

AN ABSTRACT OF THE THESIS OF

Kimberly A. Wessler for the degree of Master of Science in Applied Anthropology
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(35PO75)

Abstract approved:

David R. Brauner

During the summer of 2016, Oregon State University conducted preliminary excavations of the hospital at Fort Yamhill, Oregon (35PO75). Fort Yamhill (1856-1866), has long been a focus of OSU's field schools, offering glimpses into garrison life through the eyes of the officers and the enlisted men. However, up until recently, little was known about how the Army Medical Department operated within Fort Yamhill's system.

This thesis combines extensive archival research and exploratory excavations to create an understanding of military hospital operation and medical practices of this era and provide insight into the hospital's construction and operation at Fort Yamhill. Detailed information regarding fort medical staff has been used to create an image of the hospital and its operation throughout the fort's occupation. Additionally, hospital records were used in conjunction with contemporary diaries to offer discussion on the condition of enlisted men at Fort Yamhill and the treatment of non-military patients.

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A Preliminary Historical and Archaeological Evaluation of Fort Yamhill's Hospital Site
(35PO75)

by
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A THESIS

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I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

Kimberly A. Wessler, Author

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1. Introduction

During the summer of 2016, excavations conducted by Oregon State University focused on Fort Yamhill's hospital, providing one of the first glimpses into the material remains of pre-Civil War/Civil War era fort medical practices on the frontier. Although, the presence of the military in the west during this era has become increasingly publicized, due to books such as *Hidden History of Civil War Oregon* by Randol B. Fletcher, and *The Civil War in the American West* by Alvin M. Josephy Jr., relatively little attention has been paid to the role of the army's medical department on the frontier. The majority of these publications focus on the well-known fighting forts in the southwest and eastern Oregon, while only some turn their eye to the less well-known forts guarding Indian reservations. For many years, OSU has been conducting excavations at both Fort Hoskins and Fort Yamhill, which were associated with the Siletz and Grande Ronde Indian Agencies of the Coastal Reservation established in 1855, working to gain a thorough understanding of garrison life and military practices of these forts. Numerous structures have been excavated over the years, including officer's houses, a company barracks and kitchen, and a bakery. However, up until now, there has been little opportunity to examine one of the hospitals.

Funded by the Oregon Parks and Recreation Department, the specific aim of this thesis project was to establish the location of the hospital at Fort Yamhill and gain a thorough understanding of the historical context of the hospital in relation to military medical practices. The main motive of these investigations is to increase public knowledge of fort operation through site interpretation. In pursuance of this, this research focused on creating an accurate timeline for the medical staff stationed at the hospital and discerning the evolution of the hospital over time. Additionally, excavations were conducted to gain a

preliminary understanding of the hospital's construction and layout to lay the groundwork for future excavations.

OSU's excavations of the Fort Yamhill hospital site were assisted by remote sensing, which worked to locate the hospital and its features prior to ground work. This was done by combining LiDAR data with historic maps, to create georeferenced images based on previous excavations to determine the exact location of the hospital. Excavations were then employed to find the hospital's foundations, attempting to map the footprint of the building and estimate its dimensions. Additionally, artifacts were used to confirm or deny any findings discovered in the archival record.

The main focus of this research is to illuminate the subject of Fort Yamhill's hospital. To that end, this study works to provide the reader with essential background information to Fort Yamhill's creation, in addition to establishing an image of Fort Yamhill's layout and operation. With the support of period journals, fort records, and military correspondence, the history of Fort Yamhill and its hospital is slowly pieced together. To assist in the discussion of military hospital operation, a general look at the Army Medical Department before and during the Civil War is presented, along with explanations of the duties of the various types of medical staff, and the purpose and appearance of the various hospital sections. Fort Yamhill's hospital is examined thoroughly, in terms of its archival record, introducing the numerous medical staff that served there, as well as analyzing hospital records. Finally, archaeological methods and results are presented, discussing excavations conducted during the summer of 2016 and the archaeological findings.

2. Methods

2.1. Archival Research

Prior, during, and after excavations, extensive archival research was conducted to locate as many primary source documents as possible. This initially consisted of digitally scanning all fort records that were on hand through the libraries of Oregon State University as well as University of Oregon, including the fort's post returns and letter book. The commander's letter book, which consists of the last few months missing from the older letter book, was located at the Benton County Museum and was also scanned and combined with the early letter book. The National Archives provided a copy of the Register of Sick and Wounded, as well as personal records for Dr. Rodney Glisan, Dr. William Warren, and Dr. E.A. Tompkins. Personal records for the remaining physicians were also available, but were not ordered due to budget constraints. The Benton County Museum was also helpful in providing copies of some of the inspection reports, as well as copies of fort maps.

The remaining resources were gathered through expansive internet and library searches, looking for every piece of information that could contribute to the understanding of medical practices at Fort Yamhill. Resources that were uncovered included military manuals for army surgeons, hospital stewards, and other medical practices, as well as accompanying textbooks that would have been kept on hand. Additionally, numerous pieces of information were gleaned from contemporary sources that often referred to medical staff stationed at Fort Yamhill. Sources that were used included archive.org, ancestry.com, and Google Books.

In an attempt to gather information from the perspective of Native Americans, the Grand Ronde Tribe was consulted and gave access to their tribal archives. This produced

material that was obtained by Stephen Dow Beckham in 1997 from the National Archives, including partial personal files for Dr. Horace Carpenter, Dr. G.K. Smith, Dr. J.W. Davis, and Dr. E.A. Tompkins. Additionally, a large number of military correspondences were also obtained from Dow Beckham's research. No records were found that detailed sentiments or information about the fort from the Native American's perspective. No attempts were made to conduct interviews with the tribe due to time constraints for completing the IRB process.

2.2. Theoretical Approach

While this research was designed to create a foundation for future examinations, many attempts were made to understand the social and physical drivers of phenomenon encountered in the archival records and during excavations. The interpretation of data was approached largely both Processualism and British Functionalism, focusing on the why and function to analyze behaviors and trends (Johnson 2010:74). Because of the minimal artifact assemblage, these theoretical approaches were much more important in the analysis of the hospital's construction and the hospital register, as well as in the comparison between Fort Yamhill and Fort Hoskins.

Site formation processes were crucial in the understanding of materials and features excavated during this study (Ascher 1968). While cultural materials were largely intact and undisturbed during modern times, after the fort was abandoned, it experienced much disturbance when buildings were dismantled or demolished, as well as from logging activities. The consideration of these formation processes was important for site interpretation and analysis, contributing largely to suggestions for future research.

3. Natural Setting

3.1. Geography

Fort Yamhill is located in the northernmost portion of Polk County, Oregon, just outside of Grand Ronde in the eastern foothills of the Oregon Coast Range. The fort is just 29 miles from the Oregon Coast and 31 miles from Salem, Oregon. In 2006, Oregon Parks and Recreation Department purchased the 108 acres of land on which the fort was situated and established the Fort Yamhill State Heritage Area (Oregon State 2017).

The legal coordinates are township 6 south and range 7 west of the Willamette Meridian; the state park is within Section 8 and Avery Babcock's Donation Land Claim number 58, as seen on the 7.5 minute USGS Grand Ronde Quadrangle Map (Figure 1). The fort rests on top of a hill, known as Fort Hill, just north of the South Yamhill River, looking northwest towards Spirit Mountain. Fort Hill is one of many of the coastal foot hills, but is unique in its ramp like appearance, with sharp drops on its southern and eastern flanks.

In general, the fort was situated on an 11% slope with a northwest aspect, looking down toward Cosper Creek, which runs along the western boundary of the fort, adjacent to Hwy 22 as it heads towards Grand Ronde. The fort rests at an average elevation of 486 feet above sea level. The hospital site itself is located south of the main garrison area on a 22% slope with a northern aspect, located opposite Officers Row, at approximately 554 feet above sea level.

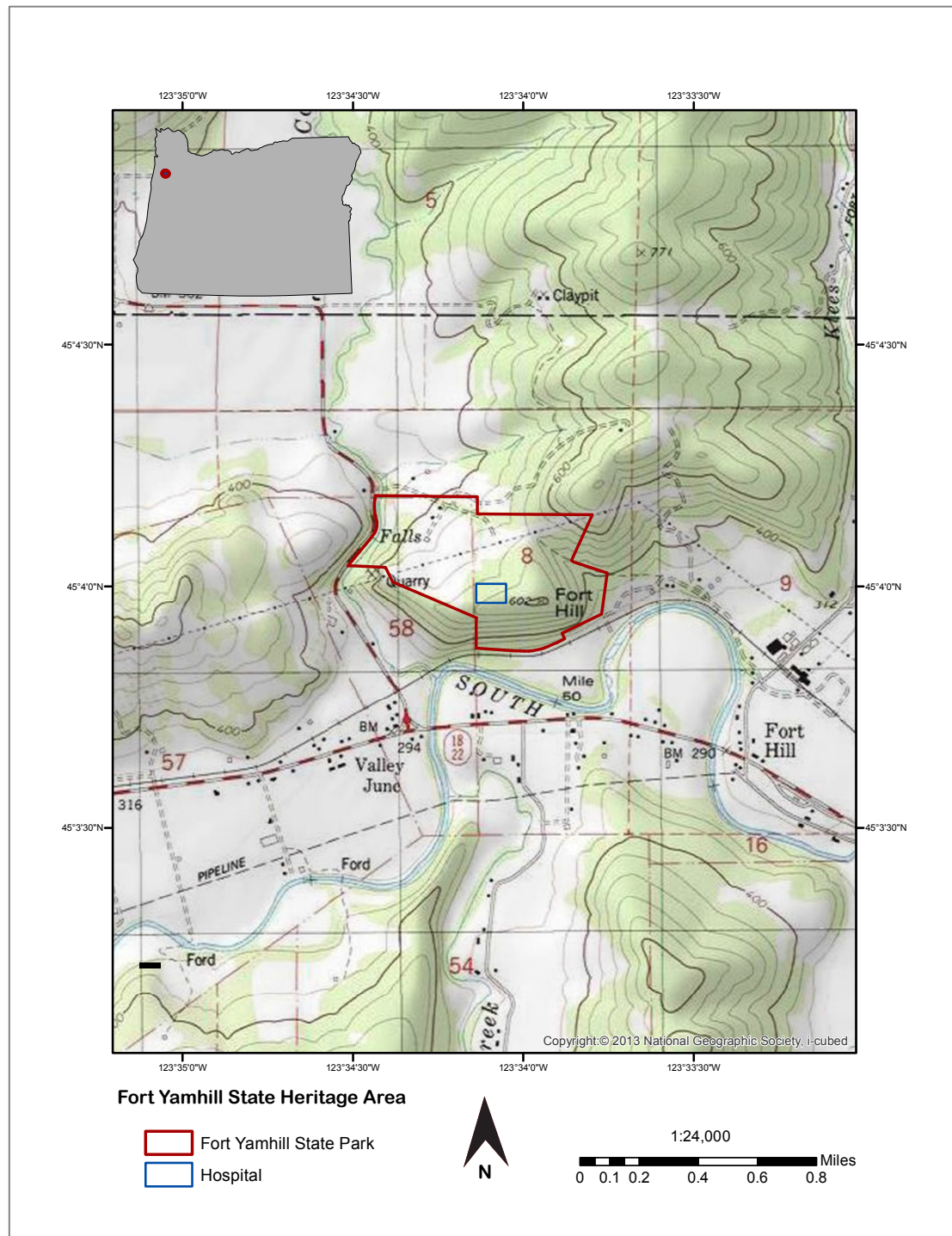


Figure 1. Fort Yamhill State Heritage Area Topographic Map

Perhaps the most vivid description of Fort Yamhill is that written by Captain J.J. Archer of the 4th Infantry, who was in command for just three days, but stayed at the fort for three months. In a letter to his mother, he describes the landscape of Fort Yamhill as thus:

This is the most beautiful delightful & desirable post on the Pacific coast — The country is fertile and well cultivated — The post itself situated on a hill overlooking the Yamhill river which is here about the size of Deer Creek — The view from my quarters is very like that from Priestford but more beautiful.

Every thing on which the [eye] can rest for many miles distant is green as emerald — the fresh green fading into blue as the distance expands to the coast rough mountains.

A low gap in the mountains lets in the delightful sea breeze from the Pacific Ocean which is only fifteen miles off — In command of this Post with no one to interfere with me in any way I know of no situation which under ordinary circumstances could be more agreeable to me (Hopkins 1961:83).

The following figure depicts a view from Officer's Row, much like the one that Archer would have been looking on when writing this letter home (Figure 2).



Figure 2. View of Fort Yamhill from Officer's Row

3.2. Vegetation

Historically, Fort Yamhill was home to a diverse landscape, that varied with elevation and treatment. Like much of the Willamette Valley, the Yamhill Valley and the area around Grand Ronde were human altered environments of oak savannah. These areas were burned by Native Americans to maintain the grassland environment and prevent the encroachment of Douglas-fir (*Pseudotsuga menziesii*), which blankets the higher slopes of the Oregon Coast Range. Upon his arrival to Fort Yamhill, Assistant Surgeon Rodney Glisan describes the landscape thus:

With the exception of the [Yamhill Valley] and the Grand Ronde, the surrounding country is mountainous and thickly timbered, principally with fir, though maple, wild cherry and alder, are to be found at a few points. Near the post and down the Yamhill, are some very fine groves of white oak. There are no swamps in this vicinity, at least in the summer, and the streams are rapid, clear and pure. Malarious fevers are almost unknown here (Glisan 1874:371).

In a later discussion of the variation of landscapes in the Pacific Northwest and in the Southwest, Glisan adds that much of the vegetation found in the Coast Range includes a coniferous component of cedar, spruce, fir, sugar pine, hemlock, Oregon yew, intermixed with deciduous species such as white maple, vine maple, Oregon alder, balsam tree, rhododendron, wild cherry, crab-apple, cottonwood, willow, and Oregon ash (Glisan 1874:480).

After the fort was abandoned in 1866, Douglas-fir dominated the landscape and was logged numerous times. When the state heritage area was established, a large portion of the fort was cleared of trees and converted to a more historical grassland environment (see Figure 3). The southern extent is still forested with Douglas-fir and small percentages of big-leaf maple (*Acer macrophyllum*), wild cherry (*Prunus sp.*), Oregon white oak (*Quercus garyanna*), red alder (*Alnus rubra*), and California hazelnut (*Corylus cornuta var. californica*). The understory

consists of a variety of disturbance species, as well as a good component of native perennials, including snowberry (*Symphoricarpus albus*), ocean spray or spirea (*Holodiscus discolor*), salal (*Gaultheria shallon*), poison oak (*Toxicodendron diversilobum*), trailing blackberry (*Rubus ursinus*), western swordfern (*Polystichum munitum*), and bracken fern (*Pteridium aquilinum*, and the invasive Himalayan blackberry (*Rubus armeniacus*).



Figure 3. Fort Yamhill Heritage Area Aerial View

4. Historical Context

4.1. Establishment of the Coastal Reservation

As American settlers began to flood into western Oregon under the premise of the Donation Land Law of 1850, the number of conflicts with Native Americans rose dramatically as they swiftly began to encroach on traditional lands and compete for resources (Eichelberger 2010:18). In the early 1850s, Superintendent of Indian Affairs Joel Palmer worked to create an acceptable alternative and settled on the creation of reservations on which the Native Americans could be placed (Brauner and Stricker 2006:22). After much debate and arguing, it was agreed that a coastal reservation would be the most suitable location for the many tribes of western Oregon, other locations in eastern Oregon being discarded because many tribes refused to move elsewhere (Brauner and Stricker 2006:22). In the spring of 1855, Palmer set aside a large area of land that extended from the coast range to the ocean, as far south as the Siltcoos River and as far north as Cape Lookout, roughly Tillamook to Florence (Brauner and Stricker 2006:23). Shortly afterward, President Franklin Pierce signed an Executive Order formally establishing the creation of the reservation, with the knowledge that Congress would be able to dismantle them just as quickly (Brauner and Stricker 2006:23). Following this action, Palmer toured the region of the Siletz River with Lieut. Phil Sheridan, seeking a suitable location for the establishment of a blockhouse and Agency headquarters, choosing a location twenty-five miles from the coast in what is now the Siletz Reservation (Brauner and Stricker 2006:23).

In the later months of 1855, multi-cultural conflicts had escalated, culminating in the Rogue River War, as the Rogue River tribe fought for their land and rights against the U.S. Army and the Oregon Volunteers (Eichelberger 2010:21). After several months of hostilities,

the war ended on November 8, 1855, with the surrender of the Rogue River tribe (Eichelberger 2010:21). After their surrender, the tribes of the Rogue and Umpqua River Valleys, and the southern Oregon coast were removed onto the newly created Coastal Reservation, clearing the way for incoming settlers.

The reservation was developed as a compromise between the wants of the Native Americans and the American settlers, where the natives and the settlers could be isolated from each other, without having to vie for land (Trussell 1996:7). Settlers were favored in this outcome as the reservation was placed in the least desirable area of the coast range where few Europeans had established themselves. While much of the motivation for this movement was to make room for Europeans, it was also conducted to reduce the risk of hostilities between the warring parties, keeping a general sense of peace (Trussell 1996:7).

Under the establishment of this reservation, it became the duty of the United States to oversee the movement of the Native Americans, and ease their transition to a sedentary lifestyle. With these duties came the creation of the Indian Agencies, which were the caretakers and watchdogs of the reservation, managing the transition and welfare of the Native Americans. For management purposes, the reservation was subdivided into two sections, the Grand Ronde Reservation, encompassing the northernmost 61,449 acres, and the Siletz Reservation, comprising of 225,000 acres south of the Grand Ronde portion (ed. Adams 1991:11). Each of these reservations were controlled by their own Indian Agency. Through these agencies, schools were established, both for children and for adults, to educate the natives in European ways, and to teach vocations to those willing to learn (Fort Yamhill Letter Book or FYLB). The agencies also provided medical care to the reservation's occupants in an attempt to keep the population healthy and to teach the benefits of Western medicine.

While the motivations and intentions of Superintendent Palmer were sincere, the outcome was a far cry from the aspiration. The conditions of the reservation lands were not conducive to farming and the government did not provide the funds needed to sustain the population of newly transplanted Native Americans (Brauner and Stricker 2006:35). During the early years, the mortality rates were high on the reservations; disease, malnutrition, and inadequate supplies took their toll, as the Native Americans struggled to survive in their new environment (Brauner and Stricker 2006:36).

As tensions were still high between Europeans and the Native Americans, it was necessary to establish military outposts around the reservations to monitor traffic in and out, and to protect the inhabitants, and Europeans living in the area (Bowyer 1993:22). To guard the reservations, three forts were built on the perimeters, Fort Yamhill, Fort Hoskins, and Fort Umpqua, as well as one post within the Siletz Reservation, the Siletz Blockhouse (Figure 4). Fort Yamhill, the northernmost of these forts, was established in March of 1856, located on the northeastern boundary of the reservation by the Grande Ronde Agency, along one of the main trails through the coast range, the Killimuck Trail (Eichelberger 2010:13). Fort Hoskins was established in August 1856, located just twenty miles west of Corvallis in Kings Valley and 33 miles from the Siletz Indian Agency (Bowyer 1993:21). Hoskins was decommissioned in 1865. Fort Umpqua, the southernmost fort, was built along the mouth of the Umpqua River by what is now Coos Bay and was in operation between 1856 and 1862. The Siletz Blockhouse was in use from August 1856 to June 1866 and was used as a military outpost to at the Siletz Agency (ed. Adams 1991). These three forts worked in concert, often sharing troops when one found itself without enough men to handle a situation. Fort Hoskins and Fort Yamhill were within a day's ride of each other and frequently exchanged men and communication (ed. Barth 1959).



Figure 4. Map of Coast Reservation and Military Forts (ed. Adams 1991:36)

4.2. Fort Yamhill

Of the three forts, Fort Yamhill was the largest and was occupied the longest, being in operation from March 1856 to June 1866 (ed. Adams 1991:1, Eichelberger 2010:28).

Between its establishment and November 1861, Fort Yamhill was operated by U.S. Army Regulars. During this time, it was constantly manned by one to two companies, including both infantry and dragoons (Fort Yamhill Post Returns or FYPR). A company of infantry ideally consisted of one captain, one first lieutenant, one second lieutenant, four sergeants, four corporals, two musicians, and 42 privates to create a minimum strength of 55 and a maximum strength of 87 (Scott 1861:50). A company of dragoons was slightly larger, having 50 privates, and had two buglers rather than musicians (Scott 1861:50). The minimum strength of a company of dragoons was 64, while its maximum size was 88 (Scott 1861:50). At its peak garrison strength in December 1856, Fort Yamhill held 124 men (FYPR). Table 1 shows the garrison strength for the entire period of operation.

With the outbreak of the Civil War, the Regulars were sent back east, leaving Fort Yamhill with only nine men to man the fort (FYPR). It was not long after that the California Volunteer Infantry moved in to maintain the fort and its mission (ed. Adams 1991:30). These volunteers manned the fort until July 1865, when they were relieved by the Oregon Volunteer Infantry who remained there until the fort's abandonment in June 1866 (FYPR). Table 2 lists the main regimental companies that were stationed at Fort Yamhill, note that this does not include the numerous smaller detachments that were temporarily assigned to the post.

Fort Yamhill was commissioned in 1856, when 2nd Lieut. William B. Hazen of Company D, 4th Infantry was charged with the establishing the location of a military post to guard the reservation, and with commencing construction of the garrison. From its vantage

point on what is now known as Fort Hill, the fort was able to look down onto the Grand Ronde Agency and efficiently monitor traffic in and out of the reservation. Hazen designed the fort to rest on an east-west orientation, with six officer's quarters, a company barracks, kitchen, and mess hall, a guardhouse, blockhouse, an adjutant's office, a commissary and quartermaster storehouse, a sutler's store, stables, blacksmith shop, bakery, six laundress quarters, and a hospital. After Lieut. Hazen was transferred in April 1857, 2nd Lieut. Phillip Sheridan was placed in charge of finishing Hazen's work, finally completing construction in February 1858 (FYLB). However, even in 1864, an inspection report noted that a number of the buildings were never fully furnished (Bowman 1864).

