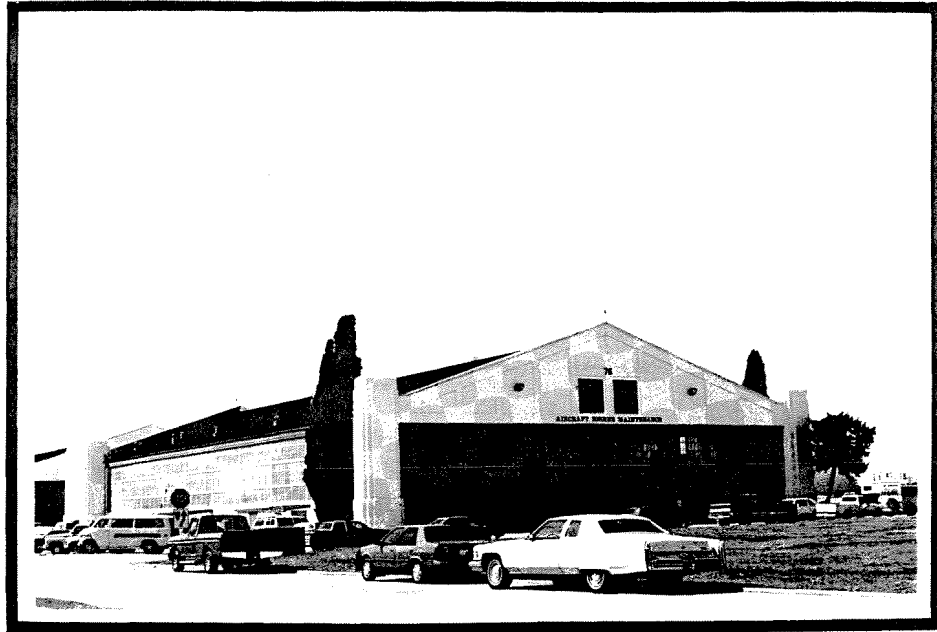
**Figure III-159.** 1918 World War I wood-frame hangar [hangar 9 in Kelly Field #5 Plot Plan] (Building 671, Brooks AFB, Texas)





**Figure III-160.** 1918 Hangar, Albert Kahn, architect (Building 781, Langley AFB, Virginia), *above*. 1918 Hangar, Albert Kahn, architect (Building 502, Naval Air Station North Island [formerly Rockwell Field], San Diego, California), *below*





**Figure III-161.** 1931 Hangar (Hangar P74, Randolph AFB, Texas), *above*. 1932 Paired hangar (Building 6415, Barksdale AFB, Louisiana), *below*

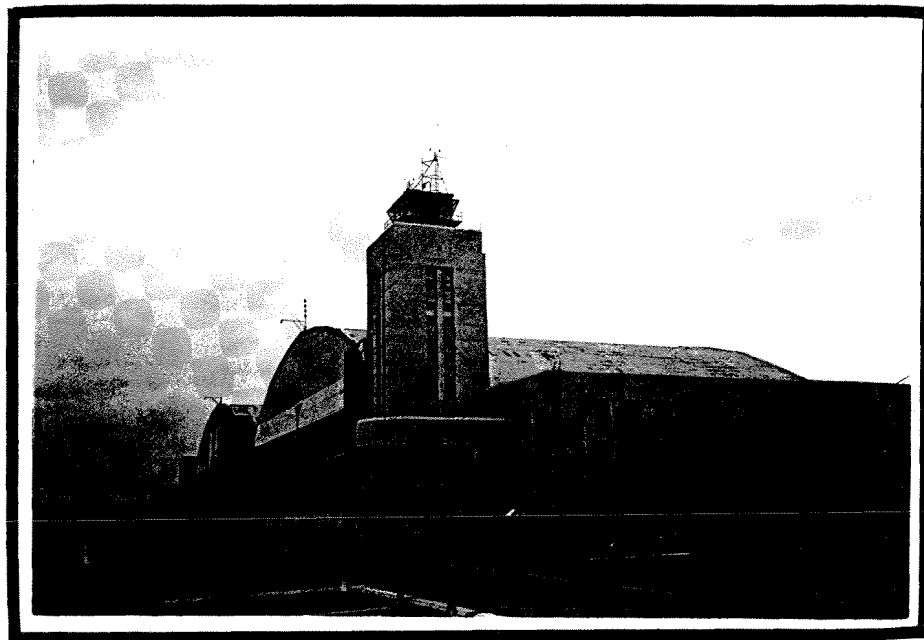
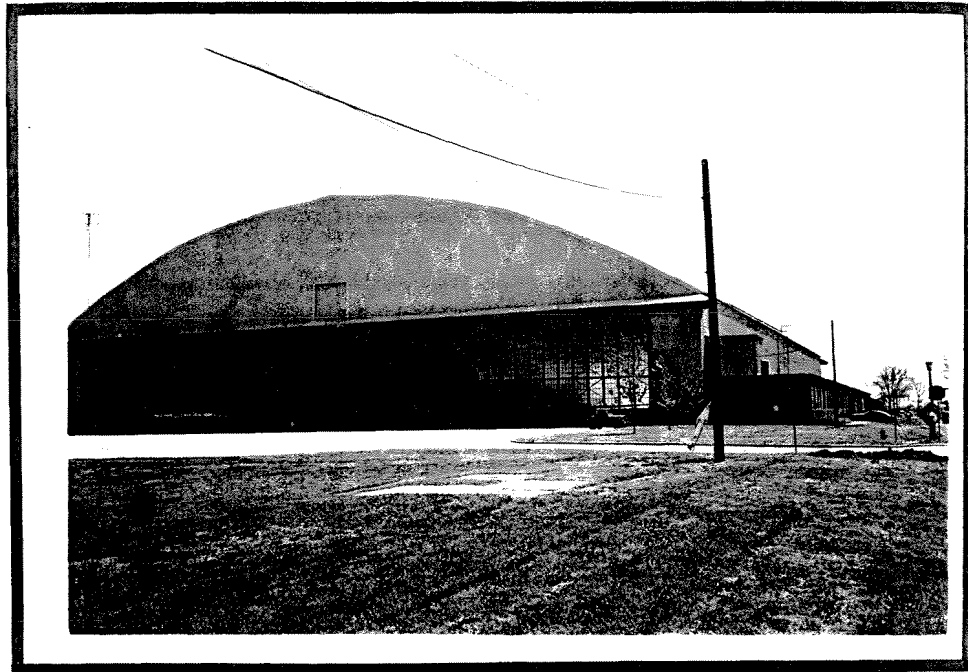






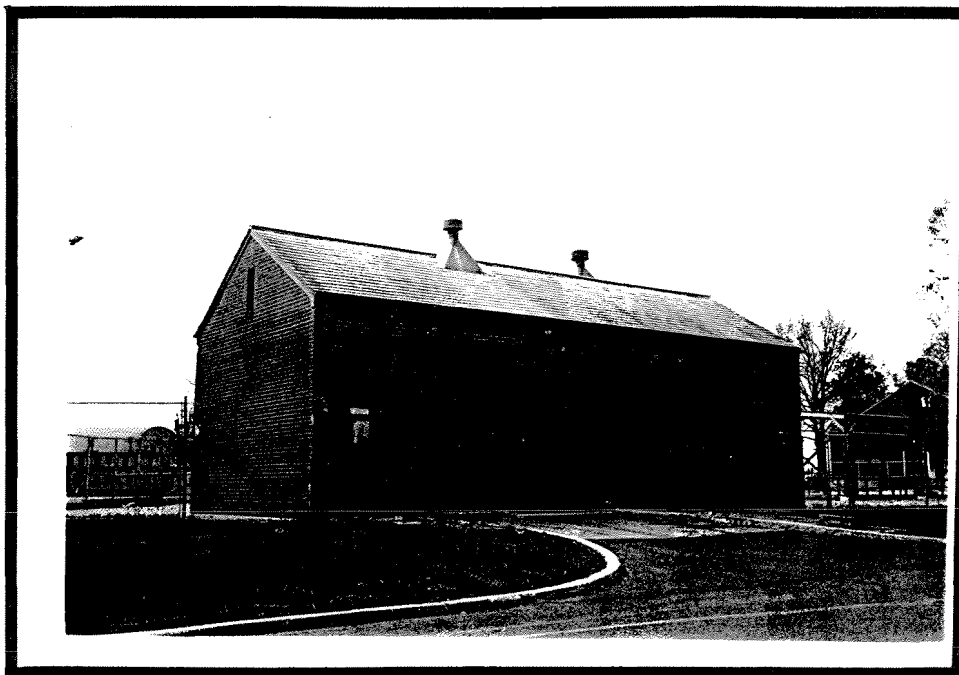
**Figure III-162.** 1934 Hangars (Buildings 5 and 6, Maxwell AFB, Alabama), *above*.  
1934 Hangar (Building 708, Pope AFB, North Carolina), *below*





