SPACE, STATUS, AND INTERACTION: MULTISCALAR ANALYSES OF OFFICERS, SOLDIERS, AND LAUNDRESSES AT NINETEENTH CENTURY FORT VANCOUVER, WASHINGTON

By

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Department of Anthropology

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Abstract

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In this study I investigated how the mid-19th century American military system at Fort Vancouver and the Vancouver Ordnance Depot, in southwest Washington, created and reinforced the dominant ideology simultaneously within multiple levels of culturally created space. The construction of space as theorized by Lefebvre (1974, 1991) provided a model to understand how cognitive processes produce cultural conceptions of space. As cultural constructs, these spaces and objects embody and reflect conceptualizations of social class, gender, and power relationships. These spaces vary in size, from that of the community level cultural landscape to that of the smallest object, and material culture facilitates this process within each spatial tier through non-verbal distribution of symbolically encoded information.

Between 1849 and the mid-1880s, members of the military community operated within a rigid social climate with firm cultural expectations and rules of behavior that were explicitly codified and articulated within the larger Victorian societal culture of gentility. Drawing upon datasets derived from the archaeological record and documentary sources, I examined how the
military system reproduced and reinforced culturally idealized class and gender roles, and how these roles structured the lives of military personnel and attached civilians within the military community. Specifically, I identified and analyzed three levels of cultural space at the garrison: the built environment, the household, and the individual. Using historical documents and archaeological evidence, the experiences of both men and women within the highly structured dominant androcentric military paradigm were considered for three military households: junior commissioned officers, non-commissioned officers and laundresses, and enlisted men.

It was not only the architectural plan that was intentionally contrived to reflect and express the rigid hierarchical configuration of the Army. Social and economic divisions between personnel were also reproduced at the household and personal levels of space by restricting access to resources (income, fuel, food, and transport) based on military rank. I argue that the physical built environment, internal military resource distribution system, and military regulations, particularly as they pertain to clothing and interpersonnel relationships, provided formal, institutionalized metaphors that embodied and transmitted military values simultaneously at the community, household, and individual levels.
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Dedication

This dissertation is dedicated to Ann Horton
CHAPTER ONE
INTRODUCTION

Archaeologists attempt to understand and when possible to reconstruct dynamic processes in past societies. To fully comprehend the interactions within a human community we search for all significant influences, including the surrounding cultural settings(s) from which people cannot be isolated (Avery 1982; Groenman-van Waateridge 1988). Traditionally, these studies focus on the scale of the community or landscape.

Modern landscape studies examine landscapes with the view that landscapes are not simply occupied parcels of ground jigsawed together (Deetz 1990:3). A critical component of landscape approaches in archaeology is the interrelationship between a place and the human behaviors that occur within it (Branton 2009:52). Landscapes are not viewed as bounded areas, but as “open and porous networks of social relations” (Massey 1994:121). Such an interactive relationship may be conceptualized through the idea of the cultural landscape – the physical spaces perceived and created by humans, imbued with meaning, and understood in culturally specific terms such that function and meaning are inseparable. In other words, humans interpret and respond to these settings, or culturally defined landscapes, through social, cultural, political, and economic filters (Brown 1997). And, most importantly, they build things and otherwise modify the landscape, and attach meanings and emotional weight to these physical constructions and alterations, as well as to the characteristics of the "natural" landscape.

People interact with the landscape in a cognitive manner, and landscapes are actively assessed by individuals that “draw upon previous experiences as a means of recognizing what course of action may be required” (Barrett 1999:27). The cultural landscape contains and
intertwines the material reproduction of society with the cultural understandings of that process. “It is both a tool and the context of social change, being part of the constitution and daily reconstitution of society” (Hood 1996:139). Rather than limiting theoretical discussions in landscape archaeology to the larger landscape itself, I suggest we shift our theoretical perspectives to view landscapes as only one level of culturally conceptualized space, as similar processes are simultaneously operating at much smaller scales.

Not only the larger landscape, but each of these cultural spaces contain and intertwine the material reproduction of society with the cultural understandings of that process. These spaces operate simultaneously at multiple scales, including at the landscape, community, familial, household, room, object, and design levels, among others, with each layer intersecting and/or nested within other layers of cultural space(s). I envision this theoretical concept as ‘nested cultural spaces,’ wherein individuals simultaneously experience the world at multiple levels of culturally defined intersecting and overlapping cognitive spaces.

“Humanly created space is the space of social reproduction” (Tilley 1993:81). As cultural and cognitive constructions, these spaces reflect conceptualizations of social class, gender, and power relationships, all of which are continually being negotiated on a daily basis. Although cultural spaces are mental constructs, these conceptions can be detected through patterns of material culture as well as within documentary literature, which can reflect peoples’ maneuvering through and within the spaces they create; in essence physically responding to and influencing the cultural meanings assigned to the world in which they operate through the mediation of symbols transmitted via the daily use of material culture.

This study explores how the process of community conceptualizations of space and cultural values used to define that space operate at multiple levels simultaneously, through
interacting with material culture, or tangible expressions of the conceptualized spaces.

Multiscalar analytical approaches allow us to move through these nested layers of meaning within a community, from the level of trade networks, to the built environment, to that of the object, to examine how culturally idealized concepts of class and gender roles are simultaneously expressed, reinforced, negotiated and/or resisted.

The mid-19th century Victorian era was selected for examination as a huge collection of documentary sources exist that were internally created to express how members of that culture perceived and interacted with the dominant Victorian paradigm, particularly in reference to the material culture produced and utilized by adherents to this cultural framework. When social values and meanings are assigned to objects, those abstract concepts then embody a physical form (Appadurai 1986). Procurement and use of goods allows an individual to express their sense of self, either perceived or desired (McCracken 1988; Miller 1987). In the Victorian era, the display of ‘proper’ objects created environments that reflected idealized virtues for gender roles, but also created, defined, and managed social relationships (Praetzellis and Praetzellis 2001).

The mid-19th century military occupation at Fort Vancouver, in southwest Washington, was selected as a case study as the community operated within the military socioeconomic system; a rigid social climate with firm cultural expectations and rules of behavior that were explicitly codified. American military posts were (and still are) physically, socially and economically intricate landscapes. They are intentionally created spaces of self-sufficiency, designed and transformed according to the dictates of the military elite to reflect social concepts of power, status and ideology, in turn articulating itself within the larger Victorian culture of Gentility.
Figure 1. Location map of Vancouver National Historic Reserve and Fort Vancouver National Historic Site in southwest Washington.
One archaeological site of the American military, Fort Vancouver, located on the north floodplain of the lower Columbia River in southwest Washington, is preserved at the modern Fort Vancouver National Historic Site (FVNHS) managed by the National Park Service (NPS; see Figure 1 and Figure 102). The site was first established as a monument in 1948, and was listed as a Historic Site in 1961. The site is within the Vancouver National Historic Reserve, which also encompasses city-owned properties that are affiliated with the NPS site. The Reserve is cooperatively managed under a partnership between the National Park Service, City of Vancouver, and State of Washington.

Drawing upon datasets derived from the archaeological record and documentary sources, I conducted spatial analyses of three levels of culturally defined spaces; the built environment, the household, and the individual. Distributions of food remains, military and personal artifacts were analyzed to examine how the military system reproduced and reinforced culturally-idealized concepts of class and gender roles for members of the military community, and how these roles structured the lives of military personnel and attached civilians within the military community.

Organization of this Dissertation

The following nine chapters provide the theoretical framework, historical context, archaeological field methodologies, archaeological stratigraphy, and analyses of the built environment and selected artifact classes to address research questions posed, and the following is a brief outline of topics covered. In Chapter Two, I develop the theoretical concept of ‘nested cultural spaces.’ First, I review and deconstruct current archaeological approaches to analyzing
space and landscapes. Then, using Lefebvre’s (1991) discussion on the human cognitive process of defining and creating space as a point of departure, I argue that individuals simultaneously experience the world at multiple levels of culturally-defined cognitive spaces. Each level of space reflects conceptualizations of social class, gender, and power relationships, all of which are continually negotiated by community members on a daily basis. Although cultural spaces are mental constructs, these conceptualizations can be detected through patterns of material culture. This study specifically examines how these social relationships are reflected within the material culture at three levels of cultural space – the structure of the built environment itself, sub-group identities as detected through household consumption patterns, and at the level of the individual as reflected through the use of items with a personal function (clothing, personal grooming items, pocket tools, etc.)

I then present introductions to theoretical concepts utilized in this study in an integrative manner to analyze the historical built environment and household object use. Discussions are two-fold. The first section theoretically examines 1) how objects operate within semiotic non-verbal communication and the process of objectification, 2) how individuals interact with social concepts through individual agency and practice theory, and 3) resource procurement and consumer choice. As mid-19th century Fort Vancouver was selected as the case study, the second section presents specific information on cultural constructions to contextually situate the study in mid-19th century America, including discussions on 1) notions of Victorian Gentility, including prescribed gender roles, 2) its relationship with the American military socioeconomic system, and 3) nested households (following Anderson 2004) within the military community.

The historical trajectory of the mid-19th century built environment selected for analysis is delineated in Chapter Three to locate, both spatially and temporally, the mid-19th century
military occupation at Fort Vancouver. A short history on the Hudson’s Bay Company occupation at Fort Vancouver, immediately preceding and overlapping that of the Army, is included as many of the artifacts archaeologically recovered from the military fort were procured as goods from their mercantile operations. Data are presented for the mid-19th century domestic areas documented on the west side of the Fort Vancouver parade ground and on the east side of the Vancouver Ordnance Depot. A detailed use-history of the structures excavated for this study is included to provide the framework to locate spatial and temporal boundaries for defining households (used as units of analysis), as well as assess potential post-depositional impacts to the archaeological record. A synthesis of data from historical documents is incorporated throughout to develop the structural context for this study, emphasizing military construction, habitation, and demolition activities, water supply, and subsequent land reuse. In addition, census records and military housing assignments were examined, as the post landscape not only provided the physical space within which the military community operated, but reflected its social organization. Mid-19th century perceptions of the realities in military housing at the post are interwoven throughout the narrative. Selected historical maps analyzed are presented within Chapter Three; additional maps are included in Appendix B.

Although not formally codified, military regulations and personnel actively limited social interactions between the officer and enlisted social classes through maintaining both a social and physical distance; practices which heavily impacted individual access to resources. Chapter Four presents the American military’s social and economic cultural expectations and realities for military personnel in the Pacific Northwest. Three main factors are identified that constrain an individual’s ability to procure goods and resources: 1) social expectations, both gender and class-based, 2) financial limitations, and 3) onsite availability of goods for consumption. An
individual’s social position within the mid-19th century military community defined the types of goods that consumers of their class (officer/elite or enlisted/working) were expected to procure within their wage earnings. In this chapter, the social position of persons within these two classes is briefly examined, specifically in reference to rank hierarchy, military discipline and dress, policing and refuse disposal behaviors, and social expectations of marriage. Economic realities for commissioned and non-commissioned officers, enlisted men, and laundresses are presented through examination of military salaries and payroll systems, ration allotments, fuel and baggage allowances. Chapter Four also presents the available avenues for goods procurement, with particular focus given to historically-documented meal-related practices, as the procurement and consumption of foods are examined through analysis of faunal remains in Chapter Eight.

Chapter Five provides a summary of archaeological field investigations that yielded the datasets used in this study, including both Cultural Resource Management (CRM) projects completed between 1988 and 2001, and test excavations undertaken specifically for this study in 2007 and 2008. Archaeological materials recovered from three loci across the Vancouver National Historic Reserve were analyzed; an officers’ quarters area (1850 to mid-1860s; Locus 1), enlisted men’s barracks complex, with kitchens and mess buildings, and laundresses’ quarters (1850 to ca. 1870s; Locus 2) and a privy (ca. 1860s [1862?] to early-1880s; Locus 3). This chapter summarizes the findings of the CRM projects, as well as anomalies detected in data obtained through non-intrusive subsurface testing, specifically magnetometer and ground penetrating radar (GPR). Detailed discussions of anomalies determined to reflect mid-19th century structure locations are given in Chapter Seven with the discussion of architectural features identified within the archaeological record. The field methodology is presented for the 2007 and 2008 investigations, including excavation objectives, excavation techniques, and
laboratory processing of materials recovered. Detailed provenience information, such as historic district and site trinomials, township and range, excavation block/unit grid coordinates and sizes, are included in Appendix A.

Chapter Six presents the archaeological stratigraphy and its relationship to the geomorphology of the region. A detailed assessment of the formation processes of the excavation areas was conducted to assist in affiliating strata disconformities with either natural processes or anthropogenic activities, particularly those that may be architectural in origin. Obtaining and analyzing these data was necessary before other research questions involving spatial analysis of artifact distributions were addressed. This chapter begins by describing the sediment examination methodologies, then strata descriptions. These are followed by a discussion of how identified strata correlate with Portland Basin geomorphology and assessment of site formation processes, specifically in relation to architectural features. Impacts to the sediment column caused by modern development and bioturbation are also discussed in relation to their impact on observed household artifact distributions. Strata boundary nomenclature and site elevation data are tabulated in Appendices A and D.

Analyses of archaeological features and distributions of architectural materials are presented in Chapter Seven to 1) ground truth historical documents depicting the garrison’s built environment, 2) provide a temporal occupations association for the deposits (i.e. whether mid-19th century, late-19th century, or early-20th century), and 3) construct household analytical units for intrasite artifact analyses. Mid-19th century residential building locations were identified from archaeological data for officers, soldiers, and laundresses occupied between 1850 and the late-1870s. As part of my analysis, I georectified these historical structure locations to the modern landscape.
Chapters Eight and Nine examine how tangible items, or goods, and foods operated within a larger system of non-verbal visual communication between individuals within three subgroups; commissioned officers, enlisted men, and non-commissioned officers and laundresses. Many domestic objects were imbued in the Victorian Period with “socially approved patterns of thought and behavior” (Logan 1995:211). Cultural meanings embedded in objects were created through the use of those pieces. The display of ‘proper’ objects created cultural spaces that reflected idealized virtues for societal class and gender roles, but also created and defined social relationships (Praetzellis and Praetzellis 2001). Personal items and foods were selected for analysis as these items reflect upon the domestic lives of military personnel. Their analysis provided information on how specific objects operated within cultural space at the household scale through analysis of household consumerism patterns. The effects of archaeological biases on results are considered as well.

Data presented in earlier chapters are interwoven in Chapter Ten to examine how the military system reproduced and reinforced culturally-idealized roles for individuals within multiple cultural spaces simultaneously. Archival and archaeological data indicate the post was intentionally constructed to communicate the dominant cultural ideas of power and gender relationships in American military society, not only at the household level, but at the level of the built environment as well. These varying levels of cultural spaces were filled with objects by individuals, within certain social and financial constraints, that expressed their acceptance, resistance, or negotiation of the transmitted and reinforced similarly-themed cultural messages. This methodology provides insight into the importance of perceived messages through emphasis at multiple spatial scales that are not necessarily apparent when focus is limited to a single frame of reference.
CHAPTER TWO

CONTEXTUALIZING THE RESEARCH OBJECTIVES

CONSTRUCTIONS OF CULTURAL SPACE THROUGH NON-VERBAL COMMUNICATION WITHIN THE DOMINANT VICTORIAN CULTURAL PARADIGM

Individuals simultaneously experience the world and find meaning in those experiences through interactions with and within intentionally constructed spaces at varying levels of scale, such as the community, the household, and the personal (individual). Material culture facilitates this process with each spatial tier through the distribution of information. Objects are created that intentionally and unintentionally reflect and communicate culturally constructed social identities. The goal of this dissertation is to better understand how the dominant military socioeconomic system at mid-19th century Fort Vancouver was reinforced and reproduced through regulated social expectations and material culture within three levels of identified cultural space. A second research objective is to ascertain whether material culture reflects site occupants resisting the imposed military socioeconomic system. My research seeks to highlight not only how consumer choices reflect the dominant social processes at work, but also the factors involved in constraining consumption at military sites occupied during the Victorian era in the Pacific Northwest.

To examine how intentional human constructions of space at various spatial levels reflect cultural conceptions of identity and society, I draw upon a variety of theoretical paradigms. This chapter will first review archaeological approaches to landscape archaeology, Lefebvre’s (1974, 1991) sociological analysis of the production of cultural space, and the impact of individual agency in assigning meaning to objects, as conceptualized by Practice Theory (Bourdieu 1977;
Theoretical approaches to consumerism and how objects operate within non-verbal communication systems through the process of objectification are then discussed. I also clarify the definition of household used as an analytical unit in this study. The dominant mid-19th century Victorian paradigm of gentility and expectation of socioeconomic and gender roles is presented to provide a sociohistorical context for the military community. Given the vast body of research conducted on these topics, these overviews are not intended as comprehensive but rather illustrative of broad findings and basic theoretical foundations.

A brief introduction to the Fort Vancouver National Historic Site and Vancouver National Historic Reserve Historic District (DT191) is followed by a review of the research frameworks utilized by previous researchers investigating the archaeological record at the site. Specific research objectives are presented in the final section, with questions designed to address topics relating to the internal organization of the mid-19th century military community, including socioeconomic status, settlement patterns, living conditions, food-ways, and the internal social relationships of military personnel at Fort Vancouver during the mid-19th century.

**Theoretical Approaches to Landscape, Space, and Agency**

This section reviews archaeological and sociological approaches of landscape, space and individual agency. Specifically, I examine how these concepts are utilized to explain the cognitive processes involved in creating cultural meanings for landscape and space, and how they articulate with social relationships at various levels. Landscape archaeology examines how cultural landscapes are formulated and function within a cultural group (Basso 1996; Branton 2009:52; Hood 1996; Knapp and Ashmore 1999; Massey 1994). The construction of space as
theorized by Lefebvre (1974, 1991) provides a framework to examine how cognitive processes produce cultural conceptions of space. Finally, practice theory (human agency) provides an approach within which we can examine how individual choices, on an aggregate level, may unconsciously affect societal patterns and constructions of cultural spaces (Bourdieu 1977; Giddens 1979; Miller 1987; Pauketat 2003).

Landscape Archaeology

Archaeologists have always been interested in natural or geographic landscapes. What has changed is how those landscapes are perceived (Knapp and Ashmore 1999). Early archaeological studies located places within topographic settings to conduct research on distributions of early peoples, both spatially and temporally (Colton 1939; Kroeber 1916). Environmental change was seen as the driving force in changes of site dispersal and occupation density. Building upon these ideas, cultural ecology focused on environmental influences on technological organizations within societies and the ensuing interplay with subsistence strategies within a functionalist framework (Steward 1955).

Building upon these ideas, Willey (1953) found that settlement patterns are not solely the result of human adaptation to the environment, but that “various institutions of social interaction and control which the culture maintained” also influenced settlements (Willey 1953:1). His research demonstrated how the analysis of settlement patterns can provide information not only on environmental strategies, but also on social organization as cultural ideology affects all aspects of social development.

Archaeologists have long focused their research on monuments, domiciles, temporary camps, and public areas – artifact productive areas – with good reason. Without physical links to
past peoples little can be known about them. However, the creation of lists of sites, maps, plans, communities, peoples and material culture traditions disallows focus on the ‘vacant’ places in between. But by ignoring the spaces in between “the very connective tissue that gives houses and communities their proper context” within a society is deemphasized (Deetz 1990:1). In this framework, landscapes become passive entities, and social interactions on and within the landscape are not viewed as dynamic interfaces, but as simply site backdrops or for people’s relationship to their environments (Darvill 1999).

**Cultural Landscapes**

Modern landscape studies hold that landscapes are not simply occupied parcels of ground jigsawed together (Deetz 1990:3). Landscape archaeology emphasizes spatial relationships (e.g. visibility, differential access to resources, distances to other places) over ecological (e.g. beauty, lushness, carrying capacity, relationships between plants and animals, etc.) and economic (resource availability, trade, exchange networks) considerations (Knapp and Ashmore 1999). Landscape approaches focus on discerning the connections between human behaviors and their spatial and physical environments (Branton 2009:52). Places and landscapes are not defined by delineated physical entities, but by networks of social relationships (Massey 1994; Thomas 1993) that maintain and support various levels of social organization (Rotman 2003). While physical aspects of the landscape may remain unaltered in time, the meanings associated with those features do not remain static or singular.

Cultural landscapes are physical and symbolic realms upon and within which individuals experience their daily lives. As culturally defined spaces, landscapes embody abstract notions imposed upon the physical environment. Spaces and places are dynamic constructs that embody
past human activities while simultaneously influencing the behavior of individuals operating within their domains (Yamin and Methany 1996). This interactive relationship can be conceptualized through the idea of the cultural landscape, defined as “the physical spaces perceived and created by humans, imbued with meaning, and understood in culturally specific terms such that function and meaning are inseparable” (Hood 1996:139). Social relationships cannot be separated from the cultural landscape as they reflect cultural ideals and the existing social order, including concepts of social class, gender, and power relationships (Basso 1996; Branton 2009; Bender 1993; Hood 1996; Knapp and Ashmore 1999; Thomas 1993).

People interact with the terrain in a cognitive manner, and landscapes are actively evaluated by individuals who “draw upon previous experiences as a means of recognizing what course of action may be required” (Barrett 1999:27). The ways in which individuals understand and interact with their landscape, or meaningful cultural spaces, are dependent on personal experiences and sociohistorical contexts (Bender 1993; Hood 1996). Meanings encoded in the cultural landscape must be interpreted and mediated by individuals. Therefore, landscapes often “contain complex and multivocal layers of meaning” (Hood 1996:125) that can operate on multiple scales simultaneously within the same physical space (Bender 1993). Each level of space within the cultural landscape reflects conceptualizations of social class, gender, and power relationships, all of which are continually negotiated by community members on a daily basis. Knapp and Ashmore (1999) propose using the concept of nested landscapes to examine the links between the different cultural landscapes while recognizing the potential diversity inherent within these socially defined spaces. However, they do not offer an operational methodology for pursing this line of research.
Built environments are fluid and dynamic spaces situated within cultural landscapes. reflect and shape social interactions. The *built environment* refers to an intentionally constructed cultural setting, or landscape, that provides the physical context for human behaviors. It ranges in scale from individual buildings to larger complexes, as well as the supporting infrastructure and spaces in between (Branton 2009). It encompasses spaces created or modified by people at a variety of scales that are imbued with culturally significant meanings, within and around which individuals experience their lives (Thomas 1993). Although most definitions of landscape are focused on the community or household level, landscape can also include interior spaces which are bounded by the surrounding structure (Rotman 2003). For example, during the Victorian era, rooms within residential households were understood by occupants who adhered to the tenets of gentility (see Victorianism below) to perform specific functions, and these were expressed through decorating each room with objects that expressed and communicated its function (Ames 1992). Through this process, each room individually acts as a cultural landscape, albeit on a smaller scale than that of the larger community.

The relative juxtaposition of buildings and open spaces can reflect and express social roles and interrelationships between individuals and/or groups within a society (Branton 2009; Hood 1996). Agency is reflected in the landscape through the ability of individuals to control nuances of imbued meaning during creation of the cognitive landscape. Their actions are then symbolically recommunicated to other people through interaction(s) with the newly defined cultural landscape (Tilley 1993). Persons in positions of authority often have the ability to implement “transformations of meaning through the physical reorganization of the landscape” (Hood 1996:124). By doing so, the built environment can be intentionally designed to maintain
and reinforce existing social inequalities to perpetuate and legitimize the existing or preferred ideology of the dominant social class and/or individuals (Branton 2009).

**Conceptualizing “Space”**

The cognitive processes of conceptualizing spaces, or cultural landscapes, are best summarized by Lefebvre (1974, 1991). French philosopher and sociologist Henri Lefebvre (1901-1991) provided a new theoretical viewpoint of *space* in the mid-1970s. His work (Lefebvre 1974), translated into English (Lefebvre 1991), initiated a theoretical shift from focusing on delineating space(s) and social relationships to grappling with the processes involved in the construction of culturally meaningful space(s). Lefebvre (1974) intentionally developed his research as an ambiguous text as an act of resistance, preferring his text be open ended and fluid rather than precisely definable, which he thought would lead to its becoming a static entity (Shields 2011).

Lefebvre (1991) argues that *space* is not an inherent entity; it is produced by individuals in their daily lives through interactions with their behaviors and practice (agency). Cultural spaces are therefore abstract notions that are “constitutive aspects of society” (Shields 2011). Lefebvre (1991) argued that social conceptualizations of space, and therefore landscapes, are produced in three dimensions; 1) spatial praxis (*le perçu*), 2) representations of space (*le conçu*), and 3) representational space (*le vécu*). All three dimensions, which are fluid in nature (Schmid 2008), together create historical *l’espace*, translated by Shields (1988) as the “‘spatialization’ of social order.”

Spatial practice (*le perçu*), or praxis, refers to culturally perceived social space in the material dimension (physical world) of everyday social life and popular perception, rather than
abstract theoretical conceptions of space (Lefebvre 1991). Specific places are defined that are considered appropriate to specific social formations that are grounded in the physical real world, such as the built environment. These spaces are “networks of interaction and communication” (Schmid 2008:36); within which individuals interact with other individuals in daily life. Links between constructed social spaces and individuals to those spaces “assures the continuation of a social formation in a cohesive fashion” (Shields 1988).

Once this spatial practice is “linguistically defined and [culturally] demarcated as space” (Schmid 2008:36), it then constitutes a representation of conceived space (le conçu). These conceptualizations of space serve as a frame of reference for communication between individuals, which enables a (spatial) orientation between them (Lefebvre 1991). These are organized and the information reproduced in culturally-produced maps, pictures, personal journals, literature, and even through objects. These representations are essential to link the socioeconomic and power structures within the real world, and simultaneously co-determine human activities and interactions (Shields 2011).

Representational space (le vécu) refers to the material “order” that emerges in the real world. It becomes the instrument(s) through which meaning is conveyed “through a process of signification that links itself to a (material) symbol” (Schmid 2008:37). In this way a (spatial) symbolism develops that expresses and evokes cultural ideals, values, and experiences through this representational space. This third space is the ‘lived space’ within a symbolic dimension (Lefebvre 1991), where individuals experience space through interpreting the cultural signifiers. In other words, representational space refers to the processes through which individuals can appropriate space. Conceptions of space, or spatializations, are represented in the spatial patterning of objects in representational space (le vécu). These can influence reconstructions of
both the perceived space (*le perçu*) and conceived space (*le conçu*) (Shields 2008, 2011), therefore offering opportunities for renegotiating spatial practice and representations of space (Lefebvre 1991).

Massey (1994) builds upon these ideas through considering simultaneously competing voices in the creation of social space, specifically how space and gender constructs are mutually influenced by one another. She argues that the conceived representations of space, or *places*, are not mutually-agreed upon, spatially defined areas bounded in the physical world. Classifications of ethnicity and gender, both culturally imposed and individually defined, shape how individuals experience, perceive, and conceptualize space and a sense of place. Therefore, places are not static but dynamic entities, defined by “open and porous networks of social relations” (Massey 1994:121) that give rise to multiple, and often competing, definitions of place(s). In turn, multiple definitions of space(s) can influence social and/or individual perceptions and definitions of gender (Massey 1994:186). These conceptualized spaces, defined through an individual(s)’ sense of place, can overlap one another and/or simultaneously occupy the same physical real world space. Conceptualized spaces become layers that intersect in multiple locations, both cognitively and physically, that mutually influence one another (Massey 1994:265).

**Individual Agency and Practice Theory**

Similar to Lefebvre (1974, 1991), Bourdieu (1977) argues that rather than seeing the individual as simply conduit for the expression of certain cultural principles, individuals must be recognized as independent actors. However, Bourdieu differs in his approach by placing emphasis on the influence of existing social structures over individual agency. Through his
concept of *habitus*, Bourdieu (1977) links socialization with historical trajectory of the reproduction of culture.

Bourdieu (1977) introduced the concept of agency and developed practice theory around the notion of the *habitus*, a collection of unconscious tendencies fashioned by “the influences of the structures of material conditions in which they live” (Dietler and Herbich 1998:246). The habitus encompasses a network of interwoven socially constructed cultural schemas (e.g. gender, economic class, and ethnicity) that are reproduced through unconscious predilections and expectations towards behaviors and actions that favor the perpetuation of those same social constructions (Bourdieu 1977). In other words, cultural systems of knowledge are learned through interacting with other individuals and the larger world, as defined by cultural worldviews. These systems are internalized by the individual where they become unconscious frames of reference, or assumptions, which influence individuals’ experiences, understandings and intentional behaviors within the world. Therefore, cultural understandings and expressions are context-dependent, and habitus promotes the perpetuation of existing social constructions. This is different from the concept of *doxa*, which “refers to forms of cultural knowledge that are so deeply taken for granted that alternatives are unimaginable” (Ortner 2001:271). Although often regarded as the seminal work in Practice Theory (Bourdieu 1977), this work discounts individual intentionality in human transactions, thereby “alienat[ing] the subject from his or her own decision-making process” and consigning the lifeways of past peoples as simply part of doxa (Smith 2001:158).

Giddens (1979) adapted Bourdieu’s concept of practice in his theory of structuration by incorporating individual human agency on a populational scale (Dornan 2002). Within this framework individuals are able to consciously examine the meanings interwoven within the
habitus and act upon these perceptions. Therefore, structures, or cultural systems, are always in a state of becoming and are in actuality not static in nature (Pauketat 2003). Structures are actively perpetuated by individuals within the social system as the system cannot propagate itself. Yet Giddens (1979) fails to address that not all individuals have the same access of existing knowledge, necessary to successfully negotiate the appropriation of meaning.

Building upon Bourdieu (1977) and Giddens (1979), practice theory provides a framework to understand how individuals and groups act in specific ways to establish, adjust, and/or perpetuate cultural traditions. *Practice* is defined as “any enactment, embodiment, or representation of one’s dispositions” based on the experience of the individual (Pauketat 2003:4). Actions are context dependent, as they are undertaken within a series of parameters, or limitations, imposed by cultural and non-cultural factors (Pauketat 2003). Although cultural parameters may constrain individual and group agency, these are also created by agency.

These concepts of agency and practice were drawn from sociology and first successfully operationalized by Sahlins’ (1981) model of the “structure of the conjecture.” In his historical ethnography of the encounters between Captain Cook and local Sandwich Islands peoples, Sahlins (1981:35) found that “the relationships generated in practical action, although motivated by the traditional self-conceptions of the actors, may in fact functionally revalue those conceptions.” As aspects of material culture often symbolize ethnic identity, practice theory is well suited to examine “the continuing dynamic cultural changes in contact situations between ethnicity and class consciousness indigenous societies and Europeans” (Wake 1997:102). By utilizing practice theory’s concept of *habitus* (tendencies developed through conditioning by social processes) patterns can be discerned which can provide information on the social processes within a culture. To fully understand changes in material culture one must understand
the habitus, material conditions which influence the tendencies that constitute the habitus and catalysts (problems) that provoke responses which in turn shape the habitus.

Material objects, or goods, are created and imbued with meaning through this process. Practice theory provides a framework that focuses on “the idea of materiality” (Pauketat 2003:10), wherein objects, or artifacts, are analyzed within this process of creating cultural traditions, rather simply by form or function of the object. As tangible products of agency, these objects are rooted in the physical world, even though the processes that created them are based in abstract cultural concepts (Pauketat 2001). The importance lies in how objects operate simultaneously as material items and symbolic communicators (Miller 1987).

Over time and space, aggregates of these micro-processes develop into macro-scale patterns (Pauketat 2003). Cultural traditions are not static but dynamic entities, with their meanings continually being negotiated simultaneously at multiple scales by individual, group, and communities, consciously and unconsciously, which may have conflicting cultural practices. The tension created by alternating traditions can bring about intentional and unintentional social changes in macro-scale processes, or cultural traditions (Nassaney 2001; Pauketat 2003). Often it is only the macro-processes that are visible in archaeological contexts through differential patternings within artifact assemblages.

Agency theory allows the individuals in past societies to be seen as active people, or agents interacting with not only each other, but with material objects. People are no longer seen as passive recipients of cultural systems, they actively engage with those systems, and through those interactions in turn affect the structure of the cultural systems. Power is wrapped up in the individuals’ ability to assert individual agency, and agency itself is influenced by identities of
status, class, gender, and race which are interwoven and inseparable from one another (Conkey and Gero 1991).

There is no consensus among agency theorists as to the levels of conscious manipulation of agents towards cultural systems, or whether there is even a conscious component of “changing the system” when people make their daily choices. Nor is there a consensus as to whether the agents in a system should be examined as if they are rational, logical actors. Agency theory is often lumped with other post-processualist theories, that strive to detect the meanings behind people’s actions, thereby using those as proxies for researchers to begin to glimpse how past peoples perceived their world in all of its complexity. However, unlike consumer behavioral theory, agency theory does not provide a mechanism for understanding the meanings behind those choices (Pauketat 2001).

**Theoretical Approaches to Consumerism**

McCracken (1988) argues that roots of consumerism begin in the 16th century with social competition amongst the noble families, as status was based in the longevity of the family, reflected through displaying durable goods with distinctive age-created patinas. By the 19th century, culture and society are seen to mutually influence each other and both move forward in their developmental trajectories (McCracken 1988). The rise of industrialization resulted in the ability to quickly mass produce goods, resulting in the increase of social meanings related to those goods (McCracken 1988; Miller 1987). With increased opportunity for procuring objects with the same function becoming available in multiple styles, fashion and/or symbolism became
the deciding factor in consumption, or which style of object to procure (Grier 1988; McCracken 1988).

**The Consumer Behavioral Choice Model**

In the late 1970s, differences in artifact attributes, or ‘style,’ were viewed as static cultural associations. As a dynamic culturally shared medium, artifacts were seen as passive venues for social communication in their stylistic variability. Wobst (1977:321) defined styles as “that part of the formal variability in material culture that can be related to the participation of artifacts in processes of information exchange” that is adaptively beneficial to the associated society. The cost of creating and transmitting these messages limits their content to “only simple invariate and recurrent messages [that] will normally be transmitted stylistically” (Wobst 1977:323). These are likely to be messages related to ownership, of religious nature, political character, individual status and/or ethnic identification.

Hodder (1982) transformed this idea that repeated usage of specific materials signal group affiliation within a post-processual framework to demonstrate how meaning is structured through social negotiation and exploitation. Unlike processualists of the late 1970s, Hodder relegates environmental adaptive processes to a secondary role in his constructions of cultural interpretations. Influenced by Sahlins (1976), this view holds consumption patterns as symbolic representations in the archaeological record.

The Consumer Behavioral Choice approach builds upon these ideas. The model allows connections to be discerned between cultural behavior within the larger capitalist market economy and the archaeological record (Spencer-Wood 1987). This model draws upon concepts developed within a variety of disciplines, including archaeology, economic anthropology,
consumer behavior theory, and economic geography. Systems theory is used to examine multiple factors influencing consumer behavior, refuse disposal, and archaeological recovery (Spencer-Wood 1987:10-11). Research conducted with this framework assumes that consumerism involves symbolically meaningful actions (*le vécu*). Objects are acquired that communicate culturally-meaningful constructs, such as ideology, economic class, and gender. Autonomous individuals are considered the basic unit of analysis whereas artifact patterns are analyzed at the household level, defined as co-occupations by groups of individuals as limited to a particular space and time.

Variations in the distribution and use of differing qualities of consumer goods are analyzed to discern links between artifact patterns in the archaeological record and consumerism. These data are interpreted through documentary data to determine potential cultural behaviors involved. These connections are then examined to ascertain why some goods are preferentially acquired within the market economy (Spencer Wood 1987:9). Several factors are linked to consumer choice behavior: household income strategies, size and composition of the household, household life cycle, and character of the marketplace (LeeDecker et al. 1987). In consumer-based historical archaeology, documentary evidence of household occupants’ social status is discerned and related to identified artifact patterns before inferences in status-related consumer behavior are established (Spencer-Wood 1987). The relationship between the distribution of objects in the archaeological record and documentary data reflect recurring social behaviors associated with procurement, use, and discard of those objects.
Expanding Upon the Model: Objects as Symbolic Entities

Although objects may primarily be procured for their utilitarian function, Consumer Choice differences in non-technomic attributes are associated with social and ideological functions within the community (Spencer-Wood 1987). Appadurai (1986), McCracken (1988), and Miller (1987) view this social function as symbolically meaningful action. Appadurai (1986:5) posits that, “from a theoretical point of view human actors encode things with significance; from a methodological point of view it is the things-in-motion that illuminate their human and social context.” When social values and meanings are assigned to objects, those abstract concepts then embody a physical form operating as visible and tangible symbols within culture (Appadurai 1986; Csikszentmihalyi and Rochberg-Halton 1981; Gibb 1996). McCracken (1988) argues that meaning is located in three places, the culturally constituted world, the good (object), and within the individual as consumer. These places correlate with the Lefebvre’s (1974) three dimensions of space. The culturally constituted world is the location of spatial praxis (le perçu), the object becomes a representation of space (le conçu), and the symbolic dimension of lived space within the mind of the consumer (le vécu).

Objects assist with mediation of the self and society through their use as symbolically charged objects (Beaudry et al. 1991). These items become social expressions that provide insight into past social processes, including power, status, and space (Rotman 2003). Individuals participating in the Victorian culture of gentility intentionally selected objects for procurement that communicated culturally significant meanings while also defining a context, or space, considered socially appropriate (Ames 1992; Logan 2001). In this role, these objects become representations of cultural definitions of space.
Cultural parameters define an individual’s world-view, including assigning behaviors to acceptable or inappropriate categories as defined by the dominant ideology. These abstract notions are realized and substantiated through transferring culturally idealized notions to material objects, or goods, which then come to embody these ideals (Appadurai 1986). The mutually accepted use of those objects as representations of abstract concepts in social contexts creates the cultural meanings embedded in artifacts. Through the process of assigning meaning, these items can represent either specific or idealized individuals, thereby becoming “literal extensions of that human being” (Miller 1987:17). Objects may be limited by their material constraints, but the social meanings that can be assigned to them are infinite, and may be communicated independently and/or simultaneously. These multiple meanings culturally embedded within an object(s) can establish connections between objects to reinforce cultural ideas, particularly those ideals expressed by the dominant culture (Miller 1987).

The difficulty is assigning those meanings to objects from the past because many items are temporally specific. Historical archaeology is well positioned to examine material culture expressions of this process in the archaeological record, as documentary data are accessed to provide an historical context for interpreting identified artifact patterns.

Object Choices as Expressions of Individual Agency

Subsequently, individuals reappropriate once externalized meanings now transmitted by the objects. The individual may be intentionally or unconsciously engaging in the process. These are transferred through interpretation by the viewer/user to develop the social self (McCracken 1988; Miller 1987). Symbolism associated with an object(s) can be communicated directly by using words or by embodying idealized abstract qualities. Historical contexts will influence how
an individual reinterprets meanings from objects (Miller 1987) as the same object may simultaneously communicate a variety of meanings, dependent upon the viewer. Miller (1987, 2005) terms this process objectification. This dual process of objectification is continually repeated, creating a dynamic, mutually constructive relationship between people and objects within the social realm. Through this process, objects act as if they were active participants in the construction of culture as they influence the production of meaning in the self, as well as in newly created or existing objects (Miller 1987). If these objects become major elements in the social world, constraints in accessing these objects, or means of representation, may assist in perpetuating the dominant cultural ideals through a deficiency of dissenting voices.

Often within this theoretical framework, larger cognitive spaces (e.g. landscapes) become passive entities, either as simply site backdrops or for people’s relationship to their environments (Darvill 1999). However, objects of different physical scales can transmit abstract social concepts. Objects can be intimately tied to cultural notions of space, particularly the built environment. Structures can be conceptually ordered to reflect and affect social relationships between different groups of people, particularly when creating group identities (see Miller 1987:121-125).

The Commoditization of Objects

Objects become commodities when their transfer to an individual becomes a “socially relevant feature;” as these transactions involve both sending and receiving meanings (Appadurai 1986:13; Wurst and McGuire 1999). Demand for these objects will influence their physical circulation in the community. Goods “become a substitute for the social relationship that lies behind it” (Appadurai 1986:50). Procurement and use of symbolically charged goods allows an
individual to express their sense of Self within the community, either perceived or desired (McCracken 1988; Miller 1987), including gender and social position.

Individuals express the self with these objects in three ways, 1) by demonstrating their social standing and power within a community through appropriation of meaning, 2) as concrete representations of that social position, and 3) as mnemonic devices linking remembered personal experiences and abstract social relationships between individuals to the real and tangible world (Csikszentmihalyi 1995). These social practices increase the consumptive demand for commodities, and potentially the choices available, within different scales of social value (Appadurai 1986). Objects are therefore intentional products of humanity that are conditioned by objects previously and currently in use at the time of manufacture (Csikszentmihalyi 1995; Wurst and McGuire 1999).

Not All Choices Are Equal

Consumer behavioral models assume that individuals act autonomously when making consumer choices, but not all consumers are equal (Wurst and McGuire 1999). Cultural expectations, social status, and economic considerations constrain individuals in their abilities to make consumer purchases and choices, limiting procurement of desired objects. Only those individuals with unlimited access to goods and resources are able to freely choose from available options.

In historical archaeology, these restrictions are most commonly associated with social status related to economic position, whether upper, middle, or working class (Douglas and Isherwood 1996; Spencer-Wood 1987). Persons with higher social status and/or wealth, or the upper class, will have more choice in procuring goods, as they have ample resources to engage in
the culture of consumption. In contrast, poor and working class individuals prioritize their energies to obtain the basic needs (food, shelter, etc.) first, and may not have enough resources remaining to fully engage in the culture of consumption. The middle-class aligned themselves symbolically with the upper classes through consuming goods associated with gentility (Wurst and McGuire 1999). Therefore, similar to culturally constructed concepts of space and agency, consumer choice is also “imbedded in social process rather simply a cause of social processes” (Wurst and McGuire 1999:193). This can create a disparity between the ability to use objects to help communicate definitions of the self or imbue space with desired meanings, which “may exacerbate class and status differences” (Miller 1987:205).

**Conceptualizing Households**

Within Consumer Behavioral Choice Models, archaeological investigations are typically conducted at the levels of the *household*, defined as “all of the residents of a domestic structure that could have created primary deposits in the house yard in one time period” (Spencer-Wood 1987:2). Analysis of associated artifacts will reflect the consumption and discard behaviors used by household occupants. The meaning of *household* must be clarified within its historical context (Brandon and Barile 2004) before it can be utilized as an analytical unit.

Household compositions are not necessarily based on traditional anthropological concepts of kin, kinship, or family. Ashmore and Wilk (1988) posit that *households* are different from *coresidential groups*. They view households as social units defined by groups of individuals sharing common activities, whose members may be centralized in one location or dispersed across space. Using this definition, households within the 19th century American military can vastly vary in size, depending upon which activities are utilized to define household
groupings. If the task(s) are limited in scope, such as weekly cleaning of a barrack, then a smaller set of individuals will be subsumed within the household, but if the endeavors are broadly defined, for example enforcing American land claims, then larger groups of people will be included, potentially stretching the domestic household group across vast physical distances, departing from the traditional concept of household within archaeology.

Historical social contexts also need to be examined to accurately identify potential household members defined by a specific activity. For example, food procurement strategies for a homesteading, pre-industrial Euro-American family typically are predominantly reliant upon local food sources, whereas 19th century American military quartermaster, commissary, and subsistence departments rely on vast networks of supply lines and food sources, from locally available fresh meats, fruits, and vegetables to imported salted meats and desiccated vegetables (see Chapter Four). Conversely, coresidential groups are comprised of groups of individuals “who regularly share living quarters” (Ashmore and Wilk 1988:6), and coresidential groups can encompass one or more households, and/or be an element of a larger household group.

Anderson (2004:111) combines these two criteria in her definition of household, which consists of a group of coresiding individuals engaged in activities to sustain the household, “for the maintenance and social reproduction of the group within a specific space associated with the residence.” Under this definition of household, Anderson (2004) found that groups of individuals living on a single plantation comprise one household, as all members are engaged in activities that perpetuate the continued existence of the plantation. However, different social groups within that plantation community (e.g. owners, workers, and enslaved persons) resided within different living quarters, operating within the larger plantation household. Therefore, Anderson (2004) introduces the concept of nested households, where smaller groups, or households at the
microscale, are simultaneously part of a larger macroscale household. This analytical model allows for the fluidity needed in defining households to reflect identified social structures. The nested households model “points to the idea that there is power inherent in defining the membership of a household and that individuals or groups may have perceived themselves differently from each other or from the way we perceive them” (Anderson 2004:120).

Drawing upon datasets derived from the archaeological record and documentary sources, I examine how the military system reproduced and reinforced culturally idealized class and gender roles, and how these roles structured the lives of military personnel and attached civilians within the military community. Specifically, I will apply the concepts of cultural spaces and the use of material culture to analyze three levels of cultural space at the garrison: the built environment, the household, and the individual. I use the paradigms of Victorian concepts of gentility and mid-19th century military ideological system as cultural frames of reference to interpret the intended function of the built environment and differential artifact distribution patterns between several residential areas.

**Victorianism, the Culture of Gentility, and Consumerism**

Within the larger mid-19th century American society, Victorian ideals defined the dominant social paradigm. The Victorian era is temporally delineated by the reign of Queen Victoria, monarch of the United Kingdom of Great Britain and Ireland from 1837 to 1901. With the rise of industrialization in the 19th century, economic strategies changed for men and women. They moved from a shared household-based economy to one wherein men engaged in wage
labor outside the home, while women’s labor remained within the household (Blanton and Cook 2002; Ryan 1987; Welter 1966).

This separation led to redefinitions of both public and private space, and the culturally idealized social roles men and women were expected to fulfill in the growing capitalist American society (Spencer-Wood 1991; Wall 1994). These definitions were embraced and refined mid-century into a cohesive Victorian ideology, often referred to as “gentility” rigorously demarcating culturally accepted behaviors for men and women. Gentility is also referred to by archaeologists and historians as the Cult of Domesticity (Praetzellis and Praetzellis 2001; Ryan 1987), or the Cult of True Womanhood (Welter 1966) for women and the Cult of Masculinity for men (Mrozek 1987). The ideology of gentility reflects culturally idealized behaviors and the positions/functions of each gender with society (Spencer-Wood 1991), and individuals were to live their lives according to scripts, self-consciously attempting to play [prescribed social] roles” (Ames 1992:211). Members of the upper class and mercantile middle class actively participated in the culture of gentility, and the tenents of the Victorian ideology were perhaps aspired to by members of the middle and lower classes.

Gender Roles and Expectations of Gentility

The dominant ideology of gentility created a binary system of oppositions to understand the role of social position within society and the larger world, such as male/female, public/private, and nature/culture. These were rather firm categorizations: individuals and objects did not usually ‘cross-over’ between categories. Two genders were accepted within the culture, masculine and feminine, linked to biologically based primary and secondary sex characteristics (Conkey and Gero 1991; Conkey and Spector 1984; Ortner 2001; Spencer-Wood 2006).
Definitions of idealized womanhood and femininity were shaped by the association of women with the private domestic household, and maleness and masculinity within public domains beyond the household (Conkey and Spector 1984; Wall 1994; Wood 2002). Industrialization created new categories of single individuals no longer part of family based “households” in the large European and American cities. In rural America, the household continued to thrive as a primarily kin-based economic group. Only large corporate entities, such as the Hudson’s Bay Company or military groups, that drew their participants from family groups but acted as collectives of single individuals, were outside of the normal households.

These culturally accepted gender roles were considered important in maintaining moral values (Wall 1994), and were reinforced through popular literature, public sentiment, and within the household itself through the socialization of children (Ryan 1987). These roles were encouraged not only in urban centers (Wall 1994; see above) but in the American ‘frontier’ west as well. Victorians believed that both roles formed a unified social framework, and concepts of morality were associated with discipline and self-control as these behaviors encouraged individuals to adhere to expected social roles (Mrozek 1987).

Victorians believed that women, as a result of their biological ability to give birth were closer associated with nature (Dickerson 1995; Ortner 2001), and as such their ‘natural’ role in the world was as a caretaker, primarily of children, and as such were associated with the domestic household. Women were expected to have the characteristics of purity, piousness, submissiveness, and domesticity (Breward 2000; Little 1994, Praetzellis and Praetzellis 2001; Welter 1966). Their role is often referred to as embodying an “Angel of the House,” after an epic poem written by Coventry Patmore of the same name (Patmore, Angel in the House, 1854 to 1856).
Although piety was viewed as the source of women’s strengths, domesticity was the most prized virtue expressed in popular writings of the time (Welter 1966). Through their piety, women could reinforce Christian ideals, therefore becoming a civilizing influence on them by “influencing them to be moral and productive members of society” (Williams 1996:52). Women who gave any appearance of stepping outside of highly restrictive female roles risked being labeled “not respectable” (Welter 1966). With marriage and motherhood, a woman’s social status increased as she was fulfilling her expected roles within gentility (Welter 1966). Keeping house, including managing servants for their households if present, allowed women to fulfill their role as nurturers and care-givers, and socialize the next generation (Logan 2001; Praetzellis and Praetzellis 2001).

Yet, her cultural domain “in the House” physically limited women’s access to knowledge necessary to engage in the exterior public sphere, a masculine domain (Dickerson 1995). Even when working outside of the house in the masculine world women were often employed performing tasks associated with the domestic sphere; cooking, cleaning, washing and teaching. “[H]er identity, status, and being were powerfully determined by the concept of house and home” (Dickerson 1995:xxvii). Therefore, a woman’s sphere of influence was limited to domestic contexts, both in settings (households) and in activities (laundry, cooking). Even within the domestic household, men were still ultimately in control (Dickerson 1995). Women were expected to provide a haven and civilizing influence on the men of their household (Wood 2002).

Victorian ideals of masculinity descended from idealized 19th century concepts of Man the Hunter (Mrozek 1987). Many Victorian iconographies reflect the expectation of men to engage in hunting, either physically or abstractly through the possession and display of objects affiliated with hunting (Ames 1992). The ideal Victorian man embodied courage, valor, virility,
strength, discipline self-control, thrift, reliability, chivalry, and a moral code that adhered to the tenents of gentility (Ames 1992; Breward 2000; Mrozek 1987; Praetzellis and Praetzellis 2001; Ryan 1987). “A strong, vigorous body was a primary signifier of manliness” (O’Conner 1997:744). Engaging in sports reinforced group identity and leadership roles, and individuals could prove their masculinity, through demonstrating strength, courage, and reliability (Mrozek 1987).

Men were to economically support not only themselves, but any dependents, “and provide protection for the rest of the population” (Jensen 1993:44) by carefully focusing their energies into bringing order and civilization to the world (Barker-Benfield 1983), acting as “Vanguards of Civilization.” The military became a model for idealized manliness (Mrozek 1987). During the Civil War writers defined masculinity as possessing both inner and outer strengths; as being courageous, disciplined and physically strong enough to survive not only military battles, but the battles of life (Strauffer 2006).

The majority of men and women living in the mid-19th century American west sought employment in gender acceptable pursuits, domestic chores for women, and tasks for men, such as mining and soldiering. However, the reality of frontier living often forced women to engage in less traditional gender roles, often outside the familial home. In fact, the first states that gave women the right-to-vote were found in the west where women often worked alongside the male members of their family (Jensen 1993). Those against the public participation of women in politics argued that women who voted would be exposed to the corrupting elements in public life (Jensen 1993) thereby impacting their role as “Angels of the House” and creating cultural anxiety for individuals unsure about redefining expected gender roles.
Although women are known to have enlisted in the Army by assuming male identities (see Blanton and Cook 2002), to date there are no accounts of these ventures at Fort Vancouver. However, even if these individuals remained undetected with their new identities, they had to engage in prescribed masculine or feminine gender roles activities to maintain their masquerade. Unless identified through documentary data, it is difficult to discern the presence of these individuals in the historical and archaeological records as they adopted the material cultural of their adopted gender.

Conceptions of Morality, Environment, and Materiality

Victorians believed that the environment had an impact on the formation of individual character, particularly within intentionally constructed built environments (e.g. houses, businesses, prisons, etc.). Victorian homes were spaces intentionally constructed through the proper use of objects in adherence to the tenets of gentility (Ames 1992; Praetzellis and Praetzellis 2001; Williams 1996). Goods operated within a larger system of communication as many material items were imbued with “socially approved patterns of thought and behavior” (Logan 1995:211). Objects were critical as they were intentionally selected to communicate culturally significant meanings. The display of ‘proper’ objects created environments that reflected idealized virtues for gender roles, but also created and defined social relationships (Praetzellis and Praetzellis 2001). Meanings embedded within objects could be augmented by affiliation with other objects, particularly through the practice of etiquette (Grier 1988).

Their inherent value was not simply a matter of function, but a matter of appropriating the correct material symbols to express and reaffirm expected societal roles, while defining a setting considered socially appropriate that in turn played an active role in creating social
relationships (Ames 1992; Grier 1988; Logan 2001; Praetzellis and Praetzellis 2001; Williams 1996). Goods purchased or consumed were understood as part of the self, who the user was and was becoming, and objects were explicitly affiliated with men or women (Logan 2001). In other words, if an individual was surrounded by ‘appropriate’ objects, those being items associated with Victorian ideals, then that individual will respond in a positive manner through absorbing the meanings transmitted by the objects. The absence of material goods was equated with poverty and the lower classes (Praetzellis and Praetzellis 2001).

The rise of commercialization led to increasing availability of consumer goods for the middle and working classes (Grier 1988). Individuals were expected to procure items that reflected both their social position and adherence to the dominant cultural ideals of gentility. Within this cultural framework, women were obliged “to secure its order, comfort, and loveliness” through “sweet ordering, arrangement, and decision” when decorating the home (Ruskin 1865:86,68). Decoration became linked to morality and people actively engaged in decorating their houses, producing the settings they desired through the consumption of goods (Logan 1995:209; Williams 1996). The domestic realm was a culturally defined space, or theater, where Victorians could engage in social behaviors (Ames 1992; Grier 1988; Logan 2001), thereby making tangible abstract notions of gentility (Miller 1987).

In his reflective analysis of the dominant culture of consumption at the end of the Victorian era, Veblen (1899) introduced the concept of *conspicuous consumption*. He observed members of the working and or merchant classes emulating wealthier aristocratic families through adopting the upper classes’ sense of fashion or taste, as expressed through displays of acquired material culture (objects). He argued that social and cultural factors were motivating
these economic behaviors. “The motive that lies at the root of ownership is emulation (Veblen 1899:35).

Members of the middle class were distancing themselves from the working class through procuring objects similar to those utilized by the upper classes. Through displaying these items, middle class individuals established affiliation with idealized societal roles, as defined by the culture of gentility. Consumption became a necessary social activity, undertaken primarily to impress other individuals. Objects were acquired to communicate an intentionally structured presentation of social status. However, Veblen (1899) focused on how this social process affects economic competition in the manufacture and marketing of goods, rather than the social meanings and functions of those objects within Victorian society. McCracken (1988) also found that escalating social competition was expressed through consumerism. Middle-class persons acquired goods symbolic of the upper class, spurring members of the latter to invent or acquire new types of goods to represent their social position.

For example, consider Victorian parlor organs, a common object located within the home, specifically the parlor. This room not only functioned as a private area for the family to experience their private lives away from the work of the household, but it also served as a reception area for entertaining guests, and as such was the most public place in the Victorian home (Logan 2001). A common object placed within the parlor was the parlor organ, which came to be associated with women and the domestic sphere. Ames (1984) found that 19th century advertisements for parlor organs depict primarily women playing the organ with several generations listening (possibly singing), a common motif reflecting both continuity through time and familial cohesiveness. This reflects women’s expected roles in being “Angels” as they could bring the church into the home through playing the organ (religious songs espousing morality.
and/or simply through the presence of the organ itself), and in providing a consistently stable ‘civilizing’ environment for men to retreat to from the external ‘corrupting’ public world, particularly in the western frontier (Ames 1984).

The Military Community at Fort Vancouver, Vancouver, Washington

In the 19th century, American military posts were physically, socially and economically intricate landscapes. These institutionally-sponsored communities functioned as operational headquarters, provision depots, and supply bases for the more remote posts. Living onsite in designated quarters were officers and their families, soldiers, and various support workers. Garrisons were intentionally created spaces of self-sufficiency, designed and transformed according to the dictates of the military elite to reflect concepts of power, status and ideology. These concepts easily articulated within the larger dominant American ideology of Victorian gentility. The primary goal of this research is to develop a better understanding of the lives of the inhabitants of the mid-19th century military community at Fort Vancouver through analysis of their socioeconomic experiences. The military occupation at Fort Vancouver, ca. 1850 to the early-1880s, was selected for analysis as the community operated within a rigid social climate with firm cultural expectations and rules of behavior that were explicitly codified. The presence of numerous remains of structures and artifacts within archaeological deposits with good integrity at Fort Vancouver National Historic Site (FVNHS) provides a unique opportunity to study the impact of culturally constructed landscapes on the lifeways of site occupants.

Briefly, Fort Vancouver was originally a British commercial enterprise, built in 1829 and managed by the Hudson's Bay Company (HBC) as its headquarters and supply depot for its fur trading operations in the Pacific Northwest. The American Army established Fort Vancouver at
this site in 1849, and the post served as headquarters for Pacific Northwest and Alaskan military exploration and campaigns until WWII. The two entities jointly occupied this area until the HBC’s final departure in 1860. The Army retained jurisdiction over the site until its transfer to the National Park Service and the City of Vancouver in mid to late-20th and 21st centuries. The historical context for the site is presented in detail in Chapter Three.

**Research Objectives**

The following research questions are designed to address topics relating to the internal organization of the mid-19th century military community, including socioeconomic status, settlement patterns, living conditions, foodways, and the internal relationships of military personnel at Fort Vancouver during the mid-19th century. Objects, can make “visible and stable the categories of culture” through the distribution of information (Douglas and Isherwood 1996:59). As discussed above, these intentionally constructed objects can simultaneously communicate similar and conflicting messages to individuals interacting with them at varying levels of physical scale.

My analysis focuses on discerning patterns within documentary data and archaeological contexts related to two cultural categories, class and gender, as defined by the dominant Victorian culture. Junior commissioned officers and their families (if present), non-commissioned officers and laundresses, and enlisted men were selected for investigation. The cultural context of these groups is given in Chapter Four. Three levels of nested cultural spaces were examined; the built environment, the household, and the individual (analytical units are defined below). I undertake a multiscalar approach to investigate
1) whether the dominant military socioeconomic system (aligned with the Victorian culture of gentility) was reinforced and reproduced through the material culture, and if so, within which levels of cultural space,

2) whether artifacts and faunal remains reflect the historically documented mid-19th century socioeconomic status and interaction patterns of occupants, and if so, within which levels of cultural space,

3) whether military policies impacted object procurement, use, deposition, and subsequent artifact recovery, and

4) whether artifacts and faunal remains reflect site occupants’ efforts to resist the dominant military and Victorian ideologies, and if so, within which levels of cultural space.

Both documentary and archaeological data were utilized to address these topics. The archaeological record can offer insight to muted, or documentarily marginalized, peoples and activities of the past through analysis of cultural materials and associated features, both assumed to reflect patterned behaviors generated over time, such as with daily activities. However, the individual histories and meanings behind identified activities and material culture distribution patterns can remain unknown to archaeologists. Historical documents can provide the necessary information for interpreting the cultural significance behind observed patterns in the archaeological record. Journals, dairies and personal letters can provide insight as to how individuals engaged in these activities internalized and perceived not only the immediate behaviors they participated in, but also the larger structuring principles these behaviors are used to enforce. Although many of the abstract qualities of culture we use as people cannot be directly determined from the archaeological and archival records, we can use a combination of both
datasets to infer how these abstract ideals are institutionalized into systems which then structure the daily lives of cultural members. The documentary record can provide insight into cultural prescriptions of the military elite, commissioned officers and non-commissioned officer middle class to contrast with the poorer enlisted men and military laundresses.

Through the Public Archaeology Field School, held by Portland State University (PSU) and Washington State University Vancouver (WSUV) with the National Park Service (NPS), I conducted archaeological investigations with NPS staff in the western portion of the central parade ground and on the Officers Row. Particular focus was given to areas identified as containing high artifact concentrations. Given the amount of artifacts previously recovered with archaeological methods (Langford and Wilson 2002; Thomas 1988) and historic documentation, it was expected that the 2007 and 2008 excavations would yield enough information to address the posed research questions. I positioned test excavations to adequately test the horizontal and vertical extent of archaeological deposits to retrieve a representative sample of artifacts and features to generate datasets necessary for this study. As this dissertation also serves as an excavation report, additional information includes

1) subsurface survey investigations, including the results of non-intrusive subsurface archaeogeophysical surveys (magnetometer and ground-penetrating radar),
2) test excavation unit placements and excavation methodology,
3) artifact recovery techniques,
4) laboratory processing procedures, and
5) location of final curation of field notes and artifacts.

A detailed assessment of the formation processes of the upland portions of the VNHR was conducted to assist in affiliating strata disconformities with either natural processes or
anthropogenic activities, particularly those that may be architectural in origin. Obtaining and analyzing these data was necessary before other research questions involving spatial analysis of artifact distributions could be addressed. Specific objectives consisted of

1) an examination of the geological and geomorphic context of the central parade ground to assist in affiliating strata disconformities with either natural processes or anthropogenic activities, and

2) an evaluation of the stratigraphic integrity and an assessment of post-depositional processes that influenced the distribution, abundance, and visibility of material culture.

The lives of personnel who occupied Fort Vancouver were experienced in and around the cultural landscape, as defined by the built environment. Fort Vancouver provided a formal, institutionalized landscape for the expression, transmission, and reinforcement of military values. A detailed use-history of the structures excavated for this study was undertaken to provide the framework to locate spatial and temporal boundaries for defining households. To fully assess distribution patterns identified during analysis of archaeologically derived data, the locations of building structures and associated yard spaces was accurately defined. Cartographic analyses of historical maps were conducted to identify and develop household analytical units. To achieve these objectives, historical maps and Army documents were analyzed in conjunction with archaeological data to

1) confirm the location of structures depicted on historic maps,

2) georectify the locations of structures to temporally and spatially define household analytical units in relation to the excavation units by correlating architectural features and artifacts to map-documented buildings, and
3) determine if the documented function of the buildings (barracks, kitchens, laundresses’ and officers’ quarters) can be verified as seen on historic maps.

Building locations at US Army posts in the west were generally constructed around a central rectangular-shaped parade ground. Structures were positioned to conform to a strict hierarchical spatial differentiation, reflecting the military and social hierarchy at the post (see Chapter Three). To assess the influence of the military socioeconomic system on site occupants at the spatial level of the built environment, analysis of documentary and archaeological datasets was undertaken to

1) determine how the buildings depicted on the historic maps were constructed,

2) determine whether historically documented status differentiation between household groups is reflected in the distribution of architectural materials,

3) examine how the military bureaucracy assigned personnel to residential structures, and whether this process reflects perceived socioeconomic status of inhabitants,

4) determine the composition of household occupants (e.g. who lived where), and

5) determine the influence of spatial organization of the built environment on the social relationships of the inhabitants.

Individual structures quartered specific categories of military personnel and attached civilians, e.g. commissioned officers, non-commissioned officers, enlisted men, laundresses, and/or military wives. Occupants carried out many of their daily activities in and around the spaces provided by these residential structures, from eating and sleeping to forming social bonds and interacting with one another. Therefore, the mid-19th century military community at Fort Vancouver is best defined using the concept of nested households. Individuals living at the post worked towards sustaining the larger post, but coresided within smaller social groups at the post.
Each of these microscale households were embedded within the larger Fort Vancouver macroscale household. In their daily lives individuals at the garrison were expected to adhere to socially acceptable behaviors with members of their own economic, and therefore social, class and members of other groups, perceived as either superior or subordinate to one’s own (see Chapter Four). Documentary data and household remains, including trash halos (sheet middens) and privies, provide data that can be used to understand domestic lifeways. To assess the influence of military socioeconomic system on site occupants at the spatial level of the household, analysis was undertaken to

1) determine the social and economic status of military groups (officers, enlisted, and laundresses) from documentary data,

2) identify sources for obtaining goods and resources for people at Fort Vancouver,

3) identify factors that constrain an individual’s ability to procure goods and resources, including social expectations, economic considerations, and local availability of items for consumption,

4) determine the impact of the military bureaucracy on the living conditions at Fort Vancouver for military personnel,

5) examine the social and economic lives of Army personnel that influenced individuals’ abilities to obtain and use various objects recovered in the archaeological record.

Culturally perceived social boundaries can be reflected by physical features in the community, such as fences or buildings, or they can be reflected in differential group access to and procurement of resources, such as subsistence foods or consumer goods. An important aspect of socioeconomic status is reflected in the symbolism or social prestige that is assigned to
the item by both the user and the rest of the community. Socioeconomic patterns can be reflected in the dietary patterns of individual households (Huelsbeck 1991) and subsistence activities can provide information on food preferences and cultural interactions (Wake 1997).

Meals had moral value during the Victorian era as they directly affected health and happiness of the consumers (Williams 1996). Since meat consumption reflects short term economic conditions of the consumer, unlike purchases of other domestic or personal goods (e.g. ceramics and glass tablewares), faunal patterns exhibit patterns reflecting daily economic conditions that can be used as a proxy for socioeconomic class (with a ranking system). The underlying assumption in faunal studies is that preferred cuts of meat are more expensive, and that people with a greater access to economic resources (those with high status, or the junior commissioned officers) will consume larger quantities of preferred cuts.

By examining the processing, consumption, and disposal of food, as reflected through the distribution of faunal remains, trends were discerned that provide insight into the consumption patterns of military personnel. Subsistence foods are objects whose acquisition and use should reflect the unequal nature of consumption at military posts (see Chapter Four). Subsistence patterns, as reflected in the archaeological record, were examined to assess the presence of luxury meals through pattern analysis of differential distribution of species and various meat cuts, discerned through analysis of recovered faunal remains. To determine the impact of the military system on personnel consumption patterns, research topics included

1) identifying military policies for food consumption for the various groups from documentary data, including how foods are prepared and served,
2) identifying the quality and quantity of various food types prepared and served to military consumers from documentary data, and whether there is differential distribution amongst the various socioeconomic groups,

3) identifying the types of foods consumed by military personnel from archaeological data, specifically meats reflected through the presence of faunal materials, and whether there is differential distribution amongst various socioeconomic groups, and

4) determine the influence of post-depositional taphonomic impacts on the faunal remains.

One of the most important societal macroprocesses affecting mid-19th century military personnel is the constrained military social environment used to maintain a cohesive force that can operate as a single entity. This military culture strengthened the distinction between men and women, or masculine and feminine.

Therefore, to examine items procured for use at the individual level of space, objects commonly worn on the person or carried while on campaign were selected for analysis. Clothing hardware (military insignia, buttons, fasteners, etc.) and personal adornment and pocket tool items (jewelry, beads, hair pieces, pocket knives, watches, etc.) recovered during the excavations were examined to assess the presence of men and women within the archaeological record. These small seemingly trivial objects can take on important symbolic meaning when linked to gender relationships (Voss 2006) and make visible gender differences in the archaeological record (Nelson 1999). Personal items were examined for evidence of gender affiliation, as clothing was the most public display of gender in the mid-19th century (Blanton and Cook 2002:48). Clothing is a category of objects that operates at various levels, but most strongly at
that of the individual, or personal level of cultural space. Clothing helps individuals position themselves, and recognize another’s place, within the community through basic cultural categories, such as age, sex, group affiliation, marital status, etc. Clothing is an active form of communication through use as a semiotic device (Wobst 1977).

These personal items were determined to reflect use by a specific gender based on documentary sources and their accepted function within the larger Victorian paradigm. Determining the presence of the male gender at historic military forts can be seen through their uniform regalia, munitions and firearms, as these materials are associated with men’s activities. The presence of women at Fort Vancouver was through identifying the presence of female-specific objects (hair pins, brooches, etc.) or using the presence of children (Euro-American toys) as proxies, as women laundresses and officers’ wives were charged with childcare as per their Victorian roles. It was expected that objects affiliated with gender would be found in greater quantities in deposits associated with structures traditionally aligned along gender lines (e.g. there will more masculine items recovered from the enlisted men’s barracks and kitchen areas). Therefore, specific research objectives consisted of

1) determining whether gender-specific artifact distributions articulate with historically documented residential spaces that reflect idealized military divisions of male and female spaces, and

2) determining social processes within the military community that limited personal expressions through clothing and personal items.

Combined, these research questions will provide information on how the military system reproduced and reinforced culturally-idealized roles for individuals within multiple cultural spaces simultaneously.
CHAPTER THREE
LANDSCAPE DEVELOPMENT AND HISTORICAL CONTEXT

Within one decade, what began as a simple mid-19th century military encampment with supply line difficulties transitioned into the Regional Headquarters and supply depot for outfitting troops throughout the Pacific Northwest. This chapter provides the historical context to locate, both spatially and temporally, the mid-19th century military occupation at the Vancouver National Historic Reserve Historic District (DT191). The chapter proceeds following a linear temporal trajectory from the past to the present, with an emphasis on the 1849 to mid-1880s Army occupation. The post landscape, as established by building placements, not only provided the physical space within which the military community operated, but reflected its social organization, particularly that of class and gender. Mid-19th century perceptions and expectations of military life are interwoven throughout the narrative.

A detailed use-history of the structures excavated for this study is included to provide the framework to locate spatial and temporal boundaries defining households (see Anderson 2004), as well as to assess potential post-depositional impacts to the archaeological record. A synthesis of data from historical documents, specifically within the mid-19th century domestic areas on the west side of the parade ground and on the east side of the Vancouver Barracks Ordnance Depot, is incorporated throughout to develop the structural context for this study, emphasizing military construction, habitation, and demolition activities, as well as subsequent land reuse.

Extant historic Army buildings are referenced by the military Vancouver Barracks tracking (numbering) system, still utilized by the National Park Service (NPS) and the City of Vancouver (COV). Although tracking numbers are often given for buildings on mid-19th century
military garrison maps and reports for Vancouver Barracks, early numerical assignments were reused for other structures and are therefore not used as designators in this document to avoid confusion. A brief discussion follows on the mid to late-20th century Historic Property designations of the Vancouver National Historic Reserve Historic District (DT191) and subsequent Federal ownership of those resources.

Although many distinguished persons lived at the post during their military careers, such as Generals Benjamin L. E. Bonneville, Otis O. Howard, Ulysses S. Grant, George B. McClellan, Arthur MacArthur, Jr., George C. Marshall, Philip H. Sheridan, and Lieutenant George W. Goethals, the roles of specific individuals and military units are discussed only in relation to the development and daily lifeways of the garrison. The aim is to better understand the lives of residents of mid-19th century military communities in the Pacific Northwest, and how past relationships between people, places, and activities reflect broader socio-cultural patterns in American society.

Fort Vancouver is located on former prairie and mixed permanent and seasonal wetlands that formed a highly productive location for native food resources. The current climate, West Coast Marine, is typified by westerly prevailing winds that provide generally cool summers and wet and mild winters, known as mesic temperature and xeric moisture regimes. Vegetation consists of a coniferous forest “adapted to abundant rain and moderate temperatures,” known as hygrophytic (Matson and Coupland 1994:21). Generally, the lowlands are mainly populated by western hemlock and Douglas fir, mid-elevations and coastal areas by Sitka spruce, red fir (Silvertip fir) and western hemlock, while mountain hemlock and silver fir dominate the higher elevations. Prairies are numerous in the Portland Basin and consist of forest-shrub communities
that include western white and ponderosa pine, Garry oak (Oregon white oak), Oregon ash and black cottonwood (Suttles 1990; USWD, SGO 1875:488).

**Early Euro-American Trade Networks in the Pacific Northwest**

The historic period of maritime trade and industry in the Columbia River Valley was promulgated by voyages of ‘discovery’ conducted by Spanish and English navigators in the 16\(^{th}\) and 17\(^{th}\) centuries. In 1775, Spanish Basque explorer Bruno Heceta on the *Santiago* was the first European to view the Columbia River, but did not enter its waters (Cook 1973; Dodds 1986:21). Captain Robert Gray of Boston first recorded the mouth of the Columbia River in 1792 during his second trip to the Pacific Northwest on the *Columbia*. Captain George Vancouver, exploring the region for British interests with the *Discovery* and *Chatham*, dispatched Lt. William Broughton to chart the river for a length of approximately 100 miles from its mouth, reaching just upstream of the mouth of the Sandy River (Dodds 1986:26; Hussey 1957:2-4; Moulton 1990:14), roughly 13.5 (21.8 km) miles east of the Vancouver National Historic Reserve.

After the Revolutionary War, American merchant ships actively sought out new ports of call as they were often excluded from continuing trade in British colonial ports (Mallory 1998:23). Unlike British trading companies whose trading territories were restricted by their royal charters, American sailing ships freely engaged in global mercantile trade and exploited British limitations, particularly in regards to the Chinese port of Canton (Mallory 1998:23; see Boit 1790-1793). Boston merchants quickly developed Pacific Northwest-to-Canton trade networks, coming to dominate maritime trade on the Northwest Coast in the early-19\(^{th}\) century (Mallory 1998:27). Americans continued to use these networks as the primary marine shipping
routes for goods and people into the region throughout the 19th century, albeit with diminished capacity during the Hudson’s Bay Company’s mercantile reign between 1824 and 1849.

Overland fur trading expeditions crossing through now western Canada first reached the Pacific Northwest in 1793 under Alexander MacKenzie of the North West Company (Gough 1997; Jackson and Kimerling 1993:11). They were soon followed in 1805 by the Corps of Discovery, led by Meriwether Lewis and William Clark (Moulton 1990, 1991). The floodplain upon which the VNHR sits has been identified as a Corps of Discovery stopping place on the trip down the Columbia River in November, and a campsite on the return trip in March 1806:

“the timber on the edge of the Prairie of white oke [Garry Oak], back is Spruce pine & other Species of Pine mixed Some under growth of a wild crab [Oregon crabapple] & a Specis of wood I’m not acquainted, a Specis of maple [big leaf maple?] & Cotton wood [black cottonwood] grow near this river [sic]” (William Clark, 4 November 1805 in Moulton 1990:15,19-20).

“here we encamped a little before sunset in a beautiful prairie above a large pond having traveled 23 M. I took a walk of a few miles through the prairie and an open grove of oak timber which borders the prairie on the back part. I saw 4 deer in the course of my walk and much appearance of both Elk and deer [sic]” (Meriwether Lewis, 30 March 1806 in Moulton 1991:33).

Inspired by the reports of the Corps of Discovery (Jackson and Kimerling 1993:12) and the promise of profitable land-based trade, Americans and Russians established trading posts
along southern Alaska and the Columbia River in the early-19th century, including those established by the Canadian-owned North West Company and American-owned Pacific Fur Company. The latter established Fort George in 1811 at what is now Astoria, Oregon before the fort was acquired by the North West Company after the outbreak of the War of 1812 (Dodds 1986:37-38; Hussey 1957:5,10). The decrease in sea mammal pelts and simultaneous increase in British land-based fur trading operations led to the decline of American maritime shipboard trade (Mallory 1998:42). However, American mercantilism in the Pacific Northwest rebounded in the mid-19th century with the exponential increase of Euro-American settlers and the decline of the Hudson’s Bay Company.

The Hudson’s Bay Company Period, 1824 to 1849

In the early-19th century the Hudson’s Bay Company became the dominant company in the Pacific Northwest fur trade, south of Russian fur operations in Alaska (Cole and Darling 1990:119), and assimilated the North West Company in 1821 (Bowen 1978:8). The Hudson’s Bay Company (HBC) moved its administrative headquarters of the Columbia Department from Fort George (Astoria, Oregon) to Fort Vancouver in the winter of 1824 to 1825, not only to protect furs and supplies from the damp coastal climate, but to establish large agricultural operations and to protect corporate interests north of the Columbia River (Hussey 1957:36-38). First located on a bluff, in 1829 the fort was relocated to the lower floodplain on the Columbia River near the geographic center of the Portland Basin, a large structural depression located at the confluence of the Willamette and Columbia Rivers, both major shipping and transportation
routes. Throughout the mid-19th century, the lands of the VNHR were often called "Fort Plain" through their association with Fort Vancouver.

The Company’s Columbia Department encompassed operations in present day British Columbia, Washington, Oregon and Idaho. Furs collected from the interior were gathered and prepared for shipment to England at the fort, and supplies were brought there from the large sailing ships and subsequently redistributed throughout the northwest. Fort Vancouver, in turn, provided supplies for fur trade and commerce to the Hawaiian Islands, California, and after 1839 to Russian settlements in Alaska (Carley 1982). The Fort was surrounded by forests, fields and gardens, had auxiliary buildings and a company employee Village (see Figures 3, 4, and 6). However, no structures are documented on the upper terrace north of the fort stockade, only agricultural fields are present (Vavasour 1845). The Company complex grew to become the center of activity and European influence for the Pacific Northwest region.

An important nexus for trade throughout the Company’s commercial enterprise, the post remained an administrative headquarters until 1845, at which time that function was transferred to Fort Victoria on Vancouver Island, now British Columbia (Hussey 1957:89; Ross 1976:121). Fertile soils attracted American settlers to the Portland-Willamette Basin, particularly when earlier HBC agricultural pursuits in the area proved successful. Mid-19th century homesteads worked small family farms and orchards in the region (Bowen 1978). Rather than risk raids by newly arrived immigrants starving from their journeys over the Oregon Trail, Chief Factor Dr. John McLoughlin allowed them to purchase goods on credit, and often loaned them seeds, farming implements, and cattle (Hussey 1957:82; Schenk 1932:96,107-110).

Although it was no longer the administrative headquarters, the HBC continued trading and fur post supply operations at Fort Vancouver on a smaller scale between 1845 and 1860, not
only for interior HBC posts, but for Oregon Trail settlers, California gold rush fortune-seekers, and the American military (Hussey 1957:92-93,96-99). Mercantile efforts by settlers attempted to compete with the HBC in the mid-1840s using store-issued paper money, which the HBC also adopted (Barlow 1912:278-279). After 1846, mercantile trade at Fort Vancouver with settlers and the military continued to prove profitable for the HBC, with imported goods also sold on commission in Portland (Gibbs 1855a:402-434). HBC merchandising endeavors dwindled in the 1850s, impacted by the American Indian Wars that disrupted communications with subsidiary posts and importation of furs to Fort Vancouver. The number of American merchants importing goods by ship continued to increase, particularly in Portland, Oregon, until by 1850 the HBC merchandising monopoly was finally overcome (Eriger 1992:202).

Until roughly 1853, Fort Vancouver was the primary population center of the Oregon country (Hussey 1957:82), with an incredibly diverse demographic profile. French-Canadians, Hawaiians, Iroquois, various English, Scottish and American craftsmen, Chinooks, Métis, and other Northwest Native peoples from dozens of tribal affiliations throughout the Coast and Plateau regions worked for the Company (Bray 1984; Cromwell 2006; Hussey 1957; Kardas 1970; Thomas and Hibbs 1984). The majority of these workers, including the Native women they married and their families, were housed in the Kanaka Village (later part of the U.S. Army Quartermaster Depot), located several hundred feet southwest of the stockade. Although French-Canadians dominated the adult male population early on (Cromwell 2006:69; Towner 1984), the Village is named after the Hawaiian male residents, known as Kanakas, who formed the largest ethnic group in later years. The HBC cemetery, where many individuals were buried, is depicted on historical maps of Fort Vancouver (ca. 1824 to 1845) just north of the fort stockade and Company village. Although historical maps and images of Fort Vancouver do not indicate
structures or uses of the (later) Fort Vancouver parade ground and the Officers Row area, the land north of the post on the upper terrace was considered by the Company as part of its claims and planted with wheat (Erigeron 1992:213).

The U.S. Army Period, 1849 to 1948

Decades of joint occupation policy in the Oregon country between the United States and Great Britain came to an end with the signing of the Oregon Treaty of 1846. The treaty established the 49th parallel as the international boundary between the United States and Canada, rather than along the Columbia River as anticipated by the English, giving the entire Oregon country to the United States. Congress then authorized establishing a military presence along the Oregon Trail (Pub. L. 29-1, 19 May 1846, 9 Stat. 13-14) to protect immigrants and the overland immigration route between the Mississippi and Columbia Rivers (Sinclair 2004). Although the treaty eliminated the political controls and aspirations of the HBC in the Oregon Country, it did respect the Company’s possessory rights on its occupied lands and property. The Oregon country was formally brought under the political and legal control of the United States government in 1848, creating the Oregon Territory (Pub. L. 30-177, 14 August 1848).

Settlers with American citizenship or those who had applied for citizenship, including “American half-breed Indians,” could claim land for homesteading (not mining) under the Donation Land Claim Act of 1850 (Pub. L. 31-76, 27 September 1850, 9 Stat. 496). The Act granted 320 acres, free of charge, to each male claimant over 18 years old, and an additional 320 acres to their wives. Large numbers of immigrants used the Oregon Trail to settle the region and access the gold fields of California after 1848. The ever-increasing number of settlers escalated
tensions with Indian tribes, leading to the first of the Pacific Northwest Indian Wars, the Cayuse War (1847 to 1855).

On 29 January 1848, the U.S. Secretary of War William L. Marcy ordered a ten square mile military reservation (USWD, JAG 1916:458) be established along the Columbia River by the mouth of the Willamette River. This positioned the military post near HBC’s Fort Vancouver, a major waypoint for Euro-American immigrants at the end of the Oregon Trail. The Army garrison, the first in the Pacific Northwest (Irving 1873:220,298), was under the Pacific Division, created to encompass newly acquired territories. Eventually, the post was reduced to four square miles, then one square mile, or 640 acres (Anderson 1904:269; Hussey 1957:103).

In 1848, the Army detached the regiment of Mounted Riflemen from Fort Leavenworth, Kansas Territory to establish an American presence at the HBC’s Fort Vancouver. Under Brevet Major John S. Hatheway, Companies L and M of the 1st Field Artillery were transported, by way of Cape Horn, Valaparasio and Honolulu (Anderson 1904:267), aboard U.S.S. Massachusetts, a full-rigged propeller ship, to compliment the overland arrival of the Mounted Riflemen. Leaving on 10 November 1848 aboard the Massachusetts, the Companies arrived at Fort Vancouver on 13 May 1849 with 152 enlisted men, and eight officers, some with wives, families and/or servants (Carey 1931:88; Fry 1879:79; Ingalls 1849b:174; Sinclair 2004:15; Thomas and Hibbs 1984:48) and “the usual number of camp women,” or Company laundresses (Carey 1931:63).

Company M went north to establish Fort Steilacoom, while Company L immediately established a military encampment on the shore, Camp Columbia. On 21 May 1849, the camp was moved to the terrace upslope from the HBC stockade (Carey 1931:89), following approval from then HBC Chief Factor Peter Skene Ogden (Hussey 1957:103), with all improvements to the land the property of the Army (Ingalls 1849b:170). Chief Factor Ogden felt that the presence
of the military reservation would dissuade American settlers from continuing to squat on or claim HBC lands (Hussey 1957:103), with land claims to be settled in accordance with the Oregon Treaty of 1846. One of the first official tasks, besides setting up camp, was to raise the Colors (see Figure 2; Anderson 1904:267; Morton 1894:1309):

“Moved to the high ground directly in rear of the Fort. It commenced to rain as began to strike our tents & rain & hail fell in heavy showers all day. We had only one wagon so that half the baggage was transported by hand” (1st Lt. Talbot, 21 May 1849 in Carey 1931:89).

“We established our camp on a ridge in the edge of the wood; by great labor trimmed all the branches from a straight fir tree more than a hundred feet high, fixed a pulley to the top, and hoisted the stars and stripes” (Fry 1879:93).

“Immediately in the rear of the [HBC] fort and on the rising ground, the company of artillery under Brevet-major Hatheway (sic) have put up temporary quarters [tents] and have made themselves very comfortable. This place would be a fine location for troops” (Cross 1851:112).

The official designation of the Army garrison changed several times in the first 20 years, and nomenclature inconsistencies within historical documents reflect these modifications. Following military tradition (later codified by the War Department, Adjutant General’s Office, General Orders [USWD, AGO Gen. Orders] No. 79, 8 November 18782 [Army Center of Military History 2011]), the tent encampment was first identified in 1849 as Camp Vancouver
under the Pacific Division, organized to accommodate new territories acquired during the
Mexican American War, ca. 1846 to 1848 (USWD, AGO Gen. Orders No. 54, 18 October 1848).
However, Camp Vancouver was often referred to as Camp Columbia in military records (Ingalls
1849a, 1849b).

Camp Columbia / Columbia Barracks, 1849 to 1853

Although the Corps of Engineers were outfitted at this post during route finding missions
and subsequent road building activities (Biles 1855; Davis 1855; Derby 1855; Erigero 1992;
Gibbs [1854]; Lander 1855; Newberry 1856; Wheeler and Dixon 1859a, 1859b; see Figures
Figure 109, Figure 111, and Figure 112), they were not permanently stationed at Fort Vancouver
as no fortifications were required, and all of the buildings were constructed by the Quartermaster
Department. The arrival on 25 May 1849 of Captain and Assistant Quartermaster, Rufus Ingalls
from San Francisco on the *U.S.S. Anita*, a barque rig (Carey 1931:89; Ingalls 1849b:169)
initiated the first wave of military construction at the post. He immediately began organizing
quarters for the troops and for the Mounted Riflemen scheduled to arrive, acquiring lumber at
Astoria (Ingalls 1849b:169) as well as buying it from the HBC (Hussey 1957:102) to construct
winter quarters for the troops, as well as hay and oats for livestock forage (Ingalls 1849a:168).
Out of necessity, Capt. Ingalls rented 13 structures in and around the HBC fort stockade and
Kanaka Village to house Army officers, 1st Field Artillery Company L, stables for public
animals, and the quartermaster and commissary departments (Ingalls 1849b:171,174).

Enlisted men of the 1st Field Artillery began construction on their winter quarters on 12
June (Ingalls 1849b:169). With barrack construction underway, the post name was converted to
Columbia Barracks on 12 August 1850 (Thomas 1987:9). Dispute with the HBC until 1859 over
land claims prevented immediate establishment of an Arsenal in this location as previously
directed (USWD, AGO Gen. Orders No. 30, 16 May 1849). By 15 September 1849, three
structures (Ingalls 1851:327) “all built of logs, and of the most temporary character” (Vinton
1850:146) were completed on the terrace slope just north of the HBC stockade, “These buildings
are, of course, made of rough material, but are considered sufficiently comfortable for our
purposes this winter” (Ingalls 1849b:170). On 2 January 1850, Major Hatheway states “I have
built during the summer a very good range of buildings for this country, log buildings it is true,
but well finished and very comfortable, with a good deal of pretension, 100 feet long, as quarters
for my Officers” (Maj. Hatheway, 2 January 1850 in Van Arsdol 1999:119). First lieutenant
Talbot described the building as “partitioned off, each officer having a sitting and bed room to
himself, with a general mess room.” (1st Lt. Talbot, 9 November 1849 in Hine and Lottinville
1972:134). These structures are labeled “Old Artillery Quarters for Officers, Old Company
Kitchen and Bakery, Sailors Shop, Company Kitchen” on a ca. 1851 sketch map (Figure 2). The
quarters, later used as an enlisted men’s barrack, is partially visible in a black-and-white 1860
historical photograph, with shutters on the two eastern windows (Figure 10, photo center). In
addition, two rented HBC buildings were finished, one of which was “occupied as quarters for
company “L,” 1st Field Artillery, company laundresses and hospital matron, company storeroom
and commissary depot” (Ingalls 1849b:170).

Six companies of the Mounted Riflemen, commanded by Brevet Colonel William W.
Loring, arrived at Camp Columbia (later Vancouver Barracks) between 30 September and 5
October 1849, having been split in two groups for the journey along the Columbia River from
The Dalles (Carey 1931:97; Osborne 1850:265; Van Arsdol 1999:119). The entourage consisted
of 22 officers, 300 enlisted men, roughly 400 mules and 150 horses (Ingalls 1849b:171). Several
officers were quartered in buildings rented from the HBC, including Major Cross and Lieutenant Denman, the latter with his family (Ayers 1891; Cross 1850:110; Ingalls 1849b:174). A larger population of people was present in Vancouver in 1850 than in following few years (Alley and Munro-Fraser 1885:47).

As housing was not available for all at Camp Columbia, 26 structures in Oregon City were rented to provide quarters, offices, a storehouse, stables and open lots for the public animals for the Riflemen troops during the winter rainy season (Ingalls 1849:169,174; Morton 1894; Cross 1851:118,174; Settle 1940:265). Forage was extremely limited, and many of the livestock were corralled on the east side of the Cascades to graze (Ingalls 1849b:171). Oregon City became the headquarters of the military district with Col. Loring in command (Settle 1940:22).

On 30 March 1850, the Riflemen relocated from Oregon City to Camp Columbia (Anderson 1904:268; Settle 1940:22). That May, Maj. Hatheway’s troops departed for Astoria, leaving the Riflemen to occupy the post (Eriger 1992:213). Col. Loring established the military reserve boundaries on 31 October 1850 (USWD, JAG 1916:457) as two miles east and two miles west of the flagpole (Eriger 1992:213), encompassing sixteen square miles (Alley and Munro-Fraser 1885:109). It is not known whether this flagstaff was the same tree adapted by Major Hatheway’s men, or a replacement placed on the same footprint or a nearby location. Acting under orders and following a plan supplied by his commanding officer, Capt. Ingalls organized construction of permanent buildings (Ingalls 1851:327) on the terrace north of the HBC stockade, on land used for growing wheat (Eriger 1992:241), purchased from the HBC in May of 1850 for $872.40 (Eriger 1992:213).

The Riflemen and hired local native men quickly constructed buildings on the upper terrace and within former Kanaka Village (Alley and Munro-Fraser 1885:47; Fry 1859:24;
Ingalls in Erigero 1992:242; Settles 1940:22). Overall, the buildings “were remarkably primitive, and very little attention had been bestowed upon their architecture” (Kip 1859:23). Living onsite in designated quarters were officers and their families, enlisted men, and various support workers, including laundresses in the former HBC schoolhouses, and the civilian sutler within his own residence and store west/southwest of the parade ground.

Nine log officers’ quarters were constructed in a linear formation, facing south, delineating the northern perimeter of the parade ground (Figure 2 to Figure 10). The commanding officer’s quarters, the oldest structure standing today within the Vancouver National Historic Reserve, was roughly aligned with the central flagstaff (Bomford [1851a]; Stuart 1850), from which all distances were measured for military purposes. The two-story commanding officers’ house, with a hipped roof and veranda (Erigero 1992:242) was flanked on each side by four officers’ quarters. The positions of these structures were laid out by Col. Loring, who “by actual experiment place[d] the officers’ quarters so far apart that a crying baby cannot be heard in the next” (Morton 1894:1309). By the end of November 1850, the officers’ quarters, known as Officers Row, were “fit for occupation” (Ingalls 1851:327), and all quarters were immediately occupied by officers attached to the Riflemen (Ingalls 1851:327).

Officers were assigned a specific number of rooms in their quarters according to their rank, with those of higher rank given more rooms USWD 1857; USWD, SGO 1870:421). For example, a Major General was allotted five rooms plus a kitchen, whereas a Captain received two rooms in officers’ housing and a kitchen, and a Lieutenant only one room plus a kitchen (USWD 1857:124). These kitchens could be shared among officers who shared the same quarters, such as at Fort Vancouver. The Officers Row maintained its prominent topographic and
Location of buildings erected by the 1st Field Artillery in 1849.

Figure 2. Plat, Survey showing the relative position of the public buildings at Columbia Barracks, Oregon Territory, ca. 1851 (Bomford 1851a), with detail.

(Courtesy of National Archives, Washington D.C.)
social position throughout the military’s occupation at Fort Vancouver, until its transfer to the City of Vancouver in the 1980s (see Fort Vancouver National Historic Site below).

Also in 1850, two enlisted men’s barrack buildings, with associated kitchens and privies, were erected on the upper terrace facing inward around a central parade ground, defining its perimeter (Figure 2). Five companies of the Riflemen overwintered in 1850 within these quarters (Ingalls 1851:327). Rather than being allotted a specific number of individual rooms like the officers, at Fort Vancouver each enlisted man had average air space of 700 cubic feet (USWD, SGO 1870:421) within a communal barrack building. Although facing south, away from the parade ground, the ca. 1849 structures constructed by the 1st Field Artillery helped define the southern boundary of the parade ground. By January 1851, all the troops were housed (Anderson 1904:268).

The number of ships continued to increase in northern California and along the Columbia River as merchants fetched a higher price for their goods than on the East Coast (see Chapter Four). Both settlers and miners continued to arrive seeking their respective fortunes. On 25 January 1851, 1st Lt. Theodore Talbot wrote, “We no longer appear so isolated as we were a year ago” (Hine and Lottinville 1972:157). When the Riflemen left Columbia Barracks for California in 1851, a small detachment remained to occupy the post that summer under 1st Lt. Talbot (Hine and Lottinville 1972:170), until Companies L and M of the 1st Field Artillery returned with Major Hatheway (Erigero 1992:214). Simultaneously, the civilian population in Oregon continued to increase, and “four river Steamboats” operated on the Columbia River (Hine and Lottinville 1972:159).

Four Companies (C, E, G and H), the band, and Headquarters of the 4th Infantry arrived 21 September 1852, comprising 292 men, under the command of Brevet Lieutenant Colonel
Figure 3. *Fort Vancouver and Environ*. Sketch, graphite and paper. Attributed to George Gibbs (Gibbs [1854]). Detail inset added.

(Courtesy of Fort Vancouver National Historic Site, National Park Service, Vancouver. No.10220).
Benjamin L.E. Bonneville (Anderson 1904:273; Erigero 1992:214; Hine and Lottinville 1972:175; Lewis 1924:57), but only some of the married officers brought their wives (Hine and Lottinville 1972:181). Typically commissioned and non-commissioned officers did not share quarters, nor messed together. However, Delia Sheffield, wife of Sergeant D.G. Sheffield Company H, 4th Infantry, recalled that she and her husband let Capts., McClellan, Brent, Grant and Lt. Sheridan board (mess) with them in the Quartermaster Depot (Lewis 1924). Bonneville remained until 1855, and the 4th Infantry remained, in varying company strengths, until 1861 when it was relocated east to fight the Civil War (Van Arsdol 1991:5-6; Erigero 1992:216).

Fort Vancouver, 1853 to 1861

In 1853, all military reservations within Oregon Territory were reduced to 20 acres, except for those posts designated as forts, which were reduced to one square mile, or 640 acres (Pub. L. 32-69, 14 February 1853, 10 Stat. 158, Sec. 9), likely because fort was (and still is) used to designate a permanent installation (Army Center of Military History 2011). The military post was finally authorized by Congress and confirmed by the U.S. Secretary of War Jefferson Davis in 1853 (Thomas and Hibbs 1984:57). Columbia Barracks was renamed Fort Vancouver on 13 July 1853 under the newly created Department of the Pacific (USWD, AGO Gen. Orders No. 20, 1853), which encompassed the newly established Washington Territory (Pub. L. 33-90, 2 March 1853, 10 Stat. 172).

Fort Vancouver grew in regional importance as it was the headquarters for Pacific Northwest military exploration, including outfitting the survey teams scouting potential railway routes into the Pacific Northwest (Grant 1990:947), Companies engaged in road building and military campaigns, and supplying goods to early settlers through the sutler’s store (Sinclair
2004:29). Forces were sent out to assist settler communities and wagon trains when they were threatened by conflicts with native peoples, and to garrison smaller posts throughout the region. Under Lieutenant Colonel Benjamin E. Bonneville, the post was resurveyed in 1854 to ensure the 640 acre limit (Anderson 1904:269).

American settlers continued to arrive in the region via ship and the Oregon Trail, inspired by the reports of fertile land (Grant 1885:201). Although initially written to formalize ownership of lands homesteaded before 1850, the Donation Land Claim Act of 1850 was extended until 1 December 1855 to claimants settling before 1 December 1853 (Pub. L. 32-69, 14 February 1853, 10 Stat. 158). Large numbers of immigrants continued to travel to the Pacific Northwest to claim land and mine for precious metals, as well as to access the gold fields of California (Van Arsdol 1991:22). Governors of the Oregon and Washington Territories were authorized to call volunteers into military service to protect Euro-American settlers. The first Oregon militia was organized under the Provisional Government of Oregon after the Cayuse attack on the Whitman Mission in 1847 (Oregon Military Department [2012]). The Oregon Volunteers were reorganized between 1854 and 1856 (Oregon Military Department [2012]), specifically “for the protection of the immigration on the southern route to Oregon” (Ross 1854). Ever-increasing demand for available land by the immigrant population continually led to land-use conflicts with native peoples and Indian removal policies.

Fort Vancouver acted as a regional training center and staging area for outfitting both regular Army and territorial Volunteer troops (Erigeron 1992:110) engaged in skirmishes, including those that expanded into the Rogue River (1855-1858), Yakima (1855-1858), and Cœur d’Alene (1858) Wars. This flurry of activity also saw new buildings erected on the upper terrace around the central parade ground and on the lower floodplain for the post’s Quartermaster
Department (not discussed herein). Simultaneously, the Army’s relationship with the HBC deteriorated, particularly after 1856, continuing until the HBC eventually moved operations from the area in 1860 (Erigero 1992:215-218).

Ordnance was managed by Army line officers in charge of the ordnance stores, until appointment of the first official Ordnance Department agent in 1853, thereby establishing the Vancouver Ordnance Depot (also referred to as Vancouver Ordnance Reserve or Vancouver Barracks Ordnance Depot in historical documents (Figure 5; Shine 2008; USWD 1852, 1862). Upon official request, Volunteer units could obtain munitions from federal ordnance arsenals (Bischoff 1976:28). The Vancouver Ordnance Depot outfitted both regular and Volunteer units fighting in the Pacific Northwest Indian Wars (Shine 2008:17-18). Although it was never officially designated an Arsenal, correspondence from the Ordnance Department began referring to the post as Vancouver Arsenal in 1862 (Shine 2008:48).

The number of troops in garrison fluctuated widely as Companies arrived, were equipped for their mission, and departed; a process repeated throughout the active military occupation into the 20th century. For example, between July 1853 and June 1854, only Companies G and H, and the Field Staff of the 4th Infantry were present, joined that June by Company L of the 3rd Artillery. By August 1854, 164 soldiers were in garrison at Fort Vancouver (Thomas and Hibbs 1984:59-60). At the end of that month, only 139 officers and enlisted men were stationed at the post during the official visit and inspection of Colonel Joseph K. F. Mansfield, Inspector General of the U.S. Army (Frazer 1963:170). However, in January of 1856, after the arrival of eight Companies of the 9th Infantry (A, B, C, E, F, G, I and K) arrived under Colonel George Wright, 34 officers and roughly 800 enlisted men were present at the post, the headquarters for the 9th Infantry in the mid-1850s (Van Arsdol 1991:7; Erigero 1992:214):
Figure 4. *Fort Vancouver, Washington* *Ty* in 1855. Engraving, Richard Covington (1855). Detail inset added.

(Reprinted from NPS 2004:ii).
“When I was here, three years ago [in 1855], the post was quiet enough, there being but three companies stationed at it. Now it is as lively as can be, being the landing-place of all those on their way to the seat of war, and where they are equipped for the field; constant drills going on, and nothing but hurry and preparation from morning to night. The rattle of the drum and the notes of the bugle are the constant sounds we hear” (2nd Lt. Kip, June 1858 in Kip 1859:18).

However, about two months later in early March the 9th Infantry marched to engage Indian Tribes east of the Cascade Mountains, leaving approximately 235 to 270 soldiers from regular and volunteer units and the Quartermaster Department, if not fewer soldiers, as the 9th Infantry Command often headquartered at posts closer to conflicts at hand (Thomas and Hibbs 1984:61):

“Our parade ground has quite a deserted appearance since the disappearance of the camp of the eight companies, which were stationed here a short time ago, and indeed the whole Fort wears an air of gloominess, which is nearly intolerable after having the hustle and excitement incident to a large garrison” (Daily Alta California 1856b).

Between 1855 and 1865, a series of Companies attached to the 4th and 9th Infantry, 3rd and 4th Artillery, and 1st Dragoons were quartered at Fort Vancouver, as well as Volunteer units in the winter of 1855 to 1856, some of whom camped along the Columbia River, at times up to about a week (Daily Alta California 1856b; Erigero 1992:216; Van Arsdol 1991:9,23). According to the 1860 federal census, at least three officers had their wives present on post, none
of whom worked as laundresses, with an additional 12 lieutenants living as bachelors in four officers’ quarters (USCB 1860:25-26). About 300 enlisted men and 20 musicians were in garrison, with three sergeants, one artificer, five privates and four musicians living separately from the main barrack buildings with their wives and families (USCB 1860:26-39). All of their wives worked as laundresses.

Not enough housing was available to house all the troops and support personnel at Fort Vancouver at the height of the influx, as “[t]he post was intended for six companies” (USWD, SGO 1870:421, 1875:489). In 1856, the officers of the 9th Infantry were quartered, whereas many of the enlisted men camped on the parade ground (Van Arsdol 1966:109, 1991:9) or near the Columbia River (Nelson and Onstad 1965:213). Several HBC structures were adapted to quarter non-commissioned officers, the band, and laundresses attached to the 9th Infantry (Ingalls 1860 in Hussey 1957:159). Upon its return to Fort Vancouver in 1858, the 3rd Artillery, including the officers, were “camped about a quarter of a mile from the barracks” (Kip 1859:23). Troops already occupying specific quarters could not be relocated upon arrival of additional soldiers. Until the 1870s, soldiers slept in pairs on double wooden bunks of rough construction, mounted on tiers, each with a wool blanket and a bed-sack filled with straw (Clary 1985). However, the Company’s allotted space could be reduced so more men could be accommodated (USWD 1861b:9). This often led to overcrowding in the enlisted men’s barracks in the winter: “We are very uncomfortable here, sleeping on the floor so thick as to make rolling a job of considerable movement. The floor is very open and the cold gets in as much as is comfortable (sic)” (William Peck, 5 December 1858 in Peck 1993:37).

To accommodate the increased need for quarters, coupled with the deterioration of existing HBC structures, buildings were repaired or replaced, and new structures were built
around the parade ground perimeter between the mid-1850s and 1870s. Although the erection of new buildings was generally limited to those “as can be built by the troops” after 1859 (USWD, AGO Gen. Orders No. 7, 1859), civilians assisted with this wave of building construction at Fort Vancouver (Van Arsdol 1991:27; USWD, SGO 1875:489). The building histories of structures selected for archaeological investigations are presented below.

Fort Vancouver, 1861 to 1879

During the Civil War, regular Army troops were called back east to fight for the Union Army, or left the Union to fight on behalf of the Confederacy. Between 1861 and 1865, Fort Vancouver was garrisoned by Volunteer units from California, Washington, and (mainly) Oregon, who lived in the log barracks (Sinclair 2004:45). By 1861, one regular Army company of 50 men remained at Fort Vancouver (Sinclair 2004:43). Only 125 men were permanently garrisoned in 1863, and 80 men, including three officers, were present in 1864 (Van Arsdol 1991:22,24). The population periodically swelled when other Companies passed through en route to other posts, with the Vancouver Ordnance Depot, now the Vancouver Arsenal, supporting these Volunteer troops with munitions, rations and other supplies: “The detachment have been busy preparing for marching tomorrow [6 July 1860], getting rations from the Commissary and turning over surplus material, storing useless clothing, and finally getting paid” (Peck 1993:171). Private William Hilleary described the process on 15 May 1865, “We were ordered to pack up and be ready to start tomorrow… Quite a stir among the boys in the afternoon packing their knapsacks and bundles” (Nelson and Onstad 1965:65).

After the Civil War, the Army restructured its organization. The Division of the Pacific was created in 1865 from the former Department of the Pacific, splitting the territory into the
Departments of the Columbia and California (USWD, AGO Gen. Orders No. 118, 27 June 1865). In 1869, the Army undertook further reorganization of the regimental units with a simultaneous reduction in overall troops (Adams 2009:13). The post served as the headquarters for the 19th century Regional Command for the Department of the Columbia (USWD, AGO Gen. Orders 118, 1865), which included all of Oregon, Washington, Alaska (after 1870), and a considerable portion of northern Idaho. After the Civil War, the Army restructured its organization.

Regular forces returned to co-occupy Fort Vancouver with the Volunteer infantry companies, including the 2nd Battalion, 14th Infantry in 1865, much of which immediately mustered out to posts east of the Cascade Mountains. Officers continued to reside in former HBC Kanaka village residential structures until at least 1863 (Crate 1867, quoted in Rose 1990). Battery F, 2nd Artillery and the 8th Calvary followed suit in 1866, the 1st Calvary in 1867, and the 21st Infantry in 1872 (Van Arsdol 1991:25,27,30,34). The post continued its pre-Civil War function of staging and outfitting troops and supplying goods to smaller posts, mainly garrisoned for suppressing periodic uprising by regional Native peoples (Erigero 1992:284; Van Arsdol 1991:29,42), including the Snake-Paiute (1866-1872), Modoc (1872-1873), and Bannock (1878) Wars, as well as the Nez Perce (1877) and Sheepeater [Western Shoshone] (1879) Campaigns. The Army in the West operated separately from the Army in the southern states assisting with post-Civil War Congressional Reconstruction (Weigley 1984:266).

Generally, a small permanent garrison was stationed at the post, yet as before the Civil War, when not on campaign, the garrison swelled with soldiers at Fort Vancouver. Although originally intended to garrison six companies (USWD, SGO 1870:421), the post often exceeded capacity with troop movements. For example, over 500 officers and enlisted men were
congregated at the post in April 1865, many of them Volunteers, often camping along the Columbia River (Hunt 1951:221; Sinclair 2004:45; Van Arsdol 1991:25). Although authorized since 1866 (USWD, AGO Gen. Orders No. 59, 6 August 1866), many of the Department of the Columbia offices finally relocated to Portland on 1 February 1867 (Van Arsdol 1991:30). Afterwards, only a skeleton force remained at Fort Vancouver. In 1867, one company was garrisoned “to guard the depot of the quartermaster and commissary stores” (Halleck 1868:44). The mean strength is given as 188.66 men in 1868 and 164.75 in 1869 (USWD, SGO 1870:432), but these averages included troops only briefly stationed at the post. Fifty-five enlisted men are recorded at the post in 1870 (USCB 1870:74-75, Dwelling 624, with an additional 21 men stationed at the Vancouver Ordnance Depot (USCB 1870:28, Dwelling 245).