Table 1. Fort Yamhill Garrison Strength, 1856-1866 (ed. Adams 1991:19)

	1856			1857			1858			1859		
	Present	Absent	Total	Present	Absent	Total	Present	Absent	Total	Present	Absent	Total
January	–	–	–	115	5	120	76	0	76	69	0	69
February	–	–	–	102	4	106	75	10	85	69	0	69
March	20	0	20	60	35	95	74	0	74	70	0	70
April	29	0	29	83	3	86	74	0	74	70	0	70
May	29	0	29	97	3	100	72	0	72	70	0	70
June	29	0	29	33	50	83	71	0	71	68	0	68
July	82	19	101	33	47	80	71	0	71	68	0	68
August	118	30	148	55	0	55	69	1	70	69	1	70
September	114	42	156	57	1	58	71	1	72	68	1	69
October	105	28	133	53	1	54	69	1	70	68	1	69
November	106	31	137	53	1	54	69	0	69	67	0	67
December	124	6	130	74	1	75	69	17	86	64	17	81
	1860			1861			1862			1863		
	Present	Absent	Total	Present	Absent	Total	Present	Absent	Total	Present	Absent	Total
January	79	3	82	64	0	64	63	21	84	81	0	81
February	73	2	75	64	0	64	62	21	83	79	0	79
March	61	2	63	63	1	64	62	21	83	39	40	79
April	57	5	62	64	0	64	62	21	83	39	48	87
May	63	0	63	63	0	63	62	21	83	36	0	36
June	63	0	63	9	0	9	61	21	82	37	43	80
July	61	1	62	56	28	84	78	4	82	34	48	82
August	59	1	60	61	24	85	81	0	81	24	0	24
September	56	4	60	53	28	81	81	0	81	39	0	39
October	59	1	60	58	22	80	81	0	81	39	0	39
November	59	1	60	83	0	83	81	0	81	28	2	30
December	63	0	63	63	21	84	80	0	80	30	0	30
	1864			1865			1866					
	Present	Absent	Total	Present	Absent	Total	Present	Absent	Total			
January	30	0	30	45	28	73	32	20	52			
February	28	3	31	50	24	74	35	18	53			
March	35	0	35	57	23	80	34	18	52			
April	35	0	35	47	26	73	34	19	53			
May	35	0	35	56	25	81	33	19	52			
June	32	4	36	51	25	76	91	0	91			
July	36	0	36	70	21	91	–	–	–			
August	36	0	36	70	23	93	–	–	–			
September	34	0	34	31	19	50	–	–	–			
October	32	28	60	30	21	51	–	–	–			
November	36	30	66	34	18	52	–	–	–			
December	40	28	68	32	19	51	–	–	–			

Table 2. Regimental Companies Stationed at Fort Yamhill (FYPR)

<u>Company</u>	<u>Arrived</u>	<u>Departed</u>
8 th Infantry, Co. F	March 25, 1856	April 25, 1856
4 th Infantry, Co. D	March 25, 1856	April 25, 1856
4 th Infantry, Co. F	April 25, 1856	August 11, 1857
1 st Dragoons, Co. C	April 25, 1856	June 29, 1857
4 th Infantry, Co. K	August 11, 1857	June 26, 1861
9 th Infantry, Co. I	July 12, 1861	November 18, 1861
4 th Cal. Vol. Infantry, Co. D	November 18, 1861	August 2, 1865
1 st OR Vol. Infantry, Co. A	July 31, 1865	August 31, 1866

Three historic maps exist of Fort Yamhill. The earliest is referred to as the Smith Map of 1856 (Figure 5), as it was drawn by commanding officer Capt. A.J. Smith on December 5, 1856. It shows the general layout of the fort, including both finished and proposed structures. The second map drawn is the Gardner map of 1858 (Figure 6), which accompanied an 1858 inspection report written by Inspector General Mansfield on November 10 (Mansfield 1858). It also shows both finished and proposed structures. This map was drawn by Mr. G. Clinton Gardner who was the son of a former surveyor general that worked at the fort briefly in the Quartermaster Department (Glisan 1874:380). It is thought that he drew this map sometime before he left the fort in April 1857, to become an Assistant Surveyor and Astronomer to the Northwest Boundary Survey and that it was edited slightly by Mansfield before being included in his report (Glisan 1874:380; ed. Adams 1991:45). The final fort map was drawn June 6, 1864, by 2nd Lt. James Davison of Company D, 4th California Infantry (Figure 7). This last map is the most detailed and complete of the three maps. Unfortunately, while this map shows minute details such as the placement of doors and windows, it was drawn using multiple scales, depicting a suggestion of how the fort was laid out, rather than reality (ed. Adams 1991:47).

In addition to these maps, two other historic maps show the general area of the fort, the 1856 Hazen Map, drawn by Lieut. Hazen, and the 1858 Nesmith Map, drawn by Deputy Surveyor John W. Nesmith (ed. Adams 1991:40,45). Both of these maps show little information about the fort's layout. Hazen's map was drawn before any buildings were constructed, instead depicting the locations of tents and Native American camps. The Nesmith Map shows land parcels and some scant landmarks, including a very rough layout of the fort.

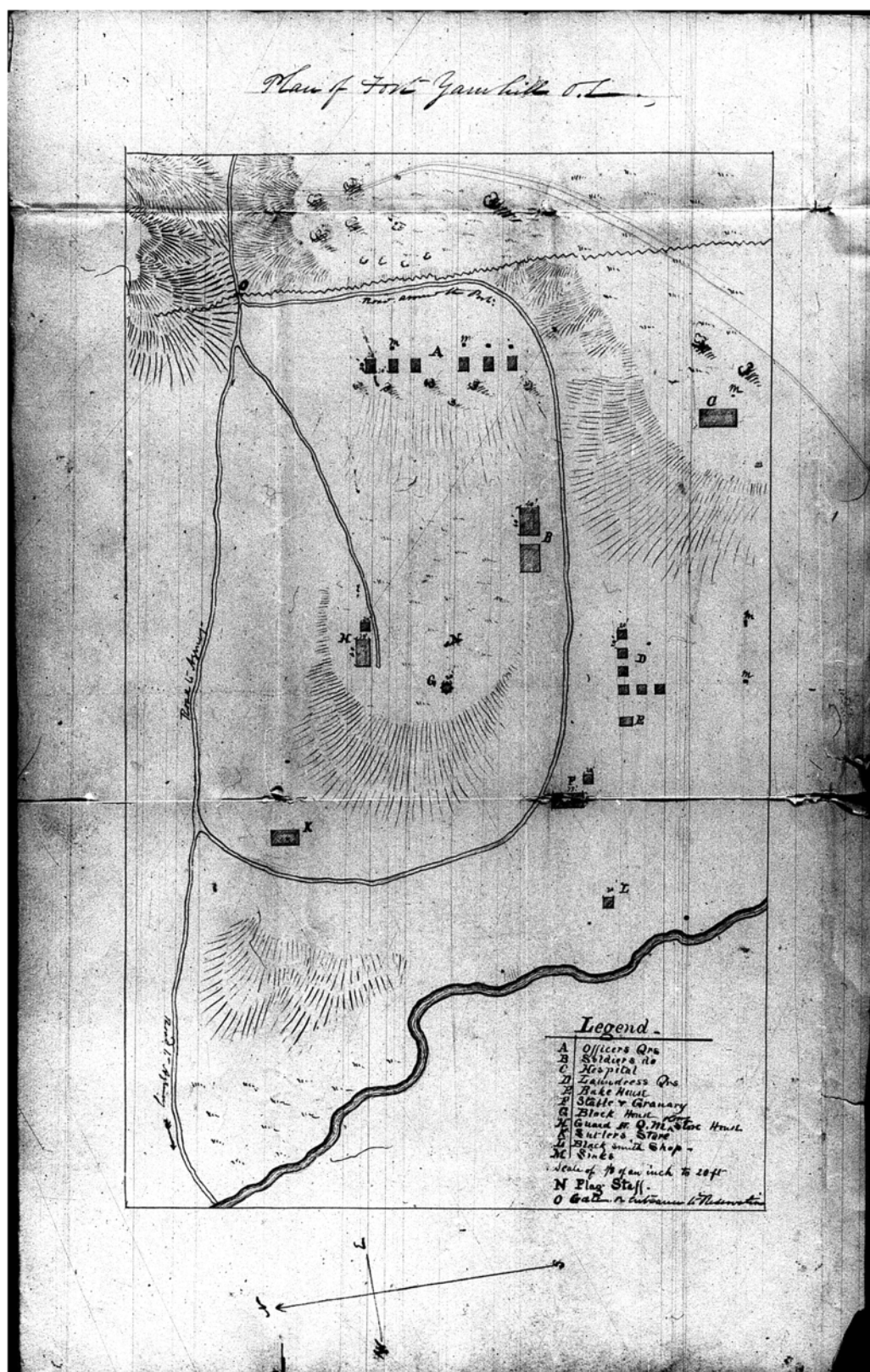


Figure 5. 1856 Smith Map of Fort Yamhill

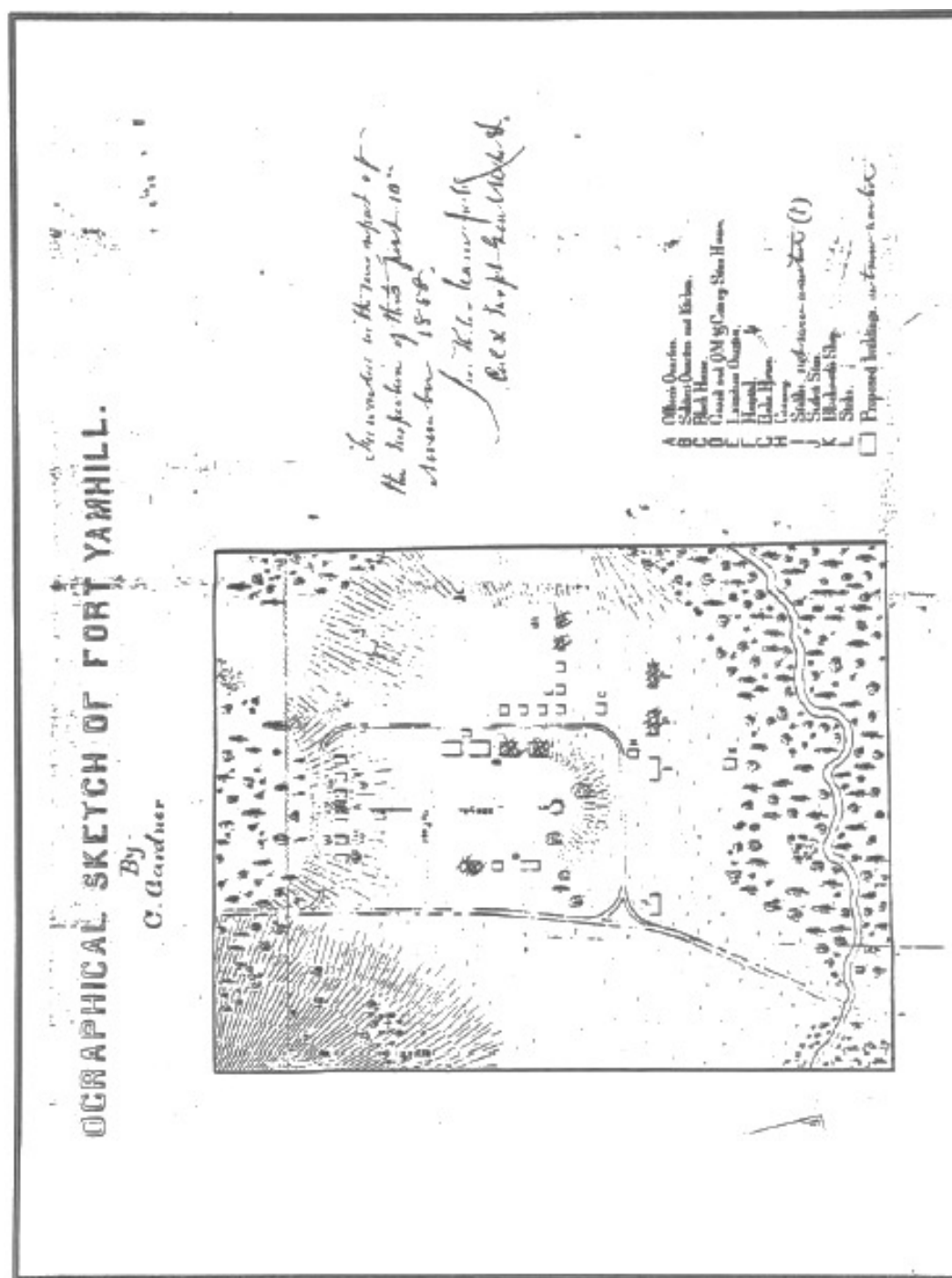
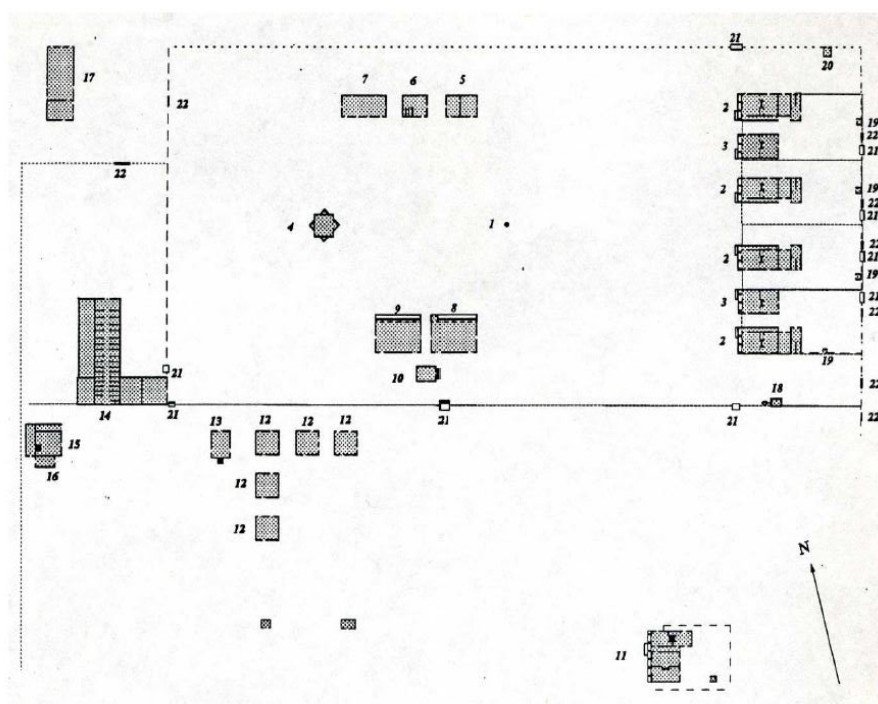


Figure 6. 1858 Gardner Map of Fort Yamhill



Fort Yamhill, 1864
(from Davison Map)

1	Flagstaff	5	Adjutants Office	10	Kitchen	16	Carpenter Shop
2	Officers Quarters	6	Guard House	11	Hospital	17	Sutlers Store
3	Unfinished House	7	Commissary & QM Storehouse	12	House of Laundresses	18	Pump and Cistern
4	Blockhouse	8	Company Quarters	13	Bake House	19	Sinks
		9	Mess Room	14	Stable	20	Sentry Box
				15	Blacksmith Shop	21	Steps
						22	Gates

Figure 7. 1864 Davison Map of Fort Yamhill, Redrawn (ed. Adams 1991:51)

4.3. Records Kept at Fort Yamhill

It is fortunate that many of the records kept at Fort Yamhill have survived over the years. Some of the most informative records kept were the Fort Yamhill Post Returns (FYPR), which are monthly reports of the number of men stationed at the fort and their condition in addition to any changes in their condition from the previous month. The complete set of post returns is available and has been one of the only sources recording deaths that occurred at the fort. Another important set of records that exists is the Fort Yamhill Letter Book (FYLB), which contains copies of all official outgoing correspondence written by the fort commander. The letter book also exists for the majority of the period that Fort Yamhill was in operation, ending shortly before the fort was decommissioned. In addition to these records, the Morning Reports for March 1858 – July 1860 survived, which are daily versions of the Post Returns, and the Guard Report for March – September 1860, which details guards posted on duty each day and a list of prisoners in the guardhouse, their crimes, and their sentences. Microfilm copies of both of these last records are available at the Benton County Museum, while the FYPR and FYLB can be found at the National Archives; copies can be found at the Oregon State University Library, the University of Oregon Library, and the Benton County Museum.

Records regarding the operation of the hospital are sparse and incomplete, but various manuals and regulations from the period give great insight into the inner workings of the Army Medical Department during the period of the fort's operation and are available online through archive.org. Records pertaining to Fort Yamhill's hospital consist almost entirely of the Register of Sick and Wounded (RS&W), which is a monthly report of all military personnel that were admitted to the hospital and their complaints. Unfortunately, these records only exist from April 1859 to May 1866. It should be noted that the Medical

Department did not publish guides to diagnosing conditions, meaning that complaints registered in this book vary greatly with the education of the attending surgeon. Due to the constant flux in staff, this register is inconsistent in its quality, but offers great insight into the health and condition of the men stationed at Fort Yamhill. Aside from the register, a Medical Supply List for Property at Fort Yamhill exists for the years 1858 and 1859, which detail instruments, bedding, and hospital stores that were on hand at the time of record.

Aside from these official records, the two most insightful records from Fort Yamhill are the journals of Assistant Surgeon Rodney Glisan, and Corporal Royal A. Bensell of the California Volunteers. Glisan's *Journal of Army Life*, consists of selected entries from his daily journal, including his excerpts from his time at Fort Yamhill, dated September 5, 1856-February 10, 1859. Glisan's journal is most helpful for understanding the context of the period and the political situation surrounding both the military and medical department, as well as contemporary happenings. Additionally, his insights into the subjects of Native Americans and the military life are also extremely useful. Bensell's *All Quiet on the Yamhill*, is an annotated version of his daily journal that was written during his stay at Fort Yamhill, encompassing the period between March 20, 1862 and October 16, 1864. His entries provide an emic perspective of garrison life during the volunteer era, detailing day to day activities which offer insight into the lives of enlisted men at Fort Yamhill.

5. The Hospital at Fort Yamhill

5.1. The Building and Its Location

Despite the fact that Fort Yamhill was first established in July of 1856, it was without a permanent hospital building until the early months of 1858 (FYLB). In October 1856, one month after Assistant Surgeon Rodney Glisan arrived at the fort, he published a sanitary report in which he states that:

The whole command are at present in tents. It is anticipated that quarters will be completed in two or three months (Coolidge 1860:259).

This report suggests that at this time, and until the completion of the hospital, the medical department at the fort was housed in either a tent or a rudimentary structure. The first report indicating that the hospital was completed was Mansfield's inspection report written November 10, 1858, in which he states that the hospital:

looks in good order & supplies ample – a good cellar to the hospital – a cook – a nurse – one ward room – no fund & nothing wanted – the post healthy (Mansfield 1858).

As shown on the Davison map, the hospital is located in the southeast corner of the fort's expanse, placed on a hill about 85 meters south of the rest of the fort and outside of the garrison fence. Based on contemporary medical manuals of the day, the hospital was likely built in this isolated location for quarantine situations. Mansfield's inspection report indicates that the hospital was entirely self-sufficient, having its own kitchen, cellar, and privy (Mansfield 1858). The Davison map shows the hospital complex with a fenced perimeter further isolating it from the rest of the fort.

In the Smith and Gardner maps, the hospital is depicted as a single block structure, with an associated privy. In the Gardner map, the orientation of the hospital is drastically different from that shown in the Smith and Davison maps, turned at a 45° angle to the

orientation of the rest of the fort. In December 1857, Capt. Smith described the style of construction being used for the fort structures. They were built in the cottage-style with projecting roofs and vertical shake board siding (FYLB). The fort buildings were white-washed, as Bensell describes one soldier, a J.H. Hannum being detailed to white-wash the garrison buildings (ed. Barth 1959:42). It is unknown if the hospital followed this style, but the Davison map, shows structural similarities in building layout and it is likely that Hazen and Sheridan would have worked to maintain a cohesive appearance across the fort.

5.2. The Hospital Expansion

Until 1862, there is very little mention of the hospital in any records or journals. It appears to have operated relatively smoothly and without issue until October 9, 1862, when Bensell writes in his journal:

Tore down a house, preparatory to removing it opposite the Hospital for the Sick
(ed. Barth 1959:58).

On October 11, of the same year, he writes:

Hospital removed until repairs are completed (ed. Barth 1959:59).

From these entries and the Davison map of 1864, it is known that the hospital was expanded from a single structure to a two-part structure in October 1862, with the purpose of expanding the wardroom. The Davison map shows the renovated structure, depicting an “L” shaped structure consisting of two different buildings joined together by a breezeway (see Figure 8). From the maps, it can be determined that the “northern wing”

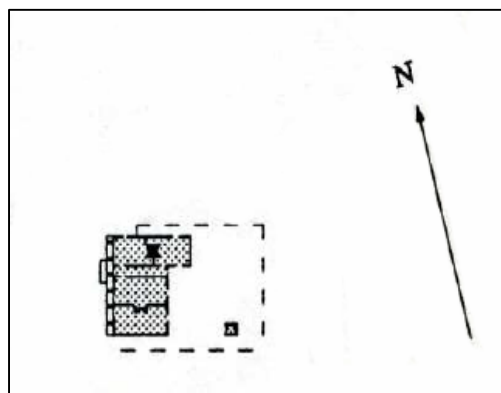


Figure 8. Detail of Hospital Complex (ed. Adams 1991:36)

shown in the Davison map, is the original hospital structure. Through comparison of the Gardner and Davison maps, it can be determined that the secondary wing was the northern most laundress quarters before it was moved up the hill to the hospital. In an Inventory of Public Buildings from June of 1862, it is noted that there were: “six laundress’s houses, two of which are occupied” (Davison 1862). The 1858 Gardner map clearly shows six laundress quarters located near the bakery (Figure 9). While the 1864 Davison map, only shows five quarters along with the bakery (Figure 10). The use of one of these houses for the expansion of the hospital would have been extremely practical, as the distance to move it was minimal and it was not in use.