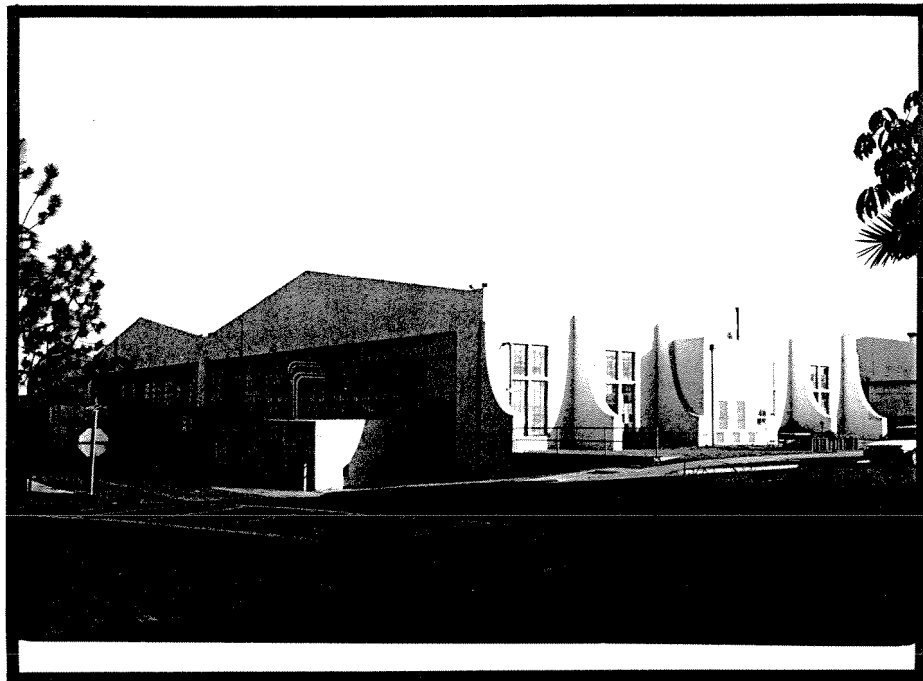
**Figure III-163.** 1939 Hangar, Quartermaster standardized plan (Building 433, Scott AFB, Illinois), *above*. 1943 Airplane hangar (Building 8-1, Area C, Wright-Patterson AFB, Ohio), *below*





**Figure III-164.** 1930s Control tower (Building 516, Naval Air Station, North Island, [formerly Rockwell Field] California), *above*. 1938 Paint oil and dope house (Building 59 Scott AFB, Illinois), *below*

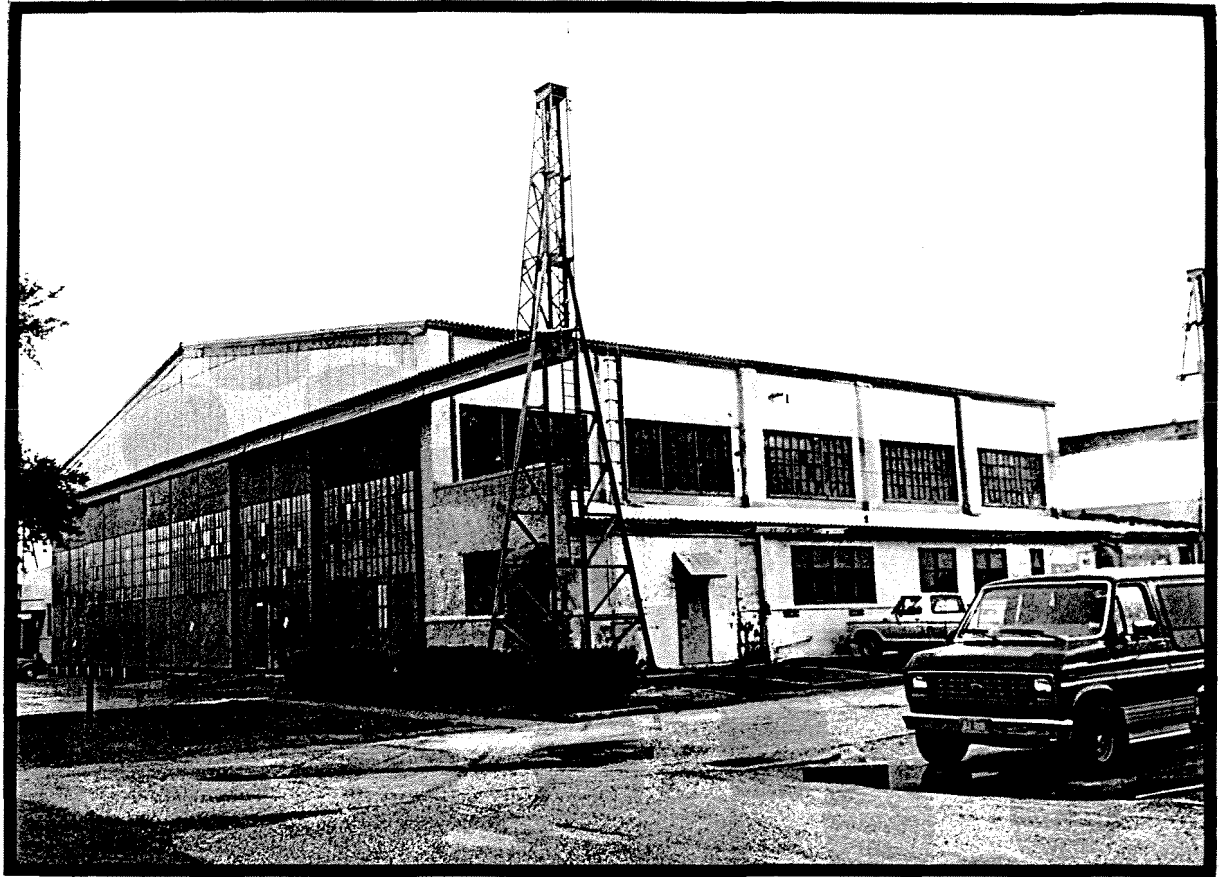




**Figure III-165.** 1916 Seaplane hangar (Building 72, Naval Complex Pensacola, Florida), *above*. 1918 - 1919 Seaplane hangar (Building 1-2, Naval Air Station, North Island, California), *below*

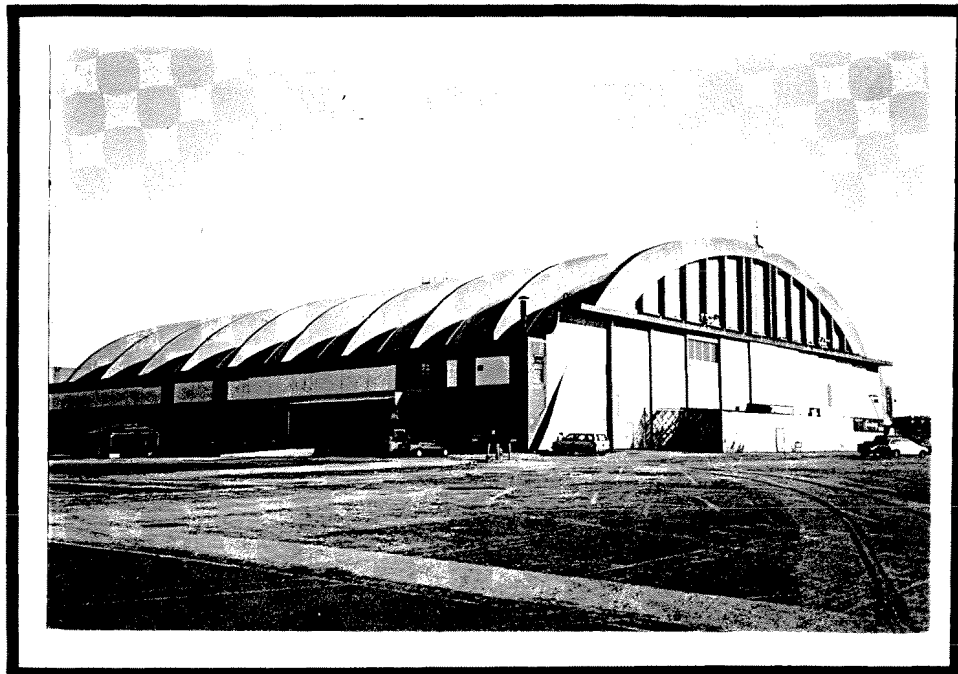
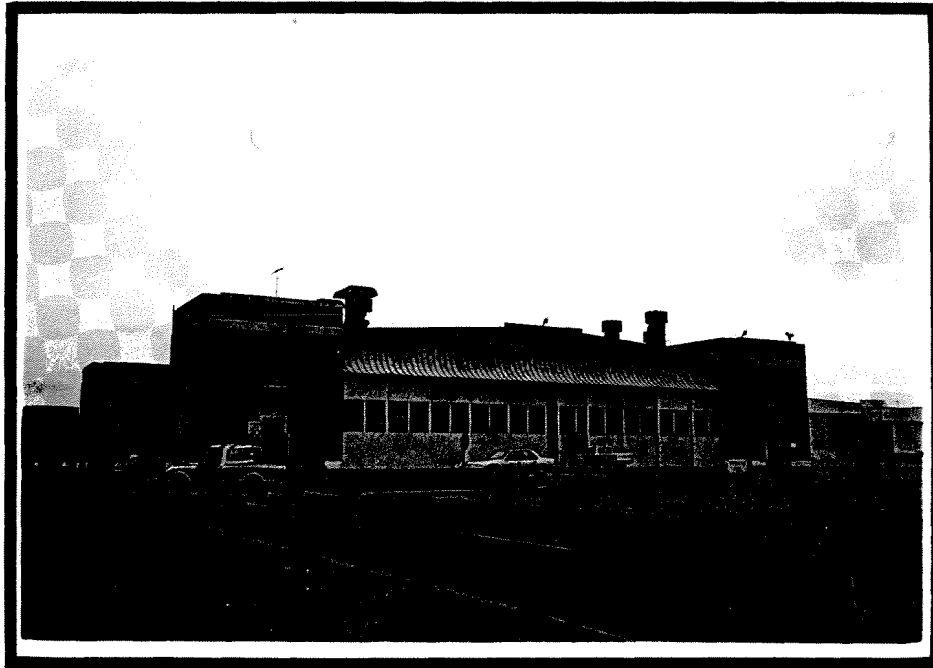