In the late-1860s, there was debate amongst military commanders whether or not to retain the main garrison at Fort Vancouver: “I would respectfully commend that Fort Vancouver, Washington Territory, with the exception of the arsenal [Ordnance Depot] and ordnance department, be abandoned, its public buildings sold, the reservation thrown open to settlers…” (Crook 1869:141). Proposals for abandonment of Fort Vancouver were finally rejected in 1870 based on its ideal location for inter-post military communications, and as a supply depot for the Quartermaster and Commissary Departments; water service was already installed to all kitchens and quarters (Gustin 1890; USWD, SGO 1875:489), and the proximity of the Vancouver Ordnance Depot (Van Arsdol 1991:30,32-33,42). General Canby wrote, “I do not concur in the opinion expressed by my predecessor in this command that it should be abandoned and sold. The buildings are now greatly out of repair, but if suitably garrisoned good condition at comparatively little expense, as the necessary; labor would be performed by the troops” (Canby 1870:55).
Figure 5. 1874 Map of the U. S. Mil. Reserve at Fort Vancouver, W. T. (Ward 1874).

(Courtesy of National Archives, Washington D.C.)
Relationship Between U. S. Army and Hudson’s Bay Company at Fort Vancouver, 1845 to 1860

Although occupying the same lands, the Army and HBC were on good terms for the first five to six years, forming a mutually beneficial relationship; the HBC land claims were protected from settlement by American immigrants (Sinclair 2004:19), and the presence of the garrison drew community business to the HBC, including the Army itself (Hussey 1957:104; Rose 1990:29; Saxton 1855:251; Vinton 1850:146).

Documentary records indicate that American military personnel of the Catholic faith, as possibly others, were buried in the HBC cemetery until 1856. A military cemetery was established by 1885 in the northwest corner of Fort Vancouver, west of the Officers Row (USWD 1855b). With the early-1880s expansion of Officer’s Row to the west (USWD 1886), individuals were reinterred at the still extant Vancouver Barracks Post Cemetery.

However, from its first arrival, the Army desired the HBC’s Fort Vancouver lands because of its prime location: “It is accessible for supplies by water in three directions, viz: through the Columbia, the Willamette, and Cowlitz Rivers—all communicating with the most fertile portions of Oregon… so it is destined to become the point from which all our supplies to the several military posts are to radiate” (Vinton 1850:147). Major Hatheway noted “Their [HBC] establishment here will make excellent Barracks. It occupies the best and most central position for military Hd. Quarters of any in the Territory” (Maj. Hatheway in Van Arsdol 1999:118).

By 1856, tensions between the Army and HBC over settlement of the land begin to change, as evidenced by their correspondence. Capt. Ingalls requests to occupy additional lands and erect a wharf and storehouse were denied by then HBC Chief Trader James A Grahame. Capt. Ingalls considered the land the possession of the United States and the Company could
claim “only to what it actually occupies and uses in the natural exercise of its functions under its charter and as guaranteed by the treaty of 1856” and erected the wharf and storehouse nonetheless (Ingalls 1858 in Hussey 1957:106-107). However, the HBC continued trading from Fort Vancouver through 1859, albeit with a much reduced volume of goods (Kip 1859:17). The Company lost its exclusive Oregon country British trading privileges on 30 May 1859 (Hussey 1957:100) and the relationship with the U.S. Army deteriorated.

Continually increasing tensions between the HBC and Army over disputed land claims, coupled with the question of the San Juan Islands which led to so-called “Pig War” with Great Britain from 1859 to 1872 (see Murray 1968; Thompson 1972; Vouri 1999), resulted in U.S. Secretary of War John B. Floyd terminating all HBC occupancy at Fort Vancouver on 30 April 1860 (later rescinded on 7 June 1860) (British and American Joint Commission [BAJC] 1865:4; Hussey 1957:108,112). Before those orders arrived, however, the HBC decided to withdraw from Fort Vancouver as the Army had destroyed several HBC structures, including the hospital, stable, ‘cow-house,’ and an occupied employee house in Kanaka Village (Hussey 1957:109). The HBC withdrew from Fort Vancouver in early May of 1860, with the final shipment of goods, equipment and personnel (excepting the gatekeeper) departing 14 June 1860 (Hussey 1957:110,112).

After determining that the fort stockade and structures within were of no use to the Army, the military began reclaiming usable materials in 1860, some for reuse at Vancouver Ordnance Depot (Erigero 1992:217). Company complaints, supported by the British minister, halted demolition operations that July (Hussey 1957:112,152,159). The fort stockade and buildings slowly fell into disrepair, and over the next several years, settlers and soldiers continued to dismantle the stockade and fort structures to reuse the timber, either for construction or firewood.
Figure 6. *Fort Vancouver, W. T.* Lithograph, Gustav Sohon [1855]. Detail inset added.

(Courtesy of Fort Vancouver National Historic Site, National Park Service, Vancouver, WA. No. 965)
Almost all remnants of the fort were destroyed by a fire of unknown origin, prior to an inspection commissioned by the BAJC in 1866 for settlement of the Company’s claims (BAJC 1867:270-280; Hussey 1957:160).

**Vancouver Barracks, 1879-1946**

The early portion of this period saw continuing Army reorganization, first begun after the Civil War. Following the Congressional requirement that all military headquarters be maintained at government owned buildings (Pub. L. 45-263, 18 June 1878, 20 Stat. 145), the garrison was designated Vancouver Barracks on 5 April 1879 when the Department of Columbia Headquarters were relocated back to Vancouver (USWD, AGO, Gen. Orders No. 42, 20 August 1878). In addition, “women were no longer allowed to accompany troops as laundresses,” but laundresses already employed and married to current soldiers could be “retained until the expiration of such soldiers present term of enlistment” (Pub. L. 45-263, 18 June 1878, 20 Stat. 145, Sect. 5). Post laundries, with men performing the washing, were established by the Quartermaster Corps in 1909 (Mescher 2001).

With reorganization of the Army, Vancouver Arsenal was abolished and the stores transferred to the Vancouver Barracks Ordnance Depot (USWD, AGO Gen. Orders No. 89, 14 December 1881), which was in use until abolished in 1884 and the ordnance stores shipped to Bencia Arsenal, near San Francisco (USWD, AGO Gen. Orders No. 34, 1894). The Arsenal grounds and some of the buildings were reused for the Department of Columbia Headquarters (Cromwell et al. 2009:8). Army reorganization, including consolidation of military posts in 1882, led to a renewed construction boom between 1885 and 1887 at Vancouver Barracks (for discussion of areas not addressed in this Chapter, see Babalis 2012). The Washington State
Legislature recognized exclusive federal jurisdiction over the military reserve on 24 February 1891 (USWD, JAG 1916:457).

Through the 1870s, the garrison continued to support the Army’s continuing mission of reinforcing American land claims (Sinclair 2004:55) by serving as a regional hub for staging and training troops for deployment to smaller posts throughout the Pacific Northwest. These small garrisons were placed at potentially volatile locations for American settlement, such as near native communities and reservations (Babalis 2012:39). Vancouver Barracks supported Army personnel engaged in continuing hostilities with Native peoples.

Military survey and expedition parties also operated out of the post in the 1870s and 1880s, sent to explore the Pacific Northwest and recently acquired Alaska, purchased from Russia on 30 March 1867 (Erigero 1992:283; Sinclair 2004:63-65,71-73). Army troops acted as a police force during events of regional civil unrest, including riots and strikes, in the 1880s and 1890s. The military frontier era in the Pacific Northwest ended with completion of the Northern Pacific Railroad in 1883, linking Portland and Vancouver Barracks to central Washington and the wider national railroad network (Erigero 1992:285; Sinclair 2004:62). Many smaller posts in the Pacific Northwest were closed as troops could be more quickly mobilized from Vancouver Barracks.

During the 1898 Spanish-American War, and subsequent occupation of the Philippines, Vancouver Barracks served as a mobilization and training center for Oregon and Washington volunteers (Erigero 1992; Sinclair 2004). In April 1899, the soldiers of the 24th Infantry, commonly referred to as “Buffalo Soldiers,” arrived at Vancouver Barracks marking the first major presence of African-Americans in the larger Vancouver community (Sinclair 2004). The scale of the Spanish-American War, coupled with its location outside of continental North
America, led to a reorganization of the Army, consisting of another reduction of the number of posts actively garrisoned to consolidate its forces (Babalis 2012:59).

Vancouver Barracks was selected for retention, thereby increasing its regional importance and necessitating facilities growth; the final wave of construction was initiated at the turn of the century. Most notably along the southwestern perimeter of the parade ground, three two-story Double Infantry Barracks were constructed between 1903 and 1907, each with a full-sized basement, attic, and full-length covered porch (Bldg. Nos. 991, 993, and 987). Based on historical map documentation (see above), these buildings were placed on the original footprints of several late-19th century buildings, which in turn were positioned over the 1859 barrack and attached 1854 kitchen on the western perimeter of the parade ground, and potentially partially over the ca. 1850 barrack and associated kitchens.

By the end of the WWI, many of the extant structures in the Vancouver Barracks Historic District had been constructed. Between the wars and through World War II, the Vancouver Barracks area perhaps saw its peak use by the Army. The active Army presence at Vancouver Barracks largely came to an end when the 7th U.S. Infantry mobilized from Vancouver Barracks to the North African and European Theatres of Operation from 1942 to 1945.

Fort Vancouver National Historic Site and the Vancouver National Historic Reserve

Most of the original post became surplus government property in 1946, and 135 acres of Vancouver Barracks, including the parade ground, Quartermaster Depot and riverside plain used for training maneuvers (the latter two encompassing the HBC’s Fort Vancouver and Company Village) were transferred to the National Park Service (NPS) in 1948 for the establishment of
Fort Vancouver National Monument (Pub. L. 80-715, 19 June 1948, 62 Stat. 532). The park was later redesignated Fort Vancouver National Historic Site in 1961 with enlarged boundaries (Pub. L. 87-78, 30 June 1961, 75 Stat. 196; 16 U.S.C. §450ff). The site now includes the reconstructed HBC fort and company village, as well as portions of the Army post, including the Pearson Air Museum complex, the waterfront, eastern and southern portions of the Vancouver Barracks, and part of the Pearson Field airport. Through a federal surplus property transfer, the Officers Row was deeded by the Army to the City of Vancouver in 1984, with final title transfer in 1986, initiating a large rehabilitation effort in 1987 (COV 2012; NPS 2011).

In turn, Fort Vancouver National Historic Site (FVNHS) is affiliated with a set of historical properties that together comprise the Vancouver National Historic Reserve Historic District (DT191), established in 1996 to preserve and interpret a diverse array of cultural resources that reflect socio-economic systems and settlement of the Pacific Northwest (Pub. L. 104-333, 12 November 1996, 110 Stat. 4154). The reserve extends from the Columbia River northward across the floodplain onto the adjacent fluvial terrace (herein referred to as the upland portion of the VNHR), between 0 and 120 ft. above sea level (USGS 1977, 1978). The site is managed in accordance to a cooperative management plan by four partners: the National Park Service, City of Vancouver, U. S. Army, and the State of Washington (Figure 1 and Figure 102). The Reserve includes FVNHS, and properties affiliated with the National Park Service and now owned by the City of Vancouver, including Officers Row, the western portion of Vancouver Barracks, Pearson Field Airport, Old Apple Tree Park, the Water Resource Education Center, Marine Park, and other portions of the Columbia River waterfront.

The western portion of Vancouver Barracks was retained by the Army as part of a training center for the U.S. Army Reserve until 2000, when it transferred to the City of
Vancouver (Pub. L. 106-398-Appendix, 20 October 2000, 114 Stat. 1654A-425; 28 (D)(1) U.S.C. §2843). The East and South Barracks were retained by the Army, and were used in its new role as part of a training center until 2000, and as an Army Reserve and Washington National Guard training center from 2000 until 2012, when these lands were relinquished to the National Park Service (77 Fed. Reg. 33235). Portions of the former garrison extend beyond current FVNHS and VNHR boundaries, including the target range and “Suds Row” (a series of ca. 1880s to 1890s laundresses’ quarters) to the north, and part of the Quartermaster Depot and wharf to the southwest.

Building Histories of Selected Military Structures, 1850 to the mid-1880s

Building dimensions for historical structures are presented in this section, with a focus on residential areas selected for archaeological investigations, those of junior commissioned officers, enlisted men, and laundresses. Specific measurements for these buildings recorded in archival records are summarized in Table 1.

Commissioned Officers’ Complex, North Parade Ground

West Officers Quarters, 1850 to ca. 1865-1868

Each officers’ quarters was an one-story, roughly 40 (assuming an 8 ft. wide central hall) by 32 ft., 12 ft. tall building, on a wood block foundation (Ingalls 1858), with a second windowed half-story, side-gabled roof and a 10 ft. wide full-length porch, visible on the ca. 1851 map (Figure 7). Each had “four assignable rooms on the ground floor” (Ingalls 1851:327), each 14½ or 15 by 16 ft., two on each side of a central hallway leading to front and rear exterior doors. Stairs to the attic are depicted within the central hallway. In the ca. 1851 sketch (Bomford
three rooms are labeled as “Chambers” with the fourth, on the backside of the house, as a “Dining Room.” The two rear rooms have two windows, one on each wall, whereas the front two rooms have three windows, two along the front facing the porch and one on the side. Each room had one door leading to the central hallway, and one door accessing the adjacent room.

The plans for the officers’ quarters depict two central fireplaces, each shared by two rooms. However, only four of the quarters were finished with chimneys; the rest were outfitted with stoves (Thomas 1987). Historic images (Figure 3 and Figure 4) do not clearly depict whether the westernmost officers’ quarters was heated by stove or chimney. Further construction details are given by Captain Thomas L. Brent, then Assistant Quartermaster:

“The eight blocks of officers’ quarters… are also unhewn logs-the partition between the rooms are in most of them rough boards nailed to upright scantling, and under the ceiling above is in many of them nothing but [illegible] boards laid on the upper side of the joist, or rather the floor of the attic which is under the roof and unfinished-the logs are chinked and filled in with mud and mortar. Inside the bare logs are seen, and from the shrinking it is impossible to render them comfortable in winter. These quarters are whitewashed at least once every year… None of the quarters are fitted with blinds or shutters-or gutters and spouts” (Brent 1856).

In the mid-1850s, the first floor of the officers’ quarters, but not the attics, were “hard-finished,” consisting of applying a smooth finishing coat of hard fine plaster to a surface of rough plastering, and considered in good order (Ingalls 1858; USWD, QGO 1872a:113). Later
additions greatly improved living conditions at the post for the officers. By 1866, the one-story log quarters were “painted yellow, with green blinds and wide verandas, snug, cozy, little homes” (Vancouver Register 1866 in Van Arsdol 1991:26). The blinds were added sometime between the late-1850s to early 1860s, as they were not present in 1856 (Brent 1856). The quarters were “in the cottage form, and for taste are superior to these we have seen at any other post“ (Kip 1859:23), considered “comfortable houses” for the officers of the 9th Infantry in the mid-1850s (Daily Alta California 1856a): “The log huts were built of carefully selected red fir, well underpinned, and are of the pattern known as “four pens and a passage,” giving four rooms and two attics… with the crevices chinked and plastered, and the walls and ceilings lined with dressed lumber” (USWD, SGO 1870:421).

Figure 7. Columbia Barracks, Oregon, Building Drawings (Bomford [1851b:1], detail of an officers’ quarters and kitchen, ca. fall 1850. Full building plan sheet given in Appendix B, Figure 104 (Courtesy of National Archives, Washington D.C.).
By 1863, the wood block foundations were “decaying and… settling, and security requires that they be replaced either by new wooden or stone foundations” (Hopkins 1863). The officers’ quarters once again fell into disrepair, described as “were once commodious dwellings, but are now old and much out of repair” (USWD, SGO 1875:489). These buildings were replaced by later constructions on the Officers Row.

**West Officers Kitchen, 1850 to ca. 1865-1868**

Each officers’ quarters had a detached kitchen and privy in the rear (Ingalls 1851:327). An 1851 map (see Figure 7) portrays the detached kitchen and a smaller outbuilding, established in a linear formation perpendicular to the parade ground. Each one-story kitchen, 32 by 16 ft. and 10 ft. tall, had two rooms with a central fireplace, or possibly stove, given that not all the officers’ quarters contained fireplaces. The exterior door, placed on the side of the kitchen facing towards the center of the associated officers’ quarters, led to the windowless “Wood & Wash’s” *(sic)* room, 12 by 14 ft. However, this room was occupied by officers’ servants; “with kitchen and servants’ room in rear” (USWD, SGO 1870:421), and possibly laundresses at times (see below). In turn, this room opened to the Kitchen proper, described as 14 by 18 ft. with three windows, one on each wall (Figure 8). The kitchens were attached to the main quarters by 1854 (Figure 9, Figure 106 to Figure 108). “The usual size [of the officers’ quarters] is 30 by 36 [ft.], with rear extension [the now attached kitchen], 15 by 30 [ft.], and piazzas out front” (USWD, SGO 1875:489).
West Officers Quarters, ca. 1865-1866 to present

By 1865 or 1866, construction of three new framed one-story cottages was completed, with each approximately 25 x 30 ft. in size, with a kitchen and an attic (cf. Figure 13). Two of the cottages are still standing on the Officers Row (Bldg. Nos. 7 and 8), and are currently occupied. Originally, these single-roofed structures each contained “three (3) rooms and [an attached] kitchen, exclusive of the attic. Room dimensions are given as “14’ x 15’; 13’-3” x 15’; and 11’ x 14’-3”. Kitchen 12’ x 14’ ” (Gustin 1890:3 [then Bldg. Nos. 17-18]).

However, these cottages were soon considered by Army personnel to be “inferior in comfort” as they were “built by contract and in a careless manner” (USWD, SGO 1875:489). By 1869, the two westernmost log officers’ quarters and associated kitchen were demolished for construction (see USWD 1869), likely soon after construction of the three frame cottages as these flanked the original quarters. The remaining seven 1850 log officers’ quarters remained in use for several more years before their removal and replacement (Erigero 1992; Sinclair 2004; Thomas 1987; USWD, SGO 1870:421).

Enlisted Men’s Complex, West Parade Ground

Although in August 1850 the Army planned to construct four enlisted men’s barracks (Figure 103), only two were built, one each on the east and west sides of the parade ground, with associated outbuildings. All were completed in November 1850 (Ingalls 1851:327). Each building cluster, or complex, consisted of one one-story log main barrack, with one kitchen and one mess, the latter often referred to as a ‘mess-house.’ On the ca. 1851 plat (Figure 2) these complexes are labeled “Soldiers Quarters & Kitchens” on the east side of the parade ground, and
“Soldiers Quarters & Kitchen” on the west side. Although not depicted, it is likely additional associated outbuildings, such as sheds and privies, were also constructed at this time.

All of these structures were built of squared logs, had shingled roofs, with floors, partitions, and gabled ends “finished with sawed timber” (Ingalls 1851:327). In the 1850s, three additional buildings were built south of these structures; a ca. 1854 “Mess-house”, and a ca. 1859 “Bath-room” and two-story enlisted men’s barrack. The 1850 mess-house was removed in the 1860s, while the 1850 log barrack and kitchens were “Destroyed” (Figure 11). This is likely to have occurred around 1870, as they are depicted on the 1869 plan of the post (Figure 113) but not on the March 1871 map (Figure 11). The ca. 1859 buildings survived until replaced by other barrack buildings in the early-1880s.

**West Enlisted Main Log Barrack, One-story, 1850 to ca. 1870**

Building drawings included with Ingalls’ 1851 report (Figure 8) depict the barracks as one-story log structures 84 by 32 ft., each with three rooms 10 ft. tall. A windowless side-gabled roof and an 8 ft. full-width roofed porch, with 11 support columns, was erected along the front façade, as can be seen on the ca. 1851 map (Figure 8). All exterior doors were framed and sills present beneath the windows (Figure 3, Figure 4, Figure 6, Figure 8). They were constructed in the same architectural style and floor plan as the 1849 one-story log barrack erected by the 4th Infantry under Maj. Hatheway, likely with similar construction materials (Ingalls 1849b:172-173), although with differently-sized partitioned rooms (Figure 2 and Figure 10). In an historical photograph, the 1850 enlisted men’s barrack is partially visible behind (north of) the ca. 1859 two-story enlisted men’s barrack (Figure 10).
The main “Barrack Room” measured 68 ft. 4in. by 30 ft., with two rooms along one side, and was accessed by two external doors opening onto the front porch, and one door opening to the rear. A fireplace is depicted on each side of the room, and two chimneys are visible in the same position in mid-1850s images (Figure 3, Figure 4, Figure 6). The main barrack room, with three windows along the front and four along the rear, was later described as “75 by 30 feet by 10 feet high, is one story, and intended for 70 men, each having a separate bed... [with] no

Figure 8. Columbia Barracks, Oregon, Building Drawings (Bomford [1851b:1], detail of an enlisted men’s barrack and kitchen, ca. fall 1850 (Bomford [1851]). Full building plan sheet given in Appendix B, Figure 104 (Courtesy of National Archives, Washington D.C.)
provision for ventilation… A kitchen and mess-room are in the… rear of the… barracks” (USWD, SGO 1870:421).

One 11 by 13 ft. 8 in. room, labeled “Ordr’y Serj’t,” opened onto the main barrack room. This orderly room was used as an administrative office by the Company, with the Company sergeant usually working and living there (Peck 1993:148; USWD 1861b:2). The adjacent “Store Room,” 13 ft. 8 in. by 18 ft. 6 in., was only accessible from the orderly room, thereby restricting enlisted men’s access to the Company stores (Figure 8). These two other rooms each had one window, but no exterior egress. The orderly and store rooms may have been combined into one room by the late 1860s as this barrack is listed as having only two rooms at its demolition (Figure 11).

Substantial building activities were undertaken on the west side of the parade ground in the mid-1850s, resulting in the construction and/or expansion of several structures. Unlike the other buildings in this area, few alterations were made to the exterior of the 1850 enlisted men’s barracks or kitchens, other than whitewash (Brent 1856) or the addition of green and yellow paint (Vancouver Register 1866 in Van Arsdol 1991:26). Historical images of the post depict the enlisted men’s barracks basically unaltered from the ca. 1851 building plans (Figure 3, Figure 4, Figure 6).

By the mid-1850s the rough-hewn log buildings, except for the 1849 Commanding Officer’s quarters, and including the remaining officers’ quarters, had unfinished interiors and remained divided by rough-hewn partitions (Brent 1855; Erigero 1992:243). As weatherboarding had not been added to the quarters, mud and lime/mortar chinking had to be regularly reapplied: “the Qtrs. Of the officers, and men, were chinked and daubed with mud, with a little lime to improve its consistency. The first heavy rains of winter swept this away and made new repairs
A) Officers log quarters.
C) Soldiers log quarters.
D) Soldiers log kitchen.
R) Laundress (married enlisted men’s) quarters.

Figure 9. Fort Vancouver, 1854 (USWD 1855a).

(Courtesy of National Archives, Washington D.C.)
necessary” (Capt. Grant, 25 July 1853 in Grant 1990:947-948). Others noted “In the dry season
mortar and daubing fall off and leave the wind free passage [through the log walls], during the
rainy season, the rains force through the crevices… [the quarters] should be something more than
mere corrals of regulations size with roofs on them” (Brent 1855).

In 1858, the post buildings were reported in a “good state of preservation and repair”
reflecting the amount of maintenance undertaken in the intervening years (Ingalls 1858).
Although materials were requested for beautification of the post, such as weatherboards, paint,
lube for furring, papering, and window/door casements (Brent 1855; Thomas and Hibbs
1984:64), little repair work was immediately undertaken, as Col. Mansfield, opined “to repair the
log houses of officers and soldiers is a waste… it would be better to put up entirely new
buildings of plank” (Frazer 1963:174). Although the chinking was periodically repaired on the
log buildings, and weatherboarding added, by the late-1860s, the early-1850s log structures were
“in poor order, needing repairs” (USWD, QGO 1872a:113; 1872b:39), “present[ing] the
appearance of decayed rubbish” (Maury 1865). The barrack may have been used as a storehouse
prior to its demolition in 1870, as it is described as a one-room structure (Figure 11).

**West Enlisted and Band Small Quarters, 1850 to ca. late-1860s**

Constructed in 1850, this small “Soldiers Quarters” was positioned north of, but on
alignment behind (west) of, the 1850 main enlisted men’s barrack. This structure is depicted on
early-1850s maps as roughly the same size as the 1850 kitchen, approximately 50 x 18 ft. in size
(Figure 2, Figure 106, and Figure 107). By 1855, the structure served as the “Band Qtrs”
quarters in 1855 (Figure 106 to Figure 108). As opposed to images drawn or sketched in 1854
(Figure 3 Figure 4), this structure quarters is depicted in some mid to late-1850s images slightly
larger than the enlisted men’s kitchen, at roughly 60 by 20 ft. (Figure 6, Figure 108, Figure 111, and Figure 112), but these size differences may result from inconsistencies in mid-19th century mapping accuracy. Mid-19th century images sketch depicts porches on both the west and east sides of the structure (Figure 6).

By 1869, this building was removed or demolished, and replaced by a smaller structure (Figure 113). This new building was used recreationally as a “Billiard Room” in the early 1870s (Figure 11, Figure 113, and Figure 114; USWD 1869b), then converted to a “Library” by 1874 (Figure 5), before its removal in the late-1870s (Figure 118). (As this structure was not selected for subsurface testing, only one excavation block was placed the southeast corner of the 1850 small quarters).

West Enlisted Kitchen, 1850 to ca. 1870

Floor plans drawn up in 1850 indicate the enlisted men’s kitchen was 50 by 18 ft., with a central fireplace and three rooms delineated (Figure 8). The “Chef’s Room”, 24 by 16 ft. in size, encompassed one side of the structure (north?). This space had three windows, one on each wall, and two doors, one door leading to the kitchen and one towards the main barrack. The main part of the fireplace faced the “Kitchen” itself, 16 by 16 ft. in size, with two windows and two exterior doors; one to the main barrack and one to the rear towards the privies. The 8 by 18 ft. “Pantry” sat along the exterior (possibly the southern) wall.

Historical images vary in their depiction of the kitchen. Covington (1855) and Sohon [1854], [1855] portray one rear (west) door flanked by two windows (Figure 6), whereas the Gibbs [1854] sketch (Figure 3) depicts instead one window on the southern kitchen façade without a rear door. While the kitchen is portrayed with two chimneys by Covington (1855;
Figure 4), an ca. 1855 lithograph (Figure 6) depicts a white-washed building with only one large central chimney, similar to the original building plans (Figure 104). No chimneys are depicted on the ca. 1855 sketches (Figure 3 and Figure 6).

In the 1860s, the kitchen may have been expanded or replaced by a larger building, as it is depicted as a larger structure on 1869 and 1871 historical maps, roughly 78 by 24 ft. in size (Figure 113 Figure 114). Its function remained unchanged before its destruction in 1870. As the 1850 floor plan depicts this building with two rooms, if enlarged (i.e. not mapping errors) the building expansion or replacement may have retained this layout, although an 1869 map portrays it with only one room, agreeing with an 1871 description “Company Kitchen, containing one room” (Figure 11).

**West Enlisted Mess-house, ca. 1854 to ca. 1870**

West of the enlisted men’s barrack, south or south/southwest (location varies with image) of the 1850 small enlisted quarters and kitchen, an one-story building, was erected with a small roofed exterior open entryway on the rear (west) side (Figure 9, Figure 106, Figure 107). Unlike the 1850 building plans for the kitchen (Figure 8), there is no window visible in historical images along the southern wall of this structure (Figure 4 and Figure 6).

The texture on the south side of the building depicted by Sohon [1855] suggests the building was not weather-boarded, but was of vertical plank construction (Figure 6). This structure is partially visible in an 1859 photograph of the post with a whitewashed frame exterior (NABC 1860). Although not depicted in the photograph, Covington (1855) and Sohon [1854] depict it with a small porch along its front (east) façade (Figure 4). This building was described
as a “Company Messhouse, containing 2 rooms” prior to its destruction in 1870 (Figure 11
Figure 114).

West Enlisted Barrack, Two-story, 1859 to early-1880s

A two-story framed barrack, with attic, was constructed by 1859 just south of the existing main
log barrack on the west side of the parade ground; it is only depicted on one draft of the 1859
military map (Figure 111 and Figure 112). This “90 by 30 feet” barrack (USWD, SGO
1875:489), with a 10 ft. deep, two-story full length porch (USWD [1859]) is prominently visible
in an 1859 historical photograph (Figure 10). The porch and exterior baseboards are
whitewashed, while the building itself retains a wood surface. The porches each have one
window on the side facades, and the attic is ventilated by at least two windows.

West Enlisted Kitchen, Mess-house and Bath-room, ca. 1859 to early-1880s

A small structure, roughly 70 x 25 ft. in size, was constructed, likely at the same time,
behind (west) of the west enlisted two-story barrack, south of the ca. 1854 mess-house. It was
used as a kitchen and mess-room [mess-house], and also appears on only one version of an 1859
map (Figure 11, Figure 111, Figure 112, Figure 114). By 1860, the building has a whitewashed
frame exterior with a small attic ventilation window (Figure 10). In 1874, the kitchen/mess-room
was connected to the two-story barrack “by a hall 31 by 14 feet, in which a bath-room has been
fitted up, supplied by the pipes of the water company” (USWD, SGO 1874:489; see also Figure
5). Although another enlisted structure was planned for construction immediately south of the
(Figure 113), it was never built (Figure 11). The ca. 1859 barrack and attached kitchen/mess-
room was subsequently replaced by other barrack structures in the early-1880s (Figure 118 and
Figure 10. United States Military Post, Fort Vancouver, Columbia River, May 1859 (NABC 1860), with detail inset added. Although the year 1859 is given in the title, the photograph has been dated to 1860.

(Courtesy of Library of Congress, No. LC-USZC4-11408, Washington D.C.)
Figure 119), which were themselves superseded by the ca. 1904 and 1907 Double Infantry Barracks (Bldg. Nos. 987 and 991), both still standing today. Archaeological investigations conducted for this study did not intersect architectural features related to these buildings.

Laundresses’ Quarters Complex, Fort Vancouver, West Parade Ground

Upon their arrival in 1849 at Fort Vancouver, then Camp Columbia, and prior to the construction of quarters specifically for them, the laundresses resided within one of the former Hudson’s Bay Company schoolhouses finished by Army personnel, a structure also used as a storehouse (Ingalls 1849b:170).

Mid-1850s sketches for all other posts within the Department of the Pacific include locations for laundresses’ quarters (Figure 106), and the laundresses’ quarters are noticeably absent on the 1850s maps of Fort Vancouver (Figure 9). On one version of an 1854 map, drafted from the post survey conducted under Lt. Col. Bonneville (Figure 106) two small structures are depicted west of the 1850 barrack and associated 1850 kitchen and 1850 mess-house. The northern one is identified as “R” in 1855 (Figure 9 Figure 106). Although the accompanying building key does not include an identification for “R,” the structure likely served as quarters for laundresses and their families, as the proposed 1860 Army Regulations for the barracks and quarters state that laundresses’ quarters should be “On one line parallel to, and 200 feet in rear of the front of the company quarters to which they belong” (USWD 1861b:7). In addition, the 1869 to 1871 maps identify this same structure “R” as quarters for laundresses (Figure 11, Figure 113, and Figure 115).

The northern laundress quarters is portrayed in an 1855 sketch as a one-story structure facing north, with a central chimney, attic and covered (possibly full-length) porch along the
south façade (Figure 4). One window and one door are depicted on the south wall, and one window on the west wall. The building is later described as containing two rooms, with a full-length porch on the south side (Figure 11 Figure 113). The footprint for this building is believed to lie within the modern asphalt-surfaced Fort Vancouver Way road corridor and was not selected for examination with archaeological test excavations.

Although present on two historical maps (Figure 9 and Figure 106) and one sketch (Sohon [1854]), the southern laundresses’ quarters is not portrayed on other 1850s post depictions, whereas the northern “R” laundress quarters is included (Figure 4, Figure 6, Figure 107, Figure 108, Figure 111, and Figure 112). In the mid-1850s, both this and the northern laundress quarters are sketched as simple one-story buildings, but other architectural details, such as windows or doors, are not included (Sohon [1854]). Unfortunately, the 1860 photograph taken by the North American Boundary Commission of the garrison (Figure 10) does not capture this portion of the post, and therefore does not resolve the question of whether or not this building was constructed and occupied for a short time, as it does not appear on maps of the garrison drawn in 1859 (Figure 111 and Figure 112).

Federal census records (see below) indicate that the laundresses and their children often lived with their husbands, typically sergeants, musicians, or privates, in smaller quarters with between one and five adults in each building (USCB 1850, 1860, 1870). The Regulations specified that assigned quarters must allot “every six non-commissioned officers, musicians, and privates, servants and washerwomen, 225 square feet of room north of 38° N.” (USWD 1857:124), the same amount of space as for enlisted men in the main barracks (Clary 1985:203). Census records indicate that typically four adults or two adults and children lived in these
smaller quarters at Fort Vancouver, reflecting their small size. Therefore, structures labeled as laundresses’ quarters on historical maps likely also referred to married soldiers’ quarters.

Generally only the Non-Commissioned Officers could afford to bring their wives, who typically worked as laundresses to support the household (see Chapter Four). At Fort Vancouver, married enlisted men could occupy family quarters with their wives and families, if available. Yet the locations of the married soldiers’ quarters are not identified on any of the 19th century maps, although military reports on Fort Vancouver state the “married soldiers and laundresses [were] log hut (síe), scattered about all parts of the post” (USWD, SGO 1875:489). Identifications for these households may have been subsumed under the term “laundresses.”

The mid-1850s to late-1860s housing shortage at the fort affected laundresses and their families the most (see Housing Assignments below). By the mid-1850s, “many of the laundresses for want of quarters are living in the kitchens of the officers much to their annoyance and discomfort” (Brent 1855). The buildings used as laundresses’ quarters in the 1860s were suffering from deterioration, and some women lived in the adjacent Town of Vancouver. Military personnel described the buildings’ decline, “The quarters for married soldiers are much decayed, damp and leaky” (USWD, SGO 1870:421), and “The condition of the laundress’ quarters some being reported daily as unfit for occupation and in such condition, (old and dilapidated) as would make repairing as costly as rebuilding, and being deficient in quantity; (the Quartermaster is now hiring buildings in town for some, for want of buildings of any class in the garrison (sic)” (Maury 1865).

By 1869, new quarters were constructed for the laundresses across Fort Vancouver, and may have housed married couples as well. Three of these were positioned in linear formation with and extending south of the northern ca. 1854 “R” laundresses’ quarters. One of these is
depicted in this same location as the ambiguous southern ca. 1854 laundress quarters depicted on some historical images of the post previously discussed (Figure 11, No. 10 and Figure 113, No. 14). It is unclear whether the southern ca. 1854 laundress quarters depicted on some mid-1850s maps and the ca. 1869 laundress quarters are the same structure, or if the earlier quarters was planned but not constructed. All of the laundresses’ quarters at Fort Vancouver, including these three buildings, were categorized as “Class 1st” structures, at the lowest level, similar to the enlisted men’s barracks and kitchen (Figure 11). The southernmost of the three new laundress quarters was selected for archaeological investigations for this study, as the northern two are likely within the asphalt-surfaced Fort Vancouver Way roadway.

A fourth structure was constructed southwest of the southernmost laundress quarters, due west of the 1859 enlisted men’s barracks and associated ca. 1854 kitchen (Figure 113). This fourth building, categorized as an one and one-half story “Class 2nd” structure containing three rooms, was used as an officers’ quarters in 1871 (Figure 11), yet is associated with the laundresses on the 1874 map (Figure 5), suggesting that as the building deteriorated, it was reassigned as laundresses’ quarters. In the late-1860s to early-1870s, “nine laundress quarters were used for ten families and are greatly out of repair” (USWD, QGO 1872a:113; 1872b:39), and if classified as a laundresses’ quarters, the former officers’ quarters would bring the total number of laundresses’ quarters to nine on the 1874 map (Figure 5).

The difficulties in providing laundresses and their families with acceptable housing was recognized at the national level as well, “it has been found impracticable to furnish comfortable or even habitable quarters for laundresses at many posts, and they and their children have suffered in consequence” (Marcy 1875:416; see Foner 1970:19). All of the laundresses’ quarters on the west side of the parade ground were removed by 1878 (Figure 118), and new laundresses’
March 1871

Destroyed: Company Kitchen, containing 1 room, Class 1<sup>st</sup>.
Company Quarters containing 2 rooms, Class 1<sup>st</sup>.
Company Messhouse containing 2 rooms, Class 1<sup>st</sup>.

1) Company Quarters, 2 stories, 1<sup>st</sup> story contain. 1 room, Class 1<sup>st</sup>.
5) Company Messhouse, containing 2 rooms, Class 1<sup>st</sup>.
10, 15, 16) Laundress quarters, containing 3 rooms, Class 1<sup>st</sup>.
11) Laundress quarters, containing 2 rooms, Class 1<sup>st</sup>.
18) Officers Quarters, 1 ½ story, containing 3 rooms, Class 2<sup>nd</sup>.
34) Quarters (Regimental Office), containing 6 rooms, Class 3<sup>rd</sup>.

Figure 11. 1871 Map of Fort Vancouver, W. T. (Winman 1871).

(Courtesy of Fort Vancouver National Historic Site, NPS.)
quarters built in the early-1880s adjacent to the western side of the military rifle range, located to the north-northwest of the central parade ground (Figure 119).

**Laundresses’ Quarters Complex, East Vancouver Ordnance Depot**

Immediately east of Fort Vancouver, the separately managed Vancouver Ordnance Depot, at times referred to as the Vancouver Arsenal, also underwent a period of construction in the mid-1860s (Cromwell et al. 2009; Shine 2008). At the eastern edge of the modern Officers Row, a series of mid-19th century Army structures are recorded on historical maps along the west side of modern East Reserve Street. These were not substantial structures, as the Vancouver Ordnance Depot was only authorized to construct temporary buildings until clear title to the property was obtained (Erigero 1992:217; Shine 2008:56).

In 1866, two one-story wood buildings were used as laundress quarters at the Ordnance depot; their approximate location remains unknown as late-1860s maps do not depict the Ordnance Depot. These structures were valued at $250 each in 1866, less than the Ordnance Depot bake-house, well or stable, each valued at $300 (Babbit 1866). Their low valuation suggests these quarters were poorly constructed and the least desirable to occupy, reflecting the lower social standing of the laundresses relative to Army officers.

In 1871, the Ordnance Depot housed enlisted personnel either in an “one two story barrack building for the detachment of 30 Ordnance enlisted men, [or] two or three cottages for married non-commissioned officers” (Kress 1928:35), whose wives may have been employed as laundresses. Two structures with identical footprints, interpreted as the above referenced cottages, are portrayed in a north-south linear formation in the west side of the Arsenal on a ca. 1867-1873 map (Figure 116). The southern building is identified as a “Laundress” quarters,
while its northern counterpart is labeled as “1st Sergt. Qrs.” (Figure 116), housing one of the highest ranked non-commissioned officers for the Ordnance Depot. In the early-1870s, the sergeant’s quarters was labeled on an 1874 map as “Laundress Quarters” (Figure 5).

Although Shine (2008:59) suggests a later construction date, these two quarters were likely erected in August 1862 as “quarters… for the artifices and their families” (Eckerson 1862) were built at the same time as two “Barracks” constructed immediately to the north (Figure 116). Slightly different building footprints are depicted for these two quarters on the 1874 map as opposed to the earlier ca. 1867-1873 map; the east wing of the southern structure shifted from the south to the north side of the structure, a difference resulting from either building improvements or errors in historical map accuracy as the two barrack structures are depicted as three structures on the 1874 map labeled “Qrs. Of Ord. Dep.” (Figure 5).

Using the scale for the 1874 map, the depicted northern building dimensions are roughly 30 x 42 ft., with an attached 20 x 16 ft. kitchen. Two small outbuildings are depicted at the eastern edge of the Ordnance Depot (Ward 1874), likely locations for privies or woodsheds associated with the laundresses. These quarters were in use until the late-1870s, but were removed by 1880 (McIlrath 2001:4) or in the early-1880s (Erigero 1992:296; Figure 117, Figure 118, Figure 119) for the eastward expansion of the Officers Row.

Cartographic analysis indicates that previous research associated the privy deposits with the southern laundresses’ quarters (see Chapters Five and Seven), rather than with the northern 1st Sergeant and/or laundresses. Based on these data, materials recovered in 2001 from this privy (see Chapter Five) are therefore associated with the northern sergeant/laundresses’ quarters, and were included in the artifact dataset for this study. As structures labeled “laundress quarters” were used to quarter both laundresses and their husbands in the 1860s (see Housing
Assignments), artifacts associated with this occupation are assumed to be similar to those associated with the laundress quarters at the main Army garrison at Fort Vancouver.

Sinks and Latrines

Army regulations require the sinks, or privies, for encampments to “always be hid from public view by encircling them with bushes or other blinds. A portion of the earth, dug out of them, ought every day to be thrown in to cover the filth, should the troops remain encamped on the same ground any length of time (USWD 1841, 1847:66, 1857:68). As lime was not easily available in the early-1850s (Ingalls 1849b:173), a similar system of using excavated earth to reduce odors was likely used at Fort Vancouver in the early years, as latrines were described as “simple earth pits” in later years (Figure 114). The latrines were kept from “becoming offensive and unhealthy” by throwing in a layer of earth, as well as lime or “other disinfecting agents” (Butterfield 1862:108), until they filled up and were replaced by excavating new latrines (USWD, SGO 1875:489).

This process was regularly repeated, and latrine areas, particularly in the back yards of the officers’ quarters (Officers Rows were generally not relocated as long as a post was occupied), were “honey-combed with deposits of filth” (Marcy 1875:658; see also Carley 1982:286). At Fort Vancouver, the enlisted men’s latrines, or company sinks were considered hazardous, “there was not a day during the month that these sinks did not emit foul odors… the pit sinks… can not be thoroughly deodorized and disinfected with the limited means at command” (Marcy 1875:670).

The privy for the westernmost officers’ quarters, is located roughly within 32 ft. of each of the officers’ kitchens on the ca. 1851 map (Figure 2), however, the privy is consistently
depicted at a much greater distance, approximately 130 to 140 ft., behind the kitchen on maps drawn three to four years later (Figure 9, Figure 106, and Figure 107). Therefore, map documentation suggests that either each officers’ privy was relocated north in the intervening years, or (more likely) that the earlier map was incorrect in its depiction of the early privy locations.

No construction details, such as building size or specific locations, are given for the enlisted men’s privies and sinks for the 1849 to ca. 1853 occupation. However, on the 1854 lithograph (Figure 6), two small windowless structures are depicted west of the 1850 and 1854 enlisted men’s kitchens, south of the previously described ca. 1854 laundresses’ quarters. These likely functioned as sinks and/or privies, as military records indicate the “Sheds in rear of barracks [were] used as lavatories” (USWD, SGO 1870:421). These small structures do not appear on any of the historical maps or the 1855 sketch of the post (Figure 4).

One smaller, as yet unidentified, structure is depicted on the 1854 maps west of the northern “R” laundresses’ quarters (Figures Figure 9, Figure 106, Figure 107). It is not depicted in any imagery of the post, and likely functioned as a sink or privy for the women and their families.

**Water Supply**

Although water was found by boring to 100 ft. below the ground surface (USWD, SGO 1875:489), throughout the 1850s and 1860s, a post water-wagon, drawn by a six-mule team, constantly hauled “the muddy and impure water” (USWD, SGO 1875:489) from the river to the upper garrison (Erigero 1992:215; Frazer 1963:173). The water was then “stored in casks and barrels in the rear of the quarters” (USWD, SGO 1870:422). A wagon with four large casks,
drawn by a six mule team, depicted in a mid-1850s lithograph could be a portrayal of the American military water-wagon on its rounds (Figure 6, image lower right).

By 1870, a water main for the Cold Spring Company crossed both Fort Vancouver and the Vancouver Arsenal, north of Officers Row (Figure 114). Only the Ordnance officer’s quarters was connected by pipes to this line by 1865 (Nelson and Onstad 1965:69), as the Arsenal was not under control of the quartermaster’s department. After 1 January 1870, the water company allowed personnel on the upper terrace at Fort Vancouver to draw water from a hydrant “as a favor” (USWD, SGO 1870:422), but it continued to be distributed to quarters by wagon (USWD, QGO 1872b:39). For the enlisted men, some of the barrels and casks were replaced by 1,000-gallon capacity cisterns attached to each quarters, whereas for the officers water barrels were positioned “over the sink just behind the latrines” (USWD, SGO 1870:422).

This water supply system was not favored by personnel at the post (Nelson and Onstad 1965:69), as “the supply for the men is often scanty; the contents of the casks freeze in winter and are very apt to become offensive in summer” (USWD, SGO 1870:422). Men would become sick from springtails (*Podura nivalis*) collecting in the water barrels (USWD, SGO 1870:421). The quartermaster’s department continued to be supplied from the river (USWD, QGO 1872a:114; 1872b:39) until the 1880s when water was piped to this area of the garrison (Figure 119). Although laundry is depicted being hung by the 1849 quarters on the south side of the parade ground (Figure 10), it is unknown whether the bulk of the garrison’s laundry was washed on the upper terrace by the laundresses’ quarters, or on the Columbia River floodplain closer to the course of fresh water.
Fencing the Parade Ground

Roaming livestock were proving to be quite a nuisance at the military post in the 1850s, “These [officers] quarters are now open with nothing to prevent hogs and cattle from coming about them… destroying the grass and disfiguring the grounds- causing great annoyance and greatly increasing the police labor” (Brent 1854). By 1855, a post and single top rail fence enclosed the parade ground proper, in an effort to keep out livestock, and a ca. 1855 sketch depicts this fence running between the enlisted men’s building complex and the associated outbuildings to the west, which consisted of two smaller structures, slightly smaller than the 1850 kitchen, and the “Dragoon Stable” (Figure 108). The yards along the Officers Row were delineated by pale fencing running between them (Figure 4; Erigero 1992:243-244). The rest of the parade ground was encircled by a fence by 1859 (Figure 111 Figure 112), which included the 1849, 1850 and ca. 1859 enlisted men’s barracks, associated kitchens and other outbuildings, as well as the Company gardens, while the laundresses’ quarters remained on the exterior of the parade ground fence line (Figure 5, Figure 11, Figure 113 to Figure 115). The fence was whitewashed at least by 1860 (Figure 10). By 1870, however, the fences were “in very bad order; posts all nearly rotted off and rails broken’ should be rebuilt of new material” (USWD, QGO 1872a:114; 1872b:39). As fencing is depicted on later maps (USWD 1878, 1879) in roughly the same locations, these rails were likely repaired in the 1870s. However, the fencing along the east and west sides of the parade ground was likely removed by 1886 (Figure 119), when the parade ground was enlarged to the east and west. On the Officers Row, the pale fencing was replaced by whitewashed pickets, likely in the mid-1870s (Figure 13).
Table 1. Summary of historical buildings discussed in text, and unless otherwise noted, all were archaeologically investigated.

<table>
<thead>
<tr>
<th>Structure</th>
<th>Occupation Date</th>
<th>Building Length x Width</th>
<th>Orientation (Main axis)</th>
<th>Rooms</th>
<th>Room Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Officers’ Quarters”</td>
<td>Fall 1850 to ca. 1865-1869.</td>
<td>40 x 32 ft. (12.2 x 9.8 m), with 10 ft. (3.1 m) porch. Attached to ca. 1850 Officers Kitchen by 1854.</td>
<td>East-West</td>
<td>Dining Room</td>
<td>14 ½ x 16 ft. (4.4 x 4.9 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Chamber</td>
<td>14 ½ x 16 ft. (4.4 x 4.9 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Chamber</td>
<td>15 x 16 ft. (4.6 x 4.9 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Chamber</td>
<td>15 x 16 ft. (4.6 x 4.9 m)</td>
</tr>
<tr>
<td>Officers’ “Kitchen”</td>
<td>Fall 1850 to ca. 1865-1869.</td>
<td>32 x 16 ft. (9.8 x 4.9 m). Building also reported as 15 x 30 (4.6 x 9.1 m). Attached to ca. 1850 Officers Quarters by 1854.</td>
<td>North-South</td>
<td>Kitchen</td>
<td>14 x 18 ft. (4.3 x 5.5 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>“Wood &amp; Wash’s”</td>
<td>12 x 14 ft. (3.7 x 4.3 m)</td>
</tr>
<tr>
<td>Officers’ Privy</td>
<td>ca. 1850s to ca. 1860s.</td>
<td>Unknown.</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Officers’ Quarters⁴ (Bldg. 7)</td>
<td>ca. 1865-1866 to present.</td>
<td>40 x 30 ft. (12.2 x 9.1 m) with 12 x 14 ft. (3.7 x 4.3 m) attached kitchen.</td>
<td>North-South</td>
<td>3 rooms</td>
<td>14 x 15 (4.3 x 4.6 m)</td>
</tr>
<tr>
<td>“Soldiers Quarters”</td>
<td>Fall 1850 to ca. 1870.</td>
<td>84 x 32 ft. (25.6 x 9.8 m), with 8 ft. (25.6 x 2.4 m) porch. Building has three rooms in 1850, but two rooms listed by 1870.</td>
<td>North-South</td>
<td>“Barrack Room”</td>
<td>68 ⅜/12 x 30 (20.1 x 9.1 m)</td>
</tr>
<tr>
<td>“Company Quarters”</td>
<td></td>
<td></td>
<td></td>
<td>“Ord’s Serjt”</td>
<td>11 x 13 ⅛/12 (3.4 x 4.2 m)</td>
</tr>
<tr>
<td>Enlisted Men’s Barrack</td>
<td></td>
<td></td>
<td></td>
<td>“Store Room”</td>
<td>8 ⅞/12 x 18 ⅜ (2.6 x 5.6 m)</td>
</tr>
<tr>
<td>“Soldiers Quarters”</td>
<td>Fall 1850 to ca. 1860s. Expanded or replaced? ca. 1854.</td>
<td>~50 x ~18 ft. (9.8 x 4.9 m). After 1854: ~60 x ~20 ft. (13.4 x 6.1 m)</td>
<td>North-South</td>
<td>Co. Qtrs. x2</td>
<td>Unknown</td>
</tr>
<tr>
<td>“Band Qtrs”</td>
<td></td>
<td></td>
<td></td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

1 = Quotations denote building labels used on historical documents; 2 = ca. denotes first map appearance and last year before excluded from map depictions; 3 = “~” denotes based on size depicted on maps; 4 = Not excavated (Ward 1874; Wheeler and Dixon 1869b; Winman 1871; USWD 1869).
Table 1 (cont.). Summary of historically depicted buildings for military structures excavated in 2007 and 2008.

<table>
<thead>
<tr>
<th>Structure</th>
<th>Occupation Date&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Building Length x Width&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Orientation (Main axis)</th>
<th>Rooms</th>
<th>Room Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Soldiers Kitchen” Enlisted Men’s Kitchen</td>
<td>Fall 1850 to ca. 1870. Expanded or replaced ca. 1860s.</td>
<td>50 x 18 ft. (15.2 x 5.5 m). After 1854: ~78 x ~24 ft. (23.8 x 7.3 m)&lt;sup&gt;3&lt;/sup&gt;. Building has three rooms in 1850, but two rooms listed by 1869.</td>
<td>North-South</td>
<td>“Chef’s Room”</td>
<td>24 x 16 ft. (7.3 x 4.9 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>“Pantry”</td>
<td>8 x 18 ft. (2.4 x 5.5 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>“Kitchen”</td>
<td>16 x 16 ft. (4.9 x 4.9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Co. Mess x2</td>
<td>Unknown</td>
</tr>
<tr>
<td>“Company Mess-house” Enlisted Men’s Mess-house</td>
<td>ca. 1854 to ca. 1870</td>
<td>32 x 16 ft. (9.8 x 4.9 m). Building also reported as 30 x 15 ft. (9.1 x 4.6 m).</td>
<td>North-South</td>
<td>Two</td>
<td>Unknown</td>
</tr>
<tr>
<td>“Company Quarters”&lt;sup&gt;4&lt;/sup&gt; (Two stories)</td>
<td>ca. 1859 to ca. early-1880s</td>
<td>90 x 30 ft. (27.4 x 9.1 m) with 10 ft. (3.1 m) two story porch.</td>
<td>North-South</td>
<td>1st story: One. 2nd story: Unk.</td>
<td>Unknown</td>
</tr>
<tr>
<td>“Kitchen and Mess-room”&lt;sup&gt;4&lt;/sup&gt; “Bah-room”&lt;sup&gt;4&lt;/sup&gt; extension</td>
<td>ca. 1859 to ca. early-1880s. Extended in 1874.</td>
<td>~70 x ~25 ft. (21.3 x 7.6 m). In 1874, attached to ca. 1854 Company Quarters (above) with 31 x 14 ft. (9.5 x 4.3 m) hall.</td>
<td>North-South</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Enlisted Men’s Privy&lt;sup&gt;4&lt;/sup&gt;</td>
<td>ca. 1850s to ca. 1870s.</td>
<td>Unknown.</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Laundresses’ Quarters (Fort Vancouver)</td>
<td>ca. (1854?) 1859 to ca. 1875-1877.</td>
<td>~50 x ~21 ft. (15.2 x 6.4 m)&lt;sup&gt;3&lt;/sup&gt;.</td>
<td>North-South</td>
<td>Two</td>
<td>Unknown</td>
</tr>
<tr>
<td>Laundress Privy&lt;sup&gt;4&lt;/sup&gt; (Fort Vancouver)</td>
<td>Unknown. Also unknown if shared with enlisted men in early years.</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>1st Sergeant/Laundresses’ Quarters (Ordnance Depot)&lt;sup&gt;4&lt;/sup&gt;</td>
<td>ca. early to mid-1860s (1862?) to ca. early-1880s.</td>
<td>~30 x ~24 ft. (9.4 x 12.8 m) with ~20 x 16 ft. (6.1 x 4.9 m) attached kitchen&lt;sup&gt;3&lt;/sup&gt;.</td>
<td>East-West</td>
<td>Three</td>
<td>Unknown</td>
</tr>
<tr>
<td>1st Sergeant/Laundresses’ Privy (Ordnance Depot)</td>
<td></td>
<td>Unknown.</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

<sup>1</sup> = Quotations denote building labels used on historical documents; <sup>2</sup> = ca. denotes first map appearance and last year before excluded from map depictions; <sup>3</sup> = “~” denotes based on size depicted on maps; <sup>4</sup> = Not excavated (Ward 1874; Wheeler and Dixon 1869b; Winman 1871; USWD 1869).
Housing was assigned by rank, with higher ranked individuals given preferential selection of housing. At Fort Vancouver, the Commanding Officers’ quarters was placed as the central building on the officers’ line, reflecting his position as the leader of the military community. For those residing on the Officers Row, individuals with higher rank were assigned quarters closer in physical distance to the Commanding Officer’s quarters, reflecting their proximity to this individual within the military hierarchy.

The 1857 Regulations allowed officers newly arriving at a post to “have their choice [of quarters] according to rank,” as long as all rooms allotted to the officer were within the same quarters (USWD 1857:125), a process referred to as “ranking out” (Agnew 2008:107; Alt and Stone 1991:27; Eales 1996:51; Stallard 1978:23). Upon arrival at a post, officers could select quarters occupied by those they outrank, but could not change their quarters once selected, unless displaced by a higher ranking officer (USWD 1857:125). At times this practice created a causal sequence, or ripple effect calling “falling bricks,” resulting in several households relocating to new quarters, with the lowest ranked displaced occupants forced to accept whatever housing was available (Agnew 2008:107; Alt and Stone 1991:27; Stallard 1978:23).

Expending time and resources on improving the household’s quarters could result in inadvertently increasing its desirability, and therefore the possibility of being ranked out by a superior officer (Eales 1996:51-52). Given that Companies consistently moved through Fort Vancouver, the laundresses and married couples were likely relegated to the least desirable quarters. Historical maps provide glimpses of this practice at Fort Vancouver. For example, a set of laundresses’ quarters newly appearing on the east perimeter of the parade ground in 1854 to
the rear of an enlisted men’s barrack (Figure 106 Figure 107), was reassigned to the Vancouver Depot Ordnance Sergeant Theodore Eckerson in 1855 (Figure 108).

With the continual movement of troops through Fort Vancouver between the mid-1850s to 1870s, and beyond, many individuals moved through the same quarters and barrack structures. Therefore, as the household compositions were continually in flux in the mid-19th century, archaeological deposits associated with these building occupations cannot be definitively linked to specific individuals at this time. Artifacts analyzed for this study suggest possible regiment and company affiliations of some of the personnel (see Chapter Nine). However, general patterns can be discerned within the census records that provide a glimpse as to the housing trends at Fort Vancouver on the west side of the parade ground for the main garrison at Fort Vancouver, and the eastern side of the Vancouver Ordnance Depot. Enlisted men employed as “strikers” (see Chapter Four) are not recorded on the Monthly Post Returns (USWD 1849-1900), so the number of individuals working as servants is severely underrepresented in these historical documents.

Fort Vancouver Census Data, ca. 1850 to 1870

Unfortunately, in the 1850 census records, dwelling listings are difficult to directly associate with individual structures depicted on the historical maps, except for prominent individuals, such as the post or departmental commanders. The census schedule of the garrison begins with Col. Loring, then all of the officers’ dwellings are listed, including those living in the Quartermaster Depot and the former HBC Kanaka Village, followed by the laundresses and then the enlisted men.
Fort Vancouver Army Garrison

Census Data, 1850

Three officers had their wives and children in garrison that 1850 November; Captain Llewellyn Jones, 39, Major Charles Ruff, 33, and Major John Simonsen, 50 (United States Census Bureau [USCB] 1850:80, Dwellings 70-71,78). Three officers’ households had servants, and Capt. Jones had one adult female slave, Monimia Travers, 49, with no children present (USCB 1850:81, Dwelling 78, line 5), later freed him at Columbia Barracks in 1851 (Shine 2009). Only two laundresses, Emily Porter, 27, and Mary Porter, 25, were present on post in 1850 (USCB 1850:40, Dwelling 77). They were probably not related to Lt. Col. Andrew Porter, also on post but living separately (Dwelling 72). These two women lived alone, either in a small building or within the former HBC schoolhouses. In January 1851, Maj. Tucker’s wife joined him at Columbia Barracks (Hine and Lottinville 1972:156). The 213 enlisted men are presented as one “dwelling” (USCB 1850:81-86, Dwelling 80) rather than by individual buildings.

Census Data, 1860

In 1860, none of the laundresses at Fort Vancouver lived separately from their husbands, indicating that all of the laundresses’ quarters were actually married enlisted men’s quarters. Through the use of historical map and census data from 1855 to 1860, some possibilities are presented as to who occupied the westernmost officers’ quarters, the enlisted men’s barrack and adjacent laundresses’ quarters. This is only possible by relying on two assumptions; 1) the quarters housing the Band remained the same in 1860 (USCB 1860:108, Dwelling 256, lines 21-34) as was depicted on an 1855 map of the post (USWD 1855b), and 2) the census taker
proceeded in a roughly geographical manner (moving from one building to its neighbor, rather than crisscrossing the post) when recording the dwelling residents in the order they were visited.

As the westernmost quarters on the Officers Row, north of the ca. 1855 band quarters (USWD 1855b), were the furthest from the Commanding Officer, it is likely that this structure housed the lowest ranked officers present on post. This is supported by the historical documentation of the built environment. This structure and its immediate neighbor were the first to be replaced by new buildings, suggesting that these two buildings were in the highest state of disrepair. On the 1860 census, four of the five dwellings immediately listed prior to the musicians’ quarters all housed Lieutenants (USCB 1860:108, Dwellings 251-255), except for the one structure in which then Major Joseph K. Barnes, Post Surgeon, lived (USCB 1860:108, Dwelling 252, line 11). It is unlikely that the Post Surgeon resided in the old westernmost quarters, being a man of prestige within the military hierarchy as the second highest ranking officer on post, as well as being a wealthy man, as he is recorded as having a personal estate of $3,000 on the census. As a man of prominence, Barnes likely resided in one of the newly built ca. 1855 buildings just north of the musicians’ quarters.

Therefore, the westernmost officers’ quarters probably housed Lieutenants, all living as bachelors in 1860. But for one wealthy individual, the men lived four to a building. Given the blueprint of the 1850 officers’ quarters (following the “four pens and a passage” format), the position of other occupied quarters, and that this building is recorded as housing two families on the census (two officers on each side of the central hallway), it is likely that Lts. T. L. Casey, 29, John Kellogg, 32, John Edwards, 29, and Abraham Weldrid, 24, resided in this building in 1860. As such, it is possible that their kitchen housed laundresses during the mid-1860s housing shortage, but this cannot be confirmed in the historical documentation at this time.
Fourteen married men, living without their wives, are recorded within one residence, interpreted here as the band quarters (USCB 1860:108, Dwelling 256). The dwelling recorded immediately following the musicians (band quarters) must have been a large barrack building, given that 68 enlisted men and two Sergeants are listed as occupants (USCB 1860:27-28, Dwelling 260). If the census taker were moving from north to south, these entries should reflect the residents of the 1850 barrack building. However, three additional occupants lived within the building: the wives of Privates James Hartney, 31, and Lawrence Franin, 29, Hannah, 30, and Julia, 27, respectively, who were employed as laundresses (USCB 1860:27, Dwelling 260, lines 32-33), and the Franin’s two year old daughter Mary Ann (USCB 1860:28, Dwelling 260, lines 16-18). At a different barrack building, Private James McDonald lived with his wife Mary, 32, also a laundress, and their 7 month old daughter Ellen along with 15 other enlisted men (USCB 1860:28, Dwelling 260, lines 21-23). These women and children either lived with their husbands, or lived separately but were listed as living together on the census.

When quarters were not available, the Army allowed laundresses to “be quartered in that part of the basement of the soldiers’ quarters which is not used for other purposes” (USWD 1861b:3). If the company laundresses resided within the main enlisted log barrack in 1860, they either lived in the main barrack room, or in the side Orderly Room. However, the two Sergeants listed within the main barrack would have been responsible for maintaining the Company stores and ordnance, thereby necessitating their retention of the side Orderly Room for use as an office and quarters. Nonetheless, the census entries for the laundresses and children are listed immediately after their husbands and amongst the entries for other soldiers living in the barrack (USCB 1860:27-28,30). Therefore, the whole family may have lived within the main barrack room when there was one child under the age of two years, sharing the traditional double bunk,
originally intended to sleep two adult soldiers simultaneously to save on heat and space (see Clary 1985). It is not known whether these housing arrangements (quartering the laundresses with their husbands in the main barracks buildings) reflect an atypical moment in time, or was de rigueur at Fort Vancouver.

Three smaller households are recorded between the census entries for the musicians and the enlisted men’s barracks. Sergeant Ja. A. Davidson, although listed as married, lived by himself (USCB 1860:26, Dwelling 257). Musician John Services, 38, lived with his wife Margaret, 26, a laundress, and their two small children (USCB 1860:26, Dwelling 258), and Sergeant Pat M. Downing, 27, lived with his wife Margaret, 27, also a laundress. It is unclear in which of the smaller buildings each of these families resided, but one of these households was likely living in the “R” laundresses’ quarters west of the 1850 barracks.

Census Data, 1870

As with the 1860 census, the listings for the officers and other military personnel on the 1870 census schedules are mixed, indicating that the census taker proceeded in a geographical manner through the post, with all personnel at the Vancouver Ordnance Depot denoted by the term “Ord. Depot” following their occupation (e.g. USCB 1870:28, Dwelling 245, line 16).

At Fort Vancouver, officers are represented on post by only two dwellings, one for an Army physician and the other for two 1st Lieutenants (USCB 1870:73-74, Dwellings 622-623). This was expected as the majority of commissioned officers resided in Portland, Oregon after the main offices relocated there in 1867. It is not known which buildings these individuals occupied. It is possible they resided in the newly built ca. 1865-1866 frame cottages (extant Bldg. Nos. 7 and 8) that replaced the two westernmost 1850 officers’ quarters on the Officers Row. However,
because they would have been exposed to “ranking out” from these potentially desirable
quarters, they may have lived elsewhere to avoid packing up and moving their belongings.

All of the enlisted men, 54 in total, are listed as a single household (USCB 1870:74-75,
Dwelling 624) and it is unclear which barrack buildings they occupied. As the newer ca. 1859
two-story barrack was in use at that time, and historical map documentation indicates that the
1850 barrack was demolished in 1870, it is extremely unlikely that it was utilized to house
military personnel by then.

On the 1870 census laundresses either lived in small quarters with their husbands or
alone, while their husbands were quartered in the enlisted men’s barrack. All laundresses at Fort
Vancouver are listed as one series of four households on the census schedules (USCB 1870:75,
Dwellings 626-629). It is surmised that these entries either directly record the individuals living
in the four laundresses’ quarters depicted on historical maps west of the 1950 enlisted men’s
barrack and associated kitchens, or indirectly reflect the types of household compositions
represented. Four women working as laundresses, all married to enlisted men at Fort Vancouver,
were living separately from their husbands, who were living in the main barrack. Three of them
had several children: Dorathea Burns, 25, Mary Hughes, 25, Bridget Guinty, 30, and Bridget
Gibney, 30 (USCB 1870:75, Dwellings 626-629). Several other women married to enlisted men
were listed as the only adults in the household and were “keeping house.” However, married
women were often authorized to work on the post as household servants or as laundresses
unattached to Army companies (Stallard 1978:54).
**Vancouver Ordnance Depot**

As the Ordnance Depot was not established until 1853 (see Chapter Three), no personnel would be listed on the 1850 census records.

**Census Data, 1860**

There are no entries on the census records specifically associated with the Ordnance Depot. Associated military personnel may have been listed with the main Fort Vancouver garrison, but discerning which dwelling represents these individuals was not possible.

**Census Data, 1870**

Relying upon the same geographical assumption for the census taker’s route used above, the only household large enough in the Ordnance Depot to represent the main barrack building, designed to house 30 men (Kress 1928:35), has 21 enlisted men listed as occupants (USCB 1870:28, Dwelling 245). As the barrack is immediately north of the two sergeant’s/laundresses’ quarters (see USWD [1867-1873]; Ward 1874), these occupants are likely recorded as the next two dwellings on the census schedule. To the south, N. Gibbons, 33, an enlisted man (military rank listed as “solider”) resided with his wife Mary, 25, who was not listed as a laundress but as “keeping house,” with their two children (USCB 1870:28, Dwelling 246). Further south, Henry Ridgeway, 24, a “solider,” lived with his wife Mary, 18, also “keeping house,” and their five month old son George (USCB 1870:29, Dwelling 247). No laundresses are listed at the Vancouver Ordnance Depot on the 1870 census.
According to the 1880 census, few military personnel (n = 14) were employed at the Ordnance Depot, with eight of the 11 soldiers, and one carpenter, resided in one building (USCB 1880:30, Dwelling 209). Holding the same geographical assumption for the census taker’s route as the 1870 census, the next two dwellings housed two families. The first family, potentially occupying the northern laundress quarters, consisted of William Arnold, 40, a “soldier” and his wife Julian, 44, with their daughter Kate Fraines, 20 and sons James Fraines, 17 and George Fraines, 13 (USCB 1880:30, Dwelling 210). Francis Broogan, 42, soldier, and his wife Mary, 36, with their young one year old daughter Francis are listed next on the census, and probably resided in the southern laundress quarters (USCB 1880:30, Dwelling 211). Two other families of enlisted men were living at the Ordnance Depot as well; Michael O’Connell, 53, Sergeant of Ordnance, wife his wife Ellen, 43, and Robert Williams, 46, “soldier,” with his wife Elizabeth, 44, and four children, Mary J., 19, Charles R., 11, Agnes, 9, and Arthur, 6 (USCB 1880:30, Dwellings 208 and 212). For each of these families, the wives are “keeping house,” the same professions as on the 1870 census. No laundresses are listed at the Vancouver Ordnance Depot on the 1880 census.

Locating the Laundresses at the Ordnance Depot

With the passing of the 1878 Posse Comitatus Act, women were no longer allowed to accompany the troops as laundresses (Pub. L. 45-263, 18 June 1878, 20 Stat. 145, Sect. 5). Already engaged laundresses could remain employed until the end of their husband’s term of enlistment. At the main garrison, the 1880 Census does list several women working as laundresses.
There is a discrepancy between the historical maps identifying at least two structures as laundresses’ quarters (USWD [1867-1873]; Ward 1874) and the census data listing no women in the ordnance depot as laundresses. It remains possible that the laundresses at the Army garrison did perform duties for the men at the Ordnance Depot, but this assumption remains tenuous given tensions between the commanders at Fort Vancouver and the Vancouver Ordnance Depot (see Shine 2008). Therefore, the women recorded as “keeping house” may have worked as laundresses for the Vancouver Ordnance Depot as hired employees, rather than being appointed as Company laundresses as was de rigueur in the mid-19th century regular Army.
CHAPTER FOUR

“ARMY SOCIETY IS ESSENTIALLY ARISTOCRATIC”

SOCIAL AND ECONOMIC EXPECTATIONS AND REALITIES AT THE GARRISON

Mid-19th century military communities included not only officers and enlisted men, but also their wives and families and civilian employees, all of whom operated within a rigid social climate with firm Victorian gender role expectations and rules of behavior. The mid-19th century rank distribution was a broadly based pyramid (Janowitz and Little 1965:35), with the enlisted men at its base and the higher ranking officers as the upper echelon; the elite class within the Army. Although no formal regulations were codified, military regulations implicitly and personnel actively limited social interactions between the officer and enlisted social classes through maintaining both a social and physical distance (Agnew 2008; Foner 1970:68).

Access to commodities and other resources was primarily based upon the financial resources of individuals within assigned quarters, or military households. These were supplemented by materials obtained through individual and household-based initiative(s), such as engaging in hunting and foraging, trade between individuals, or self-manufacture. Three factors could constrain an individual’s ability to procure goods and resources; 1) social expectations, 2) financial limitations, and 3) onsite availability of goods for consumption. An individual’s social position within the mid-19th century military community defined the types of goods that consumers of their class (officer/elite or enlisted/working) were expected to procure.

In this chapter, the social position of persons within these two classes is briefly examined, specifically in reference to rank hierarchy, military discipline and dress, and social expectations of marriage. The relative economic statuses of lower-ranked officers, enlisted men, and
laundresses are discussed as financial constraints that limited the ability of an individual to obtain goods, both within the military supply system and through external commercially-based purchases. Military baggage allowances, also based on rank, are interwoven into this discussion, as they limited the ability an individual or household to transport items while on campaign or moving to a new post, so that the size and weight of an item, as balanced against its financial cost and perceived usefulness, probably influenced consumer purchasing behaviors.

However, even if an individual desired to purchase an item (whether or not it met social expectations), was able to transport it between posts, and had the funds to engage in such a commercial endeavor, the item may simply not have been available (Alt and Stone 1991:50). Potential sources of goods and resources are discussed here, for they affected object availability for procurement by military personnel garrisoned at Fort Vancouver in the mid-19th century.

**Military Rank, Power Relationships, and Social Interactions**

In the mid-19th century, the military generally had an ascriptive system of authority, as persons were either born into the elite (and therefore officer) class, or they were excluded (Janowitz and Little 1965:29). Men, primarily native-born, became officers through direct political commission or graduating from the United States Military Academy at West Point, NY (Adams 2009:20-28; Agnew 2008:86). An Academy applicant must be nominated for admission, usually by a member of Congress. Both of these routes required access to upper class social networks, not generally available to members of the working or lower (enlisted men’s) class. These individuals enlisted as regular recruits into the Army, many of them unskilled workers and European-born immigrants (see Adams 2009:23-28 for detailed discussion). Because of this,
officers came into the Army viewing themselves as members of the wider Victorian gentlemen, or elite, social class (Adams 2009:31). Occasionally non-commissioned officers received a commission based upon their skills or merit (Foner 1970:69), but these individuals were not always accepted by other officers (Agnew 2008:87):

“The black sheep in military society are the officers and their families who have been promoted from the ranks. Their generally unrefined, uncultivated, and uncongenial manners, make them unwelcome members of the Army [sic] circle. If they are sensibly disposed, however, these little incongruities gradually wear away. On the other hand, should the new comers, instead of trying to adapt themselves to their new sphere in society, become churlish, they are treated by the other members of the garrison as intruders. Army society is essentially aristocratic” (Glisan 1874:453).

Unlike commissioned officers, the enlisted men’s life in garrison was strenuous and demanding. He was required to perform a variety of menial tasks and fatigue duties in addition to his regular military tasks. These included construction and maintenance of structures (barracks, quarters, storehouses, outbuildings, stables, corrals, fences, etc.), as well as company and post police details, including guard duty, fuel procurement, cooking, and refuse collection and disposal (Adams 2009:19; Foner 1970:14). These duties did not require or emphasize military skills (Utley 1973:80). Although civilian laborers were employed at Fort Vancouver (Post Returns, USCB 1850, 1860, 1870), soldiers had to assist in their duties as labor costs were higher in the Pacific Northwest than in other parts of the county (Ingalls 1849b:172; Hine and
Lottinville 1972:126-127,146; Vinton 1851:145-146). In addition, enlisted men were often looked down upon by the wider American society, including those of the lower class.

The long hours the enlisted men worked, for no accolades and little if any monetary reward, were a source of aggrievement amongst the men. As officers assigned others to perform, but themselves were exempt from, these tasks, the class-based social segregation between the officers and men was reinforced on a daily basis.

**Discipline**

Following military discipline, as codified in the Regulations (USWD 1847, 1857, 1861), officers adopted a paternalistic view towards their subordinates (Adams 2009). They were required to wield their authority “with firmness” (USWD 1857:1) and to ensure that “enlisted soldiers be treated with particular kindness and humanity… and protect inferiors of every rank (USWD 1847:2). In turn, all military men were “required to obey strictly” lawful orders given by their superiors (USWD 1857:1), with their respect, or deference, “not be confined to martial obedience, but will be extended to other occasions” (USWD 1847:76). Officers were expected to guide the enlisted men towards proper behavior, by ensuring that military regulations and protocol were followed. Discipline was necessary to maintain cohesiveness not only in combat, but while garrisoned in camp and garrison, particularly in the west were often the men were faced with harsh weather and hostile neighbors.

Social segregation between the officers and enlisted men allowed officers to distance themselves from the men during combat, particularly when they were sending the troops into battle, knowing that not all their men would survive. For example, a lower ranked individual was required to salute their superior first, thereby publicly recognizing the higher rank, and therefore
social position, of the other individual (Andrew 2009:137). The mid-19th century training necessary for maintaining close order formations on the battlefield was controlled by direct and rigid discipline (Janowitz and Little 1965:41). Mechanical and repetitive drills conducted on the parade ground reinforced the military hierarchy (Janowitz and Little 1965:63) at Fort Vancouver, “The Ninth Regiment is now stationed at Fort Vancouver and here the famous Shanghai drill is daily performed with a precision wonderful to behold” (*Daily Alta California* 1856a).

Discipline was maintained through fear of punishment (Rickey 1963:138). Commissioned and non-commissioned officers administered penalties to their subordinates as deemed necessary. However, Army disciplinary measures were not consistently applied throughout the service, ranging from dispassionate to austere punishments, dependent upon the administrating commissioned or non-commissioned officer (Foner 1970; Rickey 1963). Severe punishments led to disgruntlement, and inspired many enlisted men to insubordination and

![Figure 12. Battery C, 3rd Artillery training on the lower Columbia River floodplain, ca. 1860. (Courtesy of National Archives, Image No. 111SC 89759).](image-url)
desertion (Adams 2008; Agnew 2008; Foner 1970). Occasionally, soldiers who could not acclimatize themselves to military expectations lifeway were unofficially encouraged to desert (Rickey 1963:149), and military pursers would not expend much energy or time to retrieve these individuals.

Policing and Refuse

Each day after the reveille roll-call, the Company barracks and outbuildings were to be “put into order” by the men not assigned to the police detail (USWD 1857:30). Saturdays were set aside as the day for a thorough cleaning of the barracks. In the barracks, enlisted men aired their bunks and bedding, tables and benches were scoured, floors were dry rubbed or sanded, and arms cleaned (USWD 1847:28, 1857:13). Kitchens were cleaned daily by the enlisted men detailed to assist with the cooking (see below). Refuse from within buildings was to be placed in barrels or in heaps to be carted away. “This duty is performed by collecting the rubbish in heaps by one part of the detail, whilst another portion is engaged with handbarrows in transporting it to some place of general deposit, where, if necessary, it may be removed again in wagons” (Kautz 1865:122). However, records indicate that sometimes the kitchen refuse was discarded on the ground near the kitchen doors (Carley 1982:277).

The Officer of the Day was in charge of organizing a general police detail, or fatigue, for maintaining the cleanliness of the garrison, and if not enough prisoners were available for these duties, enlisted men were detailed to the task (USWD 1857:75). The general police fatigue party was responsible for “sweeping and cleaning the common parade ground, the vicinity of officers’ quarters, and other places not immediately occupied by companies or detachments” (Kautz
1865:105), including the sinks and privies (Butterfield 1862:108). Trash was typically burned or buried in trenches excavated for that purpose (Butterfield 1862:63; Stallard 1978:369).

At Fort Vancouver, these refuse piles were placed outside the outer fence of the garrison where a police cart conveyed the trash to the lower floodplain of the Columbia River (Post Order No. 61, 1876). Refuse was used as food for pigs, burned, recycled and dumped (Carley 1982:286). Ashes were saved and used as infill to disinfect the privies (Circular No. 23, 1880). Archaeological data indicates that in the 19th century, much of the refuse was discarded in the (now former) pond that opened onto the Columbia River (see Carley 1982; Chance and Chance 1976; Thomas and Hibbs 1984). If the number of enlisted personnel available for garrison duties was limited, then fuel procurement took precedence over policing the garrison for refuse removal (Carley 1982:287).

The activity of police fatigue parties, engaged in daily by troops at the post, reinforced the superior ranking of the officers over the enlisted. Officers were not responsible for cleaning the communal areas of the garrison or around their own quarters, and hired others (when affordable) to clean inside their quarters as well (see below). Enlisted men were tasked with the physical removal and transportation of rubbish, while officers instead supervised and directed the process. This practice overtly reinforced the social hierarchy and power relations between the officers and enlisted men, as the officers physically distanced themselves from the refuse, whereas the common soldier could not.

Military Dress

The mid-19th century Army placed much emphasis on the personal appearances of their soldiers (Janowitz and Little 1965:63). The highly regulated uniform visually communicated the
position of the individual within the military hierarchy, as well as encouraged and reaffirmed the common group identity. While in camp or garrison, the Army required enlisted men to wear the prescribed uniform. Even while on fatigue parties, they were to wear the prescribed clothing. The uniform was intentionally designed to make a man indistinguishable from other soldiers (Agnew 2008:95); yet attached insignia symbolically denoted a man’s rank and branch of service, and therefore social position, within the military community.

Uniform dress was highly regulated; each branch and rank, and horse equipment or tack, was (and still is) associated with specific insignia and badges, or symbols (see Delano and Mallen 1991; Emerson 1996; Langellier 1995; McAfee and Langellier 1996; Schuyler et al. 1985; Todd 1974; USWD 1847:186-215, 1857:437-456, 1861a, 1863:462-481). The 1851 uniform regulations introduced the traditional Prussian (dark) blue frockcoat or shell jacket (official uniform dress coat) and a system of branch colors for trim (Cole 2007:19; USWD 1851, 1861a). The frock coat and fatigue blouse (commonly referred to as dress or service coat and sack coat, respectively) of the 19th century U.S. Army, first introduced in the Revolutionary War, was replaced by khaki in 1898 (Emerson 1996:5). Coats for officers had a double row of buttons on the front, while those for enlisted men had only a single row of buttons. After 1858, commissioned regimental officers, non-commissioned officers and enlisted men wore sky blue trousers, whereas those worn by commissioned general officers were to be Prussian blue, to match the dress coat.

In the mid-19th century, each branch of the service wore a specific trim color; scarlet for the Artillery, emerald green for the Riflemen, sky blue for the Infantry, dark blue for Staff Officers, and after 1855 yellow for the Cavalry (Emerson 1996; USWD 1847:186-215, 1857:437-456, 1861a, 1863:462-481). The coats for musicians had added trim on the front, to
denote their distinction and the importance of their branch, as the drum, fife and bugle regulated all aspects of enlisted men’s life (when to rise, take meals, assemble for formation, parade ground and training, and when to sleep), and allowed officers to quickly communicate and maneuver troops on battlefields (Emerson 1996:18). Band musicians distinguished themselves from Company field musicians by wearing a lyre; the latter wore the standard Company insignia (Emerson 1996:225). The commonly known silver lyre was in use between 1880 and 1930 (Emerson 1996:18), but historical photographs depict U.S. military band personnel wearing lyre insignia on 1858-pattern hats (Langellier 1998:16). If permitted by the Council of Administration for the post, the commanding officer was allowed to “make such additions in ornaments as he may judge proper (USWD 1847:203).

Badges denoting rank were located on a man’s hat and in several places on his coat. Commissioned officers wore buff or white gloves, colored sashes and shoulder ornaments on their coats, such as epaulettes, straps (running along the top of the outer shoulder), or loops (running from the outer shoulder to collar), commonly with metal insignia pinned to them. Non-commissioned officers wore worsted binding chevrons on both sleeves on their coats, with the number of bars and points denoting their specific rank. Enlisted men were recognized by their lack of the above accoutrements. The style of pompom, cap or hat, sword-belt, sword and scabbard, trouser belt, boots and spurs that each man was allowed to wear was also dictated by his rank and branch of service (USWD 1847:186-215, 1857:437-456, 1861a, 1863:462-481). Buttons with military devices or emblems were fastened to the front, sleeves, and often coattails of the overcoats, frockcoats, and fatigue blouses (“sack coats”) worn by the Federal or Union Army. Differences in military button sizes and designs are discussed in detail in Chapter Eight.
Enlisted men were allotted a strictly regulated uniform allowance, spread out over their five-year enlistment. Items included a cap or hat, overcoat (“Great Coat”), frockcoat, fatigue blouse or “sack” coat, three wool flannel shirts at least one of which was white, braces (suspenders), (under) drawers, stockings (socks) and boots or bootees, a pair of trousers each year, a hat pompom, leather stock, and a blanket in the first and third years of service, while the large overcoat was only issued in their first year (Woodhead 1996:126; USWD 1857:134). If there was a balance remaining for a particular year, then it could be carried forward into the next. However, if a soldier needed to replace any item before it was allowed to be issued, the cost was deducted from his pay. The Army considered the clothing allowance “sufficient,” and recommended providing each soldier with a sewing kit, “containing an assortment of thread, needles, buttons, scissors, &c.” (Kautz 1865:55).

As only men were allowed to join the Army, the uniform with its accoutrements was one of the few items that specifically reflected masculinity in the 19th century enlisted men’s world of few personal goods. However, unlike the commissioned officers who preferred to dress in civilian clothes when off duty (Adams 2009:125), enlisted men were not “permitted to keep in their possession any other clothing” (USWD 1847:31, 1857:15, 1863:23) in an attempt to reduce desertion from the ranks. This policy was consistently reinforced at Fort Vancouver. Two separate orders were issued to the effect within the same year (Post Orders No. 34, 1866, No. 64, 1866). Two years later, enlisted men were not allowed a pass off-post unless they wore the prescribed uniform or fatigue dress (Post Orders No. 96, 1868). Until they were discharged, both the officers and enlisted men were continually reminded of their respective class affiliations and positions within the military through their clothes.
Ladies and Laundresses

Gender in the mid-19th century Army was intimately connected with social connotations of class differences (Adams 2009:106) and cultural conceptions of gentility. The behavior and demeanor of an officer’s or enlisted man’s wife could make or break a military officers’ career (Eales 1996:43; Stallard 1978:103). Although they were not listed on the 19th century Post Returns (USWD 1849-1900), when permitted, wives and children could accompany their military husbands from post to post. Military wives followed their husbands for love and a sense of wifely duty, as well as for the thrill of adventure (Alt and Stone 1991; Lewis 1924; Sinclair 2004:78-98). The “west,” in many women’s minds, was imagined on the basis of romantic conceptions of “life on the frontier” constructed from reading western tales of adventure in newspapers, magazines and novels (Eales 41996:13; Stallard 1978:15). Officers’ wives were referred to as *ladies*, accentuating their femininity, whereas enlisted men’s wives who worked as *laundresses* were referred to by that term, emphasizing not the gender, but their occupational role within the military. Even enlisted men’s wives who were “keeping house” were often employed on post as hired employees either as laundresses or household servants. Although only laundresses had a legal standing on the post (Stallard 1978:124), all women were expected to adhere to and reinforce military customs and protocol, or else they could be removed from post by the commanding officer (Eales 1996).

Officers’ wives and laundresses were considered by highly ranked military officers to have a calming and civilizing influence upon the men (Sinclair 2004:95; Wood 2002:28). Whether in garrison, in camp or on the march, women were expected to adhere to an idealized virtuousness, the Victorian feminine gender role of “Angel in the House.” Yet, the military class based social structure that created and reinforced segregation between the enlisted men and the
commissioned officers exerted its influence on the women at the post as well. A woman’s social status and her living conditions were both dependent upon her husband’s rank (Sinclair 2004:96). Each woman recognized her place and social standing within the military hierarchy (Alt and Stone 1991:48-49) and there was little, if any, socially-based interaction between the officers’ and enlisted men’s wives (Alt and Stone 1991:49; Eales 1996:137). Even military children, who often assumed their father’s rank in play, recognized and followed the social segregation which constrained their parents (see Stallard 1978:92).
Women were in a minority at many western posts, so many “officers sought company of all women, whether they were the ladies, laundresses or maids,” yet they preferred to affiliate with women related to or friends with other officers and their families (Stallard 1978:117). Officers were expected to marry women from the same social class, that of the merchant or upper classes in American society. In 1851, Lt. Talbot lamented that “there is no one here to marry” (Hine and Lottinville 1972:156), indicating that although plenty of native and working-class women were locally available for marriage (see Cromwell 2006; Hussey 1957); they were not amongst those considered socially acceptable. In the 1850s, commissioned officers at Fort Vancouver often found excuses to travel south to Portland or Oregon City to ensure they were not “deprived of the refining influence of female company” (Kip 1859:17; see also Carey 1931:91; Van Arsdol 1999). When a commissioned officer married a woman outside of the aristocratic social circle, he was considered

“married to an inferior person… he commits an offence toward Army society that is rarely forgiven; for the social code of ethics in garrison life is, that, as all commissioned officers and their families are really but one military brotherhood, no member of the coterie has any right to thrust upon them any uncongenial companion” (Glisan 1874:452-453).

Regardless of her background or education, a commissioned officer’s wife automatically became part of the military aristocracy, and considered gentle ladies by the military community (Alt and Stone 1991:48-49). She was expected to set and maintain behavioral standards (Sinclair
2004:80), as defined by Victorian concepts of femininity, to which other could aspire. As discussed in Chapter Two, a Victorian lady was a delicate and docile individual, an “Angel in the House,” who provided a haven from the rigors of the outside world, as well as a civilizing influence on her officer husband, removing any corruptions he acquired while on duty. These ladies were expected to manage a household of domestic help, whether servants, cooks, and/or strikers (enlisted men employed by officers for household suties, see below), and bring “an element of grace, refinement, and comfort to garrison life’ (Utley 1973:89). However, many lower-ranked officers’ wives in the west could not afford full time servants and performed many of the household chores themselves (Eales 1996; Stallard 1978).

Laundresses

Wives of enlisted men often took employment near or on the posts to be close to their husbands as well (Wood 2002). On post, these women often worked as laundresses for the company to which their husbands were attached (Meschner 2001; Wood 2002), but laundresses were never referred to as ladies (Eales 1996:136). Although married enlisted men were not excluded from the Army, a soldier was required to have the permission of his Commanding Officer to marry (Stallard 1978:53), as the allowance of married men was based on the need for Company laundresses (USWD, AGO Gen. Orders No. 40, 1861). Each Company was allowed up to four women to act as laundresses (USWD 1847:34, 1857:16), and women were appointed by the Company’s Captain (Stallard 1978; Wendel 1999). Laundresses were also assigned to Ordnance Depots (see Palmer 1876), although the prescribed number varied from post to post.

Although there was no consistency in laundry equipment used at military posts (Mescher 2001), to fulfill their duties laundresses are known to have used wooden tubs, kettles, buckets,
stoves, boilers, laundry sticks, scrub boards, wringers and mangles, soap crates, starch, blueing, ropes, clothespins, flat and/or charcoal irons, and fire grates (Mescher 2001; Wendel 1999), all of which had to be transported when the Company went on the march. After any necessary mending, the garments were soaked with additives to assist with stain removal. On wash day, usually within the next day or two, slivers of soap were shaved into boiling water in large, roughly 25 gallon large tubs. Boiling the clothes killed any insects remaining, and then they were rinsed three times in different tubs. Blue pigment was then dipped into the water to alter the soap’s yellowish residue to gray-white. Then clothes were hung to dry, and ironed when damp. The mending, washing, and ironing cost roughly three cents per shirt in the early-1860s (G. S. Appleton 1851; Wendel 1999).

Because of shortages of soap and to conserve time and energy, laundresses often created their own washing solutions (for an 1850 recipe, see Appendix J). In addition to the Company washing, laundresses mended clothing and uniforms before washing, nursed the sick, dressed the dead, and if no hospital matrons were present, assisted the Post Surgeon (Stallard 1978:124,128; Wendel 1999). They also performed household duties for their own families on post, including preparing meals for their enlisted husbands if they were allowed to eat at home rather than the company mess (Stallard 1978:54). By providing a home atmosphere for her husband and other enlisted men, they helped stem the loneliness that many soldiers suffered (Wendel 1999). Laundresses were also allowed to accept additional employment for commissioned officers and their households, functioning as servants, cooks, babysitters, nursemaids, and/or washerwomen (Stallard 1978:61).

However, unlike officers’ wives, Army Regulations required laundresses to carry certificates of good character issued from the department headquarters “and no woman of bad
character will be allowed to follow the Army” (USWD 1857:98). Dismissal of women found to be of questionable character reflected the masculine cultural desire for women on post to adhere to Victorian notions of feminine gentility (Mescher 2001). As laundresses had legal standing within the Army, they could also be court-martialed for failing to adhere to military rules of behavior and protocol, particularly insubordination (Eales 1996; Stallard 1978:104-105; Wendel 1999). The intricacies of how laundresses articulated their working-class duties with these Victorian expectations of womanhood are little known, as few enlisted men’s wives from western posts left memoirs from western posts detailing their daily lives, generally because of their lack of education and social position (Stallard 1978:56).

**Economic Realities**

An individual, family, or household’s access to goods and resources was primarily based upon the military rank of the associated individuals, whether they were residents themselves (officers and married enlisted quarters) or residing separately (enlisted men living separately from their laundress wives). The military supply system allocated housing (discussed in Chapter Three), allowances (fuel, baggage, etc.), and rations to an individual based on his rank, or for women that of her husband. In addition, military salaries were also allotted in accordance with military rank, those of higher rank receiving greater pay rates. Therefore, financial constraints were one significant factor in the ability of an individual or household to obtain goods, either through military supply lines or mercantile-based consumerism.
Commissioned Officers

Officers earned roughly seven to ten times what a private earned in the Army. In 1850 at Fort Vancouver, 1st Lt. Talbot earned approximately $1,000 per year (Hine and Lottinville 1972:147), roughly $83 per month. In the mid-1850s, Lieutenants earned $93 each month, significantly more than the $13 that a private earned. After the Civil War, the lowest ranked officer, a 2nd Lt. of Infantry, earned approximately $115 each month, or about $1,400 annually (Adams 2009:22-23; Agnew 2008:95). However, the Army provided housing and fuel for the officers and their families on post for free, with each Lieutenant receiving ½ cord of wood in the summer and 2 cords in the winter, and each Captain ¾ cord for the summer months, and 3 cords in the winter (USWD 1857:124).

During the mid-19th century, civilians in skilled trades (e.g. such as blacksmiths, carpenters, stonemasons, and mechanics) earned between $40 and $80 per week (Mitchell 1993:2), about as much as a 2nd Lieutenant (Agnew 2008:95). Tailors could be removed from duty to make, alter and/or mend soldiers’ clothing at rates fixed by the Company commander, to be paid for by the men receiving the services directly from their pay (USWD 1847:33). The average American family earned $1,200 annually (Adams 2009:22-23), yet wage labor could bring a family up to $1,600 annually, sometimes with board included, along the lower Columbia River (see Abbott 1982:268).

Each officer and his family were allotted a baggage allowance for transport, with the poundage commensurate with his rank and moving expenses deducted from his pay (Eales 11996:45). For example, Lieutenants were allowed up to 500 lbs. for their belongings, whereas Major Generals could transport up to 1,000 lbs. of baggage when the troops moved (Alt and Stone 1991:28). Typically all that could be transported were smaller items. Larger items, such as
chairs, tables, and makeshift bed frames were generally “rude and home-made” (Lewis 1924:29) at Fort Vancouver in the 1850s and 1860s, “The easy chair that Captain Wallin made out of a barrel [in 1852] and upholstered with calico and stuffed with moss, was the envy and admiration of the whole garrison” (Lewis 1924:59). Furniture could be purchased by officers from the quartermaster’s department at cost (USWD 1857:126, 1861:6). It was not until after 1870 that some officers could afford to lavishly furnish their houses (see Adams 2009:120-125; Altshuler 1982:11). Due to the baggage allowances, when obtained, large furniture items were often given away by the departing family to officers’ families to friends or left in the quarters for the next inhabitants (Eales 1996:45).

Unlike the enlisted men and laundresses, officers were responsible for their own mess, or food rations, and uniform purchases, often tailor-made (Emerson 1996:5; see Carey 1931:112), whose costs could be quite expensive. The average uniform cost $100 and boots $17 (Agnew 2008:95). Although the salaries for officers typically situated them amongst the economic elite (Adams 2009:22), in the Pacific Northwest this was not the case:

“Mess bill last month (food alone) 48$. Washing 15$. Not surplus enough to keep me in shoe leather, to say nothing about cigars sundries etc…” (Lt. Talbot, 2 August 1850 in Hine and Lottinville 1972:143).

“Although I am getting a 1000$ a year now I can barely keep my nose above water... Everything which might be termed luxuries and even many articles of necessity are very scarce and command enormous prices” (Lt. Talbot, 25 Sept 1850 in Hine and Lottinville 1972:147).
“Prices for all kinds of supplies were so high on the Pacific Coast from 1849 until at least 1853 – that it would have been impossible for officers of the Army to exist upon their pay, had it not been that authority was given them to purchase from the commissary” (Grant 1885:202).

The mid-19th century discovery of gold in California, Oregon and Montana (Bischoff 1976:20) raised both local wages and the cost of goods in the Pacific Northwest. For the Army to retain laborers at Fort Vancouver, the men had to pay at rates commensurate with those earned at placer mining (Vinton 1850:141), sometimes up to between $10 and $80 per day (Abbott 1982:261; Bischoff 1976:21). In 1850, Lt. Talbot noted that he needed to pay his clerk “a low salary for Oregon $120 per month,” an annual rate higher than his own income (Hine and Lottinville 1972:158), while Sergeant Sheffield’s wife Delia remembered that a Captain’s pay was not enough for Capt. Grant to meet his expenses at Fort Vancouver (Lewis 1924:59). In 1854 at the fort, local laborers earned the following monthly salaries; clerk, $150, master carpenter, $90, blacksmith, $90, teamster, $70, and herdsman, $70 (Fraser 1963:173). As many officers came from the elite class, these individuals could draw upon other economic resources, such as their families (Alt and Stone 1991:28), to provide additional goods and services, or even a servant, which could often not be afforded by their military salary alone.

**Enlisted Men**

From the mid-19th century until after the Spanish-American War of 1898, enlisted men earned $13 each month, temporarily increased to $16 each month between 1864 and 1870 (Agnew 2008:95; Foner 1970:15; Kautz 1865:286-290). Most monthly salaries for men were
between $10 and $20 each month (Blanton and Cook 2002:4). In addition, the enlisted received 
free housing, food rations, and a uniform allowance as part of their compensation. Individuals 
with experiences in skilled trades received an extra 35 cents per day (Agnew 2008:95). Non-
commissioned artillery and infantry officers earned $17 and $21 monthly in 1865, with Ordnance 
officers and Engineers earning up to $34 each month (Kautz 1865:286-287). However, these 
rolls for skilled tradesmen were much lower than their civilian counterparts. For example, in 
1870, an Army blacksmith earned about $33.50 each month, whereas a civilian blacksmith 
earned $90 each month, but had to provide their own housing, board and clothing (Agnew 
2008:96). It was not until 1872 that Congress authorized annual pay increases after a man’s 
second year of service, or bonuses for reenlistment, as the $13 each month did not make 
regimental service an enticing career option for many men (Adams 2009:5; Agnew 2008:95; 

Each regiment and post mess received one cord of wood (128 cubic feet) each month 
between October and April for fuel (USWD 1857:124). Furniture for the enlisted quarters and 
messes, made by men detailed to the quartermaster’s department, consisted of bunks, benches, 
and tables (USWD 1857:126). These items were considered part of barracks property, rather than 
Company property, and as such were left behind when the troops moved on (USWD 1861b:6). 
Each enlisted man kept all of his Army gear, clothing, and personal belongings in a prescribed 
manner on a shelf or in a wooden box (now termed a foot locker) at the foot of his bunk (Rickey 
1996:124; USWD 1847:28, 1857:13). Enlisted men were not given a baggage allotment. They 
carried all of their belongings on their person unless their wife was a laundress, in which case 
additional items could be transported under her baggage allowance. The Company’s goods, such
as pots, kettles, frying and bake pans, camp stoves, etc. were transported in Army supply wagons.

Prior to 1866, soldiers detailed for extra duties in a different department, such as for the quartermaster or commissary departments, for more than ten consecutive days were not entitled to additional pay (Foner 1970:16). However, to lessen dissention in the ranks, officers often authorized additional wages. For example, at Fort Vancouver in 1849 and 1850, the enlisted men of the First Artillery and Mounted Riflemen were required to construct their own barracks, as well as the quarters for the officers, as most of the civilian laborers had left for the California gold mines or priced themselves at $5 to 10 per day, beyond acceptable costs for the Army and far higher than the pay of an enlisted man (Abbott 1982:256; Ingalls 1849b:172; Hine and Lottinville 1972:126-127,146; Vinton 1851:145-146). High rates of desertion for the California gold fields amongst the soldiers themselves slowed progress until the soldiers were promised an extra $1 per day for the work until the buildings were completed (Ingalls 1849b:169-170). As they mustered into service from the Territories of Oregon and Washington, many Volunteer troops stationed at Fort Vancouver in the 1850s and 1860s typically had a network of family and friends in the Pacific Northwest that they could draw upon for additional resources.

Commissioned officers could hire enlisted men, but not non-commissioned officers (Butterfield 1862:89), to act as their servants or waiters servants for their off-duty hours (USWD 1847:33, 1857:15). These were called “strikers” (Alt and Stone 1991:49). Consent by the Company captain was required after he confirmed “the willingness of the soldier chosen” to undertake these extra duties (USWD 1847:33, 1857:15). The soldier was required to remain armed and in uniform at all times, and to continue to fulfill his regular military duties (USWD 1847:33, 1857:16). He was to be financially compensated each month directly from the officers’
pay, usually between five and ten dollars each month (Eales 1996; Stallard 1978:29). If a soldier proved adept at these duties, a senior officer could appropriate his services (Stallard 1978:29).

As Euro-American women were often rarities on the frontier, when they were hired as servants for the officers’ families they were promptly the source of much admiration by the enlisted men on the frontier. These women were frequently quickly married, thereby leaving the officers’ wife temporarily bereft of domestic assistance (Alt and Stoner 1991:28; Stallard 1978:117). For this reason, many officers’ households quickly realized that the strikers and laundresses were often the most available (since they were already on post) and reliable servants (Stallard 1978:61,124). Some strikers are known to have also looked after the children, as well as to have performed cooking and laundry duties (Eales 1996:63). In addition, strikers were already housed and clothed by the Army, responsibilities that officers were obligated to fulfill for their civilian servants (Utley 1973:81). However, abuses of the striker system were prevalent throughout the Army, including requiring performance of menial tasks or rank-based coercion forcing an unwilling enlisted man to undertake servant’s duties (Foner 1970:62-63). Although it was declared unlawful by Congress in 1870 (Pub. L. 44-294, 15 July 1870, 16 Stat. 319; Marcy 1875:419), some officers continued this practice into the 1880s (Eales 1996:62; Foner 1970:63).

Laundresses

Typically, of the enlisted men, only non-commissioned officers could afford to bring their wives and families, although census data and memoirs indicates that several privates were married to Company laundresses at Fort Vancouver in the mid-19th century (Glisan 1874: 453-454; USCB 1850, 1860, 1870). For the enlisted man, having one’s wife employed as a laundress provided much more than marital company. These women received Army support in the form of
quarters onsite for them and their children, fuel, and access to the Post Surgeon, and were entitled to receive one ration per day, the same as for enlisted men, and free transportation when they were relocated (Eales 1996:138; Mescher 2001; USWD 1857:212, 1863b:11; Stallard 1978:13; Wendel 1999; Wood 2002). Each laundress received the same fuel allowance as a non-commissioned officer, ½ cord of wood in the summer, with double that in the winter months (USWD 1857:124).

A laundress’ income could be relatively relied upon as the costs of washing, either per piece or monthly, was set by the Council of Administration for each post, and debts were collected by the women through direct deduction at the soldiers’ pay-table (Stallard 1978:59; USWD, AGO 1847:34, 1857:16, 1863:24; Wendel 1999). In the early-1850s, at Fort Vancouver, laundresses received 75 cents each month per soldier (Van Arsdol 1991:4). In the mid-19th century, In 1861, laundresses earned approximately $5 to $7 per month (Wendel 1999), although on some posts a laundress earned roughly $1 for each enlisted man and $5 for each officer for whom she washed (Agnew 2009:114). Comparatively, a female servant in New York City earned between $4 and $7 each month, cooks $7 to $8, and laundresses up to $10 each month (Blanton and Cook 2002:4). A married couple could earn enough money to be considered upper lower- to middle-class.

‘Greenbacks’

Difficulties in transporting coin funds to post paymasters, particularly those at posts distant from Washington, D.C., often resulted in the men being owed back pay for up to several months (Foner 1970:16). One solution was to pay the troops issue paper money, or “greenbacks,” which then had to be converted to coin locally. When it was accepted on the
frontier, the paper money was discounted at rates between 12 and 50% in relation to silver and gold coin. This was a major cause for grievances among the men at Fort Vancouver (Foner 1970:17; Rickey 1963:128; Utley 1973:19). This additional unintentional reduction in pay, for both officers and the enlisted men, further reduced the purchasing power for military personnel at Fort Vancouver.

Messes and Consumption Practices

The class and social segregation between the officers and enlisted men was reinforced daily at each meal service. The two groups were physically not allowed to eat, or mess, in the same building, let alone together, even while on field maneuvers off-post. Officers consumed luxury foods and focused on table presentation to express their social position, reinforcing their position as the elite military class, similar in dining etiquette to the “gentle” class of wider American society.

In contrast, the enlisted men were limited in their consumption behavior, not only from their pay rates, but also from the military food distribution structure (rations), as organized and reinforced by their superiors, the officers. However, this same arrangement inadvertently encouraged cooperation among the enlisted men within a Company “to overcome a commissary system that marginalized them” (Adams 2009:110). The focus on food, specifically the lack of it, reinforced a common group identity among the enlisted, albeit one that was separated from the officers of their Company.
At the Officers’ Table

Officers in the Army were expected to live and conduct themselves as Victorian gentlemen, and lived with their families (if present) together as members of this class (Adams 2009:133). Officers were also responsible for providing food for their families and domestic servants (unless strikers or laundresses). Although officers could dine alone or with their families, the military encouraged officers to mess together, particularly those who were unmarried, as this practice “promotes the harmony and comfort of its members… It affords the opportunity of hospitable entertainment to friends, and other persons, to whom the civilities and courtesies of the table should be extended” (USWD 1841:16, 1847:25). Officers were required to “cultivate intimate relations with society… by mingling with circumspection and prudence” while within and outside of the garrison (USWD 1847:2). At Fort Vancouver, officers fulfilled these social obligations by taking meals with local merchant families, the Governor of Oregon Territory, Congressional delegates, Territorial marshals, and in the 1850s, the gentlemen class of the Hudson’s Bay Company (Carey 1931:94; Kip 1859:23).

To successfully engage in these endeavors, an officer needed to maintain a domestic environment of gentility, as meals were not just for subsistence, but events within which rituals expressed social expectations of class and gender on a daily basis (Adams 2009:113; see also Williams 1996). To this end, messing (eating) was physically segregated by class. Officers and enlisted men were not allowed to eat together, even while in the field (USWD 1841, 1847, 1863). For officers, the accoutrements of dining were selected not only to emphasize their distance from the working-class enlisted men, but also to deemphasize the physical and social distance between officers and the gentrified elite on the east coast:
“Deportment at the mess should be marked with all that propriety which characterizes the society of gentlemen… The rules of good breeding must, therefore, be punctiliously observed, and the infringement of them, at the mess, will be considered a military offence, calling for the interposition of the authority of the senior officer present” (USWD 1841:16-17, 1847:25).

Public perceptions of his ‘worthiness’ for commission deeply affected a man’s military career and his ability to rise through the ranks. Officers’ wives assisted in these events through using their social skills and connections, thereby having a profound influence on their husband’s military careers (Eales 1996:3). Officers were expected to furnish their homes in a manner that would reflect their status within the military hierarchy, and therefore the wider American society. Similar to expectations for upper-class households on the east coast (see Wall 1994, 2000; Williams 1996), officers were expected to procure tableware and food items and entertain lavishly, thereby establishing and reinforcing their social standing by means of non-verbal communication through objects selected for the table. Fine dining tablewares and luxury foods provided “a constant, visible reassurance of an established and secure position in a complex and changing world” (Williams 1996:6).