Figure 9. Detail of 1858 Gardner Map

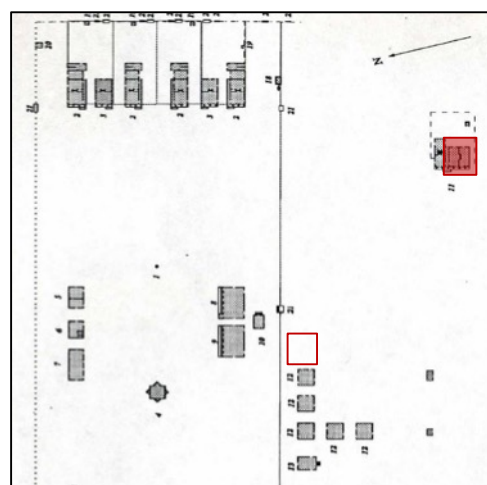


Figure 10. Detail of 1864 Davison Map

The motives behind the expansion of the hospital can be found by examining the Register of Sick and Wounded and calculating the maximum number of men that were in the hospital at any given day. In the year before the expansion, there were an average of six men in the hospital every day, with a maximum of fourteen men. Given the small size of the hospital, as it was originally constructed, it is clear that at times the hospital would have been extremely crowded. Figure 11 shows both the average and maximum monthly hospital attendance throughout the period recorded by the hospital register. The inventory of

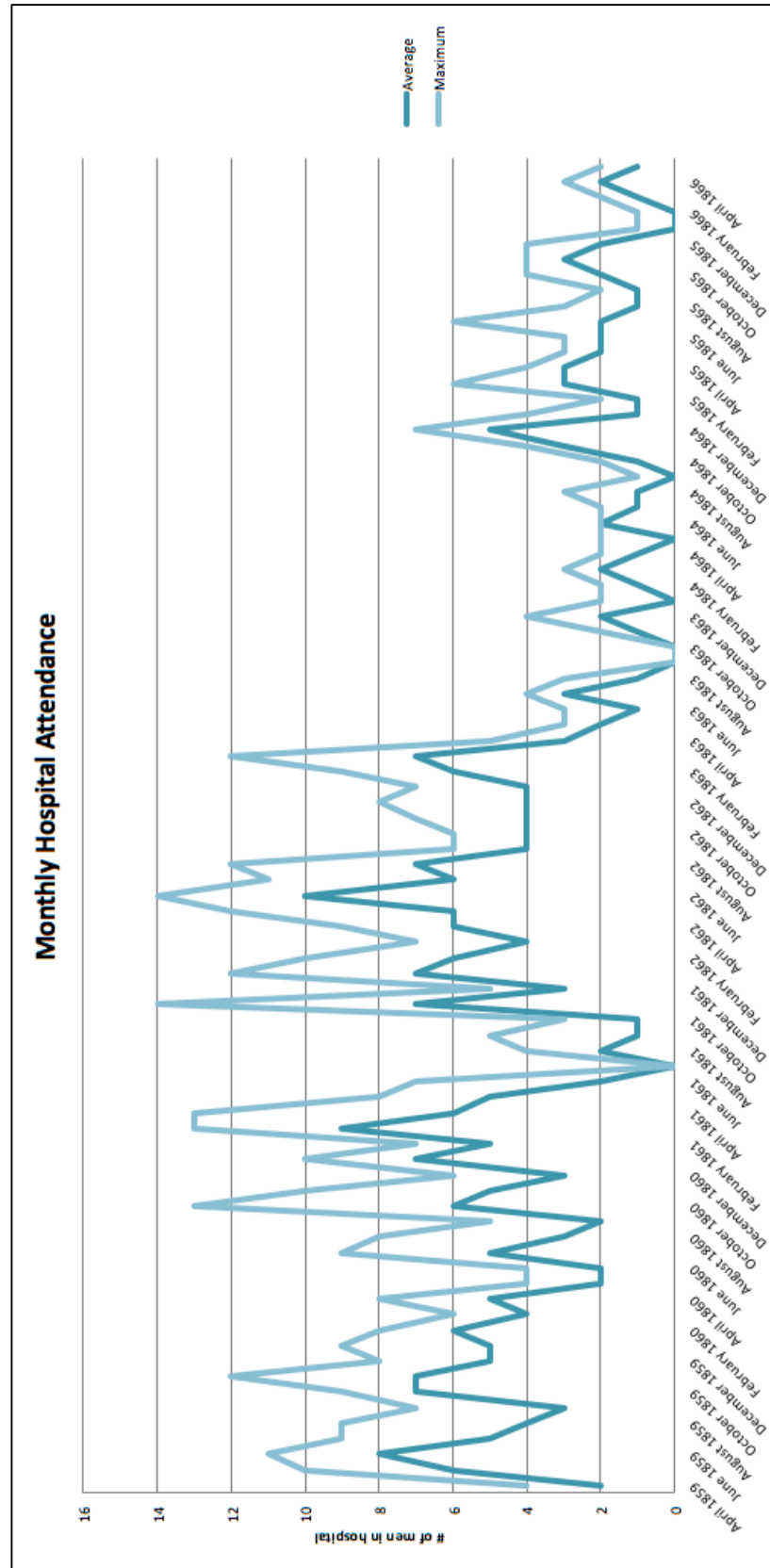


Figure 11. Average Monthly Hospital Attendance

hospital supplies from 1858 and 1859, show that the hospital had supplies to provide beds for 22 men, in the form of 3 mattresses and 19 bed sacks. Bed sacks were bags that could be stuffed with any available material to form a rudimentary mattress. It is unknown how many bed frames were on hand though it is likely that there were only three given the number of mattresses on hand. When the hospital was at full capacity, it is likely the men were forced to sleep on the floor, in rudimentary mattresses when there were no available beds.

The dimensions of the hospital are difficult to determine from the maps, as none of them present an accurate scale of their drawing, and it is known that the scale between building complexes shown in the Davison map are inconsistent (ed. Adams 1991:47). However, it appears that the original structure was four times longer than it was wide, and it is depicted as having two rooms with a central fireplace. From various sources, including Mansfield's inspection report and Bensell's diary, it can be assumed that one of the rooms was used as a wardroom, while the other was used as a kitchen and dispensary. The second wing of the hospital is also depicted on the Davison map as having two rooms, oriented east/west that had a shared central fireplace. The two wings were connected by a narrow breezeway and had a porch that ran along the front (west side) of the buildings. After the second wing was added on, it is unclear how the new space was used, but from the understood need for more ward space, it can be assumed that the new wing was used mainly for accommodating patients, possibly with a separate room for treating patients. It was common practice for the hospital steward to have lived in the hospital building to monitor patients and manage the hospital's operation. The attending surgeons are believed to have been housed in the "Surgeon's House", or the sixth and most southern house on Officer's Row. There is no documentary evidence supporting this assumption. However, this house was the closest to the hospital, making it a likely choice.

6. Military Medical Practices

Prior to the Civil War, the Army Medical Department was a small department with little ambition for professional or scientific development led by Surgeon General Thomas Lawson (Adams 1952:4). Lawson was a relic of the War of 1812, and held firmly to the notion of economy, cutting budgets wherever possible (Adams 1952:4). In 1861, the Medical Department consisted of less than 100 men, including one surgeon general, 27 surgeons, and 62 assistant surgeons (Brooks 1966:24; Adams 1952:4). These men were all professionally trained and thoroughly examined before entering the service (Glisan 1874:3). Due to the lack of any retirement law, many were past their prime, including Lawson, who was over 80 years old when the Civil War began (Adams 1952:4). Lawson's thriftiness limited his department in every way, discouraging the purchase of any medical reference books or additional sets of surgical instruments to replace failing ones (Adams 1952:4; Brooks 1966:9).

In addition to Lawson's frugality, the Medical Department struggled to operate within the confines of the military system, hindered by the fact that two other departments controlled their access to supplies and equipment as well as facilities (Adams 1952:5). The Subsistence Department was responsible for the disbursement of provisions, while the Quartermaster Corps was in charge of transporting patients, in addition to building and equipping military hospitals (Adams 1952:5). This system required that all medical staff be familiar with the process of obtaining equipment and supplies in addition to the other duties required of them (Army Medical Department 1856). With these complexities in the department, entrance into the service as a member of the medical staff had a steep learning curve for which there were few guides.

At the outbreak of the Civil War and the devastating result of the Battle of Bull Run in July 1861, it became increasingly apparent to the public that the Medical Department was

not equipped to handle the new influx of sick and wounded soldiers, let alone manage the devastation on the battlefield (Adams 1952:25). With the death of Surgeon General Lawson in May of 1861, and the placement of yet another man that was past due for retirement, Surgeon General Clement A. Finley, the government and the public began to call for a change in the department (Brooks 1966:12). Unfortunately, it was a year before the change occurred with the installation of William A. Hammond as Surgeon General, as well as the creation of a new position for a Sanitary Inspector General and several Sanitary Inspectors to help monitor the health conditions in camps and hospitals (Brooks 1966:18). With these changes, the Medical Department began to adapt to their new conditions, finding ways to manage the huge influx of patients, even though it was always one or two steps behind.

The immense need for medical help resulted in a flood of employment for any person that had medical training and even some of those that did not (Adams 1952:47). By April 1865, over 12,000 doctors had served in the war in some capacity (Adams 1952:47). Prior to 1862, very few manuals existed to create consistency across the department. In fact, only one manual existed: the *Regulations for Medical Department of the Army*. First printed in 1818, the manual was revised approximately every five to ten years until 1862, when it was revised almost every year during the war. This manual was issued to every assistant surgeon and surgeon and explained the various records that they were required to maintain and their requirements, as well as what supplies should be kept on hand. Besides this manual, men entering the service at the start of the war were offered little guidance until 1862, when Surgeon General Hammond saw the need for some form of education among his ranks (Woodward 1862). This education came in the form of manuals and guidelines, not just for surgeons, but for assisting staff as well. *The Hospital Steward's Manual* issued in 1862, was perhaps one of the most comprehensive training manuals for men entering the service as

medical staff. The manual listed all the duties a hospital steward, as well as those of ward-masters, nurses, and laundresses. It described how those duties differed at various locations and with different numbers of staff. In addition to this information, the manual also details how to perform duties, giving helpful advice on how to keep a ward room clean, how to prepare prescriptions, and even recipes for meals. However, these manuals could only teach the system of the Medical Department and the basics of proper healthcare. When it came to aspects of medical education, books could not help the newcomers that were ill-trained for the roles in which they were placed.

6.1. Military Medical Practices on the Frontier

In the Pacific Northwest, the challenges experienced by the Medical Department were not as severe as they were on the east coast. Medical staff were not overwhelmed by a constant flood of patients, nor were they pressured to adapt to the new conditions of their workplace. Instead, those on the west coast dealt mainly with the struggle of getting supplies and adjusting their practice to accommodate non-military patients. Many posts were located in remote locations, where the post surgeon was the only professionally trained physician for miles. Fort Yamhill was no exception to this as many of the surgeons stationed there are known to have cared for the settlers in the area, as well as the Native Americans living on the reservation (Larsell 1947:217). This deficiency in medical personnel often caused problems when a surgeon was called away or went on leave, as it was difficult to find a suitable replacement in the area (FYLB). Fort Yamhill's records show numerous cases of surgeon shuffling, especially in the early years of the war when there were fewer surgeons in the department. Due to this deficiency, it was not uncommon for fort commanders to hire a civilian physician when there were no commissioned surgeons available.

6.2. Military Hospital Operation

Army hospitals were supposed to be well-oiled machines of efficiency, with a place for everything (Woodward 1862:77). The large, general hospitals that were constructed after the beginning of the Civil War included every convenience that could be provided (Adams 1952:151). Designs included multiple wardrooms, a dispensary, a surgery room, kitchens, bathing rooms, dining rooms, washrooms, morgues, and storerooms (Woodward 1862). Hospitals built prior to the Civil War, especially post hospitals, were far less extensive, and often consisted of no more than a two to four room building that housed the essential facilities, including a wardroom, a dispensary, an area for surgery and examination, and a kitchen.

6.2.1. The Wardroom

Wardrooms were areas specifically meant to house patients, much like modern hospitals. Sizes varied greatly, although there were certain guidelines regarding the amount of air space per patient, but these were not published until 1862. The *Hospital Stewards Manual* specifies that for each patient housed in the hospital there should be a minimum of one thousand cubic feet of space per bed (Woodward 1862:103). It was estimated that a person used three to four hundred cubic feet of air an hour and that fresh air should be supplied at least double this rate, as once the air was breathed, it was thought unfit to be used again (Woodward 1862:104). This theory resulted in the concept that hospitals should be large and open, with adequate ventilation to keep air moving freely through the room.

Sleeping accommodations for patients ideally consisted of a mattress or bedsack, sheets, blankets, a coverlet, pillow, and pillowcase (Woodward 1862:116). Bedsacks could be stuffed with any available material to create a mattress; hair was the preferred medium, while straw was a cheaper but less durable material (Woodward 1862). Bed furniture would have

likely been made out of wood, though metal bed frames could be obtained in some locations (Grace 1856:115). Aside from bed frames, a wardroom would have also been equipped with small tables or stands (one to every two beds) and chairs (one to every bed) (Woodward 1862:120). Additionally, spittoons, chamber-pots, and bed pans would have been common items in a wardroom (Woodward 1862:121). For places fortunate enough to have indoor plumbing systems, water closets would often replace some of these items for patients well enough to walk on their own (Woodward 1862:121). Alternatives were to have a separate small room with a chamber chair or to have a privy located outside (Woodward 1862:121).

To heat the wardroom, it was expected that a stove or fireplace be installed to keep the room at a temperature of 70-72°F (Woodward 1862:106). Cooling was made possible by windows, or vents installed in the floors or ceilings that could be opened to increase airflow throughout the room (Woodward 1862:101). Lighting was most commonly provided by candles, but when the means were available, lamps or gas were preferred options (Woodward 1862:108). Oil or gas was paid for out of the hospital fund, while candles were procured through the commissary (Woodward 1862:110).

In the recreation of historic Fort Larned's hospital (1859-1878), a list was published of historical items that the hospital would have been stocked with in 1868. The ward rooms at Fort Larned were stocked with twelve beds with bedside tables, an iron heating stove, six ladder-back chairs, two rocking chairs, three window shades, two candle holders, one table, a water cooler, two bed pans, two spit mugs, and a thermometer (Sobier and Brown 1989:14).

6.2.2. The Dispensary

Dispensaries were places where organization and cleanliness were key. Surfaces needed to be free for the mixing of prescriptions and everything needed to be in place. Ideally, the room that housed the dispensary would be dry, well-lit, and conveniently placed

in the hospital (Woodward 1862:270). If possible, water would have been piped in to provide a small sink with running water and waste pipe, so as to clean mixing vessels and tools (Woodward 1862:271). A storage system with shelving, drawers and closets was ideal for the organization of various bottles and packages (Woodward 1862:271). If possible, it was recommended that the various types of preparations be stored separately, with dangerous or addictive substances stored under lock and key (Woodward 1862:271). Liquor however would have been kept with the rest of the hospital stores, with only a small amount available in the dispensary for the mixing of prescriptions (Woodward 1862:272).

Work in the dispensary required a number of items that were used in the creation of medicines. These included mortars and pestles, pill-tiles, pile machines, spatulas, and scales and weights (Woodward 1862:273). Items found in the dispensary of Fort Larned include a shelf/drawer unit, over 200 bottles of medicines, a heating stove, wood box, a desk and chair for the steward, ink stands, stamps, lead pencils, steel pens, sealing wax, two mortars and pestles, pill tiles, apothecary scale, spatula, slate and pencil, a desk and chair for the surgeon, a bookcase, examining table, instrument table, surgical instruments, wash stand, wash basin, a four panel screen, kerosene lamps, a wall clock, two spittoons, window blinds, and a barometer (Sobier and Brown 1989:4).

6.2.3. The Hospital Kitchen

The hospital would have been supervised by the hospital steward, or in larger hospitals, the steward assigned to manage the kitchen (Woodward 1862:45). According to the *Hospital Stewards Manual*, the hospital kitchen should be equipped with a range or stove, one or more long tables for meal preparation, enough shelving to hold all the essential utensils, and should be kept perfectly clean (Woodward 1862:205). Equipment that was commonly stocked included iron boilers, frying pans, stew pans, copper vessels lined with

tin, tin vessels, wooden utensils, knives, forks, spoons, plates, cups, etc. (Woodward 1862:208). Items that were stocked in the hospital kitchen at Fort Larned included: an iron cooking stove, two wooden tables, two chairs, shelving, a 20-gallon cauldron with a lid, two cleavers, two corkscrews, one cork extractor, one cork presser, two colanders, eight tin dippers, 18 dishes of assorted sizes, four feeding cups, one flesh fork, two glass funnels, two graters, two butcher knives, three carving forks, three ladles, two gridirons, one hone, two kettles, two bread knives, one tin measuring set, two milk cans, one coffee mill, two frying pans, two sauce pans, two tin pans, four tin coffee pots, two mustard pots, two pepper pots, four delft tea pots, five sadirons, one butcher saw, two steels, and two butler trays (Sobier and Brown 1989:13). This kitchen would have served approximately 24 patients, many more than would have been cared for at Fort Yamhill.

6.2.4. Hospital Stores and Supplies

Multiple sources exist which detail the commonly expected and required stores that a hospital was to keep on hand. Both the Army Surgeon's Manual and the Regulations for the Medical Department of the Army detail the supplies that were needed for medical purposes and the operation of a hospital, while the Hospital Steward's Manual is more helpful in determining the needed foods stores. The following list (Table 3 & 4) was taken from the 1862 Army Surgeon's Manual and lists all stores and supplies that should have been kept on hand at a military hospital, not including food stuffs that would have been required for meals. Most of these supplies would have been furnished by the Medical Department.

Table 3. Hospital Stores and Supplies (Grace 1862:114)

Hospital Stores	
Ginger, powdered	Beef, extract of
Milk, concentrated	Candles, sperm or composition
Nutmegs	Cinnamon, powdered
Pepper, black, ground	Cocoa or chocolate
Porter	Coffee, extract of
Sugar, white, crushed, kiln-dried	Corn Starch
Tea, black	Farina
Tapioca	Gelatin, shred
Barley, in tins	
Stationery, etc.	
Blank books, cap, half-bound, 4 qrs.	Prescription Book, Hospital
Register of Patients	Ward, (blank, 4 quires)
Case book	Regulations, Army Medical Department
Envelopes, printed	Paper, filtering, round, gray, 10 inches;
Ink	wrapping, white and blue; writing
Inkstands	Pens, steel
Traveling	Penholders
Meteorological Register	Pencils, lead, Faber's, No. 2.
Morning Report Book	Portfolio, cap size
Mucilage	Sealing wax
Order and Letter Book	
Bedding	
Bed sacks	Mattresses, hair
Beds, water, of India rubber	of straw, moss, or shucks
Blankets	Mosquito bars
Blanket cases, canvas	Pillows, hair
Counterpanes	Pillow cases, cotton, colored; linen, white
Cushions, rubber, for air or water, small	Sheets, linen
Gutta-percha bed covers	
Hospital Clothing	
Caps	Shirts, cotton
Drawers	Slippers
Gowns, dressing	Socks, woolen
Furniture and Appliances	
Basins, tin, small, for dressers, wash; hand	Clocks, wooden, small
Bed pans, delft, shovel shape	Close-stools
Bed-ticket Frames	Clothes line
Bedsteads, iron	Corks, assorted
Bowls, delft	Corkscrews
Brooms	Dippers, tin
Brushes, scrubbing	Dishes, assorted sizes
Buckets, leather; wooden	Feeding cups, or sick feeders
Caldrons, with tin covers, 20 gal.	Flesh forks
Candlesticks	Funnels, glass; tin
Chairs	Graters
Cleavers	Gridirons

Table 4. Hospital Stores and Supplies Continued (Grace 1862:114)

Hatchet	Refrigerators
Hone	Retort, delft
Kettles, tea, iron	Sadirons
Knives and Forks carving; butchers'; bread	Salt-cellars
Ladles	Scales and weights, prescription; shop
Lanterns, glass	Sheepskins, dressed for plasters
Looking-glasses, small	Slates
Measures, graduated, glass, 4 oz. minimum;	Spatulas
tin, gallon to pint	Spirit lamp
Medicine panniers	Spit mugs, without tops
Medicine measuring glasses	Spittoons
Medicine spoons, delft	Spoons, table; tea
Mess chest	Steel
Mills, coffee	Stoves, cooking
Mortars and pestles	Tables, bedside
Mugs, delft	Test tubes
Pans, frying, sauce	Thermometer
Pans, tin	Thermometer and Hygrometer
Pill boxes, turned wood; machine; tiles	Tin warmer, for stomach; to hold hot water for
Pitchers, delft	feet
Plates, delft	Trays, butlers'
Pots, chamber, delft, inodorous, Army pattern; tea,	Tubs, bath
delft; coffee, tin	Tumblers, glass
Pots, mustard; pepper	Urinals, glass
Rain gauge	Vials
Range	Wood-saws
Razor and strop, in case	

These materials were likely on hand at Fort Yamhill's hospital, although they may have differed somewhat as a function of the supplier. Fort Yamhill received all of its supplies through Fort Vancouver (Eichelberger 2010:90). These supplies would have been shipped down the Columbia River to the mouth of the Willamette River, where they were then taken upstream to Dayton (FYPR). Once reaching Dayton, supplies were then loaded onto a wagon and transported the rest of the way to the fort. In total, this journey was over 110 miles long (FYPR). Both Fort Yamhill and Fort Hoskins were supplied through Fort Vancouver, while Fort Umpqua received its goods via San Francisco (Eichelberger 2010:26).

7. Medical Personnel

When Dr. Glisan first entered into the service in 1849, he was subjected to an examination before a Board of Army Surgeons, who tested any physician wishing to join the ranks of the Medical Department. Prior to 1832, there was no regulatory board that determined who was and was not fit for service; a politician being able to appoint any man, regardless of his training (Glisan 1874:2). However, on July 7, 1832, Lewis Cass, Secretary of War, issued an order requiring that all men be examined before being admitted into the Medical Department; this order was in effect until the outbreak of the Civil War, when demand superseded qualification and the examinations became much less rigorous (Glisan 1874:2; Adams 1952:49). These intense examinations lasted three-days and required that each candidate write a thesis on a given topic and be tested individually for two days on every topic related to medicine (Glisan 1874:4). In addition to being thoroughly tested on medicine, candidates were also tested on their general knowledge of history, geography, languages, mathematics, literature, geology, botany, and other subjects (Sohn 1994:473). At this time and through the Civil War, the Medical Department consisted of a three-rank system that included a surgeon general, surgeons, and assistant surgeons (Glisan 1874:1). Surgeon generals had a rank equivalency of a colonel, while surgeons held the rank of a major, and assistant surgeons the rank of a lieutenant with the potential to gain rank of captain after five years in service (Glisan 1874:1). Because the Medical Department was a separate entity from the military, men in service could be stationed anywhere and in any branch of the military. Their rank helped define their place in their posts, determining their quarters and their authority (Glisan 1874:2). A medical officer's rank did not give him leave to command men unless no other ranking officer was present, this being the true dividing

line between being a man of the military and one of the Medical Department (Glisan 1874:2).

After the Civil War began, the Medical Department was forced to change its ranking system to accommodate the large influx of thousands of new commissions, volunteers, and acting personnel. These people were eventually dispersed into seven different bodies that operated throughout the United States and its territories. They included the traditional Surgeons and Assistant Surgeons for the Medical Corps of the U.S. Army, Surgeons and Assistant Surgeons of Volunteers, Regimental Surgeons and Assistant Surgeons, Acting Assistant Surgeons for the U.S. Army, Medical Officers of the Veterans Corps, Acting Staff Surgeons, and Surgeons and Assistant Surgeons of Colored Troops (Adams 1952:47). Fort Yamhill was home to medical staff associated with three of these bodies, including the Medical Corps, Volunteers, and Acting Assistant Surgeons. Additionally, civilian physicians were occasionally employed when no other military personnel were available.

7.1. Assistant Surgeons and Their Duties

Despite the name, the rank of assistant surgeon did not mean that these men were mere assistants to surgeons. The main difference in these ranks was that assistant surgeons did not normally have command over other assistant surgeons, unless they had more experience. Surgeons were usually placed in charge of larger hospitals or of regional medical departments, while assistant surgeons were in charge of fort hospitals or field hospitals that did not have a large staff. There was not a large difference in education between ranks, but more one of experience and desire for upward mobility.

In the west, assistant surgeons accounted for the majority of the military medical staff in the field. Unlike the descriptions of hospitals described in the Hospital Steward's Manual, fort hospitals were not usually well staffed, smoothly run machines with a room for

every need. More often, they were two to four room structures that were staffed by a small handful of people or less. In some cases, they had to work out of tents for extended periods of time before a hospital building was constructed (Tate 1999:182). Doctors that were stationed in these remote areas, had to adapt to a frontier lifestyle, as well as a frontier practice, where supplies were limited and new situations were constantly encountered. The hazards associated with frontier life were numerous and often unexpected, surgeons frequently having to care for a wide variety of wounds from arrow wounds to rattlesnake bites to wagon fall injuries (Karolewitz 1967:33). Even the simplest wound could easily become infected, threatening the life of a patient if it was not treated in time.