**Figure III-166.** 1935 Seaplane hangar (Building NS-53, Naval Base Charleston, South Carolina), *above*. 1930s Land plane hangar (Building 308, Naval Air Station, North Island, California), *below*.





**Figure III-167.** 1937 Land plane hangar (Building 606, Naval Complex Pensacola, Florida), *above*. Concrete frame hangar constructed during the early 1940s (Building 653, Philadelphia Naval Complex, Pennsylvania), *below*



## Air-Related:

### Lighter-than-Air Aircraft Hangars

#### Description

Lighter-than-air (LTA) aircraft include balloons and non-rigid, semi-rigid, and rigid types of airships. Balloons were the earliest form of lighter-than-air craft; they are unmotored spherical gas-filled bags with suspended baskets. The military employed both kite balloons, which are tethered to the ground or to a vehicle, and free balloons. Airships were motorized cylindrical vehicles. Non-rigid airships, or blimps, contain no structural framework and are the smallest of the three types of airships. Semi-rigid airships contain a structural keel and can be larger than nonrigid airships. The largest types of LTA aircraft are the rigid airships, known as dirigibles, which contain a complete structural framework and could carry a 75-man crew.<sup>16</sup> While balloon hangars did not require special construction, airship hangars had to accommodate the immense size of the aircraft, particularly the dirigibles. The characteristic features of airship hangars are great height and different solutions to the engineering problem created by the need for doors of vast scale at the ends of the hangar. LTA facilities also are characterized by specialized support facilities such as mooring masts and gas generating, purification, and storage facilities.

#### Evolution

##### Army and Army Air Corps

The Army Signal Corps began experimenting with balloons as a method of reconnaissance during the Civil War and continued to use balloons for aerial observation through World War I. In 1898, the Signal Corps established a small post at Ft. Myer, Virginia, and constructed a balloon hangar, since demolished. No construction plans for balloon hangars were identified in the Quartermaster Department collection of 1891 - 1918 standardized plans.

When the United States declared war on Germany in 1917, the Signal Corps had five balloons under its control.<sup>17</sup> During World War I, the Army greatly expanded its lighter-than-air activities and acquired 411 balloons.<sup>18</sup> Many mobilization airfields included balloon hangars. For example, four wood-frame balloon hangars were constructed in conjunction with the establishment of Post Field at Ft. Sill, Oklahoma, in 1917.

In 1920, the Army had ten balloon companies, stationed at: Ft. Lewis, Washington; Ft. Sill, Oklahoma; Ft. Knox, Kentucky; Ft. Benning, Georgia; Aberdeen Proving Ground, Maryland; the Philippines; and, Hawaii.<sup>19</sup> During the 1920s, the Army began to reduce its use of balloons, as airplanes became the dominant aircraft. The Army declared a number of balloon companies inactive in 1922. By 1939, only three squadrons remained active. These squadrons were located at Pope Field, North Carolina; Gray Field at Ft. Lewis; and, Post Field at Ft. Sill. The men of these balloon squadrons used aerial observation to help artillery units direct their fire.

Surviving balloon hangars are a rare property type. Few examples were identified during the field work conducted for this study. Two small, one-story, balloon hangars constructed in 1919 are located at the airfield at Ft. Benning, Georgia (Figure III-168). Ft. Sill has a large, eight-story blimp hangar, constructed in 1935 for a motorized, non-rigid airship.

The largest lighter-than-air aircraft were the motor-powered rigid airships or dirigibles. The Signal Corps experimented with its first dirigible in 1907 when a gasoline engine was suspended from a cylindrical balloon. During the 1920s and 1930s, awed by the success of the German Zeppelins, the Army Air Corps developed a dirigible program. During the 1920s, experimentation with dirigibles was concentrated first at Langley Field, Virginia, then at Scott Field, Illinois. The 1919 dirigible hangar at Langley Field was 420 ft. long, 125 ft. wide, and 116 ft. high; it later was demolished.<sup>20</sup> The massive hangar was located in a distinct cantonment constructed to serve the field's lighter-than-air activities, which were located on the opposite side of the installation from the heavier-than-air activities. Ground support facilities for dirigibles included mast moors, hydrogen generating plants, compressor gas plants, and large hangars. No dirigible hangars or directly related support facilities still exist at Scott AFB, Illinois; at Langley AFB, Virginia, a hydrogen plant and a compressor plant remain in the former lighter-than-air area (Figure III-168). In 1937, the U.S. Army ended its dirigible program.

### Navy

After several seasons at Greenbury Point, near the Naval Academy in Annapolis, Maryland, the Navy moved its aviation school to the Pensacola Navy Yard in 1914. The Navy stationed its first airship at Pensacola and stored it in a floating hangar.<sup>21</sup> In 1917, a dirigible hangar was constructed at the Pensacola air station, which also was the site of several free balloon hangars. These early hangars are not extant.<sup>22</sup> Though the General Board of the Navy in 1916 proposed the establishment of 12 additional naval air stations, each with 7 hydroplanes and an airship, no additional air stations had been established before the United States' entry into World War I.<sup>23</sup>

The Navy expanded its lighter-than-air aviation program during the 1920s and the 1930s. In 1919, the General Board of the Navy recommended the establishment of a major construction and operating base to allow the Navy to build its own rigid airships, an operating base located in Hawaii, and a program of two rigid airships for each battle squadron.<sup>24</sup>

The Navy initiated this ambitious program with the construction of a Naval Air Station at Lakehurst, New Jersey, as a port for airships. Hangar No. 1 was completed in 1921 (Figure III-169). The steel-frame, metal-clad hangar measures 961 by 350 ft. and is 200 ft. high. The enormous double doors were mounted on railroad tracks.

In 1931, the Navy established a second dirigible station at Sunnyvale, California, as the West Coast counterpart of Lakehurst. Moffett Naval Air Station was designated as the home of the USS *Macon*, a new dirigible then under construction. The airship hangar, completed in 1933, was constructed of steel girder framing sheathed with asbestos-protected large metal plates and measures 1115 ft. wide, 308 ft. wide, and 194 ft. high (Figure III-169). The hangar doors are curved leaves that rotate on a roof pin, and are supported by curved tracks and powered by motors; this type of door was called an "orange-peel" door. This hangar was similar to a hangar built in 1929 in Akron, Ohio, by the Goodyear-Zeppelin Corporation. The Moffett air station also included a reinforced-concrete balloon hangar that measures 89 ft. by 131 ft. LTA support facilities included a hydrogen plant and a mooring mast.<sup>25</sup>

The Navy's ended its rigid airship program after the USS *Akron* and the USS *Macon*, the Navy's two large dirigibles, crashed in separate accidents during the mid-1930s. The large, rigid airships were too vulnerable to explosions and to rough weather. The Navy continued to use blimps for aerial observation along the coasts. Blimp hangars were constructed at several naval air stations. They usually were metal frame structures clad in metal panels; the size of the structure depended on the size of the aircraft assigned to the station (Figure III-170). Large blimp hangars were constructed at Marine Corps Naval Air Station, California; Tillamook, Oregon; and,

Moffett Field in the early 1940s. In 1961, the Navy halted all lighter-than-air activity and ordered the blimps deflated and stowed.