For officers on the frontier, gentility and domesticity were intricately wound together with conspicuous consumption. However, unlike many elite families back east, many officers did not own complete dining services (Adams 2009:122) given their expense and the ever-present potential for a reassignment in their duty station. Ornamental wares were important items among officers’ families, and they often accumulated many pieces through trade or sale when new duty appointments necessitated moving their entire household (Adams 2009:123), with all its goods,
within prescribed baggage allowances. The Army allowed officers to purchase goods at costs to help defray their living expenses (Adams 2009:22-23), but military supply items did not include sumptuous tablewares.

Meals were generally prepared for small groups of people, similarly to those in eastern households, but officers, their families, and their servants (excepting strikers and Company laundresses) were not allowed to draw rations. Goods were incredibly expensive in the west (see below), providing a table lavish with plentiful and/or exotic foods could be difficult for the lowly-ranked commissioned officer. Therefore, the Army allowed officers to draw subsistence food stores at cost, paid for with cash upon delivery (as requisitioning), as long as they certified the stores were for their and their family’s use only (Patten 1864:14; USWD 1855:9). When possible, their wives often grew vegetables in a small familial garden plot and raised chickens and turkeys to provide some variety for the dinner table (Eales 1996; Stallard 1978; Utley 1973).

At the Enlisted Men and Laundresses’ Tables

The diet for enlisted men and laundresses in the west was primarily the daily ration, supplemented by wild game and consumer purchases from the post sutler. Provided as part of their compensation, a daily ration with fixed proportions was allocated for all enlisted men (including non-commissioned officers), laundresses, and day laborers (USWD 1857, 1863a, 1863b). Meals for non-commissioned officers were prepared in the Company kitchen and, if possible, served at their own mess, i.e. without the presence of enlisted men (USWD 1847:32). Rations were issued to each Company for ten days at a time while in garrison, and for five days or less while on the march (Kautz 1865:154; USWD 1855), while laundresses supporting their own households were allowed to obtain rations for several days (Stallard 1978:56). The ration was often considered bland and monotonous by its consumers (Adams 2009:108; Eales 1996;
Langellier 1996:6; Stallard 1978), and often the enlisted men blamed their superiors for its condition. Pvt. Hilleary complained, “I am not in favor of eating rotten pork… The government is not to blame, when soldiers do not get their just dues, but is the fault of the incompetent and rascally officers who handle the rations” (5 May 1865 in Nelson and Onstad 1965:63), and later commented, “The poorest mutton was brought to our kitchen this morning that I ever beheld” (Pvt. Hilleary, 9 May 1865 in Nelson and Onstad 1965:64).

All kitchen supplies and tablewares were issued or purchased at the Company level, except for each enlisted man’s field gear, which included a canteen, tin plate, and tin cup (Agnew 2008:124; Cole 2010; Military Images 1992). Until 1874, a soldier was responsible for supplying his own utensils, such as knives, forks and spoons, although on occasion their commander might permit their supply from the Company funds (Cole 2010). Company goods included axes, hatchets, camp kettles, pots and pans, large iron spoons, large iron forks, and stout knives, as well as the occasional cullender [colander] for washing vegetables (Patten 1864:68; Sanderson 1862). Companies could purchase additional items from the Company fund, such as additional utensils or storage containers, as their commanders deemed necessary.

The Daily Ration

It was not until 1855 that specific foods to be given for the daily ration were codified in Army Regulations (see Craighill 1862; Patten 1864; USWD 1841, 1847, 1855:9, 1857:206, 1863a:244, 1863b:9,10). Divided among the three meals of the day, the daily ration for each person consisted of ¾ lb. pork or bacon or 1¼ lb. fresh or salt beef (although these could be replaced by canned meats (Horsford 1864:10), and 1½ lb. fresh leavened bread or flour or ¾ lb. of hard bread (hardtack) or 1¼ lb. corn meal. Hardtack was made from flour, water, and
occasionally salt, without leavening to lessen its bulk. It was baked until all the moisture was removed, making it very hard or impossible to chew, but resistant to spoilage. It was usually broken into pieces and dipped into stews or coffee, or softened by soaking in grease or water prior to consumption. For every 100 rations, each Company was allotted 16 lbs. (roughly a bushel) of peas or beans or 10 lbs. of rice, 6 lbs. of coffee, 12 lbs. of sugar, 8 lbs. (4 qt.) of vinegar, and 4 lbs. (2 qt.) of salt (USWD 1855:6, 1857:9). When it would not be cost prohibitive, fresh beef was to be issued to the troops five times per week (USWD, AGO Gen. Orders No. 3 of 1859). Officers of the Medical Department could request “anti-scorbutics,” or additional foods for troops in the form of fresh vegetables, pickled onions, sauerkraut, molasses, and/or dried apples, if available (USWD 1855:87).

In 1861, the starch ration was adjusted to 15 lbs. of peas or beans and 10 lbs. of rice or hominy, and 30 lbs. of fresh potatoes. The coffee allowance was also increased to either 10 lbs. of green or 8 lbs. of roasted coffee, and 1½ lbs. of tea was added. Sugar was increased to 15 lbs., salt to 3¾ lbs., and additional supplements included ¼ lb. of pepper and 2 lbs. (1 qt.) of molasses, the latter “when practicable” (USWD 1863a:244; see also Patten 1864:11). Starting in 1857 desiccated compressed potatoes (1½ oz. per 100 rations) or mixed vegetables (1 oz. per 100 rations) could be substituted for beans, peas, rice, hominy, or fresh potatoes (Horsford 1864:11; Kory 1993:v; Patten 1864:11; USWD 1863a:244). In 1864, the quantity of the ration was decreased to its pre-1861 allowances (Kory 1993:iv).

Desiccated vegetables were a mixture of “potatoes, cabbages, turnips, carrots, parsnips, beets, tomatoes, onions, peas, beans, lentils, celery, &c.” that were cleaned, sliced, dried with heated air, seasoned, and compacted with a hydraulic press into ‘cakes’ (Horsford 1864:11). These were then sealed in cases and enclosed in wooden boxes for shipping. They required only
water for reconstitution, and “swelled greatly” (Kautz 1865:265), but were often considered bland and undesirable (Agnew 2008:126; Eales 1996:67; Rickey 1963:117; Stallard 1978; Utley 1973:85), having the flavor of “chopped straw” (Kory 1993:v). These were usually served in soup (Kautz 1865:265).

Additional items allocated for every 100 rations included 4 lbs. of soap, and 1 ½ lbs. tallow or 1 ¼ lbs. adamantine or 1 lb. sperm (spermaceti) candles, later switched in 1861 to 1 ¼ lbs. adamantine or star candles (both usually made from stearin, but in reality the terms encompassed all candles manufactured from any solid animal fat [Sanitary Reporter 1864:43]). The adamantine candles burned longer with less smoke than tallow, and spermaceti was becoming difficult to acquire in large quantities with the decline of the whaling industry.

These quantities and food-stuffs were considered to scientifically fulfill the essential dietary needs for a full grown man (Horsford 1864), and considered by the Army to be quite “abundant for his subsistence” (Kautz 1865:54; see also Kautz 1865:256; Horsford 1864; Mitchell 1993). However, several Army surgeons and almost all of the enlisted men disagreed (Adams 2009:108); one for worry of scurvy, the other for taste and quantity, “My appetite is hard to satisfy or the fare is scant to-day” (Pvt. Hilleary, 25 April 1865 in Nelson and Onstad 1965:59). The sugar, bread, and pork fat were considered adequate replacements for butter, and beef was believed one of the “most healthful forms of meat” (Horsford 1864:7). Raised bread, hard tack and fresh vegetables were not as economical to transport as raw flour or desiccated vegetables (Horsford 1864:9,11), and were reserved for immediate consumption activities or when field conditions prohibited establishing ovens for baking, such as on the march, in campaign, or on the battlefield.
A soldier could expect to potentially receive additional rations (if available), based upon assigned duties (USWD 1863b:11). For example, an enlisted man received an additional four ounces of hard tack per ration if on the march or campaign (USWD 1857:206). Ordnance Department sergeants and corporals, working as armorer, carriage-makers, and blacksmiths were entitled to receive 1½ rations per day for these labor intensive tasks (USWD 1855:13; 1863a:244).

It was not until 1866 that the Army Commissary Department could supply, at cost, canned fruits, canned butter, and other “small stores” to officers and enlisted men (Rickey 1963:118). Prior to this, the Army assumed that an enlisted man’s pay would furnish the soldier with additional foods, such as “preserved milk, fresh pork, cheese, smoked beef, eggs, butter, sausages, tobacco, &c.” from the sutler (Horsford 1864:10). The sutler was a civilian that supplemented the military provisions allotted to soldiers through the sale of sundry items. He carried a wide variety of goods such as boots, clothing, buttons, pocketknives, scissors, and toiletries, but his main trade was in foodstuffs like tobacco, coffee, sugar, condiments, spices, fresh and canned fruits and vegetables, fish and ready cooked meat (for a detailed history of sutlers see Delo 1998). However, items sold by the sutler and local farmers were often extremely overpriced (Eales 1996:69), thereby limiting the purchasing power of enlisted men, non-commissioned officers, and lowly ranked commissioned officers at Fort Vancouver:

“Dried Apples $45 per Bbl [barrel] value in N York $2.00. The prices for clothing too, are outrageous” (Lt. Talbot, 11 June 1849 in Hine and Lottinville 1972:133).
“Eatables demand high prices. A Soldier can eat up all his wages and not be a glutton either” (Pvt. Hilleary, 25 April 1865 in Nelson and Onstad 1965:59).

Rations not consumed could only be sold back to the Subsistence Department with the proceeds going into the Company fund (Kautz 1865:260-269; USWD 1863:2). These funds could be used to supplement the ration with fresh or canned food items obtained either from the sutler or from local merchants near Fort Vancouver, but the funds were also used for purchasing Company pots, kettles, cooking utensils and other necessary items (Adams 2009:109; Agnew 2008:127; Foner 1970:22; Rickey 1963:118-203). These funds had to be used at the discretion of the Company commander and purchases required his approval, although officers frequently left fund allocations to a council of enlisted men of the company (Adams 2009:110). Frequent mismanagement of Company funds resulted in its being considered “a practical myth” (Horsford 1864:38; see also Rickey 1963:117). Often the enlisted men independently pooled their own monies to increase their buying power (Adams 2009:109), particularly during the winter holidays (Foner 1970:21). Canned oysters, sardines, fresh milk, eggs, butter, fruit and vegetables (fresh or canned) were the most popular items purchased (Rickey 1963:117).

*Food Preparation*

Meals were cooked in the company’s kitchen(s), whereas bread was baked in the camp or post ovens. Enlisted men detailed to the post bakery on a seven to ten day rotation, baked for the entire post (Foner 1970:21; Nelson and Onstad 1965:62; Langellier 1995:6; Utley 1973:85). Each company would exchange its flour ration for baked bread, biscuits, or hardtack (Agnew 2008:215). One Company cook was detailed on a similar seven to ten day rotation schedule
Based on census data (see Chapter Three) two cooks, with up to four assistants, prepared each meal for the enlisted men in the western barracks complex at Fort Vancouver. These assistants, also detailed from the Company on a similar rotation schedule, acted as the waiters and clean-up crew. They were responsible for bringing the food from the kitchen to the men, washing the pots, pans, dishes, and utensils, and chopping wood for the kitchen and mess hall in winter (Agnew 2008:124). The concept was that each man would learn how to prepare his own meals while in the field (Kautz 1865:91). However, in reality it often led to poorly cooked and/or flavorless meals (Agnew 2008:124; Foner 1970:21; Horsford 1864:7). Each Company ate together as one at regular intervals (Butterfield 1862:104), either in the barracks mess hall, or outside in nicer weather (Agnew 2008:124). If men were detailed to guard duty or imprisoned, their meals were to be taken to them from foods prepared in the kitchen (USWD 1841:16-17; 1847:32, 1863a:23). Non-commissioned officers could not be detailed as bakers, cooks, or assistants, but they were responsible for overseeing meal preparations to ensure that there was no waste or pilfering, and that the food was equally distributed among the men (Butterfield 1862:89, 91). To further safeguard the rations, the Regulations prohibited any person from visiting the kitchens or messes unless they were attending a meal service or specifically detailed to meal preparation (USWD 1841:16-17, 1847:32, 1863a:23).

Although Americans were not fond of soups, the Army encouraged making soups of beef or pork with fresh or desiccated vegetables. The majority of 19th century civilian cookbooks or military recipes only specify the pounds of meat required, rather than the specific cuts of meat to be used (see Butterfield 1892; Craighill 1862; Lee and Leslie 1832; Sanderson 1862; USWD, SD
Most of the recipes combined the meat into soups and stews (see Craighill 1862; Kory 1993; Mitchell 1993; Sanderson 1862; USWD, SD 1896, 1901). Mid-19\textsuperscript{th} century civilian housekeeping manuals suggest using cheaper cuts for stews and soups (see Hall 1856; Webster and Parkes 1845; Lyman and Lyman 1869), and the military was no exception. Cooking tips in published Army manuals also support the presupposition that enlisted men did not receive the choicest cuts of meat:

“On fresh-beef day, if among the rations there are some choice bits – such as sirloin, tenderloin, or rump steaks – cut them into neat slices, and use for breakfast” (Sanderson 1862:5).

“Meat Soup should have for its base uncooked meat and bone, and the water with which it is to be made should be soft. There may be added to the fresh meat the bones and remnants of cooked beef, veal, lamb, and mutton, but the principal nourishment of the soup comes from the raw meat… Good rich soup can be made from the heads, tails, and soup bone of cattle… Crack soup bones well open” (USWD, SD 1896:57-58).

“MARROW BONES: Have the bones neatly sawed into convenient sizes and cover the ends with a small piece of common crust… Boil two hours, remove the cloth and paste and serve with dry toast” (USWD, SD 1896:96).
Bread and soup were believed essential to prevent scurvy and other intestinal distress (Butterfield 1862:104; USWD 1841:16-17, 1847:32, 1863a:23). In addition, when cooking for the entire Company boiling meat, whether beef, mutton, or pork (Kautz 1865:267) was considered by the military to be more economical than roasting or frying:

“Stew or boil your meat always. Roasting and frying are wasteful and unhealthy modes for camp cooking (particularly frying)” (Butterfield 1862:104).

The meat was to be placed in cold water, brought to a boil as quickly as possible, and then simmered for “at least five hours” to ensure that the meat was cooked. The vegetables were added later but cooked long enough to be easily digestible (Craighill 1862:244; USWD 1841:16-17, 1847:32, 1863a:23), with the resulting broth then used as a base for soup (Kautz 1865:259). The military continually stressed that both large and small bones should be saved from every meal and used to make broth for soup:

“Save all the bones, if large cut them in pieces and distribute them equally among the kettles” (Sanderson 1862:5).

“Bones should never be thrown away, but broken up and boiled repeatedly” (Craighill 1862:244).

“The bones of beef are the best for making soup, and should always be saved for that purpose” (Kuatz 1865:260).
The boiling process also sterilized the meat and other ingredients, as well as the cooking pots and kettles, if they had not been thoroughly cleaned before use (Rickey 1963:119).

Salt beef and pork were considered too salty to be used in soup (Kautz 1865:261). These needed to be soaked for several hours in cold water to leach out the salt, and any rising fat was to be skimmed off and saved for other culinary uses (Agnew 2008:124; Kautz 1865:261). Pork was often served at military meals, as it was considered “quite economical” (Sanderson 1862:6). It was served typically as soup, stew and bacon, in pies, added to soups, or processed into sausage, and the fat was used for frying (USWD, SD 1896). As opposed to beef, mutton and lamb were often roasted or baked, as well as being added to soups and stews, but the fat was not to be used in cooking (USWD, SD 1896). Beef roasts and hams were typically served at special occasions.

**Supplemental Foods**

Although additional foodstuffs were commonly purchased from the post sutler, by both officers and enlisted men, the sutler, as a merchant of “anything a soldier could ever want” (see Delo 1998), provided many other commodities, as is discussed below under Procurement of Goods and Commodities.

**Wild Foods**

Fort Vancouver is located on former prairie and mixed permanent and seasonal wetlands that formed a highly productive location for native food resources. Dominant faunal species on the lower Columbia River floodplain consist of a wide variety of shellfish, fish, amphibians, and land mammals (see Chance and Chance 1976; Chance et al 1982; Fladmark 1975; Horton 2010; Hussey 1976; Jabine 1984; Ray 1938). Local newspapers commented “[T]he shooting is superb.
All sorts of feathered fowl, from snipe to the swan, have made these waters their favorite residence” (Oregonian 1854).

Mammalian species known to inhabit the area include blacktail deer, elk or wapiti, black bear, cougar or mountain lion, wolf, beaver, marten, river otter, and rabbit. Aquatic mammalian species include harbor seal, sea-lion, and the otter. Shellfish and fish species include, but are not limited to, salmon, sturgeon, eulachon, trout, and river mussels. Ducks (mallard, teal, wood), cackling geese, grebes, cormorants, ptarmigan grouse or partridges, pheasants, and other fowl are known ethnographically and archaeologically as additional avian food sources. Turtles were so numerous that native peoples referred to the pond as Alaek-ae, the “turtle place” (NPS 2010).

Wapato (a starchy tuber) was incredibly abundant along the Columbia River, as were wild berries (Ray 1938).

Beef was so commonly served that any other foods were highly desired (Eales 1996:26,66). The Post Commander could permit officers and enlisted men to hunt, fish and forage wild foods during their off-duty hours. Enlisted men were encouraged to trade some of the ration for other locally available items, either wild or agricultural foodstuffs (Agnew 2008:124; Horsford 1864:7; Kautz 1865:54; Sinclair 2004:95). These were easily available through at least the early-1870s as the post surgeon noted that the river held plenty of salmon smelt, sturgeon, and trout (Carley 1982:277). Hunting wild game was a favorite pastime of both the officers and the enlisted men (see Carey 1931; Fry 1879; Glisan 1874; Stallard 1978; Van Arsdol 1999). If it was not directly procured, venison was inexpensive to purchase, and the surgeon also commented that pheasant, grouse and duck “could be shot almost within the post” (Carley 1982:277). Hunting not only increased both the variety and quantity of food available for consumption, but improved the marksmanship of the men (Agnew 2008:125; Carey 1931:90-

Enlisted men needed to obtain a furlough or permission from their commanding officers to engage in these activities, whereas officers could go hunting whenever the opportunity was afforded them. Unlike the officers, for whom food was also a matter of style, the enlisted men gathered wild foods as a matter of necessity, to supplement their monotonous and often nutrient deficient diet (Adams 2009:115). The difficulty of obtaining wild foods may have led the soldiers to rely upon their own innovations. While on pass into town, enlisted men at Fort Vancouver were known to ‘forage’ and ‘hunt’ additional locally available foods, although these were not so wild:

“Some of the boys bait hooks for fish others bait hooks for chickens, the unsuspecting hen, swallows the bait, when alas the soldier takes her under his arm and walks to quarters. A chicken with a hook in its throat neither squawks nor flutters. Several “slow bear” have been taken recently.” [Slow bear is Civil War era military slang for a stolen pig (Hendrickson 2000:136)] (Pvt. Hilleary, 23 April 1865 in Nelson and Onstad 1965:58).

“Some blue coat or someone else, killed a cow last night, and left nothing but the hide and offal” (Pvt. Hilleary, 3 May 1865 in Nelson and Onstad 1965:62).

“Rowdy soldiers raid chicken houses and orchards in the vicinity of Vancouver” (Vancouver Register, 6 July 1867 in Landerholm 1960:21).
Dairy Products and Eggs

Milk, eggs and butter were rare commodities at many posts in the West (Eales 1996:64), however, at Fort Vancouver all of these items were being produced onsite by the Hudson’s Bay Company prior to the arrival of the Army (see Hussey 1957, 1976), and were available for purchase from the local merchants (Sinclair 2004:94). However, these items were incredibly expensive, and considered luxury items (Carley 1982:277). In the early 1850s at Fort Vancouver, eggs cost between $1 and $2 for a dozen (Hine and Lottinville 1972:122; Lewis 1924:58; Sinclair 2005:95). These items continued to be expensive through the early-1870s (Carley 1982:277).

Company Gardens

In 1851, the Army directed all posts to annually cultivate a garden under the “farm culture” system established in 1818 (USWD, AGO Gen. Orders, 11 September 1818, 1 April 1851). The “farm culture” system required all men be assessed a fixed rate of “15 per centum [per 100] from officers and 8 and 9 per centum from enlisted men” to purchase supplies, such as seeds, agricultural tools, and garden fences (USWD, AGO 14 June 1820). Desiring fresh vegetables, the military community began planting gardens upon their arrival in 1849 to supplement issued rations and the officers’ tables:

“Cabbages & potatoes of our own raising will grace our board… The country yields the finest wheat I ever saw. It is too cold for corn. Cattle were raised on grass year round” (Maj. Hatheway, 10 June 1849 in Van Arsdol 1999:115).
“The long rainy winter of 1852-1853 came to an end at last, and everybody who could, began preparing gardens. We hungered for vegetables and watched eagerly their growth” (Delia Sheffield, Reminiscences in Lewis 1924:59).

Four years later in 1854, the “farm culture” system was abandoned, but the Army continued to encourage growing vegetable gardens at the posts. Rather than pooling efforts for the benefit of the entire post, each Company was responsible for planting, maintain, and harvesting their own plot within the post garden (Adams 2009:109; Eales 1996:68; Foner 1970:20). The garden was a source of pride for many enlisted men (Rickey 1963:119), and the post-Civil War post surgeon at Fort Vancouver commented “on the good supply of both animal and vegetable food at the post” (Carley 1982:277).

The Company gardens at Fort Vancouver were to the south/southeast of the parade ground at the base of the upper terrace, north of the lower floodplain to prevent yearly freshets from washing them away, as Capt. Grant’s potato field had been in 1852 (see Grant 1885, 1990; Lewis 1924). The Company gardens first appear on the 1855 map (USWD 1855), and were never moved. They expanded to the south by 1871 (Winman 1871), and then to the east, connecting with the hospital gardens by 1886 (USWD 1886). When it was established, the post hospital garden was separate from the Company gardens, positioned over a part of the Hudson’s Bay Company’s former garden and orchard area, until combined with the newly expanded Company garden by 1886 (see USWD 1878, 1886; USWD, SGO 1870:420, 1875:489; Ward 1875; Winman 1871).
Procurement of Goods and Commodities

This section presents the available avenues for military personnel to obtain items for consumption, with a focus on personal items, such as clothing or toiletries, and food. Specifically the procurement of meat is examined as faunal remains are commonly recovered from archaeological contexts at Fort Vancouver. Supplies and foods were readily issued to military personnel. On the basis of military documents and personnel letters, we know that Fort Vancouver obtained goods and supplies not only through the military supply system, but also through direct purchase from the Hudson’s Bay Company and local American merchants.

Goods arrived at the post through five importation routes; military supply lines, the post sutler, American merchants (operating in the region since the late-1700s), the Hudson’s Bay Company’s commercial mercantile operations, and through the national mail system, by means of which items were sent directly to military occupants by non-local providers. Often, these routes were combined for a single item. For example, in the 1850s, one American merchant ship might simultaneously bring goods onsite either to be sold for direct consumption or for resale, for example by the sutler or in a personal private sale. At the same time, it might bring military supplies transported as commissioned cargo and also deliver the mail.

Local Availability of Personal Items

Unlike at many western military posts, personal items, such as clothing and toiletries, were locally available at Fort Vancouver, either issued through Army supply lines or local suppliers, such as the post sutler onsite or from local merchants. The largest mercantile operation in the Pacific Northwest, the Hudson’s Bay Company, was still in operation at the fort during the 1850s. However, by this time, smaller merchants were conducting business in Oregon City,
Portland (Chapman 1993), and later in the adjacent town of Vancouver itself. Non-military issue personal items, such as non-uniform clothing, toiletries, and leisure-related items (whisky, porter, wine, smoking pipes, candy, playing cards, dominos, and toys) were not available through the Army supply system, but were frequently purchased from the sutler and local merchants.

**U. S. Army Supply System in the West and American Merchant Ships**

Within the mid-19th century Army, several departments were charged with procuring, transporting, and issuing supplies to troops at Fort Vancouver; the Quartermaster Department, Subsistence Department, and Ordnance Department. Procurement and/or fabrication, storage, and distribution of all munitions, including weapons, small arms, and ammunition, were under the management of the Ordnance Department (USWD 1852, 1862). The Subsistence Department was responsible for obtaining and allocating all subsistence stores for the Army troops, primarily those items comprising the daily ration (see Hunter 1864). All remaining military supplies were acquired and disseminated to different posts by the Quartermaster Department (See Hunter 1864), including furniture and accoutrements for camp and garrison, fuel, uniform clothing, stationary, and draft animals used for transport of personnel and equipment. Additional responsibilities of the Quartermaster Department included obtaining materials for constructing public buildings at posts, including all quarters, barracks, kitchens, mess halls, and associated outbuildings, such as sinks and privies, as well as transporting all of the subsistence stores.

For each department, supplies were procured by government contract on the open market after issuance of public notice of available contracts, with a mandate to accept “the lowest proposal received from a responsible person who produces the article” (USWD 1855:3,4; USWD 1893b:7). To obtain supplies, the quartermaster and his clerks at a post would fill out the
necessary requisition forms, and send them up the chain of command for fulfillment. The Quartermaster for the Department or Division then submitted a total request order for all of the posts under their command to the Quartermaster General in Washington, D.C. (see Carey 1931; Hunter 1864; Ingalls 1849a, 1849b, 1851; USWD 1855, 1857, 1863b; Vinton 1850). Any extra stores, as well as some of those deemed unfit for issue, were sold at public auction near the post, to reduce additional transportation costs and increase the post fund (Carey 1931:108; USWD 1855): “Had a sale of surplus provisions many persons from Portland, Astoria &c attended” (Lt. Talbot, 4 August 1850 in Carey 1931:108).

The time span between request and arrival of supplies was dependent upon the reliability of available transportation networks; those posts near major Quartermaster Depots, such as on the east coast, received their supplies much quicker in comparison to posts on the western frontier. Upon their arrival in 1849, Army personnel at Fort Vancouver found themselves at the end of a very long military supply line, originating from the east coast. Stores for the military could be shipped directly from the east, for example, the military shipped two years of supplies as cargo aboard the Walpole directly to Fort Vancouver from New York (Ingalls 1849b:117; Vinton 1850:146). These ships followed similar routes as the late-18th century fur trading ships from Boston and other eastern ports, sailing around South America, typically arriving in the Pacific Northwest typically by way of the Sandwich Islands (see Malloy 1998). However, as the Army grew and established more permanent forts along the west coast, such as The Presidio (San Francisco), Benecia, Fort Vancouver, and Steilacoom, supplies were shipped between these posts as necessary (see Vinton 1850). This was particularly true as cities on this coast, such as San Diego, Monterey, Santa Cruz, Sacramento, San Francisco, Astoria, Portland and Seattle, simultaneously grew with an influx of persons headed for gold fields and other growing cities.
It was difficult to import supplies into Oregon City, Portland, and Fort Vancouver on merchant steamships because many crews deserted their ships for the gold fields, or ship Captains would not accept a military consignment or would alter their planned course “for fear that their [economic] speculations might be interfered with” (Hine and Lottinville 1972:128). However, many ships did arrive at Fort Vancouver, commissioned by both the HBC and the Army (see Carey 1931). When items could not be easily procured through the military supply line, the commanding officer at a post was authorized to contract with local merchants, farmers and ranchers for necessary supplies (USWD 1855:3, 1863b:8). At Fort Vancouver, goods and various sundry items, such as timber, animal forage, flour, sugar, and soap were purchased from local merchants (Carey 1931:93-95; Erigero 1992:215; Fraser 1963:172), and horses and salmon from local native peoples (Saxton 1855:251-252). Many items were procured from the Hudson’s Bay Company’s mercantile operations at Fort Vancouver:

“I must not neglect to add that, without the assistance of the Hudson’s Bay Company, the difficulties met [in establishing the post] would have been almost insurmountable. That well-organized… corporation has, in all times of necessity, afforded… every means of relief in their possession… to the officers of the Army” (Maj. Vinton, 29 March 1850 in Vinton 1850:146).

“The pack-saddles with which we started were in part sent from San Francisco, partly purchased from the Hudson’s Bay Company; they were alike worthless” (Capt. McClellen, 25 February 1853 in McClellan 1855:188).
“Even the Quartermaster’s department is obliged to depend upon them [Hudson’s Bay Company] for the transportation of troops and Army supplies” (Saxton 1855:251).

Many of the objects recovered from archaeological contexts that have been associated with the mid-19th century military were items sold onsite by the Hudson’s Bay Company (see Chapters Seven and Nine). However, officers were also known to shop at local mercantile establishments in Oregon City, such as Allen, Lowe and Co. (Carey 1931), suppliers of the HBC at Fort Vancouver (Careless 1969).

_Hudson’s Bay Company Supply System for the Pacific Northwest_

The Company shipped furs and received trade goods between Fort Vancouver and London either overland to York Factory on Hudson’s Bay (now in Manitoba), thence by ship to London, or directly by sea with ships traveling around South America (Ross 1976:121). Shipments to London, prepared in the summer, left Fort Vancouver in the fall to arrive generally in late-spring through late-summer (Ross 1976:126). Supply requests for Northwest posts had to be submitted two to three years in advance. Each year, all requests were compiled at Fort Vancouver over the winter, and sent in March to be communicated to London via York Factory. After procurement, supplies would leave London that fall to arrive at Fort Vancouver the following spring, either for sale, for trade or for redistribution to interior posts (Ross 1976:127-128). This time frame held only if no ships were delayed or sank during the journey.

To reduce reliance upon foreign imports, the HBC undertook massive production activities in the Portland-Willamette Basin, such as harvesting local timber and milling lumber, drying salmon, growing a variety of crops, and raising livestock for dairying, consumption, and
export (salt pork). The company imported raw materials as well, and manufactured products at Fort Vancouver through blacksmithing, tinsmithing, and candlemaking (Ross 1976:128). However, these locally produced goods were rarely exported back to London (Ross 1976:129).

Unlike American sailing ships trading on the Northwest Coast, the British royal charter granted to the HBC in 1670 limited the Company’s trade to within North America, as the British East India Company held the license to trade in the Far East (Malloy 1998). Therefore, to reach Chinese markets without passing through London, particularly for importing Chinese goods to the Pacific Northwest, the Company traded with American merchants in the Sandwich (Hawaiian) Islands (Ross 1976:120). American goods were predominantly obtained through this network before 1853, rather than by direct importation to Fort Vancouver to avoid paying customs duties (Ross 1976:125), implemented at Astoria, Oregon in 1849 under the Walker Tariff Act of 1846 (Pub. L. 29-74, 30 July 1846, 9 Stat. 42), the first national standardized tariff schedules.

Roughly over 90% of imported goods were manufactured by British factories (Ross 1976:129), but a few originated in Scotland, France, Spain, Holland, Italy, China, and America. Extensive inventories were maintained by the HBC, both of goods for sale or trade and of those in use by the Company (Ross 1976:151). With the increase of settlers into the territory after 1840, the HBC increased its focus on offering goods and commodities to meet local consumer demand, while decreasing its focus on fur-trading stock (Hoffman and Ross 1974a; Hussey 1972:195; Steele 1976, 1979). Most of these items were of English manufacture. The HBC experienced a flourishing trade business during the Gold Rush (Hussey 1972:195).

High American customs tariffs at Astoria, Oregon, levied after 1849 (Steele 1975), forced the Company to abandon importing goods from Great Britain in 1852 (Hussey 1957:75-76; Ross
1976:121; Steele et al. 1975:18). After 1853, the Sale Shop at Fort Vancouver received goods via Victoria, British Columbia and from the firm of Allen, Lowe and Co. of Oregon City and San Francisco (Careless 1969), which supplied American-fabricated goods (Steele 1976, 1979). Increasing competition with local American merchants impacted the HBC. After 1854, the HBC began stocking large quantities of items fabricated in America (Hoffman and Ross 1974a; Hussey 1972:185-235; Steele 1976, 1979). Business for the HBC rapidly declined, except for a brief upswing in sales during the Indian Wars between 1855 and 1858, when the HBC sold items to the Oregon Volunteers and other military personnel (Hussey 1972:196).

Items for sale at the Sale Shop included axes, adzes and fur traps; glass beads, blankets, boots, clothing, textiles, buckles, hooks and eyes, buttons and hats; weights and scales, books, stationary, ink, and slate pencils; combs, brushes, sewing implements, razors, tobacco and smoking pipes; nails, building hardware (locks, hinges, etc.), horseshoes, agricultural and woodworking tools; rifles, pistols, gunflints, powder horns, ball and shot; soaps, kettles, cooking pots, camp ovens, milk pans, and eating utensils; rum, wine, spices and herbs, sugar, tea, coffee, fish spears, and specialty food items; and glass, ceramic, tin tablewares and earthenware hand basins (Hoffman and Ross 1974a; Hussey 1972:185-235; Steele 1976, 1979; Steele et al. 1975). As noted above, these commercial endeavors were advantageous for the U. S. Army upon their arrival, both for the Quartermaster Department supplying troops preparing for campaigns, and for personnel garrisoned at Fort Vancouver, who could obtain personal items from the Sales Shop as well as from the Post Sutler.
Post Sutler

Sutlers were civilians that supplemented the military provisions allotted to soldiers through the sale of sundry items. After paying a fee, the sutler could set up a general store in close proximity to military establishments, often at its boundary. Sutlers acted as both dry-goods dealers and grocers and were subject to price controls and regulations by Army officers to prevent them from overcharging the soldiers (Delo 1998). They carried a wide variety of goods, such as boots, clothing, buttons, pocketknives, scissors, and toiletries, but their main trade was in foodstuffs like tobacco, coffee, sugar, condiments, spices, fresh and canned fruits and vegetables, fish and ready cooked meat. However in 1854, Col. Mansfield noted that in the western posts transportation costs, as well as limited mercantile competition increased the cost of goods offered by the sutler between 100% and 400 over their cost in the east (Frazer 1963:64-65). Prices were so high on some items that generally only officers could afford them (Delo 1998:108-109), but as regional labor wages were inflated from the influence of the Gold Rush in California and Oregon, local civilians likely shopped there as well. However, with enlisted men earning only $13 per month, laundresses up to $7 monthly, and sergeants up to $12 each month, their buying potential at the sutler’s store was limited.

In 1852, the Fort Vancouver sutler, Elisha Camp, advertised “CHEAP GOODS!,” including “dry goods, groceries, clothing, boots, shoes &c, &c.” (Oregonian 1853, Figure 14). Itemized receipts indicated that Camp offered a wide selection of goods for purchase to both military personnel and civilians from nearby communities, particularly those within the adjacent town of Vancouver. Goods were purchased from other merchants in larger cities such as San Francisco, and shipped via Portland or directly to Fort Vancouver by steamer (Gleason and Cheung 2007). Items available included spices and herbs, coffee, tea, molasses, camphor,
bicarbonate of soda; cans of lobsters, sardines, oysters, and cheese; flour, cornmeal and yeast;
casks of brandy, cases of cider, cigars, and smoking pipes; boots, women’s and boys’ shoes,
wool socks, bags of shot, canisters of powder, candles, various patent medicines and many other
commodities (Gleason and Cheung 2007).

Ceramics recovered from archaeological privy contexts associated with the sutler store
did contain some English wares, potentially procured from the Hudson’s Bay Company (HBC).
However, the majority of the ceramics were of French manufacture. These were encountered in
dense concentrations confirming their intentional import. All were broken, and likely deposited
after a large breakage event, potentially shipping-related (Gleason and Cheung 2007). The
emphasis on French ceramic wares may reflect not only increasing tensions between the HBC
and the American Army, but the subsequent decline of HBC mercantilism along the lower
Columbia River.

The sutler also prepared meals for either individuals or small groups of people. The
butchery cuts reflected a diet of highly desirable and expensive foods, including primarily
remains of primarily beef, but also of mutton, pork, chicken, salmon, and sturgeon (Horton
2007a, 2007b). The high cost of goods and the quality of the meats served suggest that these
meals were likely taken by commissioned officers, particularly those individuals who were living as single men and could not afford servants or strikers. Fresh produce, preferable to the ration desiccated vegetable ‘cakes,’ was commonly available at the western post sutlers (Adams 2009; Agnew 20087; Foner 1970; Rickey 1963:128). Given the success of the Army’s agricultural pursuits at the post, it is unclear how many fresh fruits and vegetables were purchased from the Fort Vancouver sutler for consumption.

**Local Availability of Domesticated Animal Species**

Domestic cattle, sheep, pigs, chickens, and turkeys from agricultural pursuits undertaken first by the Hudson’s Bay Company, and later by Euro-American homesteaders in the Willamette Valley, were all locally available for the American military upon their arrival in 1849 at Fort Vancouver. Animals were usually procured locally on government contracts in order to maintain freshness (a live animal will not spoil) and reduce transportation costs.

**Arrival of Domesticated Animals in the Pacific Northwest**

Cattle, sheep, pigs, chickens and turkeys were first imported into the Pacific Northwest by the Spanish at Nootka Bay by 1792 (Kingston 1923), particularly sheep, as they provided both mutton and wool. In 1792, the Spanish Governor [Seigr. Quadra] gifted “ten head of cattle, some sheep and goats, and poultry of all kinds” to the British sailing vessels near the settlement of Nunez Gaona, on (now) Vancouver Island, and later gave an additional “four ewes… [and] two rams” to Captain Vancouver so he could establish the animals in the Sandwich (now Hawaiian) Islands (Kingston 1923:163). The North West Company brought thirty pigs, three goats, and one sheep to (now) Astoria, Oregon in 1811 (Gibson 1985:14) or in 1812 aboard the
Beaver (Kingston 1923), where they rapidly increased in number under the care of a Native Hawaiian man named Cox (Gibson 1985: 14-15). In 1814, “two young bulls and two heifers” were brought to the Columbia River mouth from San Francisco, which increased to about 12 head by 1817 (Kingston 1923: 165). The North West Company also kept chickens as early as 1814 at Fort George (now Astoria) in Oregon (Gibson 1985:15; Kingston 1923).

**Herds of the Hudson’s Bay Company**

The Hudson’s Bay Company (HBC) moved livestock from Fort George to Fort Vancouver after its absorption of the North West Company (Hussey 1976). By 1825, the company had between 27 (Galbraith and Anderson 1971) and 31 head of cattle at Fort Vancouver. The herd increased to 153 adult cattle at the post in 1828/1829, as noted during a visit by Governor Simpson of the HBC (Hussey 1976), and then to “450 head of neat cattle” in 1836 (Kingston 1923:169). These animals were utilized as breeding stock and for dairy production rather than for consumption until 1836 when 40 head were slaughtered (Hussey 1976). In the spring of 1837, the HBC had “229 cows, 58 bulls, 178 oxen and steers, 61 heifers, and 159 calves” at Fort Vancouver (Hussey 1976:360).

The herd became so large that in 1837, Chief Trader James Douglas, decided to split them into three herds, one to be retained at the Fort Vancouver post, one sent to Sauvie Island in the Columbia River just to the south, and one to the Tualatin Plains in Willamette Valley, with an additional 95 head of cattle sent to the HBC Cowlitz Valley Farm. William A. Slacum reports in 1837 that Fort Vancouver farms (likely including the Sauvie Island herd) “have over 1,000 head of neat cattle from their stock” (Kingston 1923:167). Additional cattle were imported to Fort Vancouver farms either by ship or ‘on the hoof’ on several documented occasions; in 1841,
661 cows were driven overland from the Sacramento valley, an additional 83 were purchased by the HBC upon return of an 1842 trapping expedition, and in 1843 1,250 head of cattle were brought to the Willamette Valley (Hussey 1976). It was noted that “172 oxen, 65 bulls, 1034 cows, steers, heifers, and calves” were held at Fort Vancouver in 1844, and 1,915 cattle in 1846, although these numbers may include the herd held at Sauvie Island (Hussey 1976:365-366). Cattle were herded during the day and penned at night. They provided not only meat, but “hide, and tallow, as well as draught,” and HBC dairies furnished the fur trading post with “whole milk, butter and cheese” (Gibson 1985:37).

The HBC had roughly 17 hogs at Fort Vancouver by 1825 (Hussey 1976), and additional pigs were brought overland that year from York Factory (Gibson 1985:33). By 1829, Governor Simpson notes about 200 hogs at Fort Vancouver, whereas other sources list up to 300 pigs present (Gibson 1985:39). Between 300 and 579 pigs are inventoried at Fort Vancouver each year between 1832 and 1841, with the greatest numbers in 1839 and 1840 (n=579 and n=575 respectively). Documents indicate that only 20 hogs were present in 1842, yet this may be misleading as approximately 800 pigs were listed each year on inventories between 1844 and 1846 (Gibson 1985:39; Hussey 1976:365-366).

Records state that 13 goats were present at Fort Vancouver in 1828 and up to 28 in 1829 (Gibson 1985: 39), but Governor Simpson (HBC) listed 50 goats at Fort Vancouver in 1828/1829 (Hussy 1976). The largest number of goats (n=116) was recorded at the post in 1832, dwindling to just 15 in 1845 (Gibson 1985:39). Additional accounts of medium sized bovid livestock are focused on sheep, which formed a substantial proportion of the HBC livestock operations in later years (Erigero 1992:79). Sheep arrived in the Willamette Valley in the wake of the first cattle drive in 1837 (Galbraith and Anderson 1971). The number of sheep increased
rapidly at the Fort Vancouver farm, with onsite breeding and continued import of the species; 700 sheep were transported by ship from San Francisco in the fall of 1840, and 3,670 “choice ewes” were driven overland from Sacramento in 1841 (Hussey 1976:363). Governor Simpson notes that in September of 1841, the HBC had 6,000 sheep at Fort Nisqually, with an additional 1,500 sheep at Fort Vancouver. That year, visiting Army Lieutenant Wilkes reported 2,500 sheep at Fort Vancouver, but this count likely includes the animals on Sauvie Island. An additional 3,000 sheep were brought to the Willamette Valley in the fall of 1842, 2,000 of these for HBC farms further north. Accounts by British Army Officers in 1845 indicate there were large flocks of sheep at Fort Vancouver (Gibson 1985), and by 1846, 3,000 sheep are recorded present at Fort Vancouver (Hussey 1976).

Chickens were brought overland from York Factory to Fort Vancouver by HBC Governor Simpson’s party in 1825 (Gibson 1985:33). Turkeys, chickens, and pigeons were raised at Fort Vancouver (Gibson 1985:37). Records indicate that 40 poultry animals were present in 1826, 62 in 1828, decreasing to nine in 1836. Although poultry does not appear on subsequent inventories, they were present as while visiting Hudson’s Bay Company’s post at Fort Vancouver in 1837, Miss Anna Maria Pittman mentioned having for dinner “…such a roast turkey as I never saw or ate. It was a monster, it was cutting slices of pork… (sic)” (Hussey 1972:169-170).

By the mid-1840s, the HBC had enough head of cattle and pigs to support both their immediate employee needs and an export business supplying salted beef and pork to the Russian American [Fur] Company (Hussey 1976). Inventory lists compiled in the spring of 1841 indicate that over 12,700 lbs. of salted beef were on hand stored in tierces and casks at Fort Vancouver, although the exact location of processing is not recorded (Hussey 1976:373). Although Fort
Vancouver produced 10,000 lbs. of salted pork annually (Gibson 1985:41), the stored inventories reflect much smaller amounts as a result of exportation. Inventory taken in the spring of 1841 at Fort Vancouver indicates that over 6,400 lbs. of salt pork were processed and stored in tierces and casks (Hussey 1976:373). HBC inventories taken in 1845 indicate that 43 tierces (cask size) and 35 barrels of salt beef, 2,564 lbs. of California Grease (tallow), 1,449 lbs. of tanned cattle leather, 30 barrels and 66 tierces of salt pork were on hand, as well as 732 lbs. of hog lard (Hussey 1976:354,374). In 1846, the HBC inventoried 176 barrels of salt beef, 233 tanned ox hides, 30 ox hides, 176 barrels salt beef, 400 lbs. of salted hams, and 16 barrels and 20 tierces of salt pork, as well as 1014 lbs. of hogs lard (Hussey 1976:354,374). The HBC herds roamed over the countryside rather than being confined to the Fort grounds (Jabine 1984:836).

Chief Factor John McLoughlin helped early settlers in the Willamette Valley, often HBC employee retirees, by lending them two cows each to help start their homesteads (Gibson 1985), in exchange for a proportion of the resulting small herd (Erigero 1992:78). Pigs were also raised locally by former HBC employees and in March of 1836, there were at least 384 pigs in the central Willamette Valley, while additional records indicate that the Valley had 3,000 pigs in 1838, and 1,733 pigs in 1843 (Gibson 1985:132,144). With the settlement of the international boundary at the 49th parallel, the HBC relocated its cattle herds from Fort Vancouver to Kamloops, British Columbia (Ormsby 1945), and by the mid-1850s the HBC was purchasing cattle from local settlers (Hussey 1976:369).

Local Ranchers Supplying the Army

Cattle, pigs and sheep brought by independent American entrepreneurs arrived in the region prior to 1849 as well. In 1837, nearly 800 head of cattle were brought to the Willamette
Valley by William A. Slacum (Galbraith and Anderson 1971; Gibson 1985). The Willamette Cattle Company imported 6,130 cattle and sheep from California to sell to settlers in the Willamette Valley between 1838 and 1843 (Gibson 1985:143). Americans migrating along the Oregon Trail brought at least 4,800 head of cattle to the Oregon Country between 1843 and 1845 (Gibson 1985:134). Herds of privately owned cattle were expanding throughout the northwest by 1850 (Galbraith and Anderson 1971).

The Subsistence Department was directed to procure, if possible, livestock for consumption ‘on the hoof,’ as “it carries itself” for the march (Horsford 1864:19; USWD 1855) and does not spoil. While on campaign, enlisted men in the Pacific Northwest generally followed these procedures, and slaughtered cattle as necessary for food (Bischoff 1976). In the early years of Fort Vancouver, the Army purchased beef from the Hudson’s Bay Company, “Down to [HBC] Fort paid 139.21 to Lowe for beef” (Lt. Talbot, 7 August 1849 in Carey 1931:96), “Fresh beef is had here [Fort Vancouver] at about 12 cents the pound” (Col. Mansfield, 21-23 August 1854 in Fraser 1963:172).

The increase of Euro-American settlers and of livestock poaching, particularly during the Gold Rush years, depleted the HBC herds enough that by 1849 the Army at Fort Vancouver also purchased cattle, pigs, and sheep for consumption from local farmers (Hussey 1976:367):

“John Switzler supplied them [U.S. Army, Fort Vancouver] with beef principally from the spring of 1849 to the spring of 1853… the cattle for the largest contract filled by him were purchased of Waldo, of the Waldo Hills, near Salem [Oregon]” (Army Clerk Lloyd Brooke in BAJC Papers 1865-1869, Vol. 5:150).
The ability of the Army to obtain livestock for consumption became easier as the number of cattle, pigs and sheep in the Pacific Northwest continued to increase substantially. The 1850 agricultural census listed “41,729 cattle - milch cows, 9,427; oxen, 8,114, other cattle, 24,188” in Oregon, and listed a total of 182,382 cattle on the 1860 agricultural census, consisting of “milch cows, 63,106; oxen, 10,203; other cattle, 109,073” (Kingston 1923:184). The demand of Rocky Mountain states for cattle, pigs and sheep raised in the Pacific Northwest helped increased herd farming throughout the region in the 1870s and 1880s (Briggs 1937; Kingston 1923).

**Military Management of Meat Stores**

The commissary, under the Quartermaster Department (“one and the same” at Fort Vancouver [Ingalls 1851:328]), was traditionally responsible for the care and slaughter of livestock obtained for consumption (Kautz 1865:153), although at times personnel within the Subsistence Department would perform the butchering (Butterfield 1862:51). The Army required beef to “be good in quality and condition, fit for immediate use…” (USWD, SD 1896:25).

On historical maps, barns within the Quartermaster Depot area are labeled “hay barns” (Winman 1871) and “Forage Houses” (Ward 1874) apparently storing forage for the public animals, horses and mules, used by the Army and kept in the several sets of stables. Historical maps indicate that once the former HBC fort stockade was removed, that area remained a pasture, and was used for training maneuvers (Figure 12), while cattle roamed freely in the vicinity of the post eating grass (Rose 1990:32; Van Arsdol 1999:115), “Cattle that are in good condition in the fall, winter very well without any attention being paid to them, that is in an ordinary winter” (Maj. Hatheway, 28 April 1852 in Van Arsdol 1999:131).
Smaller game procured by the officers and men themselves, such as domestic or wild fowl, rabbits, and turtles, were processed onsite in the residential kitchen areas. Army regulations suggest butchering large domesticates in the area designated for the “shambles” or open-air slaughterhouse (Butterfield 1862). The Monthly Post Returns for Fort Vancouver, filed between 1849 and 1875 (USWD 1849-1900) do not list a civilian working as a post butcher, so enlisted men were probably detailed as butchers and their assistants (Kautz 1865:153).

Army personnel slaughtered and processed the animals onsite as cranial and foot bones, often considered butchering waste, have been archaeologically recovered at Fort Vancouver (see Chapter Eight; Carley 1982; Chance and Chance 1977; Henry 1982; Horton 2010; Jabine 1984). However, in the historical documentation, there is no mention of where the shambles were located at Fort Vancouver, although it is likely they were positioned on the lower floodplain near the designated refuse burning area to contain the disarray and bloody mess. Although the Regulations repeatedly stressed the need to promptly bury the offal “at a sufficient distance from camp,” typically in trenches at least four feet deep (Butterfield 1862:63,96,108), at this post the offal was often removed by local civilians to use as pig feed (Carley 1982:287).
CHAPTER FIVE

ARCHAEOLOGICAL FIELD INVESTIGATIONS

To address the research questions posed, archaeological materials recovered from three loci across the Vancouver National Historic Reserve Historic District (DT191) were investigated (Figure 15): Locus 1) Officer’s Row (45CL160H), immediately east of Fort Vancouver Way (around Bldg. Nos. 7 and 8); Locus 2) the southwestern portion of the U.S. Army parade ground (45CL163H; north of Bldg. Nos. 987 and 989); and Locus 3) East Reserve Street, immediately north of Evergreen Boulevard at the eastern terminus of the Officers Row (45CL160H).

Although enlisted men’s and laundresses’ quarters are documented in both the western and eastern portions of the parade ground, analysis of historical maps indicates that the eastern row of structures may have been impacted by construction of the NPS Park road. Therefore, excavation efforts were confined to the western portion of the parade ground.

This chapter first presents a brief overview of previous archaeology conducted at Fort Vancouver National Historic Site and the Officers Row portion of the Vancouver National Historic Reserve Historic District (DT191). I then summarize, by loci, nonintrusive subsurface testing and archaeological survey and monitoring data, obtained during previous Cultural Resource Management (CRM) investigations, utilized to guide the 2007 and 2008 field investigations. Anomalies detected in the magnetometer and GPR data are referenced in this chapter as they influenced test unit positioning, but are discussed as they relate to architectural features and historical building footprints in Chapter Seven. Objectives are presented for test unit placements by loci, followed by a general discussion of methods undertaken during the 2007 and 2008 excavations. As objects recovered during previous archaeological investigations are
included in the artifact dataset, brief summaries of the field procedures followed by those CRM investigations are also included (see Langford and Wilson 2002; McIlrath 2001; Thomas 1988).

In 2007 and 2008, research-driven test excavations were conducted in Loci 1 and 2 for this study, with a combined total area of 77.6 m² (835.3 ft.²). These loci were positioned to examine the horizontal and vertical extent of archaeological deposits associated with residential structures of the U. S. Army junior commissioned officers, enlisted men, and civilian laundresses, as well as retrieve a representative sample of artifacts and features. Materials collected during previous archaeological investigations from all loci (see Langford and Wilson 2002; McIlrath 2001, Thomas 1988) also form part of the artifact dataset. All CRM and research driven archaeological investigations were completed in compliance with Sections 106 and 110 of the National Historic Preservation Act of 1966, as amended, in accordance with regulations delineated under 36 CFR §800.

Prior to conducting test excavations, magnetometry (McDonald 2001a, 2001b, and 2007) and ground-penetrating radar (GPR) investigations were conducted to help identify locations of subsurface utilities and buried anomalies. These techniques can provide detailed maps of features and concentrations of objects under the ground surface without excavation. Magnetometry collected vertical gradient data to eliminate interference from solar disturbances and contour maps were generated from magnetic survey data using Surfer 8.1.¹⁰ These maps, as well as GPR slice maps were then imported and georeferenced in ArcGIS 9.2. All ground-penetrating subsurface survey parcel sizes and coordinate data are summarized in Appendix A, and a comprehensive magnetometer contour map and GPR amplitude slice maps are depicted in Appendix C.
Figure 15. Loci of archaeological investigations conducted between 1988 and 2008.
These data were then combined with cartographic data, visual reconnaissance (i.e., locations of subtle mounds and depressions), and data obtained during previous subsurface survey and archaeological monitoring (see Langford and Wilson 2002; Thomas 1988). This was undertaken to identify areas with a high probability of yielding intact subsurface foundations (brick, log timber and/or wood) and other material evidence (artifacts) of the mid-19th century Army occupation. Test excavations were conducted in contiguous blocks arbitrarily positioned to locate distinctive strata, examine anomalies discerned in the magnetometer and GPR datasets, and assess the archaeological integrity of features and artifacts associated with historically documented buildings.

**Previous Archaeological Research**

Previous archaeological investigations conducted at Fort Vancouver National Historic Site (FVNHS) and the Vancouver National Historic Reserve Historic District (DT191) have identified archaeological deposits with good integrity, separated in space both vertically and horizontally, and yielded dense clusters of artifacts and building foundations (see below). The twentieth century commercial and residential development along this section of the Columbia River floodplain has largely spared the 19th century components and FVNHS is considered “the premier historical archaeological site in the Pacific Northwest” (NCRI 2006:1). My research was undertaken within a framework of long-term archaeological and historical research programs developed for FVNHS by National Park Service (NPS) personnel.

There are three major phases of inquiry pursued by archaeologists at Fort Vancouver between 1947 and the present; 1) the documentation phase, 2) the Cultural Resource Management (CRM) phase, and 3) the integrative phase. Excavations have primarily
concentrated on the HBC occupation, although U. S. Army occupation was also explored in the latter two phases. In all three periods, public education and outreach efforts (see Little 2007 for an in-depth discussion of techniques) were incorporated into the archaeological research designs, unlike many other historical sites where the archaeology is conducted first, and then (possibly) interpreted to the public.

Archaeology began in 1947 with Louis Caywood of the NPS, undertaking exploratory excavations to locate remains of the HBC fur trading post (1829 to 1860 occupation). Utilizing documentary data to approximate the positions of the historic structures, Caywood located the HBC powder magazine, with its brick and coral mortar foundation, in the southwestern corner of the HBC stockade. From this position, he used historical maps to relocate remnants of the other buildings inside the stockade, as well as the stockade itself (Caywood 1947, 1948a, 1948b, 1949, 1955). During excavations Caywood engaged the visiting public and expanded public knowledge of their local history. However, during these investigations the archaeological matrix was not systematically screened to facilitate artifact recovery.

The next series of major excavations were conducted by Kardas and Larrabee (1969; Kardas 1970, 1971) to locate artifacts and structural remains in the associated HBC company village, referred to as Kanaka Village. These archaeologists conducted a field school while undertaking fieldwork, continuing the tradition of public education. The HBC village is overlain by and intermixed with a thin layer of U. S. Army materials related to the Quartermaster Depot and military rehabilitation and reoccupation of the HBC village structures. Kardas and Larrabee (1968) excavated in arbitrary levels of 6 in. which were not shallow enough levels, leading to a mixing of artifacts from the Army and HBC occupations. In the 1970s, Hoffman and Ross (1972a, 1972b, 1973a, 1973b, 1973c, 1974a, 1974b, 1974c, 1975a, 1975b, 1975c, 1976)
undertook extensive data recovery excavations on many of the major structures inside the HBC stockade. They recovered a significant amount of cultural materials and documented a wide variety of architectural features and activity areas, but did not systematically screen sediments removed to assist with artifact recovery. The results from each of these three projects, Caywood, Kardas and Larrabee, and Hoffman and Ross’s, provided the archaeological documentation necessary for the NPS to broaden its historical document-based interpretation of the HBC fur trading operations, including reconstruction of the stockade (starting in 1966) and a number of fort buildings (starting in the 1970s).

The second phase of archaeological endeavors at Fort Vancouver also began in the mid-1970s, with an extensive amount of CRM-based archaeological work conducted in preparation for improving WA SR 14 and its interchange with I-5, west/southwest of the HBC stockade in the HBC company village and U. S. Army Quartermaster Depot. These projects were limited in their scope by focusing solely on fulfilling federal archaeological mandates under Section 106 of the National Historic Preservation Act (Pub. L. 89-665, 15 October 1966, 80 Stat. 915). These endeavors limited the possibilities for outreach and education efforts begun in 1947. Data obtained through these projects did incorporate the 19th century Army component of the Fort Vancouver history, but analytical efforts continued to focus on the fur trade. Faunal materials related to the Army occupation are incorporated as part of my analysis concerning Army foodways (see Chapter Nine). CRM-driven archaeology continues to the present day at Fort Vancouver (Cromwell et al. 2009; McIlrath 2001; Kent 1982; Langford and Wilson 2002; Thomas 1987, 1988; Thomas and Hibbs 1984). These projects expanded archaeological datasets beyond the HBC occupations to encompass the Army component of the site.
Langford and Wilson (2002) and Kent (1982) conducted the first archaeological surveys of the Army central parade ground, identifying archaeological deposits with good integrity associated with the earliest Army occupation of Fort Vancouver. Their results were used to guide my excavations undertaken as part of this dissertation research. In addition, architectural features and domestic materials recovered by Langford and Wilson (2002), McIlrath (2001), Thomas (1988) were reanalyzed as part of this dissertation research (see Chapters Five and Seven).

The third integrative phase began sporadically in the 1980s and 1990s, but reached its stride in the 2000s. Archaeological investigations moved beyond compliance-driven to research based investigations conducted to ascertain the cultural significance of distribution patterns observed in the archaeological record (Dorset 2012; Holschuh 2013; Mullaley 2011; Wynia 2013). Fieldwork for these projects was undertaken as part of archaeological fieldschools, carrying on the tradition of public education while providing information for the NPS to broaden its interpretation of the HBC and Army occupations at FVNHS. Besides contributing to archaeological research on identity and symbolic knowledge of the military landscape, my research is useful for park management, including NPS public education and outreach efforts to interpret the U. S. military story to its park visitors, by providing additional information, not just on the types of things personnel used, but on what those objects may have represented to their users.

Summary of Archaeological Investigations

Because this dissertation reports on an excavation, this section presents the rationale behind test excavation unit placements. Three loci were archaeologically tested (Figure 15):
1) the junior commissioned officers’ quarters (ca. 1850 to mid-1860s) in the westernmost portion of the 1850s Officers Row alignment, 2) the non-commissioned officers/laundresses’ quarters (ca. mid-1850s to between 1874 and 1878) and enlisted men’s building complex (ca. 1850 to 1870) in the southwestern portion of the extant Army parade ground, and 3) a non-commissioned officers/laundresses’ privy (ca. early to mid-1860s (1862?) to mid-1880s) associated with the Vancouver Ordnance Depot.

**Locus 1. The Officers Row: Fort Vancouver, Commissioned Officers Complex**

The westernmost officers’ quarters and kitchen, 1850 to ca. 1856, are recorded on historical maps within the now central portion of the Officers Row, formerly the westernmost section of the Officers Row until its expansion in the late-19th century. Other than construction of the two extant ca. 1865 officers’ quarters (Bldg. Nos. 7 and 8), no additional residential structures were erected in this area (between the 250N and 280N, and 170E and 190E gridlines on the 2007 and 2008 excavation grid. For grid explanation, see Field Methodology below). One late-19th century outbuilding recorded on historic maps (USWD 1889) and one modern storage shed (removed after 1997) were both constructed north of the extant officers’ quarters, based on the latter’s documented dimensions and position.

Previous research (Thomas 1988) indicated that archaeological deposits east of the extant ca. 1865 officers’ quarters (Bldg. No. 7) have good contextual integrity and are associated with the westernmost 1850 to mid-1860s commissioned officers’ quarters and associated kitchen (Thomas 1988). Therefore, archaeological investigations conducted in 2007 and 2008 on the Officers Row were designed to relocate and document these previously observed structures,
examine anomalies within the magnetometer and GPR datasets, as well as obtain artifact data representative of the daily lives of mid-19th century residents of the Officers Row.

*Cultural Resource Management Investigations (1988)*

The westernmost 1850 to mid-1860s officers’ quarters and associated kitchen locations were originally identified during archaeological monitoring of utility rehabilitation efforts by the City of Vancouver (Thomas 1988, 1992). While mechanically excavating for a new sewer line, east of and parallel to the extant ca. 1865 officers’ quarters (Bldg. No. 7; Figure 16), deposits associated with occupation and demolition of the 1850 officers’ kitchen cellar were noted (Thomas 1988:7-18). Subsequent data recovery operations undertaken consisted of excavating seven contiguous 1 x 1 ft. (0.3 x 0.3 m) square units placed in a linear trench formation. These

![Figure 16](image)

*Figure 16. View facing north of archaeologically monitored utility trench excavated in 1988 on the Officers Row. Building No. 7 is visible on left. It is not clear if this is the original proposed or alternate alignment for the sewer line (Courtesy of FVNHS, FOVA 3043-0012).*
efforts were positioned within portions of the cellar disturbed by construction, identified up to 7 ft. (2.1 m) below the current ground surface.\textsuperscript{11}

Five of these units were excavated by archaeological strata, whereas the northern two were excavated in 0.5 ft. (0.1 m) blocks as individual strata were indistinguishable. All matrix was screened through ¼ in. (6 mm) hardware mesh to assist with recovering artifacts. Artifacts collected (n = 6,555) were determined to be associated with construction, occupation, and demolition of the 1850 to mid-1860s officers’ kitchen (Thomas 1988:18). The sewer line corridor was subsequently relocated to avoid remaining portions of the 1850 officers’ kitchen cellar.

Additional archaeological monitoring was undertaken for sidewalk construction in 1988 along the east side of the ca. 1865 Officers quarters (Bldg. No. 7) as part of the rehabilitation of the Officers Row (Feature 6 in Thomas 1988:19-20). Mechanical shallow trench excavations were between 4.5 and 6.5 ft. (1.4 and 2 m) wide, and extended to a depth of about 0.4 ft. (0.1 m) below the current ground surface. Archaeological deposits intersected were determined to be associated with the demolition of the 1850 officers log quarters. Artifacts (n = ~80 to 90), observed but not collected, included domestic, personal and architectural materials associated with occupation of the mid-19\textsuperscript{th} century officers’ quarters (Thomas 1988:20). Although 20\textsuperscript{th} century construction impacted archaeological deposits are associated with this building, Thomas (1988:20) surmised that intact and affiliated archaeological deposits were likely to remain east of the extant ca. 1865 officers’ quarters.

Depositional details for the 1850s officers’ quarters and kitchen cellar features are given with presentation of the results of the 2007 and 2008 excavations (see Chapter Seven). Non-
architectural historical materials recovered in 1988 were reanalyzed in 2011 to obtain additional information and form part of the artifact dataset used in this study (see Chapters Eight and Nine).

Non-intrusive Subsurface Archaeogeophysical Surveys (2007)

Non-intrusive subsurface data were obtained through magnetic and GPR surveys conducted on the Officers Row in 2007. These methods were employed not only to locate mid-19th century Army officers’ structures, but to avoid small areas with modern subsurface disturbances (e.g. utility corridors and sprinkler lines). Magnetic surveys were undertaken to the north, east and west of the two extant ca. 1865 officers’ quarters (Bldg. Nos. 7 and 8) in nine survey grids, encompassing a total of 1,999 m² (0.494 ac.). Modern flowerbeds and refuse disposal areas (i.e. concrete pads upon which recycling containers and refuse dumpsters rest) were not surveyed. Ground-penetrating radar (GPR) data were obtained in 2007 for an area of 680 m² (0.168 ac.) in size, east of the westernmost extant ca. 1865 officers’ quarters (Bldg. No. 7). The GPR grid on the Officers Row roughly correlates with Area 2 of the magnetic survey, however, the GPR parcel was shortened by 3 m (9.8 ft.) on the west side to avoid signal disturbances associated with a modern concrete sidewalk and utilities. Therefore, the southwest corner of the GPR study area was positioned at 250N / 177E on the excavation grid.

Thirty magnetic anomalies were identified within the magnetic survey data adjacent to the western ca. 1865 officers’ quarters (Appendix C). Five of these anomalies are associated with modern utility lines and metal poles (McDonald 2007). An additional 16 small magnetic anomaly isolates may reflect locations of ferrous (Fe or iron) artifacts (McDonald 2007). One roughly linear feature, oriented on a north-south axis (258 to 284N / 178 to 180E on the excavation grid), was detected by a very high positive magnetic polarity, but had consistently
low amplitudes in the GPR data to a depth of at least 177 cmbs (Appendix C). This is interpreted as the location of the utility trench that intersected the 1850 to mid-1860s kitchen cellar (see Chapter Seven). Two large magnetic anomalies, roughly rectangular in shape, were detected in the vicinity of the 1850 officers’ quarters and the kitchen documented on historical maps (discussed in further detail in Chapter Seven).

In the northernmost area of the 2007 and 2008 excavations, a very strong signal (anomaly) was observed in the magnetometer data and on a GPR amplitude slice map generated for sediments between 8 and 54 cmbs (3.2 and 21.3 in.). Hypothesized to be associated with a rear yard sheet midden deposit, Block Y was positioned to the east and southeast to delineate the boundaries of this deposit. However, after a vertical shaft feature (e.g. privy) was identified (see Chapter Seven), Block Y was further expanded to the southwest to bisect and delineate the eastern, western and northern boundaries of this feature. To accomplish this, test unit OR41 was excavated with dimensions of 1.5 x 1 m (4.9 x 3.3 ft.), and test unit OR42 was limited to an area 0.7 x 0.5 m (2.3 x 1.6 ft.) in size.

Archaeological Survey and Test Excavations (2007 to 2008)

Prior to placing larger test excavation units, 35 shovel test survey units (STOR) were excavated. This was done in areas that produced evidence of features and structures during analyses of cartographic and non-intrusive subsurface survey data, to locate the footprint of the westernmost ca. 1850 to mid-1860s officers’ quarters and kitchen. The shovel test units (STs) were systematically excavated at roughly 5 m (16.4 ft.) intervals in the rear and eastern lawns of two ca. 1865-1866 officers’ quarters (Bldg. Nos. 7 and 8). Survey efforts were organized around relocating the ca. 1850s officers’ quarters and the kitchen cellar identified by Thomas (1988, Feature 5). Disturbed areas (e.g. metal utility covers, sprinkler heads, sewer and water line
corridors as recorded on maps) and those covered by concrete (e.g., sidewalks, and trash/recycling container pads) were disqualified from subsurface examination. A total area of 8.75 m² (94.2 ft.²) was examined with the shovel test survey units.

In 2007, shovel test survey units (n = 16) were excavated in a staggered zigzag-like grid pattern in an effort to survey as much area as possible (Figure 17). Three of these (STOR05 to STOR07) were excavated east of the eastern ca. 1865 officers’ quarters (Bldg. No. 8). Based on data obtained, the following year shovel tests placements were concentrated behind (north) of the current buildings, and on the lawn east of the westernmost ca. 1865 officers’ quarters (Bldg. No. 7). This process reduced intervals between the shovel test units that were greater than 5 m (16.4 ft.), created by the zigzag grid pattern used the year before. Where disturbances associated with modern utility or sprinkler lines were identified (in shovel test units STOR02, STOR27, and STOR38), excavations were terminated to avoid those objects. A new shovel test unit was excavated in a nearby position slightly offset from the original survey grid.

Test units (n = 9) were limited to three contiguous areas (Figure 17), each no larger than 3 m² (32.3 ft.²), to minimize the impact of testing (an excavation stipulation of property managers) as adjacent buildings are currently in commercial and residential use. Each block of units was positioned immediately adjacent to a shovel test (ORST) yielding very high densities of artifacts dating to the mid to late-19th century. An additional 8.85 m² (95.3 ft.²) was excavated with these archaeological test units. Block U was placed in an area hypothesized to contain remains of the officers’ quarters, specifically near the rear (north) wall. This block was expanded to the south and east from STOR15, which exposed a dense brick/bisque deposit. To the north Block W was positioned to intersect an area believed to contain remnants of the 1850 officers’ kitchen. Within this block, a dense linear deposit of scattered brick was observed in STOR18,
Figure 17. Locations of shovel test and test excavation units positioned on the Officers Row (Locus 1) in 2007 and 2008. For contiguous blocks, unit nomenclature follows relative unit position, moving from west to east (right to left).
and two test excavation units were placed to the south to examine the distribution of the brick deposit. Excavations were terminated in this block once it was determined that the test excavation units were placed within the 1850 officers’ kitchen cellar hole as a representative sample of artifacts was previously collected from this structure and available for analysis (Thomas 1988).

A dense concentration of butchered animal bone was located in STOR22 at the very northern boundary of the magnetic and GPR grids. Block Y was positioned to the east and southeast to delineate the boundaries of this deposit. After a vertical shaft feature was identified, Block Y was further expanded to the southwest to bisect and delineate the eastern, western and northern boundaries of this feature, hypothesized to be either a deep refuse pit or privy shaft location. To accomplish this, test unit OR41 was excavated with dimensions of 1.5 x 1 m (4.9 x 3.3 ft.), and test unit OR42 was limited to an area 0.7 x 0.5 m (2.3 x 1.6 ft.) in size.

The cultural materials recovered during archaeological subsurface survey and testing are related to the historic mid-to-late 19th century U.S. Army settlement along Officer’s Row. Field season time constraints necessitated early termination of Blocks U and W, and excavations conducted within these areas did not intersect culturally sterile soils (i.e. non-artifact bearing sediments). Black woven landscaping ground fabric, designed to allow water penetration, was placed at the base of excavations to preserve the exposed archaeological floor in case of future archaeological excavations. The southern half of the shaft feature (privy) observed in Block Y was intentionally left in situ, and ground fabric was placed against intact sediments to also preserve remaining cultural deposits.
Locus 2. Parade Ground: Fort Vancouver, Enlisted Men’s Complex and Laundresses’ Quarters

A series of mid-19th century Army structures are recorded on historical maps within the southwestern portion of the current parade ground, expanded to the west in the 1870s (see Chapter Three). This is defined as the area east of Fort Vancouver way and north of the two westernmost Double Infantry Barracks, ca. 1904 and 1907 (Bldg. Nos. 989 and 987), between the 100N and 145N, and 100E and 150E gridlines on the 2007 and 2008 excavation grid. Specifically, this section roughly encompasses the 1850 to ca. 1870 enlisted men’s quarters and barrack, kitchen, and ca. 1854 to ca. 1870 mess hall, as well as the ca. 1854 to late-1870s civilian laundresses’ quarters which also housed enlisted married men (see Housing Assignments in Chapter Three).

My analysis of historical maps indicates that no additional structures were constructed within this portion of the parade ground after removal of mid-19th century buildings. Archaeological reconnaissance investigations conducted on the parade ground in 2001 (see Langford and Wilson 2002) recorded high densities of mid-19th century artifacts related to military domestic habitation in this area. This is suggestive of the potential for stratified deposits associated with the mid to late-19th century military occupation of the site. Because this area was surveyed within the previous seven years, no additional subsurface survey was conducted (i.e. no shovel test units were excavated). Archaeological testing conducted in 2007 and 2008 on the parade ground consisted of a series of 1 x 1 m test units. Investigations were designed to 1) examine anomalies within the magnetometer and GPR datasets, 2) locate and document any remnants of the historically documented structures, 3) assess the stratigraphic integrity of cultural deposits, and 4) obtain additional artifact data representative of the daily lives of mid-19th century enlisted men and civilian laundresses (Figure 19).
Cultural Resource Management Investigations (2001)

In preparation for the installation of a proposed subsurface irrigation system, an archaeological reconnaissance survey was undertaken across the entire central parade ground in 2001 (see Langford and Wilson 2002). These investigations included cartographic analyses and non-penetrating subsurface magnetic surveys, both undertaken prior to excavating 66 subsurface shovel test survey units, each 50 x 50 cm (19.7 x 19.7 in.) square. The shovel test units were excavated in arbitrary 10 cm (4 in.) levels and all matrix was screened through nested ¼ and ⅛ in. (6 and 3 mm) mesh hardware cloth. These survey excavations intersected utility lines and intact sediments containing low to very high dense sheet midden deposits; the number of artifacts increased with increased proximity to the southwest corner of the parade ground.

A buried intact ground surface (Ab horizon), approximately 30 cm thick (11.8 in.), was observed beneath a 10 cm (4 in.) layer of sediments imported onsite in the late-19th/early-20th century. Culturally-sterile soils (i.e. non-artifact bearing) were identified at roughly 40 to 50 cmbs (15.8 to 19.7 in.). Although vertical shaft features were identified in the northwestern portion of the parade ground, neither these nor building foundations were observed during the reconnaissance survey in the southwestern corner of the modern parade ground. Artifacts collected included domestic, personal, ammunition, and architectural items; all were interpreted as associated with the mid-19th century Army occupation (Langford and Wilson 2002:42-43). Cultural materials and excavation data obtained from 11 of these shovel test units excavated in the southwestern portion of the parade ground (ST22 to ST30, ST58, and ST59) were included as part of this research project.
Non-intrusive Subsurface Archaeogeophysical Surveys (2001 and 2007)

Non-intrusive subsurface data were obtained during a magnetic survey conducted on the parade ground in 2001 as part of the archaeological reconnaissance investigations, and survey with ground-penetrating radar was conducted in 2007. These methods were used to determine the placement of excavations targeting the ca. 1850s to 1870s enlisted men’s barracks, laundresses’ quarters, and associated outbuildings. They were also used to avoid areas containing modern subsurface disturbances (e.g. utility corridors and sprinkler lines). Magnetic surveys were undertaken within 15 arbitrarily-sized grids across the western 40 to 57 m (131.2 to 187 ft.) of the parade ground, east of the current NPS split rail fence. Of these, nine survey grids, encompassing 2,925 m² (0.723 ac.), were placed in the southwestern corner of the parade ground. The mowed area west of the NPS split rail fence was not subjected to magnetic survey. Instead, GPR data were obtained in 2007 for an area 420 m² (0.104 ac.) in size, west of the NPS split rail fence, in the map documented vicinity of the mid-19th century laundresses’ quarters.

Three patterns were identified in the southwestern portion of the parade ground with magnetic survey data, when contour intervals were set between 5 and 50 nT¹² (McDonald 2001a, 2001b). In addition, at least 12 isolated anomalies were identified, all most likely reflecting iron artifact locations (McDonald 2001a, 2001b). The first pattern consists of an almost continuous line of strong magnetic signals indicating the locations of metal pipes, interpreted as utility lines (n = 3). One alignment runs north-south at roughly 110E and a second east-west at roughly 157N on the excavation grid (Figure 39). In the very southwestern corner of the parade ground, along Fort Vancouver Way, amplitude slice maps generated from the GPR data locate a linear feature between 44 and 83 cmbs (17.3 and 32.7 in.), also interpreted as an utility line (Figure 39).
Figure 18. Amplitude slice maps generated from ground-penetrating radar survey data for depths from 44 to 61 cmbs (left) and 132 to 149 cmbs (right) of the southwest corner of the parade ground, with positions of excavation test units and georectified laundresses’ quarters depicted. Warmer colors (red, orange, yellow) depict areas with anomalies in the data, interpreted as ground disturbance.
The second pattern is comprised of a series of anomalies with low signal strengths clustered in amorphous groupings. These may also reflect ground disturbances and/or ferrous artifacts associated with building construction, occupation, demolition and/or military activity areas. Further south, no clear structural pattern emerges among these amorphously shaped anomalies. Their low signal strengths may potentially reflect individual ferrous (iron) artifacts deposited alongside building foundations, if not nails within wooden foundations. The majority of text excavation units were positioned to examine these anomalies (Blocks B to Q), as the 2001 reconnaissance survey identified dense concentrations of artifacts in the vicinity.

One strong anomaly identified from the amplitude slice maps is approximately 3 m (9.8 ft.) in diameter and extended from 80 to at least 155 cm (31.5 to 61 in.) below the ground surface (Figure 18). Although roughly circular in shape, this anomaly was hypothesized to reflect the location of a shaft feature, such as a privy, root cellar, or some naturally occurring phenomena. Block A was positioned to examine this feature, discussed in detail in Chapter Six.

The final pattern consists of two clusters of anomalies, each positioned in roughly linear formation with one or more right angles. These are affiliated with subtle rises or depressions in topography (i.e. mounded or sunken areas) in the vicinity of the 1850 enlisted / band quarters and ca. 1860s library documented on historical maps (these are discussed in further detail in Chapter Seven). I positioned Blocks R, S and T to determine whether these rectangular anomalies reflected the locations of architectural features associated with particular structures documented within the 1850s enlisted men’s complex (Figure 19).
Archaeological Survey and Test Excavations (2007 to 2008)

A total of 60 m² (645.8 ft.²) was excavated on the parade ground in areas that produced evidence of features and structures during analyses of cartographic, shovel test, and non-intrusive subsurface survey data, to explore the mid-19th century enlisted men’s quarters and barrack, kitchen, mess hall, and laundresses’ quarters. Cartographic analyses indicated the ca. 1854 mess-house and ca. 1859 two-story enlisted men’s barrack may have been partially positioned within the boundaries of the former Hudson Bay Company’s cemetery (ca. 1829 to early to mid-1850s), also used to bury military personnel during the first few years of occupation. Therefore, a buffer was established around the cartographically-defined cemetery boundaries (Figure 15) in an effort to avoid intersecting deposits associated with internments (see Field Methodology).

Test units were excavated as a series of contiguous blocks, with each block containing between two and 11 units. Blocks were primarily placed along on four east-west axes (111N, 114N, 115N, and 121N) and on three north-south axes (149E, 153E, and 159E) to maximize the probability of encountering remains of these structures, as well as to document sediment deposition and terrace formation processes across this portion of the parade ground (Figure 19). All test excavation units identified distinct archaeological strata and features, and intersected deposits associated with the mid to late-19th century military occupation.

Blocks A, B, C, and D were located in the very southwest corner of the parade ground, in an area hypothesized to contain evidence of mid-19th century laundresses’ quarters or associated outbuildings and/or activity areas. Specifically, Block A was positioned to examine a roughly circular vertical shaft anomaly identified with GPR data (see Chapter Seven). Blocks B and C were excavated to intersect the shallow, rectangular-shaped anomaly observed within the GPR data, believed to potentially reflect the footprint of the southern ca. 1854 laundresses’ quarters.
Figure 19. Locations of shovel test and test excavation units positioned on the southwestern portion of the modern parade ground (Locus 2) in 2007 and 2008. For contiguous blocks, unit nomenclature follows relative unit position, moving from west to east.
Block D was completed to examine any associated sheet midden deposits. To the east, Blocks E and F were placed in an area hypothesized to be behind (west of) the enlisted men’s kitchens, with Block F positioned over a strong anomaly identified in the magnetic data. No structures are documented on historic maps in this vicinity, although two ca. 1855 images depict two small outbuildings in the vicinity (Figure 6). This area may have served as a refuse dump associated with the soldiers’ quarters, barracks, and kitchens. Blocks E and F were excavated to intersect sheet midden deposits identified in shovel test survey units excavated in 2001. Block E was offset to the west when expanded after identification of a vertical shaft feature to delineate its western edge.

Blocks R and S were placed to examine the rectangular anomaly identified with magnetometer data, centered at 132N / 155E (Figure 19 and Figure 39). Upon observation of fire-reddened soils (Feature 801), Block R was expanded to the north to delineate the northern feature boundary. Although the structure was not selected for testing, Block T was excavated to explore a rectangular magnetic anomaly identified within the magnetometer data hypothesized to reflect the location of the 1850 enlisted/band quarters (Figure 19 and Figure 39).

To the south, Blocks F, G, H, N, and P were established to intersect a cluster of anomalies identified with magnetometer data, considered in the vicinity of the 1850 enlisted men’s kitchen. Block H was located within a shallow topographical depression observed in this area during the pre-excavation 2007 pedestrian survey, and encompassed the footprint of ST25. With the discovery of intact milled wood boards (interpreted as part of the kitchen foundations), Block H was expanded to the east, north and south with seven additional units. Block G was placed south of Block H to examine a strong anomaly in the magnetic data, as well as potentially define a western or southern edge of the kitchen foundations. To the east, Blocks K and L were
positioned over magnetic anomalies hypothesized to reflect the location of the 1850 enlisted men’s barrack. Blocks J, M and Q were excavated west of Block K and east of Block H, in an effort to delineate the footprints of either the enlisted men’s barrack or kitchen, and examine any associated activity areas. Portions of the milled wood boards identified in Blocks H and M remain *in situ*, and were covered with black woven landscaping ground fabric for protection.

Extremely dense deposits of artifacts were encountered in two shovel test units excavated in 2001 (ST24 and ST29), in the vicinity of the ca. 1854 enlisted mess-house. However, as these are located within a buffer area established in 2007 for this study to avoid impacting HBC cemetery deposits (see Excavation Grid and Datum) test excavation units were not placed to examine these deposits.

**Locus 3, East Reserve Street: Vancouver Ordnance Depot, Laundresses’ Privy**

Two mid-19th century laundresses’ quarters, ca. 1860s to early-1880s, at the Vancouver Ordnance Depot are depicted on historical maps at the eastern edge of the Officers Row near modern East Reserve Street. Deposits associated with a privy were identified during archaeological monitoring in 2001, and mitigated with data recovery operations (Figure 20; McIlrath 2001).

Cartographic analysis (see Chapter Three) indicates these archaeological deposits are linked to the northern sergeant/laundress quarters, rather than the southern laundress quarters as argued by McIlrath (2001). My analysis of historical maps indicated the position of the southern laundress privy is likely beneath the current sidewalk and/or within the trench corridor mechanically excavated in 2001 (see Chapter Seven). Therefore, archaeological investigations were not conducted to locate the southern laundress privy in 2007 or 2008.
While monitoring mechanical excavations conducted by the City of Vancouver for construction of a new sidewalk, retaining wall, street lighting and landscaping a vertical shaft feature was observed by archaeologists (McIlrath 2001). Unfortunately, this feature was located on Friday afternoon, 11 May 2001. During the weekend it was looted before data recovery excavations, including a detailed analysis of associated sediments, could be undertaken. The materials deemed unimportant by the looters were abandoned in the trench, whereas collectable objects, such as ceramics, were observed being removed offsite by local witnesses (McIlrath 2001:9). No other cultural features were identified during monitoring.

Data recovery excavations were immediately undertaken within the vertical shaft feature interpreted as a privy (Figure 66). Four 1 x 1 m (3.3 x 3.3 ft.) square archaeological units were excavated in a continuous linear block along the base of the construction trench, parallel to the orientation of East Reserve Street. Although many artifacts were recovered from the secondary looters’ deposit within the trench, sediments with good stratigraphic integrity were observed beneath the disturbed soil layers. To distinguish disturbed from intact sediments, units were excavated through these deposits in arbitrary 10 cm (4 in.) levels until non-artifact bearing sediments were encountered. The privy was encircled to the north, east, south, and west by utility related construction disturbances, which had left only the eastern edge of the feature intact. Intact privy soils, identified within the west wall of the construction trench, were excavated as one level (McIlrath 2001:6). All matrix removed was screened through nested ¼- and ⅛-in. (6 and 3 mm) mesh hardware cloth. Depositional details for this privy are provided in Chapter Seven. Non-architectural historical materials recovered in 1988 were reanalyzed in 2010 to obtain additional information and form part of the artifact dataset used in this study.
Figure 20. Aerial view of location of a ca. mid to late-1860s to 1880s laundresses’ privy recorded along East Reserve Street in Vancouver, WA, with estimated locations of 1874 historical structures and 2001 data recovery operations depicted.
In 2007 and 2008, fieldwork was performed by the annual Public Archaeology Field School held by Portland State University (PSU) and Washington State University at Vancouver (WSUV) in conjunction with the National Park Service (NPS). A total area of 77.6 m$^2$ (835.3 ft.$^2$) was examined during survey and testing. Shovel tests and archaeological test units were numbered sequentially, regardless of unit type, in two series based upon the unit’s location, either Officers Row (OR) or Parade Ground (PG). Each set of contiguous units was then assigned to an excavation block (Blocks A to Y). Letters I, O, V, and X were not used for Block nomenclature to avoid confusion with Roman numerals, used for delineating archaeological strata. Redeposited soils associated with previous investigations (see McIlrath 2001, Thomas 1988) were not encountered during archaeological testing in 2007 or 2008, excepting sediments used to backfill ST25 excavated in 2001 (identified as Feature 701 in 2007). All unit coordinates are summarized in Appendix A.

Excavation Grid and Datum

Prior to conducting non-intrusive subsurface survey investigations and placing test units, the baselines of the metric-based excavation grid (i.e. all unit and grid locations are given in meters) were established with a total station, using existing survey markers placed in 2001 for the magnetometer survey (see Langford and Wilson 2002:25). Gridlines followed the main building axis orientation of the two extant ca. 1904 and 1907 Double Infantry Barracks (Bldg. Nos. 989 and 987) along the southern boundary of the parade ground. These two buildings are
positioned along roughly the same orientation axes as the mid-19\textsuperscript{th} century Army structures, as delineated on historical maps.

The excavation grid datum, set at 100N / 100E, was positioned in the very southwest corner of the parade ground (UTM 10T 1,086,799.1955N 114,892.510411E NAD83), immediately east of Fort Vancouver Way (Figure 19) to ensure that all survey and test units excavated by field school students would have grid coordinates with only two potential cardinal directions; north [N] and east [E]. This position is 40 m (131.2 ft.) west of the 2001 magnetometer survey grid datum (given as 0N / 0E in McDonald 2001a, 2001b), along the 100 N baseline. Therefore, the 0N /0E position on the 2001 magnetometer grid is located at the 100N / 140E position on the 2007 and 2008 excavation grid.

The 100N baseline was positioned 5 m (16.4 ft.) north of the northern boundary of the ca. 1829 to 1849 Hudson’s Bay Company (HBC) cemetery, determined by cartographic analyses (see Garnett 2002) to be near the northern edge of a narrow concrete street running along the north side of the Double Infantry Barracks (Figure 15). In addition, a 10 m (32.8 ft.) buffer was established north of the 100N baseline, in an effort to avoid excavation within deposits associated with the Hudson Bay Company’s cemetery. However, in 2008, Block G, consisting of two 1 x 1 m (3.3 x 3.3 ft.) test excavation units, was placed within the northern portion of this buffer to test a cluster of anomalies identified within the magnetic data believed associated with the 1850s enlisted men’s kitchens. Although analysis of historical documents suggests that mid-19\textsuperscript{th} century structures were likely located in these areas, no additional excavations were undertaken within the HBC cemetery buffer, and none east of 108E or north of 116N on the excavation grid, west of the NPS split-rail fencing. This was to intentionally establish a buffer
between a frequently used active roadway, Fort Vancouver Way, and the excavations for the safety of archaeologists and students.

The excavation grid was extended north across Evergreen Boulevard to encompass units excavated on the Officers Row. Twelve 5 x 5 cm square (2 x 2-in.) wooden stakes, five placed on the Officers Row and seven on the parade ground, were driven flush with the ground surface at 40 m (131.2 ft.) intervals to mark junctions (hubs) on the excavation grid. On the Officers Row one hub was offset to the east by 10 m (32.8 ft.) to keep this marker within the lawn area rather than within the northbound lane of Fort Vancouver Way (Figure 17). These established points were used to triangulate all unit placements, and wooden hub markers remain in situ. The site datum was arbitrarily positioned 10 m (32.8 ft.) below the existing ground surface at 140N / 180E (UTM 10T 1,087,091.23125N 114,924.533334E; 85.2 m, or 279.5 ft., above the VNHR total station primary datum), so that all elevations obtained using the optical level would remain numerically positive throughout field investigations. All positions for the hubs, shovel test and archaeological test units are summarized in tabular form in Appendix A.

Pedestrian Survey

Pedestrian survey was undertaken prior to excavations to determine if there were any surface remains, topographic mounds and/or depressions reflecting the locations of historically documented Army structures. This consisted of walking the excavation areas, closely examining any areas of exposed sediments, including rodent burrows, social trails, and areas of recent disturbance. All relevant observations were recorded on archival notepaper and National Park Service (NPS) standard archaeological forms. Subtle topographic features (e.g. mounds and depressions) were visually observed and positions recorded with compass and tape prior to
excavation. Locations with both unusual topography and non-utility related anomalies identified through analysis of magnetometer and GPR data were given preference for test excavation unit placement.

*Shovel Test Survey Units*

Shovel test survey units (ORST) were 50 x 50 cm (19.7 x 19.7 in.) square and were placed to provide presence/absence information on cultural deposits, with some vertical control. Data were collected by hand excavating all survey units individually (i.e. not in contiguous blocks unless offset to avoid modern utilities) in arbitrary 10 cm (4 in.) levels to at least 90 cmbs (35.4 in.), or until at least 10 cm of culturally sterile (i.e. non-artifact bearing) sediments were intersected. Vertical proveniences were maintained using a vertical datum tied into the unit and the use of line levels and string. Site elevations were obtained for each shovel test unit datum using an optical level placed over the site datum (140N / 180E).

Information was recorded by level and feature on standardized unit forms currently in use at Fort Vancouver National Historic Site (FVNHS) and included, but were not limited to, site name and number, unit/feature provenience, level, strata, excavator, dates of excavation, a detailed sediment description, inventory of samples, and descriptive summary of the survey unit as a whole. At least one vertical continuous soil profile was photographed and drawn at the termination of each shovel test unit. Profiles were sketched showing stratigraphic breaks, archaeological strata designations, soil constituents, feature boundaries, and evidence for disturbances.
Test Excavation Units

Archaeological test units (OR or PG) were 1 x 1 m (3.3 x 3.3 ft.) square, and contiguous units were excavated as a series of contiguous blocks. In 2007, excavations preceded in 10 cm (4 in.) arbitrary levels within natural sedimentary levels and features. Based upon preliminary analyses conducted between field seasons, in 2008 excavation levels were reduced to 5 cm (2 in.) arbitrary levels within artifact and feature bearing archaeological strata (Archaeological Strata I, II, and III; see Chapter Five), to improve control of artifact vertical distributions. All vertical excavation proveniences on the parade ground were maintained using an optical level placed over the site datum (140N/180E), with the instrument calibrated daily to the datum.

Archaeological excavations conducted in 2008 were excavated as arbitrary 5-cm levels within natural strata to improve vertical control of artifact vertical distributions to potentially distinguish deposits reflecting mid to late-19th and early to mid-20th century Army occupations. Excavations continued until at least 20 cm (8 in.) of culturally sterile sediments (no artifacts or features) were intersected within at least one test unit within each excavation block. Encountered features were given a unique sequential field number, with the first digit representing the calendar year (i.e. Feature 703 would be the third feature identified in 2007, whereas 809 would be the ninth feature identified in 2008). Distinct krotovina (filled-in animal burrows) seen in the B and C horizons were excavated separately from the unit levels.

As deemed appropriate, bulk sediment samples of features and natural strata (as controlled comparison samples) were collected to facilitate recovery of diagnostic artifacts smaller than 3 mm (1/4 in.) in size (e.g. clothing fasteners, beads, fish bone, botanical remains, stone materials, etc.). Bulk matrix samples consisted of collecting all materials within a 50 x 50 cm square, 5cm deep, area from the vertical middle of the sampled excavation level, specifically
Figure 21. View facing east of 2007 excavations at the enlisted men’s kitchens (Block H).
(FOVA 3070-BH-4Aug-1947).

Figure 22. View facing northwest of excavations at the officers’ quarters privy (Block Y).
(FOVA 3080-BH-23-26July-2836).
from the northwest corner of the archaeological test unit for natural strata. When feature level size was smaller than this area, an appropriate sampling strategy was devised for each provenience (e.g. either 100%, 50% or 25% of the feature matrices were collected). An unprocessed 150 ml bulk matrix sample was curated from each artifact bearing lens identified within a mid-19th century officers’ privy excavated (see Chapter Seven, Feature 810) for future analyses (e.g. chemical, biological, geomorphological, etc.) not planned for at the time of excavation. Information was recorded by level and feature on standardized unit forms currently in use at FVNHS and included, but was not limited to, site name and number, unit/feature provenience, level, strata, excavator, dates of excavation, excavation techniques, a plan sketch (if appropriate), a detailed sediment description, inventory of samples, and descriptive section.

Each unit and feature was documented with a scale plan and photographed (digital and black/white print film) after being fully examined, as well as during excavation of the level as deemed appropriate. At least two vertical continuous soil profiles were photographed and drawn at the termination of each excavation block. Profiles were drawn to scale, showing stratigraphic breaks, archaeological strata designations, soil constituents, feature boundaries, and evidence for disturbances. Upon completion, prior to being filled with the removed soils, the corners of all contiguous unit blocks were marked with thick 60d wire nails and each the walls of each excavation block were lined with woven landscaping ground fabric, designed to allow water penetration, to provide a barrier between remaining sediments and those disturbed during testing.

Characterizing Archaeological Sediments

A total of 46.1 m³ (1,626.6 ft.³) of sediments were investigated during the 2007 and 2008 excavations. Field examination of sediments was conducted not only to describe observed
attributes, mineral and organic inclusions, but assist in defining anthropological stratum. The recorded characteristics included soil color (when dry, soil and sediment colors were generally one step higher in Munsell (2000) value, or lightness), moisture content (moist/dry), texture, structure, consistence, root-, charcoal-, and observed artifact-contents, and the characteristics of boundaries between strata. Sediments were described using a modification of the U.S. Department of Agriculture National Resource Conservation Service sediment techniques (Munsell Color Company 2000; Schoenberger et al 2002; USDA NRCS 2002). Fine particle fractions were not statistically quantified, but had their textures determined in the field using the ribbon test (for methodology see Thien 1979). Gravel nomenclature was based upon four clast sizes; granules (3 to 6 mm; or ⅛- to ¼-in.), pebbles (6 mm to 7.5 cm, or ¼ to 9.8 in.); cobbles (7.5 to 25 cm, or 3 to 9.8 in.), and boulders (greater than [>] 25 cm, or >9.8 in.). Gravel percentages were obtained from each excavation provenience through analyzing a controlled volume sample (CVS) consistently 0.0177 m$^3$ (0.625 ft.$^3$) in size. If proveniences were of a smaller volume, such as feature matrices, an appropriately sized sediment sample was collected.

CVS samples were obtained by first filling a 30 cm diameter bucket 25 cm deep with sediments. While screening the matrix, each gravel size category (cobble, pebble, and granule) was returned to the same bucket and the gravel depth then measured. Rather than measuring each size class separately and combining the total, smaller gravels were added to larger gravels already within the bucket to more accurately reflect the gravel content of the excavation provenience, as larger gravels have larger air pockets between clasts. Measurements were then multiplied by four to obtain a percentage (i.e. 5 cm of cobbles: $5 \times 4 = 20\%$ gravels; 8 cm of pebbles typically measured 10 cm when combined with the 5 cm of cobbles, therefore: $10 \times 4 = 40\%$ total, rather than $8 \times 4 = 32\% + 20\% = 52\%$ if calculated separately then totals combined).
For smaller CVS, the bucket was filled with 5 or 10 cm of sediments, using a multiplication factor of 20 or 10 (i.e. if 10 cm of sediments yielded 2 cm of granules: \(2 \times 10 = 20\%\)).

**Artifact Recovery**

In all subsurface survey and test excavations, trowels, hand shovels and bamboo sticks (for fragile artifacts) were utilized to excavate archaeological matrix, as well as breaker bars in strata identified as culturally sterile. To facilitate and standardize recovery of artifacts, all matrix removed was screened through nested ¼ and ⅛ in. (6 and 3 mm) mesh hardware cloth over tarps. Architectural materials (e.g. brick, charcoal, wood, mortar) and unidentified ferrous and aluminum metal fragments were not collected from the ⅛ in. mesh. Artifacts collected from each shovel test and archaeological test unit were separated by material type and bagged by original provenience, and catalogued in the field to track the collections. Fragile items (e.g. bone, textiles, bottles retaining paper labels, etc.) were immediately transported upon removal from the surrounding matrix to the FVNHS archaeological laboratory facility, permanently located onsite.

Bulk matrix samples were water screened through nested ¼ in. and ⅛ in. (6 and 1.6 mm) window mesh, in an area of the FVNHS already subjected to archaeological excavations. All artifacts observed were collected. Historical and botanical objects were hand-collected from the bulk samples by systematically picking through matrices under 2.25x magnification (lighted 5 diopter glass lens) at the FVNHS archaeological collection facility. Sorting was conducted twice on each sample, by different individuals, to make sure no cultural materials were missed. Remaining matrix was then subjected to floatation, and the light fraction (e.g. small flakes of charcoal, wood, seeds, etc.) skimmed off and allowed to dry. Artifacts were then bagged by material type for analysis.
Laboratory Processing

Laboratory analysis of artifacts allowed questions related to the occupation periods, structure use, socioeconomic status and internal/external relations of the households to be addressed. A total of 262,093 artifacts were analyzed as part of the research undertaken for this study. The majority of temporally diagnostic artifacts, recovered during archaeological excavations conducted on the Officers Row and the parade ground, are primarily associated with the mid-19th century military occupation. How these materials operated within a larger system of non-verbal visual communication between individuals and subgroups (officers, enlisted, non-commissioned officers and laundresses) is discussed in Chapter Ten.

Collected artifacts were cleaned, identified, analyzed, and inventoried in accordance with established protocol utilized at the FVNHS archaeological collection facility. All collected artifacts were cleaned by either washing or dry brushing, as appropriate. Artifacts from each provenience were assigned a unique field lot number. Bags of each material type (e.g. buttons, ceramics, glass, ferrous and non-ferrous metal, faunal remains, stone artifacts, wood, etc.) and diagnostic artifacts from each lot were assigned a unique field specimen number. A computer-based database for all recovered materials was maintained to track the materials through various analytical steps.

After cleaning, artifacts were analyzed by material type, manufacturing and technological characteristics. Weights were obtained to an accuracy of 0.01 grams, and all measurements were obtained using digital calipers in millimeter (mm), and transformed to inches (in.) when appropriate.
Functional Classification

Materials were categorized according to a mutually exclusive functional classification system developed by Sprague (1980) to facilitate intra- and intersite comparisons. This scheme was developed in an effort to move away from classifying historical artifacts primarily by material type to one that relies primarily on object function and secondarily on raw material type and object morphology (Sprague 1980:251). The drawback of Sprague’s functional typology is that certain artifacts can have multiple functions (Sprague 1980:252), and in these cases artifact classification was guided by archaeological context (i.e. domestic military/residential occupation). Nine divisions of classification are represented in the overall assemblage; Architecture (see Chapter Seven), Domestic, Personal, Commerce and Industry, Military Defense (Group Services), Pre-Contact (Lithics), Modern, Unknown, and Miscellaneous. This last category was added to represent commensal animals.

Architectural Materials

Bolts, nuts, washers, screws, and nails were typed and surface modifications recorded, such as such as annealed, bent, clinched, flattened, and sheared. When complete, the penny size (d) of the nails was recorded. Angular foundation/chimney stone, brick, chinking, bisque, mortar, slate, flat glass, unidentified metal, were typed, counted, weighed, sized, and color recorded. Flat glass was subjected to ultraviolet light (UV) light for additional color analysis. Wood and charcoal analyses were limited to collecting basic data on condition, anthropogenic use (if any, e.g. hand-hewing or milling scars), quantity, and weight.
Military, Domestic and Personal Objects

Diagnostic attributes and surface modifications were recorded for beads, buttons, ceramics, tobacco pipes, munitions, and vessel glass. Beads characteristics recorded included chroma, color, finish, decoration, opacity, Fort Vancouver and Ross (1990) Variety Nos., surface modifications (burning, chipping and cracking), and the maximum length and diameter of each bead. Attributes recorded for buttons and buckles were type, shape, material and style. Additional button characteristics consisting of manufacturing technique, face decoration, back stamp and type (after Albert 1976; Storm 1976; Tice 1997) were recorded, as appropriate.

Ceramic traits analyzed consist of type, vessel form and shape, portion represented, size, weight, pattern/style, manufacturer and/or and country of manufacture, and surface modifications, such as crazing, burning and use-wear. Ceramics, tobacco pipes, and vessel glass (e.g. tablewares, decorative items, bottles, etc.) were assigned to Minimum Number of Vessels (MNV).

Munitions were identified, sized, weighed, described by caliber, whether fired, and any identifying marks recorded. Metal objects were identified, weighed and described. Tobacco pipe fragments were identified to portion, and data on the raw material, decorations, manufacturer, size and weight were collected.

Faunal Materials

Each bone fragment was assigned to a faunal record number. Refitting attempts were made on all specimens and congruent fragments of the same element were assigned one record number and mended with polyvinyl acetate when deemed appropriate. Detailed information recorded included taxonomic identification and size assignment, the anatomical element and
orientation, stage of epiphyseal fusion, and taphonomic indicators which included fragmentation patterns, weathering marks, and evidence of mammalian gnawing and digestion processes. No human remains were inadvertently discovered during archaeological fieldwork. Additional analyses were conducted to examine the relationship between mid-19th century household consumption and socioeconomic status at the post. These are detailed further in Chapter Eight.

**Functional categories selected for analysis**

Military Defense, Personal, and Domestic items were selected for analysis as historical documentation (Chapter Four) indicates that all three groups utilized these materials, specific functional divisions and subcategories discussed are listed Table 2. Functional classifications analyzed, presented in order of discussion. Analysis of historical data indicates that these commodities and resources were readily available for procurement by military personnel, whether from the sutler, and/or the Hudson’s Bay Company in the 1850s or other local merchants in the 1850s to 1880s (see Chapter Four). An array of analytical techniques was utilized to examine the distribution of these materials to reveal patterns that provide information on how specific objects operated within cultural space at the household scale through analysis of household consumerism patterns (see Chapters Eight and Nine). Particular emphasis is given to temporally diagnostic objects. Implications of differential access to these items, whether procured through intentional choice (officers, non-commissioned officers and laundresses) or unintentional allocation (enlisted men), are discussed in Chapter Nine.
Table 2. Functional classifications analyzed, presented in order of discussion.

<table>
<thead>
<tr>
<th>Classification Division</th>
<th>Sub-category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Military Defense</td>
<td>Office Supplies</td>
</tr>
<tr>
<td>Military Defense</td>
<td>Personal Field Equipment</td>
</tr>
<tr>
<td>Military Defense</td>
<td>Military Insignia</td>
</tr>
<tr>
<td>Military Defense / Personal</td>
<td>Uniform-related and Other Buttons</td>
</tr>
<tr>
<td>Personal</td>
<td>Other Clothing and Fashion-Related Items</td>
</tr>
<tr>
<td>Personal</td>
<td>Body Grooming</td>
</tr>
<tr>
<td>Personal</td>
<td>Pocket Tools</td>
</tr>
<tr>
<td>Personal</td>
<td>Pastimes and Recreation</td>
</tr>
<tr>
<td>Domestic</td>
<td>Gustatory, Subsistence</td>
</tr>
</tbody>
</table>

¹ = functional classification system adapted from that presented in Sprague (1980).

Final Curation

All artifacts and project documentation (unit forms, field notes, project maps, photographs, etc.) generated during the excavations conducted in 2007 and 2008 and laboratory analysis, are curated according to federal guidelines for archaeological and archival materials in the permanent collections housed in the Museum Collection at the Fort Vancouver National Historic Site (FVNHS) in Vancouver, Washington. In addition, the full artifact catalogue of all objects analyzed as part of these investigations, including attribute analyses of all artifacts recovered during excavations, both historical and precontact (the latter not discussed herein), has been placed on file at FVNHS for public consumption, as it is too extensive to include in this volume. Accession numbers are given in Appendix A.
CHAPTER SIX

INTERPRETATION OF HISTORICAL STRUCTURE LOCATIONS
THROUGH THE ASSESSMENT OF SITE FORMATION,
STRATIGRAPHY, GEOMORPHOLOGY, AND BIOTURBATION

In this chapter I first describe Portland Basin geomorphology, followed by detailed archaeological strata descriptions and their role in terrace formation. Focus is given to the upland portions of the Vancouver National Historic Reserve Historic District (DT191), specifically the Columbia River floodplain terrace north of McClellan Road and south of Mill Plain Road. A discussion of the implications for interpretations of historical structure construction is followed by an assessment of bioturbation impacts to the sediment column.

To fully assess whether artifacts recovered better reflect historically documented class and gender differences in mid to late-19th century military contexts, the locations of building structures and associated yard spaces must be accurately defined. To identify both the natural and/or cultural mechanisms involved the formation of each stratum identified (see Schiffer 1987:280), I performed a detailed assessment of the formation processes in order to affiliate strata disconformities with either natural processes or anthropogenic activities, particularly those that may be architectural in origin. It was important to obtain and analyze these data to ascertain the locations of historical structures in relation to the excavation units.
Portland Basin Geomorphology

The Vancouver National Historic Reserve Historic District (DT191) sits on the north floodplain of the lower Columbia River at the Portland Basin, a roughly 2,000 km$^2$ (772.2 mi.$^2$) topographic and structural depression centered at the confluence of the Willamette and Columbia Rivers, within the Cascadia subduction system (Evarts 2004). The geologic composition of the lower Columbia River Valley originated with Paleogene strata, consisting of marine sedimentary rocks and Western Cascades volcanic materials (Rogers et al. 1996). During the Miocene, roughly 17 to 15 million years ago (Ma), these deposits were overlain by the Columbia River Basalt Group stemming from lava flows from the eastern Columbia Basin (Alt and Hyndman 1995; Madin 2009; Trimble 1963), specifically the Grande Rhonde Basalt flows, comprised of mostly basaltic andesite (Madin 2009:82). These basalts vary locally, but can be up to 30 m (100 ft.) thick in portions of Clark County, Washington (Johnson et al. 2005).