Besides the hazards and unexpected incidents that existed on the frontier, medical personnel had to maintain the same standards and perform the same duties as their counterparts in the east. Not only did they treat patients, but they were also required to act as naturalists, anthropologists, meteorologists, biologists, and botanists, collecting information, data, samples, and specimens wherever they went (Karolewitz 1967:29). Not only did they collect specimens from the local flora and fauna, but also examples of battle wounds, diseases, and conditions, which were sent back to the Army Medical Museum in D.C. (Henry 1964:18). Additionally, they were expected to serve on numerous boards and court martials (Clary 1972:55). Often times these tasks left little time to rest, filling their schedules completely (Tate 1999:185). Apart from these activities, post surgeons also had to perform many tasks related to their duties as physicians, including inspecting living conditions of the men, monitoring water supplies, maintaining the pharmacy, supervising cooking procedures, overseeing hospital staff and performing daily sick calls (Tate 1999:185). On top of all these duties were added all the paperwork that the senior medical officers at each post were expected to keep. Such records consisted of: a register of patients, a

prescription book, a diet book, a case book, a meteorological register, copies of requisitions, annual returns, quarterly reports of sick and wounded, and an order and letter book (Grace 1864).

Their patients were diverse in nature. As has been stated before, frontier medical personnel had to care not only for the military personnel, but other non-military people in the area as well, including pioneers, and Native Americans. Besides these groups, they also extended their expertise to men hired by the army for construction or other duties, laundresses, servants, and the families of officers and soldiers (Grace 1864:17). While Congress never issued official orders indicating that its military medical personnel should treat civilians, it fell under the Hippocratic Oath and naturally became one of the duties of doctors on the frontier (Tate 1999:188).

Outside of their general hospital duties, assistant surgeons also inspected all potential recruits, ensuring their fitness for duty (Henderson 1856:16). Inspections, when done by the book, were extensive physicals that looked at every aspect of a potential recruit, from physical stature, age, current health and fitness, previous conditions, mental aptitude, and moral character (Henderson 1856:21). Prior to a physical examination, recruits would be asked to engage in conversation, to judge their mental capacity, and character (Henderson 1856:81). Any man showing evidence of being intoxicated would be dismissed upon arrival, as well as those that did not claim to be between 18 and 35 years of age (Tripler 1858:8). If they passed the preliminary exam, recruits would be asked strip down and perform various simple movements to determine their mobility before a thorough inspection of their body was conducted (Henderson 1856:88). The *Army Surgeon's Manual* of 1864 states that:

In passing a recruit the medical officer is to examine him stripped; to see that he has free use of all his limbs; that his chest is ample; that his hearing, vision, and speech are perfect; that he has no tumors, or ulcerated or extensively cicatrized legs; no rupture or chronic cutaneous affection; that he has not received any contusion, or wound of the head, that may

impair his faculties; that he is not a drunkard; is not subject to convulsions; and has no infectious disorder, nor any other that may unfit for military service (Grace 1864:18).

Men could be rejected for numerous reasons, but many times their passing depended on the strictness of the examining officer.

Prior to the Civil War, standards were high, ensuring that all accepted recruits were fully fit for service and would not prove a liability to their comrades (Rutkow 2005:10). However, once the Civil War began and the need for troops rose exponentially, surgeons received commissions based on how many men they could pass in a day, resulting in a reduction of standards (Adams 1952:12). One surgeon was known to pass ninety recruits an hour, another boasted of passing a hundred recruits in an hour (Adams 1952:12; Brooks 1966:8). As a result of these lax standards, the army began to be flooded with men that were unfit for service from the beginning and often filled hospitals before even seeing action in the field (Adams 1952:13). This was a double edged sword for the government, because men that needed care were hindered from receiving it, and it was often forced to give pensions to men that were discharged for disabilities that should have kept them from ever being enlisted (Rutkow 2005:11).

7.2. Hospital Stewards and Their Duties

Hospital Stewards were most often employed from the ranks of enlisted men at a post, but occasionally, if the option was available, they were civilians, well versed in the duties required, that were commissioned for duty. If this was not option, surgeons had to make do with whoever was on hand that showed the greatest potential for the position. The demands of the job required that the man selected was able to read and write proficiently, and hopefully had some previous experience in a pharmacy. Any man that was selected to

serve as a hospital steward was given the rank of a non-commissioned officer, sergeant, being the rank most commonly applied (Dammann and Boller 2008:153).

Aside from the post physician, hospital stewards were the most crucial staff employed at hospitals. While assistant surgeons were busy attending to all their duties, the hospital stewards were ensuring the hospital ran smoothly and efficiently (Woodward 1862). They took care of the general supervision of the hospital and its staff, maintained discipline among the patients, made sure that everything was clean, and ensured that the pharmacy and kitchen were well-stocked (Woodward 1862:44). The list of duties associated a hospital steward is extensive, and often times, especially in larger hospitals with more than 150 beds, it was not uncommon to have two or more hospital stewards assigned to various duties (Woodward 1862:15; Dammann and Boller 2008:154). There were duties associated with the maintenance of the hospital, the ward, the pharmacy, the kitchen, and the general care of the patients (Woodward 1862:44).

In the ward room, hospital stewards were in charge of overseeing the nurses, if any were employed, whose responsibility it was to maintain a clean and odor free ward room, in addition to changing dressings, clothing, and bedding of the patients (Woodward 1862:55). The hospital environment was dependent on ventilation, lighting, and heating that all had various specifications to be maintained from a cost efficiency stand point as well as a health stand point. The training of nurses was also often left to the stewards as they were usually the most familiar with what was required of the position (Woodward 1862:42).

The pharmacy was the sole responsibility of the hospital steward, who was expected to take charge of and maintain the dispensary, fill prescriptions, and to make purchases as needed with approval from the surgeon (Woodward 1862:81). It was hoped that any man employed as a hospital steward would have some background in pharmacy or medicine and

be versed enough in the creation of medicines to not require much training (Woodward 1862:21). For instances when these men were not well practiced, the Hospital Steward's Manual provided certain tips for understanding the shorthand used by doctors when writing their prescriptions and recommendations for the creation of various types of medications. Prior to the writing of this manual, it was certainly a much more daunting and difficult task to perform this job without previous experience.

In addition to these duties, stewards were charged with managing the hospital kitchen, keeping stock of stores, and overseeing the preparation of meals (Woodward 1862:204). Each day they were required to inform the cook of the quantity of meals needed to be prepared that day and how many of each ration. Aside from this they were also given instruction on how to be the most efficient with supplies, the manual even providing numerous recipes that could be used for the feeding of patients. Patients meals were ideally well planned, and suitable for each patient's condition. Once the meals were prepared they were taken to the wardroom or to the dining area depending on whether the patients were bedridden or not (Woodward 1862:206). Those fit enough to move would dine at a table, if the post hospital had accommodation for such an area, otherwise meals were distributed in the wardroom (Woodward 1862:206).

7.3. Nurses and Their Duties

The duties of nurses kept them mostly confined to the wardroom, seeing to the patients and ensuring that everything was kept to the standards of cleanliness that were required at the time. Of course, each hospital had different levels of standards, depending on the physician in charge. Nurses were most often men selected from the enlisted ranks, but in some cases, more often in the east during the Civil War, women would be employed (Adams 1952:68). A number of women became well known for their work in hospitals, often

endangering their lives to help the men struck by the violence of battle (Adams 1952:70). But in most cases, nurses were enlisted men that often had some previous experience in medical care or that showed good initiative (Woodward 1862:39).

The nurses were in charge of cleaning the wardroom and furniture, utensils and other property (Woodward 1862:54). They would also make beds, clean bedpans, sweep and mop the floors, as well as change bedding (Woodward 1862:54). During this time, germ theory had not yet been developed; instead the source of disease instead was thought to be malodorous substances, known as miasmas (Adams 1952:196). Because of this, those in the medical profession were obsessed with keeping things smelling clean (Brooks 1966:199). To this end, hospitals were kept extremely clean and well-ventilated, but sanitation was not a common practice (Adams 1952:196). When it came to cleaning the floors, utensils, and bedding, it was all cleansed with tepid water, usually under the justification of preserving the material, especially in the case of the wooden handles of surgical instruments, leaving any bacteria or viruses in place to infect the next patient (Woodward 1862:275).

Other duties included care of the patients, washing and changing clothes of those unable to do so themselves (Woodward 1862:58). Nurses were also in charge of taking notes when the surgeon made his rounds, recording any directions regarding diet, medications, and other related information (Woodward 1862:55). Additionally, they were responsible for administering medications to patients, as well as serving food in the ward (Woodward 1862:54).

7.4. Hospital Cooks and Their Duties

Cooks, like nurses, were usually privates taken from the ranks of enlisted men (Grace 1864:17). While serving in this capacity, they were exempt from their other duties, and reported to the hospital steward (Grace 1864:16; Woodward 1862:122). Occasionally, these

men were employed civilians, if the funds were available to hire someone with more experience (Woodward 1862:32). Ideally, each cook would be responsible for making meals for no more than thirty men (Woodward 1862:42).

Each morning, the cook would receive the day's ration of stores from the steward, and was told how many of each type of meal were needed (Woodward 1862:182). The day's ration consisted of all the food required for a day's worth of meals. Each man on a full ration was due $\frac{3}{4}$ lbs. of pork or bacon or $1\frac{1}{4}$ lbs. salted beef, and 22 ounces of bread (Woodward 1862:156). For every hundred men there was issued 8 quarts of dried beans or peas or 10 lbs. of rice or hominy, 10 lbs. of green coffee or $1\frac{1}{2}$ lbs. tea, 15 lbs. sugar, 4 quarts of vinegar, 2 quarts of salt, and roughly one pound of candles depending on the type of candle (Woodward 1862:157). Rations were usually procured through the commissary at contract or cost price, paid for through the hospital fund (Woodward 1862:162). Items that could not be obtained locally were ordered through the medical purveyor. Such items often included: arrow-root, barley, cinnamon, cloves, cocoa, farina, ginger, nutmeg, tea, whiskey, and wine (Woodward 1862:166).

There were four types of meals that the steward would request, depending on the health of patients. The diets consist of the full diet, for patients with no digestive issues, the half diet for those with smaller appetites, the low diet for patients in truly poor condition, and the extra diet for patients that needed more nourishment (Woodward 1862:167). Cooks were supposed to be familiar with the requirements for each diet and the most efficient way to create meals. The full diet was similar to what the enlisted men would eat in the barracks, consisting, for example, of an ample breakfast of coffee with milk and sugar, bread and butter, and a some kind of meat, soup and bread for dinner [lunch], and a somewhat meager supper of tea with milk and sugar, bread and butter, and possibly some stewed fruit

(Woodward 1862:189). The half diet, was very similar to the full diet, but it lacked meat in the mornings, and fruit in the evenings, generally having smaller portions than the full diet (Woodward 1862:191). The low diet was designed for those struggling to keep down food and consisted of meager rations. Breakfast was made up of tea and toast, and possibly gruel, while dinner included a simple broth with arrow-root, rice pudding or farina, while supper was the same as breakfast (Woodward 1862:191). Those prescribed the extra diet, were given richer foods such as eggs, oysters, chicken, fresh fruit, and malt liquors, which were usually added onto the low diet depending on the condition of the patient (Woodward 1862:167).

7.5. Medical Personnel at Fort Yamhill

The men employed by the Medical Department varied largely in background and time spent at the fort. The first man to be assigned to Fort Yamhill was Assistant Surgeon C.H. Crane, who was in charge of the hospital for a total of ten days before he was relieved by Asst. Surg. Rodney Glisan. Dr. Glisan served at Fort Yamhill for a total of five and a half years. Hospital Steward William Y. Deere also served at Fort Yamhill for an extensive period, from December 1856 to April 1863. Following Dr. Glisan came eight other physicians who manned the fort hospital for varying amounts of time. Table 5 lists all medical staff employed at Fort Yamhill and their period of service. They included both army medical staff and contracted civilian physicians, with the shortest appointment being three months long. For all those serving at the hospital there are personal records pertaining to their careers, which detail previous places of employment and haphazard pieces of information regarding their service at Fort Yamhill. However, personal records were only obtained for six of these surgeons, including Glisan, Warren, Tompkins, Smith, Carpenter, and Davis. See Appendix A for photos of some of Fort Yamhill's senior medical staff.

Table 5. Fort Yamhill Medical Staff (FYPR)

<u>Name</u>	<u>Arrived</u>	<u>Departed</u>
Assistant Surgeon C.H. Crane	August 30, 1856	September 9,
Assistant Surgeon Rodney Glisan	September 9, 1856	March 26, 1861
Assistant Surgeon John F. Randolph	February 15, 1861	November 18,
Dr. William Warren [civilian]	December 20, 1861	March 1862
Assistant Surgeon E.A. Tompkins	June 21, 1862	July 27, 1863
Dr. G.K. Smith [civilian]	July 27, 1863	December 5,
Assistant Surgeon Horace Carpenter	December 5, 1863	December 10,
Assistant Surgeon C.C. Dumreicher	December 3, 1864	August 10, 1865
Acting Assistant Surgeon J.W. Davis	August 10, 1865	November 23,
Acting Assistant Surgeon G.W. France	January 1866	May 1866
Hospital Steward William Y. Deere	February 13, 1857	May 9, 1863

7.5.1. Assistant Surgeon C.H. Crane (August 30, 1856 – September 9, 1856)

Charles H. Crane was stationed at Fort Yamhill for a period of about 10 days, five months after the fort was established. Despite this gap, Crane was the first medical staff to be stationed at Fort Yamhill. He was quickly relieved by Asst. Surgeon Rodney Glisan, but stayed at the fort until October 19, 1856, when he received orders from the War Department, assigning him elsewhere (FYPR). Later in his career, Crane became Surgeon General of the United States, and attended to the deathbed of President Lincoln (Hudnall and Hudnall 2005:41).

7.5.2. Assistant Surgeon Rodney Glisan, M.D. (September 9, 1856 – March 26, 1861)

Dr. Rodney Glisan was the longest serving surgeon at Fort Yamhill. He came to Fort Yamhill after six years of military service, which took him all over the country. Before transferring to Fort Yamhill, he was stationed at Fort Orford where he became well known as a fine, upstanding physician. His experience there and at Fort Vancouver, established a good reputation that later led to his being called away on detached service numerous times (Glisan 1874; FYPR).

During his time at Fort Yamhill, Dr. Glisan cultivated good relations with both the men of the fort who were in his care as well as the numerous Europeans that lived on and around the reservation, and the Native Americans, who slowly learned to prefer his care to their own native doctors (Glisan 1874:448). In 1868, Glisan was even employed by the agency as the reservation physician. Through his journal, Dr. Glisan provides a large amount of insight into the political affairs and life on the frontier. Because of his writings, he has the greatest legacy of any of the surgeons serving at Fort Yamhill.

In 1861, prior to the outbreak of the war, Glisan retired from the service, traveling first to New York, then to San Francisco, finally settling down in Portland where he started his own private practice. In 1867, he served as an Acting Assistant Surgeon out of Portland for six months before leaving the military completely behind him (Personal File for Rodney Glisan). Over the next twenty-three years, he drove his career to new heights, joining the Oregon State Medical Society and serving as its president in 1875 (Oregon State 1876). He published numerous medical articles and a textbook entitled *Modern Midwifery*, which he presented at the annual meeting of the American Medical Association, gaining international recognition (Oregon Native 1899). In addition to these feats, he also became a professor at the Oregon Health and Science University, focusing in obstetrics and surgery.

7.5.3. Assistant Surgeon John F. Randolph (February 15, 1861 – November 18, 1861)

Much like Assistant Surgeon Crane, Randolph had an extremely meritorious career. He was first mustered into service as an Assistant Surgeon in 1855 in Louisiana (Henry 1869:107). Between 1856 and 1859, he was stationed in numerous places around Oregon and Washington, including Fort Walla Walla, and Fort Dalles (Henry 1869:107). In 1858, he received distinction for his performance in the field on Lt. Col. Steptoe's expedition against the natives in Oregon (ed. Brinton 1880). He was stationed at Fort Hoskins for one year in

1859, before being transferred to Fort Yamhill for eleven months. All that is known of Randolph's time at Fort Yamhill is that he was ordered to remain at the fort in June 1861, when the Army Regulars left and the California Volunteers took command (Mason 1861). In November 1861, Randolph left Fort Yamhill for California where he served in the Presidio for over a year (Henry 1869:107).

Between 1862 and 1869, Randolph received two promotions, to Surgeon and later to Brevet. Lt. Col for faithful and admirable service (Henry 1869:107). These promotions placed him in commanding positions, including Medical Director of the Department of Missouri, and Medical Director of the Marine Hospital in St. Louis (Henry 1869:107).

7.5.4 William Warren, M.D. [civilian] (Intermittent December 20, 1861 – March 1862)

Dr. William Warren was a civilian physician from Salem, Oregon who was contracted into service at Fort Yamhill by Capt. L.S. Scott on December 20, 1861. His exact age is unknown, however he was likely the oldest man to serve at the Yamhill hospital, given Bensell's references to him. On March 25, 1862, Bensell writes:

Doc's family arrives this evening from Salem. Doc hugely tickled, says he, 'feels in the Family-way' once more. Good for Old Gent. Few enjoy such favors at his age
(ed. Barth 1959:5).

In the footnotes of Bensell's diary, Barth states that after Warren terminated his contract at Fort Yamhill, he went on to work at the Grand Ronde Indian Agency from April 19, 1862 to April 1, 1863 (ed. Barth 1959:23). Warren's activities after this point are relatively unknown, however records from his military personnel file state that he died in Salem in 1866 or 1867.

7.5.5. Assistant Surgeon E.A. Tompkins (June 21, 1862 – July 27, 1863)

Of the various ten surgeons that resided at Fort Yamhill, Assistant Surgeon Edward Alexander Tompkins left the largest mark in the historic record. As soon as he was assigned

to Fort Yamhill, his presence and situation becomes well known. Tompkins was first recruited into service on Nov 6, 1861 at Camp Sigel, California (Personal File for E.A. Tompkins). Previously, Tompkins had undertaken the great trek across the country and became one of the pioneering fathers of Grass Valley, California. In December 1861, he was sent to Oregon, where he arrived at Fort Vancouver on March 15. From Vancouver, he was ordered to Fort Walla Walla, where he stayed until June 9, when he was ordered to report for duty at Fort Yamhill. It took Tompkins eleven days to reach Fort Yamhill as his travel was delayed by severe flooding of the Columbia River. On June 27, 1862, Capt. Scott reported the arrival of Asst. Surg. Tompkins stating that as soon as the surgeon arrived at the fort he had applied for a leave of seven days (FYLB). With this application came the notice that Tompkins wished to resign his commission. Capt. Scott responded to this information by granting him the requested leave and asking permission to give Tompkins the option to apply for an extension of ten days.

In a letter to the District of Oregon dated July 12, 1862, Tompkins again makes himself known by writing the following letter requesting 30 days of leave:

I am forced to make this request in consequence of much sickness in my family, and the death of one of my children during my absence. The sickness of my wife is of such a kind that she is liable to die in a very brief space of time, whereby I shall be prevented from ever seeing her again if my stay is prolonged at this post. Also the adjustment of my business at home requires my attention, without which, I shall be deprived of the means of sustaining my family, and of performing the duties of my office at the same time (Tompkins 1862a).

In reply to this request, Tompkins was granted a leave of 30 days on August 7 (Personal File for E.A. Tompkins). However, on September 19 he again wrote to the District of Oregon saying he was delayed from taking leave because he was kept in Dayton, Oregon for three weeks, attempting to find a substitute surgeon (Tompkins 1862b). Curiously, Capt. Scott would not accept a replacement, preventing Tompkins from ever taking his 30 days leave. As

a result, he again requested a leave of absence. It is unknown whether this was granted or not.

In March of 1863, Bensell states that Tompkins turned the hospital over to the Hospital Steward William Y. Deere with intentions to resign from the service (ed. Barth 1959:83). However, Capt. Scott's letters reveal a more complicated situation. On April 10, Capt. Scott writes that Hospital Steward Deere would like to resign (FYLB). At this point, Tompkins was still at the fort and Scott was struggling with having Deere stay and letting Tompkins go, or keeping Tompkins and training another enlisted man in the duties of Hospital Steward (FYLB). The outcome of this situation was the loss of Deere, however his resignation was not accepted as his career with the military continued for another three years (FYPR). After Deere left, it is unclear who replaced him, however Bensell briefly mentions a Private Lowee that may have served as both Hospital Cook and Hospital Steward, a man that Bensell once wrote of striking Steward Deere while drunk (ed. Barth 1959:14).

It was not until July 27, 1863, that Tompkins was allowed to step down from his position. He was granted a leave of 30 days, which he took in August, returning to his family in Grass Valley (Personal File for E.A. Tompkins). In September 1863, he resigned from his commission and died in Grass Valley in on May 23, 1888, eight years after the passing of his wife, Henriette (Personal File for E.A. Tompkins). His character was complimented occasionally by Bensell in passing remarks, which stated that he was of good humor and politeness and that upon his supposed departure that he was a "fine old man, and we shall regret his loss" (ed. Barth 1959:83). While this seems to present a man of good character, Bensell also reported in January 1863 that Tompkins appeared at a court martial drunk and late, sullyng the image of the surgeon (ed. Barth 1959:72).

7.5.6. G.K. Smith, M.D. [civilian] (July 27, 1863 – December 5, 1863)

The day that civilian surgeon Dr. George Kellogg Smith was contracted into service at Fort Yamhill was an unfortunate day. On July 27, 1863, the day that Dr. Smith relieved Dr. Tompkins of his position, Bensell writes:

Clear and hot. Dr. G.K. Smith and family arrives this morning. The Capt's little girl being very sick authorizes me to sign passes. Jenny May expires at 3 o'clock this afternoon. Family in deep sorrow (ed. Barth 1959:96).

It is unknown whether Tompkins or Smith was in charge of Jenny May when she passed, or if they collaborated to assist in her care, however the sad outcome must have been a bleak way for Smith to begin service at this new post. Bensell writes the following day that they buried the little girl, with three sergeants and Bensell being the pallbearers (ed. Barth 1959:96). The location of her gravesite is not known.

Between July and December of 1863, Smith is mentioned little in the records. Bensell makes it clear that he made a living not just on the fort, but also off the fort, servicing many of the people in the surrounding area (ed. Barth 1959:112). While he was still at Fort Yamhill, Smith was ordered to report to the Head Quarters of the District of Oregon on November 16, 1863, to be examined by the Medical Director (Smith 1863). In response to this order, Smith apologized but claimed that sickness in his family prevented his departure, and that it was not his intent to stay in the service for long, however he would still like to undergo examination at some point (Smith 1863). Early in November 1863, Smith was ordered to report for duty at Fort Lapwai (Personal File for G.K. Smith). After Smith's departure from Fort Yamhill, Bensell was charged with seeing Dr. Smith's wife and their two children to Eugene on December 8, 1863, a trip that took them three days (ed. Barth 1959:113).

7.5.7. Assistant Surgeon Horace Carpenter, M.D. (December 5, 1863 – December 10, 1864)

Assistant Surgeon Horace Carpenter was at Fort Yamhill for approximately eleven months. According to a letter from Brigadier General Alvord, Dr. Carpenter was ordered to repair from Fort Lapwai and report for duty at Fort Yamhill on December 1, 1863 (Personal File for G.K. Smith). In this letter, it is mentioned that Carpenter had requested a transfer due to his inflammatory rheumatism. Carpenter's arrival at Fort Yamhill is clearly marked in Bensell's diary. On December 5th, 1863, Bensell writes:

Dr. Horace Carpenter arrived and relieves Dr. G.K. Smith. Carpenter brings his family. He comes with the reputation of being a "man" (ed. Barth 1959:112).