### **Association**

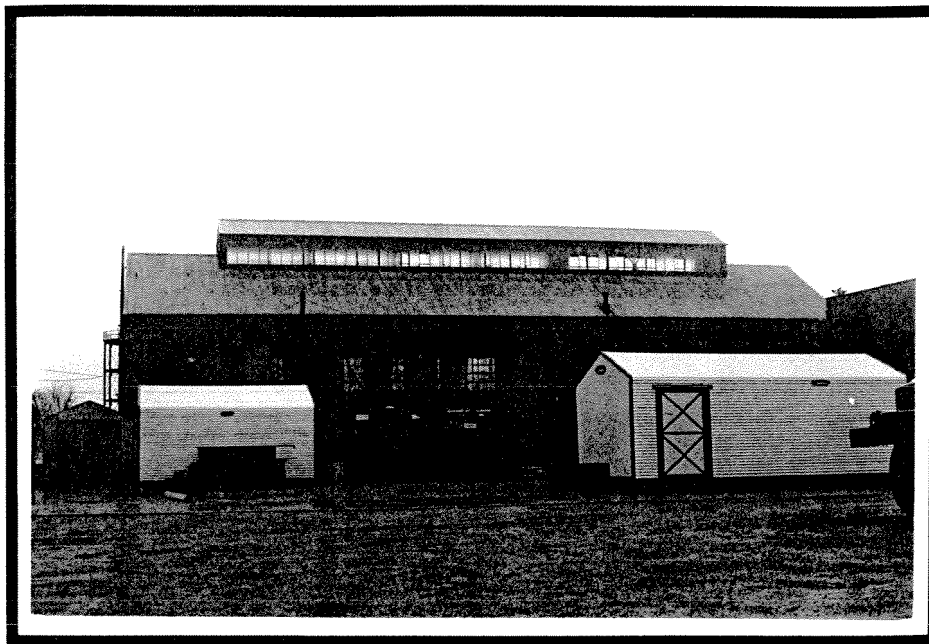
Lighter-than-air hangars and their attendant support structures are associated directly with the evolution of lighter-than-air aviation and its application by the military. The hangars also may represent a unique type of construction and may be significant as engineering achievements. LTA facilities may be small, utilitarian buildings or large, impressive structures that are engineering marvels. Where large hangars remain extant, they may possess individual significance for architectural or engineering merit, or may contribute to an installation historic district. Support buildings or isolated balloon hangars may survive as fragments of LTA activities at an installation; however, in order to represent the LTA period of significance, the facilities must have important associations with that activity and be able to convey that association.

### **Integrity**

Lighter-than-air hangars and their support structures are relatively rare property types. To possess integrity, LTA hangars and their support structures should retain their location and most of their architectural and engineering design features and external construction materials from their period of construction. Exterior elements that may have been modified include exterior cladding, doors, and windows. Where subsequent additions or renovations have been made, these facilities still may have integrity if they retain the majority of their setting, design, materials, and association.

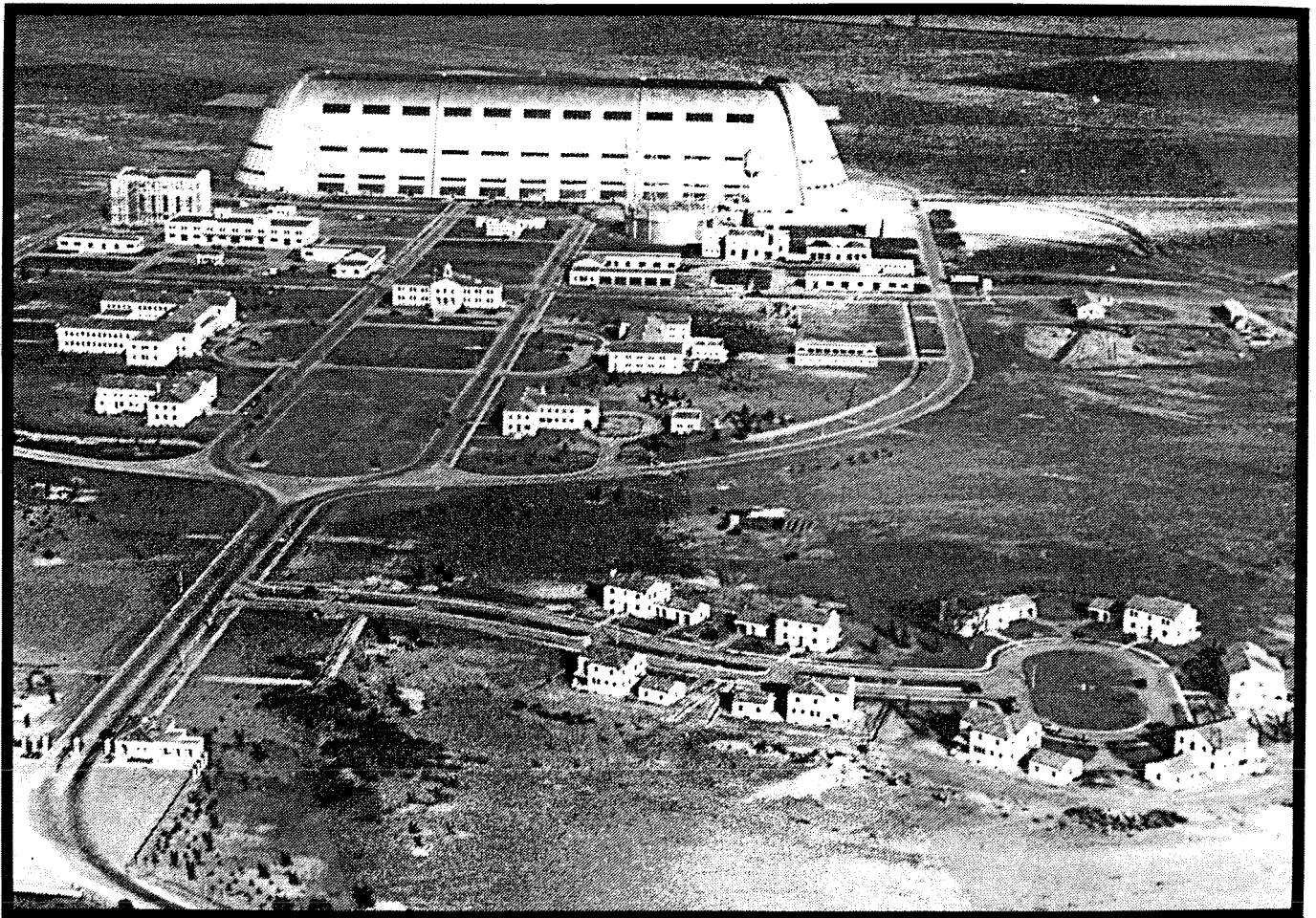
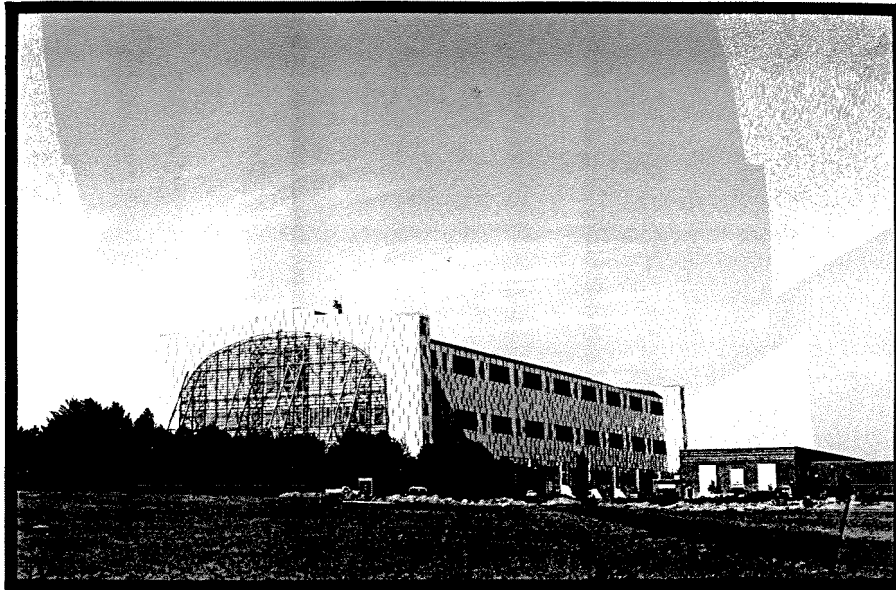