Resting on these basalts is the Sandy River Mudstone formation, which consists of sandstone and gravels eroded from the Columbia Basin and Cascade Mountains. This accumulated in the subsiding Portland Basin between 15 and 8 Ma (Trimble 1963). The Troutdale Formation resulted from a high energy period, where the Columbia River subsequently deposited over 70 m (230 ft.) of conglomerate in the basin, the Troutdale Formation (Evarts et al. 2009:5). Thus the formation of the Portland Basin continued the simultaneous downwarping of older, consolidated rocks into a shallow basin, with the Willamette and Columbia Rivers cutting through the Troutdale Formation, depositing Pleistocene age coarse gravels, sands, silts and clays (Franklin and Dryness 1973; Peterson et al. 2011). None of these particular deposits were observed during archaeological excavations.
The most recent significant episode in the region’s geology and soil formation was a series of events known as the Missoula Floods (see Bretz 1919, 1925). The advancing glacial ice of the Cordilleran Ice Sheet repeatedly blocked the Clarks Fork drainage of the Columbia River. This formed the Glacial Lake Missoula in northwestern Montana, containing approximately 480 mi.$^3$ of water. The pressure from the impounded water eventually caused the ice dam to break, releasing the dammed waters within a few days. Once the flooding waters crossed the Columbia Plateau, they burst out of the Columbia River Gorge (approximately 300 m [985 ft.] deep), east of the City of Portland, with velocities estimated at 35 m$^3$/s (Evarts et al. 2009). Constricted by ice dams at the basin exit, waters ponded up to 115 m (380 ft.) above sea level in the Portland Basin (Alt and Hyndman 1995; Madin 2009) depositing lacustrine gravels (Trimble 1963). At least twenty-five catastrophic flood events are clearly recorded in the Pacific Northwest occurring after the last glacial maximum (O’Connor and Baker 1992), and there is scattered evidence of earlier floods during previous ice ages (Alt and Hyndman 1995).

The last catastrophic flood event occurred between 15,000 and 13,000 BP, depositing coarse flood sediments within the Portland Basin. North of the modern Columbia River channel, the northern portion of the VNHR sits on an intermediate elevation terrace formed by these events (Evarts et al. 2009; Peterson et al. 2011). North of the floodplain upon which the Hudson’s Bay Company (HBC) stockade and U. S. Army Quartermaster Depot sat, associated unconsolidated sediments (Fiksdal 1975a) consist of (Qg) gravel-sized flood deposits (Phillips 1991), referred to as (Qfc) Coarse-grained facies by Beeson et al. (1991). These sediments are typically between 9 and 75 m (30 and 250 ft.) thick, but can range up to 90 m (300 ft.) thick (Johnson et al. 2005; Phillips 1991; Trimble 1963), with an age range of 15,300 to 12,700 BP (Rogers et al. 1986). They are characterized as unweathered, well-sorted, subangular to well-
rounded, foreset-stratified pebble to boulder sized ($\geq 2.5$ m) flood gravels mostly derived from Columbia River basalts. The gravel clasts become larger with increasing depth, supported within a pebbly sand matrix with minor silt interbeds that are generally cross-bedded with the forest bed dipping downvalley (Beeson et al. 1991; Fiksdal 1975b; Peterson et al. 2011; Phillips 1991; Rogers et al. 1986). Within these terraces, gullies were formed by surface run-off, dewatering, and headward erosion (Peterson et al. 2011).

Beginning in the late Pleistocene, strong east winds travelling through the Columbia River Gorge entrained glacial outwash silts and deposited them in the uplands of the Portland Basin (Evarts and O’Conner 2008; Lentz 1981; Madin 2009). This airfall loess capped and infiltrated terraced flood gravels at lower elevations, including the terrace upon which the Officers Row and the parade ground are situated, with thicker loess deposits accumulating within the gullies (Lentz 1981; Peterson et al. 2011). The loess deposits in Clark County, Washington correspond to the Portland Hills Silt deposits (Evarts and O’Conner 2008) of the Tualatin Mountains, visible to the southwest from the VNHR across the Columbia River. When unweathered, the Portland Hills Silts are described as a (10YR 6/4) light yellowish brown, comprised of 79% silt, 16% clay, and 5% sand, very poorly sorted, with gravels larger than granules (3 to 6 mm) rarely present, and strongly fine-skewed grains. These characteristics are consistently retained in the loess deposits across the Tualatin Mountains (Lentz 1981). Peterson et al. (2011:288,291) argue that in the upland portion of the VNHR, the top soils, about 0.5 m (20 in.) thick (Strata III and IV), reflect about 15,000 years of stability within the landscape.

The subsequent post-glacial sea level rise of roughly 112 m (370 ft.) flooded the river valleys between cal. 13,000 and 8,000 BP (Evarts and O’Conner 2008:16; Peterson et al. 2011:291-292), resulting in extensive deposition of clay and silt in a low energy environment.
(Dodge 1971). Throughout the Quaternary Period between and after the Missoula Flood events, sediments generally comprised of sand, silt, organic-rich clay and mixed gravels were deposited flanking the river for a total of about 70 m (230 ft.) of alluvium (Beeson et al. 1991; Madin 2009:76; Phillips 1991). These deposits were classified as (Qal) Holocene-Pleistocene alluvium by Phillips (1991) and as (Qaf) Alluvium (Quaternary) by Beeson et al. (1991). During the Holocene, the alluvial sedimentation rate was approximately 2.4 mm/yr (Madin 2009:76).

Archaeological Stratigraphy and Terrace Sediment Formation

Test excavations conducted in 2007 and 2008 yielded distinctive stratigraphic profiles, and horizons were described following Schoenberger et al. (2002). Based on these data, identified archaeological strata were numbered from top to bottom, and strata designations were based upon the Law of Superposition and pedostratigraphic units (see Cremeens and Hart 1995; Waters 1992), whereas ethnostratigraphic units, or occupation components, were based upon diagnostic cultural materials associated with each stratum. Stratum assignments were consistently assigned to excavation levels, even if several strata were not present within an excavation block (i.e. the Bw horizon was always designated as Stratum V).

The data obtained indicate that strata retain archaeological integrity and are representative of the natural sediment column. Few anthropogenic cut and fill episodes were identified within the sediment column (see Chapter Seven), and sediment descriptions obtained during subsurface survey in 2001 (cf. Langford and Wilson 2002) correlate with the general depositional sequence presented herein. To correlate archaeological strata across the VNHR, I reconciled the sediment descriptions from previous excavations conducted on the Officers Row.
(see McIlrath 2001 and Thomas 1988) and compared them to data obtained during archaeological excavations in 2001, 2007 and 2008.

The soil survey data characterize the natural sediments within the upland portion of the VNHR as 100% (LgB or LgD) Lauren gravelly loam, with 0 to 8 % or 8 to 20% slopes. These soils are somewhat excessively drained gravelly to very gravelly clay loams over 200 cm (80 in.) deep found on terraces up to 300 ft. in elevation, derived from alluvium mixed with volcanic ash (McGee 1972; USDA NRCS 2007). A typical sediment column is described as follows:

- 0 to 15 cm (0 to 6 in.): Gravelly loam
- 15 to 84 cm (6 to 33 in.): Very gravelly loam
- 84 to 112 cm (33 to 44 in.): Very gravelly coarse sandy loam
- 112 to 154+ cm (44 to 60+ in.): Very gravelly loamy coarse sand.

Sediment data collected from the excavations units correlate with the general soil descriptions from the geological survey. Seven distinct archaeological strata (I to VII), and three substrata (Ia, Ib, and IIa), were identified from sediments intersected during excavations and assigned to pedostratigraphic units (Table 3, Figure 23 to Figure 26). Strata III to VII were determined to be reflective of the natural sediment stratigraphy of the upland portion of the VNHR, north of McClelland Road. The descriptions for sediments intersected during the 2001 subsurface survey on the parade ground correlate with those for the 2007 and 2008 test excavation units.

The greatest variation in strata was caused by human modification, soil moisture content (moisture was higher in the first half of the summer, therefore soils had more color saturation and increased lightness, or higher Munsell values), and bioturbation of the sediments. The strata boundary characteristics were not recorded within the 2001 construction trench or 2002.
subsurface survey on the parade ground. Strata upper boundary descriptive nomenclature codes, average depths below surface, and average thicknesses are summarized by excavation block in Appendix A.

Stratum I reflects modern (mid-20th century to present) deposits and is split into three substrata based upon descriptions and depositional contexts; Strata I, Ia and Ib. Stratum I also denotes intact soils, whereas Strata Ia and Ib are determined to consist of sediments disturbed in the late-20th century. Stratum II encompasses all soils associated with late-19th to early-20th century U.S. Army ground leveling activities, and is divided into two substrata; Strata II and IIa, based upon soil color and texture descriptions and artifact content. Stratum III denotes mid-19th century and earlier occupations by Native peoples, whereas Strata IV through VII are culturally sterile (i.e. non-artifact bearing) layers with intrusive vertically oriented historical features. Strata I, Ia, Ib, II and IIa are anthropogenic in origin, whereas Strata III through VII were deposited by natural processes during the terrace formation.
**Anthropogenic Strata**

More mixed deposits were observed in areas subjected to ground disturbance by mid-19\(^{th}\) century building construction, occupation, and/or demolition activities, early-20\(^{th}\) century landscaping and utility installation, and/or bioturbation. All of these areas tended to have less distinct stratum boundaries. Strata Ia and Ib are associated with mid to late-20\(^{th}\) century upgrades to the subsurface utility infrastructure. Stratum Ib is comprised of an amalgamation of Strata III through VI, removed during modern construction and maintenance activities and mixed during infilling of the utility trench. Stratum Ia is the modern sod layer that was established within Stratum Ib.

**Stratum I** is composed of the natural sod layer of mowed grass and represents the modern O horizon and the uppermost portion of the A horizon which developed in Stratum II sediments. On the historic central Army parade ground on the upland terrace, this stratum is comprised of a (10YR 3/2) very dark grayish brown (moist) silty clay loam, with >1% subangular to subrounded granules and pebbles (6 mm to 7.5 cm) up to 1.5 cm (0.6 in.) in length, with a ratio of 2:1 granules:pebbles (as data was obtained by multiple individuals, ratios are used for gravel clast sizes rather than exact percentages). Stratum I has a moderate crumb structure, friable, fine to coarse, granular peds, many very fine to fine roots, few charcoal flecks, and a clear and smooth lower boundary. It is generally about 4 cm (1.6 in.) thick, dependent upon the depth of the grass root mass.

This layer contains a mix of modern, early-20\(^{th}\) and late-19\(^{th}\) century debris, with earlier materials increasing with depth. The lower boundary of Stratum I is abrupt (5 mm to 2 cm thick) and smooth to wavy. Along the Officers Row, modern application of chemical fertilizers has led
Figure 23. East wall of Block L, representative of the natural sediment column in the eastern portion of the excavations. (NPS FOVA 3070-DI01-0047)

Figure 24. East wall profile of Block L, in the vicinity of the enlisted men’s barrack.
Figure 25. East wall of Block B, representative of the natural sediment column in the western portion of the excavations on the parade ground (Courtesy of FVNHS, FOVA 3070-DI03-0988).

Figure 26. East wall profile of Block B, placed in the vicinity of the laundresses’ quarters.
to soil melanization, increasing the color saturation of the sod to a (10YR 2/1) black grading to a
(10YR 2/2) very dark brown (moist) silty loam, dependent upon soil fertilizer content.

**Stratum Ia** comprises the modern sod layer that developed in recently disturbed sediments
(O/A), based upon the high percentage of subrounded to subangular gravels present. It was
identified in the East Reserve Street construction trench during archaeological monitoring in
2001 (see Chapter Six) and in portions of the Officers Row disturbed with modern infrastructure
upgrades. This stratum is approximately 5 cm (2 in.) thick, and is described as a (10YR 2/1)
black silt loam, with about 10% subangular gravels (McIlrath 2001:7). Soil color is similar to
that characterized for Stratum I on the Officers Row, suggesting soil fertilizer was also used
along East Reserve Street, likely during 20th century landscaping activities undertaken after
completing subsurface utility work. This level was mechanically excavated without matrix
screening for cultural materials.

**Stratum Ib** (classified as Stratum II, modern fill, in McIlrath [2001:7]) reflects
redeposited sediments associated with mid to late-20th century upgrades to the infrastructure
along the Officers Row and East Reserve Street (redeposited natural horizons). These
redeposited sediments consist of a mixture of sediments removed and redeposited during
installation and maintenance of subsurface sprinkler lines (the Officers Row only), utilities,
sidewalk and road construction. On the Officers Row these sediments were primarily observed in
the northernmost shovel test units (ORST14, ORST27, ORST27a, ORST28, ORST35) placed
just south of the service road north of the Officers Row, as well as in ORST38 where a modern
water line was encountered. On East Reserve Street it was identified capping Strata V/VI and a
cultural shaft feature below.
These sediments were observed up to 80+ cm (31.5+ in.) thick, and contains a mix of the A, AbB, Bw and 2Cox horizons with modern, early-20th and mid to late-19th century materials. It is described as a (10YR 4/2 to 3/3) dark grayish brown to dark brown sandy loam to loam sand, with between 10 and 55% subrounded to subangular gravels. Along East Reserve Street, this sediment layer was intersected between 10 and 75 cmbs (4 to 29.5 in.). Backfill deposits, roughly 65 cm (25.6 in.) thick, were characterized as a dark brown (10YR 3/3) sandy silt, with about 30% rounded gravels, granules, pebbles, and cobbles (7.5 to 25 cm) (McIlrath 2001:7). However, the presence of modern artifacts and asphalt fragments throughout this deposit reflect their modern depositional origin. Soil ped and lower boundary descriptions were not obtained for this stratum.

**Stratum II** is anthropogenic in origin and reflects late-19th to early-20th century Army ground leveling activities. Soil development occurred in these sediments, with the density of grass roots delineating the boundary between Strata I and II. Stratum II is characterized by a (10YR 3/2) very dark grayish brown (moist) silty clay loam, with >1% subrounded to subangular gravels with a roughly 1:1 ratio of granules:pebbles, with a moderate crumb structure, friable, fine to coarse, blocky to granular peds, many very fine to fine roots, and a very abrupt to clear, smooth to wavy lower boundary. This layer is generally 3 to 8 cm (1.2 to 3.2 in.) thick, beginning between 2 and 8 cmbs (0.8 to 3.2 in.).

Stratum II increases to 15 cm (5.9 in.) thick in the central portion of Block H, extending down to the top of the milled boards and planks associated with the enlisted men’s kitchen foundation (Feature 703). This increased stratum thickness is interrelated with decreased Stratum III thickness. Therefore, within these same excavation units Stratum III is only 1 to 2 cm (0.4 to 0.8 in.) thick, if present. Stratum II was not observed in the sediment column associated with the
officer quarters deposits (Block U), east of the western laundresses’ quarters (Block D), or the construction trench wall profile on East Reserve Street. This stratum primarily contains artifacts dating between the mid-19th and mid-20th century, with earlier materials increasing with proximity to the interface with Stratum III beneath.

Along the northern portion of the Officers Row, however, gravels comprise 10 to 30% of the matrix. This increases to between 30 and 45% of the matrix when overlying 19th century privy and cellar shaft features (Blocks W and Y), similar to Stratum III. This layer is approximately 6 to 13 cm (2.5 to 5.1 in.) thick, beginning at about 3 cmbs (1.2 in.). For both the Officers Row and the parade ground, the lower boundary of Stratum II is abrupt, clear, and smooth or wavy, dependent upon bioturbation.

The lack of gravels within Stratum II (A) on the parade ground appears to suggest an eolian origin, similar to that of the loess deposits of the Tualatin Mountains across the Columbia River to the southwest. However, if this were the case, the wood foundations which interface these silts in Block H should display evidence of weathering, which they do not (see Chapter Seven). In addition, similar gravel-free deposits would then be present on the Officers Row, yet the gravels are similar in content and composition to those observed in Stratum III across the parade ground. Therefore, on the Officers Row, Stratum II likely reflects early-20th century redeposition of the natural A horizon (Stratum III) during road and building construction and maintenance activities.

Stratum II likely originated from periodic fluvial Holocene deposits along the Columbia River as indicated on the parade ground, evidenced by the dark organic coloring, high content of silt and clays, and lack of gravels,. While engaged in an exploring expedition between San Francisco and the Columbia River under Lieutenant Robert S. Williamson, American geologist
John Strong Newberry in (1856:59) observed “The soil of the alluvial lands bordering the streams [Columbia River] is fine, dark, and very fertile; that of the upper terrace [Fort Vancouver parade ground] is frequently gravelly and less productive” (Newberry 1856:59; see also USWD, QGO 1872a:114, 1872b:40; Gibbs 1855b:473).

Flood waters, particularly spring freshets, are recorded periodically covering the floodplain immediately adjacent to the river (Figure 27; Biles 1855:615-616; Davis 1855:12-13; Gibbs 1855b:473; Grant 1990:948; Lander 1855:186; Newberry 1856:59; USWD, SGO 1870:421, 1875:488; USWD 1886). In the mid-1800s, it was noted by the Army that:

“The bottom lands between the garrison and river, as well as those east and west, are subject to overflow, and it has not been unusual to have all communication with the Hudson Bay fort cut off except by bateaux [shallow-draft, flat-bottomed boat] and rafts” (USWD, SGO 1870:421).

Although large floods were recorded in 1853, 1861, 1862, 1873, 1876, 1880, 1894, 1948, 1964, and 1996, the largest flood stage on record was set in 1894 when waters crested between 34.4 and 36 ft. above normal (Center for Columbia River History [CCRH] 2012; Grant 1885:162; Knight 1928; Landerholm 1960:16,29,50,102; Northwest Power and Conservation Council 2010). None of these floodstage waters reached the central parade ground or the upper terrace of the VNHR, which sits between 80 and 100 ft. AMSL (USGS 1978).

Stratum II represents imported sediments not naturally accreted in situ, but sediments which are the direct results of attempts by Army personnel to level the ground surface of the upland terrace. Army regulations required that “Particular attention is required to prevent the
Figure 27. View facing southwest of flood waters (upper right of photo) at Vancouver Barracks after the flood of 1887 (Erigero 1992:293). McClellen Road is visible extending from a complex of framed buildings to the southeast (lower right). The ca. 1850s building complex was located in the parade ground to the north of those buildings (upper left of photo).

(Courtesy of National Archives. Image No. 93-F-71-1).

formation of gullies in the parade” ground (USWD 1857:6). The stratigraphy indicates that Stratum II was definitely deposited after demolition of the ca. 1850s buildings. This is evidenced by the irregularity of Stratum II depths in relation to identified 19th century wood foundations (Block H) below the existing, relatively level, ground surface. Ground depressions continued to be reported by Army surgeons in the 1870s (USWD, SGO 1875:488). Ground leveling attempts were repeated in the early-20th century, given the amount of early-20th century artifacts present in the mid to upper levels of this layer, and the observation of Stratum II soils both directly beneath and overlying Stratum IIA, west of the enlisted men’s kitchens area.

Early-20th century military uniform equipment collected from this imported A horizon consisted of, one field hat insignia, three Great Seal General Service buttons, ca. 1902 to 1935,
and two 4-hole, sew-through pant fly buttons embossed with “U.S.A.,” standard WWI U.S. Army uniform issue. Two manufacturers are represented by backstamps on the military device buttons; “CITY BUTTON WORKS/NY” (small clothes size) and “SIGMUND EISNER/RED BANK” (Great Coat size) (Albert 1976:42, types GU102a and GI103A). In 1907, City button Works began producing Army buttons in New York, but moved to New Jersey in 1923 (McGuinn and Bazelon 2006:20). The Eisner company of New York City manufactured this style button for the Army between 1902 and 1935, but the shape of the domed face suggests it’s pre-WWII production (McGuinn and Bazelon 2006:30).

A cupreous, pressed screw-post hat pin depicting two crossed cannons was recovered from this stratum in the laundresses’ quarters area. The pin was found in association with its cupreous fastener and Company insignia consisting of an “B” and “2,” each 1/2 in. tall. Because these were worn after 1907 (Emerson 1996:75), the insignia were likely deposited by a member of the 2nd Artillery, Battery B, known to be stationed at Fort Vancouver (then Vancouver Barracks) at that time (G. Shine, NPS Historian, pers. comm).

The formation of Stratum II may also be related to the installation of a small golf course on the parade ground in the 1930s (NPS-FVNHS photo-file, Denny No. 98025). Unfortunately, multiple depositional episodes could not be visually distinguished within Stratum II unless Stratum IIa was present within the sediment column.

**Stratum IIa** consists of U.S. Army target range sand trap sediments imported in the late-19th to turn of the 20th century, and placed onsite in a discontinuous layer of amorphous deposits to level the ground surface. This strata was identified sandwiched between two layers of Stratum II sediments in a small area of Block E (PG04). The upper Stratum II sediments were redeposited from elsewhere on site soon after Stratum IIa deposition. This sequence is rationalized based
upon the similarity in the soil description and presence of mid-19th to early-20th century diagnostic artifacts, which includes an 1886 Indian Head penny manufactured at the Denver Mint.

Stratum IIa was observed on the parade ground in Blocks D and E (Figure 28 Figure 29), situated 14 m (46 ft.) from each other, west of the historically documented enlisted men’s structures. These sediments consist of (10YR 4/2) dark yellowish brown, with (7.5YR 5/8) strong brown vertical mottles, compacted silty sand, with >1% subrounded to subangular gravels, primarily granules, a moderate platy to crumb structure, friable, fine to coarse granular peds, few very fine roots, with a very abrupt and wavy lower boundary. This roughly 13 cm (5.1 in.) thick layer was identified approximately 8 cmbs (3.2 in.). The mottles observed in Block E are likely from earthworm bioturbation and subsequent downward translocation of Stratum II from rainfall infiltration. The lower boundary of this layer is very abrupt and smooth on a relatively level plane. In Block E, its upper boundary is dome-shaped in profile, indicating a single depositional episode where the north-south axis of this stratum was 180 cm (71 in.) wide. The east and west margins of this stratum were not observed within the excavation units, but likely follow the topography of the mound seen at the current ground surface.

I analyzed diagnostic military ammunition to help date the formation of Stratum IIa. Ammunition recovered from Block E consist of eight fired .45-70 500 grain bullets (.45-70-500), two round nose fired .30-03 or .03-40 bullets, and one .30-03 or .30-40 jacket (the metal shell around a bullet). The .45-70 rifle cartridge was developed at the US Army Springfield Armory (MA) with a 405 grain bullet (.45-70-405) for use in the Springfield M1873 rifle, commonly referred to as the “Trapdoor Springfield.” After 1879, this cartridge was produced using a heavier 500 grain bullet (.45-70-500), increasing the firing range of the Trapdoor Springfield
Figure 28. East wall of the southern half of Block E, depicting Stratum IIa.
(Courtesy of FVNHS FOVA 3070-DI02-042)

Figure 29. East wall profile of the southern half of Block E, depicting Stratum IIa, sandwiched between two layers of Stratum II.
to over 3,500 yards from the 405 grain bullet, which only effectively reached about 1,000 yards. Designed to replace the .45-70, the U.S. Army adopted the .30-40 Krag in 1892, a smokeless powder cartridge that could be used in a number of firearms, particularly the Springfield M1892 rifle. With cartridge standardization in 1894, the .30-40 was consistently manufactured with a 220 grain metal jacketed round nose bullet. In turn, it was later replaced by the U.S. Army after the Spanish-American War (1898) in 1903 with the .30-30 cartridge designed for use in the Springfield Model 1903 rifle, also using a 220 grain round nose bullet, before being replaced in 1906 by the .30-06. At Vancouver Barracks, during the Spanish American War, the regular Army used the new .30-40, while the Volunteers continued to use the older .45-70, dating this sand trap deposit (Stratum IIa) to between 1894 and the early 1900s. (Michael S. Twist, NPS Park Ranger, pers. comm.). Although no munitions were recovered from Block D, similarities in sediment descriptions and other associated cultural materials suggest a similar depositional history.

Three of the .45-70 bullets were mushroomed, indicating this stratum was originally part of a firing range bullet trap constructed with sand, possibly a sand berm or a pit and plate trap. Concentrations of spent lead behind the targets, or ‘hot spots,’ can cause subsequent shots to ricochet off the spent lead towards the shooter. To prevent hot spots, the trap must be cleaned by separating out the lead and contaminated sand (Action Target Academy [2011]). As three of the .45-70 bullets retained lubricating grease in their grooves, the sand was deposited soon after the bullet trap was cleaned, capping the mid to late-19th century Army deposits below (Stratum III, Ab). These landscaping activities occurred with the early-20th century construction boom at Vancouver Barracks, potentially in association with construction of the two ca. 1904 to 1906 Double Infantry Barracks (Bldg. Nos. 987 and 989) directly south.
Naturally Accreted Strata

The sediment descriptions for Strata III through VI, identified in all test excavation units, are consistent with soil survey data (McGee 1972; USDA NRCS 2007). A number of catastrophic flood events, commonly referred to as the Missoula Floods, formed the riverine terrace in the upland portion of the VNHR. This is evidenced by distributions of large clasts (cobble) of varying dimensions within Strata III to VI, many with opal precipitates (see Stratum VII description). It is currently unknown how many massive flood episodes are represented by alluvial deposits, consisting of entrained and reworked previously deposited flood sediments and gravels, within the upland VNHR. Some of these flood events may have occurred after late Pleistocene loess accumulation, as paleosols are present above Missoula Flood Gravels but below later Missoula Flood sands at higher elevations of Clark County (Peterson 2011:281). Stratigraphy indicates that these strata were deposited in a separate event(s) than Stratum VII. The strata VI and VII boundary reflects a bedding disconformity, indicating that a catastrophic fluvial pedogenic event truncated upper sediments (reworked and eventually redeposited) associated with earlier deposition of Stratum VII.

Stratum III represents an intact buried A horizon (Ab) and the most recent natural ground surface of this floodplain terrace. It primarily consists of a (10YR3/2) very dark grayish brown silty clay loam, with between 20 and 35% subrounded to subangular gravels (1:2 ratios of granules:pebbles). This stratum has a weak to moderate crumb structure, friable, very fine to medium, blocky to granular peds, common fine roots, few flecks of charcoal, and a gradual and wavy to smooth lower boundary. Although the Hudson’s Bay Company (HBC) had agricultural fields on this terrace, cultural materials recovered from this stratum are primarily related to the mid to late-19th century military occupation.
Unlike other strata observed, gravel content within surrounding Stratum III matrix decreased with depth. Higher concentrations of gravels at the upper boundary of Stratum III likely reflect stratum deflation through subsequent eolian transport of the finer particle fraction, producing an eroded tread surface similar to those identified by Peterson (2011:284) on lower Missoula flood terraces in Clark County, Washington. Although localized gravel concentrations of up to 70% were observed during excavations in Stratum III, they do not appear to be associated with architectural features, such as pathways or building entry locations. This interpretation is supported by historical documents. In the 1870s, Army personnel reported “The natural drainage at the post is excellent. Water is soaked by the gravel or runs off down the steep declivity, rendering artificial drainage unnecessary” (USWD, SGO 1870:422; Newberry 1856:59; USWD, SGO 1875:488). The low agricultural productivity observed for this terrace in the mid-19th century, in comparison to the rich soils along the river, was explained by the high proportion of gravels observed in the soils at the garrison (Gibbs 1855b:473; Newberry 1856:59 USWD, SGO 1870:422,1875:488).

On average, this layer is approximately 9 to 27 cm (7.5 to 10.6 in.) thick, with the thickness increasing northerly across the excavations, and began about 9 and 23 cmbs (7.5 to 9.1 in.). The thickness of Stratum III, however, decreases in the eastern half of Block H, to about 2 to 4 cm (0.8 to 1.6 in.) thick (if present) as the lower boundary of Stratum II dips. All of the mid-19th century Army architectural remains (footings, foundations, and demolition debris), hearths, and pit features originated within this stratum, and unconformities in the sediment profiles are associated with these cultural features or krotovina. This layer was observed in an additional redeposited context in Block E, as an amorphous shape in the northeast corner of the trench. It
likely accumulated in this area during early-20th century construction and ground leveling activities as it overlies Stratum IIa.

**Stratum IV** represents the gradual transition between the Ab horizon and the culturally sterile Bw horizons (e.g. AbB horizon). This stratum is the result of organic enrichment of the upper portion of the B horizon through illuviation. It is characterized as a (10YR 3/3), dark brown (moist), silty loam to sandy loam, with sand content increasing with depth. Stratum IV contains between 15 and 40% subrounded to subangular gravels, with 2:3:1 to 2:4:1 ratios of granules:pebbles:cobbles, with the last up to 12 cm (4.7 in.) in maximum length. The gravel content and clast size varied within this stratum horizontally across the Officers Row and the parade ground, but consistently increased towards the base of the stratum to a ratio of 1:2:2. Although at least four sub-layers were identified across the excavations, differentiated by gravel content, these were all determined to represent one depositional series of events (Missoula Flood reworking). This transitional soil has a moderate crumb structure with friable, fine to medium, granular peds, few very fine to fine roots, and a gradual and wavy to smooth lower boundary.

Stratum IV, approximately 13 to 70 cm (5.1 to 27.6 in.) thick, was observed at varying thicknesses on the parade ground. In the western and eastern portions of the excavations, this stratum was roughly 18 to 23 cm (7.1 and 9.1 in.) thick in Blocks B, C, K and L. However, in the central portion of the excavations, Stratum IV varied widely in thickness, from 42 to 45 cm (16.5 to 17.7 in.) in Blocks R, S and T, to (moving southward) between 30 and 57 cm (11.8 and 22.4 in.) thick in Blocks H and J, to roughly 17 cm (6.7 in.) thick in Block G. Although Stratum IV was observed between 52 and 95 cmbs (20.5 and 37.4 in.) in Block A, these depths are likely related to an anomaly identified with ground-penetrating radar (GPR) data, interpreted as the former location of a large tree (see Chapter Seven).  

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Figure 30. South wall of Block T, representative of the natural sediment column in the northern portion of excavations. (Courtesy of FVNHS FOVA 3080-DI02-0024)

Figure 31. South wall profile of Block T, placed in the vicinity of the enlisted men’s mess hall.
Beneath the kitchen for the enlisted men, the uppermost ~20 cm (8 in.) of Stratum IV was mottled with cylindrical stains, 1 to 2 cm (0.4 to 0.8 in.) in diameter and up to 15 cm (5.9 in.) long. These are interpreted as evidence of earthworm bioturbation, as large earthworms were observed within the matrix during excavations. On the Officers Row, the upper boundary of the 8 to 14 cm (3.2 to 5.5 in.) thick Stratum IV was observed between 36 to 44 cmbs (14.2 to 17.3 in.). Stratum IV was traversed by vertical shaft or posthole features originating in Strata II and III. Very low densities of 19th century Army artifacts were recovered from the upper 10 cm (4 in.) of this stratum, as well as at lower depths from within intrusive krotovina.

Depths at which the interface between Strata IV and V (AbB and Bw horizons) was identified varied across the parade ground. In the eastern portion of the excavations, this strata boundary was encountered at roughly 25 cmbs (9.8 in.) in Blocks K and L, while in the central area it was between 42 and 72 cmbs (16.5 and 28.4 in.) in Blocks E, F, H, N, P, Q, but at only 35 to 40 cmbs (13.8 to 15.7 in.) in Blocks G and M, and at 45 cmbs (17.7 in.) further west by the laundress quarters in Blocks B and C. Stratum V was observed beginning at 95 cmbs (37.4 in.) in Block A, reflecting the tree root location detected within the GPR data.

Stratum V represents the culturally sterile Bw horizon, described as a (10YR 3/4 to 4/4) dark yellowish brown (moist) sandy loam, with between 20 and 60% subrounded to subangular gravels, some with opal precipitates accreted to one surface, with a weak subangular blocky to crumb structure, very friable, very fine to fine granular peds and few fine roots. This stratum has a slight reddish brown tint when compared to Stratum VI, suggesting a downward translocation of iron oxides (FeOx), resulting from meteoric water (rainfall) infiltration through the sediment column. Up to three sub-layers were identified within this stratum in portions of the excavations,
differentiated from one another by a slight color change and differences in gravel content. This layer generally has a clear to gradual and wavy lower boundary.

On the Officers Row, East Reserve Street, and the western portion of the 2007 and 2008 excavations (Blocks Y, A, B, C, D), this stratum was characterized as a silty loam. Across the upland portion of the VNHR, sediment color becomes slightly lighter (one step higher in Munsell values) as the proportion of sand in the matrix increases approaching the transition to Stratum VI. Gravel ratios were between 1:5:2 and 2:4:1 (granules:pebbles:cobbles) across the excavation units, but increased in content and clast size with stratum depth, with cobbles up to 18 cm (7.1 in.) in length. On the Officers Row, this 14 cm (5.5 in.) thick layer was observed in Block Y with its upper boundary intersected approximately 53 cmbs (21 in.). In the trench on East Reserve Street, it was observed from 75 to at least 150 cmbs (29.5 to 59.1 in.).

The division between Strata V (Bw) and VI (C) was based upon the accumulation of precipitated minerals and oxides (FeO) in Stratum V, with a gradual and wavy boundary delineating their transition. Stratum V was intersected by vertical shaft features originating in Strata II and III. Cultural materials recovered from this stratum were only recovered from intrusive krotovina.

Stratum VI represents a culturally sterile C horizon, and was identified in seventeen test excavation units. It was characterized as a (10YR 3/6 to 4/6) dark yellowish brown sandy loam to loamy sand (sand percentage increasing with depth), with between 50 and 75% subrounded to subangular gravels (1:5:4 to 2:5:7 ratios of granules:pebbles:cobbles), some with opal precipitates accreted to one surface, with a weak subangular blocky to crumb structure, very friable, very fine to fine granular peds, very few fine roots, and an abrupt wavy to smooth lower
boundary. Within Block Y on the Officers Row, this substratum was characterized as a silty loam to loamy silt, with 60% gravels with clast size ratios of 1:2:3.

On the parade ground, this layer was encountered at roughly 60 cmbs (23.6 in.) in Blocks K and L, and at roughly 70 cmbs (27.6 in.) to the northwest in Blocks R and S, and at 99 cmbs (39 in.) further north in Block T. Along Fort Vancouver Way, it was identified at 62 cmbs (24.4 in.) in Block B, and at 126 (49.6 in.) in Block A, reflecting the anomaly identified with GPR data in this area. On the Officers Row, this layer was intersected between 57 and 87 cmbs (22.4 and 34.3 in.) in Block Y. Stratum VI was intersected by vertical shaft features originating in Strata II and III and continuing through Strata IV and V. Very low densities of mid to late-19th century Army artifacts were recovered from the upper 10 cm (4 in.) of this stratum, and occasionally at lower depths, from within intrusive krotovina.

The transition between Strata VI and VII (C to 2Cox), consisting of Stratum VI sands infiltrating Stratum VII gravels, was observed in five excavation units. This transition is very abrupt to abrupt, between 5 mm and 10 cm (0.2 and 4 in.) thick, with thickness and depth below ground surface increasing to the north, upslope from the modern Columbia River channel. On the parade ground, the transition was encountered at 86 cmbs (33.9 in.) in Block B, 108 cmbs (42.5 in.) in Block T, and at 72 cmbs (23.4 in.) in Block L. This transition was emergent at the base of excavations in five test units. In the central portion of the parade ground by Blocks G, H and J, it was located at 97, 52, and 87 cmbs (38.2, 20.5 and 34.3 in.), respectively, while to the north it was observed at 94 cmbs (37 in.) in Block R. On the Officers Row, this boundary interface was intersected between 62 and 144 cmbs (24.4 and 56.7 in.) in Block Y, with its upper boundary sloping downwards moving northward.
Data indicate that Strata III through VI were deposited in a separate catastrophic fluvial depositional event(s) than Stratum VII. The strata VI and VII boundary reflects a bedding disconformity, indicating that a later Missoula Flood episode truncated upper sediments (reworked and eventually redeposited) associated with earlier deposition of Stratum VII.

**Stratum VII** represents a culturally sterile 2Cox horizon, consisting of a well-sorted gravel forset deposited in the Portland Basin during the Missoula Floods. It was characterized as a (10YR 2/1 to 2/2) black to very dark brown, with common medium (10YR 3/3) dark brown, (5YR 4/3) reddish brown, and (10YR 4/4 to 3/6) dark yellowish brown mottles, structureless coarse sand, with 99% rounded to subangular gravels (4:15:2 of granules:pebbles:cobbles). Very few fine roots were present when the upper stratum boundary was encountered below 70 cmbs (27.6 in.). The reddish brown mottles are more common near the interface with Stratum VI, suggesting downward translocation of iron oxide (FeO) through the sediment column. On the Officers Row, Stratum VII overlies unoxidized C horizon material in Block Y.

The majority of gravels have precipitate adhered to their ventral surfaces, identified as opal precipitates (SiO$_2$) with X-ray diffraction (Peterson 2011:285). These accumulated as dissolved silicates moved downward through the sediment column with meteoric water infiltration (Peterson et al. 2011:285). The presence of opal precipitates consistently observed on the base of the pebbles indicates that this stratum has remained in its primary depositional context. Opal precipitate was observed on clast surfaces oriented in multiple directions that are inconsistent with natural downward mineral percolation and accumulation. Roughly 10% of pebbles and cobbles recovered within Strata V and VI (Bw and C) had accreted opal precipitates, but were also seen with less frequency in Strata III and IV. Their presence indicates that upper portions of Stratum VII (2Cox) were entrained during a subsequent flooding event(s).
Excavations only intersected a maximum of 75 cm (29.5 in.) of this layer on the Officers Row (Block Y), and 20 cm (7.9 in.) on the parade ground (Blocks B, L and T). Stratum VII was not observed in the East Reserve Street trench. No krotovina were observed within this layer, and its lower boundary was not intersected. Differential cross-bedding was not observed in the upper portion of Stratum VII, but may be present at depths greater than those intersected by these excavations. On the Officers Row, Stratum VII was intersected in Block Y by a vertical shaft feature (Feature 810, Chapter Seven) originating in Stratum III.

Terrace Formation Summary and Implications for Interpretations of Historical Structures

The stratigraphy indicates that the features initially considered to be anthropogenic in origin were actually created as a result of natural geologic processes involved in terrace formation. The matrix within Strata III through VI consists of a mixture of fine particles (clay, silt, sand) and gravels throughout the natural sediment column, moving from matrix supported deposits in Strata III through VI to grain supported deposits in Stratum VII. The fine fractions supporting these clasts become larger in particle size with increased depth throughout the sediment column. They generally transition from a silty clay loam in Stratum III, to a silty loam at the top of Stratum IV, to a sandy loam in Stratum V (Bw), and finally a loamy sand in the lower portion of Stratum VI (C). Although the fine particles appear to be well-sorted, thereby indicating deposition in a low flow fluvial environment, this interpretation is not supported by the irregular vertical distribution of larger gravel clasts (cobbles) throughout the sediment column.
These data suggest as the flow diminished, the larger clasts, or cobbles, settled from suspension in a high-flow environment (i.e. a fast moving massive flood) into eroded channels as matrix supported deposits. Small channels and larger gullies were created during receding of previous flood waters and/or later inundations of the landform, such as during an influx of high energy water scouring sediments, generating irregularities in the lower strata boundaries. The greater depth at which Stratum IV was observed in Block H, and Stratum V in Block T, probably reflects larger gullies, whereas the cobble concentrations are likely within smaller eroded channels.

The presence of clays within Stratum III also supports a fluvial origin for this stratum. Few cobbles are present within Stratum III and the upper portion of Stratum IV layers, yet granules and pebbles are interspersed throughout the matrix, with clast size increasing with

![Figure 32. North central wall of Block H, depicting sub-layers within the AbB horizon (Stratum IV) in the vicinity of the enlisted men’s kitchen. Associated wood foundations (Feature 703) and sand deposit (Feature 717) are partially visible (Courtesy of FVNHS FOVA 3070-DI03-1037)
These layers were deposited in lower flow environments, either later during the latter stages of the flood event that laid down in a high flow environment the lower portions of Stratum IV, or during subsequent flood episodes that reworked existing deposits.

In addition, Stratum IV was observed between 30 and 70 cmbs (26.6 in.) in Block H (Figure 32), extending to a greater depth than identified in nearby Blocks F, G, J and N. Although deeper sections of this layer were first hypothesized to be a small root cellar, crawlspace or builder’s trench/platform below the ca. 1850s-1870s enlisted men’s kitchens, stratigraphic interpretation suggests otherwise. Four culturally sterile sub-layers (non-artifact bearing) were identified from varying gravel ratios (granules:pebbles:cobbles) within Stratum IV, and a gradual, wavy boundary was identified at the upper boundary of Stratum V in Block H. Three culturally sterile sub-layers were identified in Stratum V within Block T. The lack of abrupt or clear lower boundaries for these sub-strata negated the hypothesis that the greater depths of Stratum IV in Block H, and Stratum V in Block T, were created during ca. 1850s military construction activities.

Local cobble concentrations were observed within the matrix supported deposits in Strata IV to VII within steeply sided depressions in lower strata boundaries; two vertically oriented cobble clusters were observed at the base of Stratum IV (Figure 33). Stratigraphy suggests that these clusters were naturally deposited in a high flow fluvial environment. These natural cobble clusters were originally considered to be potentially cultural in origin, either stone footings or remnants of stones deposited inside a wood cribbing framework, similar to structural support systems identified at other mid-19th century Army garrisons in the Pacific Northwest (see Horton and Holschuh 2010; Stenger 1989). Larger angular cobbles were recovered at shallower depths in the sediment column in association with other architectural materials (wood, charcoal, brock,
Figure 33. View facing east of cobble concentration observed in matrix supported deposits in the AbB and Bw horizons (Strata IV and V), deposited during terrace landform formation. The wood foundation for the enlisted men’s kitchen (Feature 703) is partially visible above the photo board (Courtesy of FVNHS, FOVA 3070-DI03-0982).

nails, etc.). Therefore, in the upland portion of the VNHR varying thicknesses in strata and boundary disconformities are not necessarily anthropogenic in nature, but can reflect geological processes forming this Columbia River terrace, and were considered during stratigraphy and analysis of identified archaeological features (see Chapter Seven).

**Impacts to the Sediment Column**

Among the bioturbations encountered during excavation, both krotovina (filled-in animal burrows) and tree root stains were identified in the sediment profiles during the 2007 and 2008
excavations in Strata V and VI. They were generally described as (10YR 3/2 to 3/3) very dark grayish to dark brown (moist) in silty to sandy loam, and were distinguishable from Strata III and IV by soil consistency and compactness, as well as by color from the lighter surrounding Strata V and VI matrices. No krotovina were observed within Stratum VII. The extent to which bioturbation has relocated materials within the sediment column is assessed through a detailed analysis of the vertical arrangement of artifacts within the strata.

Test excavations in Block A were placed to examine the roughly circular, 2 to 3m (6.6 to 9.8 ft.) in diameter anomaly identified with GPR data between 52 and 95 cmbs (20.5 and 37.4 in.; Figure 18, Figure 34, Figure 35). Highly mottled sediments in the lower portions of Stratum III extended in some areas to at least 103 cmbs (40.6 in.) into Stratum VI. In addition, Strata IV through VI were identified at greater depths than seen 2 m (6.6 ft.) to the north/northeast in Blocks B and C (Appendix A).

An extensive complex of dark irregularly-shaped soil stains, indicative of bioturbation, observed in these layers were interpreted as former tree root runs. This explanation was verified by the presence of charcoal and root fragments within these stains. Although tree root systems are known to follow loose soils within privy shafts, this was not the case for this particular area based on the lack of artifacts, intrusive vertical sediments, and night soils. A 40 cm (in.) deep sondage excavated into Stratum VI verified that deeper sediments reflect the natural sediment column. As Strata II and III were observed at similar depths and strata thicknesses, with similar artifact assemblages, as recorded in Blocks B and C, the tree in Block A was removed prior to the early-20th century, likely before the late-19th century.
Figure 34. Base of Excavations of Block A, with sondage excavated in southeast corner (upper left). Sediment mottling and the lack of cobbles in the southern half (top) of this block is the source of the anomaly identified with GPR data. The larger cobbles were naturally deposited in a high flow fluvial environment. (NPS FOVA 3070-DI03-0953)

Figure 35. East wall profile of Block A, excavated to examine the GPR anomaly identified in the vicinity of the laundresses’ quarters. The irregular lower boundary of Stratum III was created by Pacific mole (Scapanus orarius) activity.
Impacts from Pacific mole (*Scapanus orarius*)

Among the known burrowing animals in the Pacific Northwest, Pacific moles (*Scapanus orarius*) have impacted, to varying degrees, the archaeological record of the VNHR parade ground. Active mole burrowing was noted onsite between 2007 and 2012, as evidenced by daily appearance of small piles of newly excavated soils in meandering linear patterns. Although identified at FVNHS (Grace 2009), it is unlikely that the eastern cottontail (*Sylvilagus floridanus*), known to use and adapt burrows created by other animals (Godin 1977), particularly those beneath structures (e.g. decks, porches, ramps, buildings with crawlspace), was a significant source of postdepositional bioturbation on the parade ground. Pacific moles are active year round and spend the majority of their time underground, foraging for earthworms and invertebrates. This results in two kinds of tunnels: surface runs and deeper galleries. Moles burrow in fresh soil to seek food, but they also maintain older burrows. This mole species was not introduced to Washington until the 1930s (Link 2004), therefore these naturally occurring intrusions decreased in frequency within the lower depths of Stratum VI. This may be due to an increase in clast percentages and maximum linear dimensions in the lower Bw, C, and 2Cox horizons.

A total of 59 unworked bone artifacts recovered from the excavations were determined to be Rodentia size 2 remains, an analytical size class that includes Pacific mole (*Scapanus orarius*) and brown rats (*Rattus norvegicus*). From these, a minimum of two individuals were identified based upon provenience. Characteristics of the majority of krotovina observed on the parade ground are consistent with evidence of Pacific mole burrowing activities. However, these could also be the remains of small skunks as officers at Fort Vancouver reported in the mid-19th century that “it was unpleasant to be awakened at night by hearing little pattering hoofs of skunks on the attic stairways of the big halls” (Kress 1928:36).
CHAPTER SEVEN
INTENTIONAL CONFIGURATION OF COMMUNITY SPACE
AS IDENTIFIED THROUGH STRUCTURAL (FEATURE) ANALYSIS

Thirty cultural features were identified in 1998, 2001, 2007 and 2008 relating to the construction, maintenance, demolition, and occupation of the American military mid-19th century buildings at Fort Vancouver. The structural analysis of architectural characteristics through spatial modeling enabled architectural features and artifacts to be correlated to map-documented buildings. Interpretation of archaeological features was facilitated through analysis of associated architectural materials, stratigraphy, and comparisons with 19th century American military construction techniques identified through archaeological investigations at the Fort Vancouver Quartermaster’s Depot (see Carley 1982; Chance and Chance 1976, 1982, Thomas and Hibbs 1984). Excavation data are used to examine the built-environment at Fort Vancouver, specifically, to spatially locate the intentional construction of military buildings. This chapter examines 1) how the historically map-documented buildings were constructed and 2) whether recorded dimensions for these structures can be confirmed, ground-truthed, and georectified. For placements on the landscape of excavation blocks discussed in text see Figure 17 and Figure 19.

This chapter begins by examining raw materials recovered during excavations (e.g. timber, brick, chinking and mortar, shingles, window panes, nails and door hardware), and their implications for discerning the construction history of these buildings. Features are then discussed in detail by occupation area, beginning with the commissioned officers, moving onto the enlisted men, and finally the non-commissioned officers and laundresses, both at Fort Vancouver and the Vancouver Ordnance Depot. These data assisted in extrapolating locations
and georectifying the mid-19th century structures. This was accomplished through spatial analyses of data obtained through non-penetrating subsurface investigations (e.g. magnetometer, GPR), architectural features, and construction materials using a computer-based Geographic Information System (ArcGIS 9.2). Newly created maps of 19th century military building positions and architectural material distributions are interwoven throughout this chapter, with the process used to georectify the structures and generate these maps presented as such. The surmised positions of several structures discussed in Chapter 3 are also discussed, including the 1850 Enlisted/Band Quarters, the northern ca. 1854 laundresses’ quarters (“R”), and the ca. 1854 mess-house and attached ca. 1859 two-story barrack. A brief discussion of the nature of the military built environment is followed by the construction of analytical units, based on spatial household boundaries, employed to address the expression of Victorian ideals through objectification by the officers, enlisted men, and laundresses (see Chapters Eight and Nine).

Analysis of Selected Temporally Diagnostic Architectural Items

The civilian transport ship Walpole arrived in 1849, loaded with two years’ worth of supplies (12,000 barrels of stores) for the Army (Ingalls 1849b:170,171). It also brought all manner of construction materials to the garrison, excepting “lumber, bricks, and lime” (Vinton 1850:146). My analysis of temporally diagnostic architectural materials confirmed the historically documented single mid-19th century (1850 to 1880) military occupation of the western portion of the parade ground and the Officers Row (see Chapter Three). Construction materials and hardware selected for temporal analysis include brick, mortar, nails, window glass, slate roofing tiles, and door and window hardware (doorknobs, pintles, hinges, etc.). As the
building supplies were ‘smeared’ across the site during demolition, those materials were not subjected to detailed intra-site comparison.

Timber

A total of 99,195 pieces of wood, charred wood, and charcoal were recovered. Being plentiful, timber was preferred for materials over local stone. The local rock sources were considered by Capt. Ingalls, Quartermaster (1849b:172) to be “of an inferior quality, not used in building – it is an indifferent basalt.” The soldiers logged timber from the woods, cutting it onsite with an Army-owned small horse-powered mill delivered on the transport ship Walpole (Carey 1931:92; Porter 1982:6 in Thomas and Hibbs 1984:57). This lumber was rafted from the HBC saw-mill located about six miles upriver on the Columbia (Erigero 1992:212; Ingalls 1849b:170). All of the intact wood foundation remnants observed during excavations are consistent with this form of manufacture, and differences in milling could not be ascertained from the foundations. (Intact wood foundations are further discussed below.) Since several fragments of chinking (n = 4) have evidence of regularly sized grooves, it is likely that the logs were milled either into a D-shaped or square (chink-style) profile. Historical building plans reported by Fort Vancouver personnel (Figure 7 and Figure 8) suggest that a D-shaped log profile was used in 1850, with interlocking saddle notches at the corners.

Brick

Bricks “for ordinary purposes” were easily manufactured on the Columbia or Willamette Rivers, but did “not answer well for fire-brick” (Ingalls 1849b:172). Bricks were crafted in the vicinity of the post (Hodges 1867). It remains unknown if soldiers utilized the abandoned brick-
kilns reported by Major Vinton (1850:149) near the HBC Cowlitz farm (north of Fort Vancouver, near present day Toledo, WA) or purchased them from civilian manufacturers. Local civilians were hired as brick-layers (Carey 1931:95,96).

A total of 107,483 brick, bisque, and chinking fragments were collected. Bisque is defined as baked clay, in these excavations seen primarily in reddish-orange rectangular clusters, interpreted as severedly decayed brick fragments. Chinking is comprised of materials used to fill in and insulate the wall crevices of log structures. Used as a bond between bricks or stones, mortar in these archaeological deposits was comprised of a mixture of coral or lime with sand and water.

In several locations bricks were observed decaying into bisque in situ. All bisque was considered brick for analysis. None of the bricks recovered during excavations were branded with the manufacturer’s name. Both brick (n = ~25,052) and chinking (n = ~1,165) fragments, respectively weighing approximately 85,721 g and 7,654 g, were analyzed to determine manufacturing techniques. The brick fragments range in color from brown and yellow-orange to red and red-orange. The most common coloration being a red-orange to orange-red; no deep red bricks typical of late-19th to 20th century manufacture were recovered. Typically, a single (<30 mm) brick fragment often has between two and three blended colors between the exterior and interior portions of the brick. The color variations in the brick are interpreted by Gurcke (1987) as originating from a number of manufacturers. The wide color ranges seen on these small fragments also suggest uneven heat distribution during firing, possibly from an updraft kiln (see Gurcke 1987:32,35), as would be expected from the burgeoning local brick manufacturing industry in the mid-19th century. The bricks were primarily hand-manufactured of soft-mud.
Figure 36. Fragment of a brick recovered from the 1850 enlisted men’s kitchen. The two large clay balls used to form the bulk of the brick were comprised of a harder material that the surrounding brick matrix.

Intact brick faces indicate the bricks were either sand-struck or water-struck from a mold during manufacture.

Fracture patterns observed in larger brick fragments indicate that brick clay was at least occasionally formed into round balls before being placed into the mold, and with the remaining space filled in with other softer clay materials (Figure 36). The two large clay balls used to form the bulk of the brick were comprised of a harder material that the surrounding brick matrix which has either fractured or eroded. This is unusual, as bricks are typically molded into their final shape with consistent clay and temper material for coherency in drying and firing (see Gurcke 1987). This process likely decreased the strength of the brick and it may signal the use of inexperienced brick molders in manufacturing. Of the five types of bricks identified at Fort Vancouver, the soft-mud brick (Type 05) has the widest variations in color and composition.
This soft-mud brick type is the most commonly recovered from the mid-19th century Quartermaster Depot at Fort Vancouver (Gurcke 1987:140-141).

Brick manufacturing thrived in the Willamette Valley beginning in the 1840s, but quickly expanded. The Hudson’s Bay Company purchased bricks in 1844 from local manufacturers, as well as operated their own brickyard near Fort Vancouver manufacturing soft-mud bricks sometime before 1846 (Gurcke 1987:42). Although only one brickmaker is listed in the 1850 federal census data for Portland, the brick business expanded to four manufacturers by 1853 (Gurcke 1987:42). This is due to the increasing demand for bricks by settlers arriving via the Oregon Trail. Local makers could not meet demand given that bricks were also imported to Fort Vancouver. During the 1850 construction of additional housing and service buildings at Fort Vancouver (see Chapter Three). Capt. Ingalls ordered 50,000 bricks from the Benicia Quartermaster Depot on 24 October 1850 (Gurcke 1987:42), at a cost estimated between $23 and $32 per thousand (see Gurcke 1987:47). The bricks arrived near the end of construction of the barracks and quarters surrounding the parade ground (completed in late November 1850). Most of these bricks were likely used for chimneys on the parade ground, and for other Army structures scattered across the post.

Firebricks were commonly manufactured in Great Britain and shipped to the Pacific Northwest in the mid-19th century (Gurcke 1987:48-59). Six large light gray firebrick fragments (four about 50 mm in size, two about 120 mm in length) were recovered from the enlisted men’s kitchen area (Block N, specifically from excavation unit PG50). Although one fire brick fragment was impressed with a partial branding, “C” / “O,” this brick cannot be confirmed as being manufactured by the COWAN company, whose bricks were imported into San Francisco in the mid-1800s, if not earlier. COWAN bricks have been recovered at other mid-19th century
Army sites in the Pacific Northwest, such as at American Camp on San Juan Island (Gurcke 1987:62). For a detailed history of the COWAN company, see Gurcke (1987:59-64).

Less than 0.1% of the brick fragments (n = 25) had a shiny coating applied to one face without a slip surface interface. Because there are no sewer lines installed in these structures (see Chapter Three), it is unlikely that these enameled bricks represent sanitary brick (see Gurcke 1987:100). Such fragments were only recovered from two areas, the 1850 officers’ kitchen cellar infill (n = 3) and the southern portion of 1850 band quarters (n = 14). It is unclear whether the bricks were intentionally vitrified for decorative use, or to increase their resistance to temperature.

Chinking and Mortar

Chinking was manufactured onsite from local mud (see Chapter Three; Brent 1856), and all fragments recovered (n = 1,195 or 7,645 g) were amalgamated with a high concentration of fine sand. Chinking is likely underrepresented in the parade ground artifact assemblage (n = 265 or 1,178 g) as small fragments were difficult to discern from the surrounding matrix by students during field excavations. As green log timbers dry, differential shrinkage, or “checking,” leaves small gaps between the logs and causes cracks to open in the timbers slowly over time. Chinking was periodically reapplied to these log structures to lessen drafts and replace pieces that had fallen out of the structures (see Chapter Three). Grass was used as well to fill in these gaps, evidenced by grass impressions (Figure 37) on 0.11% of the exterior chinking surfaces on (n = 27). Soldiers used leaves or pieces of fabric to daub the chinking material in between the wall logs, evidenced by leaf (n = 6) or fabric (n = 2) impressions seen on several chinking fragments.
larger than <30 mm recovered from deposits associated with the enlisted men’s complex and officers’ quarters.

Coral imported as ballast by the HBC from the Sandwich (Hawaiian) Islands (Caywood 1955; Hoffman and Ross 1974:81; Lummio and Tissot 2009), were crushed into lime. When “mixed with the soil and straw, well prepared, has been found to make a good ‘adobe’ or brick for chimneys” (Ingalls 1849b:173). Approximately 1,952 fragments of mortar were recovered, weighing 3190 g, all identified as lime or coral mortar, both characterized by a powdery white body with either small or no visible inclusions. The paucity of lime (n = 7) and coral (n = 2) fragments recovered from amongst the enlisted structures indicate that the mortar was likely prepared elsewhere, and then brought to these structures for use.
**Shingles**

Shingles were manufactured near the post (Hodges 1867) and after 1859, all of the buildings were roofed with shingles” (USWD, QGO 1872a:113; 1872b:39). These were likely wood shingles as slate quarrying was uncommon in the United States until the second half of the 19th century, with the height of production between 1897 and 1914 (Levine 1993). The low amounts of roofing slate recovered from the Officers Row (n = 72 or 23.9 g), the enlisted men’s complex (n = 831 or 86.0 g), and the laundress quarters (n = 93 or 12.1 g), as well as the recovered wire nails (see below), are likely associated with construction of late-19th century barracks and/or the extant ca. 1904 Double Infantry Barracks to the south of the 1850 Army structures.

**Window Panes**

Colors of flat glass shards were analyzed under both laboratory and ultraviolet light to assist in distinguishing window plane remnants from other panel bottle glass. All clear or aqua-tinted (as seen on the bisection plane of the glass) flat glass shards less than 0.2 in. thick, without evidence of mirror backing (reflective coating adhered to one side of the glass), were assumed to reflect remnants of window planes. Shards determined to have originated from mirrors or panel bottles, typically greater than 0.2 in. (cm) thick, were excluded from analysis.

When over five shards of window glass were recovered from the same excavation block, these were analyzed for temporal data. Window glass was dated using a method developed by Chance and Chance (1976) and sustained by Roenke (1978) with further analysis. The dating technique operates under the observation that 19th century window glass in the Pacific Northwest increased in thickness over time, such that modal thickness data can aid in dating structures and
any subsequent additions or changes (Roenke 1978:43). Calculations are based upon weight (g) rather than count to avoid overrepresentation by smaller shards.

This analysis assumes that a structure constructed at a specific time will have a single mode of window glass thickness, which would particularly be the case in remote locations, such as during the military garrison of Fort Vancouver, where window glass was imported in large lots at single time intervals. Window glass manufactured before 1959 behaves as a solid and does not flow towards the bottom of the pane over time creating varying thicknesses across a pane post-manufacture (Stokes 1999; Zanotto 1998). Therefore, differences in window glass shard thickness are related to variations in manufacture. Reuse of window glass panes, additions to structures and/or multiple construction/deconstruction events would, therefore, result in multi-modal distributions. The window glass fragments in this assemblage were measured with digital calipers to the nearest 0.01 mm. These metric data were converted to inches and means and modes obtained for comparison with established chronology for dates of manufacture (Table 4; adapted from Langford and Wilson 2002:51). Means for the data in unimodal distributions indicate the central tendency of the window glass thickness.

A total of 2,203 fragments of window glass were recovered. When examined by total weight (Figure 38), the window glass distributions for all enlisted and laundresses’ structures have a central tendency of a mode of 0.045 or 0.055 in., corresponding to date ranges of 1830 to 1845 and 1845 to 1855. Analysis of shards recovered from the officers’ quarters yields a mode of 1850 to 1885. Overall, the two highest primary modes date between 1830 and 1855, closely followed by 1850 to 1885. These manufacture dates are consistent with historical records documenting the construction, maintenance, and expansion of these mid-19th century military structures (see Chapter Three). Window glass and nails were purchased by the quartermaster’s
Table 4. Window glass thickness with corresponding date ranges.

| Dates (ca.) | Approximate Primary Mode in Use (in.)
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1810-1825</td>
<td>0.055</td>
</tr>
<tr>
<td>1820-1835</td>
<td>0.055</td>
</tr>
<tr>
<td>1830-1840</td>
<td>0.045</td>
</tr>
<tr>
<td>1835-1845</td>
<td>0.045-0.055</td>
</tr>
<tr>
<td>1845-1855</td>
<td>0.065</td>
</tr>
<tr>
<td>1850-1865</td>
<td>0.075</td>
</tr>
<tr>
<td>1855-1885</td>
<td>0.085</td>
</tr>
<tr>
<td>1870-1900</td>
<td>0.095</td>
</tr>
<tr>
<td>1900-1915</td>
<td>0.105</td>
</tr>
</tbody>
</table>

1 = The mode is the midpoint of the thickness measurement interval, rounded to the nearest 0.01 in. For example, the data plotted as a mode of 0.075 reflect window glass fragments with thicknesses in the range of 0.070 in. to 0.079 in., which corresponds to Roenke’s (1978) mode (or midpoint) of 0.075 in.

Figure 38. Window pane thickness distributions by historical structure based on total weight.
department for use in construction (Hodges 1867) through Army supply lines or possibly from the HBC at Fort Vancouver, given the higher concentrations of shards dating to 1830 to 1845.

**Nails**

A total of 10,677 nails and nail fragments were recovered (Table 39). The distinction in manufacturing technique serves as a temporal indicator. Hand wrought nails were imported prior to 1845 by the Hudson’s Bay Company (HBC) from cottage factories in England. They were also manufactured onsite by the blacksmiths employed by the HBC, and their presence is likely a result of the Quartermaster department either purchasing or manufacturing the nails themselves, for use in construction to supplement the nails shipped by the Army on the *Walpole*. Mid-19th century nails are associated with the construction, alteration, maintenance, and demolition of the Army structures on the western side of the parade ground. Machine-cut nails were manufactured throughout the 19th-century by cutting nail blanks from iron sheets of uniform thickness, resulting in nails with a uniformly thick, square/rectangular cross section (Ross 1975). This method of nail manufacture continued, with some changes, until ca. 1890 when wire-draw nails replaced the machine cut varieties because they were cheaper to produce (Visser 1996).

The nails recovered appear to be mostly of architectural function (98.3%). A total of 178 nails were determined to be of 19th century manufacture but non-architectural in function, consisting of ferrous square shoe nails (n = 94), boot hobnails (n = 73), cupreous upholstery nails (n = 3), cast square tacks (n = 7), and a horseshoe (n = 1).

Among the nails that could be definitively assigned a manufacturing technique (91.7%), the major distinction is between hand-wrought (n = 47), machine-cut (n = 9,542), and wire nails (n = 198). An additional 61 nails were unable to be identified as to their method of manufacture,
and an additional 643 nails were only able to be identified as square-bodied but are likely machine-cut nails with no identifiable diagnostic features of manufacture. Of the machine-cut, hand-wrought, and square-bodied nails, 3,876 were determined to be complete and analyzed by penny size (Table 39).

Approximately 2.3% of the machine-cut and square-bodied nails (n = 88) are larger than 18d; sizes commonly used in building framing. The large framing nails were only recovered from the Officers Kitchen cellar infill deposits (Block W and Thomas [1988]) and the Enlisted Kitchen, specifically Block H in association with plank footing supports (see below). No framing nails were recovered from the laundresses’ areas, at either Fort Vancouver or the Vancouver Ordnance Depot. The positions of large framing nails (50d or 60d) visually recorded during the 2007 and 2008 field excavations were used to assist with interpreting wooden architectural features.

About 53.3% of the complete machine-cut and square-bodied nails (n = 2,064) are between 6d and 16d in size, used for a variety of purposes in construction. The remaining 44.5% (n = 1,724) are 5d or smaller, used in finishing construction. Based on specific structural histories (see Chapter Three), these nails were used to provide partitions between rooms, frame the building interiors and exteriors, install flooring, trim, and slate tile shingles.

**Door Hardware**

Historical documents do not detail the source of other construction hardware, such as doorknobs, hinges, pintles, and locks. These were likely either purchased through Army supply lines or from the Hudson’s Bay Company mercantile operations at Fort Vancouver. Several door hardware artifacts recovered in 2007 and 2008 are similar to, if not exactly the same, as objects
archaeologically recovered from deposits associated with the HBC occupation at Fort Vancouver. As the spatial distribution of these objects assisted in interpretation of structure positions, they are discussed below with associated architectural features.

Archaeological Features

A total of 29 cultural features were identified in the 2007 and 2008 test excavations related to the mid-19th century Army occupation on the west side of the central parade ground. The majority of these are related to the mid-19th century built environment. Their characteristics, as well as the Vancouver Ordnance Depot non-commissioned officers and laundresses’ privy feature, are summarized in Appendix A. The locations of subtle topographic features and differential artifact densities roughly correlate with the historical building locations in this area. Overviews of excavation block locations discussed in text are depicted in Figure 41 and Figure 66. No architectural features or door construction hardware were observed in excavation Blocks N or S.

Architectural features were observed relating to the construction, occupation, expansion, and demolition of six historically documented mid-19th century buildings (Table 5): the westernmost 1850 officers’ quarters and kitchen, the enlisted men’s 1850 small quarters and large barrack, the 1850 kitchen, the ca. 1854 mess-house, and the southern ca. 1854 laundresses’ quarters. Two additional features were observed that reflected the locations of two shaft features, an early-1850s officers’ privy and one enlisted men’s refuse pit, the latter potentially reflecting the location of an unmapped mid-19th century outbuilding.
Table 5. Formal characteristics of mid-19th century military cultural features identified; ordered as presented in text.

<table>
<thead>
<tr>
<th>Feat. No.</th>
<th>Block (Unit)</th>
<th>Building Location Feature Type</th>
<th>Maximum Diameter/ Length x Width</th>
<th>Maximum Height</th>
<th>Position Above Site Datum</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>715&lt;sup&gt;1&lt;/sup&gt;</td>
<td>U (OR17)</td>
<td>Officers’ quarters, 1850 Demolition debris</td>
<td>59.1+ x 78.7+ (in.) 150+ x 200+ (cm)</td>
<td>32 (cm)</td>
<td>10 to 42 cmbs</td>
<td>Not fully excavated, partially sampled.</td>
</tr>
<tr>
<td>719&lt;sup&gt;1&lt;/sup&gt;</td>
<td>U (OR17)</td>
<td>Officers’ quarters, 1850 Rough-hewn wood footing?</td>
<td>12 x 78 (in.) 30.5 x 20.3 (cm)</td>
<td>Unknown</td>
<td>50+ cmbs</td>
<td>Not excavated or sampled.</td>
</tr>
<tr>
<td>714/716&lt;sup&gt;1&lt;/sup&gt;</td>
<td>W</td>
<td>Officers’ kitchen, 1850 Root cellar</td>
<td>98.4+ x 39.4+ (in.) 250+ x 100+ (cm)</td>
<td>-213</td>
<td>34 to 63+ cmbs</td>
<td>Not fully excavated. Previously sampled by Thomas (1988, Feat. 5).</td>
</tr>
<tr>
<td>805/805A</td>
<td>Y (ORST22, OR29)</td>
<td>Officers’ kitchen area, mid-19&lt;sup&gt;th&lt;/sup&gt; century Butchered bone concentration</td>
<td>27.6 x 31.5 (in.) 70 x 80 (cm)</td>
<td>21</td>
<td>15 to 36 cmbs</td>
<td>Stratigraphy suggests two temporally close disposal events.</td>
</tr>
<tr>
<td>810</td>
<td>Y (OR 30,41,42)</td>
<td>Officers’ privy 1850 to mid-1860s</td>
<td>59.1+ x 55.2 (in.) 150+ x 140 (cm)</td>
<td>116</td>
<td>28 to 144 cmbs</td>
<td>Northern portion fully excavated, southern portion remains in situ.</td>
</tr>
<tr>
<td>803</td>
<td>T (PG44)</td>
<td>Enlisted/band quarters, 1850 to ca. 1860s Brick footing demolition</td>
<td>39.4+ x 31.5+ (in.) 100+ x 80+ (cm)</td>
<td>8</td>
<td>9.80 to 9.73</td>
<td>Extends to the north and west of Block T.</td>
</tr>
<tr>
<td>708</td>
<td>H (PG17)</td>
<td>Enlisted kitchen, 1850 Rough-hewn wood footing</td>
<td>19.7 x 11+ (in.) 50 x 28+ (Circular)</td>
<td>38</td>
<td>8.83 to 8.665</td>
<td>Extends to the east of Block T.</td>
</tr>
<tr>
<td>807A (North)</td>
<td>M (PG52)</td>
<td>Enlisted kitchen, 1850 Rough-hewn wood footing</td>
<td>17.3 x 17.7 (in.) 44 x 45 (cm)</td>
<td>26</td>
<td>8.96 to 8.70</td>
<td>Within 2 in. (5 cm) of each other; pair indicates possible door location. South footing extends south of Block M.</td>
</tr>
<tr>
<td>807B (South)</td>
<td>M (PG52)</td>
<td>Enlisted kitchen, 1850 Rough-hewn wood footing</td>
<td>16.5+ x 19.7 (in.) 42+ x 50 (cm)</td>
<td>28</td>
<td>8.98 to 8.70</td>
<td>Extends to the north and south of Block M. Overlays two wood footings (Feat. 807).</td>
</tr>
<tr>
<td>807</td>
<td>M (PG52)</td>
<td>Enlisted kitchen, 1850 Brick footing demolition</td>
<td>39.4+ x 28.4 (in.) 100+ x 72 (cm)</td>
<td>16</td>
<td>9.12 to 8.96</td>
<td>Horizontal (3 x 1 ft.) and vertical (21.2 x 6.5 in.) planks. Abuts building underpinning.</td>
</tr>
<tr>
<td>703</td>
<td>H (PG07,08,17,18,60)</td>
<td>Enlisted kitchen, post-1850 Building expansion Footing/pier support, and underpinning</td>
<td>70.9+ x 35.4 (in.) (underpinnings) 39.4 x 36 (support)</td>
<td>180+ x 90 (underpinnings) 100 x 91.4 (support)</td>
<td>29.5</td>
<td>9.105 to 8.81</td>
</tr>
<tr>
<td>Feat. No.</td>
<td>Block (Unit)</td>
<td>Building Location</td>
<td>Feature Type</td>
<td>Maximum Diameter/ Length x Width</td>
<td>Maximum Height</td>
<td>Position Above Site Datum</td>
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<tr>
<td>815</td>
<td>H (PG17,56)</td>
<td>Enlisted kitchen, post-1850 Building expansion</td>
<td>Footing/pier support with box construction</td>
<td>31.5 x 4+ x 80 x 10+</td>
<td>10.2 (4 in.)</td>
<td>8.825 to 8.720</td>
</tr>
<tr>
<td>717</td>
<td>H (PG07,08,17, 18,56, 60)</td>
<td>Enlisted kitchen, post-1850 Imported ground leveling sediments with plank shadow</td>
<td></td>
<td>78.7+ x 70.9 x 200+ x 180 (Amorphous)</td>
<td>3 to 7 (varies)</td>
<td>9.075-8.890</td>
</tr>
<tr>
<td>812</td>
<td>H (PG05,06, 56,57)</td>
<td>Enlisted kitchen, post-1850 Brick pier and building demolition</td>
<td></td>
<td>78.7+ x 78.7+ x 200+ x 200+ (Amorphous)</td>
<td>8 to 10</td>
<td>9.02 to 8.92</td>
</tr>
<tr>
<td>813</td>
<td>H (PG57)</td>
<td>Enlisted kitchen, post-1850 Shallow postmold, flat base</td>
<td></td>
<td>8.7 x 8.7 x 22 x 22 (circle)</td>
<td>4</td>
<td>8.915 to 8.85</td>
</tr>
<tr>
<td>814</td>
<td>H (PG56,57)</td>
<td>Enlisted kitchen, post-1850 Shallow postmold, cone base</td>
<td></td>
<td>15.8 x 9.5 x 40 x 24 (egg-shaped)</td>
<td>14.5</td>
<td>8.885 to 8.740</td>
</tr>
<tr>
<td>709</td>
<td>H (PG22)</td>
<td>Enlisted kitchen, 1850 Partially charred flooring</td>
<td></td>
<td>39.4+ x 31.5+ x 100+ x 80+ (Rectangular)</td>
<td>16.5</td>
<td>9.075 to 8.91</td>
</tr>
<tr>
<td>709A</td>
<td>H (PG21)</td>
<td>Enlisted kitchen, 1850 Wood plank, footing support?</td>
<td></td>
<td>39.4+ x 15.8 x 100+ x 40 (Rectangular)</td>
<td>8.5</td>
<td>8.995 to 8.91</td>
</tr>
<tr>
<td>713</td>
<td>J (PG31)</td>
<td>Enlisted kitchen, 1850 Demolition debris, uncharred wood and fire-reddened soils</td>
<td></td>
<td>19.7+ x 25.6 x 50+ x 65 (Amorphous)</td>
<td>7</td>
<td>8.81 to 8.74</td>
</tr>
<tr>
<td>715</td>
<td>J (PG31)</td>
<td>Enlisted kitchen, 1850 Postmold</td>
<td></td>
<td>4+ x 4+ x 10+ x 10+</td>
<td>17.5</td>
<td>8.815 to 8.64</td>
</tr>
<tr>
<td>806</td>
<td>P (PG47,48,49)</td>
<td>Enlisted kitchen, post-1850 Burned plank/boards</td>
<td></td>
<td>87.8 x 7.1+ x 223 x 18+ (2 in.)</td>
<td>5</td>
<td>9.355 to 9.300</td>
</tr>
<tr>
<td>Feat. No.</td>
<td>Block (Unit)²</td>
<td>Building Location Feature Type</td>
<td>Maximum Diameter/Length x Width³ (in.) x (cm)</td>
<td>Maximum Height³ (cm)</td>
<td>Position Above Site Datum (m)⁵</td>
<td>Notes</td>
</tr>
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</tr>
<tr>
<td>806A</td>
<td>P (PG47)</td>
<td>Enlisted kitchen, post-1850 Relocated plank</td>
<td>6.3+ x 8 16+ x 20 5 (2 in.)</td>
<td>9.270 to 9.220</td>
<td>12 in. west of Feat. 806</td>
<td></td>
</tr>
<tr>
<td>804</td>
<td>Q (PG40)</td>
<td>Enlisted kitchen, post-1850 Building expansion Excavated depression for footing?</td>
<td>25.6+ x 34.3 14</td>
<td>9.22 to 9.08</td>
<td>Within original 1850 footprint of enlisted men’s kitchen.</td>
<td></td>
</tr>
<tr>
<td>802</td>
<td>Q (PG40)</td>
<td>Enlisted kitchen, post-1850 Building expansion Brick footing demolition</td>
<td>24.4 x 24.8 62 x 63+ 5</td>
<td>9.33 to 9.28</td>
<td>Within original 1850 footprint of enlisted men’s kitchen.</td>
<td></td>
</tr>
<tr>
<td>801</td>
<td>R (PG35,36)</td>
<td>Enlisted kitchen expansion, northwest corner, ca. 1860s; Or, nail reclamation, ca. 1870.</td>
<td>35.4+ x 43.3 90+ x 110 30</td>
<td>9.49 to 9.195</td>
<td>Fire reddened soils, dense. High density of 19th century machine-cut nails.</td>
<td></td>
</tr>
<tr>
<td>809</td>
<td>G (PG58)</td>
<td>Enlisted kitchen, ca. 1860s, west wall underpinning;</td>
<td>39.4+ x 1.6 100+ x 4 10 (4 in.)</td>
<td>8.705 to 8.610</td>
<td>Wood foundation, only upper portion charred</td>
<td></td>
</tr>
<tr>
<td>706</td>
<td>E (PG04,19)</td>
<td>Unmapped enlisted structure, ca. 1850s or 1860s Possible trench for footing</td>
<td>23.6+ x 11.8 60 x 34 (Rectangular) 21+</td>
<td>8.930 to 8.72</td>
<td>Only observed at intersection with B horizon.</td>
<td></td>
</tr>
<tr>
<td>712</td>
<td>B (PG27)</td>
<td>NCO/Laundresses’ quarters, ca. 1854 to 1870s Foundation sill</td>
<td>39.4+ x 4 100+ x 10 (Rectangular) 5</td>
<td>8.725 to 8.34</td>
<td>Sill slopes down to north. Krotovina beneath sill.</td>
<td></td>
</tr>
<tr>
<td>710</td>
<td>B (PG27)</td>
<td>NCO/Laundresses’ quarters, ca. 1854 to 1870s Possible trench for footing or refuse disposal pit</td>
<td>8 20 (diameter) (Circular) 20</td>
<td>8.695 to 8.39</td>
<td>Shallow pit feature, inverted cone shaped base. Infilled in single depositional event.</td>
<td></td>
</tr>
<tr>
<td>LQ-Ord</td>
<td>1-4</td>
<td>Sergeant/laundress quarters, ca. 1867-1873 to early-1880s Privy vault.</td>
<td>88.6 x 39.4+ 225 x 100+ 75</td>
<td>N/A</td>
<td>Upper portion truncated by modern utility corridors. Differential lensing, if present within vault, not recorded.</td>
<td></td>
</tr>
</tbody>
</table>

Notes: ¹ = Feature designator assigned post-excavation; ² = If feature located in all units within the excavation block, then the unit designators are not included; ³ = + feature extends beyond excavations, ⁴ = N/A as feature did not have associated sediments; ⁵ = cmbs is centimeters below ground surface.
Common to many excavation blocks were either intact milled boards, rough-hewn wood footings, postmolds, or a matrix of bricks (whole, fragments, or decaying into tiny bisque fragments), charred wood, and charcoal. These are all interpreted as reflecting mid-19th century military building locations (see Chapter Three), either through direct evidence of intact foundations or demolition debris. English measurements (in. or ft.) are used in reference to building sizes in the following discussion to facilitate comparisons with historically documented dimensions.

Foundations determined to retain their archaeological integrity were constructed of several different types of wood; either rough-hewn tree trunks or milled wood. Wood was either milled by American soldiers onsite with a small horse-powered mill, or purchased from the Hudson’s Bay Company saw-mill and rafted downriver for use (Carey 1931:92; Erigero 1992:212; Ingalls 1849b:170). Although the milled wood was plain sawn to various lengths, the dimensions used in building construction remained consistent; either 4 in. (10 cm) wide and ¼ in. (0.6 cm) thick boards, 4 in. wide and 2 in. thick, or 3 x 1 ft. (36 x 12 in. or 91.4 x 30.5 cm) quarter-sawn planks approximately 3/8 in. (1 cm) thick. Plank locations were also identified through board shadows reflected in soil discolorations.

**Officers’ Quarters, 1850 to ca. 1860s**

Through analysis of data obtained with the magnetometer (Figure 39), a large rectangular anomaly (No. 25) was observed about 35 ft. (10.7 m) east of the western ca. 1865-1866 officers’ quarters (Bldg. 7), with its center point positioned at 266.5N / 184E on the excavation grid. The data obtained with ground-penetrating radar also reflected an anomaly (green, yellow, and red coloring) in this area between 8 to 29 cmbs (3.2 to 11.4 in.) and 67 to 88 cmbs (26.4 to 34.5 in.),
but much larger in size and extending to the east (Appendix C). Immediately to the west, infrastructure rehabilitation efforts undertaken in 1988 on the Officers Row, consisting of a roughly 4.5 to 6.5 ft. (1.4 and 2 m) wide trench for an utility corridor (dark blue corridor) and new sidewalk (Figure 18), are also reflected in the magnetometer and GPR data.

Measuring roughly 32 x 26 ft. (10 x 8 m), a rectangular anomaly detected in the magnetometer data is interpreted as reflecting either the original or demolition location of the eastern portion of the 1850 officers’ quarters, 40 x 32 ft. in size, truncated to the west by the utility corridor (Figure 39). This interpretation is supported by the identification of archaeological deposits associated with the 1850 to mid-1860s officers’ log quarters during monitoring of this construction as part of the rehabilitation of the Officers Row (Thomas 1988:19-20). Consisting of burned soil, charred and unburned wood fragments observed just below the current ground surface (0.2 to 0.4 ft. or 0.6 to 0.1 m), these deposits reflect the destruction of a structure by fire. These were interpreted as the remains of the westernmost 1850 to 1860s officers log quarters, however, no intact wooden sill or foundation trenches were observed (Thomas 1988). Artifacts (n = ~80 to 90), observed in 1988 included domestic, personal and architectural materials associated with occupation of the mid-19th century officers’ quarters (Thomas 1988:20). These were not collected.

Approximately ten feet to the south, a linear anomaly on a roughly east/southeast to west/northwest orientation (yellow and orange linear coloring) was detected in both the magnetometer and GPR data (Figure 40). Holding that the rectangular anomaly reflects the position of the 1850 officers’ quarters, this linear anomaly is roughly in the same location as the front (south) edge of the attached 10 ft. deep front porch documented in the historical blueprints for this structure (Figure 7). In addition, this location places this officers’ quarters on the same
Figure 39. Contour map generated from magnetic survey data obtained on the Officers Row, with the rectangular anomaly (No. 25) outlined in blue. The interpreted locations of the 1850 officers’ quarters and kitchen (orange squares) and privy (orange circle) are highlighted in orange. Adapted from McDonald (2007:8,12).
Figure 40. Amplitude slice map generated for sediments between 33 and 54 cmbs from GPR data obtained on the Officers Row. Structures on 1850 map are depicted in georectified locations. The differences in color mottling are discussed in Appendix C.
alignment as that of the Grant House, correlating with all historical map depictions drawn between 1850 and the mid-1860s (see Chapter Three and Appendix B).

In 2007, a dense concentration of burned logs, fire-reddened soils (7.5 YR 4/6 strong brown sandy loam), wood ash, degraded brick and mortar, chinking, and machine-cut and square-bodied nails was intersected in Block U between 10 and 42 cm (4 and 16.5 in) below the ground surface (Feature 715; Figure 41). This feature was fully exposed within Block U, but only the southern portion was sampled; the northern portion is unexcavated and remains in situ. The horizontal extent of the feature was not delineated as it extended beyond excavations. The abundance of burned material is consistent with destruction of the 1850 officers’ quarters by fire.

Significantly higher quantities of nails, including five framing nails (20d or larger) were recovered from the northern half of Block U (OR21; Figure 42) within an area of burned earth that extended beyond the excavations. Due to field season limitations, this feature was recorded and documented, but not excavated and currently remains in situ. The concentration is roughly 12 in. (30.5 cm) wide with an east-west orientation, and is interpreted as reflecting the location of the northern log wall of the 1850 officers’ quarters.

In addition, one “agateware” doorknob was recovered in association with this nail concentration (Figure 43). This type of doorknob is characterized by a swirling red, brown, and white colored earthenware body with a clear or brown-tinted over-glaze. Versions of these agateware doorknobs were common in the third quarter of the eighteenth century, but there was a revival in the mid to late-19th century (Florida Natural History Museum 2010), consistent with the military occupation of the site. This doorknob style was attached to its spindle fitting with lead. When molten the lead was poured into the knob hole and then pressed onto its spindle fitting and set until the lead hardened (Hussy 1976:858) which helped avoid rattling. They are
Figure 41. View facing north of Block U at the base of excavations. The burned logs (reddish sediments with dense charcoal) functioned as floor joists for the officers’ quarters.

(Courtesy of FVNHS, FOVA 3070 DI-03-1050).

Figure 42. Plan view of Block U depicting demolition debris from the 1850 officers’ quarters. Feature 715 encompasses the entire block, while Feature 719 is encircled in dark blue.
commonly referred to as “Rockingham ware” manufactured in Swinton, Yorkshire, England or “Bennington-type” after a pottery in Bennington, Vermont, one of the manufacturers of these doorknobs, along with Connecticut, Liverpool, Ohio and Trenton, New Jersey potteries (Eastwood 1976). The doorknob suggests that Block U intersected the central portion of the northern log wall, near the rear exterior doorway.

In the southeastern portion of Block U, in association with large framing nails, three burned logs, each in a roughly north-south orientation with bark remnants, were identified roughly spaced about 12 in. (30 cm) from one another, with burned earth beneath them. These are interpreted as once functioning as joists supporting the first floor of the officers’ quarters. Unfortunately, the logs were too degraded to confirm that the buildings were constructed of D-shaped logs with interlocking saddle notches, as historic blueprints suggest.

In the southern portion of Block W, a series of four soil stains were observed, three of which are in interpreted as krotovina, potentially created during occupation of the structure given mid-19th century officers complaints about animals living below the buildings (see Chapter

Figure 43. Agateware doorknob recovered from the officers’ quarters deposits (Block U).
Three). In the center of the southern portion of Block U (southwest corner of OR17), at 50 cmbs
the top of a circular stain of fire-reddened sediments (5YR 4/6 yellowish red sandy loam), 12 x 8
in. (30.5 x 20.3 cm) in size, was observed encircled by charcoal (Figure 42). Although
unexcavated, this stain (Feature 719) may be the remnants of a wood footing rough-hewn from
tree trunks, similar to those observed in the excavations on the parade ground. Concentrations of
decaying brick and mortar observed in excavation Block U suggest that brick footings replaced
and/or supplemented the original wood footings during building maintenance activities in the
1850s or 1860s. An extremely dense deposit in the northwestern corner of excavation Bock U
(ORST15) of decaying brick and mortar may reflect the location of one of these footings. It
could not be determined whether this officers’ quarters was heated with a chimney, rather than a
wood stove (see Chapter Three).

Officers Kitchen, 1850 to ca. 1860s

Analysis of the contour map generated from magnetic survey data (Figure 39) and
ground-penetrating radar (Figure 40) yielded only one linear anomaly within the area of the 1850
officers’ kitchen, the utility corridor previously discussed. Although there are a number of
variations within the data obtained in this area (see Appendix C), no rectangular-shaped
variances were detected in the magnetic or GPR data obtained that could be potentially linked to
potential foundation locations for the kitchen.

During construction of the aforementioned utility corridor in 1987, a deep shaft feature
was observed north of archaeological deposits associated with the 1850 officers’ quarters
(Thomas 1988:7-18, Feature 6; see Chapter Five). Subsequent data recovery operations
identified nine archaeological strata, consisting of alternating layers of burned refuse and
Figure 44. View facing north of utility trench excavated in 1988 on the Officers Row (scale in U.S. survey feet). Charred wood flooring, interpreted as the floor of the kitchen cellar, is visible at the base of the trench, overlain by brick debris.

(Courtesy of FVNHS, NPS, FOVA 3043-0009)

Figure 45. View facing south of charred wood flooring, interpreted as the floor of the 1850 officers’ kitchen cellar.

(Courtesy of FVNHS, NPS, FOVA 3043-0014)
sediment deposits, with dense deposits of architectural, domestic and personal items. These nine strata were interpreted by Thomas (1988) as reflecting the disposal of building demolition debris within the abandoned kitchen cellar. Although excavations were undertaken up to 7 ft. below the current ground surface, excavation photographs (Figure 44 Figure 45) suggest that the cellar was probably only four ft. tall, with wooden flooring laid directly against the earth below during its construction. This was likely used as a root cellar, as officers and their families often grew their own vegetables for consumption in a small familial-type plot, when possible, because they were required by the Army to furnish their own subsistence stores (see Chapter Four).

Data obtained in 2007 support the root cellar interpretation. Excavation Block W intersected several lenses of varying sediments, one of which contained a moderately dense scatter of bricks and mortar within a sandy matrix in the eastern third of the excavations. In 2007, architectural materials recovered from this deposit consisted of a cupreous (copper, bronze, or brass) catch or lock mechanism, a ferrous door strike plate, and a 4 cm long ferrous (iron) weight-bearing hook, threaded on end to screw into wood. In addition, 2,365 machine-cut and square nails, ranging in size from large framing nails (n = 52) to finishing nails (n = 1,139) were collected. These materials support an interpretation that the Block W excavations intersected the root cellar identified by Thomas (1988), likely the central or eastern portion of the cellar. Because deposits were up to 7 ft. deep, upon confirmation that Block W intersected the root cellar location the exposed surface of fill deposits was recorded and excavations terminated.

Brick fragments recovered from Block W primarily consisted of intact half bricks with a deeper red coloring, left in situ (Figure 46). This typically indicates a manufacture date after the 1850s in the Pacific Northwest. This type of brick was not seen elsewhere in the mid-19th century Army deposits examined in 2007 and 2008. The brick may reflect later maintenance efforts.
Figure 46. Plan view of Block W at the base of excavations. The two brick scatters, interpreted as mid-19th century demolition and/or construction debris, likely connect beneath the modern roots and lens of gravelly soils. Feature 714 encompasses the entire excavation block, while Feature 716 is limited to the brick scatter.

carried out on the officers’ quarters. Or, it may be indicative of waste debris associated with mid-1860s construction and/or maintenance of other buildings on the Officers Row, as both of the
two ca. 1865-1866 extant officers’ quarters (Building Nos. 7 and 8) have full-height cellars with walls constructed of similar brick.

**Officers Privy and Refuse Deposit, ca. 1850s to ca. 1860s**

A strong anomaly was detected in both the magnetic and ground-penetrating survey data at the very northern portions of the excavation grid (289 N / 182 E). Within this area, the upper 15 cm of the sediment column is comprised of a moderate density 20\textsuperscript{th} century sheet midden, primarily consisting of architectural materials and large (40+ cm) fragments of a concrete sidewalk. These materials were likely deposited during landscaping activities, such as during the late-1980s rehabilitation of the Officers Row.

During systematic subsurface survey, an extremely dense concentration of butchered animal bone (Feature 805 / 805A; Figure 47) was observed accompanied by a low density of domestic artifacts, such as ceramic tableware, oyster shell, and a cupreous corset clasp with a keyhole shaped opening (similar in form to Sears, Roebuck and Co. 1902:314, No. 18R5032). The bone consisted primarily of domestic cattle (*Bos taurus*), sheep (*Ovis aries*) and pig (*Sus scrofa*). These remains were clearly butchered with techniques commonly used in the mid to late-19\textsuperscript{th} century by Army and associated civilian personnel (see Chapter Eight for detailed discussion). The associated soils consisted of compacted thin layers of clay loam, characterized as a very dark grayish to dark brown (10YR 3/2 to 2/2), with about 25% subangular to subrounded gravels (3:2 pebbles: granules). Differential layering of sediments indicates this deposit reflects at least two episodes of refuse dumping (805 and 805A). As they are vertically separated by an 0.8 to 1.2 in. (2 to 3 cm) layer of soil, these events both occurred within a short period of time. Historical records document that kitchen refuse was often discarded near the
building, rather than following the military practice of being put into barrels for later removal by the enlisted men for disposal by burying or burning near the Columbia River (see Chapter Four).

Upon expansion of excavation Block Y to the south, a vertical shaft feature at least 5 ft. (1.52 m) long (north-south orientation) and 4.6 ft. wide (150+ x 140 cmbs), was encountered between 11 and 56 in. (28 and 144 cmbs) below the ground surface, emitting a slight methane/sulfur odor during excavation (Feature 810; Figure 48 and Figure 49). Recognized as the location of a privy vault, portions of this feature extending south beyond excavation Block Y were left in situ in an effort to facilitate future “side-access” excavations (see Wheeler 2000).

Unlabeled structures shown north of the officers’ quarters on a ca. 1851 map, interpreted as denoting privy locations, were roughly 11 x 6 ft. in size (Table 1). The size of the vault is consistent with other structures of this size, once space for walls and seating were accounted for.

Figure 47. View facing north of the top of the concentration of butchered animal bone, interpreted as food refuse from the mid-19th century officers’ kitchen (FOVA 3080-BH-22Jul-2724).
Figure 48. Plan view of Block Y, depicting mid-19th century refuse deposit and privy vault associated with the mid-19th century military occupation on the Officers Row. Features 805 and 805 are the dense bone scatter encircled in blue, while Feature 810, also delineated in blue, extends beyond the southern limit of excavations.

Given that it is at least 5 ft. long, the privy vault likely accommodated simultaneous use by two individuals; commonly referred to as a two-holer. Although a vertical post roughly 4 x 4 in. timber in the northeast corner suggests that the corners of the privy vault were braced, the privy vault was unlined by brick or wood. This is not surprising considering the military privy vaults were regularly filled, abandoned, and relocated by the mid-19th century Army at Fort Vancouver.
until a point where the backyards of the officers’ quarters were “honey-combed with deposits of filth” (Marcy 1875:658; see Chapter Three).

At least 14 sediment lenses were observed during excavations in 2008 (Figure 49), with soil grain sizes ranging from clay loams to slightly sandy pebble matrixes. Each lens was observed sloping downward towards the southern 19.7 in. (50 cm) of Block Y. I then surmised that the southern wall of the excavation block was probably near the center of the vault. Most of these lenses are interpreted as representing periodic dumping of earth to limit emanating odors. Lime, commonly used to suppress odor, was often not available at the garrison in large enough quantities for this purpose. Gravel layers near the base of the feature are likely the result of vault side-wall slumps. Mid-19th century military personnel are reported to have complained that when the privy vault side collapsed not enough lumber was available for repairs (Carley 1982:287).

A sheet iron “tin ware” tea or coffee pot and welded eye strap hinge were recovered from the base of the privy vault. Used for doors, the eye strap hinge style was fashioned by blacksmiths employed by the Hudson’s Bay Company (HBC; Ross 1976), as well as in 19th century mass-production factories (Priess 2000:52). The hinge was not tapered or edge-beveled, retained a thin layer of wood grain and a series of evenly spaced square-body nails with their ends crimped back towards the wood grain. This style of hinge was commonly used on outbuildings in the 19th century (Priess 2000:52). Given its form, this hinge was likely deposited during relocation of a privy vault and/or maintenance of the above-ground privy house.

The sediment lenses in the deepest two-thirds of the vault were relatively free of artifacts, but for a 19th century cupreous pocket watch key wind (see Bell 1999:227, Figure D) located in the central portion of the privy deposits. A thick wood ash layer observed immediately below the capping sediment layer was interpreted as the abandonment of this privy location. This likely
Figure 49. Southwest wall profile of Block Y, depicting privy vault deposits intersected on the Officers Row, with various depositional lenses differentiated. Strata are described in Chapter Six. (Photograph courtesy of FVNHS, FOVA 3080-DI-04-1330).
resulted from cleaning out chimneys, ovens or wood stoves used for heating and/or cooking. This ash layer contained a wide variety of domestic and personal objects, including pen nibs, 19th century leather boot fragments, a ferrous spoon handle, butchered bone and eggshell fragments. In addition, a large number of ceramic sherds were recovered from this ash layer that refitted into three vessels, consisting of a porcelain teacup and a large transferprint pitcher with matching basin, both overlaid with hand-painted decorations (Figure 101). Their presence indicated a single dumping event for the ash layer (for more on the ceramics, see Chapter Eight). The ash and objects were likely dumped in anticipation of abandonment of the privy, as the final capping payer of sediment overlays this ash deposit. Based on the boot or shoe sole style (see Household Analytical Units), sediments and objects within the privy vault were likely deposited in the 1850s and/or 1860s.

Enlisted / Band Quarters, 1850 to ca. 1860s

One distinctively rectangular-shaped variance was detected in the magnetometer data on the parade ground, in the vicinity of the 1850 enlisted/band quarters (Figure 51). Measuring roughly 55 x 22 ft. (16.7 x 6.7 m) in size with a north-south orientation, its center point is at roughly 144N / 155E on the excavation grid. Given this anomaly’s similarity to historically documented dimensions for the ca. 1855 to mid-1860s enlisted/band quarters, this anomaly was interpreted as reflecting the position of a similar structure on the landscape. The southern portion of this anomaly was selected for archaeological testing.

Block T was positioned over the southeast corner of this anomaly, and intersected a dense concentration of degraded mid-19th century brick, common construction nails (6d to 16d), and charcoal (Feature 803; Figure 50). Additionally, a ferrous doorknob fitting for a square-bodied.
spindle and a ferrous pintle, with a cast iron mounting assembly for a self-closing door (the style ‘locks’ open by being held open by prominence on a hinge), were recovered from this excavation block. However, no doors are depicted near the southeast corner of this building in historical images (Figure 4 and Figure 6), although it is possible that one may be present on the eastern (front) side of the structure.

As this cluster of architectural materials extended beyond the north and west walls of excavations, this deposit is interpreted as representing the demolition of a brick footing originally in or near the southeast corner of the structure. Although the original 1850 enlisted / band quarters was likely constructed of wood rough-hewn footings, similar to the officers’ quarters.
and enlisted men’s kitchen, this brick footing may reflect either foundation maintenance or mid-
1850s enlargement of the structure as suggested by historical maps (see Chapter Three).

**Enlisted Men’s Barrack, 1850 to ca. 1870**

No features, architectural or otherwise, were identified within Block K, positioned behind
(west) of the 1850 enlisted men’s barrack, and Block L, placed within the barrack footprint
(Figure 52). However, smaller framing nails (n = 6) sized 16d and 20d were recovered from
Block K and ST28. Georectification of the enlisted men’s building complex (Figure 67) suggests
that ST28 (excavated in 2001) was positioned near the southwest corner of the 1850 enlisted
men’s barrack. This was consistently documented on historical maps as 30 ft. (9.1 m) east of the
enlisted men’s kitchen.

A moderately dense sheet midden deposit of personal and domestic objects was
recovered from Block K, and included brass military insignia (14th Infantry; see Household
Analytical Units), cellulose or tortoise shell comb teeth (n = 2), a mid-19th century haversack
hook (Bannerman 1927 [1980:273], No. 1795), a ferrous tobacco tab (n = 1), and a minimum of
five white ball clay pipes (n = 17). Three of these pipes displayed patterns not previously
identified at Fort Vancouver (see Appendix E; Figure 125-9, 125-14, and 125-20). Further east
beneath the main barrack (Block L), a low density deposit of artifacts included items small
enough to fall through the floorboards, such as a cupreous knapsack grommet, one tobacco pipe
bowl/spur fragment manufactured by Ford-Stepney, an unbranded ferrous tobacco tab, a folding
razor straight blade, and the distal taper of a scribe at least 9.4 in. (23.8 cm) long and roughly \( \frac{1}{4} \)
in. diameter. All of these materials are associated with the daily lives of enlisted military
personnel and support the interpreted function of this building as a military residential structure.
Figure 51. Contour map generated with Surfer 8.1 from magnetic survey data for the southwestern corner of the parade ground, with magnetic anomalies (black and light purple areas) potential building locations (multi) and positions of archaeological units (multi) depicted.
Figure 52. Cohesive map of features recorded during archaeological test excavations conducted in the enlisted men’s building complex on the parade ground. Plan views of Blocks E, G, H, J, M and T, and photographs of Block E, H, P and R are presented in Chapter Six.

Enlisted Men’s Kitchen, 1850 to ca. 1870

Sawn wood boards, planks, round wood blocks, and postmolds observed in Blocks G, H, J, M, P, and potentially Block R, are interpreted as reflecting the 1850 construction,
maintenance, and 1860s building expansion activities, with the greatest concentration exposed in Block H, immediately east of the west wall wood footing (Feature 708).

Three large round/oval wood blocks were encountered in Blocks H and M extending into the Bw horizon (Stratum V), and are interpreted as functioning as footings for the 1850 enlisted men’s kitchen (Figure 53 and Figure 54). Two of the footings were located adjacent to one another within the western half of Block M beneath demolition debris (Features 807A and 807B), and the third beneath a surface depression in Block H (Feature 708), its eastern half extending beyond Block H (Figure 56). Historical maps of the post consistently depict the enlisted men’s barrack 30 ft. (9.1 m) east of the enlisted men’s kitchen, with its eastern wall on north-south alignment running east of the extant ca. 1865 to 1866 officers’ quarters (Bldg. No. 7). This positions the 1850 barrack east of Block M. The distance between the wood footings in Bocks H and M is 18 ft. (5.5 m), matching the historically recorded width for the 1850 enlisted men’s kitchen (Table 1). Therefore, the pair of wooden footings in Block M reflect the original east and west wall corridors of the 1850 enlisted men’s kitchen, rather than the west wall of the 1850 enlisted men’s barrack.

Stratigraphy indicates that each footing was positioned within shallow excavations, similar to early Army construction techniques identified in the Quartermaster Depot (Thomas 1982:12-13; Thomas and Hibbs 1984:333). The two east wall footings were situated on a 1 in. (2.5 cm) thick layer of very level, hardpacked, very dark grayish brown (10YR 3/2) silty clay loam with <1% gravels, interpreted as sediment intentionally placed for leveling the ground surface for the footings. The base of the west wall footing (Block H) may have transitioned to clay if surrounding matrix was excavated to a deeper depth further exposing the feature. Each wood footing retained a circumference of bark, reflecting the limited timespan in which the
structures were constructed, starting in August and completed by the end of November 1850. Debarking logs is generally preferred before their use in construction, as bark removal not only allows the builder to assess insect damage, but can also reduce the attraction of many wood-consuming insects to the log once incorporated into the structure (Martin E. Adams, Archaeoentomologist, 2012 pers. comm). The footings are between 17.3 and 20 in. (44 and 51 cm) in diameter, with an average of 12.1 in. (30.7 cm) tall, although they were likely truncated during maintenance, expansion, and/or demolition of the kitchen as the east wall footing is about 15 in. (38 cm) tall. Footings were likely cut to different heights to accommodate a slight ground slope (south aspect) on the parade ground.

The interior of the footings are severely rotted, with multidirectional sections of wood grain suggesting that as the footing decomposed, the wood fell inwards towards the pith or xylem. While the footing along the west wall (Block H) was not burned, the east wall footings’
interior and upper 2 in. (10 cm) along the exterior are charred, indicating exposure to fire, likely during demolition of the structure. Footing bases were possibly protected from burning by their covering sediments. A greater proportion of the interior of the northern east wall footing (Feature 807A) was burned and filled with fire-reddened soils, suggesting the heat of the fire was unevenly distributed. All three footings underwent repair or replacement and were subsequently filled in with sediments and cultural materials.

The two east wall footings contained an extremely dense concentration of 19th century artifacts including architectural, domestic, and personal materials. Patches of degrading mortar were present at varying depths within these footings, interspersed with the artifacts. A large half-moon shaped boulder with patches of sand resting on its upper face was observed intentionally placed against the circumference of bark on the top of the northern footing. Because it is superimposed over sediments and artifacts (apparently used to fill the interior footing cavity)

Figure 54. Plan view of rough-hewn wood block footings (blue ovals), reflecting the 1850 enlisted men’s kitchen east wall corridor position, overlain by demolition debris (Feature 807), including remnants of brick pier remnants over the southern (Feature 807B) footing.
I interpreted that its function was to increase kitchen sill stability and protect sagging related to internal footing rot, rather than during demolition. A dense concentration of scattered mid-19th century brick and degraded mortar was encountered resting on the top of the southern east wall footing (Feature 807B). This is interpreted as the remnants of brick footing piers constructed over or adjacent to the earlier wood footing, probably to increase structural integrity of the foundation sills as well.

In turn, a very dark grayish brown (10YR 3/2) clay loam, with <1% gravels, containing an extremely dense concentration of architectural, domestic and personal artifacts (Feature 807) was observed covering both east wall footings, including the boulder and brick scatter, and extending beyond Block M to the north and south. This is interpreted as reflecting demolition debris. My analysis determined this deposit was placed to fill in the depression left by the footings along this section of the east wall corridor. No evidence of wood foundation underpinnings was observed during excavations along the east wall. However, these may not have been placed alongside wood footings, as the 4 x ¼ in. board underpinnings (Feature 703) identified in Block H was not positioned adjacent to the west wall wood footing.

Along the east wall in Block M, one 3 in. wide, 1 in. thick, iron, parallel-plate, double bolt padlock with a two-‘eared’ front plate and two horizontal locking bars but lacking a drop, was recovered from this demolition layer (Figure 55). This style of padlock was commonly used throughout the 19th and early-20th centuries (Priess 2000:81); padlock body size and the strength of the locking mechanism indicate it likely secured a door. In addition, an iron hand-wrought, wrapped pintle, typically used by the HBC for fastening doors to their frames, was collected from the Ab horizon in the eastern half of Block M. These pintle and padlock styles, the latter with brass drops, have been archaeologically recovered from deposits associated with the HBC.
occupation at Fort Vancouver (Ross 1976:870,877). These were likely procured either through purchase or opportunity from the HBC by early military personnel for use at the garrison. Given the close spacing of the east wall footings, their position could reflect the location of the kitchen’s main exterior door, particularly as the padlock and pintle were recovered nearby. Similarly clustered footings were observed beneath the main door at an ca. 1860s Army officers’ quarters built at Fort Bellingham and relocated to American Camp on San Juan Island, Washington during the mid-19th century boundary dispute between the United States and Great Britain (cf. Horton and Holschuh 2010:57-78).

A series of regularly ordered milled planks and boards, functioning as a footing or brick pier support and an “underpinning” as referred to as in military documents, was encountered in Block H (Figure 56 and Figure 57). Underpinnings refer to long, thin, vertically oriented boards positioned beneath the main sills along the perimeter of a structure. The underpinnings were typically installed to reduce drafts and keep rodents and other small animals from rummaging under the structure. Two parallel horizontal 3 x 1 ft. plain sawn planks spaced 10 in. (25.4 cm)
apart, each with a north-south orientation (Feature 703), were observed at the top of the Ab horizon (Stratum III) in association with a series of vertically oriented 4 x ¼ in. boards. The east plank abuts the underpinning identified east of the wood footing (Feature 708). Two vertically-oriented planks, at least 21.2 in. (54 cm) long and 6.5 (16.5 cm) tall, were identified inset on each end of the western horizontal plank. Stratigraphy indicates that these vertical boards were placed in a roughly 4 in. deep excavation and each was observed with a 1 ft. tall, 4 x ¼ in. vertical board placed on its bucked end abutting their eastern side.