It is unclear what Bensell means by this statement, but professionally, Carpenter had an excellent reputation. With the arrival of Carpenter, Smith leaves for Fort Lapwai, filling Carpenter's position (Personal File for G.K. Smith). Three days later, Carpenter transmits a receipt of medicine, instruments, and hospital stores that were turned over by Dr. Smith (Personal File for Horace Carpenter).

In April of 1864, Carpenter was transferred to Cape Disappointment, for unknown reasons (FYPR). After his departure, Lt. Davison began looking for a suitable replacement, struggling to do so (Davison 1864). For a brief period, he employed Carpenter's father, also named Horace Carpenter, who Dr. Carpenter recommended that Lieut. Davison contract as a citizen physician (Davison 1864). Less than a month after he left, Carpenter returned to Fort Yamhill and resumed his duties. In December 1864, Carpenter received a commission as a surgeon with the 1st Oregon Volunteers and departed soon after.

During Carpenter's time at Fort Yamhill, a contentious issue kept arising: the appointment of Private Redd as Hospital Steward. In his diary, Bensell claims that Private Redd was: "a man regularly educated as a physician" (ed. Barth 1959:157). This made him an ideal candidate for this position and he was recommended as such by Carpenter in June 1864

(ed. Barth 1959:157). Lt. Davison, however, refused to recognize the appointment of Private Redd, Bensell stating only that: “Davison was never known to give a soldier the slightest chance to make a cent or feel like a free man” (ed. Barth 1959:158). Six months later, likely after he left Fort Yamhill, Carpenter wrote a letter adamantly stating that Private Redd was unfit to serve as Hospital Steward. His exact words are thus:

Redd is unworthy and unfit for the position. Redd is a very intelligent man yet very dishonest and very much objected and has lost all moral compass and I wish it to be understood that I cannot recommend his appointment (Carpenter 1864).

No other sources give insight on this subject. Bensell gives no indication that Private Redd’s character was one to be wary of, but from Carpenter’s change in opinion, it is clear that the man was of questionable integrity.

Carpenter’s career in medicine did not end with his departure from military service. He later went on to be the first superintendent of the Oregon Insane Asylum in Portland and the first dean of the medical department at Willamette University, in Salem (Oregon Statesman). He also was a member of the Oregon State Medical Society with Glisan, serving as the society’s president three years after Glisan (Oregon Medical Society 1878).

7.5.8. Surgeon C.C. Dumreicher (December 3, 1864 – August 10, 1865)

Surgeon Conrad C. Dumreicher made an unflattering imprint in the historical record. He is first mentioned in the diary of Lt. Col. John Drake, an officer of the 1st Oregon Volunteers, who led a campaign against the Native Americans in Central Oregon in 1864. Dumreicher was assigned to Drake’s party as a surgeon. He was described by Drake as being:

a morbid, crusty, indolent old muggins and is of no account on such a campaign as this; cannot take care of himself much less take care of others (MacArthur 2012:119).

Throughout this affair, it is clear from Drake's journal that it was considered that Dumreicher held his own interests above that of the men in his care and was often insubordinate. This was a common theme in Dumreicher's career. In June 1862, he was court martialed for insubordination, but was acquitted when the board tied 4-4 in its decision (MacArthur 2012:133).

Details of Dumreicher's career at Fort Yamhill are unknown, as records pertaining to his career were not obtained. In 1868, three years after he left Fort Yamhill, Dumreicher was court martialed again in Texas, this time in service with the Army Regulars (ed. Bergeron 1999:404). In this court martial, Dumreicher was accused of being drunk on duty the night a Cavalry captain died from wounds and for disobeying the order to vacate his quarters and remove his horse from its stable (ed. Bergeron 1999:404). These charges against Dumreicher were deemed accurate and he was discharged from service June 17, 1868 (ed. Bergeron 1999:404). Following this decision, Dumreicher wrote to both President Andrew Johnson and President Ulysses S. Grant, claiming that he was innocent and that his dismissal was the result of unworthy persons conspiring to remove him from the service (ed. Bergeron 1999:404, ed. Simon 1995:540). Both presidents are known to have reviewed his case and dismissed his appeal for a re-hearing (ed. Bergeron 1999, ed. Simon 1995:540).

7.5.9. Acting Assistant Surgeon J.W. Davis (August 10, 1865 – November 23, 1865)

Acting Assistant Surgeon Joseph Wallace Davis, served at Fort Yamhill for about three months. He was first ordered to Fort Yamhill from Fort Vancouver on July 19, 1865 to relieve C.C. Dumreicher (Scott 1865). This was shortly after he had resigned from his position as Assistant Surgeon in March. On August 15, 1865, he was ordered to collect supplies from Fort Dalles: "sufficient medicines, instruments, and hospital stores to last the command of Capt. L.S. Scott forty days" (Personnel File for J.W. Davis).

In November of 1865, Davis' name disappears from the Post Returns. His personnel records show him serving at Camp Ly and Fort Colville before retiring in Tennessee, dying in 1898 at the age of 77 (Personal File for J.W. Davis).

7.5.10. Acting Assistant Surgeon G.W. France (January 1866 – May 1866)

The last surgeon to serve at Fort Yamhill, is perhaps the least known. Acting Assistant Surgeon George Washington France spent five months at the fort, his time spent there and his interactions with the nearby natives and other Europeans are completely unknown as no records mention him. France's life is most marked by a pair of ivory-gripped percussion revolvers that are inscribed "to G.W. France Acting Assistant Surgeon, U.S.A. / from Attendants of U.S. Gen. Hospital No. 11" (Flayderman 2007:444). According to Flayderman, France worked as a surgeon at a Prisoner of War camp near Nashville during the Civil War, after which he continued his service out west in the Oregon Territory (Flayderman 2007:444).

7.5.11. Hospital Steward William Y. Deere (February 13, 1857 – May 9, 1863)

The story of William Yates Deere is a fascinating tale constructed from bits of information gleaned from the historic record. He most prominently appears in the memoirs of Phillip Sheridan, who recounts that on his journey north from California through Oregon, he and his men encountered a soldier left behind by his company. The man was suffering an illness and had been told to return to his garrison once he had recovered, but upon encountering Sheridan and his men, insisted that he was fit enough to travel with them north to meet his company (Sheridan 1888:38). Unfortunately, less than a day later, the soldier's condition worsened and he could go no further (Sheridan 1888:39). Sheridan then was

forced to leave him behind, one of his own men volunteering to stay with him until he died (Sheridan 1888:39). Later Sheridan notes that:

The sick man – Duryea [Deere]– whom I had expected never to see again, afterward became the hospital steward at Fort Yamhill, Oregon, when I was stationed there (Sheridan 1888:44).

Three days after Deere's arrival at Fort Yamhill, 1st Lt. Brvt. Capt. Oliver Taylor writes:

I have the honor to inform you that William Y. Deere, late private of Comp. E '1st' Dragoons has received a warrant as hospital steward with rank & etc. corresponding to those of ordinance dept. (FYLB).

This was how Deere's extensive career at Fort Yamhill began. If he had kept a journal of his military life, he would have been able to provide more insight into Fort Yamhill than any other man stationed there. Deere is the only man stationed at the fort that experienced both the Regular Army period and the California Volunteer period, and he was still in the area when the Oregon Volunteers took over. Unfortunately, his life is difficult to decipher, and his time at Fort Yamhill is poorly recorded. He seems to have performed his duties admirably and with good conduct, as his services never received complaint.

Deere attempted to retire in April 1863 (FYLB). However, his resignation was not accepted, although he did leave Fort Yamhill. After his departure, he was stationed at various forts in the Pacific Northwest, finally making his way back to the Siletz Blockhouse in 1865, where he replaced Edward Colmache as Hospital Steward (FYPR). In August 1865, he made a request to Indian Agent Ben Simpson to have a proper hospital building erected to assist in the care of the natives (United States 1865:677). Additionally, he requested the purchase of a proper supply of medicines, instruments, and hospital stores, indicating his dedication to the practice of medicine and the care of his patients. In 1870, Deere again appears in the record, being hired by Brevet Captain Hill to work for the Tulalip Indian Agency on the eastern side

of the Puget Sound (United State Census 1870). Rather than working as medical staff, Deere was employed to monitor the natives, interrupting any smuggling of alcohol and to assist in maintaining peace on the reservation (United States 1870:20). Deere died of stomach cancer on January 5, 1895, and is interred in the Soldiers Home Cemetery in Washington D.C., grave number 6734 (United States 1895:616).

7.5.12. Uncontracted Physicians

In searching the records of Fort Yamhill, at least two instances were noted when Capt. Scott briefly employed a civilian physician without recording their employment in the Post Returns. The first instance is alluded to in Bensell's diary in two entries dated June 3, 1862 and June 4, 1862. The first entry states:

Lt. Davison Started to Monmouth for a Doctor. I think that its time, too many boys in the Hospital to be creditable to the medical ability of our 'steward' (ed. Barth 1959:27).

This occurred during the three months that the fort was without a surgeon, after Dr. Warren had left. During this time, it is clear that the hospital steward, Deere, was the only man in charge of the hospital and the care of the men. The next day Bensell writes:

Lt. Davison returns bringing Doc. Coombs whose speech, made at Simpsons some weeks ago was called a good secesh argument. This is their gait, first a "granny" then a 'secesh'. 'God deliver us' (ed. Barth 1959:27).

Warren is decidedly the "granny" that Bensell is speaking of, and this entry and makes it clear that Dr. Coombs was thought of as a southern sympathizer. Dr. Coombs was born in Pennsylvania, was married and had a 10-month old boy at the time of his employment at Fort Yamhill (ed. Barth 1959:27). He was later employed as a citizen physician at Fort Hoskins in 1865 (ed. Barth 1959:27). It is unknown how long Captain Scott retained the services of Dr. Coombs as he was not mentioned in the June Post Return, which instead bears the name of E.A. Tompkins, who arrived on June 21 (FYPR).

Besides Dr. Coombs, the other civilian that is known to have serviced Fort Yamhill without being mentioned in the Post Returns is Dr. Carpenter's father, who as mentioned previously, was hired for a brief period of time when Carpenter was transferred to Cape Disappointment in April 1864 (Davison 1864). Both of these employments were the result of the fort losing its surgeon through transfer or end of contract and being left with only the hospital steward to run the hospital. Including these gaps in service, there were five periods where the fort was without a surgeon. The longest being between March and August of 1856, when the fort was first opened.

7.5.13. Other Hospital Personnel

According to the 1856 Regulations for the Army Medical Department, a post the size of Fort Yamhill should have had a hospital staffed with one surgeon, one steward, a wardmaster, one nurse, one matron, and a cook (Army Medical 1856:11). Of these, the stewards, cooks, and nurses would have been taken from the private ranks of enlisted men, while the matron and wardmaster would be hired from the enlisted men's wives or other camp women if available (Army Medical 1856:11). Archival research found mention of five men that were employed in the hospital, likely representing just a small portion of the staff that served there. Three men were mentioned in Bensell's diary: Private Hunsucker, who served as a hospital attendant was mentioned on August 11, 1862; Private Lowee, who served as the hospital cook and possibly as steward on July 21, 1863; and Private Wheeler, who served as the hospital cook was mentioned December 19, 1863 (ed. Barth 1959:43, 96, 117). Bensell lightly discussed all of these men because they were placed in the guardhouse for being drunk or disorderly. The other two men that were found in the fort's records were a Private A.L. Ellis who possibly served as the hospital steward in November 1865, and a Private Alexander C. Craig who is mentioned in the fort letter book as being the hospital

steward in March 1866 (FYPR; FYLB). In addition to these men, Mansfield's 1858 inspection reports that the hospital was employing both a cook and a nurse (Mansfield 1858).

8. Fort Health

The men at Fort Yamhill suffered from a variety of diseases and conditions. While many of the major diseases that are known for crippling Civil War armies, such as cholera and malaria, were not a major issue here, the fort was not without its health problems. Of the 812 cases that were recorded in the Register of Sick and Wounded, 25.99% of those cases were related to genito-urinary infections, including gonorrhea, syphilis, and bubo. The next largest group of complaints were respiratory infections, which accounted for 17.49% of all cases, the majority of these being related to bronchitis, pneumonia, and catarrhs or upper respiratory infections. Following these two categories, digestive complaints were the next most represented group at 13.3%, dominated by diarrhea, constipation, and dysentery, reflecting issues that the fort had with its food and water supply. Of the remaining cases, those conditions that were most prominently an issue were: fevers, mumps, rheumatism, bruises, subluxation, and neuralgia. Alcohol related cases only amounted to 1.35% of the cases recorded in the Register. Table 6 shows the various disease classes represented in the register and the percentage and counts for each disease class. Disease classes that are used are those that were utilized in the Annual Report of the Secretary of the Navy, 1883 (U.S. Government 1884). For a full list of diseases recorded at Fort Yamhill and their counts, see Appendix B. Appendix C lists definitions for the majority of complaints recorded at Fort Yamhill.

Table 6. Disease Classes Recorded at Fort Yamhill (RS&W)

Disease Class	# of Cases	Percent of Total
Alcohol	11	1.35%
Circulatory	17	2.09%
Constitutional	61	7.51%
Digestive	108	13.30%
Ear	2	0.25%
Eye	19	2.34%
Genito-Urinary	211	25.99%
Integumentary	70	8.62%
Nervous	22	2.71%
Respiratory	142	17.49%
Teeth	8	0.99%
Unknown	8	0.99%
Various	22	2.71%
Violent	57	7.02%
Zynotic	54	6.65%
Grand Total	812	100.00%

Commissioned officers are not included in these counts, as only one officer was ever recorded being admitted to the hospital within the time frame of the register. This absence from the records does not mean that the commissioned men were not being treated by fort physicians. At this time, it was not appropriate for commissioned officers to intermingle with enlisted men (Kopperman 2016). Indeed, commissioned men had designated hospitals in larger encampments (Adams 1952:171). At Fort Yamhill, it is probable that commissioned men would have been treated by the fort physician in the comfort of their own home, protecting their privacy and their reputation (Kopperman 2016). Their families would have also been treated in this manner. From the general lack of records, it appears that Fort

Yamhill did not keep official track of the health of its officers, except for one lieutenant who was admitted into the hospital.

8.1. Violence and Deaths

Fort Yamhill, unlike many Civil War era forts and garrisons, never suffered from any major diseases or outbreaks and was relatively free of violence since it was not a fighting fort. On occasion however, tension grew amongst the ranks, and there were some instances when violence broke out. On September 23, 1856, Private Meehan of Company C, 1st Dragoons was reported to have been killed “by violent hands” on the monthly post return (FYPR). In his journal, Glisan discusses the affair, writing that Private John Meehan was murdered by Private Charles Stolzer of Company F, 4th Infantry (Glisan 1874:375). Private Stolzer was later turned over to the Polk County Sheriff to be disposed as the civil authorities deemed fit (FYLB). He was tried and found guilty of manslaughter; sentenced to ten years in the Oregon Territory penitentiary in addition to paying a fine of five dollars, plus the cost of proceedings (FYLB, Glisan 1874:376). This event sparked a feud between the two companies, which resulted in another three deaths. On December 19, Private Michael Turner of Company C, 1st Dragoons, fatally stabbed Private Connor of Company F, 4th Infantry with a butcher knife. Private Turner was taken to the Justice of Peace in Polk County where the justice ruled that he had acted in self-defense and released him (FYLB). Capt. Smith was reluctant to let Turner go on liberty without trial, and sought further action against Turner, charging him with desertion to be tried by a military court (FYLB).

In regards to these events, Glisan was shocked at the violence of the two companies, stating:

The fact of two murders in so short a period is almost unprecedented in the US Regular Service. The parties in both instances were under the influence of ‘liquor’ at the time – that great exciter of nine-tenths of all crimes committed (Glisan 1874:375).

It is not entirely clear as to why there was such contention between these two companies, but the close quarters that they were kept in likely was a source of pressure amongst them. The fort's letter book briefly mentions the deaths of two more men, Private William Justice of Company C, 1st Dragoons and Corporal John Cannon of Company F, 4th Infantry, on March 20, 1857, causes were not stated (FYLB). Taylor only states that he enclosed a receipt of effects for the two men, but the fact that both men were from the same two companies that previously fought makes it likely that this was an extension of that malevolence (FYLB). Additionally, on March 20, 1857, charges were laid against a Private Jas Kenny of Company F, 4th Infantry, though the nature of these charges is unknown (FYLB).

Besides these acts of violence, there were a number of other incidents mentioned in the fort's records. In December 1856, there was one recorded death, possibly of a 1st Dragoons sergeant that was listed as being the result of disease (FYPR). Even after the Regulars left, there was not always peace among the men. On March 11, 1863, Corporal Bensell wrote that Private John Hunsucker stabbed Drummer Charles H. Frank, slightly wounding him (ed. Barth 1959:83). While the reason for this violence is unknown, it is likely that alcohol was involved given the history of violence at the fort. Interestingly, Frank's name does not show up in the Register of Sick and Wounded at this time, suggesting either a lack of good recordkeeping or that he did not go to the hospital for his injuries (RS&W).

In Glisan's journal, on December 15, 1857, it is reported that the body of a Corporal Borland, from Company G, 4th Infantry, was brought to the fort. Borland died while delivering the mail from Portland to Fort Hoskins, drowning in Mill Creek (Glisan 1874:393). On June 6, 1858, a Corporal is listed as dying from disease, though his death did not occur at the fort (FYPR). The last death to be recorded occurred off fort when 1st Lieut. Forsythe died January 1, 1861, from disease while on leave (FYLB). In examining the

Register of Sick & Wounded, Forsythe is seen being admitted to the hospital on November 26 for gastritis. He was dismissed on November 29, and then is shown in the Post Returns as being on leave starting on December 3, 1860. The Post Returns state:

On Leave of Absence for the benefit of his health for five months with permission to apply for an extension of four months (FYPR).

Forsythe is shown in the Post Returns in this manner until April 1861, when the fort finally received word of his death in January (FYPR).

8.2. Injuries

Violent injuries amount to 7.02% of recorded cases at Fort Yamhill, consisting of a variety of injuries that would have been incurred as a result of the numerous drills that men were made to perform, as well as from hard labor related to duties. Additionally, many of the injuries likely resulted from mere clumsiness and drunken exploits. The two most common types of injuries seen in the hospital record were contusions or bruises, and subluxations or dislocations, which account for 33.33% and 28.07%, respectively, of all injuries recorded in the register (RS&W). Aside from these complaints, men also suffered from wounds of various kinds, including burns, punctures, lacerations, gunshots, as well as sprains, and fractures. The fort's records do not excel at detailing these injuries. The hospital register is extremely sparing in its information, giving no details beyond the name of the complaint of the incoming patients. Because of this, information conveying details on the condition of the men must be found in other sources, such as the letter book and Bensell's diary.

On October 6, 1856, the letter book alludes to one event that occurred on March 14, 1856, when Private Christopher C. Frayser of Company C, 1st Dragoons was shot in the upper arm (FYLB). Frayser's condition was addressed because on August 8, 1856, he was charged with being a minor, but was absent from the fort at the time, being cared for in the

hospital at Fort Orford (FYLB). The gunshot wound caused his humerus to shatter and even under the care and supervision of three surgeons, including Assistant Surgeons Crane and Glisan, he was still in the hospital in October (Otis 1876:515; FYLB). Crane later reported that Frayser was 22 when the wound occurred and was discharged from the Army with a pension in February the following year (Otis 1876:515).

On September 6, 1862, Bensell wrote that a Private Grimsley sprained his knee while jumping (ed. Barth 1959:50). According to Bensell, Dr. Tompkins declared that the private's injury was so serious as to make him unfit for active duty (ed. Barth 1959:50). The hospital register shows Grimsley being admitted on September 6 for subluxation and being dismissed on September 8. Interestingly, in spite of Tompkins statement and Bensell's admission that the private would be missed, Grimsley remained in service at Fort Yamhill for at least another year after the accident (RS&W).

One event that left an interesting imprint in the historical record occurred on November 8, 1864, after elections at the post. Because every man at the fort voted for Oregon to become part of the Union, a celebratory salute was fired. Two days after the incident, Lieut. Davison wrote in a letter to District Headquarters:

Report of severe accident while firing a salute, a man lost his arm, amputated below the elbow, and one of the musicians lost a thumb and forefinger. Both men are now doing well, according to the surgeon. ...Supposedly the gun was not properly swabbed out (FYLB).

The men are listed as reporting to the hospital on November 9 with gunshot wounds, or perhaps they were not entered into the register until the day following the accident due to the excitement of their wounds caused. Private Rodgers suffered a severe injury, resulting in the amputation of his arm below the elbow. Musician Loutsenhizer was more fortunate, losing just a thumb and fore finger. Both men remained in service at the fort until April 1865, when the California volunteers left the garrison. Interestingly, after the accident,

Private Rodgers was apparently trained, possibly by Loutsenhizer, in the art of music, as both he and Loutsenhizer were discharged as musicians (FYPR).

8.3. Alcoholism

Unlike Fort Hoskins, Fort Yamhill's hospital records do not reflect alcoholism as being an immense issue. According to Trussell, Fort Hoskins' hospital records indicate 42 cases of ebrietas or drunkenness, and eight cases of delirium tremens or alcohol withdrawals, between 1857 and 1865 (1996). The dialogue surrounding these facts has created an image of a garrison full of soldiers that had little to do but drink, resulting in numerous cases of alcoholism. Fort Yamhill's hospital record shows a stark contrast to Hoskins in that there were only six cases of ebrietas, one case of delirium tremens, and four cases of chronic alcoholism between April 1859 and May 1866 (RS&W). These alcohol related illnesses account for 1.35% of all cases reported in Yamhill's register, compared to Hoskins at 3.5%. Of course, the difference in time periods must be considered here.

Throughout Yamhill's historical record, there are numerous mentions of alcohol use and abuse. In his journal, Glisan states that:

*The use of ardent spirits, in some degree, is very common in the service
(Glisan 1874:456).*

Glisan was tremendously against the consumption of alcohol; he abstained from it himself and looked down on those who favored its use more than was healthy (Glisan 1874). Bensell frequently mentions the enlisted men using alcohol, stating one night on February 25, 1863, that several of the men were "on a bomber" which resulted in one man, Private Felix Munday, being seriously injured, his leg paralyzed (ed. Barth 1959:81). Munday was admitted into the hospital on February 26, 1863 with neuralgia (RS&W). He was not dismissed from the hospital until May 21, but continued his service. However, he was admitted into hospital

again in July of the same year for drunkenness, and in December for chronic alcoholism (RS&W). From this entry of Bensell's and others it is apparent that drinking was an issue at Fort Yamhill. It is possible that inebriated soldiers were handled differently here than at Fort Hoskins, causing the differences in numbers. In regards to the same event mentioned above, Bensell states that the men involved in the affair were put in the guardhouse to sober up, suggesting that drunkenness was treated more as a criminal offense rather than a medical condition.