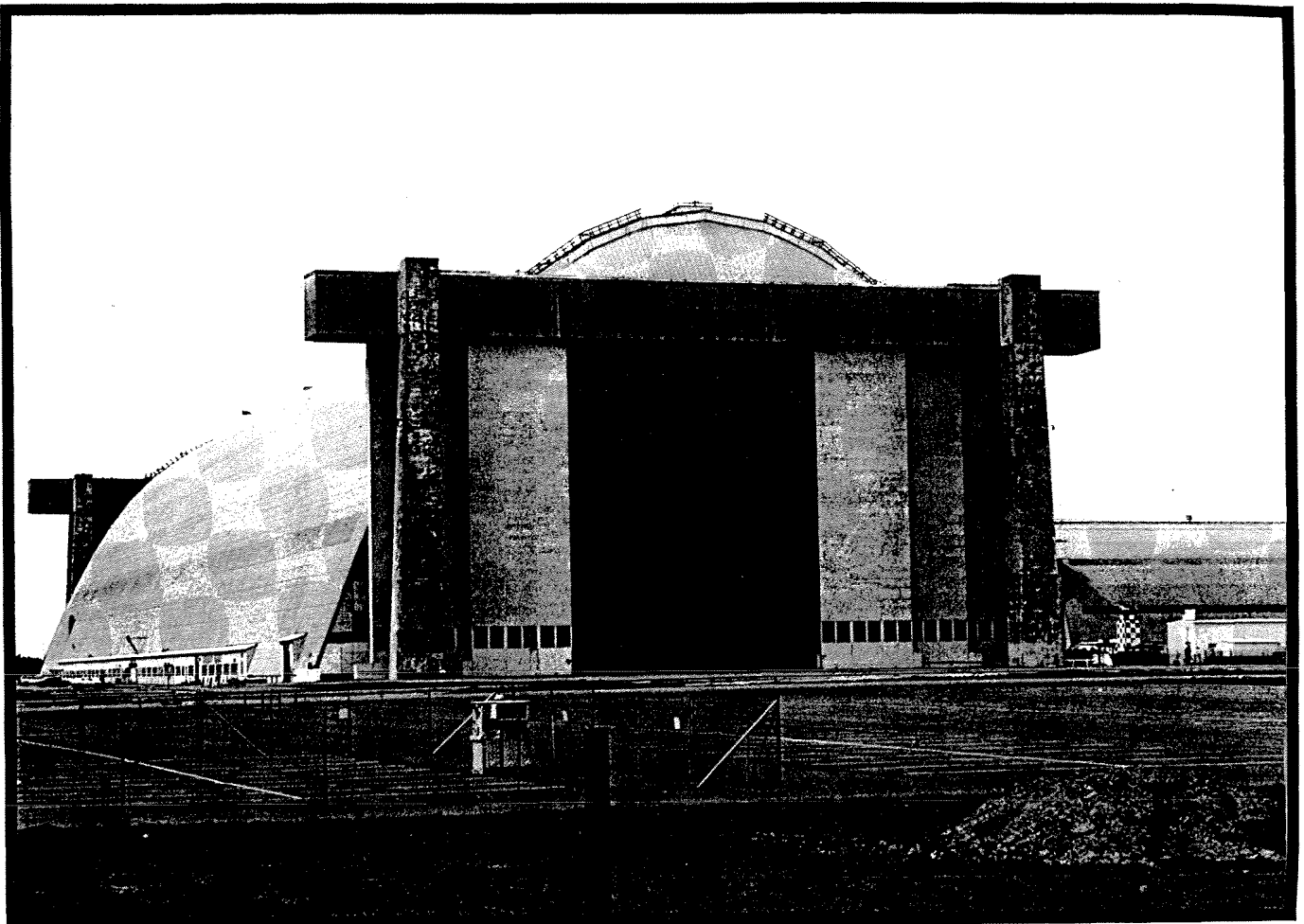
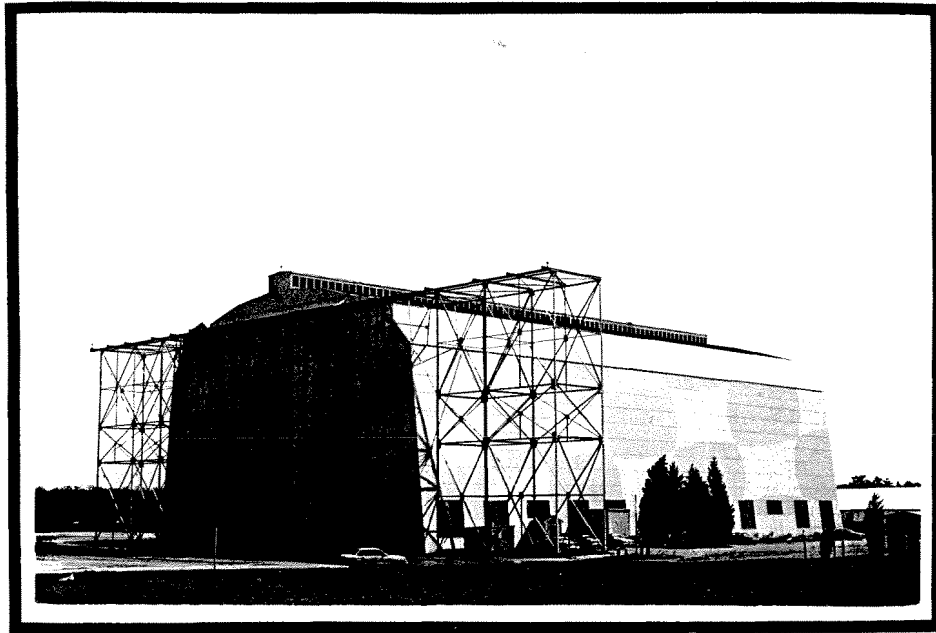
**Figure III-168.** 1919 Balloon hangar (Building 304, Ft. Benning, Georgia), *above*. 1917 Hydrogen generating plant for lighter-than-air craft (Building 1004, Langley AFB, Virginia), *below*.





**Figure III-169.** 1921 Dirigible hangar (Hangar 1, Naval Air Warfare Center Aircraft Division, Lakehurst, New Jersey), *above*. 1933 Dirigible hangar (Hangar 1, Naval Air Station, Moffett Field, California), *below*





**Figure III-170.** 1932 Blimp hangar (Building 118, Naval Air Engineering Center, Lakehurst, New Jersey), *above*. ca. 1940 Blimp hangar (Marine Corps Air Station, Tustin, California), *below*.



## Animal-Related:

### Stables and Stable Complexes

#### Description

Stables were constructed to house horses or mules and were an important part of nineteenth- and early twentieth-century Army posts associated with the cavalry and artillery. Stables also were associated with installation or regional quartermaster logistical and supply activities. Stables typically were long, rectangular, gable-roofed structures, with doors at the end elevations and windows along the side elevations. Most surviving examples were built of brick or stone. The stables for different branches are located in distinct areas of the post. The quartermaster stables generally were one-and-a-half stories with the half story used as a hay loft; they typically display little architectural detailing. Cavalry and artillery stables were constructed generally as separate complexes consisting of stables, stable guard houses, and blacksmith shop. Artillery stable complexes also included gun sheds. Cavalry and artillery stables are characterized by monitor roofs and, at permanent installations, by a greater degree of architectural detailing than that found on other types of stables.

#### Evolution

##### Army and Army Air Corps

Quartermaster stables and corral for the animals used to transport provisions were standard components of nineteenth-century western posts. Corrals were large square enclosed areas to protect horses from attackers (Figure III-171). Stables at the many temporary, frontier posts were utilitarian, long, rectangular buildings located apart from the parade ground, near the shop buildings (Figure III-171). Quartermaster stables gradually disappeared when railroads became the primary means of transporting supplies to Army installations. Yet, isolated installations continued to rely on wagon suppliers until the advent of trucks and motorized transport, sometimes until the 1930s. The Quartermaster stables identified in this study have remained remarkably similar over time. The typical example of a Quartermaster stable is rectangular, one-and-one-half story building, with stalls on the ground floor and a storage area in the half story (Figure III-171). Most installations had no more than a few Quartermaster stables.

During the nineteenth and early twentieth centuries, cavalry and artillery regiments required horses as the main support for their missions. At the small frontier posts of the mid-nineteenth century, cavalry horses were stabled directly behind the barracks. Unofficial Army regulations proposed in 1860 recommended enclosed stables with a central corridor lined with stalls.<sup>26</sup> At frontier posts, stables were arranged in blocks with open stalls facing each other, or they were arranged in rows. The quality of stables was a matter of concern to officers; one writer noted that:

From the number of suggestions received from cavalry officers about stables, it would appear that there is room for improvement in their construction...There seems to be a general opinion that we should have closed stables where the winters are severe, and open stables where they are not. That closed stables should have ridge ventilation, and should be better lighted than they generally are.<sup>27</sup>

When the Army consolidated its troops at larger, permanent posts during the 1880s and 1890s, cavalry and artillery posts required larger stable complexes. The Quartermaster



Department began to incorporate cavalry and artillery stables as part of the design and overall plan for new installations. At Ft. Riley, Kansas, for example, stables and guard houses became an integral part of the installation plan. The cavalry stables were located along the southern edge of the installation, arranged in an arc (Figure III-172). The rectangular stables were closed entirely under a gable roof with a ventilation monitor along the ridge of the roof; the interior plan consisted of a central corridor lined with stalls. This basic form of permanent cavalry stable continued until World War I. Horses were among the most valuable property at the posts; consequently, stable guardhouses were a standard component of stable complexes. The guardhouses typically were simple, one-story buildings that matched the stables in construction materials and character (Figure III-172).