A concentration of large American machine-cut framing nails (50d or 60d, n = 6) and common construction nails was observed within sediments overlying the two horizontal planks (Figure 57). The framing nails roughly orientated above and along the southern vertical inset board. Although no vertical boards were detected on the western side of the horizontal plank, two framing nails were detected inserted into the western plank perpendicular to the plank’s main axis, suggesting that a vertical board was likely present in this area when the footing was constructed. The vertical side boards of the roughly 3 x 3 ft. square ‘box’ alignment, with 90° corners, would have provided structural support and prevented shifting of the horizontal planks when the building load was released onto the new footings/piers.

On the northern side, a 4 x ¼ in. horizontally orientated plank was positioned 2.4 in. (6 cm) above the vertically oriented inset board and about 4 in. above the 3 x 1 ft. horizontal plank. This board intersected the underpinning alignment along the eastern wall of the enlisted men’s kitchen, continuing to the east another 7 in. (18 cm) underneath the original footprint for the 1850 enlisted men’s kitchen. From this board, one underpinning extended 5 ft. (60 in. or 1532 cm) to the south, and another northward at least 2.6 ft. (31.5 or 80 cm) before continuing beyond the Block H excavations (Figure 56 and Figure 57). This arrangement indicates that the roughly
box-shaped footing support was constructed when the underpinnings were installed, or the northern underpinning was installed later with placement of the 4 in. wide horizontal board.

Figure 56. View facing north of intact architectural features (703 and 708) identified in Block H related to the construction, maintenance, and expansion of the 1850 enlisted men’s kitchen. These are represented by an original wood footing (lower right), two vertically-oriented boards functioning as building underpinnings (center left), and two horizontal planks (center) upon which a brick pier or wood block footing would rest, installed as part of maintenance activities.

(Courtesy of FVNHS, FOVA 3070 DI-03-0991).
The northern 2.4 in. (6 cm) of a second series of horizontal and vertical milled wood boards (Feature 815) was encountered 3.5 ft. (42 in. or 107 cm) to the south, offset 1 ft. (30.5 cm) to the west, also interpreted as a footing/pier support. This milled board cluster was better preserved, and observed with a strikingly similar alignment. However, only one 3 ft. long plank with an east-west orientation was identified, and it too was encased by three vertical 4 x ¼ in. wood boards (Figure 57). Unlike the box construction to the north, a 4 x ¼ in. vertically oriented board with its main axis on a north-south alignment, was observed resting on the eastern edge of the horizontal plank, with common construction nails attaching it to the partially exposed horizontal plank. Although only one horizontal plank was identified, I determined that the unexcavated associated milled wood boards south of Block H are positioned in a similar square, or box-shaped, configuration. Except for the removal of the northern vertically oriented 4 x ¼ in. milled board, the boards were left in situ.

Radiating west and northward from these footing supports, excavations intersected a discontinuous amorphous-shaped layer of (10YR 4/4) dark yellowish brown loamy sand (Feature 717) with ~40% subrounded to subangular gravels (7:5 ratio of granules:pebbles), with high concentrations of extremely fragmented calcined bone and other domestic and subsistence-related artifacts. This layer was partly truncated but not identified within ST25 excavated in 2001. The amorphous sediment extended approximately 72 in. (183 cm) west from the eastern wall underpinning, avoiding both formations of milled horizontal planks. The horizontal extent of the underpinning was not delineated as it extended north and south beyond Block H. The sand increased in thickness and artifact density moving from southwest to northeast, towards the kitchen’s east wall underpinning and wood footing. The lack of bullets recovered from this sandy
Figure 57. Plan view of intact architectural features identified in Blocks H and J related to the construction, maintenance, and expansion of the 1850 enlisted men’s kitchen. ‘Box’ arrangements of planks and boards (Feature 703) were installed to increase the structural stability of the wood block footing (Feature 708), and imported sand (yellow, Feature 717) deposited to level the ground surface, both during expansion or maintenance of the kitchen. The kitchen was partially destroyed by burning, evidenced by wood flooring (Feature 709, Block H, far right) collapsing in place, and dense wood, charcoal and brick scatters (Features 702 and 713), the latter the remnants of brick piers.
deposit suggests that it did not originate from a sand trap from a military target range (cf. Stratum IIa in Chapter Six).

In the 19th century, the military frequently sanded and swept building floors during routine cleaning and policing activities (Figure 57). Given the amount of calcined bone detected within its matrix, this deposit may have been used to sweep the kitchen floors and hearths before its deposition. This lens was identified in the middle of the Ab horizon (Stratum III), sandwiched between mid-19th century Army deposits which indistinguishably merged together further west. The upper boundary of the sand lens was relatively consistent horizontally, interpreted as reflecting ground leveling activities undertaken in preparation for kitchen expansion, as suggested by 1860s maps of the post.

A distinct rectangular-shaped roughly 3 x 1 ft. area, with a north-south orientation, was identified during excavations about 6 in. (15.2 cm) west of the rough-hewn wooden east wall footing (Feature 708). As it has the same dimensions as the nearby horizontal planks, this discrepancy suggests that an additional plank was present in this location, prior to deposition of the yellow sand, but has since been removed leaving behind a “shadow.” Domestic artifacts, such as a fork, copper spoon, S-shaped hook, and an articulated butchered pig’s foot were recovered from within the plank shadow.

No intact brick configurations were encountered except to the west in Block H where a dense scatter of degraded brick fragments, mortar, charcoal and domestic artifacts (Feature 702) were recovered. These deposits were located to the west beneath the imported dark yellowish brown sandy sediment. These materials suggest that a brick pier(s) were present; one potentially sat on a plank represented by the rectangular lack of sediment (interpreted as a plank shadow). The excavations in the mid-19th century Quartermaster Depot recorded the brick piers not rising
above the foundation lines (Thomas 1982). A single-locking mechanism shackle for a 3 in. parallel-plate padlock (shackle pivot point width indicates single locking bar) was recovered from among the brick, indicating that a door was near this location, possibly for a wood shed or storage area.

West of the plain sawn plank boxed footing supports, two shallow postmolds were observed near the base of the mid-19th century Ab horizon (Stratum III) west of the ground leveling sand lens (Figure 58). The postmolds were offset about 8 in. (20 cm) to the north from being in parallel alignment with the rough-hewn 1850 west wall wooden footing (Feature 708) and plank shadow. These postmolds were distinguished from the surrounding Ab/AbB horizon.

Figure 58. Bisection profile of eastern postmold (Feature 814) identified beneath the enlisted men’s kitchen. The western circular postmold (Feature 813) is visible in the background. Posts in these areas likely may have functioned as porch supports for the kitchen, prior to building expansion (Courtesy of FVNHS, FOVA 3080 DI-04-1258).
transition though their higher clay content. Soils were characterized as a (10 YR 3/2) very dark grayish brown moist silty clay loam, with 45% rounded to subangular gravels (4:5 ratio of pebbles to granules) and common fine to medium charcoal flecks. Given their shallow depth and narrow widths, these may reflect positions of porch or woodshed supports for the 1850 enlisted men’s kitchen.

The western postmold (Feature 813) consisted of an almost perfectly circular slightly bowl-shaped depression 1.8 in. (4 cm) deep, with a diameter of 8.7 in. (22 cm). Approximately 1.8 in. (4 cm) directly east a second roughly egg-shaped depression, 15.6 x 9.5 in. (40 x 24 cm) in size, about 5.9 in. (15 cm) deep with a shallow cone-shaped base (Feature 814) was observed containing wood and charcoal fragments. Similar postmolds have been uncovered in excavations conducted within the quartermasters’ depot with larger dimensions or with associated wood post remnants (Thomas and Hibbs 1984). Neither of the postmolds were covered by dense charcoal or brick deposits, such as those present immediately to the north, west, and south (Feature 702), nor was there any presence of the dark yellowish brown sand lens (Feature 717), observed about 7.9 in. (20 cm) to the east. The domestic and architectural artifacts recovered from these postmolds were associated with the mid to late-19th century Army occupation, indicating that the postmolds were infilled shortly after post removal. These posts were either replaced with building improvements in the 1860s or removed during demolition in 1870.

A series of intact milled boards were observed extending west from the 1850 west wall of the enlisted men’s kitchen. Maps of the post drafted in the 1860s (see Chapter Three) depict the kitchen with larger dimensions; these boards are interpreted as reflecting this expansion. Concentrations of brick which once functioned as brick piers were likely constructed during maintenance or building expansion activities extending from the northwest of the west wall.
Intact plain sawn boards were observed in the northern 20 cm (8 in.) of Block P (Features 806 and 806A, Figure 59). An uncharred 4 x ¼ in. board, at least 7.3 ft. (87.8 in. or 223 cm) long, horizontally positioned with an east-west orientation, was unearthed near the northern edge of the excavation block. Its eastern terminus and southern edge were defined by 2 x ¼ in. vertically-oriented boards, whereas a 4 x ¼ in. horizontally-laid board was observed at its western terminus. About 20 in. (50 cm) to the west from the eastern edge, a second perpendicular 4 x ¼ in. board was observed extending beyond the north wall of the excavation block. Directly west, a second horizontal 4 x ¼ in. wood board was located 12 in. west on the same alignment extending north beyond Block P. Abutting this board to the west, another 4 x ¼ in. board was recorded extending west beyond the excavations. The horizontal boards likely functioned as base supports for wooden footings or floor joists, as little brick was recovered from this block.

The eastern terminus of this series of milled boards aligns with the long 4 x ¼ in. underpinning (Feature 703) observed 6.7 m (22 ft.) south in Block H. These two architectural features could reflect the foundations for different construction periods. The historical maps
Figure 60. View facing north of enlisted men’s kitchen floor and joist that collapsed during demolition by burning (Feature 709). An angled single plank used as a brick pier footing support (Feature 709A), and underpinnings (Feature 703) are both visible to the west (left).

(Courtesy of FVNHS, FOVA 3070-DI-02-053)

show that 1850 enlisted men’s kitchen was enlarged in the 1860s. In Block H, no traces or evidence of burning were found, but some calcined bone about 10 in. (25.4 cm) south of the east-west board, was observed in this excavation block. Therefore, this portion of the building was likely not demolished by fire, but the wood likely reclaimed and reused, or burned elsewhere, possibly for fuel.

Demolition debris was also observed in the eastern portion of Block H, beneath the 1850 enlisted men’s kitchen (Figure 60). Three milled wood planks, each roughly 12 in. wide and 1 in. thick, were observed bordering one another 4.5 ft. (138 cm) east of the kitchen underpinnings (Feature 703). Each plank is at least 3 ft. long with slight undulations in their horizontal planes. These boards are interpreted as kitchen flooring, and extend beyond the excavation perimeter.
The top 1 cm of the floorboards was severely charred. Immediately beneath these along the east wall of Block H, a 4 in. thick and at least 4.7 in. wide timber, once functioning as a building joist, was intersected with only its upper surface burned. A single uncharred 3 x 1 ft. plank was visible about 4 in. to the west, and likely functioned as a brick pier support. The plank is partially covered by at least two intact, well-preserved bricks observed along the north wall, likely once part of the pier itself. As the pier support plank orientation is offset by 10° from other intact wood architectural remains, its identified location probably does not reflect its original position below the kitchen. No complete nails were recovered from this area. The low density of artifacts was recovered from among the burned wood included tobacco pipes (MNV = 3), melted glass, and animal bone.

The joist and flooring planks all follow the main axis of the kitchen with a north-south orientation. Burned soils, represented by (5YR 5/6 to 6/8) yellowish-red to reddish-yellow silty loam, were observed immediately beneath the charred wood. The variations in upper surface elevations indicate that burning floor planks and the joist collapsed while the fire was hot enough to burn the earth below. Because the footing support was not charred, it suggests that this portion of the kitchen fell towards the east, thereby avoiding the pier support. The stratigraphy indicates these materials were quickly buried by the military.

Concentrations of wood and brick were also observed in Blocks G, J, and Q. These represent debris scatters related to demolition of the enlisted men’s kitchen. In the southwestern corner of Block J, a cluster of scattered uncharred wood fragments 1 to 2 in. thick (Feature 713) was observed associated with a 4+ in. stain of fire-reddened Ab horizon soils (Figure 57). The largest (10+ cm) wood fragments are rectangular in shape showing evidence of milling and reflect demolition of the structure. Approximately 3 ft. to the north a culturally sterile, 7 in. deep
square or rectangular (10+ x 10+ in.) layer of (10YR 4/1) silty clay was identified (Feature 715). Both of these features extended to the west and north or south of Block J. The burned soils and clay deposit may reflect the location of footings or posts as they are in alignment with the southern ‘box’ construction footing support (Feature 815; Figure 52). A moderately dense deposit of architectural, domestic (ceramics), and personal (buttons, pipes) items was recovered from this area.

Block Q was excavated within the 1850 and enlarged 1869 footprints of the enlisted men’s kitchen. Excavations in its western half exposed two architectural features (Figure 52) where a small anomaly was detected in the magnetometer data and hypothesized to reflect a concentration of artifacts (McDonald 2001a, 2001b). The northern portion of a 5.5 in. (14 cm) deep, roughly oval-shaped pit (Feature 804) was identified containing degraded brick, lenses and pieces (n = 17) of degraded mortar, one of which was about 3 in. long (7.8 cm) weighing 51.8 g, and fragments of uncharred wood, including two 4 in. long scraps of milled 4 x ¼ in. board. Silty loam feature sediments were distinguished from the surrounding AbB horizon (Stratum IV) by their very dark grayish brown (10YR 3/2) color, loose consistency, and lower proportion of gravels (15%) within the matrix. Less than 4 in. to the northwest, a shallow (2 in. or 5 cm deep), but dense concentration (Feature 804) of degraded brick, charcoal, finishing (n = 14) and common construction nails was identified (Feature 802) extending to the west beyond the excavations. The pit feature may represent either the location of an original wood footing which was later replaced by a brick footing during foundation maintenance or mid-1850s enlargement of the kitchen. The brick footing probably was later demolished towards the west, given the closely spaced cluster of degraded brick.
One ferrous 19th century threaded screw-top jar lid and five pieces of cast iron were recovered from the western third of Block Q (PG40), with the two largest fragments 2 and 3.6 in. (5 and 9.1 cm) possessing 0.2 in. thick and tall (5 x 5 mm) circular ridges; interpreted as a probable stove burner plate. As the 1850 blueprint (Bomford [1851:b]) indicates that the enlisted men’s kitchen had a masonry fireplace with opposing fireboxes. The presence of a cast iron stove suggests that Block Q was close to the central portion of the kitchen. Personal items collected from this excavation block with a personal function included military insignia (unknown regiment, Company G; see Chapter Nine), and tobacco pipe fragments featuring seven patterns, four of which are newly identified (see Appendix E, Figure 125-6, 125-13, 125-17, and 125-22).

Approximately 72.1 ft. (22 m) to the north, Block R intersected an area of burned earth (Feature 801; Figure 63) located at a linear anomaly detected in the magnetometer data, approximately 28 by 5 ft. (8.5 x 1.5 m), roughly centered at 136N / 160E on the excavation grid. This portion of the parade ground had clearly experienced an extremely hot fire, as evidenced associated fire-reddened soils (10YR 5/6 to 5/8 - yellowish brown to yellowish red) encountered at a depth of 7.8 in. (or 20 cm). No intact architectural features, such as foundations, footings, or underpinnings, were observed within Block R, or within Block S (excavated 6.6 ft. [2 m] to the east). The only exception were one unbranded ferrous tobacco tab and a few white ball clay tobacco pipe fragments (n = 17), representing a minimum of three tobacco pipes, one manufactured by Ford Stepney and sold by the HBC; no other personal or domestic artifacts were recovered from Block R. Small dense clusters of machine-cut and square-bodied nails (n = 735) was observed associated with these deeply burned sediments. This feature potentially represents an area associated with construction, expansion, or demolition of the 1850s structures near this area. Cut nails were annealed (heated) to prevent them from splitting when clinched.
Figure 61. Southwest wall profile of Block R depicting the burned earth interpreted as either the northwest corner of the ca. 1860s expansion of the enlisted men’s kitchen, or a nail reclamation area used during demolition of the enlisted men’s building complex.

(Courtesy of NPS, FOVA 3080 DI-02-0127).

(Sutton 1996:164), and wood containing nails was often burned away to reclaim the nails for further use. Using the enlarged dimensions for the enlisted men’s kitchen as depicted on historical maps (USWD 1869; Winman 1871), I determined that the northwest corner of the 1850 enlisted men’s kitchen was likely positioned within the vicinity of this burned earth.

Approximately 72 ft. (22 m) directly south, one partially charred, vertically oriented, 4 x \(\frac{1}{4}\) in. board was identified in Block G with a north-south axis (Figure 62). Given that it is too thin to serve as a floor joist support, it is interpreted as part of the underpinning for an expansion to the enlisted men’s kitchen, possibly a wood shed or the building itself. This board extends beyond the excavation block; therefore its southern terminus remains unknown. The upper 1.6 in. (4 cm) of the board is charred, indicating this section of building was demolished by fire. The lower portion of the board was not burned because it was sitting beneath the ground surface.

Associated artifacts consist of primarily construction materials and hardware (including several framing nails) and a moderate density of domestic and/or personal materials. Given its
Figure 62. View facing east of a partially charred 4 x ¼ in. wood board (represented as a black vertical line) functioning as an underpinning for the ca. 1860s expansion of the enlisted quarters.

position relative to the enlisted men’s kitchen, which is offset from the 1850 alignment to the southwest (Bonneville 1854; Covington 1855; McConnell 1854), the board was likely situated along the southern portion of the building expansion.

Archaeological investigations conducted in 1980 and 1981 at the Rufus Ingalls’ House, (1850 to 1937) and in the quartermasters’ depot noted several different types of foundation structures, several of which were also identified on the parade ground. In the quartermaster’s depot wood blocks were placed into shallowly excavated pits resting on wooden planks (Thomas 1982; Thomas and Hibbs 1984). These were later replaced with brick during building maintenance or expansion. They were generally positioned along the exterior with a 16 ft. (14.9 m) buffer between the brick piers and the foundation (Thomas 1988:24). A similar pattern was depicted by the architectural features observed in excavations conducted at the 1850 enlisted men’s kitchen. Originally, the kitchen was constructed using wood footings quickly manufactured from tree trunks in the fall of 1850 (see Chapter Three). Concentrations of
decaying brick and mortar suggest that brick footings replaced and/or supplemented the original wood footings during building maintenance activities in the 1850s or 1860s. A series of intact wood foundations in Block P, and possibly Blocks R and E, supported by historical maps that indicate the kitchen was enlarged before its demolition around 1870. No evidence of the chimney or the north or south walls was noted during excavations.

The general lack of brick suggests that salvageable materials were recycled for other uses during demolition of the buildings. Wood was likely reused as well, for both construction and fuel purposes. Portions of the building were destroyed by fire, as evidenced by charcoal strewn west of the footing supports that was mixed with domestic materials consisting of clusters of ironstone and other ceramic wares, vessel glass and butchered animal bone. These artifacts are interpreted as being the discarded objects used in the daily lives of the enlisted men (see Chapter Eight).

Enlisted Men’s Kitchen Refuse Midden, ca. 1850 to 1870

A small anomaly was noted within the data obtained by magnetometer west of the enlisted men’s kitchen (Figure 51), in the vicinity of a slight rise in the ground surface that was then tested (Block F). In the northwest corner, in the upper 15 cm of the Ab horizon (Stratum III), a concentration of degraded brick and other artifacts was identified. This included common construction machine-cut nails, and other materials, such as lead shot, butchered animal bone, bottle glass, a bucket bail, and ceramic sherds bearing a variety of designs. Block F likely intersected a trash midden located behind (west of) the enlisted men’s kitchen. No architectural features were identified in this area.
Enlisted Men’s Mess-House, ca. 1854 to ca. 1870

Based on data examined for this study, the northern wall of this structure is surmised to be near 0N / 149E to 0N / 159E and its southern portion partially beneath the concrete sidewalk immediately north of the ca. 1904 and 1907 Double Infantry Barracks (Bldg. Nos. 978 and 989; Figure 15). No excavation blocks intersected archaeological deposits interpreted as associated with the military construction, occupation, and/or demolition of the ca. 1854 mess-house.

Unmapped Enlisted Structure, Mid-19th century

A shallow small rectangular/rhombus shaft feature was partially excavated in Block E, west of the enlisted men’s kitchens (Figure 63 Figure 64); the northern portion of the feature remains in situ. The high proportion of domestic materials recovered from this feature suggests that area was used as for refuse disposal filling a shallow depression. This might also indicate the removal of an unmapped outbuilding, dating ca. 1855 to the 1860s or 1870. The source of the depression has not yet been determined, although several interpretations have been considered.

This small shaft feature (Feature 706) is roughly 24.5 x 13.4 in. (62 x 34 cm) in size, and at least 14.2 in. (36 cm) deep. Soils were characterized as a (10YR 3/3) dark brown (moist) structureless loam with 5% subrounded to rounded gravels (2:3 pebbles:granules). The linear edges of this shaft feature became visually apparent at the interface with the lower Bw horizon (Stratum V). The sediments observed immediately above this interface (PG04 Level 7b) were distinguished from the surrounding matrix not by color but by their loose consistency, and form the central deposits of this small shaft feature. The upper deposits of the feature were not differentiated from the surrounding matrix during excavation, but looser and slightly darker soils were noted in the area above the shaft feature. Four large mochaware sherds, each recovered
Figure 63. Plan view of north half of Block E. The recovery of an agateware doorknob and escutcheon suggest the rectangular pit feature (Feature 706) may reflect the footing location of an unmapped structure, likely a storage shed.

from these various vertically stacked proveniences, directly refitted with each other into a single mug, indicating a single depositional infill event for this feature.

As this feature was only 14.2 in. (36 cm) deep, and lacked night soils, lime deposits, or differential soil lensing, it does not reflect a shallow privy shaft. Wash houses for the enlisted
men were typically positioned behind the associated barrack. The shallow shaft depression may be related to countersinking a makeshift ‘bathtub’ or barrel (not a plunging tub), or was possibly used to collect gray water within the wash house. Five cast lead alloy buttons (FOVA Type Ip), with evidence of tin-plating (see Household Analytical Units), recovered from Block E support the wash house interpretation. These buttons were used on mid-19th century military uniform pants as fly and suspender attachments (Lord 1965:296). A moderate density of ceramic sherds were also recovered from Block E. This however suggests that this small building may have served as a storehouse with a storage bin inset into the ground creating the shallow rectangular pit feature. The recovery of a bridled tumbler (part of a gunlock) from the southern portion of Block E supports the storage shed interpretation.

One 5.4 x 3.4 in. (134 x 87 cm) ferrous lock plate, with key hole escutcheon, was observed within 15.8 in. (40 cm) of the shaft feature (Feature 706; Figure 64). Its larger size, lack of an insert for a hasp, and offset key hole suggest that it more likely locked a door, rather than a trunk, cassette or writing table. The recovery of one partial ceramic brown-tinted “agateware” doorknob, without its fitting, supports this interpretation. Although not historically recorded, the ca. 1855 lithograph (Figure 6) depicts two small outbuildings in this area, which were likely one of the following: a wash house, small privy, storage shed, or some combination thereof. This structure was likely demolished either during the 1860s construction activities in this area, or with removal of the 1850 enlisted buildings in 1870. Therefore, this rectangular feature (Feature 706) may have held a foundation footing sized 1 x 2 ft. (cf. Thomas and Hibbs 1984:317-318). However, this would be a rather large footing for the small building depicted in the ca. 1855 lithograph (Sohon [1855]). Because no brick, mortar, wood, and only one broken machine-cut finishing nail were recovered from these deposits, this feature could reflect a different function.
Laundresses’ Quarters, Fort Vancouver, ca. 1859 to 1875-1877

Within data obtained by ground-penetrating radar in the southwestern corner of the modern parade ground, a cluster of signal variances was detected in the amplitude slice maps generated for sediments between 44 and 91 cmbs (17.3 and 35.8 in.; Figure 18 and Appendix C). The west edge of this anomaly is at approximately 116 to 110N / 110E on the excavation grid, and the anomaly extends to the east beyond the GPR-surveyed area. Based on the GPR data, it was unknown whether this feature is truly square or rectangular in shape, thereby revealing the location of the southern ca. 1854 laundress’ quarters, or whether the boundaries are spurious and reflect instead 20th century utility and roadway development at the site.

Two features were identified in excavations (Blocks A, B and C) conducted in the vicinity of the ca. 1859 laundresses’ quarters. One charred sawn timber, 4 in. wide and 2 in. thick, was encountered in Block C (Feature 710; Figure 65); its overall length remains unknown.
as it extends north and south of the excavations. Fire-reddened soils were observed immediately adjacent to the timber, yet only the upper half of the wood is charred, indicating that it was partially buried when exposed to fire.

Approximately 4 in. (10 cm) to the west, an 8 in. diameter pit feature (Feature 712), with a roughly 8 in. (20 x 20 cm) deep cone-shaped base, was observed intruding into the Bw horizon (Stratum V). Feature soils were characterized as a (10YR 3/3) dark brown (moist) clay loam with a moderate crumb structure, with 36% subrounded to rounded gravels (8:2 pebbles:granules). Protruding from this pit feature was bottle glass \( (n = 3) \), one long bone steak fragment, and a 4.5 in. tall, 3.5 in. diameter tin can with crimped \( \frac{1}{4} \) in. thick base seams, with its top and rim removed with a can opener.
Fence lines were documented in this vicinity (as dashed lines on Figure 111 to Figure 114), the timber (Feature 710) was originally hypothesized to reflect a fallen mid-19th century fencepost knocked out of its posthole. Historical records however, indicate that fence posts were “rotted off” before their replacement (USWD, QGO 1872a:114; 1872b:39). It is unlikely with the continual policing of the garrison and ever-present need for wood fuel, that this wood was left in situ to be burned and then intentionally buried.

Architectural construction materials recovered from Block B consisted of degraded brick (n = 747 or 851.5 g), lime mortar (n = 11 or 1.4 g), machine-cut common construction (n = 14) and finishing (n = 6) nails, and window glass shards. Although these items reflect only a low to moderate density of objects, they do indicate that a structure was constructed in the vicinity. Building hardware collected from this area consisted of two cast iron latch mechanisms that receive a bolt for locking, and one half of a ferrous dovetail hinge. These materials suggest that a structure was demolished nearby, potentially the ca. 1854 laundresses’ quarters.

Projections of historical maps onto the modern landscape place the ca. 1854 laundress quarters in the vicinity of Block B, specifically the west side of the building. Therefore, this timber may reflect the position of a structural element, such as a sill or joist. However, no corresponding architectural features were identified within the Block C excavations, which historical maps locate in the vicinity of the quarters’ eastern side.

Stratigraphy indicates that the shallow pit feature does not align well with the timber; the pit may reflect the position of a small footing post, later filled-in with a low density of artifacts reflecting a small refuse disposal event. A low density of architectural and domestic materials was recovered from the surrounding matrix, suggesting that this portion of the building was either not near a window or door, or was kept relatively clear of refuse.
Cartographic analyses (see Georectification) indicated that archaeological deposits associated with occupation of the northern ca. 1854 laundress quarters, as well as several of those depicted on maps drafted in the 1860s and 1870s, are likely under the existing pavement of Fort Vancouver Way, which was not removed or impacted during excavations.

Laundresses’ Quarters, Vancouver Ordnance Depot, mid-1860s to early-1880s

During archaeological monitoring of utility construction, a shaft feature was identified and interpreted as reflecting an abandoned privy vault (McIlrath 2001; Figure 66). Cartographic analyses performed for this study linked these deposits with a ca. mid to late-1860s to early-1880s 1st Sergeant/laundresses’ quarters in the Vancouver Ordnance Depot (see Chapter Three). This feature was not revisited during test excavations. Three archaeological strata were identified in 2001 within the trench, consisting of modern fill, intact privy vault deposits, and culturally sterile B horizon (likely Bw) sediments. Artifacts collected (n = 855) consisted of 19th century domestic, personal, and architectural items (McIlrath 2001:42-43).

Figure 66. East wall profile of mechanically excavated trench, depicting privy vault deposits associated with a sergeant/laundresses’ quarters at the Vancouver Ordnance Depot. The string is 104 cm (41 in.) above the base of the trench (Courtesy of FVNHS, FOVA No. 211714).
The distribution of architectural features, construction materials and hardware indicate that the test excavations intersected archaeological deposits associated with the mid-19th century military structures occupied by officers, enlisted men, and laundresses. To examine the use of space at the community level, and provide the framework for assigning excavation proveniences to household analytical constructs, the hypothesized positions of mid-19th century historic structures investigated for this study were extrapolated and georectified to the current landscape. This process also allows a formal means of representing and manipulating spatially-referenced data within the artifact database.

Seven of the historical maps of the garrison referenced in this study have been previously digitized for use in ArcGIS (as shapefiles) to assist National Park Service personnel in managing cultural resources within the Vancouver National Historic Reserve Historic District (DT191; Bomford [1851]; Bonneville 1854; Ward 1874; Wheeler and Dixon 1859a, 1859b; Winman 1871; USWD 1886; for digitizing methods see Garnett 2002). However, when each map is projected (overlaid) onto modern aerial imaging of the VNHR, there are inconsistencies in building dimensions and physical locations; e.g. the enlisted men’s barrack, which historical records indicate was never expanded, is depicted between 82 and 131 ft. long (25 and 40 m), as opposed to its documented 84 ft. length (25.6 m). In addition, the location of the structure shifts; its southwest corner varies between 38 and 103 ft. (11.6 and 31.4 m) in its position on the landscape. These discrepancies are expected given the variations in mapping scales and projection error distortions on 19th century maps.
In an attempt to maintain logical consistency between georectified structure locations and historical records, a new spatial dataset (shapefile) was created of the mid-19th century Army buildings using recorded specific measurements (see Chapter Three, summarized in Table 1). Potential building expansions discerned from the original historical maps (not ArcGIS projections) were included, such as the 1860s expansion of the 1850 enlisted men’s kitchen from 50 x 18 ft. to roughly 78 x 24 ft. in size.

Structures depicted on historical maps are orientated to 20° 3.0’ E, the 1850 declination for magnetic north (NGRC 2013; see Appendix A). Architectural features determined to reflect intact wood foundations in Blocks H, M and P were observed with the same alignment. Locations of Army structures, with more accurate building dimensions (i.e. the newly created shapefiles), were manually repositioned in ArcGIS 9.2 using this compass bearing and a “best-fit” alignment based on all available datasets.

Using the geodetic North American Datum 1983 (NAD1983) coordinate system to maintain consistency with existing NPS datasets, I converted the structures depicted on the 1869 Plan of Post map (USWD 1869; Figure 113) into digital format (digitized into a shapefile) for use in ArcGIS. I chose this map as this is the latest dated known map to portray the 1850 enlisted men’s barrack, the enlarged 1850 kitchen, ca. 1854 enlisted/band quarters and mess-house while in use. Structure dimensions depicted on the 1869 map closely align with recorded building measurements, such as the 31 x 14 ft. bath-room hallway constructed in 1874 between the ca. 1859 two-story barrack and the ca. 1854 mess-house. The 1869 map is also the only map known that depicts structures in the 1850s enlisted men’s building complex while standing, as well as three extant buildings, the 1850 Commanding Office’s Quarters (now known as the Grant House) and the ca. 1865-1866 Officers Quarters (Bldg. Nos. 7 and 8). Although all of these
structures are depicted on an 1871 map (Winman 1871), the 1850 enlisted men’s barrack, kitchen and mess-house are listed as destroyed (Figure 11). Using these three buildings as reference points, once overlaid onto the modern aerial view, several buildings on the 1869 map were within a few feet of intact architectural features determined to reflect these same buildings.

Several assumptions were held during this process. First, the extant 1850 Commanding Office’s Quarters (now known as the Grant House) and the ca. 1865-1866 officers’ quarters (Bldg. Nos. 7 and 8) were not expected to have been moved or enlarged, and therefore, all three could be used as anchor points for the georectification process. Second, following historical images, the front (south) of the 1850 westernmost officers’ quarters was placed in alignment with the 1850 Commanding Officer’s Quarters (now the Grant House). In addition, historical maps indicate that new quarters placed on the Officers Row were typically built adjacent to the building(s) they were meant to replace. Therefore, the position of the 1850 officers’ quarters is likely in-between, but not within, the current footprints of the two extant ca. 1865-1866 officers’ quarters (Building Nos. 7 and 8). Third, the dimensions for and position of the enlisted men’s barrack remained consistent through its occupancy as historical documents indicate that it was never enlarged. Historical maps document the front (east) side of the main barrack, not the porch, as intentionally positioned in alignment with the west wall of the 1850 officers’ quarters (Bomford [1851b:1]). Using a bearing of 200° 3.0’ E (opposite of the 1850 magnetic declination), historical maps document that the east side of the western ca. 1865-1866 officers’ quarters’ (Bldg. No. 7) aligns with the center of the 1850 enlisted men’s barrack, while the west side alignment runs between the 1850 barrack and the east side of the 1850 kitchen. These alignment data also assisted the georectification process. Fourth, although there is conflicting evidence for the placement of the 1850 kitchen and ca. 1854 mess-house behind in relation to the
1850 enlisted men’s barrack, the building dimensions for the 1850 enlisted men’s kitchen are presumed to be the same as those reported by military personnel (Bomford [1851b:1]) and not to have been enlarged until at least the 1860s. The kitchen is consistently depicted on 1850s and 1860s maps (Bomford [1851b]; USWD 1869) roughly 30 ft. (9.1 m) behind (west of) the enlisted men’s barrack, therefore, its eastern wall is assumed not to have shifted during building expansion. However, as two maps depict the kitchen being enlarged in the 1860s confirmed with intact wood boards determined to reflect this expansion, the footprint for the larger sized kitchen was also georeferenced, holding the assumption that the kitchen’s east wall did not move, given the consistent 30 ft. (9.1 m) distance between it and the barrack. And finally, that the southern ca. 1854 laundresses’ quarters were, in fact, constructed as depicted on 1850s maps (see Chapter Three).

Anomalies in non-ground penetrating survey data were also spatially located. Raw magnetometer data obtained in 2001 were reconfigured in Surfer 8.1, and an image file (.jpeg) created from the data (Figure 51). This, as well as images of amplitude slice maps (.jpeg) generated from ground-penetrating radar (GPR), were imported into ArcGIS and trimmed (clipped) to limit projection of these images to only the visual data display before being spatially referenced to the excavation grid. These datasets, as well as the 2007 and 2008 excavation block and feature positions were then overlaid onto modern aerial imaging.

The original archaeological field notes and locational information from 1988 monitoring project on the Officers Row cannot be located as of 2013, thereby removing its ability to be precisely located in real space. However, the position in the spatial model of the 7 ft. (2.1 m) long trench, excavated in 1988 during archaeological monitoring (Feature 5 in Thomas 1988), could be estimated from the excavation photographs (Figure 16) and a modern aerial image.
Figure 67. Georectified and surmised locations of mid-19th century Army buildings.
Combining these data with those obtained from excavation Block W allowed the position of the detached 1850 officers’ kitchen to be extrapolated.

The digitized location of the utility trench that intersected privy vault deposits associated with an Ordnance Depot sergeant/laundresses occupation, ca. 1860s to 1880s, was based upon its documented position as “14.3 m [49.6 ft.] north of a staircase leading down to the street from the [Officers Row] houses” (McIlrath 2001:1). Although the position of an outbuilding is portrayed on an 1874 map (Ward 1874), privy locations are known to have constantly shifted at 19th century Fort Vancouver (see Chapter Three; Sinks and Privies). Therefore, neither the Ordnance Depot outbuildings nor associated quarters were georectified as it cannot be confirmed whether the privy location reflected by the deposits is the same as those depicted on the historical maps.

Based on the results of the spatial modeling, the hypothesized positions of seven structures were georectified (Figure 67); the westernmost 1850 officers’ quarters, associated kitchen, the 1850 enlisted/band quarters and 1850 enlisted men’s kitchen, and the southern ca. 1854 laundresses’ quarters. Using these locations, the surmised positions of the 1850 barrack, the ca. 1854 enlisted mess-house, the northern “R” ca. 1854 laundresses’ quarters, the ca. 1869 library/billiard room and laundresses’ quarters are also presented. As privy vaults were constantly being relocated in the 1860s, the noncommissioned officers and laundresses’ quarters at the Vancouver Ordnance Depot cannot be discerned at this time.

The spatial model can also be used to predict the locations of significant deposits of archaeological resources which may guide future management of these cultural resources at the Vancouver National Historic Reserve, including future research-driven excavations or avoidance of deposits with continued utility maintenance of the extant ca. 1903 and 1907 Double Infantry Barracks.
The Built Environment

In 1850, quickly constructed soldiers’ barracks, kitchens, and unlabeled outbuildings (likely a storage building) flanked the parade ground, while officers’ quarters were erected along the northern perimeter, and post support buildings along the south. By the mid-1850s, quarters for civilian laundresses were erected behind the western soldiers’ barracks and kitchens. By the late-1870s, all of these buildings, including the westernmost officers’ quarters, were demolished as the post expanded. New structures were not constructed on their footprints.

Observed architectural features indicates that excavations intersected intact and significant archaeological deposits associated with the remnants of six structures associated with the mid-19th century Army occupation at Fort Vancouver along the western edge of the parade ground. Building footprints were confirmed for commissioned officers’ quarters and kitchen, non-commissioned officers / laundresses’ quarters, enlisted / band quarters, enlisted men’s barrack and associated kitchen. Privy vault deposits affiliated with the commissioned officers, and an unmapped outbuilding in the enlisted men’s building complex (likely a structure used for storage) were also identified. On the eastern side of the military community, mid-19th century privy vault deposits associated with a non-commissioned officer / laundresses’ quarters at the Vancouver Ordnance Depot were also examined in an effort to better represent women within the military community.

Analysis of architectural artifacts assisted in determining how the buildings depicted on the historic maps were constructed. As similar building materials were utilized in construction of the buildings, they are not reflective of socioeconomic status (cf. Feister 1984). Rather, historical documents (see Chapter Three) indicate status differentiation is instead reflected through the
timing of undertaking improvements for residential structures, with those occupied by higher ranked individuals (officers) improved before those occupied by their subordinates (enlisted).

Georectification of these buildings resulted in linear patterning of structures related to the organization of the mid-19th century Army occupation. Spatial data indicate the military historic landscape was intentionally constructed to create a highly spatially-structured built environment that reflects the military hierarchy (see Chapter Ten).

**Household Analytical Units**

Occupants of the officers’ quarters, enlisted men’s barrack, and laundresses’ quarters at Fort Vancouver were continually changing in response to regional troop movements in the mid-19th century (see Chapter Three). Constructed analytical household units are designed to facilitate assessing community expressions of cultural (Victorian) ideals within conceptualized multiscalar space. Mid-19th century American military communities operated within a rigid hierarchical rank-based system. Individuals primarily lived together as coresidential groups, with their daily lives often interwoven with the complexes of buildings. The use of several structures met the basic needs of personnel while garrisoned on post. For example, enlisted men slept in the barrack, prepared food in the kitchen, ate in the mess-house, bathed in the bath-house, and frequented the privy when necessary. The families of commissioned and non-commissioned officers were permitted by Army regulations to live together as kin-based groups, although analysis of census data indicates two enlisted men’s families often coresided within one structure, or quarters. Yet the officers and laundresses also moved throughout different buildings, including their quarters, kitchens, and privies. Assigned work details often brought military
personnel and civilian employees to the far corners of the post and off site, as when on campaigns or procuring resources, such as food or firewood.

Historical documentation indicates that military structures on the west side of the parade ground underwent multiple residential cycles, reflecting the movement of troops, such as battalions and companies, through Fort Vancouver. In addition, analysis of provenience data for artifacts indicates they could be, and were, vertically translocated through the sediment column via bioturbation, primarily from Pacific mole burrowing. Therefore, objects recovered from various stacked vertical proveniences within a single excavation unit, or feature, were combined for further analysis, and ‘household units’ are defined using building construction and demolition dates as temporal boundaries, rather than being associated with specific individuals or Army regiments. Although historical maps suggest that some structures were occupied based on culturally perceived gender divisions, e.g. laundresses vs. enlisted, analysis of census data indicated building occupants were assigned housing by their military rank (community status), not necessarily along perceived gender categories of male and female (see Chapter Three).

Although each excavation block and shovel test unit was assigned to either individual structures or house yards, three analytical units were constructed for analyzing expressions of cultural ideals through the use of objects; 1) commissioned officers, 2) enlisted men, and 3) non-commissioned officers and laundresses (these are grouped together to better represent the results of my analysis of the federal census data in Chapter Three). The three groupings were spatially defined to encompass complexes of coresidential buildings, rather than single structures, using the concept of nested households (Anderson 2004). Therefore, multiple household temporal cycles, as well as multiple structures and associated sheet middens deposited in
affiliated “yards,” or open spaces in close proximity to those structures, are subsumed into one analytical unit of “household.” The assignments of specific excavation blocks and single shovel test units are presented in tabular form in Appendix A.

<table>
<thead>
<tr>
<th>Houseyard Unit</th>
<th>Time Period</th>
<th>Structures Included</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commissioned Officers</td>
<td>1850 to 1870s</td>
<td>Quarters, Kitchen, Privy and Yard</td>
</tr>
<tr>
<td>Enlisted Men</td>
<td>1850 to 1870s</td>
<td>Band Quarters, Barrack, Kitchen, Unmapped building, and Yard</td>
</tr>
<tr>
<td>Non-Commissioned Officers and Laundresses</td>
<td>1850s to 1880s</td>
<td>Quarters, Privy and Yard</td>
</tr>
</tbody>
</table>
CHAPTER EIGHT

EXPRESSIONS OF SPACE IN HOUSEHOLDS AT FORT VANCOUVER
THROUGH ANALYSIS OF SUBSISTENCE PRACTICES

In this chapter I review military subsistence practices at the household level of space, to assess socioeconomic expressions of community hierarchy through access to subsistence resources. By examining the processing, consumption, and disposal of food, as reflected through the distribution of faunal remains, trends are discerned that provide insight into the consumption patterns of military personnel, specifically the mid-19th century commissioned officers, enlisted men, and non-commissioned officers and laundresses. Livestock and procurement maintenance has been addressed in Chapter Four, as well as variables affecting acquisition and consumption.

Subsistence foods are objects whose acquisition and use should reflect the unequal nature of consumption at military posts, in that not all individuals had equal access to these resources (see Chapter Four). These items were procured directly by commissioned officers, but were issued by the quartermaster department to enlisted men, noncommissioned officers and laundresses. Additional food items could be purchased with Company funds and/or individually by consumers. Subsistence patterns, as reflected in the archaeological record, were examined to assess the presence of luxury meals through pattern analysis of differential distribution of species and various meat cuts, discerned through analysis of recovered faunal remains. The underlying assumption is that proportional differences in animal remains reflect cultural processing, consumption, and deposition trends.

Taxon identified in the artifact assemblage are presented, as represented by skeletal elements, and identified commensal, curiosity, and consumed species. To further explore
procurement strategies utilized by the quartermaster department, harvest profiles I developed for cattle, pigs, and sheep are presented. These profiles are a reflection of the military livestock management strategies practiced by quartermaster department personnel at Fort Vancouver. Once obtained, military personnel prepared the animal onsite for consumption. Butchery processing signatures (e.g. sawing, cleaving, knife cuts) were recorded to examine domesticate carcass dismembering techniques, and whether those utilized at Fort Vancouver are similar to methods prescribed in the earliest military manual (USWD, SD 1896), published in an attempt to standardize delivery of the ration across the entire country (Prell 1998).

Faunal assemblages obtained through excavation of the officers’ residential area, enlisted men’s building complex, and non-commissioned officers and laundresses’ areas, are examined to provide information on potential intra-site differences in spatial distribution. I give particular attention to the dietary importance of meat cuts as they relate to consumption patterns. Refuse disposal and building demolition practices are then examined for their potential impact on the nature of the faunal assemblage. The chapter closes with a discussion of how household status in the military community is reflected through the recovered faunal materials.

**Analysis of Faunal Remains for Military Subsistence Practices**

A total of 16,765 faunal specimens, weighing 9,636.45 g, were analyzed; refitting reduced the sample size by 2% (n = 332) for a total of 16,433 items exclusive of culturally worked bone (e.g. utensil handles, personal clothing, gaming pieces, etc.). Although the privy vault deposits associated with the non-commissioned officers and laundresses’ quarters at the Vancouver Ordnance Depot were disturbed by looting during excavations, the faunal materials
are believed representative of the original archaeological sample as these fragmented items have little monetary value and are often considered “useless” by looters and cast aside during their activities.

Faunal remains were grouped into three occupations, officers, enlisted, and laundresses (including their non-commissioned officer husbands) for standard zooarchaeological analyses. The faunal remains were analyzed using standard zooarchaeological methods. Body part distributions of consumed species and harvest profiles for large domesticate species (cattle, pigs, and sheep) were generated to examine the military meat economy at Fort Vancouver. Finally, calculations of available meat and their distribution patterns were generated to examine intrasite socioeconomic consumption patterns. Viewed together, these highlight the relative importance of species consumed. Eggshell and mollusc remains were recovered in extremely low amounts and are therefore discussed separately as they have low functional utility in this analysis besides presence/absence data.

**Intra-Site Distribution of Taxa**

Bone fragments were identified to the finest body size and taxonomic levels, including anatomical element and orientation, possible through methods detailed in Bab et al. (2007), Brown and Gustafson (1990), Boessneck (1969), Budras et al. (1994), Chamberlain (1943), Cohen and Serjeantson (1996), Davis (1987), Ellenberger et al. (1901), Fisher (1942), Flower (1885), Gaughran (1954), Gilbert (1981, 1993), Hargrave (1972), Harvey, Kaiser, and Rosenberg (1968), Hillson (1996), Hughes and Dransfield (1953), King (1983), Koch and Rossa (1973), Mivart (1890), Olson (1968, 1979), Prummel and Frisch (1986), Romer (1956), Schmid (1972), Serjeantson (2009), Sisson and Grossman (1938), Smith (1979), Thompson (1896), Williston
(1925), Wirtschafer (1960), Young (1937). Osteological collections housed at the Connor Museum, Department of Zoology, and the Department of Anthropology, Washington State University, Pullman were used for comparative reference.

When possible, bone fragments that could only have taxonomic class discerned (i.e. mammal, avian, reptile, and fish) were categorized by body size (e.g. Mammal 5, Mammal 4, Avian 4, Avian 3, etc.; Table 7). These classifications are based on element size, the trabecular structure (holes/canals) of the cancellus bone (spongy bone), and diameter thickness of cortical (compact) bone. Mammal size 4 (pig/sheep/goat/deer size) remains were not assumed to be deer, sheep or pigs as these species represent significantly different procurement processes (e.g. hunting wild game as opposed to raising domesticates for consumption). However, when appropriate, elements were grouped with identified species from the same proveniences.

**Quantification (NISP, MNI)**

Tallies were completed for the Number of Identified Specimens (NISP) and Minimum Number of Individuals (MNI), with the former based on raw counts and the latter on a combination of identified skeletal elements and age data. For small animals that are typically procured as complete specimens in military sites, such as fowl, fish and smaller mammals, calculations considered each occupation area separately. For larger domestic species elements recovered were combined for MNI analysis, as these animals underwent primary butchering by military personnel in the designated shambles area for distribution for cooking and consumption (see below). Although NISP and MNI are both standard zooarchaeological quantification procedures, inherent to both are several statistical problems (Banning 2000; Breitburg 1991; Davis 1987; Grayson 1994; Lyman 1979, 1987a, 2008).
The NISP is an index that emphasizes the importance of some species over others. Taxa have differing numbers of skeletal elements, and NISP does not address articulated elements (e.g. loose teeth vs. teeth remaining within the alveolar process). Specimen interdependence is disregarded in that several identifiable fragments may have originated from the same skeletal element, and differential recovery is a factor in that larger animals, with larger and more robust bones are more likely to be recovered archaeologically than smaller ones, and 4) anthropogenic taphonomic impacts, such as carcass processing techniques and differential transport of body parts (Binford and Bertram 1977; Karr and Outram 2012; Lam and Pearson 2005; Lyman 1984, 1987a, 1987b, 1994a, 1994b, 2008; Marean 1991; Payne 1972). For example, an older cow has much thicker cortical bone than a young calf or smaller animal, such as a squirrel, turtle or chicken, therefore having much higher depositional survival rates and more likely to be recovered during archaeological investigations.

The use of MNI is also criticized. MNI tallies correlate with sample size, with a greater number of individuals able to be identified within larger assemblages (Banning 2000; Grayson 1984; Lyman 1979, 2008). MNI reflects the minimum of individuals represented, and is affected by fragmentation and post-depositional preservation of identifiable species-specific morphological markers. In addition, the importance of rare species is overestimated (Grayson 1984; Lyman 1979, 2008); one cow will provide more meat for consumption than one squirrel, but both will be weighed equally in the assemblage (see Horowotz and Tchernov 1989:287). However, the MNI may be a more accurate reflection of known animal populations than NISP when documentary sources can provide accurate representations of the living herd population (see Breitburg 1991). Therefore, MNI counts are also tallied for this study.
Four taxonomic classes were identified within the collections (Table 7); Mammalia (mammals), Aves (birds), Reptilia (reptiles) and Osteichthyes (bony fish). Faunal remains were assigned to 31 taxonomic categories. Specimens assigned to size categories were primarily comprised of ribs, vertebrae, and long bone skeletal elements, as well as unidentifiable fragments whose size classifications were based on thickness of cortical bone and/or surface texture (birds, reptiles, and fish). A minimum of 26 individuals were recovered during excavations, distributed amongst a minimum of 16 species of animals, 11 of which are determined to represent consumption activities (Table 7). The presence of various species, as well as the arrivals of domesticates into the Pacific Northwest, were discussed in Chapter Four.

*Commensal and Curiosity Species*

Individuals determined to be commensal species include animals that were not food resources, but lived within and/or underneath post structures, such as skunks, squirrels, rats and mice. I classified animal remains that were not associated with consumption or commensal species (e.g. naturally shed antlers, turtle shells, etc.) as curiosity species, or items that were probably collected purely for display or as raw materials. Five species were identified (MNI = 5) that represent commensal species or collected curiosities / consumption activities; Rodentia/Mammal 1, Rodentia/Mammal 2, Avian 1, Avian 2, and Testudines 3 (Table 7). No evidence of butchery was detected on these specimens.
Table 7. Taxonomic species identified by occupation area.

<table>
<thead>
<tr>
<th>Species</th>
<th>Source</th>
<th>Officers</th>
<th>Enlisted</th>
<th>NCO / Laundresses</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>NISP^1</td>
<td>%^3</td>
<td>NISP^2 %^3</td>
<td>NISP^2 %^4 MNI^4</td>
</tr>
<tr>
<td>MAMMAL (Mammalia)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Bos taurus</em> (Domestic Cattle)</td>
<td>D</td>
<td>40 0.88</td>
<td>7 0.06</td>
<td>5 1.25</td>
<td>52 0.32 3</td>
</tr>
<tr>
<td><em>Sus scrofa</em> (Domestic Pig)</td>
<td>D</td>
<td>5 0.11</td>
<td>35 0.31</td>
<td>5 1.25</td>
<td>45 0.27 2</td>
</tr>
<tr>
<td><em>Ovis aries</em> (Domestic Sheep)</td>
<td>D</td>
<td>11 0.24</td>
<td>6 0.05</td>
<td>76 19.00</td>
<td>93 0.57 2</td>
</tr>
<tr>
<td>Rodentia 2 Size (Squirrel, Rat)</td>
<td>C/W</td>
<td>2 0.02</td>
<td></td>
<td>2 0.02</td>
<td>2 0.01 2</td>
</tr>
<tr>
<td>Rodentia 1 Size (Mouse)</td>
<td>C/W</td>
<td>2 0.02</td>
<td></td>
<td>2 0.02</td>
<td>2 0.01 3</td>
</tr>
<tr>
<td>Mammal 5 Size (Horse, Cattle, Elk)</td>
<td>D</td>
<td>785 17.28</td>
<td>649 5.77</td>
<td>101 25.25</td>
<td>1,536 9.49 -</td>
</tr>
<tr>
<td>Mammal 4 Size (Pig, Sheep, Goat, Deer)</td>
<td>D</td>
<td>99 2.18</td>
<td>50 0.44</td>
<td>61 15.25</td>
<td>210 1.28 -</td>
</tr>
<tr>
<td>Mammal 3 Size (Dog, Beaver, Raccoon)</td>
<td>D/W</td>
<td></td>
<td></td>
<td></td>
<td>0 0.00 -</td>
</tr>
<tr>
<td>Mammal 2 Size (Squirrel, Mole, Skunk)</td>
<td>C/W</td>
<td>57 0.51</td>
<td></td>
<td>57 0.35</td>
<td>-</td>
</tr>
<tr>
<td>Mammal 1 Size (Mouse)</td>
<td>C/W</td>
<td>4 0.09</td>
<td>23 0.20</td>
<td>27 0.16</td>
<td>-</td>
</tr>
<tr>
<td>Mammal, No size determined</td>
<td>D/W</td>
<td>3,355 73.83</td>
<td>8,221 73.13</td>
<td>380 95.00</td>
<td>11,956 72.76 -</td>
</tr>
<tr>
<td>BIRD (Aves)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phasianidae 4 (Chicken, Pheasant Size)</td>
<td>D/W</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Gallus gallus</em> (Domestic chicken)</td>
<td>D</td>
<td>7 0.15</td>
<td>1 0.01</td>
<td>2 0.50</td>
<td>3 0.02 4</td>
</tr>
<tr>
<td>cf. <em>Gallus gallus</em></td>
<td>D</td>
<td>2 0.50</td>
<td></td>
<td>2 0.01</td>
<td>-</td>
</tr>
<tr>
<td>cf. <em>Branta spp.</em> (Canada or Brant Goose)</td>
<td>W</td>
<td>1 0.25</td>
<td></td>
<td>1 0.01</td>
<td>1</td>
</tr>
<tr>
<td><em>Anas spp.</em> (Mallard, Pintail, Teal, Wigeon)</td>
<td>W</td>
<td>2 0.04</td>
<td>2 0.02</td>
<td>4 0.02</td>
<td>2</td>
</tr>
<tr>
<td>Anatidae (Dabbling Ducks)</td>
<td>W</td>
<td>4 0.09</td>
<td>3 0.03</td>
<td>6 0.04</td>
<td>-</td>
</tr>
<tr>
<td>Avian 4 (Chicken, Duck size)</td>
<td>D/W</td>
<td>71 1.56</td>
<td>41 0.37</td>
<td>5 1.25</td>
<td>120 0.73 -</td>
</tr>
<tr>
<td>Avian 3 (Crow, Pigeon size)</td>
<td>W</td>
<td></td>
<td></td>
<td></td>
<td>0 0.00 -</td>
</tr>
<tr>
<td>Avian 2 (Robin Size)</td>
<td>W</td>
<td>1 0.02</td>
<td></td>
<td>1 0.01</td>
<td>1</td>
</tr>
<tr>
<td>Avian 1 (Wren, Finch, Sparrow size)</td>
<td>W</td>
<td>5 0.11</td>
<td></td>
<td>5 0.03</td>
<td>1</td>
</tr>
<tr>
<td>Avian, No size determined</td>
<td>D/W</td>
<td>33 0.73</td>
<td>4 0.04</td>
<td>1 0.25</td>
<td>38 0.23 -</td>
</tr>
<tr>
<td>REPTILE (Reptilia)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Testudines 3 (Mud or Painted size turtle)</td>
<td>W</td>
<td></td>
<td>2 0.50</td>
<td>2 0.01</td>
<td>1</td>
</tr>
<tr>
<td>FISH (Osteichthyes)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Catostomus macrocheilus</em> (Largescale sucker)</td>
<td>W</td>
<td>5 0.04</td>
<td></td>
<td>5 0.03</td>
<td>1</td>
</tr>
<tr>
<td>cf. <em>Catostomus macrocheilus</em></td>
<td>W</td>
<td>1 0.01</td>
<td></td>
<td>1 0.01</td>
<td>-</td>
</tr>
<tr>
<td>Catostomidae (Suckers)</td>
<td>W</td>
<td>2 0.02</td>
<td></td>
<td>2 0.01</td>
<td>-</td>
</tr>
<tr>
<td><em>Mylocheilus caurinus</em> (Peamouth)</td>
<td>W</td>
<td>2 0.02</td>
<td></td>
<td>2 0.01</td>
<td>1</td>
</tr>
<tr>
<td>cf. <em>Mylocheilus caurinus</em></td>
<td>W</td>
<td>5 0.04</td>
<td></td>
<td>5 0.03</td>
<td>-</td>
</tr>
<tr>
<td><em>Ptychocheilus oregonensis</em> (Northern pikeminnow)</td>
<td>W</td>
<td>1 0.01</td>
<td></td>
<td>1 0.01</td>
<td>1</td>
</tr>
<tr>
<td>Cyprinidae-Catostomidae (Carps-Suckers)</td>
<td>W</td>
<td>30 0.27</td>
<td>30 0.18</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Salmonidae (Salmon, trout, chars)</td>
<td>W</td>
<td>1 0.02</td>
<td></td>
<td>1 0.01</td>
<td>1</td>
</tr>
<tr>
<td>Osteichthyes (Bony fish) NID</td>
<td>W</td>
<td>1 0.02</td>
<td>83 0.74</td>
<td>84 0.51</td>
<td>-</td>
</tr>
<tr>
<td>No taxonomic class determined</td>
<td>D/W</td>
<td>120 2.64</td>
<td>2007 17.85</td>
<td>2,127 12.94</td>
<td>-</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>- 4,544</td>
<td>28.08 11,241 69.45</td>
<td>400 2.47 16,432 100 26</td>
<td></td>
</tr>
</tbody>
</table>

^1 = “C” refers to commensal, “D” denotes domestic animals, “W” denotes wild species; ^2 = “NISP” refers to Number of Identified Specimens; ^3 = NISP % calculated from that occupation only; ^4 = calculated from total assemblage.
Class Mammalia- mammals

Order Rodentia - rodents

Rodentia 1/Mammal 1 (NISP = 29, MNI = 3) and Rodentia 2/Mammal 2 (NISP = 59, MNI = 2) specimens consisted of cranial, thorax, and limb elements recovered from the officers and enlisted men’s kitchens. Although potentially representing wild animals, these are likely the remains of commensal species, specifically pacific moles and/or rats. Rats were known to raid food stores in the early-1850s at Fort Vancouver; in 1852 a large amount of chili flour suffered from the “aggression of rats” (Report of the Council of Administration, 12 February 1852). It is possible that some of the Mammal 2 fauna reflect the remains of small skunks (see Kress 1928:36).

Class Aves - birds

The Avian 2 cranium (occipital, parietal, frontal) collected from the officers’ kitchen area (NISP = 1, MNI = 1), and the Avian 1 specimens (NISP = 5, MNI = 1), including one tarsometatarsus and phalanx, recovered from the officers’ privy, may represent natural attrition of wild species, or deposition of pets (e.g. song birds) as there is no evidence of butchery. Only remains from Steller’s Jay (Cyanocitta stelleri) have been identified in archaeological deposits from the pond (Henry 1982:155), and these likely represent natural attrition.

Class Reptilia - reptiles

Order Testudines – turtles

Two specimens (0.01% of the assemblage) were identified as reptile remains (Table 7). One Testudines 3 left femur and possible tibia fragment (NISP = 2, MNI = 1), roughly the size of
a mud turtle, were recovered from the noncommissioned officers and laundresses’ privy. Previous investigations have identified Painted turtle (*Chrysemys picta*) in archaeological deposits near the pond (Colby and Gall 2003).

By the 1800s, turtle soup was considered a prestigious food to consume and a very popular menu item in the cooler months (Armitage and McCarthy 1980:13; Rivers 1916). Many American domestic guides and cookbooks included at least one recipe for this dish, typically calling for sea turtle, but on occasion snapping turtle was also recommended (Smith 2007:551; see Abell 1852; Batterberry and Batterberry 1999; Storke 1859; Lyman and Lyman 1869). As this individual was recovered from a privy vault over 4,000 ft. from the closest naturally-occurring water source - the pond, referred to as *Alaek-ae*, the “turtle place” by native peoples (NPS 2010), analysis determined this specimen was not deposited as a result of natural attrition. No other skeletal elements were recovered, such as carapace or plastron fragments. It is highly probably this individual was collected as a curiosity for secondary uses, such as finding and cleaning a shell for decorative or container purposes. It is therefore not included in calculations of taxonomic richness and evenness for the different groups.

**Consumed Species**

Twenty-two species (MNI = 20) were determined to reflect human consumption activities (Table 7). Although recovered in very low frequencies, two mollusk species, clams and oysters, were also identified (Table 9). Additionally, fragmented specimens assigned to taxonomic class (Mammal NID, Avian NID, and Class NID) are also believed to reflect food consumption, as many display evidence of butchering (see below).
A total of 13,980 specimens (85.07% of the assemblage) were identified as mammalian remains. Of these, 85.5% (n = 11,956) could not assigned beyond taxonomic class (Mammal), although it is likely that many originated from large domesticates, as 120 specimens, although small, retained evidence of butchery marks (sawing, cleaving, chopping, and cutting). Commensal species or those collected as curiosities (turtle) are represented by 84 specimens (see above).

Order Artiodactlya – even-toed ungulates

Family Bovidae – cloven-hoofed, ruminant mammals

*Bos taurus* – domestic cattle

Many Mammal 5 elements (cattle, elk size) lacked species-specific morphological indicators due to anthropogenic processing, consumption, and disposal activities. However, the distribution of butchery marks (sawing, cleaving, and chopping) on Mammal 5 bones correspond to those observed on elements identified as domestic cattle. Specimens identified as Mammal 5 (NISP = 1,536) were combined with cattle (NISP = 52) remains for analysis.

Beef was the most commonly served meat in 19th century military posts (see Chapter Four), and the majority of military recipes (see USWD, SD 1896, 1901) utilized beef. Domestic cattle remains comprised the largest portion of the assemblage, representing 9.7% (n = 1,588) of the collection (Table 7), of which 25.3% (n = 402) retain evidence of butchering (see Butchery Techniques). The greatest amount of cattle bone (51.9% or n = 825) was recovered from the
officers’ residential area, consisting of all parts of the bovine, but for the head (see below) and feet. Identified cattle elements consist of an axis and atlas, inominates, femurs, tibia, radii, and carpals/tarsals, while fragments of scapulae, vertebrae, sacrums, ribs, and long bone shafts were categorized as Mammal 5. Conversely, only an axis, teeth and carpals (n = 7) from the enlisted men’s complex and five carpals/tarsals from the noncommissioned officers and laundresses deposits were identifiable to the level of species. Recovered Mammal 5 skeletal elements from these two occupations were similar, in that cranial (head), vertebrae, ribs, scapula, and long bone fragments were identified (enlisted NISP = 650, noncommissioned officers and laundresses NISP = 101). Higher frequencies of identified specimens from the officers’ deposits are a result of the bone clusters identified as Feature 805/805A, which consists of a cluster of unburned large domestic bone refuse (see Fragmentation).

Cattle bones are the most commonly identified species in American Army-related archaeological assemblages at Fort Vancouver, all of which were generated through compliance-driven investigations near the former pond (now filled in), Quartermaster Depot, and former HBC employee (Kanaka) village, all located along the Columbia River, south of the central parade ground (see Appendix B). Exploratory archaeological testing in 1968, within the HBC employee village, with structures reoccupied by the U.S. Army during the early 1850s, found little food remains but for eight large pieces of bone tentatively identified as bovine (Larrabee and Kardas 1968:31). Subsequent excavations in 1969 resulted in the recovery of little food debris but for “two small piles of sawed beef bone” (Kardas 1971:331).

The pond was used extensively for trash disposal for HBC village waste and debris from other company activities within the stockade and Army general refuse (domestic, personal and architectural items) throughout the 19th and early-20th centuries. There are at least 15 different
artifact-bearing strata within the historic pond sealed periodically by flooding (Chance and Chance 1976). In 1974, excavations in the former pond (now filled in) recovered 93 cattle specimens from sediments dated to between 1835 and 1876 (Chance and Chance 1976:257). An additional 409 pieces of animal bone were recovered from the pond in 1975, with most of the HBC/early Army period bones identified as cattle (Chance et al. 1982:307). However, no specific counts or additional analyses were reported for the 1975 materials. Further excavations held in 1977 recovered a minimum of 26 faunal elements from sediments deposited prior to 1887 (Henry 1982:155). Unfortunately, the distribution of skeletal elements is not presented in these reports.

Small amounts of cattle bone (n = 47) associated with the military occupation of the Quartermaster Depot and HBC village were recovered from various locations, including portions of an innominate, scapula, humerus, femur, ribs and a thoracic vertebra (Jabine 1984). The majority of these were collected from an Army clerk’s residence in the Quartermaster Depot (Jabine 1984:839-840). Archaeological testing, conducted south of the HBC pond in 2002 and 2003, recovered 207 specimens of cattle (n = 124) and cattle sized (n = 83), from the hind limbs and vertebrae, forming 56% of the collected assemblage (Colby and Gall 2003). These faunal materials may be from either pre-Contact or historic occupations as the deposits were originally interpreted as being of mixed strata.

In 2010, archaeological investigations of a ca. 1859 infilled cellar for an unlabeled Army building recovered 27 cattle sized specimens, and an additional 10 were collected from a nearby dense sheet midden (Horton 2010). Vertebrae, long bone, and mandible fragments were identified, butchered in a similar fashion to those recovered from the residential areas for the officers, enlisted, and noncommissioned officers and laundress discussed in this study.
*Ovis aries* / *Capra hircus* – domestic sheep / goats

*Ovis aries* (domestic sheep) and *Capra hircus* (domestic goat) post-cranial elements could not be separated through methods determined by Boessneck (1969), Halstead et al. (2002), Payne (1969, 1985), and Prummel and Fisch (1986) due the lack of preservation of species-specific morphological indicators. Although goats were kept by the Hudson’s Bay Company at Fort Vancouver prior to establishment of the American military post, Company inventories record herds of less than 50 individuals, and after 1845 additional medium sized bovid livestock accountings focus solely on sheep. By 1846, approximately 3,000 sheep were present at Fort Vancouver (Gibson 1985; Horton 2010; Hussey 1976). Although potentially present, it is unlikely that goats formed a large portion of the military diet. In addition, goat meat was commonly marketed under the name of mutton in 19th century civilian markets (Manning 1905:94-95). As such, the Army warned personnel to “guard against selecting goat carcasses” for purchase (Eakins 1924:179). Therefore, all Ovicaprine elements are collectively referred to as sheep, mutton, or lamb throughout this chapter.

Sheep remains were the most frequently identified species (NISP = 93) in the assemblage, and all skeletal elements were present, excepting cranial vault fragments, vertebra and ribs, which could only be assigned to Mammal 4. Elements recovered from the officers’ privy vault and kitchen area (NISP = 11) are primarily portions of the hind limb (femur, tibia, metatarsal, and phalanx), but also included one humerus shaft. The highest proportion of sheep remains (81.7% or n = 76) was collected from the noncommissioned officers and laundresses privy vault deposits. Similar to the officers, the majority of elements (55.3% or NISP = 34) were portions of hind limbs (femurs, patella, tibias, tarsals and metatarsals), but two metacarpal fragments, a scapula neck, an ilium neck and several long bone shafts were also identified. Other
portions identified consisted of metapodial shaft fragments and phalanges (n = 25). Few sheep remains were recovered from the enlisted men’s complex (n = 6). Those recovered consist of part of a yearling mandible (see Harvest Profiles below), two scapula blade fragments, one innominate acetabulum, and a metapodial fragment. Fifteen (16.13%) of the sheep specimens have butchering marks (see below). A portion of the specimens identified as Mammal 4 (NISP = 210), primarily vertebrae, ribs, and long bone fragments, are thought to also partially reflect the remains of sheep, but could not be distinguished from pig bones, also identified in this collection. Of the Mammal 4 remains, 17.6% (n = 37) retain evidence of butchering.

Sheep bones have been recovered from archaeological deposits along the Columbia River, but typically from strata reflecting both HBC and early Army occupations. In these locations, such as the former pond near the Army quartermaster depot, the importance of lamb/mutton in the Army diet may be inflated, although mutton was commonly served (USWD, SD 1896, 1901). The HBC was heavily involved in sheep herding at Fort Vancouver, with over 3,000 head present at this site by 1846. Sheep breeding ended at the post in 1852, after three years of continuous Army occupation (Hussey 1976). Excavations in the pond area yielded 59 specimens in 1974 from sediments dated between 1835 and 1860 (Chance and Chance 1976:257) and an additional three sheep bones were recovered in 1977 (Henry 1982:155). An additional 12 specimens were recovered from deposits affiliated with Capt. Rufus Ingalls’ house (Chance and Chance 1976:259). In 1981, 47 additional sheep remains were collected during excavations from an Army clerk’s residence in the Quartermaster Depot (Jabine 1984:839-840). Archaeological testing conducted south of the HBC pond in 2002 and 2003 recovered 25 bones identified as sheep from mixed strata (Colby and Gall 2003), however, the distribution of specific skeletal elements is not discussed in these studies although the butchery cuts (as defined by modern cuts)
are discussed by Colby and Gall (2003). Although only one adult distal metapodial fragment was collected during investigations of an infilled cellar for an unlabeled ca. 1859 Army building in 2010, some of the sawn Mammal 4 bone (NISP = 34) were also interpreted as sheep and/or pig bone given their depositional context (Horton 2010).

Family Suidae – hogs and pigs

*Sus scrofa* – domestic pigs

Although none of the specimens recovered during this project could be definitively identified to the sub species *Sus scrofa domesticus* from anatomical markers, they are interpreted as originating from domesticate animals, as none of them have bone morphology suggesting the heavy muscle attachments of wild boars, a species not native to the Pacific Northwest. Domestic pigs, represented by fragments of a femur, humerus, radius, molars, carpals, tarsals, metapodials and phalanges (NISP = 45, MNI = 2). Over 77% (n = 35), were recovered from the enlisted men’s complex, while only 11% were recovered each from the officers’ (n = 5) and laundresses’ (n = 5) deposits. Fragments of molars (n = 4), canines (n = 2), and an incisor (I2) were recovered from the enlisted and noncommissioned officers and laundresses occupations. The presence of pig teeth and feet in the various collections indicates that pigs were slaughtered and processed on site, and 4.4% (n = 2) contain evidence of butchering (see below).

A portion of the specimens identified as Mammal 4 (NISP = 210), 37 of which are butchered (17.6%), primarily vertebrae, ribs, and long bone fragments, are believed to also be pig remains, but could not be separated from Ovicaprine bones, which are also present in this assemblage. A preservation bias seems unlikely as *Sus* bones are more likely to survive than those of *Ovis/Capra* (Meadow 1978), but is still possible.
Pig remains have been identified during several archaeological investigations previously conducted at Fort Vancouver. In 1974, archaeological investigations tested various areas of the former pond, used for refuse dumping and recovered 33 pig bones from deposits associated with the HBC and early U.S. Army occupations, ca. 1835 to 1876 (Chance and Chance 1976:257). “Several pig phalanges” were recovered in 1977 during additional excavations in the pond area (Henry 1982:156). Twenty additional pig bones were recovered from sheet midden and privy vault deposits associated with Capt. Rufus Ingalls house, dated between 1855 and 1856 (Chance and Chance 1976:259), and another nine from deposits within the HBC employee village related to the Army reoccupation (Jabine 1984:840). Deposits filling in a cellar associated with an unlabeled ca. 1859 Army structure along the Columbia River yielded an additional 46 pig remains, comprised primarily of rib fragments, but also several pig skulls and teeth (Colby and Gall 2003).

Class Aves – birds

A total of 192 specimens (1.17% of the assemblage) were identified as bird remains, and of these six were determined to reflect the presence of natural occurring attrition (death) and/or commensal animals. No size could be determined for 38 specimens, although they likely reflect smaller fragments of species identified as food remains.

Order Anseriformes – web-footed birds, adapted for living at water’s edge

Family Anatidae – waterfowl

Six fragmented specimens were identified to the family Anatidae. However, as these were recovered in association with skeletal elements that could be identified to the level of sub-family or genus, they are interpreted as representing the same individuals.
Subfamily Anatinae – dabbling ducks

cf. Anas spp. – mallards, pintails, teals, wigeons

Waterfowl remains were recovered from the officers (n = 6) and enlisted (n = 5) areas, but were not collected from the noncommissioned officers and laundresses’ occupations. Wing and foot elements were identified in the officers’ privy vault deposits (scapula, carpometacarpus, phalanges) likely all from the same Anatinae/Anas spp. individual (MNI = 1). Similarly, one Anatinae/Anas spp. (MNI = 1) was identified in the enlisted men’s complex from portions of the leg and wing (femur, tibia, carpometacarpus). Previously identified (Coby and Gall 2003; Henry 1982) waterfowl include Wood duck (Aix sponsa), cf. Ring-necked duck (cf. Aythya collaris), Green-winged teal (Anas carolinensis), and mallard (Anas platyrhynchos). Unfortunately, not enough of the skeletal elements were present to identify these specimens beyond family or genus. Additional Avian 4 fragments from the officers (n = 74) and enlisted (n = 41) areas, consisting of tibiotarsaii, fibula, radius, phalanges, long bone and lumbrosacral fragments, may reflect additional portions of these individuals, or of identified pheasants/chickens identified in these same locations. Both chopping and knife cutting marks are present on the Anatinae metacarpal, as well as one Avian 4 long bone, recovered from deposits representing the officers’ occupation.

Subfamily Anserinae – swans, true geese

cf. Branta spp. – Canada or Brent geese

This species is represented by one tibiotarsus (distal third) recovered from the noncommissioned officers and laundresses’ privy vault. Both Canada and Brent geese were (and continue to be) present in large numbers in the winter months at Fort Vancouver (see Grace
The only other avian specimens recovered from this provenience were chicken (see below). The lack of additional skeletal elements from this species is unusual, although several of the chicken/goose sized remains (n = 16) may have originated from this same individual. Canada Goose (Branta canadensis) and goose (species unknown) remains were previously identified in archaeological deposits associated with either the HBC or Army occupations along the Columbia River (Colby and Gall 2003; Henry 1982). Additional Avian 4 fragments from the laundresses areas (n = 7) consisting of a femur, rib, and long bone fragments, may reflect additional portions of the goose, or, more likely, of identified pheasants/chickens in these same locations.

Order Galliformes – gamefowl
Family Phasianidae - turkeys, pheasants, grouse, quail, chickens
Subfamily Phasianinae – pheasants, grouse, quail, chickens

Three specimens (metacarpus, tarsometatarsus, fibula) could only be identified to the taxonomic subfamily Phasianinae due to a lack of species-specific morphological indicators. This subfamily represents a wide range of species; several are historically documented at Fort Vancouver. Turkeys and chickens were raised for consumption at Fort Vancouver (see Chapter Four). Pheasant was hunted by officers and soldiers stationed at the post, “There are also some pheasant drumming. Fry shot one” (Lt. Talbot, 5 June 1849 in Carey 1931:90; see also Carley 1982:277).

Given their skeletal size and artifact recovery contexts in the officers, and laundresses’ residential areas (e.g. Phasianinae fibula was recovered in association with chicken carpometatarsals and tarsometarsals), all Phasianinae elements from the officers and laundresses’ areas were grouped with chicken (Gallus gallus) remains for analysis.
**Gallus gallus** – domestic chickens (junglefowls)

Comprising 0.09% of the overall assemblage, 14 specimens were identified as domestic chicken (MNI = 4). Chicken remains (NISP = 7) recovered from the officers area consisted of a maxillae fragment, corocoid, femur, tibiotarsus, metatarsus, and phalanges. These were recovered from two discrete proveniences, the privy vault and kitchen cellar infill, suggesting at least two chickens were consumed. At least two individuals were identified from the laundresses’ privy vault (NISP = 7) based on carpometacarpii, tarsometatarsii, ulnas, and maxillae fragments.

Chicken bones have been identified in archaeological deposits linked to officers’ occupations elsewhere at Fort Vancouver. Faunal remains (n = 249) recovered from quartermaster privy vault deposits (ca. 1855 to 1870) primarily consisted of fowl (n = 204 or 81.93%), 18 of which are turkey sized, with the remaining species consisting of sheep, pig, deer, and fish (Chance and Chance 1976:259). Food bones (n = 268) were recovered from a cellar midden associated with the John Johnson’s house (see Jabine 1984:838), a cooper (barrel maker) for the Hudson’s Bay Company, whose home was later reoccupied by occupied by Captain and Quartermaster Rufus Ingalls in 1849 before construction of his quarters. Other military personnel, likely officers, occupied the structures until their demolition in 1857 (Thomas and Hibbs 1984:111). Specimens were identified primarily to the order Galliformes (n = 216 or 80.59%), which includes turkeys, chickens, and pheasants, with artiodactyl (n = 37 or 13.81%) comprising only a small proportion of the assemblage, unlike the distribution seen in this assemblage. However, their importance may have been overestimated from the high numbers of bones deposited together, as chickens were typically procured and consumed whole. Excavations conducted in 2009 intersected a dense sheet midden near the Quartermaster Depot. These deposits yielded 970 pieces of bone, 76 of which were identified as Phasianinae/chicken.
specimens, all post-cranial elements, including feet (Horton 2010). Three of these contained medullary bone reflecting the presence of female birds, or hens. The majority of bone food refuse in these deposits, however, were identified as large domesticates, suggesting a similar consumption pattern to that seen in the officers and enlisted men’s deposits.

Of the 41 Avian 4 (chicken or duck sized) specimens recovered from the enlisted men’s complex, one long bone specimen contained medullary bone. Medullary bone is a granular deposit of calcium most often found during eggshell formation and egg laying, but not while the animal is molting, indicative of a female bird (Driver 1982; Serjeantson 2009). The stage of egg laying is unknown as the medullary bone volume remains the same whether the bird is in an active (forming eggshell) or inactive period (van de Velde et al. 1984). The presence of medullary bone suggests the remains were deposited in the winter, spring and/or summer, as naturally raised chickens typically enter moult in the autumn months, a process triggered by the decreasing daylight.

Historical documents record the enlisted men baiting fish hooks and raiding chicken houses at night to acquire hens (female chickens) kept by local townspeople in Vancouver (Landerholm 1960:21; Nelson and Onstad 1965:58). Although a steel fishhook (Figure 68) was recovered from the same excavation block (Block M), it cannot be tied to baiting chickens as fish remains were also recovered from that provenience. The clandestine nature of these activities may have resulted in surreptitious disposal of the remains, resulting in fewer chicken bones deposited around the enlisted men’s buildings. Therefore, several of the Avian 4 bones may be the remains of domestic chickens, although when combined with the Phasianidae remains only a minimum of one individual can be identified in the collection.
Table 8. Distribution of eggshell remains.

<table>
<thead>
<tr>
<th>Species</th>
<th>Officers</th>
<th>Enlisted</th>
<th>NCO/Launderesses</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NISP</td>
<td>Weight (g)</td>
<td>NISP</td>
<td>Weight (g)</td>
</tr>
<tr>
<td>Eggshell¹</td>
<td>8</td>
<td>0.2</td>
<td>9</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

¹ = potential eggshell species are discussed in text.

Eggshell from the officers’ kitchen likely represents chicken eggs, as they were recovered in association with domestic chicken bones. However, as only chicken, pheasant, and/or duck sized bones were recovered from the enlisted men’s complex, these small eggshell fragments could reflect domestic or wildfowl egg(s). Previous archaeological investigations recovered 14 eggshell fragments from deposits determined affiliated with the military occupation, likely officers, of a former HBC employee house in Kanaka Village (Thomas and Hibbs 1984:523).

Few fragments of eggshell (Table 8) were recovered from the officers’ kitchen (n = 8, total weight 0.2 g) and from the enlisted men’s kitchen (n = 9, total weight <0.01 g). As both locations have a MNI of one egg, the only difference is the size of the fragments recovered at each location, with larger (<20 mm) pieces recovered from the officers’ kitchen than at the enlisted men’s kitchen (<6 mm). No eggshell was recovered from the laundresses’ areas.

Figure 68. Steel fish hook recovered from the enlisted men’s kitchen area.
Class Osteichthyes – bony fishes

A total of 131 specimens (0.8% of the assemblage) were identified as reflecting the remains of fish and of these 47 could be identified to taxonomic family or species. Unidentified fish specimens consist of fragments of vertebrae, ribs and spines. All identified taxa were locally available in the Columbia River through at least the early-1870s as the post surgeon noted that the river held plenty of salmon, smelt, sturgeon, and trout (Carley 1982:277). No fish remains were recovered from the noncommissioned officers and laundresses’ occupation areas.

Order Salmoniformes – ray-finned fish; salmon, trout, chars

Family Salmonidae - salmonids

One abdominal vertebra and one unidentified fish specimen (MNI = 1) was recovered from the officers’ privy vault deposits. One other unidentified fish specimen was recovered from the officers’ yard deposits. Salmon were commonly consumed along this portion of the Columbia River for centuries by native peoples. Salmon were initially obtained primarily for subsistence in the 19th century. Prior to the American military occupation in 1849, the HBC operated extensive salmon processing operations near the pond (Chance and Chance 1976:257; Lichatowich and Zuckerman 2003), and their employees were provided salted salmon as part of their ration (Thomas and Hibbs 1984:35). With the establishment of the first salmon cannery on the Columbia River in 1866, harvested and canned salmon soon became an inexpensive food item for the working classes (Lichatowich and Zuckerman 2003). The Army encouraged consuming fish in the late 19th century, particularly salmon (U.S. Subsistence Dept. 1896:73-80). Salmon (n = 2) bones were previous identified in archaeological contexts from deposits associated with Capt. Rufus Ingalls (Jabine 1984:838, 840). As this specimen was recovered
unbroken, it is interpreted as reflecting fishing along the Columbia River, either by
commissioned officers or by local suppliers who in turn sold the meat for consumption (Saxton
1855:251-252).

Order Cypriniformes – ray-finned fish; carps, minnows

Family Cyprinidae or Catostomidae – carps, suckers

*Catostomus macrocheilus*  
Largescale sucker

*Mylocheilus caurinus*  
Peamouth

* Ptychocheilus oregonensis  
Northern pikeminnow

The largest proportion of fish remains (n = 129) were recovered from the enlisted men’s
complex, of which 46 were identified to taxonomic order, family or species (Table 7). Three
species were identified in the enlisted men’s kitchen area from cranial elements (n = 10) and
vertebrae (n = 2); largescale sucker (NISP = 6, MNI = 1), peamouth (NISP = 2, MNI= 1), and
the Northern pikeminnow (NISP = 1, MNI =1). Eighteen vertebrae, primarily centrums, were
identified to the family Cyprinidae or Catostomidae. All fish specimens, but one, were recovered
 together along the eastern wall of the enlisted men’s kitchen (Block M) in association with a 1.4
 cm long ferrous barbed tip fishhook. These are interpreted as also reflecting opportunistic fishing
by the enlisted men to supplement their rations.

**Phylum Mollusca**

Class Bivalvia – bivalves

Order Heterodonta – saltwater clams    Order Ostreoida – true oysters, other bivalves

Family Ostreidae – true (edible) oysters

A total of 42 small shell fragments (19 are <10 mm in size, the remainder <30 mm in
size) were recovered from the enlisted men’s kitchen, officers’ kitchen and privy vault (Table 9).
Two shell fragments, one clam (weight 0.12 g) and one mussel or oyster shell (represented by one small flake of hypostracum; weight <0.01 g), were recovered from the enlisted men’s kitchen area. At the officers’ residential area, 11 oyster shell fragments (weight 1.65 g) were recovered from the kitchen deposits, and the remaining 4.8 g collected from privy vault deposits. Taxonomic species could not be determined and as no umbros, teeth, or hinges were identified.

*Interhousehold Distribution Patterns*

Using the statistical program “R” (R Core Team 2013), I performed Correspondence Analysis to assess the variability between the residential households, based on the NISP frequency data (the butchery cuts datasets are too sparse). Correspondence Analysis is a multivariate quantitative method which allows for analysis of contingency tables of categorical variables using either frequency or presence-absence data, and allows for visual representation of the data. The “R” program uses standard computation methods to calculate the coorespondance analysis (see Baxter 2003; Blasius and Greenacre 1994; Greenacre 1993; Husson et al. 2010; Lê and Husson 2008; Nenadic and Greenacre 2007; Shennan 1997).
Several patterns emerge when comparing the faunal collections associated with the commissioned officers', enlisted men’s, and noncommissioned officers and laundresses’ residential occupations (Table 7 and Figure 69). For all three, the greatest numbers of identified remains are from domesticated species, primarily cattle, then sheep, pigs, and chickens, and the distribution patterns are significant (Fisher’s Exact $p = 0.0004998$, two-sided; $p$ calculated from Monte Carlo, 2000 replications, table $> 2x2$; $\chi^2 = 987.9632$, df = N/A, $p = 0.0004998$).
Among the large domesticates, the body part distribution is most diverse for cattle and sheep. Of identified species, cattle bones were the most commonly identified (18.16% or NISP = 785) in the commissioned officers and noncommissioned officers and laundresses’ collection (26.5% or NISP = 106). Conversely, in the enlisted men’s complex, only 5.9% (NISP = 657) were identified as cattle. Cattle and cattle-sized animals are eaten by all three groups in roughly equal measure, but identifiable faunal remains of cattle correspond with officers and NCOs (Figure 70). This may reflect more thorough processing of beef bones by the enlisted men, whereas officer’s diets utilized cuts that leave more identifiable refuse (see Fragmentation and Marrow Processing below).

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**Figure 70.** Distribution of identified species by residential area, based on NISP using correspondence analysis. Numerical analytical results are presented in Appendix I.
For all three occupations, pig bones comprise the lowest portion of the collections, between 0.11% (officers) and 1.25% (noncommissioned officers and laundresses). The greatest difference is seen in the proportion of sheep bones. Sheep remains encompass 0.05% of the enlisted men’s specimens, and 0.11% of the officers, but represent 19% of the bones recovered from the noncommissioned officers and laundresses areas. Correspondence Analysis suggests that sheep comprised a significant portion of their diet (Figure 70), particularly as an additional 15.25% of similarly sized (Mammal 4) identified bones (NISP = 61) likely reflect sheep and/or pig bones. Rather than directly reflecting varying levels of dietary importance, other factors, such as carcass processing, marrow extraction, and refuse disposal are likely influencing the deposition, archaeological retrieval, and subsequent identification of large domesticate bones.

Among fowl, the greatest variety of skeletal elements were identified as domestic chicken, not surprising as these animals were typically acquired as whole individuals. Although analysis determined that only a minimum of four chickens were present, their importance in the military diet, particularly among commissioned officers and noncommissioned officers and laundresses is likely underestimated.

Military personnel at Fort Vancouver relied significantly on domesticate species for consumption, with wild foods supplementing the diet ($\chi^2 = 181.1146$, df = 6, $p = 2.2^{-16}$). Wild foods are represented by the recovery of at least one duck each from the officers and enlisted men’s areas, and one goose from the laundresses’ privy vault deposits. At least four fish species are represented in the officers and enlisted men’s refuse as well; the officers consumed at least one salmonid, while the enlisted men ate at least one largescale sucker, one peamouth, and one Northern pikeminnow (Table 7). Although these species do not represent a large portion of the diet, their presence reflects the variety of foods consumed at the post.
There are significant distinctions between the rank-based households and food sources, whether they are of domesticate, wild, or potentially eating commensal species. The enlisted men had a greater reliance on wild game, primarily consisting of wild fish that are expediently acquired. The commissioned and noncommissioned officers/laundresses consumed mainly domesticated animals, although the commissioned officers did supplement their diet with wild game (Figure 71). The presence of commensal animals is almost exclusive to the enlisted men’s complex. The disproportionate representation (as compared to distribution of small mouse-sized and rodent remains) for enlisted areas suggests cause other than commensal presence. Although the enlisted men may have supplemented their diet by eating commensal species as well, I propose that this variability reflects instead the low military rank of the occupants. Commensal species were entering the barrack and kitchen buildings at a greater rate than at the officers or laundresses’ quarters and kitchen, likely resulting from deferring maintenance at the enlisted
men’s complex until repairs to structures quartering higher-ranked individuals were at or near completion. Official letters and personal journals written by military personnel attest to the state of disrepair of buildings housing lower ranked individuals (see Chapter Four).

**Herd Structure and Slaughtering Practices**

*Harvest Profiles*

To examine the military herd economy at Fort Vancouver, harvest profiles, or mortality patterns, were created for the larger domesticates (cattle, pigs, and sheep). At Fort Vancouver, the Army Subsistence and/or Quartermaster departments purchased live animals for consumption from the Hudson’s Bay Company (in the 1850s) and local ranchers (see Chapter Four). Therefore, it is expected that the harvest profile would reflect a consumer economy, consisting of primarily market-age animals and little breeding stock, or animals of reproductive age (Crabtree 1990:162). Cattle, pigs, and sheep would therefore be slaughtered at ages that maximized their growth potential at Fort Vancouver.

To obtain age-related data, teeth were identified, and age and sex assignments assigned when possible through methods discussed in Amorosi (1989), Andrews (1982), Bull and Payne (1982), Driver (1982), Eakins (1924:119); Grant (1982), Grigson (1982), Hillson (1986), O’Connor (2008), Pope (1934), Reitz and Wing (1999), Serjeantson (2009), Silver (1969) and Watson (1978). When present, morphological indicators of biological sex (bovid antler pedicles, medullary bone, fowl spurs, etc.) were recorded. Medullary bone is a calcium deposit connected with egg laying, and therefore female fowl (Driver 1982; Serjeantson 2009; van de Velde et al. 1984), while the presence of spurs on the tarsometatarsus are associated with adult male fowl, although hens do occasionally develop spurs (see Sadler 1991; West 1985).
Avian species were not assigned specific ages at death beyond simply “adult” or “juvenile.” No age at death was determined for commensal and curiosity-collected species. No sex assignments could be made but for one chicken, identified as a female through the presence of medullary bone. All chickens (MNI = 4) were butchered after reaching 5 to 8 months of age.

As all teeth were recovered loose (i.e. not within the alveolar process) but for one yearling mandible, dental eruption patterns could not be determined, Therefore, ages of large domesticates (cattle, pigs, and sheep) represented in this collection were calculated based upon the epiphyseal fusion rates of diagnostic skeletal elements. When animals are younger their epiphyses are not fused to their corresponding diaphyses, or bone shafts. As mammals mature, these bone portions join together in a regular temporal sequence, and higher rates of fused diagnostic diaphyses are equated with more mature animals (see Bull and Payne 1982; Silver 1969). Fusion rates are calculated by grouping bones that fuse at approximately the same stage in the animal’s life (Table 10). The number of fused bones is divided into the total number of bones for a particular age class, and is then expressed as a percentage representing the frequency of animals surviving beyond a particular age class. Each age class is considered individually as a self-contained data set; therefore, the sum of the percentage values does not equal 100.

Unfortunately, influences on the fusion data, such as nutrition rates or maturing rates of specific sub-species are not known and may slightly affect the results. Therefore, the age stages presented are not absolute, but are utilized as indicators of the mortality patterns of the herds from which they were culled. Although the specimens are likely to have originated from a wide array of animals, only a small percentage (0.005%, n = 80) were able to provide fusion data (Table 10). Therefore, epiphyseal fusion data are combined for all three occupations (officers, enlisted, noncommissioned officers and laundresses) to generate harvest profiles (mortality
patterns). This data aggregation more accurately reflects the herd structure consumed by military personnel, as the animals were slaughtered in the shambles area before distribution for consumption (see Chapter Four). Following Grant (1982), histograms were drawn to allow a visual representation (Figure 72).

Cattle remains provided the most fusion data. The cattle at Fort Vancouver represent an adult population, with all of the animals reaching at least two years of age (24 months) before slaughter (Table 10). Half of the cattle survived up to three years, with only 16.7% of the bovines surviving past four years before death. Over 54.56% of the cattle vertebrae epiphyses were fused, indicating that at least a few animals were close to or over six years old when they were killed. These results are similar to trends discerned in other archaeological faunal assemblages from Fort Vancouver. Jabine (1984) examined faunal remains from three occupations combined for analysis; the mid-19th century Hudson’s Bay Company employee village, the ca. 1850s re-occupation of the village, and the 19th century military Quartermaster Depot occupation. Based upon epiphyseal fusion rates, she determined the cattle were slaughtered after reaching 12 to 18 months, but before 42 months of age (n = 13). Additional faunal analyses undertaken on a variety of faunal assemblages strictly related to the 19th century Army occupation discerned similar patterns, although the majority of the large domesticates lacked epiphyseal fusion data due to their high rates of fragmentation (Horton 2010). One bovine was killed after reaching at least 2.5 years of age, while another was slaughtered after four years (Horton 2010:19,23).

The harvest profiles for pigs and sheep are inconclusive due to the low presence of identifiable skeletal elements with diagnostic fusion data that were recovered for these species. However, some broad trends are present (Figure 72). No slaughtered juvenile pigs (<24 months or 2 years) were identified in the collections. The majority of pigs (80%) were killed before
Table 10. Mortality patterns of domesticates, based on epiphyseal fusion rates.

<table>
<thead>
<tr>
<th>Age of Fusion¹</th>
<th>Officers</th>
<th>Enlisted</th>
<th>NCO/Laundresses</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Months</td>
<td>Years</td>
<td>N</td>
<td>F²</td>
<td>Ind.</td>
</tr>
<tr>
<td>7 to 10</td>
<td>&lt; 1</td>
<td>7</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>12 to 18</td>
<td>1 to 1.5</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>24 to 36</td>
<td>2 to 3</td>
<td>8</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>36 to 42</td>
<td>3 to 3.5</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>42 to 48</td>
<td>3.5 to 4</td>
<td>7</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Vertebrae</td>
<td>6</td>
<td>15</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Pigs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>24 to 30</td>
<td>2 to 2.5</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>36 to 42</td>
<td>3 to 3.5</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Sheep</td>
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</tr>
<tr>
<td>6 to 10</td>
<td>&lt; 1</td>
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<td>0</td>
<td>1</td>
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<td>2</td>
</tr>
<tr>
<td>30 to 36</td>
<td>2.5 to 3</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>36 to 42</td>
<td>3 to 3.5</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

¹ = based on Eakins (1924:119) and Silver (1969); ² = “F” denotes the epiphyseal is fused to the diaphysis, % calculated from specimens within that age group. “Ind.” refers to indeterminate, these values were not included in calculations, Unk” refers to Unknown.

Figure 72. Harvest profiles for large domesticates at Fort Vancouver; cattle (blue), pigs (red), and sheep (green). Based on data given in Table 10.
reaching 2.5 years, of those surviving, 50% lived past 3.5 years of age before death (Table 10).

No additional pig age at death data are currently available for Fort Vancouver. As the prime age for slaughtering for pigs is between two and three years of age, based on body growth to meat yield ratios (Bowes 1971), this presence of older animals is unexpected as pork, both fresh and cured, was the most commonly consumed meat in mid-19th century America, particularly with the rise of canning (Martin 1942:46,49,61) and large scale canneries operating in the east by the 1840s (Busch 1981:95; Rock 1984:98).

Fusion data indicate that sheep mortality at the post followed a similar pattern as the cattle and pigs, in that older animals were typically slaughtered. No evidence of lambs (<15 months or 1.25 years [Eakins 1924:170]) was observed. At least 83.7% of the sheep were killed as adults, after reaching two years of age. Only 25% of the remaining sheep were slaughtered after reaching three years, while the remaining 75% survived (Table 10). One mandible was recovered with the M1 and M2 erupted but unworn, and the M3 not yet in the occlusal plane but was emergent in the tooth cavity. As the M3 crown starts forming after 1 year (Hillson 1986:202), but erupts between 1.5 and 3.5 years (Silver 1969), this animal was between one and two years old when it died (cf. Payne 1973), or a yearling. Twelve sheep specimens recovered from deposits affiliated with Capt. Rufus Ingalls' house (Chance and Chance 1976:259), with the majority (n = unknown) identified as “from young animals,” interpreted as the remains of lamb, although specifically what age is not reported (Henry 1982:157). Other archaeological investigations (Horton 2010:23) identified at least one sheep consumed by Army personnel at least 10 months old, but before reaching three years of age, similar to the animals in this dataset. It is unlikely that the Army was retaining sheep for wool production at Fort Vancouver, as
military-issued textiles (uniform clothing, blankets, etc.) was manufactured and distributed to posts through Army supply lines.

Butchering Techniques

Techniques used in the primary processing, or dividing into large portions (e.g. hind limb, fore limb, mid-section, etc.) of large domesticates for consumption in the mid-19th century are similar to those used today when butchering these animals by hand (cf. Mettler 2003). In the mid-19th century, hand saws and cleavers were the basic instruments utilized in dressing and butchering large domesticates. Smaller game directly procured (hunted or fished) by military personnel, such as domestic or wild fowl, rabbits, and turtles, were processed onsite in the residential kitchen areas by consumers.

A steer, cow, sheep, or goat, was killed either by shooting it or with an axe blow to the head (USWD, SD 1901:24), although shooting or beheading was preferred for sheep to ensure a quick kill, given the angle of their skull (Mettler 2003). The animal was then hung up by its hind limbs on a pritch (wooden rod with a metal spike on each end, also known as a gambrel) for dressing (removing the organs), and the blood was drained from its throat and collected for use, but not for human consumption (USWD, SD 1901:23). Using a hand saw, the head was removed for a bovine at the fourth cervical vertebral joint, and for sheep at the first vertebral joint (USWD, SD 1896:27), whereas for veal, lamb, and deer, the head could be removed after bisecting the carcass.

The hides were then removed, although at times the hides could be removed after splitting the carcass in half (Eakins 1924). Beef hides were either removed to be refashioned into leather at military processing sites or sold locally at public auction by the Subsistence
Department (USWD 1855:10; USWD, SD 1901:23). No specific uses or procedures are given in the military manuals for sheep or goat hides. Pigs are also drained of blood after killing, but afterwards they are dipped in boiling water and their hide scraped to remove bristles rather than stripping the hide completely, as the skin is used as fat in cooking, or eaten. The pig is then hung up as well for dressing, and the head can be removed prior to its hanging or afterwards (Mettler 2003:41-45) at the junction of the occipital and axis vertebra (Eakins 1924).

For all of these animals, the organs, tongue, viscera and offal were then removed (Horsford 1864:20) to prevent them from contaminating the meat during further processing. Portions of these were often made into tallow, while feet could be rendered into bone meal and/or glue (Eakins 1924). Viscera were used as casings for sausage. Organs such as tongue, liver, head flesh could be used as “head cheese.” Although yielding low rates of edible meat, cranial and foot bones of cattle and sheep were not discarded in the mid-19th century (cf. Lyman 1977:69). Cattle skulls were cleaned and processed for meat, as ox cheek was a common dish in the Mid-19th century (see Abell 1852; Lyman and Lyman 1869; Storke 1859; Webster and Parks 1845). Typically, everything from the pig was saved for use, whether as meat or in sausages or making jelly (Eakins 1924). Although the Regulations repeatedly stressed the need to promptly bury the offal “at a sufficient distance from camp,” typically in trenches at least four feet deep (Butterfield 1862:63,96,108), at this post the offal was often removed by local civilians to use as pig feed (Carley 1982:287).

Once these steps were completed and cattle hung for a period of time to let the meat age or “rest” to tenderize and/or improve the flavor, and it was commonly believed that eating freshly killed beef could cause ill health upon immediate consumption (USWD, SD 1901:37). Beef carcasses were generally hung for about a week (Mettler 2003), although timing was
weather dependent as hotter days will necessitate shortening the aging process to keep the meat from spoiling. Meat for pigs was not generally aged, as the process has no impact on the flavor or tenderness (Mettler 2003), although it was commonly cured or salted for future use. Sheep, veal and lambs could be hung for a few days to age the meat, but this was not as consistently done as with cattle (see Eakins 1924; Mettler 2003).

Large domesticates were then split by cutting longitudinally along one side of the vertebral spinous processes, through the costal cartilage (“breast bone”). For cattle, “the cartilage of the aitch [innominate] bone is cut with a knife, a cleaver or saw, at the center line” but was often left intact for sheep (Eakins 1924:46,52). The carcass was then quartered by dividing between the ribs and sirloin (Figure 73) typically with a cleaver (Eakins 1924:47). For cattle, the feet and lower limb shanks were removed about 4 in. above the knee and 8 in. above the gambrel (hock) joint (USWD, SD 1896:25), or at the proximal end of the metatarsal, and at the knee and hock joints for sheep (USWD, SD 1896:27). For sheep, the fore and hindshanks were to be removed right above the knee (carpals) and hock (tarsals) joints prior to sectioning (USWD, SD 1896:28). Unlike the bovidae, the feet of pigs were saved for pickling or making into jelly (USWD, SD 1896:28). The limbs for all three were then removed, and the body quartered into primal cuts (large sections) for issue. Once issued, the meat was further reduced into appropriate portions for cooking at the kitchens of military personnel, as per the style of the era (e.g. mid-19th as opposed to late-19th or early-20th century cuts). Meat was removed from the bone with a knife (USWD, SD 1896:27).

For cattle, the meat was to be issued after waiting ten to twelve hours for the meat to shrink (USWD, SD 1901:15,23). The Army assumed a 45% shrinkage of the meat if the bovine weighed over 1,300 lbs., 55% if the animal was less than 1,300 lbs., and cattle less than 800 lbs.
Figure 73. Prescribed butchering process for military personnel and division into primary joints (primal cuts) for cattle, hogs and sheep (reprinted from USWD, SD 1896:27-28).
were considered unacceptable for butchering, given the ratio of waste to available meat (Horsford 1864:21; USWD 1863b:15). However, the purchase of smaller cattle was acceptable when “sufficient reason render[ed] it necessary” (USWD, SD 1901:35). An ordinary sized beef furnished roughly 500 rations, and an adult sheep about 40 rations (Craighill 1862:90). Hogs were to weight at least 150 lbs. before slaughter (USWD 1896:28).

Evidence of dismemberment methods is frequently present on skeletal elements from preindustrial 19th century assemblages, in the form of sawing, cleaving, and/or chop marks. Following Landon (1996), to better understand the distribution of meats at Fort Vancouver, butchering marks are examined to assess whether meats consumed at the post 1) were processed onsite, and 2) followed the prescribed division of cattle, pigs, and sheep into mid-19th century primal cuts. A primal cut, now often referred to as a wholesale cut, is a large portion of meat initially separated from the carcass during butchering. These can be served whole, or further reduced with secondary butchering, involving trimming and preparing smaller retail cuts for sale and consumption. Specimens identified as Mammal 5 (Cow size) were combined with as domestic cattle (*Bos taurus*) elements for analyses as identified meat cuts correspond to those historically documented for beef, and many Mammal 5 elements lacked species specific morphological indicators due to anthropogenic processing, consumption, and disposal activities.

Mechanized and hand sawing were distinguished by striation patterns; consistently and evenly parallel striations are associated with mechanical sawing, whereas uneven parallel striations, with series of them often crossing each other, are caused by hand-sawing. When the sawn surfaces were too degraded to assess directionality or the consistency of the distance between striations, the specimen was recorded as “Indeterminate sawing.” Cleaving is distinguished by a lack of striations, leaving only straight edges on cortical bone and a straight
plane on spongy bone, commonly seen on cleaved vertebrae bodies. Chop marks were distinguished from cut marks by the thickness of the impact; initial sawing marks (e.g. sawing was not completed through the bone) were not tabulated with chop marks. Chop marks are generally 2 to 3 mm thick with a blunt termination into the cortical bone, caused by the cleaver or axe head, whereas cut marks are incised line(s) typically less than 1 mm thick when caused by a knife blade. Larger bone specimens often displayed multiple marks simultaneously, most commonly sawing and cleaving. Cut marks are associated with removing the meat from the bone for preparation, cooking and consumption (Crader 1990:706), tasks performed at the individual kitchens. As such, cut marks are discussed separately.

![Figure 74. Knife marks on hand-sawn domestic pig (Sus scrofa) humerus recovered from officers kitchen area, representing a hand roast, determined to be within the medium cost range.](image)
Table 11. Distribution of butchery signatures on bone specimens included unidentifiable skeletal elements.

<table>
<thead>
<tr>
<th>Description</th>
<th>Officers</th>
<th>Enlisted</th>
<th>Laundresses</th>
<th>TOTAL MARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Quarters</td>
<td>Kitchen</td>
<td>Privy</td>
<td>Yard</td>
</tr>
<tr>
<td>Hand-sawed</td>
<td>15</td>
<td>81</td>
<td>115</td>
<td>0</td>
</tr>
<tr>
<td>Indeterminate</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Sawing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial</td>
<td>7</td>
<td>47</td>
<td>66</td>
<td>0</td>
</tr>
<tr>
<td>Cleaved</td>
<td>0</td>
<td>6</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Chop Marks</td>
<td>1</td>
<td>11</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Cut Marks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL SPECIMENS</td>
<td>19</td>
<td>131</td>
<td>176</td>
<td>0</td>
</tr>
</tbody>
</table>

1 = Initial sawing" is when sawing is initiated on the cortical bone, but does not continue through the marrow cavity, distinguished from chop marks by the presence of striations; Total is for NISP with butchery, as several specimens have multiple butchering signatures, this does not equate with a summation of the above rows; 2 = “NISP” refers to Number of Identified Specimens, and percentage is calculated from that occupation only; 3 = calculated from total assemblage.
When purchased, cattle heads were to be removed at the fourth cervical vertebra (Figure 73). However, the atlas (MNE = 3) and axis (MNE = 2) were recovered from the officers and enlisted men’s areas. Cranial fragments (NISP = 4) were identified in the enlisted and noncommissioned officers and laundresses’ occupations. Their presence supports historical documentation that cattle were brought to Fort Vancouver as livestock, free-ranged and grazed on grass, and then butchered onsite. The Monthly Post Returns for Fort Vancouver, submitted between 1849 and 1875 (USWD 1849-1900), do not list a civilian working as a post butcher, so enlisted men were likely detailed as butchers and their assistants (Kautz 1865:153). Although the first Army manuals detailing butchery procedures were published in the late-19th century (see USWD, SD 1879, 1896, 1901), many civilian cookbooks did include discussions on processing domestic livestock (see Abell 1852; Hall 1856; Lee and Leslie 1832; Lyman and Lyman 1869; Storke 1859; Webster and Parkes 1845).