The use of alcohol as a treatment for various maladies was common during this era. It was thought to strengthen a patient, ease his pain, and increase his chance of survival, especially in the case of battle wounds (Adams 1952:140). When it was not being used as a prescription, it was being used to create other

medicines, acting as a base for liquid medicines, or used in lotions, gargles, and eyewashes (Schroeder-Lein 2008). The army medical regulations for this

Table 7. Fort Yamhill Liquor Stores

<i>Liquor Stores</i>	<i>1858</i>	<i>1859</i>
Brandy	32	28
Wine, Port	0	30
Wine, Sherry	24	0
Whiskey	32	28

period, issued in 1856, 1860, and 1863, all include a list of stores that hospitals should keep on hand. In this list, it is recommended that two dozen bottles of rum or American whiskey and three dozen bottles of wine be kept on hand (Army Medical Department 1856). Table 7 shows a portion of Fort Yamhill's hospital supply table for 1858 and 1859, where it is clear that the hospital was well stocked with liquor.

While it may have been common practice to prescribe alcohol for medicinal purposes, Dr. Glisan did not condone the use of alcohol as a medical treatment stating:

There are few cases in medical and surgical practice where it is useful; but there being an abundance of medical substitutes, alcohol could be easily banned from the Pharmacopoeia without impairing in the least the doctor's power of controlling disease (Glisan 1874:457).

Glisan may have been ahead of his time when it came to medical treatments, or perhaps he just represented a small minority of well-informed individuals within the American medical community. In either case, his opinion was not one that was shared with many of the surgeons stationed at Fort Yamhill, including Dr. Tompkins. Bensell states in his journal that Dr. Tompkins had recommended that a Private Pilcher use spirits for his disease, who according to the hospital register, came in twice in one month for rheumatism (ed. Barth 1959:74; RS&W).

8.4. Venereal Diseases

Sexually transmitted diseases were not uncommon at Fort Yamhill. On the contrary, in the hospital register, they were more common than the common cold, representing almost 26% of all recorded cases (RS&W). Gonorrhea and syphilis were rampant both at Fort Yamhill and Fort Hoskins. On the western frontier, military garrisons suffered highly from venereal infections, showing considerably higher levels of infection than garrison strengths in the east (Tate 1999:180). In fact, statistics from the Department of Pacific show 461 men in every thousand seeking treatment for these diseases, a rate five times greater than seen in the entire Union Army (Tate 1999:180). Thomas P. Lowry in his book, *The Story the Soldiers Wouldn't Tell: Sex in the Civil War*, hypothesizes that these venereal diseases were first contracted when country boys enlisted in the army and traveled to military forts located near large cities, such as San Francisco (1994:107). There are numerous records from these types of forts that allude to vagrant pastimes that both enlisted and commissioned men would partake in during their exposure to new environments (Lowry 1994:107). After contracting these diseases, the infected men would then be shipped off to their new stations, later exposing new people and populations (Lowry 1994:107). Lowry also refers to the impact of untreated venereal diseases after the war, not on just the soldiers, who often died in veteran's

homes from advanced stages of syphilis and gonorrhea, but also their wives who contracted them after the men came home, and their children that were born with birth defects (1994:108).

At Fort Yamhill and Fort Hoskins, the dispersal of venereal diseases is attributed to relations with Native American women. Bensell's diary is extremely enlightening on this subject, as he makes numerous statements regarding the men's relations with native women. One of the most prominent entries in his diary regarding this subject are in regards to the hospital steward at Fort Hoskins:

Hospt'l Steward Edward Colmache receives commission as Surgeon in the 1st O.S. Cav. He is an old Soldier, and excellent Doctor, but a most indolent [man]. Has kept a Squaw for the last seven years. His system is so thoroughly impregnated with syphilitic disease as to show itself in its most loathsome form in his face, on his neck, &c., &c., yet this man will soon dictate etiquette, manners, &c. to his moral superiors (ed. Barth 1959:165).

Colmache was not the only man to keep a mistress, and it is extremely evident that cavorting with native women was not at all uncommon. Between April 1859 and May 1866, the hospital treated 17 cases of bubo, 2 cases of herpes, 68 cases of gonorrhea, and 97 cases of syphilis in various stages, as well as 3 cases of strictum urethra, a side effect of gonorrhea (RS&W).

Today, syphilis is commonly treated with penicillin, making it a relatively easy disease to control. In the 1800s, syphilis was still a misunderstood disease, and the most effective treatment was constantly changing. Most doctors failed to identify the root cause of the disease, treating the symptoms rather than the blood (Tate 1999:180 Mercury was a common form of treatment, which essentially poisoned the patient, causing the disease to go into remission. It should be noted that Army Medical Department did not list mercury as a substance that needed to be kept on hand, creating the need for alternative treatments. Other treatments included dietary restrictions, purges, or bed rest (Tate 1999:180).

Physicians were constantly working to find the most effective treatment. Assistant Surgeon Tompkins, not only prescribed alcohol to his patients, but he is also known to have attempted experimental treatments on the soldiers in his care.

Surgeon E.A. Tompkins of Fort Yamhill, Oregon, described an unfortunate soldier with syphilis who, over a period of about four months, was treated with potassium iodide in sarsaparilla, corrosive sublimate, lunar caustic, calomel, black draught, emetics, blistering, iron, quinine, and external chloroform. At the end of the treatment, he was in severe pain, with one leg badly swollen and cold, barely able to walk (Parascondola 2008:32).

Looking at the hospital records, no patient with syphilis was kept in the hospital for more than two weeks while Tompkins was in charge, but it is possible that the poor patient mentioned in this account was Private Francis M. Morrow, who came into the hospital twice for syphilis. However, Private Buckner, and Private Courtwright were both kept in the hospital for over three months, Buckner for hemorrhoids, and Courtwright for neuralgia. Both were discharged at the end of their stay and had previously been admitted into the hospital for syphilis. Out of these options, Courtwright is the most likely candidate as he was the only one to have been treated by Tompkins for the entire length of his stay. It is possible that Courtwright went to the hospital for neuralgia, but ended up being treated for syphilis, and was ultimately discharged when the treatment failed and/or caused so much damage that he could no longer perform his duties.

8.5. Digestive Diseases

During the period recorded in Fort Yamhill's hospital register, digestive complaints accounted for 13.3% of all complaints, amounting to 108 cases. Of these, diarrhea and acute diarrhea were the most common illnesses, followed by constipation and acute dysentery (RS&W). In an examination of health reports recorded throughout the Civil War, it was discerned that both diarrhea and dysentery were most frequently recorded during the

summer months (Woodward 1863:233). At the time, diarrhea was commonly attributed to changes in water supply or to consumption of unripe fruit or vegetables, or gorging on rich foods such as pies, cakes, and beer (Woodward 1863:209). Access to clean water sources was perhaps the most pervasive issue that armies had to deal with during the Civil War, often being limited to discernibly contaminated sources (Woodward 1863:212). Fresh meat was also considered a culprit, when a company had relied too long on preserved meat (Woodward 1863:210). Other supposed causes of diarrhea were heat exhaustion and being exposed to cold damp conditions (Woodward 1863:213). The causes of acute dysentery are recorded to have been the same as those of diarrhea (Woodward 1863:223). Interestingly, food poisoning was not a consideration during this period, because bacterial strains of *E. coli* and *Salmonella* were not discovered until 1885 with advances in germ theory (ed. Schaechter 2003:417).

At Fort Yamhill, many of these conditions would have prevailed, including cold, wet conditions, sudden changes in diet, and possibly water issues as well. Food poisoning was without a doubt an issue at the fort, with Bensell commenting numerous times on the poor quality of food (ed. Barth 1959). Sanitary conditions at the fort are relatively unknown, with no knowledge of where men were bathing or how privies affected water supply. However, there are discernable changes in the infection rate of these conditions that may hold some clues. When the Army Regulars left the fort and were replaced by California Volunteers, recordings of acute dysentery stopped completely until two cases were recorded with the Oregon Volunteers (RS&W). The reason for this is not clear, as there was no major change in garrison strength. It appears that either the California Volunteers were prescribing to different practices, or all cases of dysentery during their stay at Fort Yamhill were recorded

instead as acute diarrhea. Curiously, acute diarrhea was recorded more often than diarrhea, perhaps reflecting reluctance to visit the hospital until symptoms became unbearable.

8.6. Respiratory Illness

Respiratory illnesses are the third most represented disease class recorded at Fort Yamhill's hospital, comprising mostly of bronchitis, both chronic and acute. General respiratory infections or catarrhus were also recorded frequently in 1859, but few times after that (RS&W). According to Woodward, illnesses such as catarrhus and bronchitis are most likely to appear in the winter months, coinciding with cooler, moister weather (1863:284). At Fort Yamhill however, this is not the case, as these complaints were recorded throughout the year except for September and October (RS&W). The majority of cases were recorded November through May, with November experiencing the most cases, particularly of bronchitis (RS&W).

Atmospheric conditions are much to blame for these infections. Exposure to cold, damp conditions increased infection rates, such as it does today. Treatment of these conditions often included the application of a mild cathartic, in conjunction with quinine and iron, or bitters (Woodward 1863:295). Many of the cases of respiratory complaints could likely be attributed to allergic reactions to seasonal pollen fluctuations as theories regarding histamine reactions were not developed until the early 1900s (Igea 2013:967). The trend of catarrhus complaints is similar to the seasonal variation of pollen counts in the Willamette Valley, spiking during the summer months, then again November through January (RS&W). This suggests that some of these complaints were symptoms of allergic reactions rather than bacterial or viral infections. It is also probable that allergic reactions led to bacterial infections resulting in an increase in cases of bronchitis, especially during winter months when symptoms would have been exacerbated by the weather.

9. Treatment of Non-Military Persons

9.1. Care for Native Americans

Both Glisan and Deere expressed frustrations with the Native American's tendency to only seek medical care on ration day, and for their lack of routine or follow-through when prescribed medications (Glisan 1874; Deere to Simpson 1865). Caring for the Native Americans was a difficult task, as many did not practice suitable hygiene for being kept in a confined environment. Glisan attributed much of their poor immune responses to their practice of consuming seven days' worth of food over the course of three or four days, half starving for the remainder of the week (Glisan 1858). Glisan commented multiple times that many of the illnesses found among the Native Americans could be attributed to their change in lifestyle (Glisan 1858). Previously, they had roamed the country freely, moving about with the change in seasons, maintaining an active lifestyle. Once they were moved onto the reservations, they were forced to become sedentary, a type of living to which they were not culturally adapted. They quickly succumbed to the various illnesses that were brought in by Europeans, including such maladies as whooping cough, gonorrhea, dysentery, pneumonia, and the most common cause of fatalities: consumption (Glisan 1858).

In his own personal journal and writings, Glisan frequently refers to the native custom of dispatching any doctor that failed to keep a patient alive. This custom made it both dangerous and difficult for him to establish good relations with the Native Americans. But, over time, he gained their trust, and with the help of the military authorities, successfully discouraged the native custom. Reflecting on his time spent at Fort Yamhill, Glisan states that:

Although I attended to their medical wants a great deal, and, of course, lost a patient occasionally, they never tried to harm me (Glisan 1874:448).

In an article that he published to *The American Journal of Medical Sciences* in 1865, Glisan recounts how, during his time at Fort Yamhill, he performed two amputations on Native Americans, one of a finger, and one of a leg at the upper thigh of Chief Sampson of the Santiam Tribe (Glisan 1865:80). Chief Sampson's amputation was conducted with the assistance of chloroform and he made a speedy recovery post operation. His wife however, was not sure of his condition and hired two native doctors who convinced her that her husband would die if she did not prescribe to traditional medicine. According to Glisan, she promised them all of her property and they proceeded to scream and howl and dance around her house for a week (Glisan 1865:80). Her husband meanwhile was recovering quite well in the hospital and did not share his wife's beliefs (Glisan 1865:81). When she came to him, rejoicing at his recovery and proudly told him of how she had saved him, he became furious and began beating her with a cudgel until the hospital steward came running to stop him (Glisan 1865:81). When Glisan learned of the events that had transpired, he ensured that the medicine men were prevented from receiving their payment (Glisan 1865:81).

From this account, it is clear that at least some Native Americans were treated in the hospital at Fort Yamhill instead of being treated on the reservation. In 1865, Deere's letter to Agent Simpson made it clear that the reservation had no hospital at that point, requesting that one be built (United States 1865:677). However, Glisan's treatment of Chief Sampson in the hospital may have been atypical to the norm, exclusive to the major operation of amputation. In May of 1858, Glisan wrote a letter to Col. Nesmith in Salem, complaining that the \$300 budget allotted to him to provide medical care on the reservation was insufficient to cover costs of a physician let alone an assistant to help with patients (Glisan 1858). From this letter, it can be construed that Glisan was, at least for a short period of time, employed to bring his services to the reservation and treat the residents as well as he

could. It is then probable that Glisan would transport extreme cases to the fort's hospital for proper treatment in a controlled environment.

9.2. Care for Europeans

Caring for settlers was a common responsibility for fort physicians. As mentioned previously, it was not uncommon for these men to be the only reliable medical care for miles, acting much like doctors of the World Health Organization today. Glisan made several references to his care of settlers around the fort, commenting in August 1857, that he had spent the last three months making countless professional visits throughout the countryside, traveling up to 30 miles from the fort (Glisan 1874:385). On one instance, in January 1859, he was entreated to make a late night emergency call to treat a Reverend Chamberlain's wife, who lived several miles away. Reluctantly, he obeyed, almost catching cold after fording the Yamhill River on his horse. Glisan's journal also alludes to him performing surgeries for settlers, indicated by his reference to the amputation of a patient's a hand in May 1857 (Glisan 1874:382).

Glisan was not the only fort physician to care for settlers in the area. Dr. Smith is also known to have had quite a substantial outside practice, accruing over \$1500 during his time at the fort (ed. Barth 1959:112). While there is no mention of Glisan treating non-military persons at the fort, there is record of Smith doing so. Bensell mentioned one day in November 1863, that a Miss Linkins, one of Smith's patients, visited the fort, commenting on the woman's immense size, stating that she weighed 200 pounds (ed. Barth 1959:109). It was certainly not uncommon for people to seek out care from fort physicians, especially on the frontier. Tate recounts a situation where two men hauled their friend in a wagon some sixty miles to the nearest doctor that was at the military outpost, Fort Robinson in Nebraska (Tate 1999:175).

10. Locating the Hospital

10.1. Remote Sensing

During the 1980s and early 1990s, William Hampton Adams and his colleagues worked to establish the locations of the various buildings at Fort Yamhill through pedestrian survey and metal detection. They were able to find evidence of a number of the structures from metal debris and land features (ed. Adams 1991:59). Unfortunately, due to the time that these surveys were conducted, the only surviving data of their work is their printed maps. While these maps offer a good reference for the relative placement of the buildings, the discontinuity from the landscape and lack of geospatial coordinates make them a poor guide to actual building locations

Fort Yamhill's hospital lies in one of the areas of the fort that is still forested, making it hard to survey and distinguish features on foot. Because of the dense vegetation located at the site, Light Detection and Ranging (LiDAR) is an extremely attractive alternative to locating the site in the field. Additionally, a remote sensing technology like this gives the advantage of offering a big picture view of sites, making it easier to discern patterns of disturbance and see the full extent of features and their relationship with other features (Harmon 2006:649).

LiDAR is an active remote sensing technique that uses laser pulses emitted from an aircraft to measure differences in elevation between the aircraft and the landscape. These measurements are achieved by knowing the exact position of the aircraft, the speed of its travel and the amount of time it takes for a laser pulse to return to the sensor (Gallagher and Josephs 2008:187). The result is a computer-based three-dimensional topographical model (Crow et al. 2007:242).

Depending on the rate of pulses per square meter, these models can be accurate to the centimeter (Crow et al. 2007:242). The advantage of LiDAR is that more than one return can be recorded for each pulse, measuring second, third, and last returns, from which vegetation, buildings, and the landscape can all be mapped in one 3D image. With this comes the ability to see through forest canopies and isolate the ground returns, creating a bare earth digital elevation model (Crow et al. 2007:243). The accuracy of these bare earth models is dependent on the pulse rate and the density of vegetation (Crow et al. 2007:243).

The LiDAR data for Fort Yamhill is available free through the Oregon Department of Geology and Mineral Industries or DOGAMI. It was acquired in 2010, between March 5th and May 15th by a contractor, Watershed Sciences, using a point resolution of 8pts/m². The raw LAS data files are accessible through OSU's engineering server and represent a 100th section of a USGS 7.5-minute quad. Available for download are point cloud files that contain all unclassified data points and ground return files that only contain the ground points (Figure 12).

The purpose of using LiDAR data in this research was to create a highly accurate bare earth image that could be used to identify archaeological features on the landscape. A digital elevation model or DEM created from an LAS dataset produces an image like that seen in Figure 13, which appears to contain very little detail. This DEM was created using the LAS to Raster tool in ArcMap using the parameters shown in Figure 14. See Appendix C for a workflow diagram, metadata, and a discussion on data uncertainty. Using a method developed by B.J. Devereux, G.S. Amable, P. Crow, and A.D. Cliff, sixteen different hillshade outputs were created, each varying by 22.5 degrees in azimuth (2008:471). The purpose of doing this was to see the landscape from every different angle, increasing the

Fort Yamhill - Bareground LiDAR Data

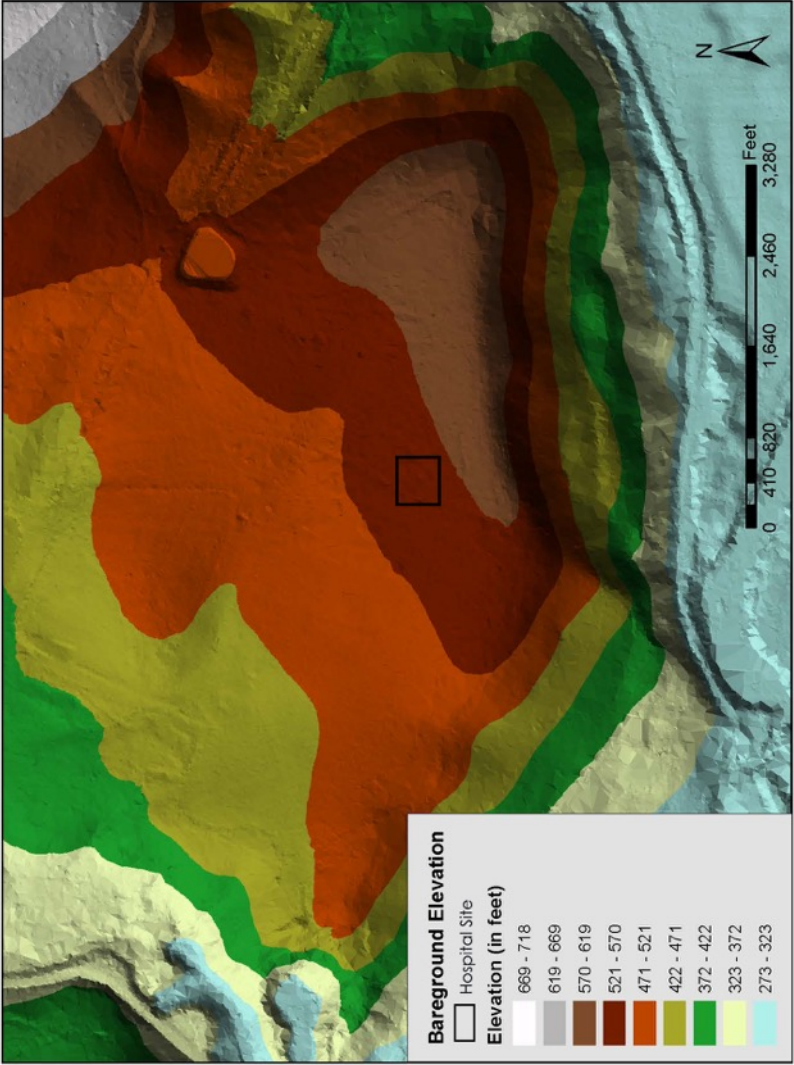


Figure 12. Fort Yamhill Bareground LiDAR DEM



Figure 13. Fort Yamhill Bareground DEM

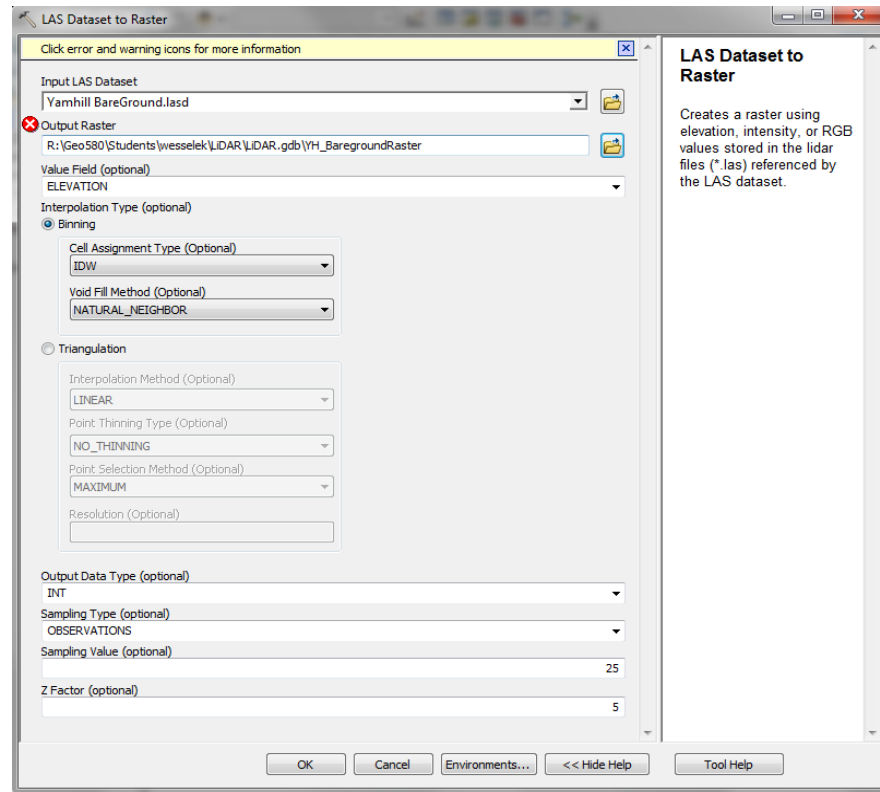


Figure 14. Parameters for Digital Elevation Model

ability to detect features that may only be visible under certain light conditions (Devereux et al. 2008:471). Figure 15 shows the resulting hillshade images, which exemplifies the various features and the change in their visibility depending on the direction of lighting.

However, having to look at sixteen images is not convenient. To rectify this issue, Devereux et al. (2008:472) use the Spatial Statistics Principal Component Analysis tool in ArcMap to combine all sixteen images into one image that highlights all the similar features in all of the hillshade outputs. The resulting image is a very colorful raster image that uses three principal components or bands to display detailed topographic features. The colors themselves are relatively meaningless, showing the overlap of three bands which combine the sixteen images, but the image itself displays a highly detailed view of the landscape (see Figure 16). Unfortunately, because the product of a PCA is a jpeg or tiff file, it is not possible to view it in grayscale without losing data.