Distinct veterinarian stables and support buildings were constructed after around 1900. The first veterinarian complex was constructed at Ft. Sheridan, Illinois.<sup>28</sup> Veterinarian stables characteristically were T-shaped buildings with a large arched opening at the end elevation that provided cover for both horses and supply wagons. The interior plan was similar to other types of stables. Separate veterinarian facilities were constructed at Ft. Riley, Kansas, in 1902, and at Ft. D. A. Russell, in 1908 (Figure III-173).

Artillery stables were similar to cavalry stables. The major distinction was that some artillery stables were T-shaped and narrower than the stables for cavalry horses. Artillery stables also were built in complexes consisting of rows of stables with guardhouses between the stables. Artillery stable complexes had one additional building type, the gun shed, which was used to house artillery. At Ft. Riley, the gun sheds are one-story, narrow, rectangular, gable-roofed structures arranged in a widely spaced row across from the artillery stables (Figure III-173).

Evidence of formally planned cavalry and artillery stable complexes remains extant at Ft. Riley, Kansas; Ft. Sheridan, Illinois; Ft. Sill, Oklahoma; Ft. Myer, Virginia; and, F.E. Warren AFB (formerly Ft. D. A. Russell), Wyoming. At Ft. Sill, Oklahoma, the shaped gable ends of the 1911 artillery stables reflected the influence of the Spanish Mission Revival architecture at the new artillery post (Figure III-173).

The Army continued to construct cavalry and artillery stable complexes during the 1930s. The Army retained its horse cavalry until 1947 and its horse-drawn artillery until the eve of World War II. However, the number of stables decreased dramatically between World Wars I and II as motorized vehicles gradually replaced horses. Stable complexes constructed during the 1930s contained the same components as earlier stable complexes, including stables, guard houses, gun sheds, and a veterinarian complex. The brick artillery stables at Ft. Bragg, North Carolina, consist of one-story rectangular stable sections with one-and-a-half story blocks at the end elevations (Figure III-174). The stable guard houses resemble NCO cottages with porches (Figure III-174). The gun sheds are one-story buildings with garage door openings along the side and a one-and-a-half story end block (Figure III-174).

Although mechanization eventually replaced the horse, horses remained an integral part of Army culture. Officers were expected to practice their equestrian skills. Stables were included at military schools even during the 1930s. Even the Air Service Tactical School required 25 hours of instruction in stable management until 1923.

### Navy and Marine Corps

Stables were not a prevalent building type on Navy and Marine Corps installations since the focus of both these services was on ships and water transport. Stables on naval installations generally served as private stables for use by the naval officers living on the installation or for draft

animals necessary for hauling provisions (Figure III-175). During the nineteenth century, marine railroads were used to haul or move raw materials and equipment in shipyards. Historic maps of Navy shipyards do not depict large stable complexes.

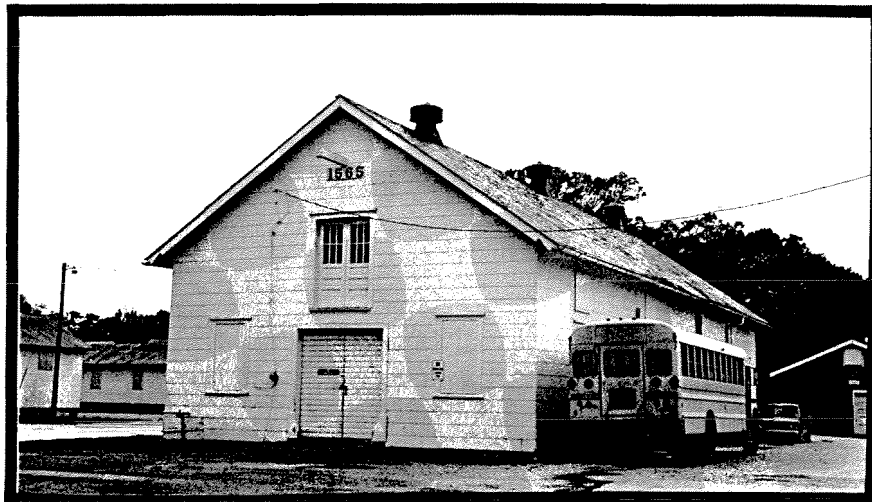
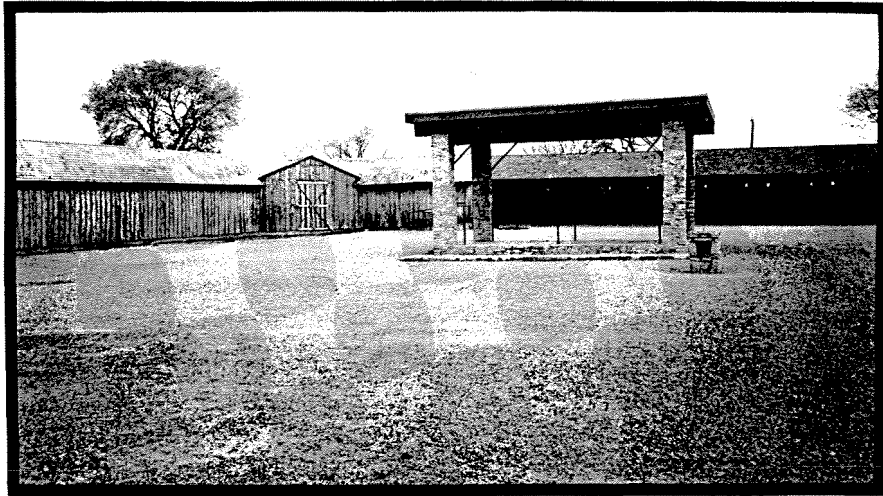
### **Association**

Stables and stable complexes are associated with a time when horses were essential to military operations. Horses were not only essential to cavalry and artillery units, but were used to move military supplies. Stables also are associated closely with frontier posts and western expansion. The evolution of the design of stable complexes is related to the development of installation planning, culminating in the post planning and beautification movements of the late nineteenth and early twentieth centuries. Stables can be major components of an installation or minor support buildings. A stable complex may possess significance for its association with significant historical themes or as a distinguishable architectural entity. Both stable complexes and isolated stables should be assessed for their potential as contributing buildings to an historic district, since stables were integral to the mission and operation of Army posts during most of the period preceding World War II. Stables identified on naval facilities are secondary, support structures that may be contributing buildings in an historic district; however, they are not associated specifically with significant events or themes related to the Navy or Marine Corps.

### **Integrity**

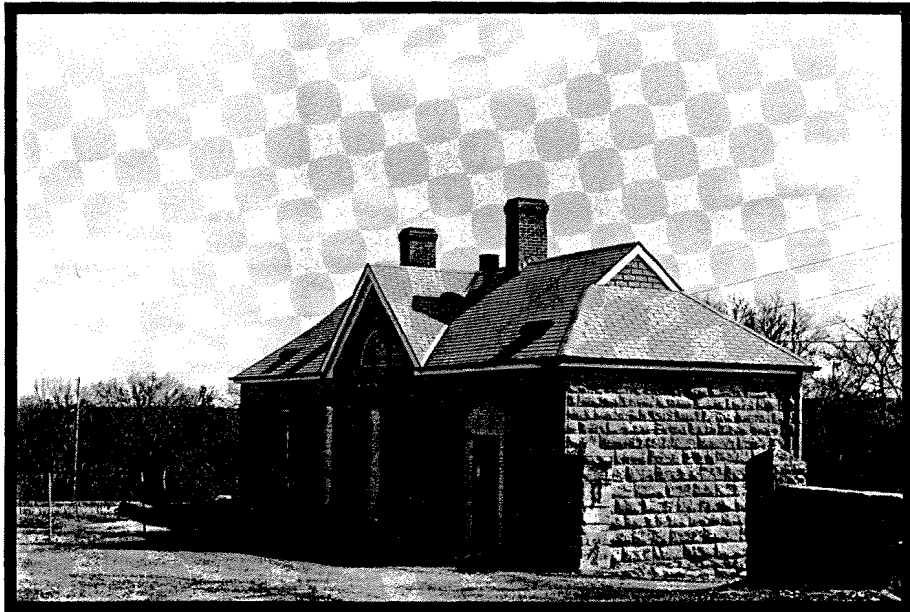
Few military stables continue to serve as stables. Most stables have been converted to other uses, including storage, offices, resident support activities, garages, and hobby shops. To possess sufficient integrity to contribute to an historic district, stables and their associated support buildings should retain their original location and most of their setting, design, exterior materials, workmanship, and association. Exterior elements that often have been modified include location and size of window and door openings and the installation of new doors and windows. In cases of subsequent additions or renovations, the stables and associated buildings still may have integrity if they retain the majority of their character-defining features, including building shape, roof design, exterior materials, overall pattern of openings, and relationship to associated buildings within the installation plan.