It was expected, therefore, that since the animals were processed onsite near the shambles, that the majority of the specimens would display evidence of carcass processing, but butchering marks were only observed on 3.15% (NISP = 510) of the bones. When examined by provenience, the bones deposited into the privy vaults and around the kitchens possessed the greater number of butchered bones (Table 11). The secluded privy vaults afforded the greatest protection from post-depositional fragmentation, particularly as they were not cleaned out when full, but capped and the privy relocated. The high frequency of butchered bone in the kitchen areas, 54% of the officers’ assemblage and 94.5% of the enlisted men’s, is likely directly related to these buildings being used to process the primal cuts into selected meat cuts.

Sawing and cleaving marks are the most frequent butchery marks present across all three occupations (Table 11), as expected given the amount of processing necessary to extract primal
cuts, prior to their distribution for consumption. Among the fowl and fish remains, only two Anserinae/Avian 4 long bones recovered from the officers’ kitchen area contained butchery marks, specifically cut marks near protrusions on the bone surfaces that are indicative of tendon attachments; e.g. consumers were facilitating removal of the tendons by cutting with a knife.

The distribution of butchery marks on cattle, pig, and sheep bones was examined to compare their similarity with the historically-documented butchery practices discussed above (Table 12). Specimens with evidence of butchering that could not be identified to specific skeletal elements, excepting the long bones, were removed from analysis. Long bone shaft fragments were included as butchering practices impacted all of these skeletal elements (humerus, ulna, radius, femur, tibia and for bovidae the metapodials).

The distribution of sawing, cleaving, and chopping marks on large domesticate body parts within this assemblage are generally consistent with the prescribed butchering process. Sawing, cleaving, and chop marks are located on elements in areas that would be significantly impacted using documented Army methods for diving carcasses into primal cuts, or joints (USWD, SD 1896, 1901). Specimens on which distinctive butchery marks are present are visually depicted in Figure 74).

Initial sawing and chop marks were consistently identified within ¼ in. of a sawn or cleaved end, suggesting probable inexperience of some military personnel detailed with carcass processing. Meat cuts discussed below are presented in tabular form in Table 12. Distribution of marks associated with cattle carcass butchering (sawing, cleaving, chop marks) by occupation.

No marks were present on cattle cranial bones (Table 12, Figure 75), a probable result of being highly fragmented for use in broth and soup, “Good rich soup can be made from the heads, tails, and soup bone of cattle…” (USWD, SD 1896: 57-58). Although cranial fragments and
Table 12. Distribution of marks associated with cattle carcass butchering (sawing, cleaving, chop marks) by occupation.

<table>
<thead>
<tr>
<th>Element</th>
<th>Officers NISP</th>
<th>Enlisted NISP</th>
<th>NCO / Laundresses NISP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Cranium</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Vertebral Atlas</td>
<td>2</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Vertebral Axis</td>
<td>1</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Vertebral Cervical</td>
<td>6</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Vertebral Thoracic</td>
<td>6</td>
<td>2</td>
<td>33.33</td>
</tr>
<tr>
<td>Vertebral Lumbar</td>
<td>64</td>
<td>25</td>
<td>39.06</td>
</tr>
<tr>
<td>Vertebral</td>
<td>129</td>
<td>23</td>
<td>17.83</td>
</tr>
<tr>
<td>Sacrum</td>
<td>5</td>
<td>1</td>
<td>20.00</td>
</tr>
<tr>
<td>Incomplete</td>
<td>20</td>
<td>17</td>
<td>85.00</td>
</tr>
<tr>
<td>Rib</td>
<td>144</td>
<td>17</td>
<td>11.81</td>
</tr>
<tr>
<td>Scapula</td>
<td>1</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Ulna</td>
<td>2</td>
<td>2</td>
<td>100.00</td>
</tr>
<tr>
<td>Radius</td>
<td>5</td>
<td>4</td>
<td>80.00</td>
</tr>
<tr>
<td>Femur</td>
<td>5</td>
<td>3</td>
<td>60.00</td>
</tr>
<tr>
<td>Tibia</td>
<td>12</td>
<td>8</td>
<td>66.67</td>
</tr>
<tr>
<td>Long Bone</td>
<td>142</td>
<td>38</td>
<td>26.76</td>
</tr>
<tr>
<td>Metapodial</td>
<td>1</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Carpal/Tarsal</td>
<td>168</td>
<td>1</td>
<td>0.60</td>
</tr>
<tr>
<td>TOTAL</td>
<td>981</td>
<td>174</td>
<td>17.74</td>
</tr>
</tbody>
</table>

1 = no specimens were identified in the Noncommissioned officers (NCO) and /Laundresses assemblage; 2 = % calculated from specimens within that occupation. NOTE: several specimens exhibit multiple butchery signatures.
Table 13. Distribution of marks associated with pig and sheep carcass butchering (sawing, cleaving, chop marks) by occupation.

<table>
<thead>
<tr>
<th>Element</th>
<th>Officers</th>
<th>Enlisted</th>
<th>NCO / Laundresses¹</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NISP</td>
<td>Sawn</td>
<td>Cleaved</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%²</td>
<td>N</td>
</tr>
<tr>
<td>Pig</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Femur</td>
<td>3</td>
<td>1</td>
<td>33.33</td>
</tr>
<tr>
<td>Humerus</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Radius</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Carpal/Tarsal/Foot</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>5</td>
<td>1</td>
<td>20.00</td>
</tr>
<tr>
<td>Sheep</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cranium</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Innominate</td>
<td>1</td>
<td>1</td>
<td>100.00</td>
</tr>
<tr>
<td>Scapula</td>
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<td>1</td>
<td>50.00</td>
</tr>
<tr>
<td>Humerus</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Femur</td>
<td>5</td>
<td>1</td>
<td>20.00</td>
</tr>
<tr>
<td>Patella</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tibia</td>
<td>2</td>
<td>2</td>
<td>100.00</td>
</tr>
<tr>
<td>Metapodial</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Carpal/tarsal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foot</td>
<td>11</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>20</td>
<td>3</td>
<td>15.00</td>
</tr>
<tr>
<td>Mammal 4 (Size Class)</td>
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</tr>
<tr>
<td>Cranium</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Vertebra</td>
<td>27</td>
<td>4</td>
<td>14.81</td>
</tr>
<tr>
<td>Sacrum</td>
<td>1</td>
<td>1</td>
<td>100.00</td>
</tr>
<tr>
<td>Rib</td>
<td>49</td>
<td>3</td>
<td>6.12</td>
</tr>
<tr>
<td>Radius</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Femur</td>
<td>1</td>
<td>1</td>
<td>100.00</td>
</tr>
<tr>
<td>Tibia</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Long bone</td>
<td>17</td>
<td>2</td>
<td>11.76</td>
</tr>
<tr>
<td>TOTAL</td>
<td>99</td>
<td>11</td>
<td>11.11</td>
</tr>
</tbody>
</table>

¹ = no cleaved specimens were identified in the Noncommissioned officers (NCO) and Laundresses assemblage; ² = % calculated from specimens within that occupation. NOTE: several specimens exhibit multiple butchery signatures.
Figure 75. Overall prevalence of marks associated with cattle carcass butchering (sawing, cleaving, chop marks). Based on data presented in Table 12.

Figure 76. Overall prevalence of marks associated with pig, sheep, and Mammal 4 (pigs and sheep) carcass butchering (sawing, cleaving, chop marks). Based on data presented in Table 12.
teeth were recovered for cattle, pigs, and sheep, none displayed evidence of butchery. For cattle, 43.18% of the butchering marks are located on vertebrae (NISP = 264), all, but one unbutchered fragment from the noncommissioned officers and laundresses’ privy, are refuse from the officers and enlisted men’s areas. Only two vertebrae, a bovine atlas and cervical vertebra, were recovered intact, both from the officers’ kitchen area. The axis from the enlisted men’s area was sawn along the sagittal plane from splitting the carcass, but also cleaved along the transverse plane during sectioning the spine into primal cuts. The lack of pig and sheep atlases and axii is unexpected while similarly sized cranial fragments (such as teeth and a mandible) are present.

No domesticate caudal vertebrae were recovered. Of the cattle and pig/sheep (Mammal 4) cervical, thoracic, lumbar, and unidentified vertebrae, 48.56% (n = 101) were sawn, cleaved or chopped. Vertebrae (26.44% or n = 55) and sacrums (n = 2) were split longitudinally by hand-sawing along one side of the spinous processes, but also by cleaving (Table 12 and Table 13, Figure 77 to Figure 79). The position of the sagittal cut varied; some were split adjacent to the spinous process, others were longitudinally split along the exterior of the spinal canal. Once split, vertebrae were further divided during sectioning of the carcass, by either sawing or cleaving roughly perpendicular to the spinal column. As vertebrae cortical bone is thin, several of the cleaving planes may in fact represent sawing locations whose striations have worn with cooking, consumption, and disposal. Vertebrae bodies were rarely recovered with arches attached (n = 2). Both primal and secondary meat cuts are reflected by the cattle vertebrae. Several vertebrae were sectioned into slices 0.51 to 1.23 in. thick, indicative of individual steaks, represented by fragments (mostly transverse processes) of the original bone (NISP = 25). Of these fragments, 76% (n = 19) were collected from the officers’ area. No pig/sheep sized vertebra or the sacrum displayed evidence of reduction into secondary butchery cuts.
Cattle (n = 68) and pig/sheep (n = 65) ribs were sawn or cleaved along the body at a variety of angles, roughly parallel to the vertebrae, and all but one were broken on one end. One rib body, 3.544 in. long, recovered from the officers’ privy vault was hand-sawn on both ends. Original anatomical positions for the rib fragments could not be orientated to the body, and specific meat cuts beyond “rib” could not be determined. Of the domesticate ribs (n = 198), only 3% (n = 6) retained the head and/or tubercle, indicating the rib bodies were removed while the head and tubercles remained attached to the vertebral column (Figure 77 to Figure 79). Sawn and cleaving marks on rib bodies suggest the ribs were then divided into the ribs/backbone and the brisket (short plate), and then into smaller strips for short ribs (see Mettler 2003). The ribs/backbone were further sectioned into the fore (best end), middle or chuck ribs, which can be immediately prepared as a rib roast (see Landon 1996:75) or reduced into rib steaks. Of the fragments with cut marks (n = 3), all recovered from the officers’ kitchen and privy vault deposits, one had five cut marks along the dorsal crest of the rib, likely resulting from separating the meat tenderloin from the bone.

Cattle innominates (pelves) are represented by ilium neck and blade fragments (n = 25), and sheep by neck and acetabulum fragments (n = 2), cleaved into primal and/or secondary cuts (n = 21 or 84%). No pig innominates were present. Removal of the leg exposes the center of the innominate (Landon 1996:83) facilitating access to the ilium neck. Nine specimens (seven cattle, two sheep) were hand-sawn along the ilium neck (Figure 77), dividing the cattle innominate into sirloin (loin) and rump cuts, and sheep into chump end loin and leg mutton cuts. These were further reduced into secondary cuts between 0.8 and 3+ in. thick for distribution.

Fore and hind limb elements were rarely butchered at the junction between skeletal elements. Cattle and pig femurs were either sawn along the proximal epiphyseal junction or just
Figure 77. Dismembering evidence on selected butchered cattle (Bos taurus) bone specimens. Portions present are depicted in blue, and thick black lines denote locations of hand-sawing and cleaving planes, while thin lines represent cut marks. Not to scale.
below the femur head, regardless of age (Figure 77). This separated the hind limb while simultaneously dividing the aitch bone (rump) and buttock (round) cuts for cattle, and the hind loin from the leg (ham) for pigs. Sheep hind limbs were removed from the torso by sectioning the femur ~2 in. below the head, splitting the leg cut into smaller portions. One cattle femur was sawn about 3 in above the knee joint, while pigs were either sawn at the knee (femur distal condyles) or in the center of the diaphysis (Figure 77). Distal portions of sheep femurs and patellas (n = 1) did not retain evidence of primary butchering, excepting five knife cuts on the dorsal side of one diaphysis above the condyles, reflecting separating meat from bone (Figure 79). Cattle tibias were sawn about 3 to 5 in. below the knee either for portioning secondary cuts or marrow extraction, and/or 2 to 4 in. above the gambrel joint for removing the hindshank (Figure 77). Sheep hindshank and feet were removed by sawing the tibia between 3 and 5 in. above the hock (tibiotalar) joint, but the tibias were not sectioned by further sawing/cleaving (Figure 79). Occasionally, cattle and sheep were cleaved at the gambrel/hock joint, as three tarsals were cleaved. No sawn/cleaved pig tibias were present.

Scapulae and long bones were sawn or cleaved a few inches above or below the joint. Almost of all long bones were sawn through the cortical bone and marrow cavity, but for the last ¼ in. of the final cortical bone, which was snapped off. Any remaining still-attached tendons or meat were likely cut or cleaved at that point without impact to the bone. Bovidae scapulae were removed from the torso at the scapula neck, near the proximal portion of the acromion (Figure 77). The scapula blades were then further reduced into smaller sections, between 0.6 and 3.5+ in. thick. The two humerii (pig and sheep) did not retain any evidence of dismemberment. Butchered cattle radii (n = 4) and ulnas (n = 3) were not consistently sawn at the prescribed 4 in.
above the knee, but between 2.2 and 4.5 in. above this joint when the foreshanks were removed. Ulnas/radii were sawn or cleaved between 2 and 4 in. below the humeroradial joint, likely during reduction into secondary meat cuts for distribution.

None of the metapodials, although highly fragmented, or phalanges retained evidence of sawing and/or cleaving. One cleaved pig calcaneus reflects the removal of pig feet, commonly used to flavor broth or make into jelly. At least five pigs feet were consumed by the enlisted, and one foot each by the officers and noncommissioned officers and laundresses (Table 13). Although only one, a forefoot, was observed articulated in situ (enlisted men’s kitchen), pigs feet were typically procured and cooked whole. At least one sheep’s foot was recovered from the noncommissioned officers and laundresses privy vault, indicating that either the hind limbs (with feet) were procured by or feet were obtained for flavoring broths.

The distribution of sawing, cleaving, and chopping marks indicate that although processing large domesticate carcasses was somewhat standardized, differences are apparent, most notable in the amount of bone removed near long bone joints. These variations are commensurate with military personnel rotating butchering duties in lieu of retaining a regular butcher at the garrison. The paucity of cranial fragments and lack of cow feet in deposits near the central parade ground indicates that primary carcass dismemberment, and likely division into secondary cuts, was performed in accordance with military regulations near the designated shambles area. Additional sawing and cleaving marks on, as well as extensive fragmentation of, the large domestic bones are believed associated with marrow extraction.
Figure 78. Dismembering evidence on selected butchered pig (*Sus scrofa*) bone specimens. Portions present are depicted in red, and thick black lines denote locations of hand-sawing and cleaving planes, while thin lines represent cut marks. Not to scale.

Figure 79. Dismembering evidence on selected butchered sheep (*Ovis aries*) bone specimens. Portions present are depicted in green, and thick black lines denote locations of hand-sawing and cleaving planes, while thin lines represent cut marks. Not to scale.
Meat Cuts and their Dietary Importance

Based on the harvest profile data, economic factors constraining the military system influenced the quality of meat served to the officers, enlisted and noncommissioned officers and laundresses. Although differences were present “behind the scenes” within the military distribution system, the distribution of butchery cuts was examined to ascertain whether variations were present in the types and quality of cuts served to the various groups.

Identifying the Meat Cut Analytical Units

MNI calculations are commonly used to assess relative species abundance (Plug and Plug 1990) or the availability of meat in a diet (see Mudar 1978). Calculating the amount of meat consumed in this manner does not necessarily accurately reflect the reality of consumptive patterns, differential transport, and/or cultural use practices concerning various portions of a carcass (Banning 2000; Crabtree 1985; Davis 1987; Grayson 1984; LeeDecker et al 1987; Lyman 1979, 1987a, 1987b, 1994a, 1994b, 2008), particularly at 19th century military sites where meat distribution was based on the ration. Meat yields calculated in this fashion can both over- and underestimate the amount of meat available in the diet (Crabtree 1985; e.g. see Guilday 1977; Jolley 1983).

To more accurately address the relationship between mid-19th century household consumption and socioeconomic status at Fort Vancouver, the relative importance of meat in the diet is evaluated. The underlying assumption is differential status, social and/or economic, will be reflected in differential access to food resources (Branster 1987; Crabtree 1990), and therefore consumption patterns. Following Lyman (1987b), butchery cuts are used for analytical units, as these not only reflect how domestics were processed for consumption, but also status distinctions.
at military sites (Losey 1973; Jolley 1983). The Minimum Number of Butchery Cuts (MNBC) was calculated as historical documentation (see Chapter Four) and butchery techniques indicate portions of domestic animals were distributed to various socioeconomic groups. Although domestic animal body sizes cause variations in the available meat yield (Crabtree 1990; Jolley 1983:65), these are not considered to be a significant factor in this collection as all domesticates were obtained from the same military source, the commissary or quartermaster departments. Portions were designed to reflect the needed amounts of rations to be allocated for each group of individuals, and distributed by Army personnel to various groups for consumption.

Detailed analysis of butchery cut and mortality patterns focused on domesticates (cattle, pigs, and sheep). These were selected based upon their numerical representation within the collection and historical dietary importance in mid-19th century Euro-American communities. Butchery cuts were not assigned to avian or fish remains, rather, they were to be used “whole” as historical documents indicate that residents at Fort Vancouver procured and utilized the entire carcass as an entity. To create analytical units that more closely match the unit of acquisition (Huelsbeck 1989, 1991) for the larger domestic species, faunal remains were compared to detailed visual depictions of complete skeletal elements with the historic cuts overlaid, accounting for different sides (left vs. right) and age differences (e.g. beef vs. veal, mutton vs. lamb) when possible (Halliday and Noble 1928; Davis 1987; Rivers 1916; USWD, SD 1896). As these works all date after the military occupation at Fort Vancouver under analysis, these associations were then compared with mid-19th century American cookbooks that included visual depictions of specific butchery cuts for cattle, pigs, and sheep (Abell 1852; Beecher 1871; Bliss 1850; Hall 1856; Lee and Leslie 1832; Lyman and Lyman 1869; Philip 1859; Webster and Parkes 1845; Storke 1859).
Figure 80. Mid-19th century meat cuts for cattle, sheep and pigs. Reprinted from (Abell 1852).
Butchery cuts depicted are consistent across all of the depictions (Figure 80), yet several differences between the text representations forced some meat cuts to be combined for analysis. For example, the beef mouse buttock, buttock, veiny piece, and thin flank are equated to the late-19th century round cut. These could not be disentangled from one another since each encompasses overlapping parts of the femur, and cannot be distinguished from one another archaeologically. The mid-19th century aitch (edge or H) and rump cuts were combined in the late-19th century under the rump cut, and analysis of the butchery marks indicated that domesticates were not consistently partitioned into these two cuts. As they could not be anatomically orientated, rib bodies (shafts) were not split into various meat cuts due to their fragmentary nature but for belly (pig), breast (sheep), and brisket (cattle) cuts, as these identifications are based on the presence of costal cartilage and/or the distal ends of rib bones.

The assignment of specific skeletal elements to mid- and late-19th butchery cuts is given in Table 14. When appropriate, skeletal elements were combined to represent larger meat cuts as absent portions of bone may, in fact, prove them to be congruent (e.g. an acetabulum and femur head form the same side of the a bovine together represent one mid-19th century aitch bone cut or late-19th century rump cut). Suggested uses for the various butchery cuts, obtained from mid-19th century civilian and late-19th century military cookbooks, are also given (Abell 1852; Beecher 1871; Bliss 1850; Hall 1856; Lee and Leslie 1832; Lyman and Lyman 1869; Philip 1859; Webster and Parkes 1845; Storke 1859; USWD, SD 1896). However, military manuals suggested personnel “Stew or boil your meat always. Roasting and frying are wasteful and unhealthy modes for camp cooking (particularly frying)” (Butterfield 1862:104).

Burning patterns on the bone specimens reflect post-depositional refuse and building demolition practices rather than roasting on the bone (indicated by burnt ends of bones). It is
likely that most of the beef, pork, and mutton were prepared by boiling or a lá mode (cooked in water). Because it is difficult to determine which meat cuts were reused in soups and stews, as suggested by the fragmentation analysis, only primary uses are discussed.

Figure 81. Selected hand-sawn butchered cattle (*Bos taurus*) bones, representing various roast and steak cuts. The unfused diaphysis and epiphysis of the radius (top center) represent an individual younger than 42 to 48 months at death.

Counterclockwise from top left: bisected lumbar vertebra (sirloin), scapula (shoulder, n = 2), longbone shaft (steak), tibia (dorsal view) and spiral-fractured fragment (round), and radius (fore-knuckle).
Table 14. Mid-19th century butchery cuts for beef, pork and mutton/lamb, including meat weights, skeletal correlates, preferential rankings and suggested cooking uses.

<table>
<thead>
<tr>
<th>Species</th>
<th>Butchery Cut, Civilian Mid-19th Century</th>
<th>Butchery Cut, Military Late-19th Century</th>
<th>Meat Yield (MY)</th>
<th>Skeletal Element</th>
<th>Rank1</th>
<th>Cooking Use1,2,5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>(MY)3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beef</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(1-9)</td>
<td>H, M, L</td>
</tr>
<tr>
<td>Leg</td>
<td>Leg</td>
<td>Leg</td>
<td>9.06</td>
<td>Distal tibia, tarsals, proximal metatarsal</td>
<td>8</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Mouse Buttock, Buttock, Veiny Piece, Thick Flank</td>
<td>Round</td>
<td>19.88</td>
<td>Femur shaft and distal femur, patella, proximal tibia and shaft</td>
<td>3</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Aitch, Edge, or H bone</td>
<td>Rump</td>
<td>9.00</td>
<td>Ischium, pubis, acetabulum, caudal vertebrae, proximal femur</td>
<td>4</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Rump</td>
<td>Rump</td>
<td>14.44</td>
<td>Ilium, sacral vertebrae</td>
<td>2</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Sirloin</td>
<td>Sirloin (Short loin)</td>
<td>11.81</td>
<td>Lumbar vertebrae</td>
<td>1</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Fore rib, Middle rib, Chuck rib</td>
<td>Ribs (best end), ribs (middle), ribs (chuck)</td>
<td>29.12</td>
<td>Thoracic vertebra, proximal ribs</td>
<td>2</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Neck or Sticking piece</td>
<td>Chuck</td>
<td>7.56</td>
<td>Cervical vertebra</td>
<td>8</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Thin Flank</td>
<td>Short plate, brisket</td>
<td>8.75</td>
<td>-</td>
<td>7</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Brisket</td>
<td></td>
<td>12.00*</td>
<td>Distal ribs, sternum</td>
<td>7</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Shoulder, Clod</td>
<td>Shoulder</td>
<td>8.38</td>
<td>Scapula, proximal humerus</td>
<td>5</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Shin or Fore-knuckle</td>
<td>Foreshank*</td>
<td>7.00</td>
<td>Distal humerus, ulna, radius, carpals, proximal metacarpal</td>
<td>8</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Foot*</td>
<td>Foot*</td>
<td>3.6</td>
<td>Maxillae, mandible</td>
<td>9</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Cheek*</td>
<td>Cheek*</td>
<td>3.6</td>
<td>-</td>
<td>9</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Head*</td>
<td>Head*</td>
<td>3.6</td>
<td>-</td>
<td>3</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Marrow*</td>
<td>Marrow*</td>
<td>3.6</td>
<td>-</td>
<td>3</td>
<td>H</td>
</tr>
<tr>
<td>Pork</td>
<td>Leg</td>
<td>Ham</td>
<td>6.6*</td>
<td>Sacrum, innominate, femur, proximal tibia</td>
<td>3</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Hind loin</td>
<td>Loins</td>
<td>20.6*</td>
<td>Lumbar vertebrae</td>
<td>4</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Fore loin</td>
<td></td>
<td>20.6*</td>
<td>Thoracic vertebra, proximal ribs</td>
<td>4</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>Spare rib</td>
<td>Top of Neck (Butt)</td>
<td>3.0</td>
<td>Cervical vertebrae, scapula blade</td>
<td>7</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Belly/Spring</td>
<td>Side meat or bacon</td>
<td>20.9*</td>
<td>Distal ribs, sternum</td>
<td>7</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Hand</td>
<td>Shoulder</td>
<td>3.0*</td>
<td>Proximal scapula, proximal/shaft humerus</td>
<td>6</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Foreleg</td>
<td>3.7*</td>
<td>Distal humerus, ulna, radius</td>
<td>7</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Foot*</td>
<td>Feet</td>
<td>0.6*</td>
<td>Carpals, tarsals, metapodials, phalanges</td>
<td>9</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Head, Jowl*</td>
<td>Head, Jowl*</td>
<td>3.2*</td>
<td>Cranium, mandible</td>
<td>9</td>
<td>L</td>
</tr>
</tbody>
</table>

Notes:
1. MY: Meat Yield
2. Rank: 1-9, where 1 is the highest rank
3. Cooking Uses: Soup, Roast, Salt, Boil, Corn, Smoke, Mince, Broth, Mince
<table>
<thead>
<tr>
<th>Species</th>
<th>Butchery Cut, Civilian Mid-19th Century&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Butchery Cut, Military Late-19th Century&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Meat Yield&lt;sup&gt;3&lt;/sup&gt; (MY)</th>
<th>Skeletal Element</th>
<th>Rank&lt;sup&gt;4&lt;/sup&gt; (1-9)</th>
<th>H, M, L</th>
<th>Cooking Use&lt;sup&gt;1,2,5&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mutton (M) / Lamb (L)</td>
<td>Leg</td>
<td>Leg</td>
<td>L M 2.3* 5.0*</td>
<td>Sacrum, innominate, femur, tibia, tarsals, proximal metatarsal</td>
<td>3</td>
<td>H</td>
<td>Boil, Roast</td>
</tr>
<tr>
<td></td>
<td>Loin, Chump end</td>
<td>Loin</td>
<td>1.3* 2.9*</td>
<td>Sacral vertebrae, innominate bone</td>
<td>3</td>
<td>H</td>
<td>Roast</td>
</tr>
<tr>
<td></td>
<td>Loin, best end</td>
<td>Loin</td>
<td>Lumbar vertebrae</td>
<td>3</td>
<td>H</td>
<td>Roast</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Neck, best end</td>
<td>Fore quarter</td>
<td>1.1* 2.5*</td>
<td>Thoracic vertebrae</td>
<td>3</td>
<td>H</td>
<td>Boil, Corn</td>
</tr>
<tr>
<td></td>
<td>Breast</td>
<td>Breast</td>
<td>0.4* 0.6*</td>
<td>Distal ribs, sternum</td>
<td>-</td>
<td>-</td>
<td>Boil, Corn</td>
</tr>
<tr>
<td></td>
<td>Shoulder</td>
<td>Foreleg</td>
<td>0.1* 0.8*</td>
<td>Scapula, humerus, ulna, radius</td>
<td>5</td>
<td>M</td>
<td>Boil, Corn</td>
</tr>
<tr>
<td></td>
<td>Neck, Scrag end</td>
<td>Neck</td>
<td>Cervical vertebrae</td>
<td>9</td>
<td>L</td>
<td>Boil, Corn</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Foot*</td>
<td>Foot*</td>
<td>0.3</td>
<td>Carpals, distal metapodials, phalanges</td>
<td>9</td>
<td>L</td>
<td>Broth</td>
</tr>
<tr>
<td></td>
<td>Head*</td>
<td>Head*</td>
<td>2.0</td>
<td>Cranium, mandible</td>
<td>9</td>
<td>L</td>
<td>Broth, Mince</td>
</tr>
<tr>
<td>Deer, Pig, Sheep</td>
<td>Marrow*</td>
<td>Marrow*</td>
<td>-</td>
<td>Long bone fragments (Mammal Size Class 4)</td>
<td>-</td>
<td>-</td>
<td>Broth</td>
</tr>
<tr>
<td>Chicken</td>
<td>Whole*</td>
<td>Whole*</td>
<td>3</td>
<td>All</td>
<td>2</td>
<td>H</td>
<td>Boil, Roast</td>
</tr>
<tr>
<td>Duck</td>
<td>Whole*</td>
<td>Whole*</td>
<td>2</td>
<td>All</td>
<td>-</td>
<td>-</td>
<td>Boil, Roast</td>
</tr>
<tr>
<td>Salmonids</td>
<td>Whole or Partial*</td>
<td>Whole or Partial*</td>
<td>2-8</td>
<td>All</td>
<td>-</td>
<td>-</td>
<td>Boil, Roast</td>
</tr>
<tr>
<td>Other Fish</td>
<td>Whole*</td>
<td>Whole*</td>
<td>1-2</td>
<td>All</td>
<td>-</td>
<td>-</td>
<td>Boil, Roast</td>
</tr>
</tbody>
</table>

<sup>1</sup> “*” denotes butchery cut not given in references, cuts based on Abell (1852), Beecher (1871), Bliss (1850), Hall (1856), Philip (1859), Lyman and Lyman (1869), Storke (1859), and Webster and Parkes (1845); <sup>2</sup> “*” denotes butchery cut not given in references, cuts based on USWD (1896), the earliest official Army publication with visual representation of butchery cuts (see Figure 80); <sup>3</sup> based on USWD (1896), “*” denotes based on Lyman (1979:543), “M” refers to mutton and “L” to lamb; <sup>4</sup> “H” refers to a high, “M” to medium and “L” to low, “-” denotes no rank given, cuts are ranked relative to one another, regardless of species, rankings based on Huelsbeck (1991), LeeDecker et al. (1987), Lyman (1979); Manning (1905), and Schultz and Gust (1983), meat weights for duck, squirrel, salmonids, and other fish are averages based upon personal experience and the diameter of fish vertebrae; <sup>5</sup> the term “soup” encompasses stews and sometimes broths, while “a la mode” denotes cooking in liquid.
Table 15. Mid-19th century butchery cuts identified by occupation.

<table>
<thead>
<tr>
<th>Butchery Cut</th>
<th>Officers MNBC</th>
<th>%1</th>
<th>Officers MNBC</th>
<th>%2</th>
<th>Enlisted MNBC</th>
<th>%3</th>
<th>NCO/Laundresses MNBC</th>
<th>%3</th>
<th>Total MNBC</th>
<th>%4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leg</td>
<td>4</td>
<td>9.09</td>
<td>1</td>
<td>5.00</td>
<td>5</td>
<td>4.90</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mouse Buttock, Buttock, Veiny Piece, Thick Flank (Round)</td>
<td>3</td>
<td>6.82</td>
<td>1</td>
<td>2.63</td>
<td>4</td>
<td>3.92</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aitch or Edge bone</td>
<td>2</td>
<td>4.55</td>
<td>1</td>
<td>2.63</td>
<td>3</td>
<td>2.94</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rump</td>
<td>3</td>
<td>6.82</td>
<td>1</td>
<td>2.63</td>
<td>1</td>
<td>5.00</td>
<td>5</td>
<td>4.90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sirloin</td>
<td>1</td>
<td>2.27</td>
<td>1</td>
<td>2.63</td>
<td>2</td>
<td>1.96</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neck or Sticking piece</td>
<td>2</td>
<td>4.55</td>
<td>1</td>
<td>2.63</td>
<td>1</td>
<td>5.00</td>
<td>4</td>
<td>3.92</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fore rib, Middle rib, Chuck rib</td>
<td>4</td>
<td>9.09</td>
<td>1</td>
<td>2.63</td>
<td>1</td>
<td>5.00</td>
<td>6</td>
<td>5.88</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brisket</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>0.98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoulder, Leg of mutton, Clod</td>
<td>1</td>
<td>2.27</td>
<td>1</td>
<td>2.63</td>
<td>1</td>
<td>5.00</td>
<td>3</td>
<td>2.94</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shin or Fore-knuckle</td>
<td>3</td>
<td>6.82</td>
<td>1</td>
<td>2.63</td>
<td>1</td>
<td>5.00</td>
<td>5</td>
<td>4.90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cheek/Head</td>
<td>1</td>
<td>2.27</td>
<td>1</td>
<td>2.63</td>
<td>2</td>
<td>1.96</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marrow</td>
<td>4</td>
<td>9.09</td>
<td>2</td>
<td>5.26</td>
<td>6</td>
<td>5.88</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL BEEF</strong></td>
<td>28</td>
<td>63.64</td>
<td>12</td>
<td>31.58</td>
<td>6</td>
<td>30</td>
<td>46</td>
<td>45.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beef</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>0.98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pork</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>0.98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leg</td>
<td>1</td>
<td>2.27</td>
<td>2</td>
<td>5.26</td>
<td>3</td>
<td>15.00</td>
<td>6</td>
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<td>Shoulder</td>
<td>1</td>
<td>2.27</td>
<td>1</td>
<td>2.63</td>
<td>1</td>
<td>5.00</td>
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<tr>
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<td>Head</td>
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<td>1</td>
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<td></td>
</tr>
<tr>
<td><strong>TOTAL MUTTON/LAMB</strong></td>
<td>3</td>
<td>6.82</td>
<td>9</td>
<td>23.68</td>
<td>5</td>
<td>25</td>
<td>17</td>
<td>16.67</td>
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<td></td>
<td></td>
<td></td>
<td>1</td>
<td>0.98</td>
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</tr>
<tr>
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<td></td>
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<td>1</td>
<td>0.98</td>
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<tr>
<td>Loin</td>
<td>3</td>
<td>6.82</td>
<td>1</td>
<td>2.63</td>
<td>1</td>
<td>5.00</td>
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<tr>
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<td>1</td>
<td>2.63</td>
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<td>5.00</td>
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<td>Marrow (Pig or Sheep)</td>
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<td>1</td>
<td>2.63</td>
<td>2</td>
<td>10.00</td>
<td>5</td>
<td>4.90</td>
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<tr>
<td><strong>TOTAL PORK/MUTTON</strong></td>
<td>7</td>
<td>15.91</td>
<td>4</td>
<td>10.53</td>
<td>2</td>
<td>20</td>
<td>15</td>
<td>14.71</td>
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<tr>
<td>Pheasant or Chicken (Whole)</td>
<td>2</td>
<td>4.55</td>
<td>1</td>
<td>2.63</td>
<td>2</td>
<td>10.00</td>
<td>5</td>
<td>4.90</td>
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<tr>
<td>Goose/Large Wildfowl (Whole)</td>
<td></td>
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<td>1</td>
<td>0.98</td>
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</tr>
<tr>
<td>Duck/Medium Wildfowl (Whole)</td>
<td>2</td>
<td>4.55</td>
<td>1</td>
<td>2.63</td>
<td>3</td>
<td>2.94</td>
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<tr>
<td><strong>TOTAL FOWL</strong></td>
<td>4</td>
<td>9.09</td>
<td>2</td>
<td>5.26</td>
<td>3</td>
<td>15</td>
<td>9</td>
<td>8.82</td>
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<td>Fish</td>
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<td></td>
<td></td>
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<td>0.98</td>
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<td></td>
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<tr>
<td>Largescale sucker (Whole)</td>
<td></td>
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<td></td>
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<td></td>
<td>1</td>
<td>0.98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peamouth (Whole)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>0.98</td>
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</tr>
<tr>
<td>Northern Pikeminnow (Whole)</td>
<td></td>
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<td></td>
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<td>0.98</td>
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</tr>
<tr>
<td>Salmonidae</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>0.98</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL FISH</strong></td>
<td>1</td>
<td>2.27</td>
<td>3</td>
<td>7.89</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>3.92</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>44</td>
<td>43.56</td>
<td>38</td>
<td>37.62</td>
<td>20</td>
<td>21.05</td>
<td>102</td>
<td>100.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 = “D” denotes domestic species, “W” denotes wild species; 2 = “MNBC” refers to Minimum Number of Butchery Cuts; 3 = % calculated from specimens within that occupation; 4 = % calculated from overall total.
Diversity of Meat Cuts in the Diet

Overall, a minimum of 102 meat cuts (MNBC) were determined from the bone specimens (Table 14), with beef the most numerous (44.66%), followed by mutton (16.67%), pork or mutton (14.71%), pork (10.78%), fowl (8.82%), and fish (3.92%), indicating a diet at the garrison primarily based on large domesticates. The meat cuts are believed to be highly underrepresented in the collection, as 102 cuts represent an amount of meat that may have fed the garrison for a few days, but not over 20+ years. Under representation likely results from a combination of high bone specimen fragmentation for marrow extraction and refuse disposal practices (see below).

When examined by identified meat cuts (MNBC), their distribution varies across the three occupations (Table 15; Figure 82). For the commissioned officers, beef cuts (n = 28) outnumber all other cuts combined (n = 16). Conversely, among the enlisted men and noncommissioned officers and laundresses the meat cuts reflect relatively similar diets, with remnants of pork and mutton cuts deposited in greater quantities than beef. The proportion of foods supplementing the diet, identified as fowl and fish, is relatively consistent across the officers (11.36%), enlisted (13.16%), and noncommissioned officers and laundresses’ (12.62%) occupations, with fish a higher proportion of the diet for the enlisted than fowl.

Measures of species richness, evenness, and abundance were calculated to compare the diversity of butchery cuts across the three occupations, and against the entire collection. Generally, it is preferable to use MNI values rather than NISP values to avoid influence from fragmentation (Cruz-Uribe 1988; Lyman 2008). For this analysis, the number of identified butchery cuts (MNBC; Table 15) are used rather than MNI for larger domesticates (cattle, pigs, and sheep) as military personnel obtained their meat as portions of animals. MNI values are
Figure 82. Proportion of meat types consumed as indicated by identified meat cuts, by species and provenience. Based on MNBC counts given in Table 15.

retained for fowl and fish in calculations as these species were generally obtained as whole animal units. Commensal animals, turtle remains, and taxonomic size class categories were removed from analysis.

Species richness \((S)\) is equated with the total number of food species identified within the assemblage, \(S = \sum N\), where \(N\) is the number of taxon identified (Grayson 1984; Lyman 2008), with higher values equated with greater diversity. Species richness values (Table 16. Taxonomic richness, evenness and diversity for consumed species, based on identified butchery cuts.) are not correlated with sub-assemblage sample sizes (Kendall’s \(\tau = 0.3333, p = 1.00\)). To account for the problem of small sample size, the Margalef Richness Index \((D_M)\) was used to standardize the number of species present with the total number of individuals, calculated as
\[
D_M = \frac{(S - 1)}{\ln(N)}
\]

where \( S \) is the species number, and \( N \) the total number of individuals, and a natural logarithm (ln) is used (Bitton 1998:24). Similar to species richness, the higher the Margalef Index value, the greater the diversity. With this adjustment for sample size, Margalef richness values (Table 16. Taxonomic richness, evenness and diversity for consumed species, based on identified butchery cuts.) are not correlated with sub-assemblage sizes (Kendall’s \( \tau = 0.3333 \), two-sided \( p = 1.00 \)).

The relative abundance of the various species, or evenness, within the subassemblages, was assessed with the reciprocal of the Simpson Index, calculated as

\[
\frac{1}{D_S} \quad \text{with} \quad D_S = \frac{\sum n_i (n_i - 1)}{N (N - 1)}
\]

where \( D_S \) is the Simpson’s index value, \( n_i \) is the total number of specimens of each individual species \( (i) \), and \( N = \) the total number of specimens of all identified species (Grayson 1984; Lyman 2008:196-197). Index values start at 1 as the lowest possible figure, representing an assemblage containing only one species. Thus, the taxonomic diversity increases as index values increase. Evenness values (Table 16. Taxonomic richness, evenness and diversity for consumed species, based on identified butchery cuts.) are not correlated with the sub-assemblage sizes (Kendall’s \( \tau = -0.3333 \), \( p = 1.00 \)). The proportional abundance of the most abundant type of species represented by the butchery cuts is assessed with the reciprocal of the Berger-Parker Index, calculated as

\[
\frac{1}{D_B} \quad \text{with} \quad D_B = \frac{N_{\text{MAX}}}{N}
\]

where, \( D_B \) is the Berger-Parker index value, \( N_{\text{MAX}} \) is the number of individuals in the most abundant species, and \( N = \) the total number of specimens of all identified species (Bitton
Table 16. Taxonomic richness, evenness and diversity for consumed species, based on identified butchery cuts.

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Abundance (MNBC)</th>
<th>Richness</th>
<th>Heterogeneity</th>
<th>Evenness</th>
<th>Dominance of Most Abundant Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Officers</td>
<td>37</td>
<td>6</td>
<td>3.1884</td>
<td>0.9252</td>
<td>0.5866</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.7049</td>
</tr>
<tr>
<td>Enlisted</td>
<td>34</td>
<td>8</td>
<td>4.6507</td>
<td>1.5784</td>
<td>0.2543</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.9320</td>
</tr>
<tr>
<td>NCO/Laundresses</td>
<td>16</td>
<td>5</td>
<td>3.3219</td>
<td>1.4244</td>
<td>0.2734</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.6571</td>
</tr>
<tr>
<td>TOTAL</td>
<td>88</td>
<td>10</td>
<td>4.6285</td>
<td>1.4843</td>
<td>0.3316</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.0156</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.9130</td>
</tr>
</tbody>
</table>

1 = based upon values given in Table 14; 2 = values are included as this index is commonly used in zooarchaeological analyses, although it can be affected by sample size (Lyman 2008:192); Shannon-Wiener Index is calculated as $H = -\sum P_i (\ln P_i)$, where $P_i$ is the proportion of total number of species made up of the $i$th species.

1998:24). Increasing values are equated with an increase in taxonomic diversity and reduction of species dominance (Table 16. Taxonomic richness, evenness and diversity for consumed species, based on identified butchery cuts.).

As reflected in the faunal assemblage, enlisted men complex contained a greater diversity (richness) of consumed food species ($S = 8; D_M = 4.6507$), than either the officers ($S = 6; D_M = 3.1884$) or noncommissioned officers and laundresses ($S = 5; D_M = 3.3219$) residential areas. However, not all of the species were utilized to the same extent. The commissioned officers ($1/D_S = 1.7049$) relied more heavily ($1-D_B = 1.3214$) on consuming one species or type of meat, beef. The non-commissioned officers and laundresses ate a wider range of meats ($1/D_S = 3.6571$) than the commissioned officers, and relied most heavily on mutton/lamb ($1-D_B = 3.6$). Contrary to expectations, the enlisted men ($1/D_S = 3.9320$) exploited the widest range of species for food, but with a moderate reliance ($1-D_B = 2.6667$) on one species, also beef.
**Meat Yields**

However, frequency comparisons among the different cuts can be misleading, as in these calculations, one beef round, providing about 19.88 lbs of usable meat (USWD, SD 1896: 27), is given the same analytical weight as one pig foot, which only yield about 0.6 lbs of meat (Lyman 1979:543). To more accurately gauge the relative importance of the various taxa, I conducted additional economic analysis. Retail costs for meat cuts are often utilized to calculate measures of cost efficiency (see Huelsbeck 1989, 1991; Lyman 1979, 1987), to help determine which taxa contributed the most meat to the diet. However, relying upon differential retail costs to assess differential access is not necessarily appropriate in military sites, as meats were issued as part of the daily ration to the enlisted men, laundresses attached to Companies and the Ordnance Depot, and non-commissioned officers, while only commissioned officers were required to purchase their foods. Instead, the relative prices for various meat cuts are used to discern a preferential ranking for the cuts.

The underlying assumption is that preferred cuts of meat are more expensive, and that people with a greater access to economic resources will consume larger quantities of preferred cuts. Prices between domesticates have changed over time relative to one another, and rankings have been adjusted to reflect mid-19th century urban price rankings between beef, veal, pork, mutton and lamb (Table 14). Rankings are based upon Huelsbeck (1991), LeeDecker et. al. (1987), Lyman (1979), Manning (1905), and Schultz and Gust (1983a, 1983b). More expensive cuts have lower numbers assigned to them, i.e. one being the most expensive, and therefore the most preferred, and nine being the cheapest and least desired. Cut rankings are assigned a high (1 to 3), medium (4 to 6) or low status (7 to 9) following LeeDecker et. al. (1987). As domestic chickens were considered luxury foods (Carley 1982:277), the preferential rank for chicken is
Table 17. Meat yields (MY) represented in pounds (lbs.) by butchery cuts and occupation.

<table>
<thead>
<tr>
<th>Butchery Cut</th>
<th>Officers MNBC^1</th>
<th>Officers MY^2</th>
<th>Enlisted MNBC^1</th>
<th>Enlisted MY^2</th>
<th>NCO/Laundresses MNBC^1</th>
<th>NCO/Laundresses MY^2</th>
<th>Total MNBC^1</th>
<th>Total MY^4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leg</td>
<td>4</td>
<td>36.24</td>
<td>1</td>
<td>9.06</td>
<td>5</td>
<td>45.30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mouse Buttock, Buttock, Veiny Piece, Thick Flank (Round)</td>
<td>3</td>
<td>59.64</td>
<td>1</td>
<td>19.88</td>
<td>4</td>
<td>79.52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aitch or Edge bone</td>
<td>2</td>
<td>18.00</td>
<td>1</td>
<td>9.00</td>
<td>3</td>
<td>27.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rump</td>
<td>3</td>
<td>43.32</td>
<td>1</td>
<td>14.44</td>
<td>5</td>
<td>72.20</td>
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</tr>
<tr>
<td>Sirloin</td>
<td>1</td>
<td>11.81</td>
<td>1</td>
<td>11.81</td>
<td>2</td>
<td>23.62</td>
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<td></td>
</tr>
<tr>
<td>Neck or Sticking piece</td>
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<td>15.12</td>
<td>1</td>
<td>7.56</td>
<td>4</td>
<td>22.68</td>
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</tr>
<tr>
<td>Fore rib, Middle rib, Chuck rib</td>
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<td>116.48</td>
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<td>29.12</td>
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<td>174.72</td>
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<td></td>
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<td>12.00</td>
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<td>8.38</td>
<td>3</td>
<td>25.14</td>
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<td>Shin or Fore-knuckle</td>
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<td>7.00</td>
<td>5</td>
<td>35.00</td>
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<tr>
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<td>1</td>
<td>7.56</td>
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<td>7.20</td>
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<td><strong>337.55</strong></td>
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<td><strong>130.35</strong></td>
<td><strong>6</strong></td>
<td><strong>75.56</strong></td>
<td><strong>41</strong></td>
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<td></td>
<td>7</td>
<td>4.20</td>
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<tr>
<td>Foot</td>
<td>2</td>
<td>13.40</td>
<td>1</td>
<td>13.40</td>
<td>2</td>
<td>6.40</td>
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<tr>
<td><strong>TOTAL PORK</strong></td>
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<td><strong>0.6</strong></td>
<td><strong>8</strong></td>
<td><strong>19.6</strong></td>
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<td><strong>3.8</strong></td>
<td><strong>11</strong></td>
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<td>2</td>
<td>10.00</td>
<td>3</td>
<td>15.00</td>
<td>6</td>
<td>30.00</td>
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<td>1</td>
<td>0.80</td>
<td>3</td>
<td>2.40</td>
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<td></td>
</tr>
<tr>
<td>Foot</td>
<td>1</td>
<td>0.30</td>
<td>5</td>
<td>1.50</td>
<td>7</td>
<td>2.10</td>
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<td></td>
</tr>
<tr>
<td>Head</td>
<td>1</td>
<td>2.50</td>
<td></td>
<td></td>
<td>1</td>
<td>2.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL MUTTON/LAMB</strong></td>
<td><strong>3</strong></td>
<td><strong>6.1</strong></td>
<td><strong>9</strong></td>
<td><strong>14.8</strong></td>
<td><strong>5</strong></td>
<td><strong>16.1</strong></td>
<td><strong>17</strong></td>
<td><strong>37.00</strong></td>
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<tr>
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<td>5.85</td>
<td></td>
<td>1</td>
<td>5.85</td>
<td></td>
<td></td>
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<tr>
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<td>39.00</td>
<td>1</td>
<td>13.00</td>
<td>5</td>
<td>65.00</td>
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<td></td>
</tr>
<tr>
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<td>7.50</td>
<td>1</td>
<td>3.75</td>
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<td>15.00</td>
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</tr>
<tr>
<td><strong>TOTAL PORK/MUTTON</strong></td>
<td><strong>5</strong></td>
<td><strong>46.5</strong></td>
<td><strong>3</strong></td>
<td><strong>22.6</strong></td>
<td><strong>2</strong></td>
<td><strong>16.75</strong></td>
<td><strong>10</strong></td>
<td><strong>85.85</strong></td>
</tr>
<tr>
<td>Pheasant or Chicken (Whole)</td>
<td>2</td>
<td>6.00</td>
<td>1</td>
<td>3.00</td>
<td>5</td>
<td>15.00</td>
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<td></td>
</tr>
<tr>
<td>Goose/Large Wildfowl (Whole)</td>
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<td>3.00</td>
<td></td>
<td></td>
<td>1</td>
<td>3.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duck/Medium Wildfowl (Whole)</td>
<td>2</td>
<td>4.00</td>
<td>1</td>
<td>2.00</td>
<td>3</td>
<td>6.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL FOWL</strong></td>
<td><strong>4</strong></td>
<td><strong>10</strong></td>
<td><strong>2</strong></td>
<td><strong>5</strong></td>
<td><strong>3</strong></td>
<td><strong>9</strong></td>
<td><strong>9</strong></td>
<td><strong>24.00</strong></td>
</tr>
<tr>
<td>Largemouth sucker (Whole)</td>
<td>1</td>
<td>2.00</td>
<td></td>
<td></td>
<td>1</td>
<td>2.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peamouth (Whole)</td>
<td>1</td>
<td>2.00</td>
<td></td>
<td></td>
<td>1</td>
<td>2.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern Pikeminnow (Whole)</td>
<td>1</td>
<td>2.00</td>
<td></td>
<td></td>
<td>1</td>
<td>2.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salmonidae</td>
<td>1</td>
<td>2.00</td>
<td></td>
<td></td>
<td>1</td>
<td>2.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL FISH</strong></td>
<td><strong>1.00</strong></td>
<td><strong>2.00</strong></td>
<td><strong>3.00</strong></td>
<td><strong>6.00</strong></td>
<td><strong>4</strong></td>
<td><strong>8.00</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>38.00</strong></td>
<td><strong>398.79^3</strong></td>
<td><strong>35.00</strong></td>
<td><strong>190.79^3</strong></td>
<td><strong>18.00</strong></td>
<td><strong>121.21^3</strong></td>
<td><strong>91</strong></td>
<td><strong>710.79</strong></td>
</tr>
</tbody>
</table>

^1 = “MNBC” refers to Minimum Number of Butchery Cuts; ^2 = % calculated from specimens within that occupation; ^3 = % calculated from overall total.
arbitrarily assigned in to the middle of the high cuts (2). To assess the possible contribution of Mammal 4 cuts that cannot be distinguished into pork or mutton in the analysis, the meat weight and preferential ranking are taken for corresponding cuts and averaged together.

Huelsbeck (1989) found that preferential ranking of meat cuts do reflect cost-efficiency, but not as well as analyses using differential meat yields. Therefore, rankings are weighed by the amount of usable meat each cut represents. Meat yields estimates were adjusted to reflect primal cuts (unit of acquisition, see Huelsbeck 1991) utilized by mid-19th century Army personnel for distribution. For beef, meat yields for mid-19th century cuts are determined from average proportions of meat to bone provided by the late-19th century Army (USWD, SD 1896:27). The weight of bone was subtracted from the gross weight of each cut to arrive at the meat yield for each primal cut \( MY = W_G - W_B \). For example, a sirloin cut with an average weight of 13 lbs. 6 oz. (13.38 lbs.) typically included 1 lb. 9 oz. (1.56 lbs) of bone weight; once the proportion of bone is removed, the beef sirloin cut provides 11 lbs. 13 oz. (11.81 lbs.) of usable meat. As the U. S. Army did not report on the amounts of usable meat for pork and mutton cuts, figures given by Lyman (1979:543) for ca. 1903 century pork, lamb (L), and mutton (M) cuts recovered at Fort Walla Walla, Washington (approximately 240 mi. to the east of Fort Vancouver) are adopted. Meat Yields (MY) for each identified cut are given Table 14. As analysis of the harvest profiles indicated that no lambs were identified in the collections, all cuts from the sheep are calculated using mutton weights.

Meat yields for domestic chicken, duck and fish are based on averages reported in historical cookbooks (see Abell 1852; Beecher 1871; Bliss 1850; Hall 1856; Lee and Leslie 1832; Lyman and Lyman 1869; Philip 1859; Webster and Parkes 1845; Storke 1859), and the diameter of fish vertebrae. Smaller vertebrae (< 1 cm in diameter) in identified fish species
generally represent smaller individuals, as fish will continually increase in size if ecological conditions support unfettered growth (Wheeler and Jones 1989). Body part distributions for the carps and suckers indicate that these fish were procured whole, whereas the presence of a single salmonid vertebra may reflect a partial or whole individual. Therefore, to avoid introducing undue preferential weighting of different fish taxa, each identified fish was considered to equally provide two pounds of usable meat. However, although the relative proportion of meat in the diet can be determined, these species are not included in preferential ranking of the meat yields.

The abundance of the various meat cuts, as distributed by preferential rank ($P_R$), was assessed using the following calculation,

$$P_R = \sum R_{H,M,L} (MY_i(n_i))$$

where $R$ represents the assigned preferred rank ($H =$ high, $M =$ medium, or $L =$ low), $MY_i$ is the determined meat yield for each individual butchery cut within that rank ($H$, $M$, or $L$), $n_i$ is the total number of specimens of each individual butchery cut within that same rank ($i$). The amount of usable meat represented by each meat cut are given in Table 17 and Table 18, and visually displayed in Figure 83.

Based on the meat yields, the commissioned officers consumed the greatest amount of meat (337.55 lbs) representing 55.62% of all available meat. The enlisted men and

| Preferential Rank | Officers | | Enlisted | | NCO/Laundresses | | Total |
|-------------------|----------|----------|----------|----------|----------|----------
|                   | MY$^1$   | %$^2$    | MY$^1$   | %$^2$    | MY$^1$   | %$^3$    | MY$^1$   | %$^3$    |
| High  | 242.25 | 61.67 | 94.10 | 51.48 | 64.56 | 54.61  | 400.91 | 57.79 |
| Medium | 73.68 | 18.76 | 48.33 | 26.44 | 25.93 | 21.94  | 147.94 | 21.32 |
| Low   | 76.86 | 19.57 | 40.36 | 22.08 | 27.72 | 23.45  | 144.94 | 20.89 |
| TOTAL | 392.79 | 56.62 | 182.79 | 26.35 | 118.21 | 17.04  | 693.79 | 100  |

$^1$ = “MY” refers to Meat Yield, or amount of usable meat; $^2$ = % calculated from specimens within that occupation; $^3$ = % calculated from overall total.
noncommissioned officers and laundresses each consumed less than half of available meat, only 26.35% (182.79 lbs.) and 17.04% (118.21 lbs.), respectively, of meat represented by the bone specimens. For all three occupations, the greatest proportion of the diet consisted of highly preferred cuts, amongst the most expensive in the mid to late-19\textsuperscript{th} and early-20\textsuperscript{th} centuries (Lee and Leslie 1832; Manning 1905, Rivers 1916). There was no significant difference in the ages of animals selected for procurement and slaughter, based on the harvest profiles.

When preferential rank distributions of available meat cuts are examined by total pounds/rank, there is no significant difference between the quality of meat consumed by the officers, enlisted men, and noncommissioned officers and laundresses ($\chi^2 = 6.792$, df = 4, $p = 0.1473$), nor when compared by proportions of the diet ($\chi^2 = 2.662$, df = 4, $p = 0.6159$). These results are contrary to expectations that the commissioned officers would have consumed higher
amounts of preferential meats in their diet than the lower ranked enlisted or noncommissioned officers and laundresses.

*Fragmentation and Marrow Processing*

I used a fragmentation intensity index (F) to assess the extent of breakage patterns, (after Cruz-UrIBE 1998; Lyman 2008:250-254), which calculates the ratio of complete specimens to the total NISP. As military personnel acquired meat from larger domesticates (cattle, pigs, sheep) by butchery cuts, rather than as whole animals, for these species a complete specimen refers to a complete skeletal element within a butchery cut; e.g. if two ribs are sawed or chopped at both long ends, these are considered two complete butchery cut specimens, whereas combined they only represent one butchery cut for meat calculations (see below). Smaller animals, such as fish and fowl, were generally obtained as a whole carcass, and for these taxa only complete skeletal elements are included in the assessment. As so few specimens were recovered, the fragmentation patterns are compiled for the entire sub-assemblage, rather than by individual taxa (Table 19). Lower fragmentation index values (F) reflect higher rates, or a greater intensity of bone

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Complete Specimens</th>
<th>Total NISP</th>
<th>Fragmentation Index (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Officers’ Quarters, Kitchen, Yard</td>
<td>13</td>
<td>1,012</td>
<td>0.0128</td>
</tr>
<tr>
<td>Officers’ Privy</td>
<td>78</td>
<td>3,532</td>
<td>0.0221</td>
</tr>
<tr>
<td>Enlisted Men (All Proveniences)</td>
<td>39</td>
<td>11,241</td>
<td>0.0035</td>
</tr>
<tr>
<td>NCO/Laundresses’ Quarters</td>
<td>1</td>
<td>72</td>
<td>0.0139</td>
</tr>
<tr>
<td>NCO/Laundresses’ Privy</td>
<td>7</td>
<td>328</td>
<td>0.0213</td>
</tr>
<tr>
<td>TOTAL</td>
<td>138</td>
<td>16,185</td>
<td>0.0085</td>
</tr>
</tbody>
</table>

1 = skeletal elements as identified by completeness based on butchery cut configurations and are used rather than NISP; 2 = after Lyman (2008:250-254).
fragmentation. To assess whether bone was intentionally fractured or whether deposition location was a factor, privy vault (intentional fracturing) and sheet midden (potentially unintentional breakage) deposits are examined separately, with officers’ kitchen deposits considered sheet midden.

Overall, the faunal materials are highly fragmented ($F = 0.0085$), with the highest rates (lowest index) in the enlisted men’s complex ($F = 0.0035$), expected as 90.98 % ($n = 10,232$) of the materials could not be identified beyond taxonomic class. It is likely that the high rate of breakage on this area is associated with a variety of military practices, including processing bones to extract marrow and collagen for increasing nutrition and flavor enhancement in soup/broth, trampling of bone refuse associated with the range of kitchen duties undertaken by personnel on their 10-day rotation in the kitchen, as well as the demolition of the buildings by burning, leading to their collapse and additional crushing of bone remnants (see Chapter Seven).
Fragmentation indices are similar between the officers and laundresses’ residential areas (Figure 84). As anticipated, specimens recovered from the privy vaults (officers F = 0.0221, laundresses F = 0.0213) are 60% to 65% less broken than those recovered from the surrounding sheet middens (officers F = 0.0128, laundresses F = 0.0139). Unfortunately, privy vault deposits associated with the enlisted men are not yet located at Fort Vancouver, and cannot be considered for comparison. Bone refuse deposited in sealed/protected contexts, such as shaft features (privies, cellars, etc.), were less fragmented and contained more diagnostic information on diet that can be linked with either the military or farming household occupation.

The high rates of fragmentation suggest that bones from larger domesticates were processed to extract marrow to obtain additional nutrition and flavoring for soups and broths (see Jolley 1983:74). To assess whether bones were fractured while fresh, rates of spiral fractured specimens were calculated. Spiral, or torsion, fracturing occurs when ‘green,’ or uncooked non-dry bone is broken while being twisted, often occurring when splitting larger meat bearing bones to obtain the marrow (Table 20). Overall, less than 0.0017% (n = 27) of the bone specimens displayed evidence of spiral-facturing. The lack of spiral fractures suggests that bones were not simply broken, but likely sawn or cleaved instead to extract marrow (see Chapter Four).

### Table 20. Distribution of spiral-fractured specimens by sheet midden and privy proveniences.

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Spiral-Fractured Specimens</th>
<th>Total NISP</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Officers’ Quarters, Kitchen, Yard</td>
<td>6</td>
<td>1,012</td>
<td>0.0059</td>
</tr>
<tr>
<td>Officers Privy</td>
<td>5</td>
<td>3,532</td>
<td>0.0014</td>
</tr>
<tr>
<td>Enlisted (All)</td>
<td>9</td>
<td>11,241</td>
<td>0.0008</td>
</tr>
<tr>
<td>NCO/Laundresses Quarters</td>
<td>0</td>
<td>72</td>
<td>0.0000</td>
</tr>
<tr>
<td>NCO/Laundresses Privy</td>
<td>7</td>
<td>328</td>
<td>0.0213</td>
</tr>
<tr>
<td>TOTAL</td>
<td>27</td>
<td>16,185</td>
<td>0.0017</td>
</tr>
</tbody>
</table>
Impact of Refuse and Building Disposal Practices on the Faunal Assemblage

Army regulations (Butterfield 1862) stress butchering large domesticates in the area designated for the shambles (open-air slaughterhouse[s]). However, in the historical documentation, there is no mention of where the shambles were located at Fort Vancouver, although it is likely they were positioned on the lower floodplain near the designated refuse burning area to contain the disarray and bloody mess.

As the amount of available meat represented by the assemblage is not enough to feed the commissioned officers, noncommissioned officers and laundresses and enlisted men residing in these structures, a population roughly between fifty and seventy persons (see Chapter Three) for one day, taphonomic impacts were examined to assess the integrity of the assemblage (weathering, rodent/carnivore gnawing, burning). Information recorded included taphonomic indicators of burning and mammalian non-human consumption (after Binford 1981; Haynes 1983; Lyman 1994b), and evidence of digestion processes Table 21).

Less than 3% (n = 38) of the bone specimens display evidence of gnawing or severe weathering, suggesting that the faunal remains, once deposited, were covered fairly quickly with other materials. A total of 25 specimens (0.15% of the overall assemblage) contained evidence of weathering (defined by flaking on their periosteum), and of these two-thirds (n = 15) were recovered from deposits associated with the enlisted men’s building complex. None of the weathered bones were significantly degraded from extensive weathering suggesting limited exposure to the elements.

Only 0.08% of the specimens (n = 13) had evidence of micromammalian rodent gnawing. These likely represent opportunistic rodent consumption as all were recovered from deposits associated with either the officers (n = 2) or enlisted (n = 11) kitchens. Although dogs were kept
Table 21. Distribution of non-human consumption related taphonomic impacts.

<table>
<thead>
<tr>
<th>Taphonomic Influence</th>
<th>Officers NISP</th>
<th>%1</th>
<th>Enlisted NISP</th>
<th>%1</th>
<th>Laundresses NISP</th>
<th>%1</th>
<th>Total NISP</th>
<th>%3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weathered</td>
<td>5</td>
<td>0.02</td>
<td>15</td>
<td>0.13</td>
<td>5</td>
<td>1.25</td>
<td>25</td>
<td>0.15</td>
</tr>
<tr>
<td>Gnawed (Rodent)</td>
<td>11</td>
<td>0.02</td>
<td>2</td>
<td>0.02</td>
<td>0</td>
<td>0.00</td>
<td>13</td>
<td>0.08</td>
</tr>
<tr>
<td>Gnawed (Carnivore)</td>
<td>0</td>
<td>0.00</td>
<td>0</td>
<td>0.00</td>
<td>0</td>
<td>0.00</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Digestion (Carnivore)</td>
<td>0</td>
<td>0.00</td>
<td>0</td>
<td>0.00</td>
<td>0</td>
<td>0.00</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Partially Carbonized</td>
<td>24</td>
<td>0.53</td>
<td>76</td>
<td>0.68</td>
<td>15</td>
<td>3.75</td>
<td>115</td>
<td>0.71</td>
</tr>
<tr>
<td>Carbonized</td>
<td>49</td>
<td>1.08</td>
<td>78</td>
<td>0.69</td>
<td>9</td>
<td>2.25</td>
<td>136</td>
<td>0.84</td>
</tr>
<tr>
<td>Carbonized and Calcined</td>
<td>180</td>
<td>3.96</td>
<td>408</td>
<td>3.63</td>
<td>60</td>
<td>15.00</td>
<td>647</td>
<td>4.00</td>
</tr>
<tr>
<td>Partially Calcined</td>
<td>6</td>
<td>0.13</td>
<td>29</td>
<td>0.26</td>
<td>3</td>
<td>0.75</td>
<td>38</td>
<td>0.23</td>
</tr>
<tr>
<td>Calcined</td>
<td>897</td>
<td>19.74</td>
<td>8,784</td>
<td>78.14</td>
<td>233</td>
<td>58.25</td>
<td>9,916</td>
<td>61.27</td>
</tr>
<tr>
<td>Unburned</td>
<td>3,388</td>
<td>75.56</td>
<td>1,866</td>
<td>16.60</td>
<td>80</td>
<td>20.00</td>
<td>5,469</td>
<td>33.79</td>
</tr>
<tr>
<td>Total Burned</td>
<td>1,156</td>
<td>25.44</td>
<td>9,375</td>
<td>83.40</td>
<td>320</td>
<td>80.00</td>
<td>10,716</td>
<td>66.21</td>
</tr>
<tr>
<td>Burned Bone Identifiable to Taxonomic Species or Family</td>
<td>6</td>
<td>0.01</td>
<td>9</td>
<td>0.08</td>
<td>53</td>
<td>13.25</td>
<td>68</td>
<td>0.42</td>
</tr>
</tbody>
</table>

1 = “NISP” refers to Number of Identified Specimens; 2 = NISP % calculated from that occupation only; 3 = calculated from total assemblage.

Figure 85. Relative distribution of burning impacts on faunal specimens, based on NISP.
by officers and enlisted men at Fort Vancouver (see Horton 2013a), none of the faunal remains had evidence of carnivore gnawing or digestion. In addition, the proximal and distal ends of long bones show no differences in survival rates, which are apparent in assemblages with high carnivore interaction (see Marean and Spencer 1991; Moran and O’Connor 1992; Payne and Munson 1985). At Fort Vancouver, organic kitchen refuse was also fed to pigs (see Chapter Four). No evidence of domestic pig consumption (gnawing, digestive erosion of the periosteum) was detected on the faunal remains; not unexpected as the piggery was probably located closer to the Columbia River, near the cattle pens and barns.

As Fort Vancouver was an established post, with the possible exception of soldiers occasionally encamped along the Columbia River when housing was unavailable (see Chapter Three), meals would have been cooked in the kitchens. Bones were cooked in ovens or in large stew kettles, typically not directly exposed to fire. Therefore, bones with evidence of thermal alteration were most likely affected during refuse disposal practices, which included burning (see Chapter Four) and/or structure demolition through burning (see Chapter Seven). To assess these impacts, faunal materials were classified by the degree of their exposure to fire; unburned, partially carbonized where bone is charred or blackened from collagen carbonization, completely carbonized, partially carbonized and partially calcined, and calcined bone, which is burned bone reduced to white or blue mineral constituents.

Of the 16,517 faunal artifacts, 66.21% (n = 9,916) exhibit traces of burning (Table 21 and Figure 85). A total of 5.78% were either exposed to lower degrees of heat, being partially (0.78% or n = 11) or completely carbonized (0.84% or n = 136), or partially exposed to high temperatures, being partially calcined (0.23% or n = 38) and carbonized and calcined (4.00% or n = 647). Within the overall assemblage, more bone specimens were calcined (61.27% or n =
9,916) than unburned (33.79% or n = 5,469). Of all the burned materials, only 0.42% (n = 62) could be identified to taxonomic family or species, indicating that small fragments were likely overlooked (either intentionally or inadvertently) during grounds cleaning by military personnel.

The highest proportion of burned bone was recovered from the enlisted men’s building complex, with over 83.4% (n = 9,375) of the fragments burned, 78.1% (n = 8,874) of which were completely calcined. Of these, the overwhelming majority were small (<10 mm) unidentified or mammalian bone fragments, and only 53 specimens (0.08%) could be assigned to taxonomic family or species (Table 7). While excavating, it was observed that larger bone artifacts recovered from the lower portion of the Ab horizon (Stratum III) displayed less evidence of burning, and the burned specimens, particularly those that were calcined, where recovered in association with high amounts of charred wood, charcoal, and burned artifacts, such as glass and ceramics. Therefore, the high rates of calcined bone and burning in the enlisted men’s complex is likely directly tied to the demolition of these structures in 1870 by burning (see Chapter Seven).

Over 97% (n = 1,125) of burned bones collected from the officers occupation were recovered from sediments intermixed with ash deposits within the privy vault (n = 556), kitchen area (n = 460), and demolished officers’ quarters (n = 109). In the laundresses’ areas, 80% (n = 320) of the faunal specimens were burned, with 90% (n = 288) of these recovered from the privy vault. The bone refuse was likely burned onsite and mixed with ashes before deposition into privy vaults to help reduce offensive odors (see Circular No. 23, 1880). Although ash lenses were not observed during excavations of this privy vault, the disturbance of sediments by mechanical excavation and/or looters during archaeological monitoring (see Chapter Three) may have obscured any that were once present. Placing bone in the privy vaults by the commissioned officers and noncommissioned officers and laundresses reflects opportunistic disposal behavior
in that waste was intentionally dumped in a convenient location that could be quickly buried, particularly if mixed or followed by a deposited layer of “earth” to reduce offensive odors.

Unlike the enlisted and laundresses areas, only 25.44% (n = 1,156) of the faunal elements recovered from the commissioned officers residential area were burned. However, one cluster of unburned bone observed from behind (north of) the officers’ quarters and kitchen (Features 805 and 805A) represents 51.1% (n = 2,322) of all bone recovered from the officers’ quarters. Therefore, at least on several occasions, commissioned officers were intentionally disposing and burying their bone refuse onsite, in accordance with Army regulations to bury butchery offal and food refuse in trenches (Butterfield 1862:61-63; Stallard 1978:369). These events may have occurred when limited availability of enlisted men necessitated fuel procurement took precedence over policing the garrison (Carley 1982:287).

Similar concentrations of unburnt bone were not encountered in the enlisted men and noncommissioned officers and laundresses’ areas. If the cluster of bone deposited by the commissioned officers is removed from analysis, the amount of unburned bone present (23.46% or n = 1,066) is similar to frequencies observed among faunal specimens recovered from the enlisted (16.6%) and laundresses’ (20%) areas (Table 21), indicating similar depositional practices between the different socioeconomic classes. However, unburnt bone clusters were not identified among deposits associated with the laundresses and enlisted men, suggesting that these two groups primarily disposed of refuse through established post procedures (see Chapter Four).
CHAPTER NINE

EXPRESSIONS OF GENDER IN PERSONAL SPACE THROUGH
ANALYSIS OF OBJECT FUNCTION, GENDER AFFILIATION, AND DISTRIBUTION

This chapter examines items procured for use at the individual level of space, here considered to be that of the person. Objects commonly worn on the person or carried while on campaign, limited here to non-textile clothing-related items, were selected for analysis. These items reflect the domestic lives of military personnel, as well as avenues for procuring commodities. These were examined for evidence of gender, as clothing was the most public display of gender in the mid-19th century (Blanton and Cook 2002:48). These personal items are determined to reflect use by a specific gender based on documentary sources and their accepted function within the larger Victorian paradigm, and gender designations follow the Victorian dichotomy of gender into the male/masculine and female/feminine realms (see Chapter Two). Proveniences of these materials are then examined to determine how their distribution articulates with historically documented residential spaces, and potential differences in consumption patterns (Table 22). Specific military practices are then examined for their potential impact on recovering items from the historical record.

Fort Vancouver Classification System

The classification system (FOVA types) currently in use at FVNHS for these types of personal items first categorizes metal objects and buttons by their raw material and secondly by type, designated by a lowercase Arabic letter (Wilson et al. 2007). This section presents military insignia, military-device and civilian buttons, military accoutrements (personal field
Table 22. Artifacts recovered classified with Military Defense and Personal functions at Fort Vancouver.

<table>
<thead>
<tr>
<th>Description</th>
<th>TOTAL MNI</th>
<th>Material</th>
<th>Style</th>
<th>Functional Category</th>
<th>Victorian Gender Affiliation</th>
<th>Provenience</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Officers^3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Enlisted^3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Laundresses^3</td>
</tr>
<tr>
<td>Insignia</td>
<td>4</td>
<td>Cupreous</td>
<td>Stamped Various</td>
<td>Military Defense Insignia</td>
<td>Masculine</td>
<td>1 3</td>
</tr>
<tr>
<td>Button</td>
<td>15</td>
<td>Various</td>
<td>Military</td>
<td>Military Defense Clothing</td>
<td>Masculine</td>
<td>1 11 1 2</td>
</tr>
<tr>
<td>79</td>
<td></td>
<td>Various</td>
<td>Various</td>
<td>Personal, Clothing</td>
<td>Either</td>
<td>8 8 2 12 39 5 4 1</td>
</tr>
<tr>
<td>Booties/Boots</td>
<td>2</td>
<td>Leather</td>
<td>Pre-1872 Sole Pattern</td>
<td>Military Defense Clothing, Footwear</td>
<td>Masculine*</td>
<td>2</td>
</tr>
<tr>
<td>Hobnails</td>
<td>72</td>
<td>Ferrous</td>
<td>Domed Head</td>
<td></td>
<td>72</td>
<td></td>
</tr>
<tr>
<td>Corset Clasp</td>
<td>1</td>
<td>Cupreous</td>
<td>Keyhole-shape</td>
<td>Personal, Clothing</td>
<td>Either</td>
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</tr>
<tr>
<td>Straight Pin</td>
<td>17</td>
<td>Plated Steel</td>
<td>Domed Head</td>
<td>Military Defense or Personal Clothing, Fastener</td>
<td>Either</td>
<td>8 10</td>
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<tr>
<td>Safety Pin</td>
<td>7</td>
<td>Cupreous</td>
<td>Domed Head</td>
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<tr>
<td>Eye Hook</td>
<td>5</td>
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<td>Clothing</td>
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<td></td>
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<td>2</td>
<td>Ferrous</td>
<td>Clothing</td>
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<td>Eyelet</td>
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<td>Clothing</td>
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<td>Clothing</td>
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<td>Hair Stick</td>
<td>1</td>
<td>Bone</td>
<td>Hand-Carved</td>
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<td>Hair Pin</td>
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<td>Incised Floral</td>
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<td>Geode, Pendant</td>
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<td>Crypto-Crystalline Silicate</td>
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<td>Beads</td>
<td>20</td>
<td>Glass</td>
<td>Various</td>
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\^1 Functional Category: Victorian, Military Defense, Personal
\^2 Victorian Gender Affiliation: Feminine, Masculine
\^3 Provenience: Officers\^3, Enlisted\^3, Laundresses\^3
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<thead>
<tr>
<th>Description</th>
<th>TOTAL MNI</th>
<th>Material</th>
<th>Style</th>
<th>Functional Category</th>
<th>Victorian Gender Affiliation</th>
<th>Officers</th>
<th>Enlisted</th>
<th>Laundresses</th>
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<tr>
<td>Roller Buckle, General Purpose</td>
<td>7</td>
<td>Ferrous</td>
<td>Rectangular Single Frame Utilitarian</td>
<td>Military Defense Equipment or Clothing</td>
<td>Masculine*</td>
<td>2 L</td>
<td>2 L 3 S</td>
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<tr>
<td>Buckle, Chape</td>
<td>1</td>
<td>Cupreous</td>
<td>Rectangular Stamped</td>
<td></td>
<td></td>
<td></td>
<td>1 L</td>
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<td>Cupreous</td>
<td>Single Prong</td>
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<td></td>
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<td>1 L</td>
<td></td>
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<tr>
<td>Hook</td>
<td>3</td>
<td>Cupreous</td>
<td>Cast Utilitarian Knapsack</td>
<td>Military Defense Equipment</td>
<td>Masculine*</td>
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<td>1 2</td>
<td></td>
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<tr>
<td>Washer</td>
<td>2</td>
<td>Cupreous</td>
<td>Utilitarian</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
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<tr>
<td>Grommet</td>
<td>1</td>
<td>Cupreous</td>
<td>Utilitarian Tent or Gait</td>
<td></td>
<td></td>
<td></td>
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<td>Scribe</td>
<td>1</td>
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<td>Distal Taper</td>
<td></td>
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<td>Either</td>
<td>1 2</td>
<td>1</td>
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<tr>
<td>Pencil</td>
<td>4</td>
<td>Slate</td>
<td>Cylindrical</td>
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<td></td>
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<td>Cupreous</td>
<td>Tubular</td>
<td></td>
<td>Military Defense Equipment or Personal Office Equipment</td>
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<td>Curved cylinder</td>
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<tr>
<td>Ink Bottle</td>
<td></td>
<td>Glass</td>
<td>Octagon Base</td>
<td></td>
<td>Personal Pocket Tool</td>
<td>Masculine</td>
<td></td>
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<td>Sheepsfoot</td>
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<td>Cupreous</td>
<td>Stamped Pattern</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
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<td>Pocket Watch, Wind</td>
<td>1</td>
<td>Cupreous</td>
<td>Winding Stem</td>
<td></td>
<td>Personal Pocket Tool</td>
<td>Masculine</td>
<td></td>
<td></td>
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<tr>
<td>Pocket Watch, Key Set/Wind</td>
<td>1</td>
<td>Ferrous</td>
<td>Bow and Stem</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Pocket Watch, Key Set/Wind</td>
<td>1</td>
<td>Ferrous</td>
<td>Teardrop Handle Oval Ring</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
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<td>Material</td>
<td>Style</td>
<td>Functional Category</td>
<td>Victorian Gender Affiliation</td>
<td>Provenience</td>
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<td></td>
<td></td>
<td>Laundresses</td>
<td></td>
<td></td>
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<tr>
<td>Comb, Tooth</td>
<td>6</td>
<td>Cellulose Nitrate or Gutta Percha</td>
<td>Straight Axis Hand-filed</td>
<td>Either</td>
<td>1 2 2 1</td>
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<td></td>
<td></td>
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<tr>
<td>Razor, Straight</td>
<td>1</td>
<td>Ferrous</td>
<td>Straight Handle</td>
<td>Masculine</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bristle Toothbrush</td>
<td>2</td>
<td>Bone</td>
<td>Bone Handle</td>
<td>Either</td>
<td>1 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toothbrush Handle</td>
<td>1</td>
<td>Cellulose Nitrate or Gutta Percha</td>
<td>Curved handle</td>
<td>Either</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 = functional classification system adapted from that presented in Sprague (1980); 2 = "*" denotes gender affiliation assigned by archaeological context, not functional use; 3 = "L" denotes a 1 5/8 x 1 in. sized buckle, and "S" refers to a 1 x 3/4 in. sized buckle.
gear), and other personal items. Implications for dating site depositional events associated with the household analytical units are explored in an effort to link the deposits with specific Companies and potentially individuals. Using a typology modified from Sprague (1980), the function of each group of personal items (see Chapter Five) and potential gender affiliations are determined.

Military Defense, Office Supplies

Although the Army is well known for extensively documenting information, few objects were identified within the collection that were associated with the tasks involved with these duties (Table 22). One base and three panel shards of an olive green, octagonal-bodied inkwell were collected from the enlisted men’s kitchen, specifically underneath the western expansion near the original western wall alignment. No branding is visible on the bottle. The inkwell has an open pontil, struck from a bottom-hinged mold, dating it to the first half of the 19th century (Covill 1971; Lindsey 2010). The presence of flaking patina indicates the inkwell was deposited long enough to allow adequate time for the glass surface to react to natural decomposition processes (Lindsey 2010), potentially before the 1860s expansion of the enlisted men’s kitchen. Although no pen hardware was collected from the enlisted or laundresses’ areas, three ferrous, pointed pen nibs and a portion of a cupreous pen holder were recovered from the privy vault on the Officers Row. Two of the pen nibs were broken perpendicularly to the slit or breather hole.

Other writing implements including at least five carved slate, cylindrical-bodied pencil fragments were recovered, four from the officers’ quarters and kitchen and one from the enlisted men’s kitchen expansion (Block G). All were produced with rounded bases and had rounded tips,
several were hard-filed along one side. In addition, one ferrous 1 in. long square-bodied scribe, with a blunt end opposing a rounded taper to a fine point, was recovered from the enlisted men’s barrack. Slate scribes and pencils temporarily recorded necessary information onto writing slates.

The HBC imported similarly styled pencils and pen nibs; these were archaeologically recovered at Fort Vancouver (Ross 1976:1056,1063). Yet these styles of pen nibs and pencils were produced by a number of manufacturers, and could have easily been procured though Army supply lines. Although all of these items would have been utilized by officers and soldiers in performing their military duties, they were also found in domestic contexts in the 19th century. Census data gathered between 1850 and 1880 indicate that almost all of the inhabitants registered as residing at Fort Vancouver and Ordnance Depot could read and write. Therefore, these items are not interpreted as associated with either masculinity or femininity.

Figure 86. Selected examples of recovered artifacts determined to function as office supplies. Top, then clockwise from left: ferrous scribe, slate pencils (n = 2), steel pen nib, olive glass inkwell base, and stoneware ink bottle rim.
Military Defense, Personal Field Equipment

The few items (n = 16) related to military field equipment consisted of utilitarian buckles, hooks, rivets, and a grommet (Table 22). In the mid-19th-century, these items were used by military personnel and civilians alike for similar purposes, as fasteners, but are functionally classified herein under Military Defense based on their recovery contexts. Given their historical context, all of these specimens can be linked to personal field equipment issued by the American military to enlisted men, and therefore considered masculine items.

All of the buckles recovered are utilitarian in function. Rectangular, single-frame, iron roller bar buckles were recovered in two sizes, categorized by their widths as either large (1\(\frac{7}{8}\) x 1 in.) or small (1 x \(\frac{3}{4}\) in.). Rectangular cupreous buckles are represented by one tongue and partial single-frame (chape). The large sized brass and iron single framed buckles are found on mid-19th century knapsack shoulder straps and flaps and other military carrying cases such as cartridge box flaps, canteen straps, and horse tack (Herskovitz 1978:33, 87; Woodhead 1996:208-209,212-213, 303). Smaller \(\frac{3}{4}\) in. width buckles were also used on gaiters, spur straps, and ice-creepers (Herskovitz 1978:87; Woodhead 1996:190-193). Gaiters were worn to provide support for ankles while marching, as well as to protect the trousers and bootie uppers from dust and mud (Kautz 1865:53). As horses and mules were stabled elsewhere (to the southwest near the Quartermaster Depot) at mid-19th century Fort Vancouver, these items most likely were originally utilized on military field kits.

One ferrous eye-hook, intended for use with 3 in. textile or leather strapping was recovered from the officers’ kitchen area. Three cupreous 1\(\frac{1}{2}\) in. long hooks, two washers, and
Figure 87. Selected examples of recovered artifacts determined to function as part of personal field equipment issued for military use.

Clockwise from left: large (1 in.) and small (\(\frac{3}{4}\) in.) utilitarian rectangular, single-frame, iron roller bar buckles; cupreous rivet, grommet and hook used on military knapsacks and horse tack. One rivet, typically used on canteens, knapsacks, and horse/mule tack (Herskovitz 1978, Woodhead 1996) were recovered from the enlisted men’s barrack and kitchen. In addition, one 1 in. cupreous grommet, often found on these items as well as on leather-tied gaiters, rubberized blankets and ponchos, was recovered from the enlisted men’s barrack. However, as no fragments of rubberized fabric, canvas, or leather were recovered, the intended function of these items cannot be confirmed, although it is highly probably these were once part of knapsacks issued to officers and soldiers for campaign use.

Helmet ventilators were used by Army personnel since the Civil War (Langellier and Loane 2002:105). They were adopted because soldiers traditionally often poked holes in their
caps to relieve heat (Langellier and Loane 2002:104). One black japanned (coating is missing) stamped white metal “pinwheel” style helmet ventilator (see Langellier 1999:33), 0.7 in. tall, was recovered from the upper layers of the Ab horizon (Stratum III). This style was inserted on both sides of the 1872-pattern mounted enlisted dress helmet and in the top of the 1872-pattern dismounted enlisted dress caps worn between 1872 and 1875 (Herskovitz 1978:43; Langellier 1999:17,24,33), and was recovered from post-demolition deposits of the kitchen, probably associated with ground-leveling activities.

Military Defense, Military Insignia

Although few 19th century insignia were recovered during the excavations (Figure 88), analysis potentially linked three items to the presence of specific companies at Fort Vancouver in the mid-19th century. All of these items reflect a masculine presence at the garrison.

Insignia recovered from the mid-19th century enlisted men’s barrack deposits (Block K) consist of one brass (cupreous), 1 in. tall stamped “4” dropped by military personnel from either the 4th or 14th Infantry while they were stationed at Fort Vancouver during the Indian Wars. The 4th Infantry served in the Pacific Northwest between 1852 and 1861, and several companies were stationed at Fort Vancouver and at the American garrison on San Juan Island during the 1859 to 1872 boundary dispute with Great Britain, known as the “Pig War” (see Murray 1968; Thompson 1972; Vouri 1999). After seeing heavy combat during the Civil War, including Antietam, Fredericksburg and Gettysburg, the 14th Infantry (reorganized from the 1st Battalion) arrived in 1865 and established its Pacific Northwest headquarters at Fort Vancouver until 1866 (Anderson 1896). Troops serving with the 14th engaged in several campaigns during the Pacific
Clockwise from left: stamped cupreous “4”, lyre fragment, helmet ventilator, worsted epaulette baseplate, and stamped cupreous “G.”

Northwest Indian Wars (Anderson 1896). The 14th Infantry returned to Fort Vancouver in 1884, then Vancouver Barracks, and was stationed at the post until the Spanish American War of 1898 (Keliher 2013).

In the enlisted men’s kitchen expansion area (Block Q), one brass (cupreous) 1 in. tall stamped “G,” was recovered from the Ab horizon (Stratum III), and is similar in style to the regulation Civil War pre-1872 forage cap (Emerson 1996:161). The 1851 regulations required enlisted men to wear a 1 in. tall regimental number on their coat collar until it was abandoned in 1858 (Emerson 1996:164). After 1872, the Company designating insignia was reduced to $\frac{1}{2}$ in. tall to accommodate the shorter cap front (Emerson 1996:161). Several Company G units are
known to have been present at the post during this period. Between July 1853 and June 1854, Companies G and H and the Field Staff of the 4th Infantry were stationed at Fort Vancouver. In 1856, the post was garrisoned by the headquarters and Companies A, B, C, E, F, G, I, and K of the 9th Infantry (see Chapter Three for historical context).

One cupreous roughly $\frac{1}{2}$ in. tall and wide insignia featuring a five-stringed lyre was recovered from near a wooden box construction footing support installed along the west wall of the enlisted men’s kitchen (Block H, Feature 703). The silver lyre insignia was in official use between 1885 and 1930 on caps and helmets (Emerson 1996:18,225), but historical photographs depict U.S. military band personnel wearing yellow metal lyre insignia on 1858-pattern hats (Langellier 1998:16). This lyre insignia was likely worn by band members stationed at the post, possibly as general staff for either the 4th, 9th or 14th Infantry. Commanders could distinguish band musicians from Company field musicians by the wearing of a lyre insignia if permitted by the Council of Administration; field musicians wore the standard Company insignia (Emerson 1996:225). An 1855 map of Fort Vancouver (USWD 1855) depicts the band quarters immediately north near excavation Block T, and personnel would have been assigned to this kitchen during their seven to ten day rotation on kitchen duty and serving/cleaning crew (Agnew 2008:124; Foner 1970:21; Utley 1973:85). To pass the time, in the mid-19th century band members often serenaded different quarters and barracks at Fort Vancouver (Erigero 1992:215), and this artifact could have been deposited during one of these events. However, with the amount of troops moving through the post during the mid-19th century Indian Wars, the lyre insignia cannot be linked to a specific regiment.

Officers are represented by one cupreous strap, $\frac{1}{2}$ in. wide and $2\frac{1}{8}$ in. long, collected from the enlisted men’s kitchen, possibly near an exterior door (Block M), that functioned as the
baseplate for a worsted epaulette. The outer fabric was sewn to three punched holes on each end of the baseplate for attachment. Army regulations issued in 1854 adopted brass shoulder scales to replace the earlier worsted epaulettes (Langellier 1998:37). However, this uniform insignia may have been in use for a longer period of time, as old pattern clothing was often used in the early-1850s in the west (Langellier 1998:36).

Military Defense / Personal, Uniform-Related and Other Buttons

Buttons worn by military personal were divided into two categories based on style: either with Group Services/Military Defense or Personal functions. Buttons with military devices or designs on their faces are grouped with other military paraphernalia under Group Services/Military Defense and are categorized as masculine, as they were worn specifically by male individuals. These objects were specifically manufactured for military use, functioning as group identifiers, first to the U.S. Army, second to the branch, and then to specific regiments and companies. Several other button styles were incorporated into official military uniforms but as these styles may be found on non-military clothes they are classified as civilian buttons with a Personal function (e.g. 4-hole sew-through pewter alloy buttons and white Prosser-molded buttons, see Table 24). In the mid-19th century (and today) the French ligne (1 in. equates to 12 ligne) or English line (1 in. is equal to 40 line) were used to measure button diameters, yet military specifications are given in inches. Therefore, both dimensions are given in the following discussions, and as several button styles were produced in Great Britain, English line sizes are used here.
Buttons with military devices, or emblems, were fastened to the front and sleeves of the overcoats, frockcoats, fatigue blouses (“sack coats”), and caps/hats worn by the Federal or Union Army, specifically stamped two-piece Sanders or three-piece staff style buttons manufactured from copper alloy. Sanders style buttons had a front shell with the device stamped on it, and solder applied between the back plate and wire shank. The two button sides were fastened together by folding over and crimping the edge of the front shell. The sides of three-piece buttons were held together by a separate flat rim and manufactured specifically for Army staff officers (Albert 1976:7).

Based on equations used to calculate Mean Ceramic Dates (see Miller 1980), Mean Button Dates (MBD) were developed for 19th century military device buttons recovered from the west side of the 1850 parade ground; no military emblem buttons were identified within archaeological investigations conducted on the Officers Row or East Reserve St. (non-commissioned officers/laundresses’ privy). Although military buttons were issued for use until stores were depleted, the exact termination date of their issue is unknown. Therefore, the median manufacture/use date for each military device button was calculated from known production and issue dates for each button style and/or manufacturer’s back stamp (cf. Albert 1976; Emerson 1996; McGuinn and Bazelon 2006; Tice 1997; Wyckoff 1984). The average of these median production/use dates was implemented as the MBD for the grouping or overall site.

When possible, production dates are narrowed using data obtained from historical documents. For example, buttons manufactured by William Lang of Boston were assigned a median date of 1857 when the company received their only contract for Federal button manufacture (Tice 1997). Several buttons depicting non-manufacturer specific quality marks (e.g. SUPERFINE, EXTRA QUALITY, etc.), commonly stamped between 1800 and 1850 to
help promote sales (Luscomb 1967:163), were assigned manufacture dates based on their face motif.

Changes in button designs in the 1850s may obfuscate whether a button was worn by a commissioned officer or enlisted man, particularly amongst the 1850s and 1860s service buttons. Between 1845 and 1854, most of the Army buttons displayed a similar crest (some departments displayed alternate designs), consisting of a spread eagle with a recessed or raised shield across its breast holding an olive branch in its left talon, and arrows in its right talon. Adopted in 1821 (Tice 1997:106), the “Line Eagle” button had a letter embossed into the center of a spade-shaped shield. Letter selection was dependent upon the man’s branch of service; e.g. “A” was worn by the Artillery, “D” by the Dragoons, “I” by the Infantry, “R” by the Riflemen and “C” by the Calvary after its inception in 1855 (Albert 1976; Emerson 1996; Tice 1997). Letters were depicted with either straight or curved (two styles) serifs (see Wyckoff 1984:31), but these do not have known temporal significance.

After 1854, all buttons were to be manufactured in yellow metal (brass alloys, etc.), and enlisted men were to wear the “General Service” button that used a lined shield device (USWD, AGO Gen. Orders No. 1, 20 January 1854). This design is characterized by a series of parallel and perpendicular embossed lines within a spade shield centered on the eagle’s breast, similar to that used on general staff buttons after 1836 (Tice 1997:99). General Service buttons were in use from the 1840s until the end of the Civil War (Tice 1997:141), but continued in use into the early-1880s until adoption of a Prussian-styled eagle emblem in 1884 (Brinkerhoff 1972:5; Herskovitz 1978:40; Wyckoff 1984:90). Officers continued to wear the Line Eagle device buttons until 1902 (Emerson 1996; Herskovitz 1978:39; Langellier 1998:37; Tice 1997).
Larger emblematic buttons used on the coat fronts can be differentiated by diameter sizes as Army regulations specified button sizes for different personnel in 1847, 1851, 1854, and 1861 (USWD 1847, 1851, 1854, and 1861). Military uniform specifications required the frockcoat buttons for commissioned officers to be \( \frac{7}{8} \) (0.875) in. or 35 line in diameter, and only \( \frac{3}{4} \) (0.75) in. or 30 line diameter for enlisted men (Lord 1965:65; Ludington 1889; USWD 1847:186-200). Military device buttons affixed to “small clothes,” such as vests, sleeves, (pant) cuffs, coattails, hats, etc., for both the commissioned and enlisted were to be \( \frac{1}{2} \) in. or 20 line in size until they were enlarged in 1888 (Ludington 1889:61). However, in actuality military device buttons with identical intended functions, such as for a cuff sleeve, could vary in diameter given that they were manufactured by multiple companies (Herskovitz 1978:39).

Fifteen buttons with military devices were identified within the collection (Figure 89), and their characteristics are summarized below in tabular format (Table 23). Two general sizes are represented amongst the military device buttons; the larger overcoat, front frock coat, and/or fatigue blouse (“F”) buttons and those attached to “small clothes” (“S”). Six large coat buttons for enlisted men (30.5 to 32 lines, or \( \frac{1}{2} \) to \( \frac{4}{5} \) in.) and eight small clothes buttons (21.6 to 25 lines, or \( \frac{1}{2} \) to \( \frac{5}{8} \) in.), were collected. One Line Eagle button for the Artillery (“A”) manufactured by W.H. Hortsmann and Sons (AY215A33) with a diameter of \( \frac{5}{8} \) in. (33.2 lines), is also considered enlisted issue as it is smaller than the required 1 in. for officers’ use, and has a similar diameter to a General Service button (GEN215A14). No officers’ buttons were identified.

Two Army or General Militia buttons (GM206As1) were identified with a blank shield depicted over the eagle’s left flank rather than its breast; neither was back-stamped. This motif was generally issued in the 1830s and 1840s, but may have persisted into the 1860s (likely through use) as this type was recovered at a ca. 1862 Federal Civil War encampment at
Table 23. U.S. uniform buttons of the Federal Armed Forces (n = 1 for each row).

<table>
<thead>
<tr>
<th>Backstamp or Description¹</th>
<th>Production/Use Dates² (Median for MBD)</th>
<th>Button Style</th>
<th>Button Size³</th>
<th>Classification⁴</th>
<th>Occupation (Structure)</th>
</tr>
</thead>
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<tr>
<td>No Back Stamp (Shield over eagle’s left flank)</td>
<td>1840s-1865 (1855.5)</td>
<td>X</td>
<td>22.11 X</td>
<td>GM206As1, Plate D-24 #6 Io</td>
<td>Enlisted (Kitchen)</td>
</tr>
<tr>
<td>No Back Stamp</td>
<td>1840s-1865 (1855.5)</td>
<td>Raised Shield</td>
<td>25.01 X</td>
<td>GEN215A56 Io</td>
<td>Enlisted (Kitchen)</td>
</tr>
<tr>
<td><em><strong>EXTRA</strong></em>/QUALITY</td>
<td>1840s-1865 (1855.5)</td>
<td>Recessed Shield</td>
<td>30.50 X</td>
<td>GEN215A50 Plate D-14 #13 I</td>
<td>Enlisted (Kitchen)</td>
</tr>
<tr>
<td>W.H. HORSTMANN &amp; SONS•/PHL•</td>
<td>1843-1863 (1853)</td>
<td>“A”</td>
<td>33.17 X</td>
<td>AY215A33 In</td>
<td>Enlisted (Yard)</td>
</tr>
<tr>
<td>HORSTMANN &amp; ALLIEN*/NY•</td>
<td>1850-1877 (1863.5)</td>
<td>Recessed Shield</td>
<td>32.06 X</td>
<td>GEN215A14 Il</td>
<td>Enlisted (Barrack)</td>
</tr>
<tr>
<td>ROBINSONS*/EXTRA*</td>
<td>1834-1848 (1860) (1847)</td>
<td>“I”</td>
<td>23.10 X</td>
<td>GI215A59 Plate B-4 #5 Im</td>
<td>Enlisted (Kitchen)</td>
</tr>
<tr>
<td>•SCOVILLS &amp; CO.*/ EXTRA</td>
<td>1840-1850 (1855)</td>
<td>“A”</td>
<td>23.62 X</td>
<td>AY205As3 In</td>
<td>Laundress (Quarters)</td>
</tr>
<tr>
<td>SCOVILLS &amp; CO.***</td>
<td>1840-1850 (1845)</td>
<td>“A”</td>
<td>23.54 X</td>
<td>AY215A56 I</td>
<td>Enlisted (Kitchen)</td>
</tr>
<tr>
<td>•SCOVILLS &amp; CO.*/ SUPERFINE</td>
<td>1840-1850 (1845)</td>
<td>“I”</td>
<td>31.01 X</td>
<td>GI215A69, Plate D-4 #7 Im</td>
<td>Enlisted (Kitchen)</td>
</tr>
<tr>
<td>•WATERBURY•/ BUTTON CO.</td>
<td>1849-1944 (1850s-1870s) 1864.5</td>
<td>Raised Shield</td>
<td>22.91 X</td>
<td>GEN215A46 Plate D-14 #12 Io</td>
<td>Enlisted (Kitchen)</td>
</tr>
<tr>
<td>Backstamp or Description¹</td>
<td>Production/Use Dates² (Median for MBD)</td>
<td>Army or General Militia</td>
<td>Button Style</td>
<td>Button Size³</td>
<td>Classification⁴</td>
</tr>
<tr>
<td>---------------------------</td>
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<td>--------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>...A...R...</td>
<td>1849-1944 (1850s-1870s) (1864.5)</td>
<td>Raised Shield</td>
<td>23.97</td>
<td>X</td>
<td>GEN215A46 Plate D-14 #12 Io</td>
</tr>
<tr>
<td>(Waterbury Button Co.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W...LANG•/BOSTON...</td>
<td>1840s-1865 (1857)</td>
<td>Recessed Shield</td>
<td>30.87</td>
<td>X</td>
<td>GEN215A19 or GEN215A20 Io</td>
</tr>
<tr>
<td>(William Lang)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unreadable back stamp</td>
<td>1845-1866 (1855.5)</td>
<td>Unknown</td>
<td>30.87</td>
<td>X</td>
<td>None Io</td>
</tr>
<tr>
<td>Unknown</td>
<td>1840s-1865 (1855.5)</td>
<td>Recessed Shield</td>
<td>30.47</td>
<td>X</td>
<td>GEN215A50 Plate D-14 #13 Io</td>
</tr>
<tr>
<td>Backplate missing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ = “*” denotes a star-shaped symbol; ² = MBD refers to Mean Button Date, production and use dates based on Albert (1976), Emerson (1996), McGuinn and Bazelon (2006), Tice (1997) and Wyckoff (1984); ³ = 1 in. is equivalent to 40 English line (or ligne), 1 line is equal to 0.025 in. or 0.635 mm; ⁴ = for FOVA type see Chance and Chance (1976), Chance et al (1982), Carley (1982), and Storm (1982).
Figure 89. Selected examples of U.S. Army uniform buttons with military devices. Larger buttons were worn on the front of frock coats, while smaller ones were used on sleeves and small clothes.

Clockwise from left: General Service Army or Militia (GM206As1), recessed shield (GEN215A19 or GEN215A20), raised shield (GEN215A46), Line Eagle Infantry “I” (GI215A59, GI215A69), and Artillery “A” (AY215A56, AY215A33).

Harrison’s Landing, VA (Tice 19974:174; Wyckoff 1984:22). They were affixed on caps worn by the Federal Armed Forces during the Mexican-American War (1846 to 1848), but were limited to general militia use by 1860 (Tice 1997:174). Therefore, these buttons could have been deposited by personnel who campaigned in Mexico, or by the Oregon Volunteers, a militia who were stationed at Fort Vancouver during Indian Wars of the 1850s and 1860s.

Five Line Eagle buttons were clearly issued to personnel serving in the Artillery (“A”) or Infantry (“I”) branches. All letters are in straight serif font embossed within the recessed shield which became standard in 1845 (Wyckoff 1984:25,44). Although the MBD for the Artillery
buttons is 1847.7, and the Infantry buttons is 1846, these were deposited at the earliest in 1849, when the 1st Field Artillery established a permanent camp at Fort Vancouver (then Columbia Barracks). The 3rd or 4th Artillery first arrived at the post in 1854, and a series of associated Companies were quartered at the post until 1865. A number of units associated with the 4th, 9th, and 14th Infantry were garrisoned and/or supplied at Fort Vancouver. Both recessed and raised shield General Service button styles were recovered with an MBD of 1858.9, but all depict an eagle motif that predated the 1884 Prussian-style eagle. These buttons could not be affiliated with specific Companies at the post.

Overall, buttons with military devices were produced between 1834 and 1877 with an MBD of 1854.8. However, these dates for button manufacture do not necessarily reflect their actual production and/or use. Button manufacturers, such as Scovills, often affixed old backstamps to newer styled buttons until the inventory was depleted (Tice 1997:31). Although the Robinsons, Jones, and Company firm went bankrupt around 1845 to 1847, button backs stamped with “ROBINSONS” continued to be utilized until 1860 under Daniel Evans, whose family controlled the company post-bankruptcy until it was acquired by the Waterbury Button Company at the end of WWII (Tice 1997:17,20). In practice, soldiers in the 1850s and 1860s on the western frontier wore a mixture of uniform pieces, as the Army reduced stored surplus by issuing outdated uniform pieces (Albert 1976; Langellier 1998:89-90; Tice 1997).

Military issue uniforms incorporated a number of non-military device button styles as well, the most common of which are 4-hole sew-through pewter alloy and white Prosser-molded buttons, both typically classified as civilian Personal Clothing items at FVNHS (e.g. Carley 1982; Cromwell 2009; Langford and Wilson 2002; Storm 1976, 1982; Thomas and Hibbs 1984).
Army regulations do not specify pattern details for drawers (long johns) and socks prior to 1877, and only a few examples survived their military use (Lord 1965:315).

Plain 4-hole sew-through cast pewter alloy flat disk buttons, with a concave face, were recovered from the officers (n = 5) and enlisted (n = 26) residential areas (Table 24). A fracture line is present on the rear of each button, along its mold seam, where the pewter was cast around an iron shank (see Luscomb 1967:80-89). Two sizes were identified in the collections, one with a roughly $\frac{1}{2}$ in. diameter or 20 to 22.4 lines (n = 11), and almost $\frac{3}{4}$ in. or 27.7 to 29 lines (n = 20). These buttons were affixed to trousers for the fly and attaching the braces, now referred to as suspenders (Herskovitz 1978:38; Woodhead 1996:126-127). Rough casting edges reflect quick production without refinement. With hard use, threads pulled against the round button holes, distorting them into a slightly almond shape (Ross 1976:607). Six undecorated stamped iron 4-hole buttons were recovered from the Officers Row (n = 2) and the enlisted building complex area (n = 4) badly rusted. Plain iron buttons were also used on military trousers, drawers, and tents (Herskovitz 1978:38l Woodhead 1996:214).

Three other styles of metal buttons were identified in the collection (Table 24). One 3-hole sew-through, dish-shaped, cupreous button, roughly $\frac{1}{2}$ in. or 19 lines in diameter, was recovered from the enlisted men’s barrack. As it was manufactured of yellow metal, it was likely attached to uniform small clothes. One sleeve-sized ferrous Sanders style button, with a weave impression on its face, was recovered from the band quarters and it is unclear whether this button was gilt-decorated, or functioned as an additional band ornament on their uniform or as a personal item. Two white metal undecorated dome-shaped buttons, with a cast shank (see Albert 1976:7, Type IA) were recovered from the officer’s kitchen area, and their original use is unknown.
Table 24. Buttons recovered without military devices.