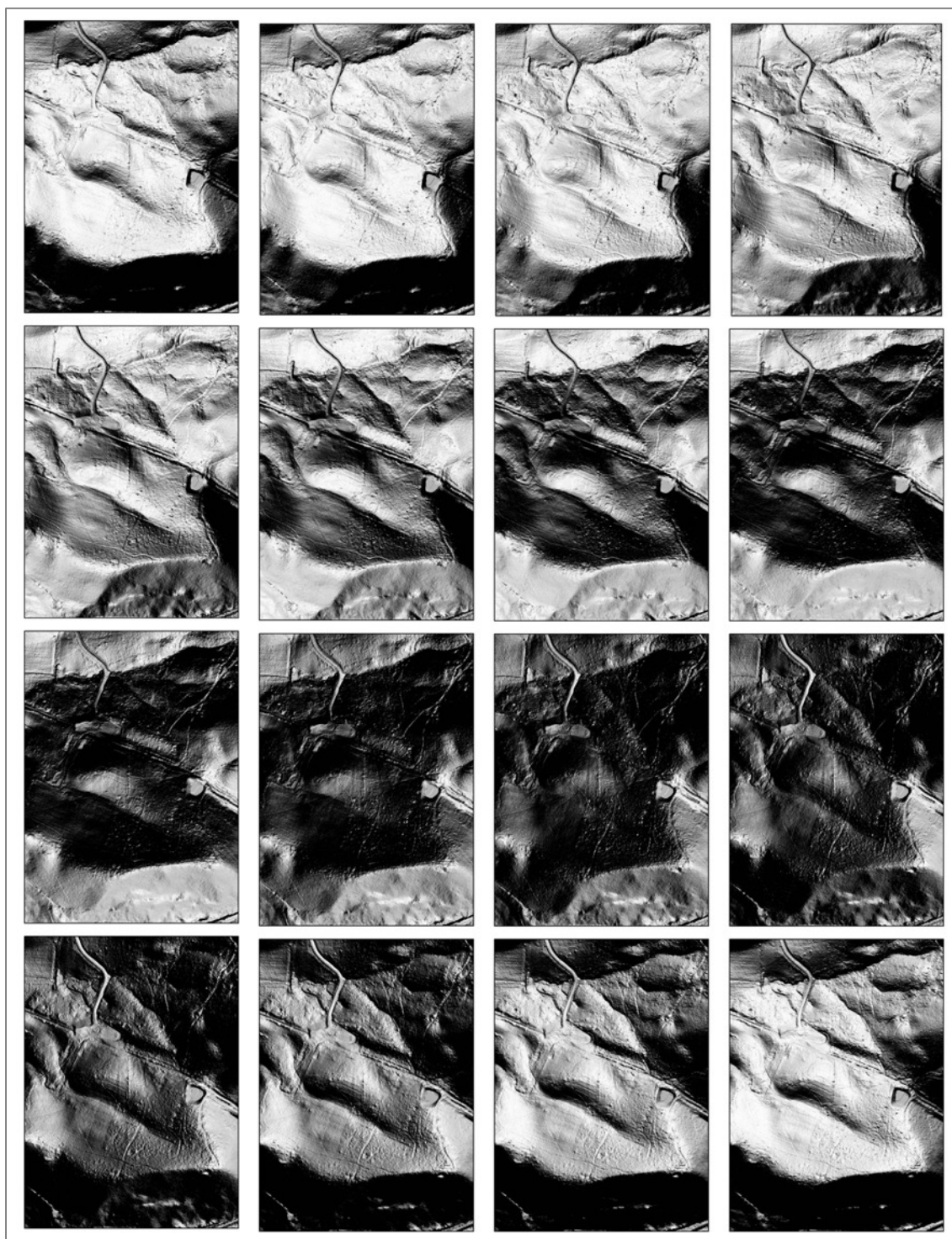


Figure 15. Hill Shade Images from Multiple Aspects

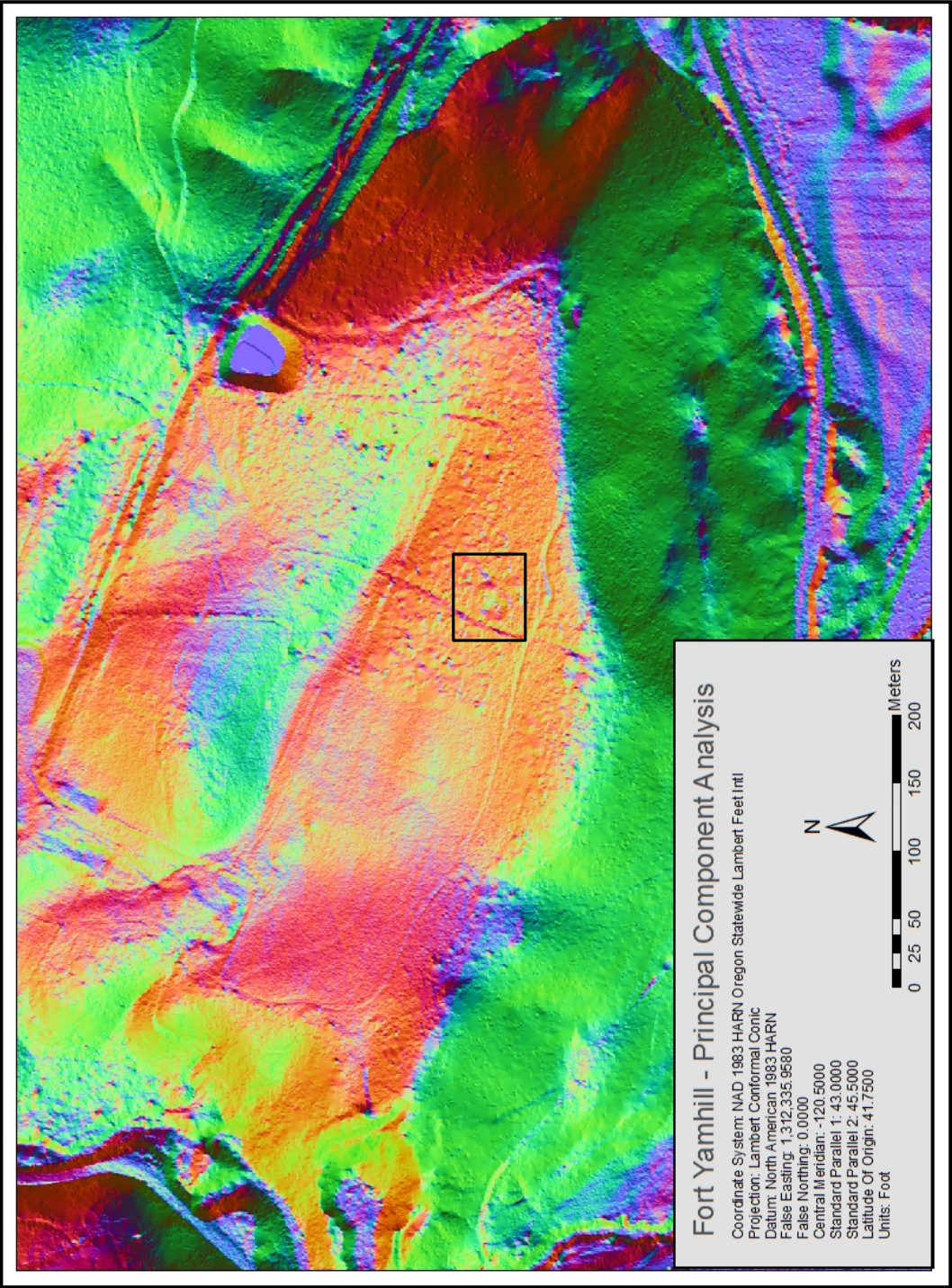


Figure 16. Fort Yamhill Principal Component Analysis

Using this image, it is possible to see details that would not be apparent in the field in a densely forested canopy, and while the canopy cover of Fort Yamhill State Park limits the penetration of LiDAR pulses through the canopy, this image is still relatively detailed (Gallagher and Josephs 2008:188). According to their work entitled *Woodland Vegetation and Its Implications for Archaeological Survey Using LiDAR*, Crow et al. state that a mature, well-thinned conifer forest canopy, like that at Fort Yamhill, may only allow for as little as 21-40 percent of laser pulses to reach the forest floor (2007:245). The impact of this can be seen in the southern areas of the fort, right around the drop-off, where the image appears much rougher than the smoother area of the parade ground. Unfortunately, this is the area where the hospital was located. Fortunately, there is still a good amount of detail in this area for identifying features.

To assist with the process of locating fort buildings in the PCA image, the next step in this process was to georeference the historic maps and overlay them on top of the PCA. Historic maps were georeferenced using known features, including previous excavations of the commander's house and the bakery, as well as the location of the blockhouse and historic roads. Georeferencing jpegs to an image in ArcMap is most successful when reference points are spread evenly, otherwise the image becomes unevenly skewed. If the points spread the image evenly, skewing is more consistent, essentially resizing the image to fit the landscape. The Smith Map overlays relatively poorly, as expected with the low quality of its drawing (see Figure 17). Even though this map does not overlay well, it still gives a general idea of the location of fort buildings. Certain depressions on the landscape match up with previous excavations at the fort, specifically the kitchen, the bake house, the commander's house, and houses 2 and 3. The linear feature located on the north end of the fort marks a historic wagon trail that was used to travel to and from the reservation (ed.

Adams 1991). The large crater behind Officers Row is a pond that was built for fire suppression at the Hampton Lumber Mill east of the fort site (Brauner 2017). The hospital appears to be marked by a large depression on the southern end of the fort, the depth of the depression may indicate that the hospital had a cellar. The Davison Map was able to be georeferenced much more successfully, as seen in Figure 18. This more detailed and accurate map can be seen to fit the depressions and features of the landscape very closely, albeit not perfectly. This map suggests that the sutlers store and the stables were located further up the hill than is currently thought, although there appears to be more than one feature that could mark the previous location of these buildings. The other numerous linear features located on the PCA suggest either roads or trails, some of these mark the interpretive trail that winds through the park, while others could be remnants of historic features.

A two-dimensional representation of this image is useful for seeing the site from a bird's eye view, but the nature of the topography is not entirely clear. This makes it difficult to fully understand the environment in which this fort was constructed. To further help with the identification of features and to gain a different perspective on the area, the image was opened in ArcScene. To create a 3D image, the PCA image was draped over the DEM from which it was created, using the associated elevations as its base height. Figure 17 shows the result of this action and the ability of ArcScene to create an interactive viewing scene. In this program, images can be manipulated easily, allowing the viewer to see the landscape from various angles and perspectives.

Yet another potential way to apply ArcScene's versatility is to use its 3D capabilities to reconstruct historic landscapes, including historic structures. To do this a shapefile was created in ArcMap, with points representing all known and potential building locations. The attribute table was edited to include feature names, making unique object IDs.

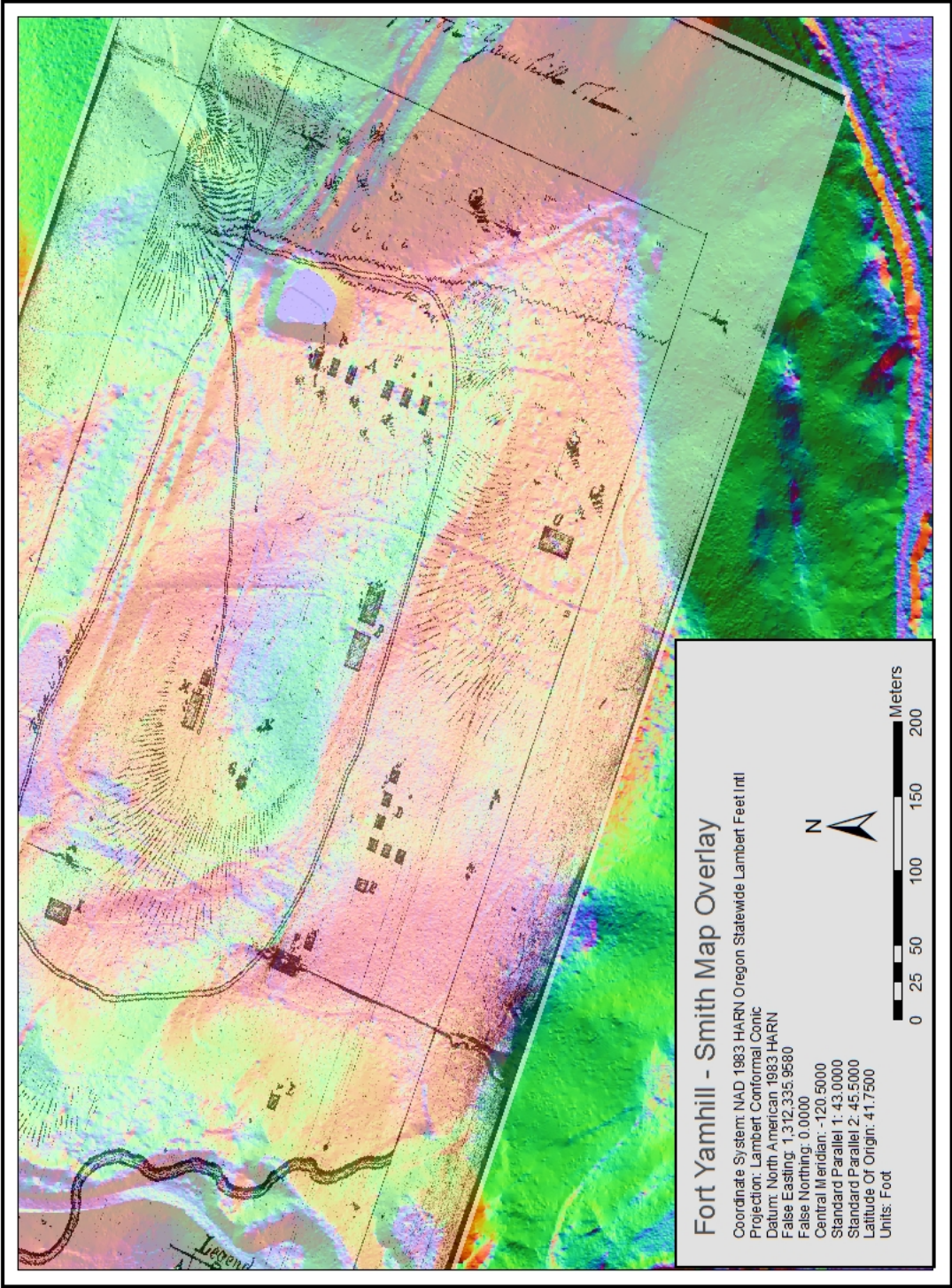


Figure 17. 1856 Smith Map Overlay

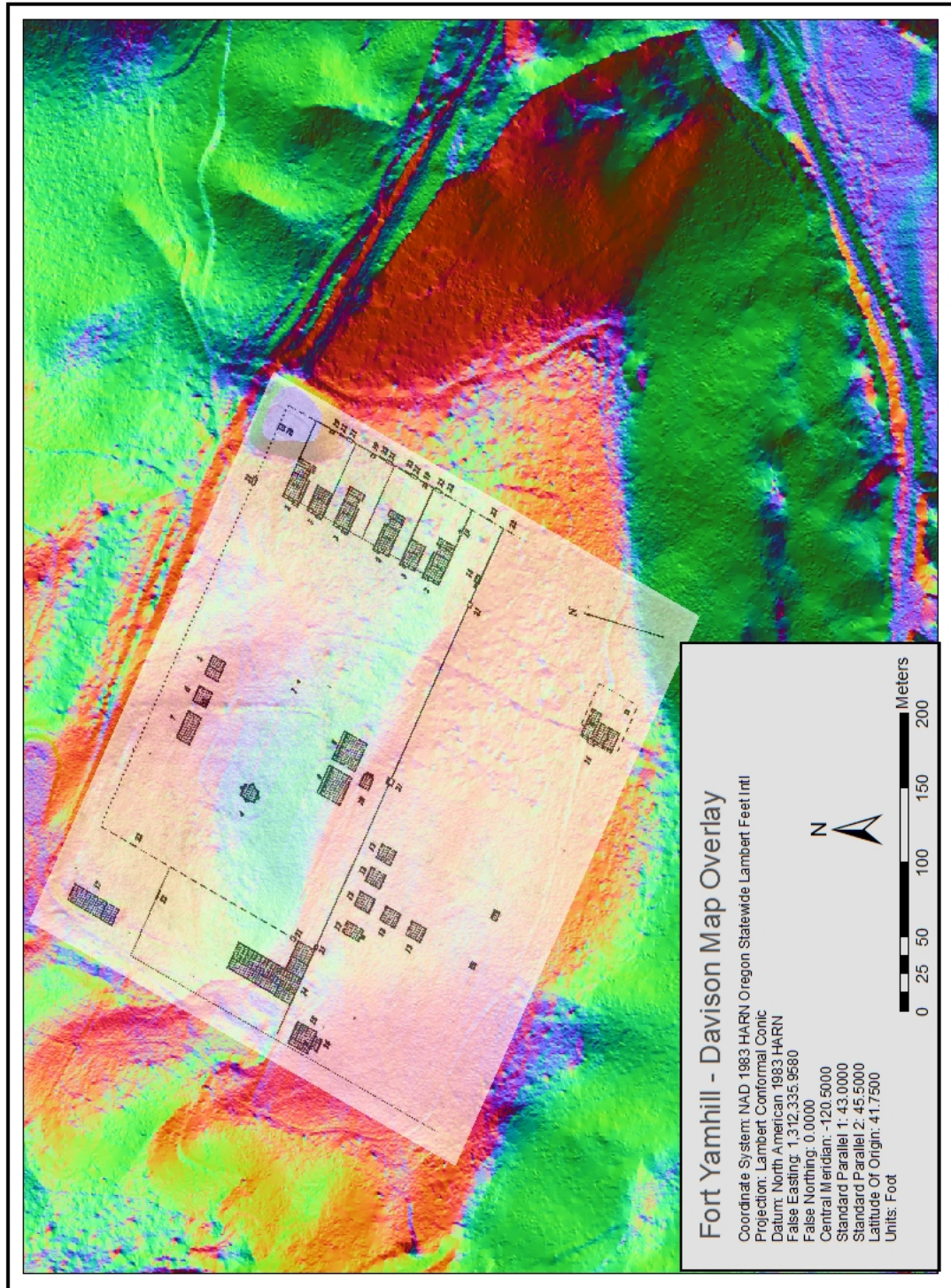


Figure 18. 1865 Davison Map Overlay

The file was then dropped into ArcScene and the symbology was adjusted to create unique symbols for all the features. Then, using the 3D Residential and Commercial symbol sets in ArcScene, appropriate building symbols were selected for each feature. The result can be seen in Figure 20.

This process can be taken a step further incorporating the raw LiDAR point cloud data file and using it to represent the vegetation as well as the ground. Unfortunately, the point cloud data offered by DOGAMI is relatively unclassified, meaning that the points representing vegetation has not been differentiated from ground returns. This resulted in a rather creative output that uses slope instead of elevation as its symbology attribute. When combined with a customized color gradient, the output offers a somewhat fantastical view of the fort's landscape (see Figure 21). While this image certainly does not show historic vegetation, it does give the viewer an intriguing perspective on how the fort may have generally looked while it was in operation. Of course, the area where the hospital was located was not as densely vegetated as this image shows.