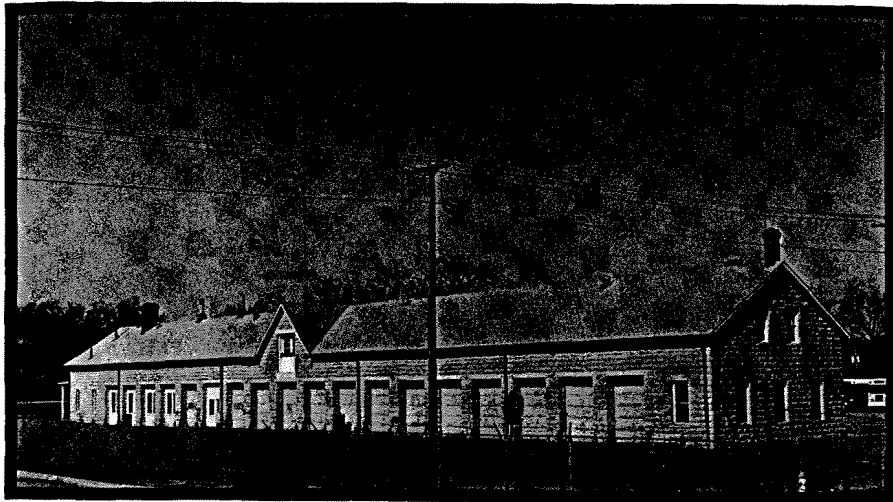
**Figure III-171.** 1870 Quartermaster corral (Ft. Sill, Oklahoma), *above*. 1893 Quartermaster stable (Building 2011, Ft. Bliss, Texas), *middle*. 1907 Quartermaster stable (Building 1585, Naval Complex Pensacola [formerly Ft. Barrancas], Florida), *below*.





**Figure III-172.** 1880s Cavalry stable complex (Ft. Riley, Kansas), *above*. 1897 Stable guard house (Building 283, Ft. Riley), *below*.

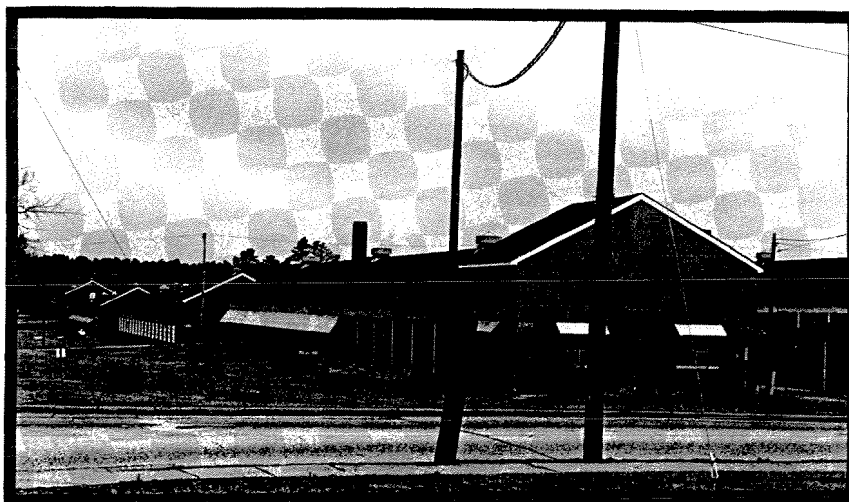
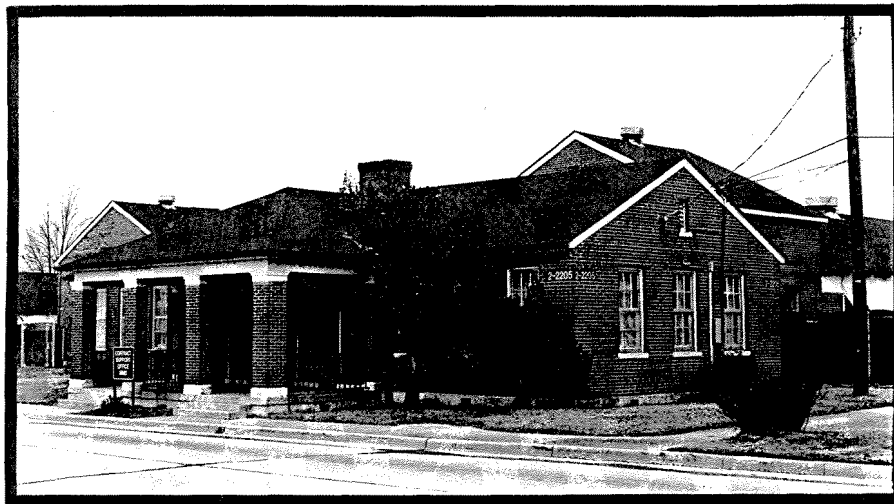




**Figure III-173.** 1908 Veterinarian stable, Quartermaster standardized plan no. 166 (Building 329, F.E. Warren AFB [formerly Ft. D.A. Russett], Wyoming), *above*. 1905 Gun shed (Building 375, Ft. Riley, Kansas), *middle*. 1911 Stable (Building 1714, Ft. Sill, Oklahoma), *below*.







**Figure III-174.** 1935 Artillery stables (Buildings 22404, 22405, 22205, Ft. Bragg, North Carolina), *above*. 1935 Stable guard house (Building 22205, Ft. Bragg), *middle*. 1935 Gun sheds (Buildings 22402 and 22802, Ft. Bragg), *below*.





**Figure III-175.** 1851 Stable, later converted to storage (Building 40, Portsmouth Naval Shipyard, Maine). (Courtesy U.S. Navy)



## Vehicle-Related:

### Gas Stations

#### Description

Gas stations first were constructed at military installations during the 1930s. The gas stations resembled small, civilian service stations of the same era. The typical gas station consisted of a small, one-story building with several gasoline pumps in front of the building. In some examples, a roof extended from the building over the pumps. Gas stations often were designed to match the prevailing architectural style of the installation, such as the Spanish Colonial Revival or the Georgian Colonial Revival. Gas stations constructed during the 1930s sometimes display the elements of the streamlined Moderne architectural style. Installations typically had only one gas station, usually located in a convenient, yet unobtrusive site.

#### Evolution

##### Army and Army Air Corps

Gas stations were constructed as minor support facilities during the wave of new construction of the late 1920s and 1930s when the Army modernized many of its posts and airfields. Gas stations of the inter-war period retain the same general appearance and do not display any major evolution in design. Most surviving examples of the early gas stations were constructed during the late 1930s; earlier examples may have been demolished to make way for more modern facilities. The small gas stations generally had only a few pumps and were designed to complement the design of the other buildings of the cantonment, particularly at installations built during the inter-war period (Figure III-176). Post World War II gas stations are much larger than the pre-war facilities.

##### Navy and Marine Corps

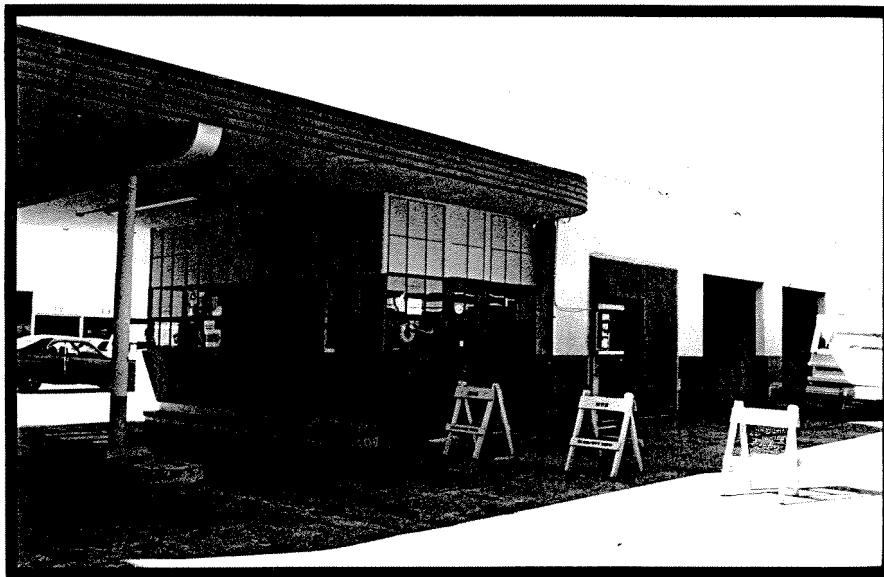
The Navy constructed gas stations at its installations with large resident populations, such as training stations, and air stations, during the 1930s. Gas stations were more common at the newer installations developed after World War I and usually were simple, one-story structures that were compatible with the overall architectural character of the installation. One example is located at Naval Air Station, Moffett Field, California. The 1933 gas station was a small, one-story building with Spanish Colonial Revival design elements. Few gas stations constructed before 1940 were identified during the field survey undertaken for this project.