<table>
<thead>
<tr>
<th>Description</th>
<th>Material</th>
<th>Manufacturing Technique</th>
<th>Button Style</th>
<th>Face Decoration</th>
<th>English Line Size</th>
<th>FOVA</th>
<th>Type</th>
<th>Provenience</th>
<th>Officers</th>
<th>Enlisted</th>
<th>Laundresses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sew-through 3-hole</td>
<td>Cupreous Yellow</td>
<td>Stamped</td>
<td>Dish</td>
<td>Sunken Face</td>
<td>None</td>
<td>18.90</td>
<td>I 3001</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cast w Alpha Style Shank</td>
<td>White metal</td>
<td>Cast</td>
<td>Domed One Piece</td>
<td>None</td>
<td>23.56-24.93</td>
<td>1</td>
<td>2 L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sew-through 4-hole</td>
<td>Pewter alloy</td>
<td>Cast</td>
<td>Flat Disk Concave Face</td>
<td>None</td>
<td>19.96-22.44</td>
<td>Ip2 2001</td>
<td>4 L</td>
<td></td>
<td></td>
<td></td>
<td>1 L 4 L 8 L 3 L 2 L</td>
</tr>
<tr>
<td>Sanders</td>
<td>Ferrous</td>
<td>Stamped</td>
<td>Domed</td>
<td>Saunders</td>
<td>18.30</td>
<td>Ik -1019</td>
<td>1 L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-piece</td>
<td>Ferrous</td>
<td>Stamped</td>
<td>Flat Disk Concave Face Two Piece</td>
<td>Shank Unknown</td>
<td>29.45</td>
<td>I</td>
<td>1 L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sew-through 4-hole</td>
<td>Ferrous</td>
<td>Stamped</td>
<td>Dish Sunken Face Two Piece</td>
<td>None</td>
<td>22.80-23.35</td>
<td>I</td>
<td>2 L</td>
<td></td>
<td></td>
<td></td>
<td>1 L 1 S</td>
</tr>
<tr>
<td>Sew-through 4-hole</td>
<td>Ceramic Black (N.75)</td>
<td>Prosser Molded</td>
<td>Dish</td>
<td>Raised Border</td>
<td>None</td>
<td>14.32</td>
<td>Ilh</td>
<td></td>
<td></td>
<td>1 S 1 S</td>
<td></td>
</tr>
<tr>
<td>Sew-through 4-hole</td>
<td>Ceramic White (N9)</td>
<td>Molded</td>
<td>Dish</td>
<td>Raised Border</td>
<td>None</td>
<td>14.00 15.87-17.48</td>
<td>IId</td>
<td>2 L</td>
<td></td>
<td></td>
<td>1 S 2 L</td>
</tr>
<tr>
<td>Sew-through 4-hole</td>
<td>Ceramic White (N9)</td>
<td>Prosser Molded</td>
<td>Dish</td>
<td>Raised Border</td>
<td>None</td>
<td>13.37 15.32-17.50 20.96-21.32 25.32</td>
<td>Ile Iih</td>
<td>1 L 2 S</td>
<td>10 L 4 S 1 S 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sew-through 4-hole</td>
<td>Ceramic White (N9)</td>
<td>Prosser Molded</td>
<td>Concave Face Sloped Border</td>
<td>“Inkwell”</td>
<td>None</td>
<td>24.50</td>
<td>IIg</td>
<td></td>
<td></td>
<td>1 L</td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Material</td>
<td>Manufacturing Technique</td>
<td>Button Style</td>
<td>Face Decoration</td>
<td>English Line Size</td>
<td>FOVA Type</td>
<td>Provenience</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Sew-through 4-hole</td>
<td>Ceramic White (N9)</td>
<td>Prosser Molded</td>
<td>Dish Raised Border</td>
<td>Impressed Lines</td>
<td>13.73</td>
<td>II 6006</td>
<td>Officers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sew-through 4-hole</td>
<td>Ceramic White (N9)</td>
<td>Molded</td>
<td>Dish Elevated Panel</td>
<td>Beaded Border</td>
<td>17.61</td>
<td>Ilk 6007</td>
<td>Enlisted</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sew-through 4-hole</td>
<td>Ceramic White (N9)</td>
<td>Prosser Molded</td>
<td>Dish Raised Border</td>
<td>Blue Border (10B 3/2)</td>
<td>17.28</td>
<td>Ilh</td>
<td>Laundresses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sew-through 4-hole</td>
<td>Ceramic Calico</td>
<td>Prosser Molded</td>
<td>Dish Raised Border</td>
<td>Perpendicular Stripes, brown (7.5 YR 3/6)</td>
<td>10.19</td>
<td>Ila</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sew-through 4-hole</td>
<td>Ceramic Calico</td>
<td>Prosser Molded</td>
<td>Dish Raised Border</td>
<td>Calico, Hearts, brown (7.5 YR 3/6)</td>
<td>17.10</td>
<td>Ila</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sew-through 4-hole</td>
<td>Ceramic Calico</td>
<td>Prosser Molded</td>
<td>Dish Raised Border</td>
<td>Calico, Vine and leaves, red (7.5R 3/8)</td>
<td>13.83-14.06</td>
<td>Ila</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sew-through 4-hole</td>
<td>Bone</td>
<td>Carved</td>
<td>Dish-shaped center panel One piece</td>
<td>Carved Linear Depression</td>
<td>19.15</td>
<td>IVa 4002</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sew-through 5-hole</td>
<td>Bone</td>
<td>Turned (lathe)</td>
<td>Flat Disk Sunken panel Raised Border</td>
<td>None</td>
<td>30.69</td>
<td>IV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Molded</td>
<td>Glass</td>
<td>Molded/Pressed</td>
<td>Pyramid of Raised Nubs</td>
<td>Gilt-decorated</td>
<td>23.65</td>
<td>VII</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>Glass</td>
<td>Unknown</td>
<td>Flat Disk</td>
<td>Black base, two parallel white stripes</td>
<td>N/A (Fragment)</td>
<td>VII</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 = commonly recovered from military sites, used for pant fly and suspender attachments; 2 = 1 in. equals 40 line; 3 = for letter designations see Chance and Chance (1976), Chance et al (1982), and Carley (1982), for numerical designations see Ross (1976:593-614); 4 = “L” denotes a larger coat sized button, and “S” refers to a “small clothes” sized button, typically worn on cuffs, vests, coattails, etc., no size designations were given to fragments with less than half of the button present.
Figure 90. Selected examples of metal, ceramic, bone and glass buttons.

From left to right, top row: cupreous sew-through 3-hole, pewter alloy sew-through 4-hole concave face (Ip2), small and large (military issue utilitarian for suspenders, fly, etc.), ferrous Sanders weave impressed (Ik), ferrous sew-thorugh 4-hole sunken dish face (I).

Middle row (all sew-through 4 –hole prosser-molded ceramic): black (IIh), white (IId), “inkwell” (IIg), impressed lines (II), beaded border (IIk).

Bottom row: blue border (IIh), Calico, Hearts, brown (IIa), and Calico, Vine and leaves, red (IIa) prosser-molded ceramic, sew-through 4-hole (IV) and 5-hole bone (IVa), and black with white stripes glass (VII).

Two sew-through bone buttons, one with 4-holes and one with 5-holes were collected from the enlisted men’s kitchen area. Similar buttons were sold by the Hudson’s Bay Company at the post, as well as by other merchants in the area as bone buttons were commonplace and typically used on utilitarian clothing (Storm 1976:119). The center hole of the 5-hole button was used to index the turning tool during manufacture. This was probably done on a lathe, given the consistent placement and depth of an unintentional line engraving around the center face.
Both plain and decorated ceramic buttons were recovered in a range of sizes. Of these 84% (n = 27 of 32) are dated to post-1840, when the Prosser-molding process was patented and first began to be used (Sprague 2002:113; Storm 1976, 1982). The remaining five white china (ceramic) button backs did not have the distinctive orange-peel texture indicative of manufacture with the Prosser process (Sprague 2002:111). Prosser-molded, termed “agate” buttons in the 19th century (Sprague 2002:112), and china buttons are generally plain white and were used for a variety of utilitarian purposes. Fourteen buttons of this style (IIe and IIh, differentiated by size diameter), with more than half of the button present, were collected during excavations.

Undecorated buttons were not intended for formal display, and were used mostly for undergarments and shirts, although later in the 19th century they became common on women’s dresses (Chance and Chance 1976:118; Ross 1976:613). These buttons could be affixed to a wool flannel shirt worn as part of the uniform (see Woodhead 1996:126-127). Larger buttons were also used on mid-19th century haversacks and tents (Woodhead 1996:210-211, 214).

Seven ceramic buttons with decorated faces in a variety of line sizes were recovered (Table 24). On mid-19th century American military sites, use of decorated buttons is generally held to be limited to laundresses’ and/or officers’ personal clothing (see Brown 1999), as clothing for enlisted men was limited to the prescribed uniform (USWD 1847:31), in an effort to reduce their desertion rates. All of these were collected from deposits associated with the kitchens, but five were recovered from the enlisted men’s complex (Block H). As the mid-19th century federal census records for Fort Vancouver and the Ordnance Depot indicate that the laundresses and their children often lived with their husbands (USCB, 1850, 1860, 1870, 1880), these decorated buttons may have been lost by these individuals when visiting the enlisted men’s kitchen, either for taking meals or social calls. Three decorated buttons are white with either
molded (IIg, IIk/6007) or impressed designs (IIk/6006). One other has a blue color applied to the face border (II), while the other four represent three transferprinted calico (IIa) button designs (Table 24).

Recovered glass button fragments (n = 2) were also decorated. One fragment of a black glass button with two white stripes, possibly a sew-through style, was collected from the enlisted men’s kitchen. The most elaborately decorated button, not previously identified at Fort Vancouver, was collected from the Ordnance Depot noncommissioned officers and laundresses’ privy. The face was molded or pressed from black glass into a series of small raised nubs aligned in concentric circles, raised up in the center in a pyramid-shaped formation. This button is gilt-decorated across the concave back of the button, with gilding delineating each nub. A faint mold seam is visible along the rim.

Other Clothing and Fashion Related Items

Additional small utilitarian clothing eye-hooks and clasps, both cupreous (MNI pairs = 5) and ferrous (MNI pairs = 3), were collected from the officers’ kitchen and enlisted men’s complex (Table 22). Archaeological specimens previously recovered at Fort Vancouver were similarly manufactured form cupreous wire (Ross 1976:614). In addition, one cupreous corset clasp, with a keyhole-shaped opening and two cupreous rivets, were recovered from the privy vault on the Officers Row. Although corsets are commonly considered a strictly feminine item, Victorian gentlemen of this class worse corsets as well to assist in maintaining a strong upright posture while wearing a uniform, particularly when supporting heavy overclothes (Haggit 2011).
Dome-head straight pins, both cupreous (n = 7) and plated steel (n = 17), and cupreous safety pins (n = 3), first patented by Walter Hunt in 1849 (Wulffson 1981), are all categorized as sewing items and often considered feminine items as sewing and needlework were considered essential skills for Victorian women to learn (see Gorham 1982:74; Osaki 1988). Therefore, sewing-related artifacts (e.g. notions, needles, thimbles, thread, etc.) are often assumed to be associated with women’s activities in the mid to late-19th century (cf. Lydon 1993). However, military personnel often carried a personal sewing kit, termed a *housewife*, as a matter of necessity to mend their clothes while on campaign, or while in garrison simply to save money (Woodhead 1996:222). These kits were typically constructed from scraps of fabric with pockets to contain needles, pins, thread, buttons, and sometimes a small pair of scissors and/or a thimble. In the 1860s, Commanders of the Department of California required soldiers to carry “one fine
and one coarse comb, one sewing kit, one piece of soap, one toothbrush” (USWD, HQ Dept. California Gen. Orders No. 3, 11 February 1862). Many officers and enlisted men in other departments also carried small sewing kits (Woodhead 1996:222), as suggested by mid-19th century military manuals, “A little industry in mending and cleaning his clothes will well reward his labors in the savings of the frugal soldier. To this end, he should be provided with a little wallet, containing an assortment of thread, needles, buttons, scissors, &c.” (Kautz 1865:55). Because of this, the eye-hooks, clasps, corset clasp, and straight and safety pins cannot be definitively assigned to a specific Victorian gender.

Army regulations required officers to wear either ankle brogans or Jefferson-style booties, and the enlisted men serving in the Artillery, Infantry and Riflemen branches to wear Jefferson booties (USWD 1857:444). All of these regimental types served at Fort Vancouver in the 1850s and 1860s. Federal issued square-toed boots were better constructed than those produced by civilian manufacturers, with an average life span of 20 to 30 days with hard marching and wear (Lord 1965:306). Footwear was considered “the most important item of clothing to the foot-soldier. [and] The Army bootee is much the best… soles should be broad, the heels low and broad” (Kautz 1865:53). On soldier described the booties as “very coarse leather, uppers fastened to the sole by brass screws. These were… very uncomfortable” (Rickey 1963:124).

A minimum of two boot or bootie soles were recovered from the privy vault on the Officers Row, but as the uppers are missing, the style of boot cannot be definitively ascertained (Figure 92). However, the sole design resembles the pre-1872 pattern (see Brinckerhoff 1976:5,7) seen on both the ankle booties and Jefferson style boots, with low heels and wide soles. The soles were attached to the uppers by a series of 10 to 12 mm long, 2 mm thick (0.4 to
0.5 x 0.08 in.) ferrous square tacks, a common method seen on Army boots (Woodhead 1996). Both soles underwent a series of repairs using the French method (Brinckhoff 1976:3). Each repair is represented by one strip of leather attached to the toes and/or heels with brass wire screws, of similar size to the ferrous tacks, hammered into place. The screws were then crimped to a point, which was then flattened during wear. One tap/quarter sole was repaired four times, and the two heels three times each, suggesting that the wearer(s) could not easily afford or acquire replacement boots.

The mid-19th century custom in the Pacific Northwest was to tack on pieces of leather to the soles to “prevent slipping and preserve the boot” by directly fastening it either with screws or tacks to the bottom of the boot (Beach 1879:1). When the repairs began to wear out, the boots would leak again. The durability of boots with soles machine-fastened by brass wire screws (Figure 92) was tested by the Army beginning in 1862, and success led to their implementation in about half of the boots purchased by the Army in 1871 (Brinckhoff 1976:4,45). Similar soles with “yellow metal” screws were recovered from the Bachelor’s Privies within the HBC stockade (Ross 1976:626). However, these specimens were likely deposited by Army personnel while renting HBC buildings within the stockade (Ingalls 1849b:171,174), as brass screws were commonly used for repairs by military personnel in the 1850s and 1860s (Brinckhoff 1976; Koehler 1921:27).

A cluster of ferrous <1/4 in. diameter domed head (4 mm) boot hobnails (n = 72) was exposed within the georectified 1850 footprint of the enlisted men’s kitchen. Hobnails were hammered into the sole of boots (typically Jefferson booties in the 1860s for military personnel) to provide traction on soft or rocky ground, but also to protect the sole from wearing out. The number of hobnails applied to each sole varied, depending upon the pattern and coverage desired.
Figure 92. Pre-1872 pattern leather shoe or boot soles with evidence of three or four repairs, collected from the officers’ privy vault, and selected hobnails recovered from the enlisted men’s kitchen. Inset depicts alternate view of brass screws used in boot construction and repair.

by the wearer. No boots or leather fragments were recovered from the enlisted men’s kitchen area, suggesting that the hobnails were accidentally dropped before use (Figure 92). Although both men and women wore brogans in the mid-19th century, these leather soles match the Army 1872-pattern and manufacturing style, and hobnails were commonly worn by military personnel in the Pacific Northwest during this period, so they are classified here as masculine items.

Few objects (n = 23) functioning as Personal Adornments were identified during analysis (Figure 93). These consisted of one hand-carved bone hair stick and one cupreous hair pin with an incised floral design, collected from the officers’ quarters and the area around the enlisted men’s building complex (Table 22). In addition, a small geode formed into a roughly triangular shape and in cross-section with an opaque, white crypto-crystalline silicate (CCS) inner matrix, was recovered from deposits associated with the enlisted men’s barrack. The opposite (dorsal face) surface of the amber and red crystal cluster (ventral face) is completely covered in small
Figure 93. Cupreous hair pin (detailed in overlay) and hand-carved bone hair stick collected from the officers’ quarters and the enlisted men’s building complex.

Figure 94. Flaked crypto-crystalline silicate geode recovered from the enlisted men’s barrack.
(3 to 6 mm) flake scars. Although no evidence of hardware mounting is present, this geode fragment is interpreted as having an intended use as a pendant. However, it cannot be determined whether local persons or military personnel manufactured the item, or whether it was deposited by its wearer (assumed to be a feminine item) or by a soldier intending it as a gift.

Eight types of glass beads, all sold by the Hudson’s Bay Company (HBC), were recovered from the Ab horizon (Stratum III), with blue (n = 3) and white (n = 7) the most popular colors (Table 25). All but one are drawn beads (95%, or n = 19). These were produced by stretching a hollow wand of glass between two pontils and cutting it into 3 ft. lengths to be sorted by diameter and chiseled into individual beads (Cromwell et al. 2013; Ross 1976, 1990; Sprague 2002). Of these, 95% (n = 18) have a “hot-tumbled” finish, achieved by placing the beads into a heated drum and rotating them to eliminate sharp edges. The other bead has two rows of ground facets and may be the historically-known “cut glass” beads sold by the HBC (Ross 1990:36). One opaque, light blue, faceted glass bead was collected from the enlisted men’s kitchen area. This bead is a mold-pressed, monochrome, spherical bead with bi-conical, punched perforations (Ross 1990:39). The finish and type for one drawn green bead collected in 1987 from the officers’ kitchen could not be determined.

Most drawn beads are used in beadwork (Sprague 2000:206). Prior to Army settlement at Fort Vancouver in 1849, women worked for the HBC as farm laborers (Hussey 1977:59) and these beads could have been dropped on the parade ground during those pursuits as it was formerly a cultivated wheat field. Alternatively, to be fashionable Victorian women carried a small handbag and/or other accessories (e.g. hair combs, jewelry, belts, etc.) often decorated with colorful beadwork. These artifacts are interpreted as reflecting the accidental loss of the beads.
Table 25. Nineteenth century beads identified within the collection.

<table>
<thead>
<tr>
<th>Description</th>
<th>Color</th>
<th>Munsell</th>
<th>Opacity</th>
<th>Style Decoration</th>
<th>FOVA Type(^2)</th>
<th>Kidd and Kidd (1970) Type</th>
<th>Ross (1990) Type(^2)</th>
<th>Provenience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drawn, Hot-tumbled</td>
<td>Monochrome White</td>
<td>N 9/</td>
<td>Opaque</td>
<td>Cylindrical None</td>
<td>1003</td>
<td>Ila14</td>
<td>Ila-ops-1</td>
<td>Officers</td>
</tr>
<tr>
<td>Drawn, Hot-tumbled</td>
<td>Monochrome White</td>
<td>N 9/</td>
<td>Translucent</td>
<td>Cylindrical None</td>
<td>1009</td>
<td>Ila12</td>
<td>Ila-tls-1</td>
<td>Enlisted</td>
</tr>
<tr>
<td>Drawn, Hot-tumbled</td>
<td>Monochrome Blue</td>
<td>10B 8/6</td>
<td>Opaque</td>
<td>Cylindrical None</td>
<td>1010</td>
<td>-</td>
<td>Ila-ops-12</td>
<td>Laundresses</td>
</tr>
<tr>
<td>Drawn, Hot-tumbled</td>
<td>Monochrome Purple-Blue</td>
<td>5PB 5/8</td>
<td>Opaque</td>
<td>Cylindrical None</td>
<td>1012</td>
<td>-</td>
<td>Ila-ops-19</td>
<td></td>
</tr>
<tr>
<td>Drawn, Ground Facets</td>
<td>Polychrome Colorless over White(^1)</td>
<td>N 9/</td>
<td>Translucent</td>
<td>Cylindrical Faceted</td>
<td>1036</td>
<td>IIIf1</td>
<td>IIIf-d6/7tp/tls/I-1</td>
<td></td>
</tr>
<tr>
<td>Drawn, Hot-tumbled</td>
<td>Monochrome Black</td>
<td>N 0.5/</td>
<td>Opaque</td>
<td>Cylindrical None</td>
<td>1050</td>
<td>Ila7</td>
<td>Ila-ops-2</td>
<td></td>
</tr>
<tr>
<td>Drawn, Hot-tumbled</td>
<td>Monochrome Blue-Green</td>
<td>10BG 5/6</td>
<td>Translucent</td>
<td>Cylindrical None</td>
<td>1063</td>
<td>-</td>
<td>Ila-tls-4</td>
<td></td>
</tr>
<tr>
<td>Mold-Pressed Ground Facets</td>
<td>Monochrome Light Blue</td>
<td>2.5B 8/4</td>
<td>Opaque</td>
<td>Bi-Conical Faceted</td>
<td>3002</td>
<td>-</td>
<td>MPIIa-sppgfops-2</td>
<td></td>
</tr>
<tr>
<td>Drawn (Crushed)</td>
<td>Monochrome Green</td>
<td>2.5G 7/2</td>
<td>Opaque</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) = Colorless exterior, white interior; \(^2\) = classification system presented in Cromwell et al. (2013). Ross (1990) is a modification of the Kidd and Kidd (1970) system (Cromwell et al. 2013:iii).
Toiletries and other objects used for personal body grooming were also examined to discern whether they are affiliated with expected gender-based hygiene behaviors (Table 22 and Figure 95). Only one, a straight razor, could be linked to one gender; masculine. The roughly 5\(\frac{1}{2}\) in. ferrous, single-edged, 3 in. long straight blade razor missing its handle was unearthed from within the footprint of the enlisted men’s barrack (Block L). Straight razors sold to the HBC by the Benjamin Fenton & Co., the only known supplier, had either plain wood, carved ebony, or carved ivory handles (Ross 1976:182-183). Razors were considered the “most important implement of the male toilet” (Philips 1859:835), and are therefore categorized herein as a masculine item. The same style razor was recovered archaeologically from deposits affiliated with the HBC, and based on blade length and concavity was determined to be “an inexpensive razor of relatively poor quality” (Ross 1976:184), likely the imported style identified by the HBC as Common Paper Cased Razors (Ross 1976:183). Its thin profile and depositional provenience suggest that a soldier may have dropped it through the floorboards of the main barrack room.

Six tips from pocket comb teeth were observed scattered across excavations at the enlisted men’s building complex; two of the teeth are slightly wider. Striations across the teeth reveal that the comb was hand-filed from brown and black mottled gutta percha or cellulose nitrate, both commonly used to imitate tortoise shell. Due to their destructive nature, tests were not performed to determine from which of these materials the comb was manufactured. Based on tooth form and curvature, the artifact is not indicative of a women’s hair comb. It cannot be determined whether the comb was a straight or folding type, both of which were available during the mid-19th century. Because gutta percha is fabricated through compression molding and very
Figure 95. Selected examples of recovered artifacts used for personal grooming.

From top left to right, then down: guta percha or cellulosie nitrate pocket comb teeth (two widths), bone bristle toothbrush, gutta percha or celluloise nitrate toothbrush handle, and ferrous straight razor blade.

durable, it was popular for producing many objects from the 1850s throughout the Victorian era, such as mourning jewelry, lockets, cane heads, etc. (Bell 1999:18; Institute for Conservation 2011; Plastics Historical Society 2011). These artifacts could reflect a varying width comb, with the center section teeth thicker than those closer to the ends, rather than two combs.

Fragments of two bristle bone toothbrushes, one of which has a rounded tip with bone backing, were recovered from the officers’ privy vault and the enlisted men’s kitchen deposits. This style of bone toothbrush typically had a straight horizontal profile; the number of bristle rows or holes per row could not be determined from the artifacts. No bristle remnants were recovered. Based on the presence of wire within the holes Ross (1976:186) argues that similarly
styled toothbrushes recovered at Hudson Bay Company’s Fort Vancouver had iron bristles, although Herskovitz (1978:129) states that bristles (unknown fibers) were held in place by a wire fitted into the bristle holes from the back of the toothbrush head. On the Officers Row, a dark brown cellulose or gutta percha curved toothbrush handle (4+ in. long) was collected from the kitchen deposits. The letters “COLIE” are hand-scratched into the surface on underside of the handle, possibly reflecting an individual claiming ownership of the object. No individual named “Colie” was identified within the Federal census records. Neither the toothbrushes nor the comb teeth can be definitively linked to either the laundresses or enlisted men as both frequently used these items.

**Personal Pocket Tools**

Two types of pocket tools were recovered from archaeological contexts, watches and pen knives (Figure 96). Two styles of pen knives, common and fine, were imported by the HBC into the Pacific Northwest, both with handles manufactured from natural materials but unknown blade styles (Ross 1976:1064). One 1.8 in., heavily rusted, ferrous sheepsfoot blade for a pocket or pen knife was collected from sediments associated with the enlisted men’s kitchen (Table 22). Sheepsfoot blades have a straight-edge spine that curves convexly down to the end of the blade. This was a relatively safe blade style to use as no tip is present to unintentionally pierce objects, or its handler, during use. This design was first used to trim the hooves on sheep, but was (and still is) commonly used by woodcarvers and on ships to cut rope (Lansky Sharpeners 2013). The American knife industry rapidly developed in the 1830s and 1840s, and by the 1850s penknives were commonly carried personal tools used by almost every adult male (Sopko 2000:69,71).
Figure 96. Pocket watch and pen knife components.

Clockwise from left: cupreous winding stem, bow and stem, white metal teardrop handle with oval ring, ferrous sheepsfoot pen knife blade and cuprous watch back.

Penknives “are now carried about the person, as a useful little implement to be employed for numerous officers, and is found of great use in many emergencies” (Philips 1859:768).

Parts from a minimum of two pocket watches were collected from the officers’ kitchen and privy vault and the enlisted men’s kitchen (Table 22). A ferrous bow/stem and cupreous key set, with a teardrop-shaped handle aperture, were collected from the officers’ privy, and a 1.4 in. diameter cupreous watch back plate, with a symmetrical stamped pattern, from the officers’ kitchen deposits. It is possible that these items originated from the same watch as the bow and stem may have once been plated with cupreous metal(s). One cupreous pocket watch winding stem was observed in the enlisted men’s kitchen deposits. No other watch parts were identified in the collections.
Based on their manufacturing quality, these artifacts likely reflect mass-produced rather than hand-made items. Attempts at mass-production of pocket watches began in 1850 near Boston, Massachusetts, and the Waltham Model 1857 pocket watch was the first to be produced with standardized parts. Watches were valued tools, and owners were advised to maintain their watches through careful winding, use, storage and cleaning (Philip 1859:1076). By the end of the Civil War, mass-produced pocket watches, cheaper than hand-made watches, were sold throughout Europe and North America (Carosso 1949; James 2013; Stephens 2002). The stem-winding watch, invented in the 1840s by Patek Philippe & Co. in Geneva, replaced the key winding watch in popularity after the Civil War (Stephens 2002). Until the mid-1920s, watch cases were sold separately from the watch itself. Upon purchase/order of the watch, the consumer simultaneously selected the case style (Niebling 1971). These items are identified as men’s watches, as watches worn by Victorian ladies were often smaller and sometimes inset into other jewelry (Bell 1999). It is expected that the cuprous watches would be utilized by those responsible for task completion amongst the troops, such as the commissioned and non-commissioned officers. However, it is possible that an enlisted man dropped the winding stem in the kitchen area.

Personal Pastimes and Recreation Items

While off-duty, leisure activities provided a welcome change in the rigid structure of military duties, and playing games helped to ease the monotony of garrison life. Commissioned officers spent their leisure time reading, writing letters, horseback riding, attending church, sleighing (in winter), fishing and hunting game (Carey 1931; Fry 1879; Hine and Lottinville
“Reading, riding, occasionally duck shooting and my military duties make up the round of my existence” (Maj. Hatheway, 15 April 1852 in Van Arsdol 1999:129).

Both the officers and enlisted men enjoyed playing cards or dominos, smoking from pipes, and drinking alcoholic beverages (Brauner 2006; Carey 1931; Erigero 1992; Fry 1879:94; Hussey 1957; Landerholm 1960:10; Stallard 1978:110; Thomas and Hibbs 1984:42). Women typically spent their free time sewing, either clothing or decorative items, often gathering in groups (Stallard 1978:46). Additional pursuits included and organizing and attending dances, amateur theater productions, lawn tennis, and croquet with the ladies living at and near the post (Alt and Stone 1991:57). Children played with a variety of toys (Alt and Stone 1991; Stallard 1978).

A variety of molded smoking pipe fragments, produced primarily from white ball clay (97% or n = 382), but also red clay (2.8% or n = 11) and buff clay (0.25% or n = 1), were recovered during the excavations (NISP = 394, MNP = 73; Table 26). The forms of the white clay pipes date to the mid to late-19th century (see Atkinson and Oswald 1969; PfiFFer 1982), and the red clay sherds are from reed stem pipes (see Murphy 1976). Six sherds of the white ball clay pipes are glazed in a variety of colors, including red, light blue, yellow and green, and all of the sherds from red clay caricature pipe (n = 5) were covered in a clear glaze.

The minimum number of pipes (MNP) for these objects was determined from decorative designs (following PfiFFer 1982), bowl and/or spur counts. Stems, commonly broken off while smoking and discarded, were not included in the calculations unless they had evidence of specific decorations (e.g. Medallion or Green-glazed). Sixty-seven motifs were recovered, 23 of which represent newly identified, or more completely represented, molded designs within the
Table 26. Objects recovered that facilitated participation in activities related to Pastimes and Recreation (Personal Indulgences).

<table>
<thead>
<tr>
<th>Description</th>
<th>TOTAL MNI</th>
<th>Material</th>
<th>Style</th>
<th>Functional Category(^1)</th>
<th>Victorian Gender Affiliation(^2)</th>
<th>Provenience Officer(^3)</th>
<th>Provenience Enlisted(^3)</th>
<th>Provenience Laundresses(^3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobacco Tag</td>
<td>6</td>
<td>Ferrous</td>
<td>Undecorated, two-pronged</td>
<td></td>
<td>Personal Indulgences</td>
<td>1 1 2 1 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tobacco Pipe</td>
<td>63</td>
<td>White Ball Clay</td>
<td>Various</td>
<td></td>
<td>Either</td>
<td>3 4 3 8 27 6 8 2 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tobacco Pipe</td>
<td>4</td>
<td>Red Clay</td>
<td>Various</td>
<td></td>
<td>Either</td>
<td>2 1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Domino</td>
<td>1</td>
<td>Bone</td>
<td>Ferrous pin, “Double Two”</td>
<td></td>
<td>Personal Pastimes and Recreation</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Mable</td>
<td>2</td>
<td>Porcelain, Bisque-Fired</td>
<td>White or Hand-painted</td>
<td></td>
<td>Either</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marble</td>
<td>1</td>
<td>Glass</td>
<td>Hand-blown</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Figurine</td>
<td>3</td>
<td>Porcelain, European soft-paste</td>
<td>“China” Clear-Glazed</td>
<td></td>
<td>Either</td>
<td>1 3 2 3 1 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toy Teaset</td>
<td>1</td>
<td>Porcelain, European soft-paste</td>
<td>Clear-Glazed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Geode, Natural</td>
<td>1</td>
<td>Quartz</td>
<td>N/A</td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) = functional classification system adapted from that presented in Sprague (1980); \(^2\) = "*" denotes gender affiliation assigned by archaeological context, not functional use; \(^3\) = “L” denotes a 1\(\frac{5}{8}\) x 1 in. sized buckle, and “S” refers to a 1 x \(\frac{3}{4}\) in. sized buckle.
Fort Vancouver collections (visualized depicted and described in Appendix F). For discussions of all pipe styles previously recovered at Fort Vancouver, see Chance and Chance (1976), Pfieffer (1982a, 1982b, 1982c), Ross (1976), Thomas and Hibbs (1984), and Wynia (2013).

In the 1850s, the HBC imported clay pipes for sale. Historical documents list suppliers as Thomas Duggan of Glasgow, Scotland and John, Jesse and Thomas Ford of London, England, but pipes archaeologically recovered were also produced by Duncan McDougall and William Murray, both of Glasgow, Scotland, and Prince and Sparnaay of Gouda, Holland (Ross 1976:804-805). It is currently unknown what pipe styles or specific pipe manufacturers were sold by the sutler at the post, or by other local merchants.

Twenty-two pipe motifs identified during analysis were previously recovered from deposits associated with the HBC occupation. Although 27.2% (n = 107) of the pipe fragments are decorated, only one specific manufacturer, John, Jesse and Thomas Ford of London, England, could be identified amongst the collection (n = 11 sherds) based on their markings of STEPNEY or MILE END (within Stepney borough of London). All sherds were manufactured in Stepney (Ross 1976:807). An additional six sherds were produced by a Dutch manufacturer (Pfieffer 1982:26) as their maker’s marks were typically placed on base of the heel, or if heelless on the base or back of the pipe bowl, until the end of 1800s (Bradley 2000:117).

Eleven sherds (2.8%) are marked with a “T. D.,” first produced in the 1750s by Thomas Dormer of London (Lenik 2008:20). As these were extremely high quality pipes, they were soon imitated until the term “TD” pipe became practically synonymous with a clay pipe, and were manufactured in England, Ireland, Scotland, France, Holland, Germany and the United States (Alexander 1983:197-204; Walker 1983:36-39). These pipes cannot be definitively linked with known HBC supplier Thomas Duggan of Scotland because at least one William White pipe style
recovered from archaeological deposits associated with the HBC occupation was marked with a “TD” (Ross 1976:805,807). Although these cannot be assigned to a manufacturer, these pipe styles are common after the 1840s during the Victorian Period, and were recovered at American military sites throughout the Pacific Northwest (see Pfieffer 1982a).

Six plain, circular ferrous tobacco tags with two attachment prongs (Figure 97) were collected from the upper portions of the 19th century ground surface (Ab horizon or Stratum III) in both the officers and enlisted areas. After the Civil War, with the rise in demand for tobacco grown in the southern states, manufacturers used these tags to identify each plug (twist) of tobacco to prevent fraudulent consumer practices (Hyman 2010; Storino 1995:5). Although these tags are plain they were one enameled with bright colors (Springate 1997:10), and hobbyists collected them as early as the 1880s (Hyman 2010). These were deposited during demolition of the 1850 enlisted buildings, or with subsequent use of the parade ground. Physiological evidence indicates that both men and women smoked in the 19th century (see Solano 2006), so no affiliation to Victorian gender was determined for smoking items. However, the majority of these items were likely deposited by officers and soldiers as smoking was considered uncivilized activity for aristocratic Victorian women to participate in, although it was a common habit among the lower class in the mid-19th century (Martin 1942:82; Rudy 2005; Segrave 2005).

Many fewer artifacts were recovered that reflect non-smoking activities. One carved bone “Double Two” domino (two spots on each side), missing its wooden backing but retaining its cupreous square-bodied center tack, was recovered from the enlisted men’s kitchen (Figure 97). Dominos, like cards, checkers, and chess sets, were easily carried in a knapsack by soldiers. In the mid-19th century, dominos were a social game, played with two or four people (Philips 1859:382).
Figure 97. Selected examples of items used while engaging in personal pasttime and recreational activities.

From left to right, top row: ferrous tobacco tags and bone domino.

Middle row: plain and striped bisque-fired ceramic and hand-blown glass marbles.

Bottom row: European soft-paste porcelain figurine fragments, including peach and clear-glazed head, brown leg, and clear-glazed foot fragments

Bottom: quartz crystal geode fragment.

Three marbles, two bisque-fired and one hand-blown from glass, were recovered from the officers’ kitchen area, all decorated with simple designs. One ceramic marble was hand-painted with a “banded” pattern (Bauman 2004:32), with five 1 mm wide dark green (10GY 2/6) parallel bands situated perpendicular to five gold colored bands; the other was undecorated. The glass “swirl” marble was produced from light blue (7.5B 7/6) translucent glass, and contained three
series of four opaque ribbons within the glass, two white and two light green. Ceramic marbles were produced in Europe beginning in the 1800s, and in the United States in the 1840s. After the 1900s, they are scarce in archaeological assemblages (Bauman 2004:31-32). The German invention of the marblechere (marble scissors) in 1846 (Action et al. 2006:148) allowed glassblowers to simultaneously slice and round sections of glass from long canes. Marbles were not mass-produced until 1884 (Cohill and Robinson 2008). Although dominoes and marbles were played frequently by military men to pass the time, they are not classified as masculine pursuits as they could also be played by women and children.

One fragment of a clear-glazed European soft-paste porcelain toy tea set vessel was recovered from the enlisted men’s kitchen area; no manufacturer brands or other identifying information is available for this sherd. Fragments (n = 13) of glazed European soft-paste porcelain figurine head and limbs for soft-bodied dolls, known as China and bisque dolls, were identified within the collection. Both types are produce from porcelain, China dolls are glazed, whereas bisque dolls are unglazed and characterized by their realistic, skin-like colorings (Cieslik 1985). Identifiable China doll body parts from the enlisted men’s complex consist of a clear-glazed head, foot, and leg. The latter has a marbled brown exterior glaze applied to resemble clothing. One portion of a clear-glazed limb was collected from the laundresses’ quarters. Although not distinguishable based on manufacturing techniques or glazing, given the distance between the enlisted men’s building complex and the laundresses’ quarters to the west, these likely represent a minimum of two dolls (MNI = 2). Part of an unglazed peach colored bisque doll head was recovered from the yard area behind (north of) the 1850 officers’ quarters. Girls are most commonly associated with dolls and toy tea sets, as these items reflect domestic activities, connected with the proper sphere for Victorian women, although boys could play with
them as well. However, as children often assumed their father’s rank during play in 19th century military communities (Stallard 1978:92), boys would likely have pretended to be soldiers or engaged in other activities that emulated adult masculine behaviors.

China dolls were predominantly manufactured in Germany, with peak production between approximately 1840 and 1890, but were considered outdated in the mid-1870s (Coleman et al. 1968). Bisque dolls were developed in France in the early-1850s, and were most popular between 1860 and 1900 (Cieslik 1985:164). As no manufacturer marks are present on the doll parts, these cannot be linked to a specific factory. China dolls, represented by sherds recovered from the enlisted and laundresses’ areas, were cheaper to purchase than bisque dolls, reflecting the historically documented difference in economic purchasing power between the officers and enlisted men (see Chapter Four).

Two refitting fragments of an amethyst quartz geode were recovered from the officer’s quarters area, specifically beneath the porch. Although no cultural modifications are present on this object, geodes are not known to be naturally deposited at the VNHR. Therefore, this geode is interpreted as a manuport, collected for decoration and/or symbolic meaning, as Victorian-era persons found meaning in the colors, shapes, and textures of the jewelry and minerals they wore and displayed, and under this system, amethysts represented devotion (Bell 1999).

**Distribution Patterns**

Analysis of potential sources for objects determined to have a Personal function supports historical documentation that these objects could be obtained locally; through the military supply system (e.g. buttons, field equipment) but also from local merchants, particularly the Hudson’s
Table 27. Distribution of personal objects by determined gender affiliation and occupation¹.

<table>
<thead>
<tr>
<th>Victorian Gender Affiliation</th>
<th>Provenience</th>
<th>Officers</th>
<th></th>
<th>Enlisted</th>
<th></th>
<th>Laundresses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Quarters</td>
<td>Kitchen</td>
<td>Privy</td>
<td>Yard</td>
<td>TOTAL</td>
<td>Band Quarters</td>
</tr>
<tr>
<td>Masculine</td>
<td></td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Feminine</td>
<td></td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Either</td>
<td></td>
<td>1</td>
<td>11</td>
<td>26</td>
<td>1</td>
<td>39</td>
<td>3</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>2</td>
<td>16</td>
<td>32</td>
<td>1</td>
<td>51</td>
<td>3</td>
</tr>
</tbody>
</table>

¹ = calculated from counts presented Table 22. Personal pastime items were not considered in these counts as none were definitively assigned specifically to gender.

Figure 98. Relative distribution of personal objects with determined gender. Small samples size of items obtained from the laundresses’ quarters (n = 5) may have yielded spurious results.

Bay Company located onsite in the 1850s (see Chapter Four). All of these items reflect probably refuse, likely accidental loss. Personal pastime items were not considered in the analysis as none were definitively assigned to a specific gender. Distribution patterns of the different functional
categories between the residential areas are significant (Fisher’s Exact $p = 0.0004998$, two-sided; $p$ calculated from Monte Carlo, 2000 replications; $\chi^2 = 70.0209$, df = N/A, $p = 0.001499$).

Personal pocket tools, clothing fasteners, footwear, and personal adornment items are predominately associated with the commissioned officers quarters (Figure 99). All of these items are not necessarily procured through the military supply system, and their presence reflects the greater purchasing power of the inhabitants. As expected, military insignia and personal military equipment are primarily associated with the enlisted men’s complex. These items are all associated with executing the military mission, and the paucity of other items reflects the low economic status of the enlisted men at the military post (see Chapter Ten).

The distribution of items determined affiliated with a specific gender did not follow expectations that gendered objects will be found in greater quantities in deposits associated with structures traditionally aligned along gender lines; the enlisted men’s complex and laundresses’ quarters (Table 27 and Figure 98). In all occupation areas, masculine items were recovered in higher frequencies than feminine items. Differences are present between the households that are significant (Fisher’s Exact $p = 0.0004998$, two-sided; $p$ calculated from Monte Carlo, 2000 replications; $\chi^2 = 110.2829$, df = N/A, $p = 0.0004998$).

Masculine (n = 7) and feminine (n = 5) items are represented in deposits associated with the commissioned officers, not unexpected as historical documentation indicates that both male officers and laundresses resided in these buildings. During housing shortages at Fort Vancouver laundresses were quartered in the officers’ kitchens. Items determined to be gender neutral (office supplies, personal grooming items, sewing supplies, and clothing fasteners) comprise 76.47% (n = 23) of the personal items recovered from this area. Most of these were recovered from the officers’ privy vault deposits, which reflected the most gender neutral assemblage of all
Figure 99. Distribution by residential area of artifacts determined to have a Military or Personal function, based MNI using correspondence analysis. Numerical results are given in Appendix I.

Figure 100. Distribution by residential area of artifacts affiliated with gender based MNI using correspondence analysis. Numerical results are given in Appendix I.
the proveniences (Figure 100). Feminine items (Personal Adornment) are more affiliated with the officers areas, than the laundresses’ quarters as well, reflecting the presence of officers’ wives and/or laundresses (Figure 100). Their presence is likely more closely related to the higher economic status enjoyed by occupants on the Officers Row, rather than reflecting greater numbers of women than men residing in this area.

Artifacts traditionally associated with women and female children, such as decorative hair pieces, porcelain figurines, and toy tea sets were unexpectedly recovered from the enlisted men’s barracks, along with masculine objects, such as military insignia, uniform buttons, and a razor blade. As anticipated, masculine items dominate those recovered in the enlisted men’s complex (55.43% or n = 102). However, unexpectedly 17 objects (9.24%) associated with women were also collected from this area. The cluster of hobnails in the enlisted men’s barrack (n = 72) was likely dropped as a single occurrence, and beads in the enlisted men’s kitchen area (n = 15) deposited in few events, based on bead morphology. These items inflate the appearance of gendered objects in the enlisted men’s complex (Figure 100). Removing these items from consideration alters the proportion of masculine objects recovered from this area to 30.93% (n = 30) and feminine objects to 2.06% (n = 2), maintaining an emphasis on masculine artifacts as expected, given that this area was one of two main residential areas for the enlisted men, and the high numbers of men quartered in this location according to federal census data. The feminine items may have been left by barrack women visitors, or women and girl barrack residents (based on 1860 federal census data), or were a soldier’s keepsakes or gifts intended for distribution.

The paucity of feminine (n = 3) and masculine (n = 2) personal items in deposits associated with the noncommissioned officers and laundresses’ quarters does not negate their usage in these areas. Instead, it may be reflective of excavation placements, as georectification of
the structures has determined that the rear yards of both the southern and northern
noncommissioned officers and laundresses’ quarters are within the footprint of modern Fort
Vancouver Way. Masculine items recovered from noncommissioned officers and laundress areas
consist of three uniform buttons worn by enlisted men, not surprising as census data indicate that
the laundresses were living with their non-commissioned officer or musician husbands in the
quarters. The lack of laundry related equipment (washtubs, scouring boards, etc.) recovered
during excavations suggests that laundresses were washing clothes closer to the river, given the
difficulty in transporting the amount of water needed to the quarters location. Alternatively, the
few non-work related feminine items a woman managed to maintain were probably carefully
curated in this overwhelmingly masculine-oriented community.

More likely, the lack of large objects that can be affiliated with gender, such as boot spurs
and washing equipment, and the low amounts of personal items recovered, when examined in
reference to historical documentation, indicates military community practices impacted their
potential deposition in the archaeological record near the residential structures. Wage limitations,
including those of the junior commissioned officers that were often lower than civilian wages,
likely limited procuring large numbers of gender-affiliated objects (Logan 1995). Another factor
is the requirement than officers purchased their own uniform and supplies, and that enlisted men
pay for missing clothing and equipment out of their meager pay. Additionally, strict baggage
transport allowances (see Chapter Four) for all but the senior commissioned officers and
laundresses, and the enlisted men (who carried all of their items on their person) necessitated
careful selection of objects to procure, as one could be on campaign the next day, or ‘ranked out’
by higher ranking individuals arriving at the garrison. Larger items to be discarded were likely
collected by daily policing and refuse gathering parties, to be transported to designated disposal
areas for burning or burial. At Fort Vancouver these activities were conducted along the lower floodplain (Post Order No. 61, 1876). Combined, the economic constraints and the logistics of being at a frontier post influenced the potential for these items to enter the archaeological record at Fort Vancouver, resulting in their low recovery rates during excavation.
CHAPTER TEN

THE MID-19TH CENTURY MILITARY IDEOLOGICAL SYSTEM

AS EXPRESSED AND REINFORCED THROUGH THE

SPATIAL ORGANIZATION OF STRUCTURES AND CONSUMER BEHAVIOR

Individuals simultaneously experience the world at multiple levels of culturally defined cognitive spaces. Each level of space reflects conceptualizations of social class, gender, and power relationships, all of which are continually negotiated by community members on a daily basis. Although cultural spaces are mental constructs, because they are expressed through the built environment and use of objects, these conceptualizations can be detected through analysis of documentary sources and material culture, represented within the archaeological record by features and artifacts. The construction of space as theorized by Lefebvre (1974, 1991) provided a model to understand how cognitive processes produce cultural conceptions of space. Because space is a human construct, representations of space or places, are not necessarily mutually-agreed upon, spatially defined areas bounded in the physical world (Massey 1994) and personal experiences influence interpretations of space. Individuals simultaneously experience the world and find meaning of those experiences through interactions with and within intentionally constructed spaces at varying levels of scale. Material culture facilitates this process with each spatial tier through the distribution of information. Objects are created that intentionally reflect and communicate culturally constructed social identities.

Fort Vancouver provided a formal, institutionalized setting at the community, household, and individual levels for the embodiment and transmission of military values, group membership, and the idealized roles of men and women in mid-19th century America. Socioeconomic changes in urban areas of the eastern United States during this period involved
the redefinition of the concepts of class, work and home, of public and private space, and the roles of men and women. Using a multiscalar analytical approach allowed me to move through these nested layers of meaning within the mid-19th century military community at Fort Vancouver, from the built environment to the object. Through analyzing documentary data and the distribution patterns of artifacts, I examined how the military system reproduced and reinforced culturally idealized concepts of class and gender roles for members of the military community, and how these roles structured the lives of military personnel and attached civilians within the military community.

Fort Vancouver and the Vancouver Ordnance Depot between 1849 and the mid-1880s embodied a series of physically, socially and economically intricate nested cultural spaces, or landscapes. They are intentionally created communities of self-sufficiency, designed and transformed according to the dictates of the military elite to reflect social concepts of power, status and ideology. The Fort Vancouver military community, ca. 1849 to the mid-1880s, included not only officers and enlisted men, but also their wives and families and civilian employees. All of these individuals operated within a rigid social climate with rather firm gender role expectations and rules of behavior. Gender in the mid-19th century army was intimately connected with social connotations of class differences and cultural conceptions that adhered to the dominant ideological Victorian paradigm.

The dominant Victorian ideology rigorously defined idealized gender roles for men and women, and associated the performance of these roles to gender-affiliated spaces within the community, the public realm for men and the private sphere, or household, for women. Adherents to this ideology believed that both gender roles formed a unified social framework, and were important in maintaining cultural beliefs, seen as moral values. These concepts were
reinforced through public sentiment and messages were embodied within the built environment and objects. Participants in Victorianism believed the surrounding environment influenced the socialization of individuals. Structures and goods operated within the Victorian system of communication by nonverbally communicating social concepts of economic class, gender, and power relationships. Community and household spaces were intentionally constructed and filled with carefully selected objects to provide appropriate settings that embodied cultural ideals and reinforced adherence to those tenets.

Drawing upon datasets derived from the archaeological record and documentary sources, I investigated how the mid-19th century American military system created and reinforced social spaces to perpetuate the dominant ideological paradigm simultaneously within three levels of space; the built environment, the household, and the personal, or individual. My analysis focused on discerning patterns within the documentary data and archaeological artifact distributions related to two socially constructed categories, class and gender, as defined by the dominant Victorian culture. Women’s roles are often unaddressed at public sites predominately associated with men (Spencer-Wood 2006), such as in military communities. Therefore, my research examined the experiences of both men and women at Fort Vancouver within the highly structured dominant male-based military paradigm. Three military households documented along the western perimeter of the central parade ground were selected for investigation; junior commissioned officers, non-commissioned officers and laundresses, and enlisted men.

In chapters Three though Nine I have presented and analyzed the data collected to address four primary research objectives; 1) whether the dominant military socioeconomic system was reinforced and reproduced through the material culture, 2) whether artifacts and faunal remains reflect the historically documented mid-19th century socioeconomic status and
interaction patterns of occupants, 3) whether military policies impacted object procurement, use, deposition, and subsequent artifact recovery, and 4) whether artifacts and faunal remains reflect site occupants’ efforts to resist the dominant military and Victorian ideologies.

Utilizing practice theory I examined the messages communicated within the three identified levels of space at the post, as this theoretical model provides an approach that focuses on “the idea of materiality” (Pauketat 2003:10), wherein objects, or artifacts, are analyzed as aspects of the process of creating cultural traditions, rather than simply by form or function of the object. The concept of individual human agency developed within this framework allowed investigation into how individual choices, on an aggregate level, may consciously and/or unconsciously affect societal patterns and constructions of cultural spaces. I drew upon the Consumer Behavioral Choice model to assess the expressions of agency at the level of household and individual space as consumption, or how consumerism involves symbolically meaningful actions. I applied these concepts to interpret the documentary data and archaeological material cultural distribution patterns, using the dominant ideology of Victorian gentility as a sociohistorical frame of reference to interpret patterns discerned within the archaeological dataset.

Social Stratification within the Mid-19th Century American Military

In Chapter Four, I reviewed documentary data to determine how the military power structure was strengthened through daily behaviors undertaken at Fort Vancouver to support the wider military mission in the Pacific Northwest, as well as the garrison itself. To accomplish a wide variety of mission objectives, whether they be military campaigns, exploration, quelling
riots, or road building, to name a few, cohesiveness amongst individuals needed to be maintained. Discipline, primarily maintained through fear of punishment, was necessary to maintain cohesiveness not only in combat, but also while garrisoned in camp and garrison. Social rank-based segregation allows officers to maintain discipline through distancing themselves from the enlisted men (Agnew 2008; Foner 1970). Officers were expected to guide the enlisted men towards proper behavior, by ensuring that military regulations and protocol were followed.

Rigid rank and class stratification and differential power relationships between the officers and enlisted men were established and reinforced daily through military training activities (see above), garrison duties, and social life. Unlike commissioned officers, the enlisted men’s lives in garrison were strenuous and demanding. They were required to perform a variety of menial tasks and fatigue duties in addition to their regular military tasks, while the officers who assigned these duties were exempt from performing them. The class-based social segregation was reinforced through these manual labor duties, acting as daily reminders of the enlisted men’s social position as essentially inferior to the officer class.

Women at the post were also expected to participate in actively maintaining the social segregation between ranks (Alt and Stone 1991:49; Eales 1996:137), as a woman’s social status and her living conditions at the garrison were both dependent upon her husband’s rank (Sinclair 2004:96). Officers were expected to marry women from the same social class, that of the merchant or upper classes in American society. If an officer married a woman outside of the aristocratic social circle, he was considered “married to an inferior person” (Glisan 1874:452). Regardless of her background or education, a commissioned officer’s wife automatically became part of the military aristocracy, and was considered a gentilewoman or lady by the military community (Alt and Stone 1991:48-49). She was expected to set and maintain behavioral
standards (Sinclair 2004:80), as defined by Victorian concepts of femininity, to which other women could aspire. Following the Victorian ideal for women, as “Angels of the House,” laundresses and officers’ wives were seen to have “a welcoming calming influence upon the men” (Wood 2002:28).

Although only laundresses had a legal standing on the post (Stallard 1978:124), as officers’ wives were not employed by the military, all women were expected to adhere to and reinforce military customs and protocol, or else they could be removed from post by the commanding officer (Eales 1996). Laundresses were required to maintain good character (USWD 1857:98) by adhering to sanctioned feminine behaviors, including the manner in which they dressed (see Roberts 1977). Army Regulations required laundresses, as well as other civilian employees, to carry certificates of good character issued from the department headquarters. Dismissal of women found to be of questionable character reflected the masculine cultural desire for women within the military system to adhere to Victorian notions of feminine gentility (Mescher 2001).

In the 19th century, military men were typically recognized as embodying the masculine ideals of virility, toughness, self-control, fulfilling their socially-prescribed roles as the “Vanguards of Civilization.” In opposition, women were seen as delicate and docile individuals, an “Angel in the House,” who provided a haven and civilizing influence on the men of their household. This role was easily realized by the officers’ wives and families on post, but was likely difficult to accomplish for the wives of enlisted men when their spouses resided in separate quarters at the garrison.
Summary of Archaeological Investigations and Site Formation Processes

Working with the Public Archaeology Field School, offered jointly by Portland State University and Washington State University Vancouver, in conjunction with the National Park Service, I directed test excavations in 2007 and 2008 encompassing an area of 77.6 m$^2$ (835.3 ft.$^2$). These were positioned in the western portion of the central parade ground and on Officers Row to generate the bulk of the archaeological dataset. Particular focus was given to areas identified during previous systematic surveys as containing high artifact concentrations (Langford and Wilson 2002; Thomas 1988). Excavations were positioned to examine the horizontal and vertical extent of archaeological deposits associated with the residential areas of the U. S. Army junior commissioned officers, enlisted men, and civilian laundresses, as well as to retrieve a representative sample of artifacts and features. The features and artifacts identified provided information that enhanced my understanding of the socioeconomic status, consumption patterns, and the internal and external relations of mid-19th century personnel garrisoned at Fort Vancouver.

The results of archaeological testing identified significant sub-surface archaeological deposits and cultural features in association with historically documented mid-19th century residential buildings associated with these groups of military personnel. When combined with existing collections (see Chapter Five) recovered from the junior commissioned officers kitchen area on Officers Row (Thomas 1988) and a non-commissioned officers and laundresses privy vault in the Vancouver Ordnance Depot (McIlrath 2001), the assemblage included a fuller array of utilized objects for my analysis. As this dissertation also serves as an excavation report,
Chapter Five presented the excavation and laboratory processing methods, and provenience information is summarized in tabular form in Appendix A.

Seven distinct strata (I to VII), and three substrata (Ia, Ib, and IIa), were identified during stratigraphic analysis of sediments intersected during excavations (see Chapter Six). Through analysis of a suite of soil characteristics, I determined that multiple catastrophic flood events, commonly referred to as the Missoula Floods, formed the riverine terrace in the upland portion of the Vancouver National Historic Reserve Historic District (DT191). This is reflected in the distributions of large clasts (cobble sized), many with opal precipitates, throughout entrained and reworked previously deposited flood sediments (Strata III to VI). These sediments overly a series of gravel forest beds deposited by an earlier Missoula Flood event (Stratum VII). Strata III to VII are reflective of the natural sediment stratigraphy of the upland terrace, upon which the central parade ground sits. Strata I and II consist of late Holocene floodplain soils relocated from along the Columbia River to the upper terrace during landscaping activities. I examined the role of identified strata in terrace formation in relation to the Portland Basin geomorphology to assess the potential implications for interpretations of architectural features (e.g. identifying root cellars, crawl spaces, stone footings, etc.). Cobble clusters and varying thicknesses in strata and boundary disconformities were determined not to be anthropogenic but to reflect geological processes forming this Columbia River terrace.

**Summary of Analysis of Building Histories and Household Occupancy**

I reviewed documentary data to develop a historical context to locate site activities spatially and temporally in order to provide a frame of reference for interpreting architectural
features and artifact distribution patterns. In Chapter Three, I provided a historical timeline for Euro-American settlement and subsequent federal management of the Fort Vancouver National Historic Site and the Vancouver National Historic Reserve. Particular emphasis was given to presenting a detailed overview of the American Army occupation of Fort Vancouver and the Vancouver Ordnance Depot between 1849 and the mid-1880s. As part of this discussion, I analyzed documentary data to develop a comprehensive use-history of the buildings along the western perimeter of the central parade ground and the east-central portion of the Vancouver Ordnance Depot, including their construction, expansion, and demolition. I identified fourteen mid-19th century structures from the historical maps in these areas, and surmised the presence of a fifteenth outbuilding, the enlisted men’s privy. Archaeological test excavations revealed architectural features (see Chapter Seven) that indicated the presence of a sixteenth unrecorded structure (Feature 706), potentially a storage shed, between the enlisted kitchens and laundresses quarters.

The Fort Vancouver cultural landscape, as established by building placements, not only provided the physical space within which the military community operated, but reflected its social organization, particularly that of class and gender. These structures underwent multiple residential cycles consisting of relatively short-term occupations, associated with the movement of troops through the garrison. Military personnel were assigned quarters primarily by their military rank, e.g. officers were assigned to quarters designated for that purpose, and enlisted men always resided in the barracks. As part of this work, I developed a general profile of household occupants based on federal census data collected between 1850 and 1880s. My analysis of these data revealed that until the 1870s, housing was not strictly demarcated along Victorian gender categories of male and female (summarized below, also see Chapter Three).
The westernmost commissioned officers’ quarters, with an associated kitchen and privy behind the residence (all 1850 to ca. mid-1860s), were recorded on Officers Row, which delineated the northern perimeter of the central parade ground. These were erected as log structures, between two ca. 1865-1866 extant officers’ quarters, both currently in use as commercial properties and residential housing. Although originally constructed as two separate buildings, the officers’ quarters and kitchen were attached by 1854. The privy is depicted at varying distances behind the kitchen on historical maps. This is to be expected because when the privy vault was filled the privy was moved to a new location. This process was continually repeated in the 1850s and 1860s. These structures were likely in the worst condition of all on Officers Row, as they were the first to be replaced. The officers’ privy vault deposits date to the 1850s as several recovered artifacts are of the identical manufacture as items recovered during archaeological excavations conducted in the 1970s within the Hudson’s Bay Company (HBC) stockade.

My analysis of federal census records indicates that this particular officers’ quarters housed four unmarried lieutenants in 1860, as each lieutenant was allotted only one room plus a kitchen for housing (USWD 1857:124). It is unknown, but possible, that in the late-1850s to early-1860s other commissioned officers living in this building may have had their families residing with them, as the officers’ quarters were intentionally spaced far enough apart that a crying baby could not be heard next door (Morton 1894:1309). Although no women are listed in the federal census records as residing in the westernmost officers’ quarters in 1860, by the mid-1860s the laundresses’ quarters were in such a state of disrepair that laundresses were living in some of the officers’ kitchens (Maury 1865). The officers’ quarters and kitchen were demolished by 1869, probably soon after construction of the two ca. 1865-1866 officers’ quarters which
flanked each side of the 1850 quarters. It was expected that artifacts determined to be associated with a particular gender would be primarily masculine, but artifacts associated with women and femininity may be recovered that could confirm the presence of officers’ wives and/or quartered laundresses.

To the south, two building complexes housing enlisted men and Company laundresses were established on the east and west sides of the central parade ground, with its southern boundary following the terrace edge, just north of several Army buildings constructed in 1849. On the western side, I identified six structures associated with the enlisted men, from the historical documents. In 1850, an enlisted men’s one-story log barrack was erected with a smaller, soldiers’ quarters which housed military band personnel in 1855 (USWD 1855) and a detached kitchen constructed to the rear. By 1854, a company mess-house was built south of the detached kitchen, and two laundresses’ quarters were raised behind the band quarters and enlisted kitchen. By 1859, directly south of the 1850 log barrack a second two-story enlisted timber-frame barrack and second mess-house were erected. Analysis of architectural features (see Chapter Seven) indicated that the 1850 enlisted kitchen was expanded to the west and north, probably in the 1860s given the enlarged depictions of this structure on historical maps. Two additional laundresses’ quarters were constructed by 1859 on alignment with the ca. 1854 laundresses’ quarters, as well as a small two-room officers’ quarters, later used to house laundresses, offset to the southwest. The 1850 soldiers/band quarters building had been replaced by a billiard room by 1869, which in turn was repurposed for use as a post library by 1874. In 1870, the 1850 enlisted barrack, 1850 kitchen, and ca. 1854 mess-house were destroyed. The four laundresses’ quarters were removed by 1878 and the ca. 1859 barrack and mess-house demolished by the early-1880s. Test excavations did not intersect architectural features
associated with the ca. 1859 barrack, ca. 1854 mess-house, three of the four laundresses’
quarters, or associated privies.

The main barrack was designed to house 70 men in separate beds, although military
personnel complained in the late 1850s about sleeping crammed together on the barrack floors
during housing shortages (Peck 1993:37). Federal census data lists 68 soldiers and two sergeants
living in the barrack in 1860, along with three additional occupants: two Privates’ wives who
worked as Company laundresses and a two year old child. The listing of these additional persons
within the main barrack was unexpected, and it unclear whether this reflects an unusual
arrangement during a housing shortage, or was common practice at Fort Vancouver for small
families. Based on these data, it was expected that the majority, if not all, of the gender-affiliated
artifacts recovered from this area would reflect an overwhelming masculine, or male, presence in
the barrack area.

In 1860, none of the laundresses at Fort Vancouver were listed as living separately from
their husbands, indicating that all of the laundresses’ quarters were in reality married non-
commissioned officer and/or musician quarters. The laundresses’ quarters are often referred to as
“the quarters for married personnel” in Army documents (USWD, SGO 1870:421; see Chapter
Three). In 1860, census records list structures determined to function as laundresses’ quarters as
occupied by either married non-commissioned officers living alone or small nuclear families,
consisting of one sergeant or musician with his wife, and their children. However, by 1870 the
laundresses and their children were living separately from their husbands who were quartered in
the barracks. Occupations for several additional women living onsite in similar scenarios in 1870
were listed as “keeping house;” indicating these women were not Company laundresses. As
married women were often authorized to work as household servants or post laundresses, these women may have helped support their families with these pursuits.

Along the eastern boundary of the Vancouver Ordnance Depot, two structures on a north-south alignment were constructed in the 1860s, potentially as early as 1862. A ca. 1867-1873 map lists the northern structure as housing the 1st Sergeant and the southern building quartering laundresses, whereas an 1874 map records laundresses residing in both structures. Similar to the main garrison, census records indicate these buildings housed a soldier (military rank was not recorded), his wife, and their children. Unlike at the main Fort Vancouver garrison, in 1870 enlisted men continued to reside with their wives and children in the laundresses’ quarters at the Ordnance Depot, a practice that continued until at least 1880. However, none of the women are listed as working as laundresses, but rather as “keeping house.” They may have worked as laundresses for the Ordnance Depot as hired employees, or as household servants. Based on these data, gender related artifacts collected from both the main Fort Vancouver garrison and Ordnance Depot laundresses’ quarters areas were expected to reflect men and women, as well as potentially children.

In Chapter Seven, I used these documentary data to assist with interpreting thirty architectural features identified during test excavations relating to the construction, maintenance, demolition, and occupation of these map-documented buildings. I analyzed the spatial distributions of timber, brick, chinking and mortar, shingles, window panes, nails, and door hardware, all specifically referenced in Army construction reports. As a result, one unmapped structure, likely a storage shed, was identified in the enlisted men’s complex. I focused on determining the spatial relationship between artifact clusters of these materials to log remnants,
intact milled boards, and rough-hewn log footings. I used the results of these analyses to determine how the residential structures depicted on the historic maps were constructed.

These buildings were constructed in the late summer and fall of 1850 by the company of Riflemen and local wage laborers (see Chapter Three). Wood was either milled by American soldiers onsite with a small horse-powered mill, or purchased from the Hudson’s Bay Company. Footings used for the enlisted kitchen were formed from rough-hewn tree trunks cut into disks between 16 and 20 in. in diameter and approximately 10 to 15 in. tall. Although not uncovered during test excavations, Army documents indicate that wood block foundations were used for the officers’ quarters, possibly also comprised of tree trunk sections. The exterior walls of the 1850 structures were manufactured from rough-hewn logs using an interlocking saddle notch construction, with chinking, mud and mortar used to fill the spaces in between. The floor of the enlisted men’s kitchen was constructed from milled boards that sat on milled 4 x 5+ in. square joists. I anticipate the other structures built in the 1850s used similar construction techniques.

By the mid-1850s the rough-hewn log buildings, except for the 1849 Commanding Officer’s quarters, had unfinished interiors and remained divided by rough-hewn partitions formed from “rough boards nailed to upright scantling” (Brent 1856). Throughout the 1850s and 1860s, maintenance on these structures consisted of yearly whitewashing, replacing missing chinking, and weatherboarding was added. The enlisted kitchen was expanded to the west, and the presence of decaying mortar and brick fragments suggested brick footing piers were constructed over or adjacent to the 1850 decomposing wood footings along the eastern wall, probably to increase structural integrity of the foundation sills. The footings for the new western walls were constructed of either of wood blocks or brick piers placed into shallowly excavated pits resting on wooden planks within a box-shaped wood board support system. Concentrations
of decaying brick and mortar suggest that brick footings replaced and/or supplemented the original wood footings during building maintenance activities in the 1850s or 1860s.

Little architectural data were available for determining how the laundresses’ quarters were constructed in the main garrison. However, the identification of one charred 4 x 2 in. sawn timber, interpreted as a sill, suggests that these buildings were of frame construction. At the Vancouver Ordnance Depot, the laundresses’ quarters were probably poorly constructed, given their valuation in comparison to the stables, and the fact that only temporary buildings could be constructed in the Depot. Army records indicate that the laundresses’ or married soldiers’ quarters were often in disrepair, to the point that in the mid-1860s several women were either living off-post or in the Officers’ kitchens, reflecting the lower social standing of the laundresses relative to Army officers. By the late-1870s, all of these buildings were demolished as the post expanded. The lack of brick recovered from archaeological deposits suggests that during demolition of the buildings, salvageable materials were recycled for other uses. Wood was likely reused as well, but for both construction and fuel purposes. Portions of the buildings were destroyed by partial burning, evidenced by the partial charring of intact wood footings, sills, and flooring (when present).

I examined potential sources for raw material building supplies and searched for potential differences in the qualities of materials that may be reflective of differential social status and economic class of the occupants. At the late-18th century British Fort of Crown Point, New York, Feister (1984) found no significant variation in the domestic materials recovered from the soldiers and officers’ quarters, which she interpreted to be a result of regular refuse disposal activities undertaken by military personnel. However, there were differences in materials used in floor construction of the officers’ quarters and soldiers’ barracks. The barrack floors were lined
with cheaper paving stone, whereas the officers’ quarters were laid with significantly more expensive tiles. Her results suggest that variations in architectural materials may be a better indicator of socioeconomic status than domestic materials in military sites with proficient grounds maintenance. At Fort Vancouver, there were no discernable differences in the types or qualities of building materials used to construct the buildings on the western side of the parade ground. Door hardware artifacts are of identical manufacture to objects recovered from within the HBC stockade, suggesting Army personnel likely procured door hardware either through purchase or by opportunistic salvaging from structures formerly owned by the HBC.

I expected differences in decorative hardware to reflect differences in military rank, but identical agateware doorknobs were recovered from archaeological deposits associated with the commissioned officers and enlisted men. Therefore, architectural materials recovered during test excavations from the western perimeter of the parade ground are not reflective of socioeconomic status. Rather, historical documents indicate status differentiation is instead reflected through the timing of undertaking improvements for residential structures, with those occupied by higher ranked individuals (officers) improved before those occupied by their subordinates (enlisted).

Using architectural features identified in 2007 and 2008, I georectified these structures to confirm their position on the existing landscape. My analysis of documentary and archaeological data indicated army buildings were intentionally positioned to create a highly spatially-structured built environment that reflected the military rank hierarchy. These residential building positions were used to delineate the household analytical constructs used for intra-site analyses of domestic food refuse and personal artifact distributions. Although their locations were not depicted on historical maps, based on the georectification of the historical structures, the enlisted men’s and laundresses privies for the main garrison were surmised to be positioned behind the
laundresses’ quarters. As the footprints for the two northern laundresses’ quarters are hypothesized to be within the modern active road Fort Vancouver Way, the privies are likely further west, in the yard or beneath the O. O. Howard House, built in 1879, and/or a modern asphalt-paved parking lot.

Cultural Space of the Built Environment

Social power configurations need maintenance to retain their structure (Nelson 1999). Through adhering to a formalized and codified architectural plan, or strategy, the military construction of structures can be viewed as a production strategy for reinforcing and creating their cultural system/built environment. At the community level, each defined space, whether used for housing (quarters), food preparation (kitchens), food consumption (mess halls), directing group activities (administrative buildings), or participation in group actions (parade ground), was furnished with objects (artifacts) used in the specialized rituals of everyday life. This process was repeated at a smaller household scale not only in Victorian homes across America (see Ames 1992), but within the military buildings themselves, with individual structures functioning as the defined spaces, such as sleeping areas, kitchens, sinks, and storerooms.

Victorian ideals of masculinity encouraged men to carefully focus their energies into bringing order and civilization to the world through controlling nature (Barker-Benfield 1983). This idealized behavior is expressed at Fort Vancouver, not only through daily activities and use of material objects, but through the built environment itself, as seen in the historical documentation of the mid-19th century domestic buildings. The main garrison, planned and
constructed by men, was designed to impose an ordered, civilized landscape upon the agricultural landscape, formerly the Hudson’s Bay Company’s cultivated wheat field.

The architectural plan was not only intentionally contrived to reflect and express the rigid hierarchical configuration of the Army, but was formerly codified in official military behavioral customs and Regulations (see USWD 1847, 1857, 1861, 1863). Military structures were intentionally positioned to define a central open space, the parade ground. The parade ground functioned as both a spatial and social center of the post around and within which military personnel experienced their daily lives, and group identity was expressed and reaffirmed. Structures constructed around the perimeter of the parade ground and activities engaged in on the parade ground can be viewed as not only functional in advancing the military mission, but also as symbolic representations of the socioeconomic structure and dominant Victorian ideology within the broader mid to late-19th century American society (see Adams 2009; Ames 1992; Branton 2009). Moving through the landscape not only reflected military values for individuals, but reflected and reinforced their social position within the military community. Women’s status and living conditions were dependent upon on their husbands’ military rank (Sinclair 2004:96).

Until the mid-1870s when a bandstand was added (see Ward 1874), the only permanent structure on the parade ground was the central flagstaff, upon which the American Colors flew, the symbol of government authority (Langellier 1995:6). The Colors, or Flag, is a tangible object that functions as a visual symbolic reminder of the common group identity and reinforces internal cohesiveness amongst military personnel. These ideas are also expressed in map documents that record American military perceptions of the landscape. The Flag figures prominently in defining and recording the post within the region. All distance measurements in
military documents were given in relation to the central flagstaff, such as reserve boundaries and
post building coordinates (cf. Bonneville 1854; Eckerson 1854; McConnell 1854; Wheeler and
Dixon 1859a, 1859b), as well as distances between the posts themselves (cf. Derby 1855). The
visual image of the Arms of the United States, another symbol of American nationalism, was
codified in the Army Regulations, with an entire Article dedicated to their description (USWD
1847:155; 1857:35; 1863:474). The addition of the bandstand supported continual reinforcement
of the expected cohesiveness and social gentility within the military community. The military
band would perform public concerts that were attended by officers, soldiers, and their families as
a socially accepted leisure pursuit (Adams 2009; Agnew 2008).

Although the parade ground was at the center of the entire military community, the
parade ground was a space utilized by the officers and enlisted men of the garrison, all male,
defining a primarily masculine space. The parade ground served as a public, open place that
provided a venue for interactions between the two main classes within the American military; the
officers and the enlisted men (Adams 2008:133). Military reviews, inspections and training drills
were frequently performed in this central space, if not daily while in garrison. Mechanical and
repetitive drills conducted on the parade ground reinforced the hierarchical power relationships
within the community (Janowitz and Little 1965:63).

Men also participated in recreational activities, such as athletic competitions, on the
parade ground. In the mid-19th century, literary writers defined masculinity as possessing both
inner and outer strengths; as being courageous, disciplined and physically strong enough to
survive not only military battles, but the battles of life (Strauffer 2006). The Victorian belief
system held that “A strong, vigorous body was a primary signifier of manliness” (O’Conner
1997: 744; also see Breward 2000). Through engaging in sports and military training, men at
Fort Vancouver can be seen as fulfilling their societally-defined and ascribed gender role. Women did participate in recreational activities occasionally held on the parade ground after the Civil War, such as military band concerts (Kent 1982). However, in these events men were the active participants while women were passive observers, thereby maintaining the dominant masculinity within the parade ground and lessoning any long lasting feminine presence in the space.

These power relationships were also reflected in the adjacent built landscape, specifically by how buildings were positioned in relation to one another. Officers’ quarters, enlisted men’s barracks, laundresses’ quarters, associated residential outbuildings, and administrative structures constructed in 1850 or afterwards around the parade perimeter faced towards its center and the flagstaff. (The log structures quickly constructed in 1849 faced south towards the Hudson’s Bay Company’s stockade, the then socioeconomic center of the wider community.) The flagstaff furnished a common visual focal point from various military structures as well as a visual reminder of the military identity. Facing outward from within the parade, the focal point of individuals switched to primarily encompass a series of similarly constructed buildings defining its perimeter, also reinforcing the group identity. Individual building placements were determined by expected occupants’ military rank and position, i.e. the officers’ quarters, enlisted men’s barracks, and laundresses’ quarters. Building complexes were then grouped into two social classes, the upper middle to upper class officers forming one group, and the lower class enlisted men and attached civilian laundresses forming the other, subservient group.

In northern latitudes, officers’ quarters were to be generally located on the south side of the parade to receive more sunlight and better natural ventilation of their quarters. However, the officers’ quarters could be moved to the north side if “peculiar features of a locality… render it...
preferable” (USWD 1861b:8). At Fort Vancouver, the line of officers’ quarters, or Officers Row, defining the northern perimeter of the parade, was constructed at the highest elevation of the post. This topographic position directly embodied their higher military rank. At Fort Vancouver, the Commanding Officers’ quarters was placed as the central building on the officers’ line, directly associated with the central flagstaff, symbolizing his position as the local leader of the military community. For the remaining officers, but for those of the Quartermaster Department and Vancouver Ordnance Depot, those with higher rank were assigned quarters physically closer to the Commanding Officer’s quarters, reflecting their proximity to this individual at the apex of the military hierarchy at the local community level, and therefore within the garrison social ranking amongst the elite officer class.

The parade ground also connected the spatially differentiated domestic areas of the officers and enlisted men, reinforcing cohesion amongst the two classes of men (see Deetz 1990) while housing assignments maintained segregation. The enlisted men’s barracks perpendicularly flanked both sides of the Officers Row, defining the east and west perimeters of the rectangular-shaped parade with an east-west main axis. Along the southern perimeter, in the 1850s the enlisted men also occupied the former officers’ quarters built in 1849. The position of the barracks reflected the subordinate position of the enlisted men in the military hierarchy, being physically placed on the sides of the central visual focus area – Officers Row.

Other than the laundresses, quarters for civilian personnel attached to the Army were not constructed near the parade, once again emphasizing the military group identity of the community. Yet the laundresses’ quarters were not directly visible from the parade, rather they were placed behind the enlisted men’s barracks and associated kitchens. The physical location of the laundresses’ quarters metaphorically reflects their supporting, and socially expected
subordinate, role in both economic and political realms in the military community, and wider mid-19th century American society.

Cultural Space of the Household and the Individual

The social and economic divisions between personnel were also reproduced by the military system at the household and personal levels of space through the dissemination of resources. Access to commodities and other resources was primarily based upon the military rank of individuals within assigned quarters, or military households. In Chapter Four, I reviewed monthly allowances of income, access to wood fuel, baggage transport, and food at Fort Vancouver to develop a profile of resource distribution amongst the officers, enlisted men, and laundresses. Using this profile, I analyzed artifacts issued through the military system, specifically the consumption of meat and personal items that were commonly carried on the body, which I believe reflect the use of objects to define household and personal levels of space, respectively. I chose to examine food remains rather than ceramic and glass tablewares because food was consumed daily at the post and should be more indicative of socioeconomic differences between military households.

Social expectations, financial limitations, and local availability for procurement affected an individual’s ability to procure goods and foods, either through military supply lines or mercantile-based consumerism. Resources distributed through the military system were allocated to an individual commensurate with their rank, with higher ranked individuals receiving greater amounts of income and wood fuel. For example, in the mid-1850s a lieutenant at Fort Vancouver received about $93 each month, significantly more than the enlisted men or laundress earned,
with their pay rates between $17 and $21 for a non-commissioned officer (NCO), $13 for an enlisted man, and between $5 to $7 earned by each laundress. When pooling their wages, a married noncommissioned officer and laundress couple could earn enough money to be considered upper lower- to middle-class. Laundresses could supplement their income through other endeavors, such as taking additional sewing or selling/bartering cooked foods, such as pies.

Both food rations and uniform clothing were obtained either through direct issue for the enlisted men or by consumer purchasing for the commissioned officers, likely through the same military supply lines given the high cost of in the Pacific Northwest. Laundresses received the daily ration but were required to purchase their own clothing. As such, I expected the distribution patterns of artifacts related to food and uniform hardware will also reflect the social separation of personnel by rank (class) and potentially by gender. Additional food and clothing objects recovered that were not obtained through the military system reflected intentional consumer actions undertaken by personnel to acquire these items. I interpreted the presence of non-military objects within the archaeological record as physical symbols selected by individuals to nonverbally express whether individuals participated in the Victorian culture of gentility.

Non-military issue personal items, such as non-uniform clothing, toiletries, and leisure-related items (whisky, porter, wine, smoking pipes, candy, playing cards, dominos, and toys) were not available through the Army supply system. However, foods and goods were readily available at Fort Vancouver for purchase as the largest mercantile operation in the Pacific Northwest, the Hudson’s Bay Company, was still in operation at the fort during the 1850s, as well as the post sutler and other local merchants. Imposed military baggage transport limitations also affected the procurement of goods, because they limited the ability of an individual or household to transport items while on campaign or moving to a new post. Officers and
laundresses received baggage allowances whereas the enlisted men carried everything they owned on their person unless their wife was a laundress, in which case additional items could be transported under her baggage allowance. Goods used by the entire Company (e.g. pots, kettles, frying and bake pans, camp stoves, etc.) were transported in Army supply wagons. Therefore, not only financial cost but the size and weight of an item were considerations that influenced purchasing behaviors of domestic items for military personnel.

Influence of Refuse Disposal Practices on Artifact Recovery

Based on household profiles generated from the federal census data in relation to the number of identified household occupants in the various residential areas, the amount of meat is believed to be highly under-represented in this analysis, particularly for the enlisted men. Rather than directly reflecting varying levels of dietary importance, my analysis indicated that other factors, such as carcass processing, marrow extraction, and refuse disposal are likely influencing the deposition, archaeological retrieval, and subsequent identification of large domesticate bones. The low number of butchery cuts identified from the enlisted men’s complex, and therefore the amounts of available meat, are likely related to high rates of bone fragmentation, likely for marrow extraction, and refuse disposal practices. Concentrations of deposited bone were observed in privy vault deposits associated with the officers and noncommissioned officers and laundresses’ occupations; locations of enlisted men’s privy vaults are yet to be identified at Fort Vancouver. Placing bone in the privy vaults reflects opportunistic disposal behavior in that waste was intentionally dumped in a convenient location that could be quickly buried, particularly if mixed or followed by a deposited layer of “earth” to reduce offensive odors.
Unlike residential Euro-American households where the majority of trash is deposited near the household itself (Deetz 1996), at Fort Vancouver the enlisted men were detailed to police, or clean, the grounds. Refuse was placed in designated areas for collection and conveyance to the Columbia River floodplain for burning and/or dumping (Post Order No. 61, 1876) likely into the former pond, located southeast of the quartermaster depot. This area was used extensively for trash disposal for U.S. Army general refuse (domestic, personal and architectural items), and at least 15 different artifact-bearing strata are known within the pond, sealed periodically by flooding (Chance and Chance 1976). In addition, food refuse was used as food for pigs, if not burned, recycled and discarded (Carley 1982:286). As a result, it is likely that the majority of food refuse generated by enlisted men, as well as a good portion generated by the officers and noncommissioned officers and laundresses, is not accessible for intra-site analysis as all waste was deposited en masse. Although military regulations requiring the removal and elimination of refuse by burning and/or burial are intended to provide for more sanitary living conditions at the post, these behaviors reduce our capacity to associate large trash middens with specific groups of personnel, thereby potentially limiting our ability to discern differential interhousehold procurement, use and discard of those objects. However, although the assemblages analyzed for this study represent the minimum amount of food and objects consumed, my results indicate they are comparable in spite of these refuse disposal issues.

**Military Subsistence Practices**

An underlying assumption in socioeconomic studies is that households with greater access to resources (i.e. occupied by individuals with higher military rank) have better ability to obtain a variety of foods for consumption. At Fort Vancouver, the class and social segregation
between the officers and enlisted men was reinforced daily at each meal service. Based on documentary data presented in Chapter four, I expected faunal remains recovered from the commissioned officers residential area would reflect the widest variety of foods, and greatest proportion of preferred meat cuts. In turn, bone specimens collected from the enlisted men’s complex should reflect the lowest quality of meats, as they received their foods through the ration, supplemented with locally available and inexpensive foods. Although the non-commissioned officers and laundresses probably engaged in hunting, it was expected that their food refuse would reflect the lowest diversity of foods, as they received generally lower middle-class wages to support their families, and priorities may have necessitated expenses be directed away from luxury food procurement.

I identified four taxonomic classes within the faunal collections, mammals, birds, reptiles, and fish, distributed among 16 species of animals, five of which were commensal species or collected as curiosities, with the remainder representing consumption activities. Domesticated cattle, sheep, pigs, and chickens were the most commonly identified species from the faunal artifacts. Once livestock were onsite, military personnel processed cattle, pigs, and sheep for consumption; enlisted men were likely detailed as butchers and their assistants (Kautz 1865:153). Carcasses were hand-sawed and cleaved into primal cuts for distribution or further reduction into secondary cuts, and faunal materials closely resemble known 19th century Army meat cuts (cf. USWD, SD 1896). Army regulations (Butterfield 1862) stress butchering large domesticates in the area designated for the shambles (open-air slaughterhouse[s]). However, in the historical documentation, there is no mention of where the shambles were located at Fort Vancouver, although it is probable they were positioned on the lower floodplain near the designated refuse burning area to contain the disarray and bloody mess. These were likely near
the Quartermaster Depot, as foot and cranial bones, often considered butchering waste, have been archaeologically recovered in this area (see Carley 1982; Chance and Chance 1977; Henry 1982; Horton 2010; Jabine 1984).

It appears that beef was the primary meat source for the military personnel at Fort Vancouver, albeit with a substantial reliance upon sheep and pigs for the enlisted men and noncommissioned officers and laundresses. When analyzed by the minimum number of meat cuts (MNBC), the enlisted men appeared to have consumed a greater diversity of food species than the officers or noncommissioned officers and laundresses, but with a moderate reliance on beef. The officers’ diet primarily consisted of beef, whereas the noncommissioned officers and laundresses relied most heavily on mutton/lamb. However, when analyzed by the amounts of available meats represented by the butchery cuts, there is no significant difference between the quality of meat consumed by the officers, enlisted men, and noncommissioned officers and laundresses. Preferred cuts comprised roughly half of the diet for all three groups. These results are contrary to expectations that the commissioned officers consumed higher amounts of preferential meats in their diet than the lower ranked enlisted or noncommissioned officers and laundresses.

To more accurately address the relationship between mid-19th century household consumption and socioeconomic status at Fort Vancouver, I evaluated the proportions of available meat and their distribution to examine intrasite patterns. The underlying assumption is differential status, social and/or economic, will be reflected in differential access to food resources (Branster 1987; Crabtree 1990), and therefore consumption patterns. To develop a series of culturally relevant meat cuts (as they have slightly changed over the last 150 years), I reviewed nine mid-19th century civilian cookbooks (Abell 1852; Beecher 1871; Bliss 1850; Hall
Lee and Leslie 1832; Lyman and Lyman 1869; Philip 1859; Webster and Parkes 1845; Storke 1859) and a late-19th century American Army manual (USWD, SD 1896) that contained detailed visual depictions of complete animals, from which I could assign skeletal elements to identified meat cuts. Although additional military manuals on cooking were consulted (Butterfield 1862; Horsford 1864; Krautz 1865), these did not contain visual depictions of meat cuts. Following Lyman (1987b), I used the minimum number of identified butchery cuts for analytical units, as these not only reflect how domestics were processed for consumption, but also status distinctions at military sites (see Losey 1973; Jolley 1983). I weighted preferential ranking of the meat cuts by the amount of usable weight each cut represents, as determined by the U. S. Army in the late-19th century and Lyman (1977). From these, I calculated measures of species richness, evenness, and abundance to compare the diversity of butchery cuts across the three occupations.

A wide range of beef cuts, including cheek, sticking piece (neck), fore/middle/chuck ribs, brisket, rump, sirloin, aitch bone, mouse buttock, buttock, leg, shoulder/clod, and shin were consumed by the officers and enlisted men, while bone specimens associated with the mouse buttock, buttock, aitch bone, brisket, and cheek were not recovered from the noncommissioned officers and laundresses deposits.

As noted above, my analysis of faunal remains from the commissioned officers’ residential area indicated that although several species were present, the officers primarily consumed beef. The non-commissioned officers and laundresses ate a wider range of meats than the commissioned officers, and relied most heavily on mutton/lamb. The diets of the enlisted men and noncommissioned officers and laundresses were relatively similar, with remnants of pork and mutton cuts deposited in greater quantities than beef. Pork cuts consumed by the
enlisted men and noncommissioned officers and laundresses consisted of the hand (haunch), head, and feet; the latter two are often used in flavoring soups and stews. Mutton leg and shoulder cuts were present, as well as elements typically identified as secondary trimming waste (phalanges and teeth). Officers consumed less pork and mutton cuts. Contrary to expectations, the enlisted men exploited the widest range of species for food, but with a moderate reliance on beef. This diversity results from the presence of three fish species, likely acquired through opportunistic fishing. Contrary to expectations that the lowest ranked military personnel, the enlisted men, would have consumed primarily the least desirable cuts, I found that for all three occupations, the greatest proportion of the diet consisted of highly preferred cuts, mostly beef. There was no significant difference in the ages of animals selected for procurement and slaughter, based on the harvest profiles I generated for the larger domesticates.

I calculated a fragmentation intensity index (F) to assess the level of fragmentation of the bones, particularly those from cattle, pigs, and sheep. I found that skeletal elements from larger domesticates underwent significant fragmentation, primarily related to marrow extraction. Following my expectations, I determined that the highest rates of bone fragmentation were amongst faunal materials recovered from the enlisted men’s complex, likely related to processing bones to extract marrow and collagen for increasing nutrition and flavor enhancement in soup and broth. Through examining the distribution of spiral fractures, I determined that bones were not broken while fresh, but sawn or cleaved instead to extract marrow, consistent with instructions given in the military manuals.

Americans preferred beef over other meats for consumption in the 19th century, and U.S. Army soldiers and officers were no exception. For example, the U.S. Army bugle call for dinner (the midday meal), was entitled ‘Roast Beef’ (Butterfield 1862:57). The quality of the beef,
however, was not considered to be of high quality in the opinion of the Post Surgeon (Carley 1982:277). In the 1850s, the U.S. Army had difficulties in storing fresh meat because it easily spoiled from the Pacific Northwest dampness and mold. In 1851, the U.S. Army Council of Administration noted that 151¼ lbs. of fresh beef, 1 barrel of pork, and 230 lbs. of bacon were damaged. Meat spoilage decreased throughout the 19th century, becoming infrequent in the 1890s, and quality improved according to the Post Surgeon (Carley 1982: 277). Beef remained popular throughout this period among the soldiers.

I expected that the harvest profile would reflect a consumer economy, consisting of primarily market-age animals and little breeding stock, or animals of reproductive age (Crabtree 1990:162). Therefore, cattle, pigs, and sheep should have been slaughtered at ages that maximized their growth potential at Fort Vancouver. Surprisingly, cattle were slaughtered for consumption by the military in the mid-19th century at ages well after reaching market-weight. Cattle reach market age between 18 and 36 months (Landon 1996:114; Lyman 1977:71; Mudar 1978), when they maximize their growth to meat yield, i.e. raising cattle beyond three years will not increase the amount of meat the animal will provide at slaughter. In 1896, the Army dictated that “Beef from bulls, stags, or diseased cattle shall not be delivered” (USWD, SD 1896:25). Therefore, unworked uncastrated males or males castrated after reaching sexual maturity, both considered lower grades of meat than heifers or cows, were undesirable and the beef remains recovered are likely either heifers, cows (both female) or steers (males castrated before reaching sexual maturity). Early-20th century Army manuals (Eakins 1924:118) consider the best quality meat to be from cattle slaughtered between 18 and 36 months (1.5 to 3 years). Younger animals (<18 months) were though to contain less nutrition in their meat (Harvard 1905:318). Meat obtained from animals over three years old was considered “coarser, fibrous, dark colored; and
of lower quality” (Eakins 1924:118). The mortality profile for bovines consumed at the commissioned officers’ table indicates that 50% of the animals were slaughtered between two and three years, when the meat was considered of the best quality (Table 10).

Generally, the Army considered meat from lambs and yearlings “more desirable because of palatability, quality, and relative small size of cuts” (Eakins 1924:181) whereas “older mutton carcasses [were] not desirable” for consumption (Eakins 1924:180). Typically, 75% of ovines are sold as lambs (9 to 15 months old), another 20% as yearlings (sometimes sold as lambs), while only 5% were consumed as mutton (Eakins 1924:170-171). In the mid-19th century, “mutton was rather poor in quality and entered consumption only to a minor degree; in the West it was seldom to be found” (Martin 1942:48).

The older ages for the large domesticates is more reflective of a producing economy than a consuming economy, but with a lack of neonates (cf. Crabtree 19909:162). These data indicate the Army procured live animals for consumption from local ranchers, who managed their livestock to produce secondary products (see Sherratt 1981) as well as for meat, such as the production of milk, butter, and wool. Given the cattle harvest profile, the most probable scenario is that a small number of cows were possibly kept for milking while the majority of animals were obtained and slaughtered for food production. Although at most western posts milk was a rare commodity (Eales 1996:64), at Fort Vancouver milk was produced onsite by the Hudson’s Bay Company prior to the arrival of the Army (see Hussey 1957, 1976). After the departure of the HBC cattle herds, milk was locally available for purchase (Sinclair 2004:94). However, as it was an expensive item, it is probable that local settlers and ranchers kept a few cows for milk before selling them to the quartermaster department.
Being less desirable, these older animals could be acquired for less money (Henn 1985), thereby being cost-efficient for the quartermaster department to procure (see Huelsbeck 1989), particularly as the bulk of consumers, the enlisted, could not dictate the quality of the ration meat. However, officers were required to purchase their own food, although it could be procured at cost from the quartermaster department. The cattle harvest profile for the officers’ table suggests that this group not only had access to finer quality meat, but chose to consume those cuts even if lower quality, and likely cheaper, beef was available. Alternatively, their commissioned rank may have garnered them additional privileges with other members of the officers corps stationed at the Fort Vancouver quartermaster depot, and they may have purchased their meat at the same cost as that served to the enlisted men.

The proportion of foods supplementing the diet, identified as fowl and fish, is relatively consistent across the three occupations, with fish comprising a higher proportion than fowl of the diet for the enlisted men. Among fowl, the greatest variety of skeletal elements were identified as domestic chicken, not surprising as these animals were typically acquired as whole individuals. Domestic chickens were recovered from the officers and noncommissioned officers and laundresses’ residential areas. As chicken and eggs were considered luxury items (Carley et al. 1982: 277) it is unsurprising that they were found in refuse associated with a high-ranking military officer (Jabine 1984:841), supporting historically documented military rank-based dietary differences. The partial remains of one Phasianinae fowl was recovered from the enlisted men’s complex, but it is unclear whether these are from a domestic chicken or wild pheasant. In the 19th century, eggs from “granivorous fowls,” particularly those from common hens, were considered superior to waterfowl eggs (ducks, geese, etc.) as the latter were considered too strong for sensitive stomachs (Philip 1859:400). Chickens were raised onsite at Fort Vancouver
and their eggs were considered “dear” or luxury items by mid-19th century military personnel (Medical History [Fort Vancouver], Vol. I 1869-1873:74 in Carley 1982:277). Although rare at many military posts (Earle 1996:26,66), eggs were locally available at Fort Vancouver for purchase, either from the Hudson’s Bay Company or local merchants, although these items were expensive. Unlike the officers, for whom food was also a matter of style, the enlisted men often pooled their financial resources to increase their buying power (Adams 2009:109), and the presence of eggshell may reflect these purchasing practices, trade, or opportunistic foraging.

Ducks were frequently hunted by officers and enlisted men along the floodplain at Fort Vancouver (Carey 1931:104; Oregonian 1854). At least two ducks were consumed by the officers, one duck by the enlisted men, and one goose by the noncommissioned officers and laundresses at the Ordnance Depot. At least four fish species are represented in the officers and enlisted men’s refuse as well; the officers consumed at least one salmonid, while the enlisted men ate at least one largescale sucker, one peamouth, and one Northern pikeminnow (Table 7). All were likely obtained through successful opportunistic fishing near the post as all identified species were available in or along the Columbia River. Hunting wild game was a favorite pastime of both the officers and the enlisted men, when permitted. Although these species do not represent a large portion of the diet, their presence reflects the variety of foods consumed at the post.

Oysters and clams were both inexpensive food items commonly consumed globally throughout the 1800s, by both the elite and working-class peoples (see Kurlansky 2006; Martin 1942; Stavely and Fitzgerald 2008:88-90; Williams 2006:28-29). At Fort Vancouver, the post sutler sold canned oysters (Gleason and Cheung 2007), but the oyster shell fragments indicate that local merchants, if not at the sutler store itself, also sold fresh shellfish for consumption.
Along the Washington coastline, fresh oysters were gathered in great quantities to ship to San Francisco and other places (Nims and Mckean 1996:55). The few shell fragments recovered likely underrepresent their consumption at the garrison, and previous analyses of Fort Vancouver faunal materials do not address shellfish beyond NISP (see Henry 1982; Jabine 1984; Thomas and Hibbs 1984) and/or and simple taxonomic identifications (see Carley 1982; Horton 2010). Therefore, based on data obtained to date, the proportion of shellfish within the military diet cannot be accurately determined, but documentary and archaeological data indicate they were consumed by all socioeconomic classes.

Rather than directly reflecting varying levels of dietary importance, other factors, such as carcass processing, marrow extraction, and refuse disposal are likely influencing the deposition, archaeological retrieval, and subsequent identification of large domesticate bones. As a result, the amounts of beef, pork and mutton are severely underrepresented in this collection given their documented presence at Fort Vancouver. This is because salted pork (which leaves no trace archaeologically other than its container), rather than fresh pork, formed a large portion of the mid-19th century military diet (see Horsford 1864).

Officers were expected to serve sumptuous meals to express their adherence to the dominant military socioeconomic system following Victorian tenets of gentility, requiring officers to present themselves as members the aristocratic or upper class. Foods, as objects consumed daily, could non-verbally visually communicate this membership that they were proper Victorian gentlemen. At Fort Vancouver, officers occupying the westernmost quarters on the Officers’ Row engaged in these behaviors evidenced by their reflection in my identification and analysis of species consumed. Meals were events where commissioned officers consumed luxury foods and focused on table presentation to express and reinforce their position as the elite
military class in manner similar in dining etiquette to the “gentle” class of wider American society. These behaviors were particularly important for an officer to engage in because public perceptions of his ‘worthiness’ for commission deeply affected a man’s military career and his ability to rise through the ranks. However, because goods were incredibly expensive in the Pacific Northwest, furnishing a table lavish with plentiful and/or exotic foods could be difficult for the lowly-ranked commissioned officer, such as the lieutenants living in the westernmost officers’ quarters on the Officers Row. Therefore, the army allowed officers to draw subsistence food stores at cost, and it is assumed here that faunal remains of large domesticates (e.g. cattle, pigs, and sheep) were obtained by commissioned officers at the Quartermaster Depot to reduce financial expenditures.

In comparison, the enlisted men were limited in their consumption behavior, not only from their pay rates, but also from the military food distribution structure, as organized and reinforced by the commissioned officers. The diet for enlisted men and laundresses in the west was primarily the daily ration, supplemented by the Company vegetable garden, wild game and consumer purchases from the post sutler (see Chapter Four). Unlike the commissioned officers, the entire Company of enlisted men ate meals together that were prepared in the Company kitchens. Additional items sold by the post sutler, other local merchants, or small family businesses (e.g. selling products produced by their livestock, such as milk, butter, domestic fowl and eggs) were often extremely expensive at Fort Vancouver. Their cost limited the purchasing power of enlisted men, laundresses, and likely as well as lower ranked commissioned officers at Fort Vancouver.

To supplement their diets, commissioned officers were able to pursue hunting when free from duties, whereas the non-commissioned officers and enlisted men were required to obtain
permission to hunt by their superiors. If they desired, officers could attempt to directly influence the enlisted man’s access to a wider variety of meats. At Fort Vancouver, foraging practices reflected in animal bone distribution patterns in the enlisted men’s residential area resulted in the recovery of a wider variety of foods eaten by the enlisted men than the officers’ or the non-commissioned officers and laundresses’ households. The remains of three small fish species (assumed to be ~2 lbs. each for analysis) contributed to these numbers, weighting the diversity results. However, the diversity of foods consumed is also likely partially the result of the differential number of occupants in the military structures, as over twenty times more individuals used the enlisted men’s kitchen facilities (n = 84+, see above) than received their meals from the officers’ kitchens (n = 4, plus possible laundresses temporarily living in the kitchens in the 1860s). Faunal remains recovered from the noncommissioned officers and laundresses’ occupations had the least amount of variety, and the greatest number of mutton cuts identified. This is probably the result of several factors, including financial constraints, fewer occupants, and that Army wives and laundresses did not typically hunt while stationed at the garrison although they could procure additional foods through purchase or trade. Therefore, unlike the officers, for whom food was also a matter of style, the enlisted men gathered wild foods as a matter of necessity, to supplement their monotonous and often nutrient deficient diet (Adams 2009:115). Documentary data indicate although the enlisted men pooled their funds to obtain additional communal foods, thereby increasing their purchasing power; the majority of their purchases were related to leisure activities (Adams 2009:129). These differences directly and overtly reinforced the social hierarchy and power relations between the officers and enlisted men at the level of meeting basic human needs for survival.
Clothing or Individual Level of Space

An individual’s appearance, whether a commissioned officer, enlisted man, or civilian employee, was of great importance to the army, and alterations to the prescribed uniform were not tolerated (USWD 1847:31). The most readily obvious public expression of an individual’s position within the military hierarchy is the highly regulated uniform. Examining military uniforms and equipage for economic considerations is difficult, as commissioned officers and laundresses were required to purchase their own items, whereas clothing for non-commissioned officers and enlisted was issued as part of the regulation uniform (Langellier 1998:33). Therefore, this discussion is limited to examining these items for their communication of social position within the military hierarchy and potential local procurement sources. All of these items reflect primary refuse, likely accidental loss. Personal pastime items were not considered in the analysis as none were definitively assigned to a specific gender.

These small seemingly trivial objects, such as uniform, clothing, and personal items can take on important symbolic meaning, as clothing was the most public display of gender in the mid-19th century (Blanton and Cook 2002:48). Military dress visually communicated the position of the individual within the military hierarchy, both within the chain of command and by extension their social position within the community. Civilian dress reinforced these differences; enlisted men were “not permitted to keep in their possession any other clothing” whereas officers were allowed to be out of uniform when not at “their stations” (USWD 1847:31).

Using the dominant Victorian paradigm to interpret gender affiliation, I determined that of all the objects analyzed during this study, the military insignia, button devices, personal adornment items (e.g. hair pieces, beads, jewelry), and pocket tools (e.g. watches, penknives) are the only ones distinctly associated with Victorian gender. Although women are known to have
served in the military during the Civil War (see Blanton and Cook 2002; Hall 1993, 2006), they enlisted posing as men, thereby assuming the masculine gender, and all of its expectations, including clothing and accoutrements. Few other items discussed here can be a priori assigned to reflect either masculine or feminine gender in the military community, as many were used by both men and women.

I analyzed the distribution patterns of these personal items to ascertain whether gender-specific artifact distributions corresponded to officers’, noncommissioned officers and laundresses’, and enlisted men’s residential spaces. I expected that artifacts linked to a particular gender, men or women, would be recovered in greater quantities in households typically quartered along gender lines. My results supported my expectations for the enlisted men’s occupation, in that the majority of gender-affiliated objects were identified as masculine. In the noncommissioned officers and laundresses’ residential areas, more artifacts reflecting masculine personal items were collected than feminine objects. I anticipated the opposite, because by 1870 most of the laundresses’ quarters were occupied only by women and their children, even if their husband was garrisoned onsite (in the enlisted barrack). In archaeological deposits excavated on the Officers Row the recovery of masculine and feminine items was almost equivalent but feminine items were collected in slightly, but not significantly, greater quantities. This slightly higher proportion of feminine items strongly suggests that women were living or working within structures in the westernmost officer’s residential area, either as officers’ wives, servants, or laundresses quartered temporarily in the kitchens, contradicting the 1860s federal census data.

There was a discernable lack of larger gender-affiliated objects within the analyzed collection, such as boot spurs and clothes washing equipment and supplies. Starbuck (1994) in his review of late-18th and early-19th century military posts in eastern New York and western
New England, found that although women are mentioned in historic documents, they are often underrepresented in the archaeological record as many of the materials used in their activities are similar or the same as those used by the men. I suggest instead at Fort Vancouver, object curation practices pursued by military personnel impacted the potential deposition in the archaeological record near the residential structures. Wage limitations, including those of the junior commissioned officers that were often lower than civilian wages, likely limited procuring large numbers of gender-based objects. The most commonly recovered gender-related objects were items that could be replaced locally, either through the quartermaster department (military buttons and military equipment hardware such as buckles, hooks, etc.) and from local merchants (other button styles, hobnails, etc.). In addition, with the exception of small beads (as these are hard to find when dropped in grass or a privy vault) the few non-work related feminine items a woman managed to maintain were probably carefully curated in this overwhelmingly masculine-oriented community. The recovery of similar children’s items from the officers, laundresses, and enlisted men’s residential areas, such as toy teaware and doll figurines, suggests that children at Fort Vancouver may not have recognized and followed the social segregation which constrained their parents (see Stallard 1978:92). Larger items to be discarded were likely collected by daily policing and refuse gathering parties, to be transported to designated disposal areas for burning or burial.
Concluding Remarks

Archaeological investigations at the Vancouver National Historic Reserve encountered generally intact deposits that provide data on the structure of the landscape of the early U.S. Army occupation, including building locations, and artifacts recovered are representative of the diversity of status and gender roles present at 19th century Fort Vancouver. These deposits contained a variety of objects that I analyzed to address important research questions of the use of space, human diet, and personal identity at the post.

Using the methodology of analyzing the dominant cultural messages transmitted through multiple levels of culturally created spaces simultaneously, I was able to determine that similar messages were transmitted and enforced at Fort Vancouver and the Vancouver Ordnance Depot, in southwest Washington, that created and reinforced the dominant ideology. I examined how social and economic divisions between personnel were strengthened and replicated simultaneously within three levels: 1) in the built environment by the spatial segregation of individuals, 2) through household food allotments and 3) the direct and indirect impacts of military regulations on individuals acquiring and publically using personal items. At each level, an individuals’s position within the military social hierarchy, as defined by military rank and economic class, was revealed and reinforced daily through adhering to formalized social behaviors. Acting as metaphors, objects, such as buildings, foods, and artifacts determined to have a personal and/or military functional use (e.g. insignia, clothing, personal military equipment, and personal adornment), facilitated this process through non-verbal distribution of symbolically encoded information that simultaneously embodied and transmitted military cultural values.
Personnel did intentionally avoid or reject various military regulations and expected social behaviors, evidenced by the need for a guard house (jail) onsite used to punish lawbreakers. No evidence of resistance to the military system was present in the objects I analyzed for this research, excepting potentially the presence of chicken remains within the enlisted men’s complex. As noted above, enlisted men were encouraged to forage for wild foods, but these did not include domestic animals kept by local individuals and/or families, such as chickens and pigs. The very use of the term “slow bear” by the enlisted men to refer to domestic pigs stolen from non-military farms reflected the illicitness of this behavior within the military culture. However, enlisted men also pooled their personal funds to increase their purchasing power, particularly when buying supplemental foodstuffs, and may have instead purchased chickens for consumption. If so, the pooling of funds was sanctioned by the military elite and the chicken remains may instead reflect not resistance to but negotiation within the military system to achieve non-military goals held by personnel, i.e. the desire to obtain more food to eat.

**Directions for Future Research**

Nowhere is the segregation between the officers and enlisted men more apparent than in the built environment (examined as part of this dissertation) and at the dinner table. The class and social segregation between the officers and enlisted men was reinforced daily at each meal service, as each group consumed similar foods, but in divergent dining settings. Although faunal materials were examined as part of my research, differential distribution of tablewares can also provide insight into the use of durable goods to create culturally meaningful spaces to military personnel. Goods were selected by commissioned officers to not only emphasize the distance
from the working-class enlisted men, but to deemphasize the physical and social distance between officers and the gentrified elite on the east coast, not only through consuming luxury foods, but by also focusing on dining etiquette and table presentation. Unlike many western military posts, goods were readily available at Fort Vancouver, either issued through Army supply lines or local suppliers, such as the post sutler or from local mercantile operations, such as the one onsite operated by the Hudson’s Bay Company in the 1850s.

Preliminary exploratory analysis of the distribution of ceramic wares among the officers, enlisted, and laundresses’s residential areas indicates that analysis of these items will be a fruitful line of inquiry (Horton 2013b). Different consumption locations appear to also metaphorically reflect either the domestic association with and/or the subordinate place of groups defined by class and gender within the Victorian perspective, particularly on a military post.

Over 80% of ceramics recovered during excavations in the enlisted men’s and laundresses areas were undecorated white ironstone, issued by the Quartermaster for Company use. Mugs, bowls, plates, and serving dishes were identified, all used to prepare and serve food. Several vessels were Gothic-molded styles, dating between 1849 and the 1900s (see Appendix F for identified decorative Gothic patterns). In the Victorian cultural mindset, these wares were commonly associated with homesteaders, farmers and working-class peoples, as ironstone was inexpensive to purchase, could be packed easily, and tough enough to survive trail transportation (Wetherbee 1996). Additional vessels recovered consisted of mochaware mugs, hand-painted earthenwares and European soft-paste porcelains decorated with polychrome floral patterns, stoneware bottles, and Chinese porcelain ginger jars. All were purchased at the Hudson’s Bay Company mercantile operations onsite, likely not by individuals, but with Company funds as
these items were all utilitarian wares, used for food preparation and storage in the kitchens, choices made by the Company commander, not the enlisted men.

The paucity of fancy table wares in the enlisted men’s contexts is likely a result of several factors; 2) financial constraints limited the purchasing power of the enlisted, thereby prohibiting obtaining these wares, 3) the perceived value of procured items led to their careful curation, thereby limiting their presence in archaeological contexts, or 4) the enlisted actively segregated themselves from the officers through resisting such ostentatious purchases, and focused their purchasing efforts on other items. As discussed in Chapter Four, many officers did not own complete dining services given their expense and the ever-present potential for a reassignment in their duty station. They often accumulated many pieces of ornamental tablewares through trade or sale when new duty appointments necessitated moving their entire household with all its goods, within prescribed baggage allowances. The army allowed officers to purchase goods and foods at cost to help defray their living expenses, but military supplies did not include luxury foods or expensive ceramic tablewares.

Unlike at many western military posts, fancy ceramic wares were locally available for purchase, from the post sutler or local merchants, such as the Hudson’s Bay Company, once the largest mercantile operation in the Pacific Northwest, and still in operation during the 1850s. Although lower-ranked officers rarely earned more than local civilians, archaeological data indicate they chose to purchase and use primarily expensive tablewares to grace their tables while dining, such as transferprinted earthenware teacups, plates, and serving vessels, and Chinese export Oxblood stoneware bowls, from the Hudson’s Bay Company and/or other merchants.
Although both the enlisted men and officers utilized Chinese export wares, hand-painted earthenwares, and European soft-paste porcelains, I suggest these items were not necessarily used for similar cultural expressions. For example, the Cantonware ginger jars used by the enlisted men were purchased by the Company commanders for kitchen use, whereas the Officers purchased Chinese Oxblood-glazed stoneware bowls, a very thin and easily breakable ware, segregating themselves from the enlisted men. An example of this intentional distancing can be

Figure 101. Mid-19th century people transferprint pitcher and washbasin (refitted), with hand painted yellow, salmon, and mulberry overglaze, recovered from the privy vault (Feature 810) on Officers Row.
seen with a pitcher and washbasin set, recovered in 2008 from a privy on Officers Row (Figure 101). The purple transferprinted design was printed onto the ceramic, then hand-painting with red, yellow, and peach was added sometime after the piece was fired. The brightly colored, floral motif stood as a contrast to the plain white or Gothic-molded dishes supplied by the Quartermaster for use by enlisted men. Officers strove to portray a higher social position, similar to the Victorian civilian gentlemen class, as it was advantageous for career advancement.

Ceramic tablewares recovered from the laundresses,’ or married enlisted quarters, consisted of primarily stoneware crocks, ironstone cups, mugs and plates, all used for storing, preparing, serving, and consuming foods. However, additional pieces included hand-earthenware tea cups decorated with polychrome floral patterns, transferprinted soup tureens, and European soft-paste porcelain hollowwares, including one candlestick holder. These items were likely purchased by individuals or families, as laundresses were allowed to transport their wash tubs, and selected personal items, on the Army wagons when moving to a new post. Therefore, the presence of finer wares in the laundresses’ quarters, including porcelain candlestick holders, may reflect the attempt of the NCOs to emulate the commissioned officers, thereby non-verbally expressing their affinity with the Commissioned Officers; their worthiness of also receiving a commission.

These exploratory analyses suggest differential use of these ceramic tablewares helped create, express and reinforce the physical and social distance between the officers and enlisted men which Army personnel actively worked to maintain. Cultural tenets of gentility and domesticity were intricately wound together with conspicuous consumption in the Pacific Northwest. Their use, with other goods, created formal, institutionalized setting(s) during meal
services that expressed, transmitted, and reinforced mid-19th century military values, group membership, and class segregation.

Resistance to the military system is most likely to be reflected within the differential distribution of vessel glass (e.g. bottles and tablewares; n = 11,347), specifically those originally containing alcohol. In the early-1850s, military personnel were allowed to consume alcoholic beverages at Fort Vancouver (Carey 1931; Van Arsdol 1999), but were soon prohibited. The recovery of alcohol bottles from “hidden” contexts, beneath building floors, within privies, can reflect intentionally hiding the discarded objects that are associated with prohibited behavior.

A fuller investigation of other artifact classes as utilized by personnel at Fort Vancouver will provide opportunities to develop a greater understanding of how multiple items operate simultaneously within a single level of cultural space. My results can be compared with examinations of space conducted on smaller posts throughout the Pacific Northwest, particularly satellite posts supplied through the Quartermaster Department at Fort Vancouver. The same object may have embodied different cultural messages within different contexts, such as at a small frontier post, farmhouse, or fur trading communities, such as within traditional native households or those that operated by the Hudson’s Bay Company at Fort Vancouver. In addition, comparisons with interhousehold distributions of similar, if not identical, artifacts recovered from household contexts at Fort Vancouver associated with the earlier Hudson’s Bay Company occupation (cf. Cromwell 2006; Holschuh 2013) will provide a fuller historical context for Fort Vancouver, as well as increasing our knowledge of the interactions between mercantile and military personnel.
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Phillips, William M. (Complier)

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<th>Year</th>
<th>Title</th>
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Storm, J. M  


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Suttles, Wayne  

Sutton, Mark Q.  

Thien, Steve J.  

Thomas, Bryn  


Thomas, Bryn

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Thompson, Ernest E.

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Tice, Warren K.

Tilly, Christopher

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Troup, Charles

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United States Department of Agriculture, Natural Resources Conservation Service (USDA NRCS)
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NOTES

1 The Mounted Riflemen were later designated the 3rd Cavalry in 1861 (Morton 1894:1303).

2 The General Orders of the United States War Department, Adjutant General’s Office issued between 1809 and 1860 are indexed in Allen (1886), those issued between 1861 and 1880 in USWD, AGO (1913), and those issued between 1881 and 1911 in USWD, AGO (1912).

3 Major Theodore J. Eckerson (then 1st Sergeant) began serving at Fort Vancouver with arrival of the first troops on the U.S.S. Massachusetts in May 1849 (Shine 2008:218).

4 Redesignated the 23rd Infantry on 21 September 1866 (25th Infantry Division Association 2012).

5 In 1869, the Band was living in the 1849 barrack south of the parade ground (USWD 1869b).

6 Brigadier General Barns eventually became the 12th Surgeon General of the United States in 1864, later attending the death bed of President Abraham Lincoln, and overseeing the subsequent autopsy.

7 The Cavalry was established by Congress in 1855, and in 1861 all of the Mounted Riflemen and Dragoons units were converted to the newly formed 3rd Calvary (Emerson 1996:133; Morton 1894).

8 These inventories were compiled to create an archaeological classification system by Ross (1976). Many objects identified in these schemes were also archaeologically recovered from mid-19th century Army deposits in 1988, 2001, 2007 and 2008.
The contour map generated with Surfer 8.1 for the 2001 magnetometer survey on the parade ground was created by Doug Wilson in 2001, on digital file at the FVNHS, NPS, Vancouver, WA.

Unfortunately, the wrong project map was included in the report on file with the NPS (c.f. Thomas 1988). Relocation information presented here is based on modern utility plans (City of Vancouver 1987) and photographic images (color slides) taken during fieldwork (field paperwork is not available), currently housed in the Museum Collection at Fort Vancouver National Historic Site (FVNHS), National Park Service (NPS), Vancouver, WA (Accession No. FOVA 3043). No additional information is available at this time.

nT = nanotesla, a unit of measure used to record magnetic signatures.

Figure 14B in Peterson et al. (2011:288) depicts the south wall profile of PG 43, excavated during the 2008 fieldwork undertaken as part of this study.

These were originally identified during fieldwork in 2007 and recorded as Features 705 and 711.

The flood of 1853 is best known for destroying a potato crop planted by Brevet Capt. Ulysses S. Grant and Lt. Henry D. Wallen, both then attached to the 4th Infantry (Grant 1885:162).
APPENDIX A.

SITE TRINOMIAL AND PROVENIENCE DATA

Historic Properties and Archaeological Sites Investigated

DT191  Vancouver National Historic Reserve National Historic District
45CL163H  Fort Vancouver National Historic Site
45CL160H  Officers Row

Township/Range:

Vancouver National Historic Reserve Historic District (DT191)
Laundresses’ Quarters, East Reserve St.
SW¼ of NE¼ of NE¼ of SW¼, Section 26, Township 1 North Range 1 East
Willamette Meridian

Officers’ Quarters, Officers Row
E½ of SE¼ of SE¼ of NE¼, Section 27, Township 1 North Range 1 East
Willamette Meridian

Fort Vancouver National Historic Site (FVNHS)
Enlisted Men’s Barracks Complex and Laundresses’ Quarters
N½ of NE¼ of NE¼ of SE¼, Section 27, Township 1 North Range 1 East
Willamette Meridian

Permanent Curation Location (archived documents and artifact materials):
Museum Collection at Fort Vancouver National Historic Site, Vancouver, Washington.

Table 28. Accession numbers for collections analyzed.

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<th>Accession No.</th>
<th>Fieldwork Year</th>
<th>Project Description</th>
<th>Previous Report</th>
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<td>3070</td>
<td>2007</td>
<td>Test excavations, Public Archaeology Field School.</td>
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<tr>
<td>3080</td>
<td>2008</td>
<td>Test excavations, Public Archaeology Field School.</td>
<td>This document.</td>
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Figure 102. Topographic location of the Vancouver National Historic Reserve Historic District (DT191; USGS 1977, 1978).
Table 29. Changes in magnetic declination at Fort Vancouver for selected years between 1850 and 2013 (NGRC 2013).

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<th>Date</th>
<th>Magnetic declination (Estimated)</th>
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<td>20° 3.0’ E</td>
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<tr>
<td>1860</td>
<td>20° 36.0’ E</td>
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<tr>
<td>1870</td>
<td>21° 4.0’ E</td>
</tr>
<tr>
<td>1880</td>
<td>21° 15.0’ E</td>
</tr>
<tr>
<td>1890</td>
<td>21° 27.0’ E</td>
</tr>
<tr>
<td>2007</td>
<td>16° 45.0’ E</td>
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<tr>
<td>2008</td>
<td>16° 55.0’ E</td>
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<tr>
<td>2013</td>
<td>15° 58.0’ E</td>
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Table 30. Excavation grid coordinates for grid datums and junction markers (wood hubs).

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<th>Location</th>
<th>Northing (m)</th>
<th>Easting (m)</th>
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<td>Parade Ground (southwest corner)</td>
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<td>100</td>
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<td>Parade Ground</td>
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<td>Hub 2</td>
<td>Parade Ground</td>
<td>100</td>
<td>180</td>
</tr>
<tr>
<td>Hub 3</td>
<td>Parade Ground</td>
<td>140</td>
<td>140</td>
</tr>
<tr>
<td>Site Datum / Hub 4</td>
<td>Parade Ground</td>
<td>140</td>
<td>180</td>
</tr>
<tr>
<td>Hub 5</td>
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<tr>
<td>Hub 6</td>
<td>Parade Ground</td>
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</tr>
<tr>
<td>Hub 7</td>
<td>Officers Row</td>
<td>250</td>
<td>180</td>
</tr>
<tr>
<td>Hub 8</td>
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<td>Officers Row</td>
<td>290</td>
<td>220</td>
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Table 31. Excavation grid coordinates for southwest corners of non-penetrating subsurface surveys (magnetometer and ground-penetrating radar) referenced in this document.

<table>
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<th>Month/Year</th>
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<th>Survey Area</th>
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<th>Northing (m)</th>
<th>Easting (m)</th>
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<td>Unit 2</td>
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<td>Grid 3</td>
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\(^1\) = Magnetic survey location data adapted from McDonald (2001a, 2001b, 2007).
\(^2\) = The main axis orientation of Grid 2 was offset from the excavation grid by 9° west.
Table 32. Provenience data and analytical unit assignments for 2007 and 2008 excavations.

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<th>Unit</th>
<th>Excavation Block</th>
<th>Household Analytical Unit</th>
<th>Size (m) N/S x E/W</th>
<th>Northing(^6) (m)</th>
<th>Easting(^6) (m)</th>
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<td>Easting (m)</td>
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<td>PG47</td>
<td>P</td>
<td>Enlisted Kitchen</td>
<td>1 x 1</td>
<td>121</td>
<td>150</td>
</tr>
<tr>
<td>PG48</td>
<td>P</td>
<td>Enlisted Kitchen</td>
<td>1 x 1</td>
<td>121</td>
<td>151</td>
</tr>
<tr>
<td>PG49</td>
<td>P</td>
<td>Enlisted Kitchen</td>
<td>1 x 1</td>
<td>121</td>
<td>152</td>
</tr>
<tr>
<td>PG50</td>
<td>N</td>
<td>Enlisted Kitchen</td>
<td>1 x 1</td>
<td>117</td>
<td>148</td>
</tr>
<tr>
<td>PG51</td>
<td>N</td>
<td>Enlisted Kitchen</td>
<td>1 x 1</td>
<td>118</td>
<td>148</td>
</tr>
<tr>
<td>PG52</td>
<td>M</td>
<td>Enlisted Kitchen</td>
<td>1 x 1</td>
<td>116</td>
<td>158</td>
</tr>
<tr>
<td>PG53</td>
<td>M</td>
<td>Enlisted Kitchen</td>
<td>1 x 1</td>
<td>116</td>
<td>159</td>
</tr>
<tr>
<td>PG54</td>
<td>D</td>
<td>NCO/Laundresses</td>
<td>1 x 1</td>
<td>113</td>
<td>126</td>
</tr>
<tr>
<td>PG55</td>
<td>D</td>
<td>NCO/Laundresses</td>
<td>1 x 1</td>
<td>114</td>
<td>126</td>
</tr>
<tr>
<td>PG56</td>
<td>H</td>
<td>Enlisted Kitchen</td>
<td>1 x 1</td>
<td>112</td>
<td>151</td>
</tr>
<tr>
<td>PG57</td>
<td>H</td>
<td>Enlisted Kitchen</td>
<td>1 x 1</td>
<td>112</td>
<td>150</td>
</tr>
<tr>
<td>PG58</td>
<td>G</td>
<td>Enlisted Kitchen</td>
<td>1 x 1</td>
<td>107</td>
<td>149</td>
</tr>
<tr>
<td>PG59</td>
<td>G</td>
<td>Enlisted Kitchen</td>
<td>1 x 1</td>
<td>107</td>
<td>150</td>
</tr>
<tr>
<td>PG60</td>
<td>H</td>
<td>Enlisted Kitchen</td>
<td>1 x 1</td>
<td>114</td>
<td>151</td>
</tr>
</tbody>
</table>

1 = OR refers to Officers Row, PG refers to Parade Ground; 2 = ORST01 to OR21 and PG01 to PG35 were excavated in 2007, while ORST22 to OR42 and PG36 to PG60 were excavated in 2008; 3 = ORST05 to ORST07 were excavated east of Bldg. No. 8, and data obtained are not discussed in this document; 4 = Block nomenclature generally follows a northing and easting pattern; letters I, O, V and X were not used in Block nomenclature; 5 = "N/A" denotes unit artifacts not included in further analyses as they were excavated by structures not selected for analysis, if no structure is listed, then artifacts are determined to reflect general occupation; 6 = grid coordinates are given for southwest corners of excavation and shovel test (ST) units.
Table 33. Analytical unit assignments for archaeological investigations conducted in 1987 and 2001.

<table>
<thead>
<tr>
<th>Unit</th>
<th>2007-2008 Excavation Block</th>
<th>Household Analytical Unit</th>
<th>Size (m) N/S x E/W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Officers Row Trench</td>
<td>-</td>
<td>Officers Kitchen</td>
<td>2.1 x 0.3</td>
</tr>
<tr>
<td>East Reserve St. Trench</td>
<td>-</td>
<td>NCO/Laundresses</td>
<td>4 x 1</td>
</tr>
<tr>
<td>ST21</td>
<td>-</td>
<td>NCO/Laundresses</td>
<td>0.5 x 0.5</td>
</tr>
<tr>
<td>ST22</td>
<td>-</td>
<td>NCO/Laundresses</td>
<td>0.5 x 0.5</td>
</tr>
<tr>
<td>ST23</td>
<td>-</td>
<td>NCO/Laundresses</td>
<td>0.5 x 0.5</td>
</tr>
<tr>
<td>ST24</td>
<td>-</td>
<td>NCO/Laundresses</td>
<td>0.5 x 0.5</td>
</tr>
<tr>
<td>ST25</td>
<td>H</td>
<td>Enlisted Kitchen</td>
<td>0.5 x 0.5</td>
</tr>
<tr>
<td>ST26</td>
<td>-</td>
<td>Band Quarters</td>
<td>0.5 x 0.5</td>
</tr>
<tr>
<td>ST27</td>
<td>-</td>
<td>Enlisted Barrack</td>
<td>0.5 x 0.5</td>
</tr>
<tr>
<td>ST28</td>
<td>-</td>
<td>Enlisted Barrack</td>
<td>0.5 x 0.5</td>
</tr>
<tr>
<td>ST29</td>
<td>-</td>
<td>Enlisted Barrack</td>
<td>0.5 x 0.5</td>
</tr>
<tr>
<td>ST30</td>
<td>-</td>
<td>Enlisted Barrack</td>
<td>0.5 x 0.5</td>
</tr>
<tr>
<td>ST58</td>
<td>-</td>
<td>NCO/Laundresses</td>
<td>0.5 x 0.5</td>
</tr>
<tr>
<td>ST59</td>
<td>-</td>
<td>NCO/Laundresses</td>
<td>0.5 x 0.5</td>
</tr>
</tbody>
</table>

1 = “N/A” denotes unit artifacts not included in further analyses as they were excavated by structures not selected for analysis, if no structure is listed, then artifacts are determined to reflect general occupation.
Table 34. List of all features identified during the 2007 and 2008 excavations.

<table>
<thead>
<tr>
<th>No.</th>
<th>Unit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>702</td>
<td>PG05,06, 56,57</td>
<td>Enlisted kitchen; demolition debris, wood structural remnants (charred) with dense concentration of domestic and subsistence-related materials.</td>
</tr>
<tr>
<td>703</td>
<td>PG07,08, 17,18,60</td>
<td>Enlisted kitchen; wood foundation, planks for footing support and “underpinning” (exterior kickboard)</td>
</tr>
<tr>
<td>704</td>
<td>PG14</td>
<td>Naturally deposited cobble cluster.</td>
</tr>
<tr>
<td>705</td>
<td>PG02</td>
<td>Naturally deposited cobble cluster.</td>
</tr>
<tr>
<td>706</td>
<td>PG04</td>
<td>Unmapped building? Rectangular small shaft feature, post mold?</td>
</tr>
<tr>
<td>707</td>
<td>PG13</td>
<td>Krotovina.</td>
</tr>
<tr>
<td>708</td>
<td>PG17</td>
<td>Enlisted kitchen; round wood footing, rough-hewn tree trunk.</td>
</tr>
<tr>
<td>709</td>
<td>PG21,22</td>
<td>Charred boards/planks reflecting collapsed flooring and joists. Observed with fire-reddened soils.</td>
</tr>
<tr>
<td>709A</td>
<td>PG21</td>
<td>Enlisted kitchen; wood foundation/footing remnant.</td>
</tr>
<tr>
<td>710</td>
<td>PG27</td>
<td>Small refuse pit.</td>
</tr>
<tr>
<td>711</td>
<td>PG07</td>
<td>Naturally deposited cobble cluster.</td>
</tr>
<tr>
<td>712</td>
<td>PG27</td>
<td>Laundresses’ quarters; wood foundation, partially charred.</td>
</tr>
<tr>
<td>713</td>
<td>PG31</td>
<td>Enlisted kitchen; wood structural remnants, demolition debris, partially charred.</td>
</tr>
<tr>
<td>714</td>
<td>OR19</td>
<td>Officers’ kitchen; cellar hole infilled with demolition debris, including brick concentration (Feat. 714). First identified by Thomas (1988, “Feature 5”).</td>
</tr>
<tr>
<td>715</td>
<td>ORST15, OR16,17,21</td>
<td>Officers’ quarters; demolition debris.</td>
</tr>
<tr>
<td>717</td>
<td>PG07,08,17, 18,56,60</td>
<td>Enlisted kitchen; imported sand used for ground leveling around footings.</td>
</tr>
<tr>
<td>718</td>
<td>PG31</td>
<td>Small rectangular pit with concave base. Stratigraphy indicates early to late-20th century small culturally-sterile compacted clay feature. Possible golf course cup location.</td>
</tr>
<tr>
<td>801</td>
<td>PG36,37</td>
<td>Enlisted building complex; demolition area; nail reclamation activity area, fire-reddened soils.</td>
</tr>
<tr>
<td>802</td>
<td>PG40</td>
<td>Enlisted kitchen; demolition debris, likely brick footing remnants.</td>
</tr>
<tr>
<td>803</td>
<td>PG44</td>
<td>Enlisted/Band quarters; demolition debris, likely brick footing remnants.</td>
</tr>
<tr>
<td>804</td>
<td>PG40,41</td>
<td>Enlisted kitchen; postmold? infilled with demolition debris.</td>
</tr>
<tr>
<td>No.</td>
<td>Unit</td>
<td>Description</td>
</tr>
<tr>
<td>-------</td>
<td>----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>805</td>
<td>ORST22,29</td>
<td>Butchered animal bone concentrations.</td>
</tr>
<tr>
<td>805A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>806</td>
<td>PG47,48,49</td>
<td>Enlisted kitchen; wood foundation, plank for footing support? and “underpinning” (exterior kickboard).</td>
</tr>
<tr>
<td>806A</td>
<td>PG47</td>
<td>Enlisted kitchen; wood plank for footing support? Associated with 806.</td>
</tr>
<tr>
<td>807</td>
<td>PG52</td>
<td>Enlisted barrack; demolition debris overlying two wood footings.</td>
</tr>
<tr>
<td>807A</td>
<td>PG52</td>
<td>Enlisted barrack; round wood footing, rough-hewn tree trunk.</td>
</tr>
<tr>
<td>807B</td>
<td>PG52</td>
<td>Enlisted barrack; round wood footing, rough-hewn tree trunk.</td>
</tr>
<tr>
<td>809</td>
<td>PG58</td>
<td>Enlisted mess-house; wood foundation or “underpinning” (exterior kickboard), charred.</td>
</tr>
<tr>
<td>810</td>
<td>OR30,41,42</td>
<td>Officers privy.</td>
</tr>
<tr>
<td>811</td>
<td>OR30</td>
<td>Krotovina.</td>
</tr>
<tr>
<td>813</td>
<td>PG56</td>
<td>Post mold.</td>
</tr>
<tr>
<td>814</td>
<td>PG57</td>
<td>Post mold.</td>
</tr>
<tr>
<td>815</td>
<td>PG17,56</td>
<td>Enlisted kitchen; wood foundation, plank for footing support.</td>
</tr>
</tbody>
</table>

1 = Identified features were given a unique sequential field number with the first digit representing the calendar year (i.e. Feature 703 is the third identified in 2007, whereas 803 is the third observed in 2008).
Several Army maps referenced are presented below, with north always positioned at the top of the page. Below the detail of each map, a summary legend is included for buildings within the enlarged area described with a key. Structures selected for study are highlighted as follows;

August 1850   Map of the Government Reserve at Vancouver, Oregon (Stuart 1850a).
1850       Columbia Barracks, Oregon, Building Drawings (Bomford [1851b:1]).
1854       Columbia Barracks, Oregon Territory (Eckerson 1854).
February 1854  Map of the Government Reserve at Fort Vancouver, W.T. (Bonneville 1854).
1855       Topographic Sketch of Fort Vancouver and Environs, 1855 (USWD 1855b).
October 1855  Cascades to Vancouver. U.S. Military Road, From The Dalles to Columbia Barracks (Derby 1855).
1869       Plan of Post at Fort Vancouver W.T. (USWD 1869a).
1869       Proposed position of supplying the Post of Fort Vancouver with Hydrants and Fire Plugs (USWD 1869b).
1870       Fort Vancouver, Washington Territory (USWD, SGO 1870:420).
1870       Fort Vancouver, Washington Territory (USWD, SGO 1875:489).
[1867-1873]  Vancouver Arsenal, W. T. (USWD [1867-1873]).
July 1886      Plan of Present Water Supply at Vancouver Barracks, W. T. (USWD 1886).
A) Hudson’s Bay Company’s stockade.
B) Flagpole.

Figure 103. Map of the Government Reserve at Vancouver, Oregon (Stuart 1850a), with detail.

(Courtesy of National Archives, Washington D.C.)
Figure 104. Columbia Barracks, Oregon, Building Drawings (Bomford [1851b:1]). Buildings depicted on this sheet were completed by December 1850, and are as follows: (clockwise from left) Officers Kitchen and Quarters, Commanding Officer’s quarters, Guard House, [Enlisted] Barrack Room and Kitchen. (Courtesy of National Archives, Washington D.C.)
A) Flagpole.

Figure 105. Columbia Barracks, Oregon Territory. (Eckerson 1854).
(Courtesy of National Archives, Washington D.C.)
February 1854

A) Flagpole.

Figure 106. Map of the Government Reserve at Fort Vancouver, W. T. (Bonneville 1854), with detail. (Courtesy of National Archives, Washington D.C.)
A) Flagpole.

Figure 107. Map of the Government Reserve at Fort Vancouver, W. T. (McConnell 1854), with detail. (Courtesy of National Archives, Washington D.C.)

Note that one outbuilding depicted on the Bonneville (1854) and United States War Department (USWD 1855a) map is not portrayed on this map (red arrow).
Figure 108. Topographic Sketch of Fort Vancouver and Environs, 1855 (USWD 1855b).
(Courtesy of Fort Vancouver National Historic Site, National Park Service).
Figure 109. Cascades to Vancouver. U.S. Military Road, From The Dalles to Columbia Barracks (Derby 1855), with detail.

(Courtesy of National Archives, Washington D.C.)
Figure 110. Fort Vancouver and U.S. Military Post with Town Environs, 1859 (Covington 1859).
Figure 111. Map of the Military Reservation at Fort Vancouver, W. T. (Wheeler and Dixon 1859a), with detail. (Courtesy of National Archives, Washington D.C.)
Figure 112. Map of the Military Reservation at Fort Vancouver, W. T. (Wheeler and Dixon 1859b).

(Courtesy of National Archives, Washington D.C.)
Figure 113. Plan of Post at Fort Vancouver W. T. (USWD 1869a). No identification key is currently available for buildings depicted. (Courtesy of National Archives, Washington D.C.)
Figure 114. Fort Vancouver, Washington Territory, with detail. Reprinted from United States War Department, Surgeon General’s Office (USWD, SGO 1870:420).
A) Officers quarters
B) Barracks

Figure 115. Fort Vancouver, Washington Territory. Reprinted from United States War Department, Surgeon General’s Office (USWD, SGO 1875:489).
10) 1st Sergeant quarters
11) Laundress quarters

Figure 116. Vancouver Arsenal, W. T. (USWD [1867-1873]). Map date based on Cromwell et al. (2009-12).
(Courtesy of National Archives, Washington D.C.)
Figure 117. Military Reserve, Fort Vancouver, W. T. (USWD 1878).

(Courtesy of National Archives, Washington D.C.)
2) “Company Officers Quarters”
3) “Company Quarters”
14) “Company Mess Rooms”

Figure 118. Fort Vancouver (USWD 1879).
(Courtesy of National Archives, Washington D.C.)
Figure 119. Plan of Present Water Supply at Vancouver Barracks, W. T. (USWD 1886).
(Courtesy of National Archives, Washington D.C.)
APPENDIX C

MAPS GENERATED FROM NON-PENETRATING SUBSURFACE DATA
Figure 120. Comprehensive contour map generated from data obtained during magnetic survey on Officers Row in 2007. Area discussed in text is encircled in red. Reprinted from McDonald 2007:3).
Non-penetrating subsurface data were collected with ground-penetrating radar GPR between 29 and 30 June 2007. The extent of post-acquisition processing (e.g. gain control, vertical filtering, scale correction, background removal processing) and interpolation parameters (see Conyers 2004) for the raw time amplitude slice maps produced is unknown. Although the current ground surface is relatively flat, having a south aspect of 1-2°, buried strata may interface at different depths as a result of alluvial erosion and sedimentation associated with the Missoula Floods (see Chapter Five). Although possible, it is likely that many anomalies in the amplitude regions are anthropogenic or organic (e.g. tree roots, mole tunnel systems) in origin, rather than resulting from amplitude slices crossing subsurface bedding planes (see Figure 121 to Figure 124). No associated report for the GPR data was produced (Douglas C. Wilson 2010, pers. comm).

All grids have a north-south orientation, and all measurements are in meters (m). Grid 2 was placed in the southwest corner of the parade ground along the east side of Fort Vancouver Way in the vicinity of the historically documented laundresses’ quarters. These survey data were tested with Excavation Blocks A, B and C. Position 0/0 on Grid 2 is located at 112.5N / 101E and 28/15 at 127N / 130E on the excavation grid, as the main axis orientation of Grid 2 is offset ~9° west from the excavation grid. Grid 3 was located in the lawn area between the extant ca. 1865 officers’ quarters (Bldg. Nos. 7 and 8). Position 0/0 on Grid 3 is located at 250N / 177E and 40/17 at 290N / 194E on the excavation grid. These survey data were tested with both shovel test units (ORSTs) and Excavation Blocks U, W, and Y.
Figure 121. Amplitude slice maps for Grid 2, between 0 and 105 cmbs, positioned along the east side of Fort Vancouver Way in the southwest corner of the parade ground.
Figure 122. Amplitude slice maps for Grid 2, between 96 and 155 cmbs, positioned along the east side of Fort Vancouver Way in the southwest corner of the parade ground.
Figure 123. Amplitude slice maps for Grid 3, between 96 and 113 cmbs, positioned between the two extant ca. 1865 officers’ quarters on Officers Row.
Figure 124. Amplitude slice maps for Grid 3, between 100 and 177 cmbs, positioned between the two extant ca. 1865 officers’ quarters on Officers Row
APPENDIX D

STRATA BOUNDARY NOMENCLATURE AND ELEVATION DATA

Table 35. Average depth below surface (m) of observed upper boundary for each strata identified, by excavation block.

<table>
<thead>
<tr>
<th>Stratum</th>
<th>BLOCK</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.00</td>
<td>0.05</td>
<td>0.14</td>
<td>0.52</td>
<td>0.95</td>
<td>1.26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>0.00</td>
<td>0.06</td>
<td>0.14</td>
<td>0.28</td>
<td>0.46</td>
<td>0.62</td>
<td>0.86</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>0.00</td>
<td>0.08</td>
<td>0.13</td>
<td>0.28</td>
<td>0.45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>0.00</td>
<td>0.06</td>
<td>0.06</td>
<td>0.20</td>
<td>0.33</td>
<td>0.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>0.00</td>
<td>0.06</td>
<td>0.10</td>
<td>0.23</td>
<td>0.48</td>
<td>0.72</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>0.00</td>
<td>0.06</td>
<td></td>
<td>0.10</td>
<td>0.31</td>
<td>0.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>0.00</td>
<td>0.02</td>
<td></td>
<td></td>
<td>0.09</td>
<td>0.28</td>
<td>0.40</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>0.00</td>
<td>0.05</td>
<td></td>
<td></td>
<td>0.17</td>
<td>0.42</td>
<td>0.58</td>
<td>0.52</td>
</tr>
<tr>
<td>J</td>
<td>0.00</td>
<td>0.04</td>
<td></td>
<td></td>
<td>0.12</td>
<td>0.32</td>
<td>0.50</td>
<td>0.62</td>
</tr>
<tr>
<td>K</td>
<td>0.00</td>
<td>0.04</td>
<td></td>
<td></td>
<td>0.10</td>
<td>0.21</td>
<td>0.39</td>
<td>0.59</td>
</tr>
<tr>
<td>L</td>
<td>0.00</td>
<td>0.04</td>
<td></td>
<td></td>
<td>0.13</td>
<td>0.28</td>
<td>0.51</td>
<td>0.67</td>
</tr>
<tr>
<td>M</td>
<td>0.00</td>
<td>0.03</td>
<td></td>
<td></td>
<td>0.13</td>
<td>0.29</td>
<td>0.35</td>
<td>0.46</td>
</tr>
<tr>
<td>N</td>
<td>0.00</td>
<td>0.03</td>
<td></td>
<td></td>
<td>0.12</td>
<td>0.23</td>
<td>0.45</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>0.00</td>
<td>0.03</td>
<td></td>
<td></td>
<td>0.18</td>
<td>0.39</td>
<td>0.56</td>
<td></td>
</tr>
<tr>
<td>Q</td>
<td>0.00</td>
<td>0.04</td>
<td></td>
<td></td>
<td>0.16</td>
<td>0.40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>0.00</td>
<td>0.05</td>
<td></td>
<td></td>
<td>0.18</td>
<td>0.38</td>
<td>0.69</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>0.00</td>
<td>0.03</td>
<td></td>
<td></td>
<td>0.12</td>
<td>0.30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>0.00</td>
<td>0.02</td>
<td></td>
<td></td>
<td>0.14</td>
<td>0.39</td>
<td>0.72</td>
<td>0.94</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stratum</th>
<th>Parade ground Overall</th>
<th>U</th>
<th>W</th>
<th>Y</th>
<th>Officers Row Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.00</td>
<td>0.04</td>
<td>0.08</td>
<td>0.14</td>
<td>0.34</td>
</tr>
<tr>
<td></td>
<td>0.00</td>
<td>0.02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.00</td>
<td>0.05</td>
<td>0.24</td>
<td>0.36</td>
<td>0.45</td>
</tr>
</tbody>
</table>

1 = Average thickness of stratum portion excavated, as the lower boundary of this stratum was not observed in this Block during excavations; 2 = this stratum was emergent at this depth, but not excavated.
Table 36. Average thickness (m) for each strata identified, by excavation block.

<table>
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</tbody>
</table>

\[^1\] Thickness based on one unit within excavation block, as the lower boundary of this stratum was observed only in one unit of this Block during excavations; \[^2\] = Average thickness of stratum portion excavated, as the lower boundary of this stratum was not observed in this Block during excavations; \[^3\] = This is total thickness for Stratum II, observed both above and below Stratum IIa; \[^4\] = Only completely bisected strata used in calculations.
Table 37. List of strata boundary distinctness and topography nomenclature used in profiles.

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<th>Code</th>
<th>Term</th>
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<td>A</td>
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<td>Clear</td>
<td>2 to 5 cm thick</td>
</tr>
<tr>
<td>G</td>
<td>Gradual</td>
<td>5 to 15 cm thick</td>
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<td>D</td>
<td>Diffuse</td>
<td>&gt;15 cm thick</td>
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Distinctness

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<td>Smooth</td>
<td>Nearly a plane</td>
</tr>
<tr>
<td>W</td>
<td>Wavy</td>
<td>Pockets with width greater than depth</td>
</tr>
<tr>
<td>I</td>
<td>Irregular</td>
<td>Pockets with depth greater than width</td>
</tr>
<tr>
<td>B</td>
<td>Broken</td>
<td>Discontinuous</td>
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</table>
APPENDIX E

NEW TOBACCO PIPE PATTERNS IDENTIFIED IN THIS STUDY

Three systems are currently in use at Fort Vancouver NHS for recording tobacco pipe patterns. The first system consists of a descriptive list of pipe styles or motifs (Caywood 1955; Ross 1976:804-816). Although generally unnumbered, white ball clay tobacco pipes manufactured by the London pipe makers John, Jesse and Thomas Ford (Ross 1976:805) were assigned to five recognizable pipe forms, called Styles (Ross 1976:807, 809), with the various pipe bowl Ford manufacturer marks presented in tabular format (Ross 1976:080, Fig. 384).

The second system, developed by Clarence Richie (Chance and Chance 1976:6, 169-186) and expanded upon by Pfeiffer (1982a, 1982b:113-127, 1982c:183-189), consists of a descriptive list of pipe designs/styles/motifs presented in numerical order for ease of reference, each assigned a Type number. Although similar motifs were grouped together within the numerical list, additional motifs identified were assigned the next number in the sequential series, even if strikingly similar to motifs previously described (i.e., once begun, the numerical motif assignments were not revisited). These descriptions are expanded upon and combined into a single series in Pfeiffer (1982a).

Thomas and Hibbs (1984:252-256) developed an expandable classification system, the K81 taxonomy, for archaeological investigations conducted in Kanaka Village/Vancouver Barracks for realignment of the I-5 and WA SR 14 Interchange. Pipes were first identified by Type, based on clay material and the presence of glaze or enamel, then by Variety and individual Style based on design motifs. Styles newly created within this system are comparable to Types under the Chance and Chance (1976) and Pfeiffer (1982a, 1982b, 1982c) system. Styles were
then linked to previously designated Types (Chance and Chance 1976; Pfeiffer 1982b, 1982c [referred to as Carley 1982]).

Current analytical procedures in place at Fort Vancouver NHS for categorizing tobacco pipes consists of using all three systems to identify motifs, beginning with Chance and Chance (1976) and Pfeiffer (1982b, 1982c). Therefore, nomenclature used in this study follows that of Pfeiffer (1982a), as it combines the Type system distributed across Chance and Chance (1976) and Pfeiffer (1982c, 1982c), to maintain consistency with analytical techniques currently in use at Fort Vancouver NHS. However, during analysis by the author, pipe types were also identified under the Thomas and Hibbs (1984) system to Type or Variety, but rarely to Style, or individual motifs. To assist in future intersite and Fort Vancouver NHS intrasite comparisons, each identified pipe motif and more complete fragments of already identified motifs not previously sketched by Pfeiffer (1982a) were drawn and digitized by the author (Figure 126). When possible, these types were identified to Type, Variety or Style, but not depicted, in the Thomas and Hibbs (1984) system.

One major difference in terminology is the embossed ridge decoration motif. Chance and Chance (1976:169-186) and Pfeiffer (1982a:33, 19852b, 1982c) use the descriptive term cockles, after the concentric ridges on bivalve cockles. These motifs are primarily referred to as flutes in the archaeological literature (see Alexander 1983; Bradley 2000; Lenik 2008; Walker 1966, 1983), as well as in earlier (see Caywood 1955; Ross 1976) and later (see Thomas and Hibbs 1984) archaeological investigations at Fort Vancouver, although they are occasionally referred to as ribbed (see Sudbury and Gerth 2011). Therefore, the term cockles is used in this document to maintain consistency with current NPS analysis terminology at Fort Vancouver NHS.
Figure 125. White ball clay (kaolin) tobacco pipe nomenclature. Pipes can also be spurless, or the spur replaced by a differently-shaped heel or foot. Reprinted from Ross (1976:806).

A few points of additional clarification are necessary. First, nomenclature for the parts of a white ball clay tobacco pipe are given in Figure 125 (reprinted from Ross 1976:806). Second, the mold seam on a tobacco pipe bowl faces away from the smoker while smoking, whereas the rear mold seam faces the smoker. Third, a single distinct raised ridge present along the mold seam and/or rear mold seam, that is not a parting line, will be referred to as a fin (Caywood 1955, Ross 1976) rather than a flute or rib (see Lenik 2008:38), terms typically used to refer to a series of embossed ridges placed around the bowl. Fourth, the motif commonly depicted along the mold seen referred to as fronds here, has been described as grain heads elsewhere (Ross 1976:811).

To avoid confusion with existing systems, no type or variety numbers are given herein for newly identified pipe motifs; they are referred to by image number (Figure 126) and catalog number. It is hoped that the different type systems currently in use at Fort Vancouver NHS will be merged into one expandable classificatory system in the near future, with each variety linked to associated images for ease of analysis and researcher consistency.
Selected Tobacco Pipe Type Descriptions

Tobacco pipe type descriptions given below are limited to those types that were drawn by the author during this study. One additional pipe fragment of note (No. 209040) not depicted or typed, consists of a white clay stem fragment with a squared horizontal angle. As the piece was broken lengthwise, it is unknown if the entire pipe stem was squared in cross-section. For all other type descriptions given in the artifact catalog, see Pfieffer (1982a).

E.1-1, E.1-17. Alternating Cockles. White ball clay. Identified in Pfeiffer (1982a:56, Fig. 8a) as Type 46. Bowl/spur fragments (n = 2) with a single series of parallel evenly spaced incised lines (2.5 mm long, 1 mm thick) placed along the mold seam from the rim to the undecorated spur, each positioned at a 45° angle. Alternating wide and thin cockle widths are present around the circumference of the bowl, but terminate below the rim of the bowl. One bowl fragment consists of the rim portion only, and may be of a different as of yet unidentified pattern, as the same series of incised parallel lines are present on pipe bowls with different motifs, such as birds, recovered from the Five Points site, New York City (Manhattan) NY and the Booth Brothers Knife Factory site in Stockholm, NJ (Lenik 2008:41, Fig. 35). Seven additional bowl fragments recovered in 2007 and 2008 may be Type 14 or 46, as both motifs have similar cockle patterns, but different motifs along the mold seam.

E.1-2. Spur Stamped. White ball clay. Identified in Pfeiffer (1982a:56, Fig. 8a) as Type 44. Rim and bowl/spur fragments (n = 2) with a series of rouletted impressed rectangles (1 x .05 mm) located 1 mm below the rim. Embossed “X” are the spur/stem junction on one side,
with an impressed milkmaid figure on the base of the heel. Probably of Dutch manufacture.

E.1-3. Half-Moon Stamped. White ball clay. Bowl/rim fragment (n = 1) with impressed rouletting of solid half-moons (1 mm diameter, with convex side towards rim) positioned in a single row at 1 mm intervals, about 1 mm below the rim. The rouletting is similar to that of Type 44 (Pfeiffer 1982a:53, Fig. fd), suggesting potential Dutch manufacture.

E.1-4. Windmill-Marked. White ball clay. Identified in Pfeiffer (1982a:42, Fig. 5g) as Type 30, also termed Style IA3.1 (Thomas and Hibbs 1984:253, Fig. 14-70b). Bowl/rim fragment (n = 1) with impressed 5 mm diameter circular field with well-executed embossed windmill. Windmill has half circle base (convex side up), square house with square window, a slanted roof (flat top) extending beyond the house, with three windsails depicted. One row of single embossed dots (~0.5 mm diameter) is spaced along the bowl rim in roughly 1 mm increments (not previously described). Pfeiffer (1982a:44) proposes that the bowl may be of Dutch origin, which is quite possible as Dutch manufacturers typically put their maker’s mark on the bowl base or rear if the pipe design did not include a spur or heel (Bradley 2000:117).

E.1-5. Plain with Embossed Crescents and Dots. White ball clay. Bowl fragment (n = 1) with the upper 2/3 of the bowl (18.5 mm) highly polished and undecorated. The design field on the lower 1/3 of the bowl is demarcated at its top by an embossed band, alternating between thin and thick widths, the edges reminiscent of a sine waveform. The design field itself consists of jumble of embossed crescents and dots (~1 mm diameter), with a textured background of slightly embossed small dots (0.25 to 0.5 mm diameter). Well-executed, intricately crafted design with no parting lines.
E.1-6. *Applied Enamel Fin and Leaves*. White ball clay. Bowl fragments (n = 2) of bowl design consisting of molded motifs, applied enamel, and a fin. The upper 3.5 mm of the bowl exterior along the rim, is undecorated and without the fin. Below this, the 2.6 mm wide fin rises 1 mm from the bowl exterior along the mold seam with light blue enamel applied to the outer surface. One row of embossed dots is present along each edge of the fin. The remaining bowl design is symmetrical in the portion adjacent to the fin (the remaining part of the bowl is missing). One molded leaf is present on each side of the fin. Each leaf has an embossed central vein and incised smaller radial veins, and is covered with deep red enamel. Embossed plain dots are scattered across the remaining bowl surface.

E.1-7. *Tulip, Plain Rim*. This design is very similar to that of Type 10 (Pfeiffer 1982s:36, Fig. 8d), and falls under the Variety IA8 (Thomas and Hibbs 1984:253), and H.1-3 below. Bowl/rim fragment (n = 1) of a large molded stylized tulip, with four leaves, centered along the mold seam. The petals have more rounded tips than seen in Type 10 or H.1-3 below.

E.1-8. *Tulip and Shields*. This design is very similar to that of Type 10 (Pfeiffer 1982s:36, Fig. 8d), and would fall under the Variety IA8 (Thomas and Hibbs 1984:253), and H.1-2 above. Bowl/rim fragment (n = 1) of a large molded stylized tulip, with four leaves, centered along the mold seam. This tulip is thicker walled and has larger leaves than seen in Type 10. On each side of the stylized tulip, below the rim band, are two shields molded in relief. In turn, in its center each shield has an embossed circle above an embossed shield. Encircling the rim is a raised 4.4 mm wide band, with embossed plain shields spaced at 3.4 mm intervals, 1 mm below the edge of the rim. Immediately adjacent to and beneath this band, in an impressed 2 mm wide band, inset deeper than the background
field of the embossed stylized tulip, not seen on Type 10. Molded motifs have parting lines on their edges, suggesting this bowl was quickly manufactured.

E.1-9. ‘TD’ with 6-point stars, lattice with vertical frond. White ball clay. Style IA10.1 in Thomas and Hibbs (1984:254, Fig. 14-73j), with more of the design field now known the Style should be reclassified under Variety IA4 (‘TD’) series (Thomas and Hibbs 1984:252-253). Rim, bowl, spur and stem fragments (n = 4) are present. On the bowl rear (facing smoker) the embossed letters “T D” are surrounded by embossed 6-point stars on a circular design field, demarked by a thin embossed circle. Embossed cross-hatching, or latticework, is present on the remainder of the bowl and transition to the stem, terminating at a plain embossed band (1 mm wide) encircling the stem. A series of three-lobed embossed leaves extend along each side of the mold seam. Adjacent to the lattice on the stem/bowl is an undecorated peg spur with a flat base. Along the rim are embossed 6-point stars on a plain band. Although not directly refitting, the lattice works suggests the rim fragment is congruent with the pipe design. Parting lines are faintly present along the mold seam. This pipe design was also recovered from Ward-Ryerson Patterson House site, excavated for construction of the Monksville Reservoir, NJ (Lenik 2008:12, Fig. 8e).

‘TD’ pipes may have been manufactured by Thomas Duggan (London), Thomas Dennis (Bristol) and/or Thomas Dormer (London) and imported into North America by the Hudson’s Bay Company (Pfeiffer 2006:12), although at Fort Vancouver the only (now) known suppliers are Thomas Duggan, John, Jesse and James Ford, William Murray, William White, Gambier, Giselon, J. & G. Prince, and A. OP. S. Sparnaay (Ross 1976:805). However, in the 19th century, ‘TD’ pipes became synonymous with a generic style of pipe rather than a specific pipe maker (Sudbury and Gerth 2011:7; Walker 1966).
E.1-10. ‘TD’ with Lanceolates. White ball clay. Variety IA4 series (Thomas and Hibbs 1984:252-253). Bowl fragments (n = 2) display the embossed letters “T D” on the bowl rear (facing smoker). A series of small embossed lanceolate shapes are scattered around the central ‘TD’, but not immediately within or adjacent to the ‘TD’ itself. The lanceolates do not appear to extend to the sides, front or base of the bowl.


E.1-12. No. 211726. Ship Keel. White ball clay. Bowl fragment (n = 1) that increases in thickness at the mold seam (from 3.1 to 8.8 mm thick), coming to a point (1 mm wide) that resembles a ship’s keel. The outer and inner bowl surfaces are highly polished (there is no evidence for smoking use). The fragment is otherwise undecorated, however, the sides and rear of the bowl are missing.

E.1-13. Alternating Oak Leaf Frond. White ball clay. Variety IA7 series (Thomas and Hibbs 1984:253). Bowl/rim fragments (n = 3) with a series of alternating five lobed leaves, resembling oak leaves, with the stems originating from the mold seam. Each leaf is positioned at a ~30° angle from the mold seam. The rear of the bowl is not present and the oak leaf motif terminates at the rim.

E.1-14. Paired Wheat Frond. White ball clay. Variety IA7 series (Thomas and Hibbs 1984:253). This design has two spur motifs; one roughly tree-shaped the other undecorated. Bowl, spur, and stem fragments (n = 5) with a series of paired opposing fronds, each roughly resembling a wheat grain head, with the stems originating from the mold seam. Each frond is comprised of three lanceolate leaves, with a seventh lanceolate leaf at the tip, and
is positioned at a ~30° angle from the mold seam. The rear of the bowl is not present and the oak leaf motif terminates at the rim. On one peg spur (3 mm tall), an embossed three-tiered triangular-shaped motif, roughly resembling a stylized tree, on present on one side of the spur; the other side of the spur is missing. A second bowl/spur/stem fragment with an identical frond motif had an undecorated spur. The stems of all fragments appear to be undecorated.

E.1-15. *Vertical Shallow Ridges.* Red clay. Bowl fragment (n = 1) with a series of shallow molded parallel ridges, that are scalloped in cross-section. These ridges resemble cockles, but are not as defined as the cockles in relief. The design is strikingly similar to that of the lower portion of a pipe bowl recovered from excavations near the Town of Lillooet, British Columbia (Pfeiffer 1982a:139, Fig. 23f), however, the lack of the rim portion (H.1-14) disallows confirmation of the identicalness of the design motif. This is most likely a fragment of the upper bowl portion of a reed pipe.

E.1-16. *Ford Mile End, Solid Line, Inverted Shield.* White ball clay. A rime/bowl/stem spurless fragment (n = 1 [7 refitted]) is undecorated but for an impressed maker’s mark. The letters “FORD/MILE/END” are impressed in horizontal alignment into the rear of the bowl (facing smoker), encircled by an incised solid line motif, roughly-shaped as a pentagon with rounded corners, or an inverted shield. Although a number of different Ford maker’s marks have been identified (Ross 1976:808, Fig. 384), the encircling inverted shield has not, nor has “FORD MILE END” been identified without the word “LONDON” immediately following. Based on this maker’s mark, this bowl was manufactured at the Ford company factory located in the Mile End parish of Stepney, London (Ross 1976:807).
E.1-18. *Petals, Ladder & Dots.* White ball clay. Stem fragments (n=3) with two alternating
design fields (‘ladder’ and ‘incised lines’) repeated twice around the stem, each with very
detailed workmanship. The stems are ovoid in cross-section and are not rouletted. The
‘ladder’ motif consists of a series of raised horizontal parallel bands (~0.75 mm apart)
with embossed dots (~0.5 mm diameter) positioned on the center and ends of the bands at
roughly equal intervals (not every band has dots). The ‘incised lines’ motif consists of a
series of short (1.5 - 2 mm long) parallel incised lines, each positioned at a 45° angle, all
encircled by one embossed line, roughly rectangular in shape with rounded ends.
Roughly 2 cm along the stem from the base of the bowl rear mold seam, a single line of
embossed dots is present around the circumference of the stem. Extending from the
embossed dots, each design motif is replaced by a single elongated raised petal that
terminates at the base of the bowl. Bowl decoration is currently unknown.

E.1-19. *Petals and Scroll.* White ball clay. Stem/spur fragment (n = 1) with four molded petals at
the base of the bowl, with the bottom petal turning away from the bowl becoming a scroll
motif, acting as a spur. Two molded linear impressions along the base of bowl suggest
that bowl is decorated as well, possibly as a flower. Well-executed design, no parting
lines, and mold seams are very faint. A similar petal and scroll spur motif was identified
with a Federal eagle motif on the bowl at the Five Points site in New York City
(Manhattan), NY (Reckner 2001:105, Fig. 2 lower), but the petal tips are lifted off the
stem in the fragment recovered in 2008 at Fort Vancouver NHS.

E.1-20 *B/ Reverse ‘S’ Spur.* White ball clay. Bowl/stem/spur fragment (n = 1) with an
undecorated stem. One partial curved incised line is present on the bowl, but the motif
cannot be determined at this time. On side of the spur is embossed with a “B,” the other
with a motif resembling the reverse image of an “S.” Pfieffer (1982a) Types 8, 9 and 65 are also defined by embossed letters on the spurs ("I/S," "T/B," and "H/S," respectively).

E.1-21. Medallion with Scrolls. Buff ball clay. Thick stem fragment (n = 1), with one design repeated on two opposing sides of the stem. The motif consists of an embossed oval medallion, with sloped edges, encircled by a raised oval. Four embossed scrolls are present along the oval exterior, with scroll ends meeting each other. One embossed dot is present on each side of the vertical axis of the central design motif. Two parallel embossed adjacent bands. Each 3.2 mm wide, encircle the stem on each side of the central oval and scrolls. The pipe stem diameter increases towards the bowl in a stepped fashion, with each step marked by the two adjacent encircling bands. The diameter of the central bore increases across this fragment as well (4.11 to 7.16 mm).

E.1-22. Petal Stem. White ball clay. Stem fragment (n = 1) embossed with slightly curved lines that form the base of petals, each between 5 and 7 mm wide. An embossed line depicts a center petal vein. Petals open to the bowl area. It is currently unknown if the bowl was decorated, as seen on pipes with similar petal motifs (see Reckner 2001:105, Fig. 2 lower).

E.1-23. Cockles with dot-banded shank. White ball clay. Stem fragments (n = 2) with thin, widely-spaced cockles emanating from four embossed bands, one with embossed dots, encircling the stem. An undecorated spur is present. The cockle motif terminates at the embossed line closes to the mouthpiece. This motif is identical in design, but for an additional encircling band, to a fragment recovered from the Bellevue Trading Post (25SY26) in Nebraska (Pfeiffer 1982a:170, Fig. 27f). A raised parting line along all mold
seams and the spur suggests the piece was quickly manufactured, as the excess clay was not removed upon pipe construction. Cockles likely continue onto the bowl.

E.1-24. *Rounded Bite*. White clay. Undecorated 35 mm long stem mouthpiece (n = 1), curved along the horizontal axis, ovoid in cross-section with one 1 mm wide rouletted notch present on each side of the mouthpiece. The 3 mm long tip is rounded in cross-section. Mold seams are clearly visible along the mouthpiece.

E.1-25. *Plain Reed with Elbow, Bulbar Edge*. Style IIB1.1 in Thomas and Hibbs (984:255, Fig. 14-74d). Red clay, clear glazed. Undecorated reed elbow pipe stem, with a bulbar edged tip (reed insert). Ross (1976:813) indicates that several earthenware reed pipes were present at that time in the FOVA collections, but only two designs are described in detail (Ross 1976:816, Fig. 390a,390b). The pipe form is most similar to plain reed elbow pipes manufactured in Point Pleasant, Ohio or Pamplin, Virginia (Hamilton and Hamilton 1972; Sudbury 1979).
Table 38. New or more complete tobacco pipe pattern types identified.

See text on previous pages for full description.

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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>116-1</td>
<td>3080</td>
<td>white</td>
<td>Alternating Cockles</td>
<td>None</td>
<td>46</td>
<td>Type IA5</td>
<td></td>
</tr>
<tr>
<td>116-2</td>
<td>3080</td>
<td>white</td>
<td>Spur Stamped</td>
<td>None</td>
<td>44</td>
<td>Group IA</td>
<td></td>
</tr>
<tr>
<td>116-3</td>
<td>3080</td>
<td>white</td>
<td>Half-Moon Stamped</td>
<td>None</td>
<td>None</td>
<td>Group IA</td>
<td></td>
</tr>
<tr>
<td>116-4</td>
<td>3080</td>
<td>white</td>
<td>Windmill-Marked</td>
<td>None</td>
<td>None</td>
<td>Var. IA3.1</td>
<td></td>
</tr>
<tr>
<td>116-5</td>
<td>3080</td>
<td>white</td>
<td>Plain with Embossed Crescents and Dots</td>
<td>None</td>
<td>None</td>
<td>Group IA</td>
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</tr>
<tr>
<td>116-6</td>
<td>3080</td>
<td>white</td>
<td>Applied Enamel Fin and Leaves</td>
<td>None</td>
<td>None</td>
<td>Group IB</td>
<td></td>
</tr>
<tr>
<td>116-7</td>
<td>2993</td>
<td>white</td>
<td>Tulip, Plain Rim</td>
<td>None</td>
<td>None</td>
<td>Type IA8</td>
<td></td>
</tr>
<tr>
<td>116-8</td>
<td>3080</td>
<td>white</td>
<td>Tulip and Shields</td>
<td>None</td>
<td>None</td>
<td>Type IA8</td>
<td></td>
</tr>
<tr>
<td>116-9</td>
<td>3070</td>
<td>white</td>
<td>‘TD’ with 6-point stars, lattice with vertical frond</td>
<td>None</td>
<td>None</td>
<td>Var. IA10.1 [Reclassified to Var. IA4]</td>
<td></td>
</tr>
<tr>
<td>116-10</td>
<td>3043</td>
<td>white</td>
<td>‘TD’ with Lanceolates</td>
<td>None</td>
<td>None</td>
<td>Type IA4</td>
<td></td>
</tr>
<tr>
<td>116-11</td>
<td>3080</td>
<td>white</td>
<td>‘TD’ on Plain Stem</td>
<td>None</td>
<td>None</td>
<td>Type IA4</td>
<td></td>
</tr>
<tr>
<td>116-12</td>
<td>3174</td>
<td>white</td>
<td>Ship Keel</td>
<td>None</td>
<td>None</td>
<td>Group IA</td>
<td></td>
</tr>
<tr>
<td>116-13</td>
<td>3070</td>
<td>white</td>
<td>Alternating Oak Leaf Frond</td>
<td>None</td>
<td>None</td>
<td>Type IA7</td>
<td></td>
</tr>
<tr>
<td>116-14</td>
<td>3080</td>
<td>white</td>
<td>Paired Wheat Frond</td>
<td>None</td>
<td>None</td>
<td>Type IA7</td>
<td></td>
</tr>
<tr>
<td>116-15</td>
<td>3070</td>
<td>red</td>
<td>Vertical Shallow Ridges</td>
<td>None</td>
<td>None</td>
<td>Group IIB</td>
<td></td>
</tr>
<tr>
<td>116-16</td>
<td>3070</td>
<td>white</td>
<td>Ford Mile End, Solid Line, Inverted Shield</td>
<td>None</td>
<td>None</td>
<td>Type IA1</td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
<td>------</td>
<td>------------------------------------------</td>
<td>-------------</td>
<td>------------------</td>
<td>-------------------------</td>
<td></td>
</tr>
<tr>
<td>116-17</td>
<td>3043</td>
<td>white</td>
<td>Alternating Cockles</td>
<td>None</td>
<td>46</td>
<td>Type IA5</td>
<td></td>
</tr>
<tr>
<td>116-18</td>
<td>3070</td>
<td>white</td>
<td>Petals, Ladder and Dots</td>
<td>None</td>
<td>None</td>
<td>Type IA11</td>
<td></td>
</tr>
<tr>
<td>116-19</td>
<td>3080</td>
<td>white</td>
<td>Petals and Scroll</td>
<td>None</td>
<td>None</td>
<td>Type IA11</td>
<td></td>
</tr>
<tr>
<td>116-20</td>
<td>3080</td>
<td>white</td>
<td>B/Reverse ‘S’ Spur</td>
<td>None</td>
<td>None</td>
<td>Group IA</td>
<td></td>
</tr>
<tr>
<td>116-21</td>
<td>3070</td>
<td>buff</td>
<td>Medallion with Scrolls</td>
<td>None</td>
<td>None</td>
<td>Group IIB</td>
<td></td>
</tr>
<tr>
<td>116-22</td>
<td>3080</td>
<td>white</td>
<td>Petal Stem</td>
<td>None</td>
<td>None</td>
<td>Type IA11</td>
<td></td>
</tr>
<tr>
<td>116-23</td>
<td>3070</td>
<td>white</td>
<td>Cockles with Dot-Banded Shank</td>
<td>None</td>
<td>None</td>
<td>Type IA5</td>
<td></td>
</tr>
<tr>
<td>116-24</td>
<td>3070</td>
<td>white</td>
<td>Rounded Bite</td>
<td>None</td>
<td>None</td>
<td>Group IA</td>
<td></td>
</tr>
<tr>
<td>116-25</td>
<td>3080</td>
<td>red</td>
<td>Plain Reed with Elbow, Bulbar Edge</td>
<td>Unknown</td>
<td>None</td>
<td>Var. IIB1.1</td>
<td></td>
</tr>
</tbody>
</table>

¹ In the Thomas and Hibbs (1984) Classification system, Group, Type and Variety (Var.) are groups of patterns, whereas Style refers to only one pattern.
Figure 126. New or more complete tobacco pipe types identified during this study. Solid lines between images indicate multiple views. Mold seams indicated by dashed lines. See Table H.1 for names and provenience information. Pencil and paper, digitally inked. B. Horton, 2012.
Figure 127. Ironstone Gothic-Molded patterns identified during this study, ca. 1850 to 1870s. Pencil and paper, digitally inked. B. Horton, 2012.
## APPENDIX G. NAIL PENNY SIZES IDENTIFIED IN COLLECTION

Table 39. Complete 19th century nails recovered during excavations (1988 to 2008), sorted by type and penny (d) size.

<table>
<thead>
<tr>
<th>Structure</th>
<th>Type</th>
<th>Total</th>
<th>Finishing</th>
<th>Common Construction</th>
<th>Framing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2d 3d 4d 5d</td>
<td>6d 7d 8d 9d 10d 12d 14d 16d</td>
<td>18d 20d 30d 40d 50d 60d</td>
</tr>
<tr>
<td>Officers’ Quarters</td>
<td>Nail, Machine-cut</td>
<td>79</td>
<td>1 2 27 1</td>
<td>5 4 21 6 7 2 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nail, Machine-cut, American</td>
<td>442</td>
<td>1 16 139 4</td>
<td>18 20 153 35 27 10 7</td>
<td>3 4 5</td>
</tr>
<tr>
<td></td>
<td>Nail, Machine-cut, Finishing</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nail, Square</td>
<td>3</td>
<td>1</td>
<td>1 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nail, Wrought</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Officers’ Kitchen</td>
<td>Nail, Machine-cut</td>
<td>2,221</td>
<td>2 40 1,042 16</td>
<td>54 17 687 8 243 60 1 8</td>
<td>10 3 20 8 1 1</td>
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<td>Nail, Machine-cut, American</td>
<td>44</td>
<td>1 1 17 1</td>
<td>1 2 14 1 3 2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Nail, Machine-cut, Brad</td>
<td>7</td>
<td>1 3</td>
<td>1 3</td>
<td></td>
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<tr>
<td></td>
<td>Nail, Machine-cut, Finishing</td>
<td>83</td>
<td>2 13 1</td>
<td>48 4 12 2 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nail, Machine-cut, Finishing, Shingle</td>
<td>1</td>
<td></td>
<td>1</td>
<td>1 3 4</td>
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<tr>
<td></td>
<td>Nail, Wrought</td>
<td>9</td>
<td>1</td>
<td>1</td>
<td></td>
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<tr>
<td>Officers’ Quarters Area</td>
<td>Nail, Machine-cut</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nail, Machine-cut, American</td>
<td>14</td>
<td>3 1</td>
<td>1 2 2 1 1 2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Nail, Square</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Officers’ Privy</td>
<td>Nail, Machine-cut</td>
<td>41</td>
<td>1 2 12 4</td>
<td>2 2 4 6 3 3 1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Nail, Machine-cut, American</td>
<td>57</td>
<td>4 4 20 6</td>
<td>6 1 13 2 1</td>
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</tr>
<tr>
<td></td>
<td>Nail, Machine-cut, Finishing</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nail, Roofing</td>
<td>4</td>
<td>1 3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nail, Square</td>
<td>6</td>
<td>1 1</td>
<td>1 1 2</td>
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</tr>
<tr>
<td>Structure</td>
<td>Type</td>
<td>Total</td>
<td>Finishing</td>
<td>Common Construction</td>
<td>Framing</td>
</tr>
<tr>
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<td>-----------------------------</td>
<td>-------</td>
<td>-----------</td>
<td>---------------------</td>
<td>---------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2d 3d 4d 5d</td>
<td>6d 7d 8d 9d 10d 12d</td>
<td>14d 16d</td>
</tr>
<tr>
<td>Enlisted / Band Quarters</td>
<td>Nail, Machine-cut, American</td>
<td>101</td>
<td>6 24 8</td>
<td>5 8 26 1 9 13 1</td>
<td></td>
</tr>
<tr>
<td>Enlisted Men’s Barrack</td>
<td>Nail, Machine-cut</td>
<td>6</td>
<td>3 1</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Nail, Machine-cut, American</td>
<td>66</td>
<td>6 11 14 4</td>
<td>3 4 9 3 9 2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Nail, Square</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nail, Wrought</td>
<td>4</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Enlisted Men’s Kitchen</td>
<td>Nail, Machine-cut</td>
<td>52</td>
<td>1 5 3 4</td>
<td>4 3 6 6 8 7</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Nail, Machine-cut, American</td>
<td>265</td>
<td>13 31 75 15</td>
<td>14 16 37 9 29 11 3</td>
<td>5 1</td>
</tr>
<tr>
<td></td>
<td>Nail, Machine-cut, Flooring</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nail, Square</td>
<td>7</td>
<td>1 4 1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nail, Wrought</td>
<td>4</td>
<td></td>
<td>1 1 1 1</td>
<td>1</td>
</tr>
<tr>
<td>Enlisted Men’s Kitchen Area</td>
<td>Nail, Machine-cut</td>
<td>66</td>
<td>1 3 6</td>
<td>7 4 18 2 5 17 1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Nail, Machine-cut, American</td>
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<td>2 4 20 3</td>
<td>12 8 49 6 27 23 8</td>
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<td></td>
<td>Nail, Square</td>
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<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enlisted Men’s Unmapped</td>
<td>Nail, Machine-cut</td>
<td>13</td>
<td>5</td>
<td>2 2 1 2 1</td>
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<tr>
<td>Structure</td>
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<td>2 1</td>
<td>2 2 1 4 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nail, Square</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Laundresses’ Quarters Area</td>
<td>Nail, Machine-cut</td>
<td>3</td>
<td></td>
<td>1 1 1 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nail, Machine-cut, American</td>
<td>58</td>
<td>2 7 15 5</td>
<td>8 5 4 4 5 1 2</td>
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</tr>
<tr>
<td>Laundresses’ Privy</td>
<td>Nail, Machine-Cut</td>
<td>24</td>
<td>3 4 4</td>
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<td>Nail, Machine-Cut, American</td>
<td>7</td>
<td>1</td>
<td>2 1 2 1</td>
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</tr>
<tr>
<td>TOTAL</td>
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<td>3,876</td>
<td>44 142 1,453 85</td>
<td>206 110 1,067 97 385 157 1 41</td>
<td>11 22 29 16 3 7</td>
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### APPENDIX H. AMMUNITIONS IDENTIFIED IN COLLECTION


<table>
<thead>
<tr>
<th>Description^1</th>
<th>TOTAL</th>
<th>Fired or Unfired^2</th>
<th>Headstamp</th>
<th>Manufacturer</th>
<th>Dates of Manufacture/ Official Use</th>
<th>Notes</th>
<th>Provenience</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Officers$^3$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Quarters</td>
</tr>
<tr>
<td>Rifle Ball .53 caliber for .54 caliber rifle (0.1 patch)</td>
<td>1</td>
<td>F</td>
<td>N/A</td>
<td>N/A</td>
<td>1803 to 1861</td>
<td>Possibly Model 1836 or Model 1842 Pistol or Model 1841 Rifle.</td>
<td>1</td>
</tr>
<tr>
<td>Rifle or Pistol Ball .43 caliber for .44 caliber</td>
<td>1</td>
<td>U</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td>Pistol or rifle. Pistol caliber popular among U. S. Army officers mid-19th century.</td>
<td>1</td>
</tr>
<tr>
<td>Minié Ball</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>1855 to 1865</td>
<td>.577 in. ball.</td>
<td>2</td>
</tr>
<tr>
<td>Percussion Cap, Musket</td>
<td>22</td>
<td>F</td>
<td>N/A</td>
<td>N/A</td>
<td>1842 to 1866</td>
<td>“Top Hat” Style</td>
<td>3</td>
</tr>
<tr>
<td>Percussion Cap, Pistol or Sporting Rifle</td>
<td>5</td>
<td>U</td>
<td>N/A</td>
<td>N/A</td>
<td>1832 to 1870</td>
<td>“Ground Edge” Style</td>
<td>1</td>
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<tr>
<td>Percussion Cap, Pistol</td>
<td>1</td>
<td></td>
<td></td>
<td>N/A</td>
<td>1842 to 1866</td>
<td>“Ground Edge” Style</td>
<td>1</td>
</tr>
<tr>
<td>Boxer Primer, Rifle</td>
<td>10</td>
<td></td>
<td></td>
<td>N/A</td>
<td>1869 to present</td>
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<td>10</td>
</tr>
<tr>
<td>Bullet, .454 255 grain</td>
<td>1</td>
<td>F</td>
<td>N/A</td>
<td>Unknown</td>
<td>1873 to 1892</td>
<td>.45 Colt Pistol</td>
<td>1</td>
</tr>
</tbody>
</table>

^1 Description
^2 Fired or Unfired
^3 Officers
^4 Enlisted
^5 Laundresses

1. Possibly Model 1836 or Model 1842 Pistol or Model 1841 Rifle.
3. .577 in. ball. Pronounced point at tip, grooves and base retain lubricating grease.
4. “Top Hat” Style
5. “Ground Edge” Style
<table>
<thead>
<tr>
<th>Description</th>
<th>TOTAL</th>
<th>Fired or Unfired</th>
<th>Headstamp</th>
<th>Manufacturer</th>
<th>Dates of Manufacture/Official Use</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bullet, .45-70 500 grain</td>
<td>4</td>
<td>F</td>
<td>N/A</td>
<td>Unknown</td>
<td>1880 to 1892 Used into early-20th century by Federal Reserves, State and Volunteer Units.</td>
<td>Infantry bullets were 500 grain. Mushroomed grooves and base retain lubricating grease. Grooves retain lubricating grease.</td>
</tr>
<tr>
<td>Cartridge Case, .45-70</td>
<td>1</td>
<td>F</td>
<td>R/4/L/80</td>
<td>Frankfurt Arsenal</td>
<td>April 1880 (1880 to 1892)</td>
<td>Used by military personnel for training through WWI.</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>F</td>
<td>R/3/F/84</td>
<td>Frankfurt Arsenal</td>
<td>March 1884 (1884 to 1892)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>F</td>
<td>10/F/87</td>
<td>Frankfurt Arsenal</td>
<td>October 1887 (1887 to 1892)</td>
<td></td>
</tr>
<tr>
<td>Bullet, .30-40 or .30-03 200 grain</td>
<td>1</td>
<td>F</td>
<td>N/A</td>
<td>Unknown</td>
<td>1892 to 1906 (1918)</td>
<td>Likely the .30-40 Krag. .30-40 in use at the Spruce Production Division in 1917 and 1918 at Fort Vancouver, and by other military personnel for training through WWI.</td>
</tr>
<tr>
<td>Cartridge Case, .30-40 or .30-03</td>
<td>1</td>
<td>F</td>
<td>None</td>
<td>Unknown</td>
<td>1892 to 1906 (1918)</td>
<td></td>
</tr>
<tr>
<td>Cartridge Case, .30-40</td>
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<td>F</td>
<td>None</td>
<td>Unknown</td>
<td>1892 to 1906</td>
<td>“Tinned” case (nickel plated steel jacket) Frankfurt Arsenal plated ammunition in 1890s.</td>
</tr>
<tr>
<td>Description</td>
<td>TOTAL</td>
<td>Fired or Unfired</td>
<td>Headstamp</td>
<td>Manufacturer</td>
<td>Dates of Manufacture/Official Use</td>
<td>Notes</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-------</td>
<td>------------------</td>
<td>-----------</td>
<td>--------------</td>
<td>-----------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Cartridge Case, .30-40 Krag</td>
<td>1</td>
<td>F</td>
<td>K/C/99</td>
<td>Unknown</td>
<td>1899 to 1906</td>
<td></td>
</tr>
<tr>
<td>Bullet, .03 Spitzer (Spire Point)</td>
<td>1</td>
<td>F</td>
<td></td>
<td></td>
<td>1906 to present</td>
<td></td>
</tr>
<tr>
<td>Cartridge, .03 Spitzer</td>
<td>1</td>
<td>U</td>
<td>F/3/05</td>
<td>Frankfurt Arsenal</td>
<td>1905 (1906 to 1957)</td>
<td>Spitzer bullets not used until 1906, so a 1905 case was used to load Spitzer for .03-06 weapon.</td>
</tr>
<tr>
<td>Cartridge Case, .30-06</td>
<td>1</td>
<td>F</td>
<td>F/A/12/08</td>
<td>Frankfurt Arsenal</td>
<td>December 1908 (1906 to 1957)</td>
<td>Used for special weapons (sniper and competition rifles) through the 1960s, and by the National Guard into the early-1970s.</td>
</tr>
<tr>
<td>Cartridge, .30-06</td>
<td>1</td>
<td>U</td>
<td>P.C. CO/18</td>
<td></td>
<td>1918 (1918 to 1957)</td>
<td></td>
</tr>
<tr>
<td>Cartridge, .32 Smith &amp; Wessen</td>
<td>1</td>
<td>U</td>
<td></td>
<td>Smith and Wessen</td>
<td>1878 to present</td>
<td>Pistol, Centerfire</td>
</tr>
<tr>
<td>Cartridge Case, .22</td>
<td>14</td>
<td>F</td>
<td>P</td>
<td>Peters Cartridge Co, Remington</td>
<td>1887 to 1934</td>
<td>Peters Cartridge Co purchased by Remington</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>F</td>
<td>None</td>
<td>Unknown</td>
<td>1887 to present</td>
<td></td>
</tr>
<tr>
<td>Cartridge Case, .22 long rifle</td>
<td>2</td>
<td>F</td>
<td>U</td>
<td>Union Metallic Cartridge / Remington</td>
<td>1887 to 1934 or 1931 to mid-1980s</td>
<td>UMC then a division of Remington. Same headstamp for Hi-Speed brand (Remington).</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>F</td>
<td></td>
<td>SUPER X in cartouche</td>
<td>Winchester Repeating Arms Co.</td>
<td>1931-1980s</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>F</td>
<td>H</td>
<td>Winchester Repeating Arms Co.</td>
<td>1887 to present</td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>TOTAL</td>
<td>Fired or Unfired</td>
<td>Headstamp</td>
<td>Manufacturer</td>
<td>Dates of Manufacture/Official Use</td>
<td>Notes</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>-------</td>
<td>------------------</td>
<td>-----------</td>
<td>-----------------------</td>
<td>----------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Bullet, .38 special, heeled</td>
<td>1</td>
<td>F</td>
<td>N/A</td>
<td>Unknown</td>
<td>1877 to present</td>
<td></td>
</tr>
<tr>
<td>Cartridge Case, .38 special</td>
<td>1</td>
<td>F</td>
<td>F/A/1/10</td>
<td>Frankfurt Arsenal</td>
<td>January 1910 (1910 to present)</td>
<td></td>
</tr>
<tr>
<td>Bullet, 45 ACP, 230 grain</td>
<td>1</td>
<td>F</td>
<td>N/A</td>
<td>Unknown</td>
<td>1911 to 1985</td>
<td></td>
</tr>
<tr>
<td>Lead Shot “BB” Size</td>
<td>2</td>
<td></td>
<td>N/A</td>
<td>Unknown</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lead Shot “oo” Size</td>
<td>1</td>
<td></td>
<td>N/A</td>
<td>Unknown</td>
<td>.33 caliber. Most common large sized shot.</td>
<td></td>
</tr>
<tr>
<td>Lead Shot No. 1 Size</td>
<td>1</td>
<td></td>
<td>N/A</td>
<td>Unknown</td>
<td>1830s to present</td>
<td>No. 1 shot used in .30 caliber shotgun. Partially broken</td>
</tr>
<tr>
<td>Shotshell Case, Brass Base</td>
<td>1</td>
<td>F</td>
<td>U.M.C./No 12/STAR</td>
<td>Union Metallic Cartridge</td>
<td>1888 to 1910s</td>
<td>12 gauge. 8-pointed star around centerfire primer.</td>
</tr>
</tbody>
</table>
APPENDIX I

STATISTICAL ANALYSES

This section presents the data results of the statistical analyses performed to assess whether the artifact distribution patterns were unlikely to reflect a random distribution (statistically significant). The Open Source statistical program “R” was used as it provides a wide variety of statistical and graphical techniques (R Core Team 2013). In this section, the term Group is used to refer to the different residential areas occupied by the commissioned officers (officers), noncommissioned officers and laundresses (NCO) and the enlisted men (enlisted). NISP refers to the number of identified specimens within a particular category, and MNI as the minimum number of individuals (faunal) or identified objects (artifacts determined to have a personal and/or military function). As curiosity species, turtle (T) remains (Testudines 3) were not included in the analyses.

Faunal Materials, Statistical Results

*NISP Species by Group*

<table>
<thead>
<tr>
<th>Species[drop = T]</th>
<th>Group</th>
<th>Enlisted</th>
<th>NCO</th>
<th>Officers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anas spp.</td>
<td></td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Anatidae</td>
<td></td>
<td>3</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Avian 4</td>
<td></td>
<td>41</td>
<td>5</td>
<td>71</td>
</tr>
<tr>
<td>Bos taurus</td>
<td></td>
<td>7</td>
<td>5</td>
<td>40</td>
</tr>
<tr>
<td>Catostomidae</td>
<td></td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Catostomus</td>
<td></td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>cf. Branta spp.</td>
<td></td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>cf. Catostomus</td>
<td></td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>cf. Gallus gallus</td>
<td></td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>cf. Mylocheilus</td>
<td></td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Clam</td>
<td></td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cyprinidae-Catostomida</td>
<td></td>
<td>30</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Gallus gallus</td>
<td></td>
<td>0</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Mammal 2</td>
<td></td>
<td>57</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mammal 4</td>
<td></td>
<td>50</td>
<td>61</td>
<td>99</td>
</tr>
<tr>
<td>Mammal 5</td>
<td></td>
<td>649</td>
<td>101</td>
<td>785</td>
</tr>
</tbody>
</table>
Mussel/Oyster                   1  0  0
Mylocheilus                     2  0  0
Osteichthyes                   83  0  1
Ovis aries                      6  76 11
Oyster                          0  0  41

Group
Species[drop = T] Enlisted NCO Officers
Phasianidae             1  2  0
Ptychocheilus            1  0  0
Rodentia                2  0  0
Salmonidae               0  0  1
Sus scrofa               35  5  5

Scaled Species by Group

Species[drop = T] Enlisted NCO Officers
Anas spp.                0.0011879744 0.000000000 0.002319891
Anatidae                 0.0017819616 0.000000000 0.004639783
Avian 4                   0.0243534755 0.042739206 0.082356140
Bos taurus               0.0041579105 0.042739206 0.046397825
Catostomidae             0.0011879744 0.000000000 0.000000000
Catostomus               0.0029699360 0.000000000 0.000000000
cf. Branta spp.          0.0000000000 0.008547841 0.000000000
cf. Catostomus           0.0005939872 0.000000000 0.000000000
cf. Gallus gallus        0.0000000000 0.017095682 0.000000000
cf. Mylocheilus          0.0029699360 0.000000000 0.000000000
Clam                      0.0005939872 0.000000000 0.000000000
Cyprinidae-Catostomidae   0.0178196162 0.000000000 0.000000000
Gallus gallus            0.0000000000 0.059834888 0.008119619
Mammal 2                  0.0338572708 0.000000000 0.000000000
Mammal 4                  0.0296993604 0.521418311 0.114834618
Mammal 5                  0.3854976975 0.863331957 0.910557325
Mussel/Oyster            0.0005939872 0.000000000 0.000000000
Mylocheilus              0.0011879744 0.000000000 0.000000000
Osteichthyes             0.0493009382 0.000000000 0.001159946
Ovis aries                0.0035639232 0.649635928 0.012759402
Oyster                    0.0000000000 0.000000000 0.047557771
Phasianidae              0.0005939872 0.017095682 0.000000000
Ptychocheilus            0.0005939872 0.000000000 0.000000000
Rodentia 2                0.0011879744 0.000000000 0.000000000
Salmonidae               0.0000000000 0.000000000 0.001159946
Sus scrofa               0.0207895523 0.042739206 0.005799728

attr(,"call")
xtabs(formula = NISP ~ Species[drop = T] + Group, data = subset(faunal,
Taxa != "REPTILE (Reptilia)" & !(Size %in% c("M0", "M1",
"A0", "A1", "A2"))))

attr(,"call")
xtabs(formula = zNISP ~ Species[drop = T] + Group, data = subset(faunal,
Taxa != "REPTILE (Reptilia)" & !(Size %in% c("M0", "M1",
"A0", "A1", "A2"))))
Species as Percentage by Group

<table>
<thead>
<tr>
<th>Species[drop = T]</th>
<th>Enlisted</th>
<th>NCO</th>
<th>Officers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anas spp.</td>
<td>0.2</td>
<td>0.0</td>
<td>0.2</td>
</tr>
<tr>
<td>Anatidae</td>
<td>0.3</td>
<td>0.0</td>
<td>0.4</td>
</tr>
<tr>
<td>Avian 4</td>
<td>4.2</td>
<td>1.9</td>
<td>6.7</td>
</tr>
<tr>
<td>Bos taurus</td>
<td>0.7</td>
<td>1.9</td>
<td>3.7</td>
</tr>
<tr>
<td>Catostomidae</td>
<td>0.2</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Catostomus</td>
<td>0.5</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>cf. Branta spp.</td>
<td>0.0</td>
<td>0.4</td>
<td>0.0</td>
</tr>
<tr>
<td>cf. Catostomus</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>cf. Gallus gallus</td>
<td>0.0</td>
<td>0.8</td>
<td>0.0</td>
</tr>
<tr>
<td>cf. Mylocheilus</td>
<td>0.5</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Clam</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Cyprinidae-Catostomidae</td>
<td>3.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Gallus gallus</td>
<td>0.0</td>
<td>2.6</td>
<td>0.7</td>
</tr>
<tr>
<td>Mammal 2</td>
<td>5.8</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Mammal 4</td>
<td>5.1</td>
<td>23.0</td>
<td>9.3</td>
</tr>
<tr>
<td>Mammal 5</td>
<td>66.0</td>
<td>38.1</td>
<td>73.6</td>
</tr>
<tr>
<td>Mussel/Oyster</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Mylocheilus</td>
<td>0.2</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Osteichthyes</td>
<td>8.4</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Ovis aries</td>
<td>0.6</td>
<td>28.7</td>
<td>1.0</td>
</tr>
<tr>
<td>Oyster</td>
<td>0.0</td>
<td>0.0</td>
<td>3.8</td>
</tr>
<tr>
<td>Phasianidae</td>
<td>0.1</td>
<td>0.8</td>
<td>0.0</td>
</tr>
<tr>
<td>Ptychocheilus</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Rodentia 2</td>
<td>0.2</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Salmonidae</td>
<td>0.0</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Sus scrofa</td>
<td>3.6</td>
<td>1.9</td>
<td>0.5</td>
</tr>
</tbody>
</table>

NISP Source (C/W/D) by Group

<table>
<thead>
<tr>
<th>Source[drop = T]</th>
<th>Enlisted</th>
<th>NCO</th>
<th>Officers</th>
</tr>
</thead>
<tbody>
<tr>
<td>C/W</td>
<td>59</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>D</td>
<td>747</td>
<td>257</td>
<td>947</td>
</tr>
<tr>
<td>D/W</td>
<td>42</td>
<td>7</td>
<td>71</td>
</tr>
<tr>
<td>W</td>
<td>136</td>
<td>1</td>
<td>49</td>
</tr>
</tbody>
</table>

% Source (C/W/D) by Group

<table>
<thead>
<tr>
<th>Source[drop = T]</th>
<th>Enlisted</th>
<th>NCO</th>
<th>Officers</th>
</tr>
</thead>
<tbody>
<tr>
<td>C/W</td>
<td>6.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>D</td>
<td>75.9</td>
<td>97.0</td>
<td>88.8</td>
</tr>
<tr>
<td>D/W</td>
<td>4.3</td>
<td>2.6</td>
<td>6.7</td>
</tr>
<tr>
<td>W</td>
<td>13.8</td>
<td>0.4</td>
<td>4.6</td>
</tr>
</tbody>
</table>

Fisher’s Exact and Pearson’s \(X^2\) Tests

Identified Faunal Species (NISP) by Group

Fisher’s Exact Test for Count Data with simulated \(p\)-value (based on 2000 replicates)
data: xtb фаunal spec.grp
\(p\)-value = 0.0004998
alternative hypothesis: two.sided
Pearson's Chi-squared test with simulated p-value (based on 2000 replicates)
data:  xtb.faunal.spec.grp
X-squared = 987.9632, df = NA, p-value = 0.0004998

*Meat Type (Commensal (C)/Wild (W)/Domesticated (D)) by Group*

Pearson's Chi-squared test
data:  xtb.faunal.src.grp
X-squared = 181.1146, df = 6, p-value < 2.2e-16

**Correspondence Analysis**

*Identified Faunal Species (NISP) by Group*

Call:
summary(CA(xtb.faunal.spec.grp), graph = FALSE)

Eigenvalues

<table>
<thead>
<tr>
<th></th>
<th>Dim.1</th>
<th>Dim.2</th>
<th>Dim.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variance</td>
<td>0.287</td>
<td>0.140</td>
<td>0.000</td>
</tr>
<tr>
<td>% of var.</td>
<td>67.257</td>
<td>32.743</td>
<td>0.000</td>
</tr>
<tr>
<td>Cumulative % of var.</td>
<td>67.257</td>
<td>100.000</td>
<td>100.000</td>
</tr>
</tbody>
</table>

Rows (the 10 first)

<table>
<thead>
<tr>
<th>Species</th>
<th>Dim.1</th>
<th>ctr</th>
<th>cos2</th>
<th>Dim.2</th>
<th>ctr</th>
<th>cos2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anas spp.</td>
<td>-0.359</td>
<td>0.078</td>
<td>0.983</td>
<td>-0.047</td>
<td>0.003</td>
<td>0.017</td>
</tr>
<tr>
<td>Anatidae</td>
<td>-0.322</td>
<td>0.109</td>
<td>0.733</td>
<td>-0.194</td>
<td>0.082</td>
<td>0.267</td>
</tr>
<tr>
<td>Avian 4</td>
<td>-0.161</td>
<td>0.458</td>
<td>0.249</td>
<td>-0.280</td>
<td>2.832</td>
<td>0.751</td>
</tr>
<tr>
<td>Bos taurus</td>
<td>0.101</td>
<td>0.080</td>
<td>0.025</td>
<td>-0.631</td>
<td>6.391</td>
<td>0.975</td>
</tr>
<tr>
<td>Catostomidae</td>
<td>-0.621</td>
<td>0.116</td>
<td>0.285</td>
<td>0.984</td>
<td>0.599</td>
<td>0.715</td>
</tr>
<tr>
<td>Catostomus</td>
<td>-0.621</td>
<td>0.290</td>
<td>0.285</td>
<td>0.984</td>
<td>1.496</td>
<td>0.715</td>
</tr>
<tr>
<td>cf. Branta spp.</td>
<td>2.696</td>
<td>1.094</td>
<td>0.939</td>
<td>0.685</td>
<td>0.145</td>
<td>0.061</td>
</tr>
<tr>
<td>cf. Catostomus</td>
<td>-0.621</td>
<td>0.058</td>
<td>0.285</td>
<td>0.984</td>
<td>0.299</td>
<td>0.715</td>
</tr>
<tr>
<td>cf. Gallus gallus</td>
<td>2.696</td>
<td>2.188</td>
<td>0.939</td>
<td>0.685</td>
<td>0.290</td>
<td>0.061</td>
</tr>
<tr>
<td>cf. Mylocheilus</td>
<td>-0.621</td>
<td>0.290</td>
<td>0.285</td>
<td>0.984</td>
<td>1.496</td>
<td>0.715</td>
</tr>
</tbody>
</table>

Columns

<table>
<thead>
<tr>
<th></th>
<th>Dim.1</th>
<th>ctr</th>
<th>cos2</th>
<th>Dim.2</th>
<th>ctr</th>
<th>cos2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enlisted</td>
<td>-0.333</td>
<td>16.382</td>
<td>0.450</td>
<td>0.368</td>
<td>41.131</td>
<td>0.550</td>
</tr>
<tr>
<td>NCO</td>
<td>1.444</td>
<td>83.184</td>
<td>0.970</td>
<td>0.256</td>
<td>5.374</td>
<td>0.030</td>
</tr>
<tr>
<td>Officers</td>
<td>-0.052</td>
<td>0.433</td>
<td>0.016</td>
<td>-0.403</td>
<td>53.496</td>
<td>0.984</td>
</tr>
</tbody>
</table>

622
Meat Type by Group (Commensal (C)/Wild (W)/Domesticated (D))

Call:
summary(CA(xtb.faunal.src.grp), graph = FALSE)

Eigenvalues

<table>
<thead>
<tr>
<th>Dim 1</th>
<th>Dim 2</th>
<th>Dim 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variance</td>
<td>0.074</td>
<td>0.005</td>
</tr>
<tr>
<td>% of var.</td>
<td>94.083</td>
<td>5.917</td>
</tr>
<tr>
<td>Cumulative % of var.</td>
<td>94.083</td>
<td>100.000</td>
</tr>
</tbody>
</table>

Rows

<table>
<thead>
<tr>
<th>Dim 1</th>
<th>ctr</th>
<th>cos2</th>
<th>Dim 2</th>
<th>ctr</th>
<th>cos2</th>
</tr>
</thead>
<tbody>
<tr>
<td>C/W</td>
<td>-1.155</td>
<td>46.200</td>
<td>0.986</td>
<td>0.139</td>
<td>10.651</td>
</tr>
<tr>
<td>D</td>
<td>0.088</td>
<td>8.840</td>
<td>0.954</td>
<td>0.019</td>
<td>6.713</td>
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<tr>
<td>D/W</td>
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<td>0.192</td>
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<td>70.484</td>
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<tr>
<td>W</td>
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<td>-0.084</td>
<td>12.152</td>
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Columns

<table>
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<th>Dim 2</th>
<th>ctr</th>
<th>cos2</th>
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<tr>
<td>Enlisted</td>
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<td>56.691</td>
<td>0.999</td>
<td>0.009</td>
<td>0.822</td>
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<tr>
<td>NCO</td>
<td>0.317</td>
<td>15.654</td>
<td>0.773</td>
<td>0.172</td>
<td>72.904</td>
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<tr>
<td>Officers</td>
<td>0.210</td>
<td>27.655</td>
<td>0.944</td>
<td>-0.051</td>
<td>26.274</td>
</tr>
</tbody>
</table>
## Personal and Military Artifacts, Statistical Results

### NISP Artifacts Determined to have a Personal or Military Function by Group

**NISP**

<table>
<thead>
<tr>
<th>Category</th>
<th>Enlisted</th>
<th>Laundresses</th>
<th>Officers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clothing, Fastener</td>
<td>18</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Military Defense Clothing</td>
<td>13</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Military Defense Clothing, Footwear</td>
<td>72</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Military Defense Equipment</td>
<td>8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Military Defense Equipment or Clothing</td>
<td>6</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Military Defense Insignia</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Military Defense or Personal</td>
<td>10</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Military Defense or Personal Office Equipment</td>
<td>3</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Personal Adornment</td>
<td>17</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Personal Grooming</td>
<td>7</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Personal Pocket Tool</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Personal, Clothing</td>
<td>62</td>
<td>1</td>
<td>17</td>
</tr>
</tbody>
</table>

attr("call")

```r
tabs(formula = MNI ~ Category + Group, data = art.mil.pers)
```
### Percentage of Artifacts Determined to have a Personal or Military Function by Group

<table>
<thead>
<tr>
<th>Category</th>
<th>Enlisted</th>
<th>Laundresses</th>
<th>Officers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clothing, Fastener</td>
<td>8.1</td>
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<tr>
<td>Military Defense Clothing</td>
<td>5.9</td>
<td>40.0</td>
<td>0.0</td>
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<tr>
<td>Military Defense Clothing, Footwear</td>
<td>32.4</td>
<td>0.0</td>
<td>3.9</td>
</tr>
<tr>
<td>Military Defense Equipment</td>
<td>3.6</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Military Defense Equipment or Clothing</td>
<td>2.7</td>
<td>20.0</td>
<td>3.9</td>
</tr>
<tr>
<td>Military Defense Insignia</td>
<td>1.8</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Military Defense or Personal</td>
<td>4.5</td>
<td>0.0</td>
<td>15.7</td>
</tr>
<tr>
<td>Military Defense or Personal Office Equipment</td>
<td>1.4</td>
<td>0.0</td>
<td>13.7</td>
</tr>
<tr>
<td>Personal Adornment</td>
<td>7.7</td>
<td>20.0</td>
<td>9.8</td>
</tr>
<tr>
<td>Personal Grooming</td>
<td>3.2</td>
<td>0.0</td>
<td>3.9</td>
</tr>
<tr>
<td>Personal Pocket Tool</td>
<td>0.9</td>
<td>0.0</td>
<td>5.9</td>
</tr>
<tr>
<td>Personal, Clothing</td>
<td>27.9</td>
<td>20.0</td>
<td>33.3</td>
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### MNI of Artifacts Determined to have a Personal or Military Function by Group

<table>
<thead>
<tr>
<th>Location</th>
<th>MNI</th>
<th>%</th>
<th>Location</th>
<th>MNI</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EitherFeminine</td>
<td>Masculine</td>
<td>Either</td>
<td>Feminine</td>
<td>Masculine</td>
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<tr>
<td>Enlisted Barracks</td>
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<td>1</td>
<td>77</td>
<td>19.6</td>
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<tr>
<td>Enlisted Kitchen</td>
<td>67</td>
<td>15</td>
<td>27</td>
<td>61.5</td>
<td>13.8</td>
</tr>
<tr>
<td>Enlisted Quarters</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>100.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Enlisted Unknown</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>100.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Enlisted Yard</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>66.7</td>
<td>16.7</td>
</tr>
<tr>
<td>Laundresses Privy</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>50.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Laundresses Yard</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0.0</td>
<td>33.3</td>
</tr>
<tr>
<td>Officers Kitchen</td>
<td>11</td>
<td>2</td>
<td>3</td>
<td>68.8</td>
<td>12.5</td>
</tr>
<tr>
<td>Officers Privy</td>
<td>26</td>
<td>2</td>
<td>4</td>
<td>81.2</td>
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</tr>
<tr>
<td>Officers Quarters</td>
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<td>1</td>
<td>0</td>
<td>50.0</td>
<td>50.0</td>
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<tr>
<td>Officers Yard</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>100.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

### Fisher’s Exact and Pearson’s X² Tests

**MNI of Personal or Military Artifacts by Group and Artifact Function by Group**

Fisher's Exact Test for Count Data with simulated p-value (based on 2000 replicates)
data:  xtabs(MNI ~ Category + Group, art.mil.pers)
p-value = 0.0004998
alternative hypothesis: two.sided

Pearson's Chi-squared test with simulated p-value (based on 2000 replicates)
data:  xtabs(MNI ~ Category + Group, art.mil.pers)
X-squared = 70.0209, df = NA, p-value = 0.001499
MNI of Artifacts Determined to have a Personal or Military Function by Group and Gender

Pearson's Chi-squared test with simulated p-value (based on 2000 replicates)

data:  xtabs(MNI ~ Location + Gender, art.mil.pers)
X-squared = 110.2829, df = NA, p-value = 0.0004998

Fisher's Exact Test for Count Data with simulated p-value (based on 2000 replicates)

data:  xtabs(MNI ~ Location + Gender, art.mil.pers)
p-value = 0.0004998
alternative hypothesis: two.sided

Correspondence Analysis

Distribution of Artifacts with Personal or Military Functions by Group and Artifact Function

Call:
summary(CA(xtabs(MNI ~ Category + Group, art.mil.pers), graph = FALSE))

Eigenvalues

<table>
<thead>
<tr>
<th></th>
<th>Dim.1</th>
<th>Dim.2</th>
<th>Dim.3</th>
</tr>
</thead>
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<tr>
<td>Variance</td>
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<td>0.068</td>
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<tr>
<td>% of var.</td>
<td>72.891</td>
<td>27.109</td>
<td>0.000</td>
</tr>
<tr>
<td>Cumulative % of var.</td>
<td>72.891</td>
<td>100.000</td>
<td>100.000</td>
</tr>
</tbody>
</table>

Rows (the 10 first)

<table>
<thead>
<tr>
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<th>cos2</th>
<th>Dim.2</th>
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<td>0.369</td>
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<td>Military Defense Clothing</td>
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<td>Military Defense Clothing, Footwear</td>
<td>-0.394</td>
<td>22.496</td>
<td>0.819</td>
</tr>
<tr>
<td>Military Defense Equipment</td>
<td>-0.463</td>
<td>3.365</td>
<td>0.851</td>
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<tr>
<td>Military Defense Equipment or Clothing</td>
<td>0.058</td>
<td>0.060</td>
<td>0.007</td>
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<tr>
<td>Military Defense Insignia</td>
<td>-0.463</td>
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<td>0.851</td>
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<tr>
<td>Military Defense or Personal</td>
<td>0.679</td>
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<td>0.994</td>
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<tr>
<td>Military Defense or Personal Office Equipment</td>
<td>1.335</td>
<td>34.931</td>
<td>1.000</td>
</tr>
<tr>
<td>Personal Adornment</td>
<td>0.076</td>
<td>0.259</td>
<td>0.123</td>
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<tr>
<td>Personal Grooming</td>
<td>0.108</td>
<td>0.204</td>
<td>0.434</td>
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</table>

<table>
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<tr>
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</thead>
<tbody>
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<tr>
<td>Military Defense Insignia</td>
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<td>0.149</td>
</tr>
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<td>Military Defense or Personal</td>
<td>0.259</td>
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</tr>
<tr>
<td>Military Defense or Personal Office Equipment</td>
<td>0.045</td>
<td>0.000</td>
</tr>
<tr>
<td>Personal Adornment</td>
<td>4.978</td>
<td>0.877</td>
</tr>
<tr>
<td>Personal Grooming</td>
<td>0.718</td>
<td>0.566</td>
</tr>
</tbody>
</table>
MNI of Artifacts Determined to have a Personal or Military Function by Group and Gender

Call:
summary(CA(xtabs(MNI ~ Location + Gender, art.mil.pers), graph = F))

**Results of the Correspondence Analysis (CA)**
The row variable has 11 categories; the column variable has 3 categories
The chi square of independence between the two variables is equal to 110.2829 (p-value = 1.744e-14).

Eigenvalues

<table>
<thead>
<tr>
<th></th>
<th>Dim.1</th>
<th>Dim.2</th>
<th>Dim.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variance</td>
<td>0.346</td>
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<td>0.000</td>
</tr>
<tr>
<td>% of var.</td>
<td>87.158</td>
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</tr>
<tr>
<td>Cumulative % of var.</td>
<td>87.158</td>
<td>100.000</td>
<td>100.000</td>
</tr>
</tbody>
</table>
Rows (the 10 first)

<table>
<thead>
<tr>
<th>Location</th>
<th>Dim.1</th>
<th>ctr</th>
<th>cos2</th>
<th>Dim.2</th>
<th>ctr</th>
<th>cos2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enlisted Barracks</td>
<td>-0.773</td>
<td>60.355</td>
<td>0.996</td>
<td>-0.052</td>
<td>1.844</td>
<td>0.004</td>
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<tr>
<td>Enlisted Kitchen</td>
<td>0.340</td>
<td>13.088</td>
<td>0.905</td>
<td>0.110</td>
<td>9.295</td>
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<td>0.827</td>
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<td>Enlisted Yard</td>
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<td>1.597</td>
<td>0.896</td>
<td>0.172</td>
<td>1.253</td>
<td>0.104</td>
</tr>
<tr>
<td>Laundresses Privy</td>
<td>-0.182</td>
<td>0.069</td>
<td>0.327</td>
<td>-0.260</td>
<td>0.957</td>
<td>0.673</td>
</tr>
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<tr>
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<td>0.460</td>
<td>3.523</td>
<td>0.996</td>
<td>0.028</td>
<td>0.087</td>
<td>0.004</td>
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</table>

Columns

<table>
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<tr>
<th></th>
<th>Dim.1</th>
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<th>cos2</th>
<th>Dim.2</th>
<th>ctr</th>
<th>cos2</th>
</tr>
</thead>
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<tr>
<td>Either</td>
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<tr>
<td>Feminine</td>
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<td>0.006</td>
<td>0.034</td>
<td>0.000</td>
</tr>
</tbody>
</table>

CA factor map (Gender|Location)
APPENDIX J

LAUNDRESSES’ SOAP RECIPE, FORT VANCOUVER, 1852

This recipe was included in a letter sent by Lieutenant Theodore Talbot to his sister, dated 9 July 1852 (Hine and Lottinville 1972:174). It has been faithfully reproduced here, word for word.

A Receipt for Washing Clothes expeditiously and with but little labor.

1 Pint Alcohol 1 Pint Spirits of Turpentine
1 oz. Liquid Ammonia 1 oz Gum Camphor

Mix together and keep in a bottle well corked. Two table-spoonfuls of this mixture to five gallons of water adding about one pound of brown Soap or more if you choose. Rub the clothes a little if very dirty but this is generally not necessary. After the Clothes have soaked one hour in the mixture then boil them in clean water for an hour and wring them dry, which completes the process.

N.B. probatum est. My washerwoman uses this in getting up my clothes, with much comfort to herself, great economy of buttons and expletives on my part, and I believe no serious detriment to the linen. Any druggist can make up the receipt.
APPENDIX K

PERSONS INVOLVED IN EXCAVATIONS AND LABORATORY WORK

National Park Service Personnel

Dr. Douglas C. Wilson, Archaeologist, Vancouver National Historic Reserve
Dr. Robert J. Cromwell, Archaeologist, Fort Vancouver National Historic Site
Theresa Langford, M.A., Curator, Fort Vancouver National Historic Site
Heidi Pearson, Museum Technician, Fort Vancouver National Historic Site
Jacqueline Cheung, Archaeological Technician, Fort Vancouver National Historic Site
Eric Gleason, Archaeological Technician, Fort Vancouver National Historic Site

Portland State University (PSU) and Washington State University Vancouver (WSUV)

Dr. Kenneth Ames, Professor, PSU (Liaison)
Dr. Virginia Butler, Professor, PSU, (Liaison)
Dr. Steve Weber, Associate Professor, WSUV (Liaison)

Beth Horton, M.Sc., WSUV, Graduate Student Field Director (2007 & 2008)
Martin Adams, PSU, Teaching Assistant (2007)
Elaine Dorset, PSU, Teaching Assistant (2007 & 2008)
Dana Holschuh, PSU, Teaching Assistant (2008), NPS Lab Supervisor (2008-2009)
Meris Mullaley, PSU, Teaching Assistant (2007)
Stephanie Simmons, PSU, Teaching Assistant (2007 & 2008), NPS Lab Supervisor (2007-2008)
Stephanie Cathcart, PSU, Field School Student (2007)

Cori Willis, WSUV, Advanced Undergraduate Intern (2009)

Corrie Ahrens, WSUV Field School Student (2007)
Arthur “Dane” Burkey, WSUV Field School Student (2007)
Jessica Byers, WSUV Field School Student (2007)
Deborah Carvalho, PSU, Field School Student (2007)
Stephanie Cathcart, PSU, Field School Student (2007)
Geoff Cornell, PSU, Field School Student (2007)
Evan Crittenden, PSU, Field School Graduate Student (2007)
Nicole Dullenty, PSU, Field School Student (2007)
Sean Hawks, WSUV Field School Student (2007)
James Hillegas, PSU, Field School Graduate Student (2007)
Rebecca Hodgin, PSU, Field School Student (2007)
Rachel Jensen, WSUV Field School Student (2007)
Shea Knight, PSU, Field School Student (2007)
Jade Luiz, PSU, Field School Student (2007)
Heidi Moore, PSU, Field School Student (2007)
Rebecca Rickard, WSUV Field School Student (2007)
Portland State University (PSU) and Washington State University Vancouver (WSUV) cont.
Heather Ulrich, PSU, Field School Graduate Student (2007)
Carrie Vincent, PSU, Field School Student (2007)
Magnus Wood, WSUV Field School Student (2007)

Irene Alvarado, PSU, Field School Student (2008)
Debra Barnett, WSUV Field School Graduate Student (2008)
Luis Beal, PSU, Field School Student (2008)
Seth Defayette, PSU, Field School Student (2008)
Benjamin Goodling, PSU, Field School Graduate Student (2008)
Andrea Johnson, PSU, Field School Student (2008)
Leslie Jones, PSU, Field School Student (2008)
Caitlin Kleinschmidt, PSU, Field School Student (2008)
Laura Lang, WSUV Field School Student (2008)
Michelle Lynch, PSU, Field School Student (2008)
Angela Perri, PSU, Field School Student (2008)
Elsabeth Petersen, WSUV Field School Student (2008)
Selena Roloson, PSU, Field School Graduate Student (2008)
Amber Smith, WSUV Field School Student (2008)
Breanne Taylor, PSU, Field School Student (2008)
Alysia Wright, PSU, Field School Student (2008)

Independent Contractors
Keith Garnett, Anthromaps, Portland, Oregon (Total Station Cartography)
Kendal McDonald, Z-Too Archaeogeophysical Prospection, Portland, Oregon (Magnetometry)
Shawn Steinmetz, Archaeologist, Cultural Resources Protection Program, Confederated Tribes of the Umatilla Reservation, Oregon (Ground-Penetrating Radar)

NPS Volunteers-In-Parks (VIPs), Cultural Resource Division

<table>
<thead>
<tr>
<th>Richard Ballard</th>
<th>Erin Dunbar</th>
<th>Melissa Schultz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ike Bay</td>
<td>Stephanie Ezat-Panah</td>
<td>Gary “Bud” Snook</td>
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<td>Christina Bennett</td>
<td>Chris Funk</td>
<td>Mike Twist</td>
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<td>Ward Upson</td>
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<td>Glynis Irwin</td>
<td>F. Scott Vieth</td>
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<td>Fred Munhoven</td>
<td>Blair Wardwell</td>
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<td>Lyle Nakonechny</td>
<td>Jill Ward</td>
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<td>Melissa Darby</td>
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