#### Association

Gas stations are associated with the development of automobiles as a major mode of transportation. They were constructed at military installations during the inter-war period, when the military began to provide many of the same services found in cities to installation residents. Pre-1940 gas stations are typically found at military installations with large resident populations. Gas stations are minor building types that do not possess individual historic significance; however, they can be contributing elements to an historic district if the design of the gas station reflects the overall architectural character of the individual installation.

## **Integrity**

To possess integrity, gas stations should retain their location and most of their setting, design, workmanship, and materials from their periods of construction. Most gas stations constructed before 1940 are no longer used as gas stations, or have been altered so that their original design is unrecognizable. Where subsequent additions or renovations have occurred, the building still may have integrity if it retains the majority of its character-defining features, such as the basic shape of the building, projecting roof bay, exterior materials, pattern of openings, and design features that define its original architectural expression, such as revival or Moderne stylistic references.



**Figure III-176.** 1940 Gas station, Quartermaster standardized plan (Building 48, Scott AFB, Illinois), *above*. ca. 1940 Gas station at Rockwell Field (Naval Air Station North Island, California), *below*.





## Vehicle-Related:

### Motor Pools

#### Description

The military, particularly the Army, began to construct facilities for motorized vehicles during the early twentieth century, when motorized vehicles began to replace trains and horses. Two types of motorized vehicle facilities were built: (1) motor pools to service and repair motorized vehicles that were used for logistical support and supply; and (2) separate facilities for tactical motorized vehicles. Garage and repair facilities were one-story, rectangular, masonry buildings with wide bands of industrial sash windows and parapeted gable ends; they resembled smaller versions of early 1930s gabled hangars. In some cases, larger motor pool facilities were constructed by joining several units of the basic building form. Motor pool facilities for tactical vehicles were larger than general motor pool facilities and typically consisted of buildings with one-story central portions flanked by block ends. Garage door bays lined the long sides of the center portion of the buildings. Motor pool facilities generally were located apart from the main cantonment area in a secondary service area.

#### Evolution

##### Army and Army Air Corps

The Army first used motorized vehicles in 1899; however, motorized transport did not prove itself until Pershing's expedition into Mexico in 1916 against Pancho Villa. Within three months of the expedition's start, the Army had 588 trucks, 57 motor tanks, 10 motor machine shop trucks, 6 wreckers, 75 automobiles, and 61 motorcycles.<sup>29</sup>

The Quartermaster Corps began to construct distinct motor pool areas, in the same way that earlier quartermasters had designed separate stable complexes. Motor pools of garages, storage facilities, and repair shops were located in a complex apart from the living and administrative areas of the post. The Quartermaster Corps may have based the designs for early motor pool buildings on stable designs; some early motor pool buildings have the monitor roof and shaped gable ends of some stable designs.

The typical motorized vehicle garage appears to have evolved from nineteenth-century vehicle storage sheds and gun sheds. Between the 1890s and 1917, the Quartermaster issued a series of standardized plans for sheds to store wagons and field artillery pieces. The typical vehicle shed was a horizontal, one-story building with wide, paired doors along the side elevation. Eventually, steel rolling doors on overhead tracks replaced the paired doors.<sup>30</sup>

Maintenance and repair shops for motorized vehicles generally were brick utilitarian structures with industrial sash windows. Most were constructed as part of the wave of new post construction and improvement during the 1930s. The Quartermaster Corps developed shop buildings as multiple-use building types. The same basic building design was constructed as utility buildings, general maintenance and repair shops, Army Air Corps shops, and general storehouse functions, in addition to its construction as maintenance and repair garages (Figure III-51).

Specialized repair and maintenance facilities were developed to service tactical motorized vehicles, such as the early tanks developed for the mechanized cavalry. These facilities, which

resembled the artillery stables also constructed during the 1930s, consisted of masonry, one-story, rectangular buildings flanked by blocks at the end elevations and with garage bay doors lining the side elevations. An important feature that distinguishes this building type from stables are the large expanses of industrial windows that provided interior light to aid repair work (Figure III-177).

Some arsenals have vehicle repair shops that vary from the typical pattern. The technical branches often developed their own building plans instead of relying on Quartermaster plans. For example, the vehicle repair shop at Picatinny Arsenal, New Jersey, is a two-story, concrete structure with industrial, steel-sash windows; it resembles industrial designs for automotive shops and factories of the 1920s and 1930s (Figure III-177).

### Navy and Marine Corps

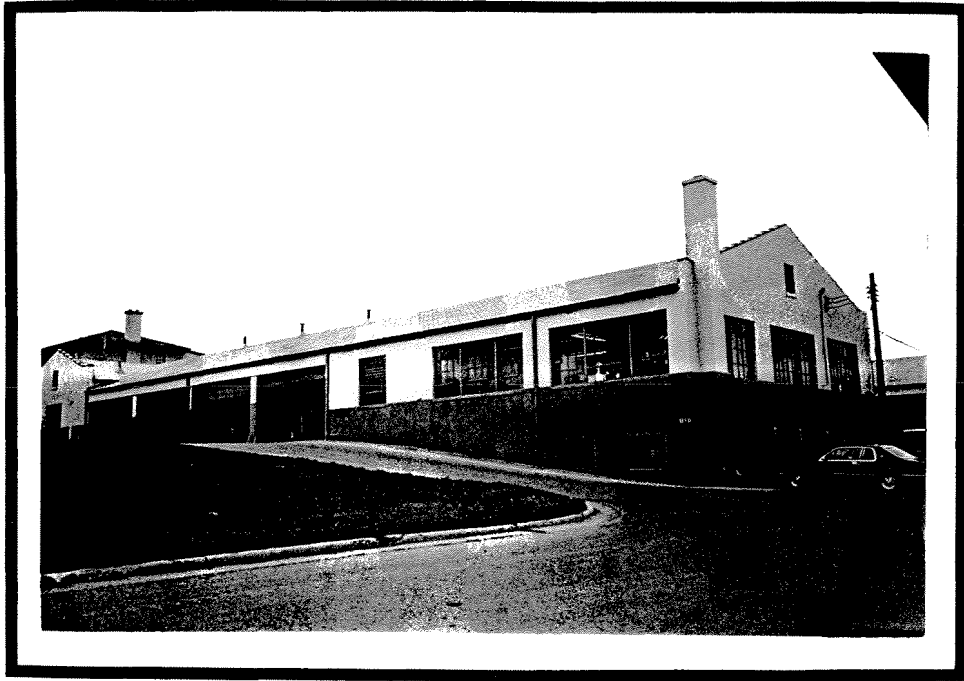
The Navy and Marine Corps did not develop motorized land vehicles as a significant element of their shore facilities. Thus, vehicle maintenance and repair facilities were not important parts of installation construction. Few pre-1940 motor pool facilities were identified at Navy or Marine Corps facilities during the field survey conducted on behalf of this study. Generally, motor pools constructed before 1940 were temporary sheds constructed of wood or corrugated metal.

### **Association**

Motor pools are associated with the adoption of mechanized vehicles for logistical support and as a tactical weapon during the inter-war period. These facilities are related to the themes of technology and transportation. Motorized vehicle facilities generally are utilitarian structures located in the support areas of an installation. They generally do not possess individual historic significance, but may be contributing elements to an historic district and can reflect, in a utilitarian fashion, the overall architectural character of an installation.

### **Integrity**

To possess integrity, motorized vehicle facilities should retain their location and most of their design, materials, setting, workmanship, and association from the period of significance of the historic district. Motor pool facilities often continue to serve as maintenance, repair, and storage facilities for military vehicles, or, at some installations, have been converted into storage or other utility shops. The size and location of openings may have changed; doors and windows often have been replaced. Where subsequent additions or renovations have occurred, the building may have integrity if it retains the majority of its character-defining features, including exterior construction materials, garage openings, metal sash windows, and relationship to associated buildings within the installation plan.



**Figure III-177.** 1934 Vehicle maintenance shop (Building 1501, Ft. Sill, Oklahoma), *above*. 1933 Vehicle repair shop (Building 33, Picatinny Arsenal, New Jersey), *below*.



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