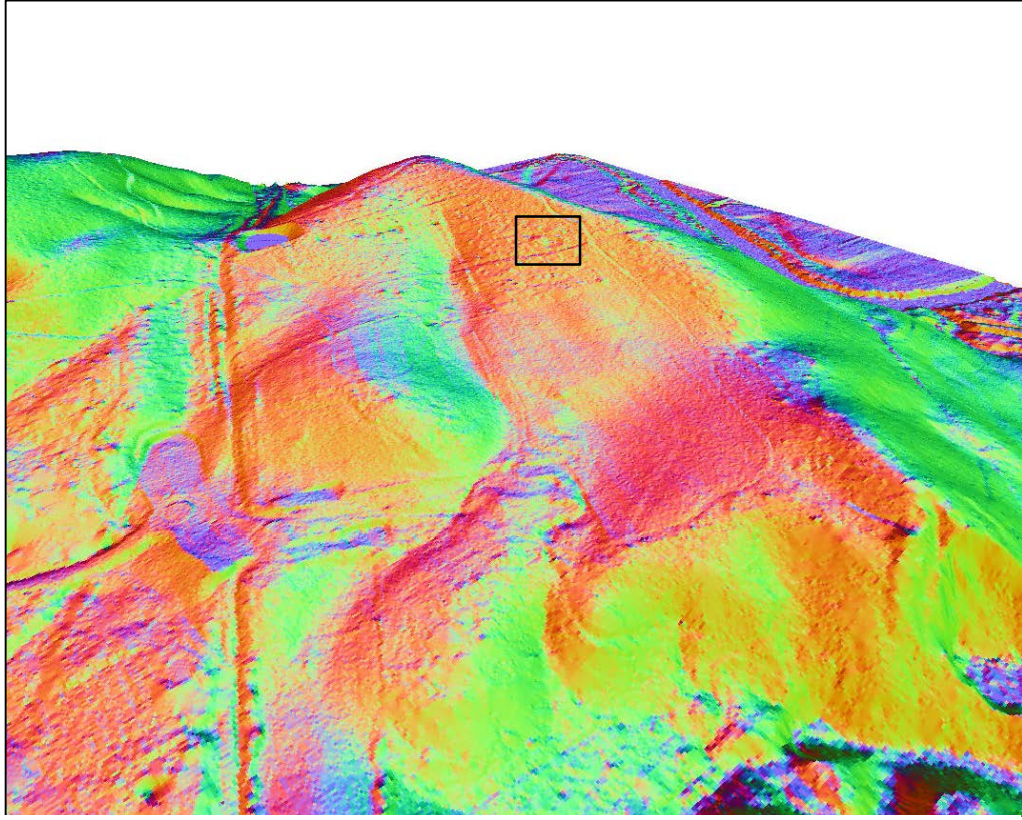


Figure 19. 3D Model of PCA in ArcScene

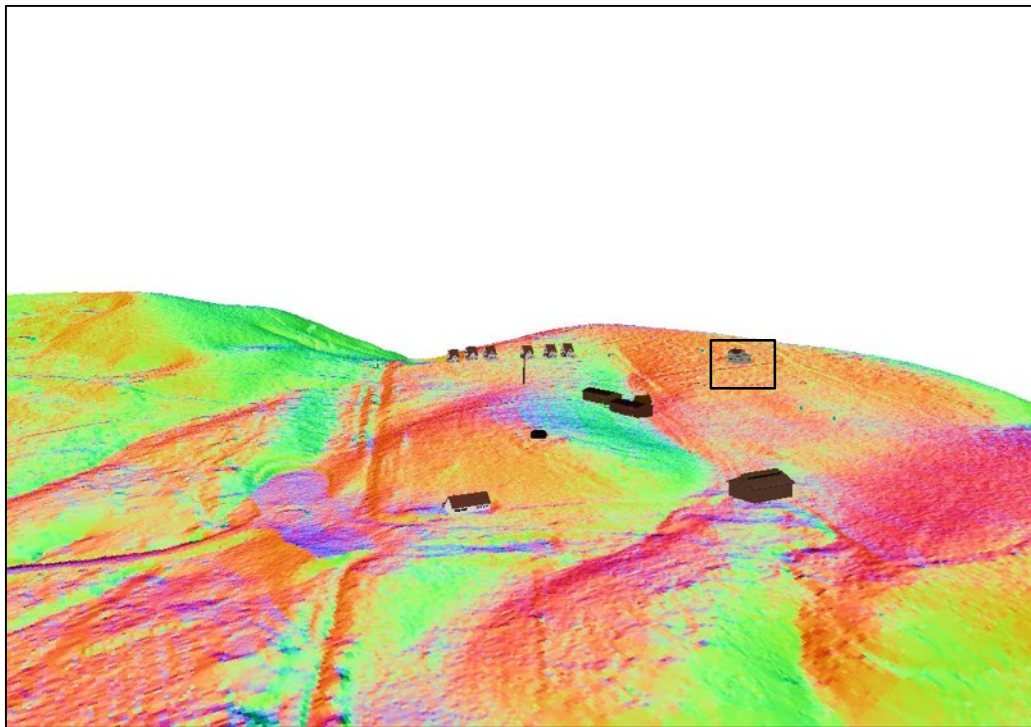


Figure 20. 3D Reconstruction of Fort Yamhill in ArcScene

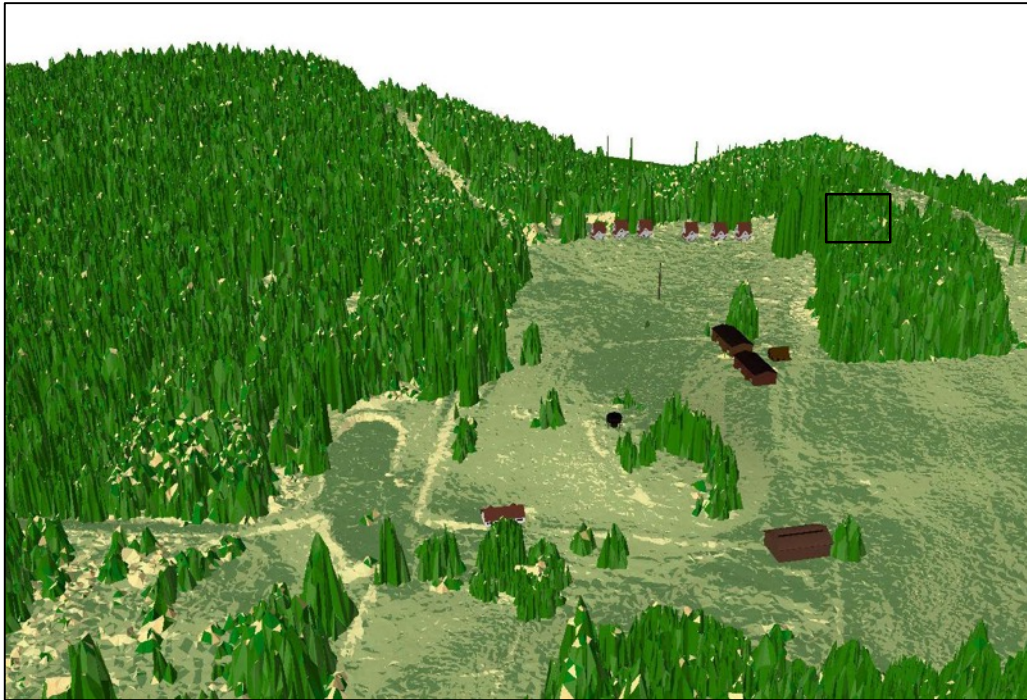


Figure 21. 3D Reconstruction of Fort Yamhill with LiDAR Data Point Cloud

10.3.2. Remote Sensing Results

Figure 22, a hillshade output, highlights the area where the hospital is most likely located. This conclusion is based on both the results of the georeferenced maps and the relative size and location of the depression. The shape and depth of the depression suggests that is most likely the result of the supposed cellar that is associated with the original hospital building. It does not appear large enough to represent the footprints of both the original building and the later addition. Figure 23 shows closer detail of this area, however, due to the diminished penetration of LiDAR in forested canopies, the data appears extremely rough. The hospital location as it is seen today with vegetation can be viewed in Figure 24. The linear feature directly to the south of this depression marks the current power line that runs along the outside of the fort, previously this line ran through the main parade ground.

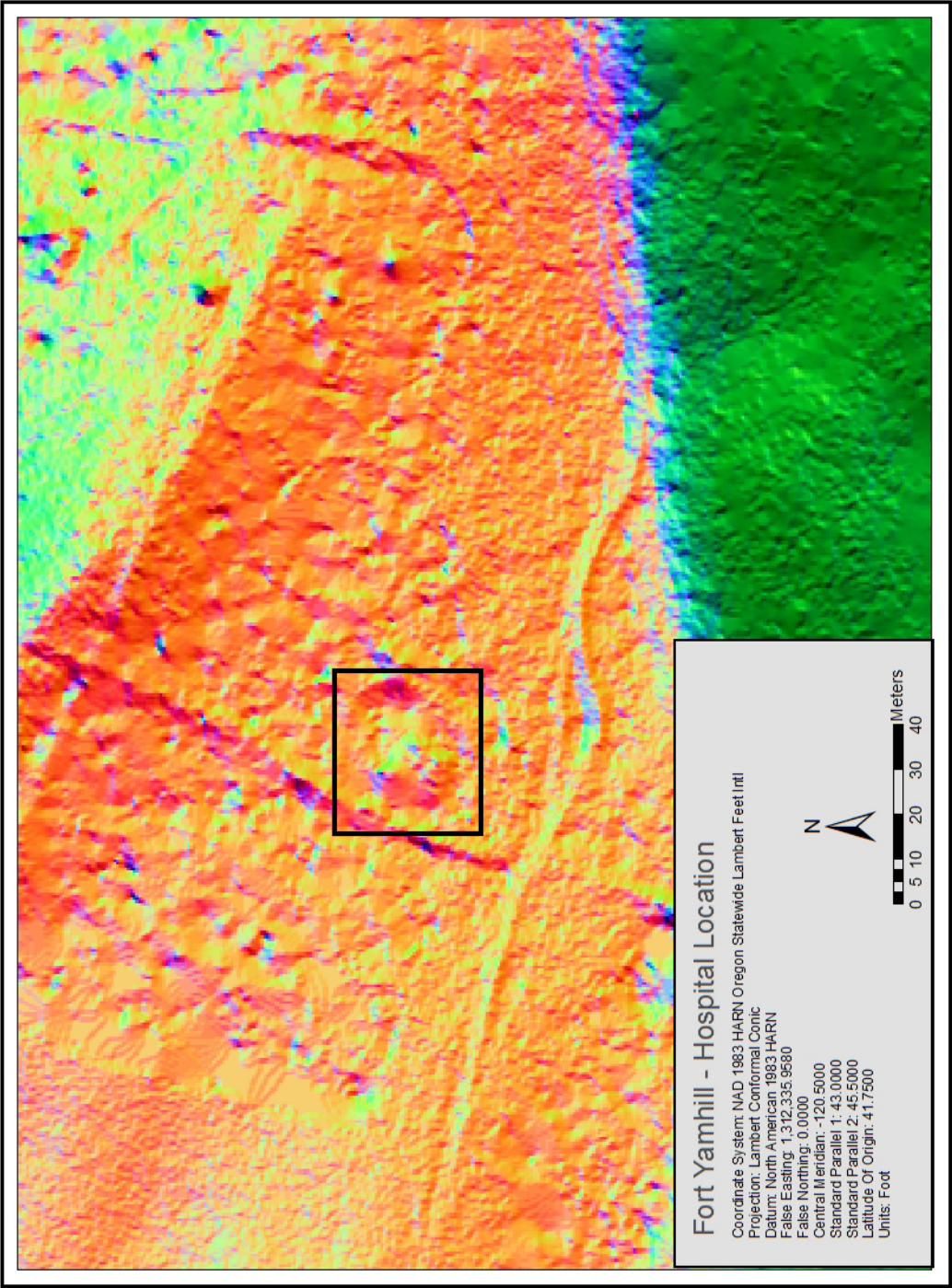


Figure 22. Fort Yamhill's Hospital Location

The other linear feature that runs to the east of the depression may mark the trail that would have been used to travel to and from the main fort grounds. Because of its isolation from the fort compound, it is likely that a designated trail existed between the two features for ease of access. The small depression, marked by the black arrow, may indicate the hospital's privy although it is located on the opposite end of the compound than the Davison Map indicates. It is important to note here that these results are only meant to guide further surveys and excavations, giving an educated guess of where this feature is located.

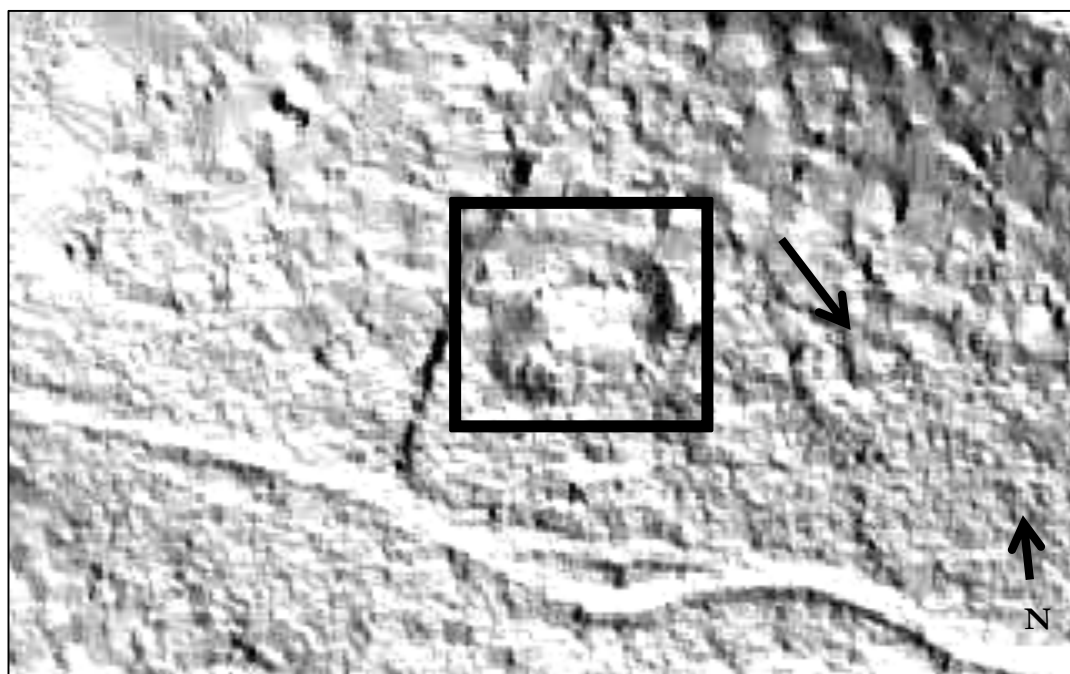


Figure 23. Detail of Hospital Location



Figure 24. Aerial View of Hospital Location

10.2. Site Reconnaissance

In June 2016, initial site reconnaissance was conducted at Fort Yamhill, assisted by the previous site exploration conducted by Dr. David Brauner and by maps created with remote sensing techniques mentioned above. These sources helped in locating the site and its boundaries, as much of the area was overgrown with blackberries and sword ferns. The hospital site is located above the rest of the fort, sitting in isolation on the southern extent of the state park. It is marked by a prominent two-meter-deep cut bank on its eastern and southern sides, which border a flat area that is 18 by 14 meters. The northwest portion of this flat drops into a depression that is 5 by 4 meters and about 1.5 meters deep. When this depression was first discovered, it was barely perceptible due to vegetation, but when its dimensions were discovered, it seemed likely that this feature was the hospital's cellar. When the site was cleared out, two stone courses were revealed on the depression's western wall, identifying the feature as being manmade (see Figure 25). These features are identified as being altered by the military for the construction of the hospital complex. Initially, the clearing may have only been large enough to accommodate the first building, and was later enlarged to make room for the addition in 1863. The cellar was part of the original construction, noted in the 1858 inspection report (Mansfield 1858). Once the site was located, the site grid was extended from the fort kitchen that was excavated in 2005 and 2007. This was done using a transit and tape measure and was verified with back azimuths. The grid was marked with rebar pins and will be used for future excavations.

Attempts to locate the hospital's privy were unsuccessful. Comparison of the various historic maps, did not indicate a clear location for the privy. However, it may have been moved at some point, creating the inconsistency in the various maps. The LiDAR PCA map

showed two possible depressions that seemed likely candidates for the privy feature, but when these features were located on the ground, they did not show any of the markers that are normally seen with buried privies, including rich soil and a change in vegetation, and were more distant from the hospital than the historic maps indicated. Soil samples taken with an auger showed no change in soil type within a depth of 20cm. However, it is possible that the privy was filled in when the site was abandoned, meaning that the privy would not be represented by a marked depression and that a change soil type would not be found for a significant depth.



Figure 25. Detail of Cellar Feature with Stone Courses

10.3. Excavations

Preliminary excavations were conducted over the course of six weeks during the summer of 2016 and were the main focus of the 2016 OSU Historical Archaeology Field School led by Dr. David Brauner. Cayla Hill, MA, acted as field director for these operations with the help of the author and Nathan Brauner as field foremen. Graduate student Diane Zentgraf managed the field lab and was in charge of the initial curation process for all excavation materials. There were a total of nine students that were enrolled in the field school. Excavations were conducted under permit number 2197 issued by the Oregon State Historic Preservation Office.

The goal of excavations was to locate the hospital's foundations and determine the dimensions of both wings of the building. Figure 26 shows all excavated units and features that were located in the units. All units were labeled according to the arbitrary site grid established in previous years of excavations at Fort Yamhill. Elevations were taken according to an arbitrary datum point installed at the hospital site and do not correspond to any other excavations conducted at the park. A total of 26 units were excavated this summer, with approximately 8.4 cubic meters of sediment removed. Each unit was dug as a 1x1 meter unit, excavated in 10 centimeter increments, allowing for a variable first level to achieve a consistent flat floor from the surface elevations. All excavated sediments were shifted through ¼-inch screens with twenty percent of the material shifted through nested 1/8-inch screens. Due to high clay content, 1/8-inch screens were not used for the majority of excavated materials, and wet screening was not an option due to lack of access to water. With the completion of excavations, all units were lined with heavy duty black plastic and filled with back dirt. Units are marked by grid pins in each corner. The site datum, a rebar

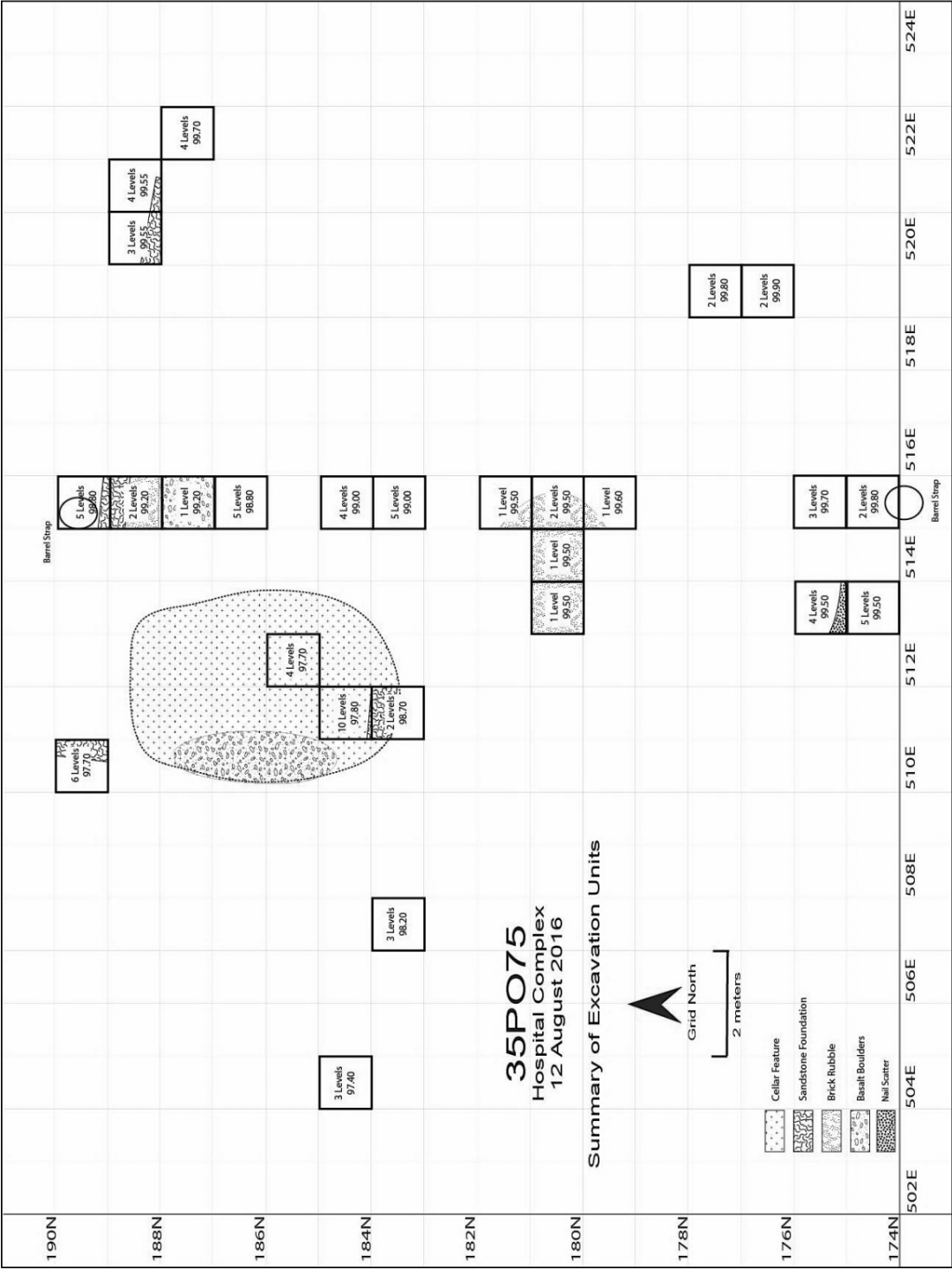


Figure 26. Fort Yamhill Excavation Map

stake, is located approximately 4.5 meters north of the eastern units following the northern foundation.

All artifacts were collected, except for brick fragments. Any artifacts found in place within the units were laterally and vertically mapped to the centimeter. Artifacts were then cleaned, catalogued, and labeled. Any ferrous metal artifacts were additionally coated with beeswax to prevent further deterioration. All excavated artifacts are now housed at the Department of Anthropology, Oregon State University.

The initial plan of excavations was to locate the southern foundation of the south wing by finding the corners and then extrapolating the location of its northern walls and the north wing. However, this plan was quickly modified after three staggered 1x2s along the southern wall revealed no evidence of foundation. Of these units, only three offered much information in the form of deposited materials. One of the first units excavated was on the southern end of the cellar feature, which picked up a portion of sandstone foundation. In an attempt to follow the foundation to a corner, units were placed four meters to the east, which were surprisingly sterile. Moving two meters north, the fire box foundation of the south wing was located, over which five units were placed to gain a better understanding of how the firebox was constructed. Up until this summer, the only firebox that has been found intact at Fort Yamhill is the oven in the bake house (Brauner 2016).

After the firebox foundation was exposed, excavation units were placed further north along the previous line to try and find any evidence of the northern foundation for the north wing. Concurrently, the cellar excavations were extended both to the south and to the north, to gain a better cross section of the foundation and to determine the composition of the cellar floor. Those units placed to find the foundation were successful in finding the north wall, which was beautifully intact. Following the line back south revealed a spread of

basalt boulders followed by a spread of a brick that are likely the remnants of the firebox for the north wing. In an effort to find the continuation of the north wing's southern foundation, a unit was placed four meters to west of the cellar units, which came up sterile. Another unit placed another three meters to the west and one meter to the north was to excavated to find any evidence of the western wall of the north wing, but was also sterile.

A one-inch stainless steel soil probe was used to follow the north wing's northern foundation east, in attempt to find where it met the eastern wall. The transit was used to estimate a straight line along the edge of the excavated foundation, and a measuring tape was used to visualize its trajectory. The soil probe was then pushed in at 6-12 inch intervals following the foundation east. Three units were placed five meters to the east of the other foundation segment, two along the north wall and one meant to catch the east wall. The two units on the north wall revealed the foundation, however, at some point in its history a large tree had fallen on it, disturbing much of the material and leaving a dense layer of decaying wood. This disturbance made it difficult to determine where the foundation was headed. It was not until after the east wall unit was opened that it was determined that the foundation had turned in the previous unit.

The last unit to be opened during the 2016 season was also located with the assistance of the soil probe. The probe was used to follow the northern foundation of the north wing west towards the cellar and also a possible foundation along the western wall of the cellar. Where these two lines met, it was the hope that a corner would be found that would help to determine the dimensions of the north wing. Upon excavating this unit, a foundation was located that ran north to south, but did not line up with the north foundation. There was evidence that the north foundation continued running to the west, and did not actually stop at this point.

In summary, a total of 26 units were excavated in 2016, successfully locating portions of the northern wing's foundation as well as the two fireboxes. Additionally, the hospital's cellar was partially excavated. Excavations failed to locate all four walls of the northern wing, but did determine that the southern wing was installed without a permanent foundation, indicating that it was added as a temporary installment. Explorative probing around the hospital site failed to locate the associated privy.

11. Descriptive Archaeology

11.1. Soil and Integrity

As excavations at Fort Yamhill have been on-going for over ten years; the site's history of disturbance is well known, as are its soil properties, and the usual depth of the cultural layer. Since its abandonment, Fort Yamhill has been logged numerous times, causing much disturbance to the soil and producing changes in the native vegetation. These disturbances are most readily seen in the immense number of stumps and tree roots that radiate through each feature. As a result of both these roots and the methods used for logging, the factors of disturbance are well considered in the analysis of features and debris.

Fort Yamhill soils, particularly those seen at the hospital site and on officer's row, consist of mixed classification between the Jory and Bellpine series. Characteristics of these soils are yellowish red to reddish yellow colors, high clay content, and a weathered marine sandstone bedrock. The horizons found at the hospital site are as follows, depths are estimates:

Oe – 0-4 cm; dark brown (7.5YR 4/2 dry); consisting of moderately decomposed organic matter, varies across site.

A – 4-20cm; reddish yellow (7.5YR 6/6 dry); silty clay loam with little to no gravel content.

AB – 20-45cm; reddish yellow (7.5YR 6/6 dry) silty clay with clay percentages averaging around 40 percent; gravel content varied with distance to foundations, foundation units had higher gravel contents due to the weathering sandstone, otherwise gravel is minimal.

B – 45-63cm; yellowish red (5YR 5/6 dry and 5YR 4/6 moist; silty clay with clay percentages upwards of 50 percent; moderately sticky and very plastic; very hard subangular aggregates; iron masses present; gravel content was dependent on distance from features.

Cr – 63cm; pale yellow (7Y 7/3 dry), fresh breaks are white (5Y 8/1); weathered marine sandstone, used for foundations, but occasionally encountered at the bottom of units.

The effects of bioturbation are readily apparent when excavating at Fort Yamhill, causing obvious changes in soil texture and structure, particularly from tree roots.

The cultural layer at this site is shallow in comparison to many other sites since the period of occupation was only eleven years. Due to this, it is relatively easy to identify where the cultural layer begins and ends. After its abandonment, Fort Yamhill was not occupied again, making the remnants of the fort the only material remains are present. The depth of the cultural layer differs very little across the site, beginning between 0-20cm below the surface and ending at weathered bedrock. This contact with the bedrock may be in part due to the excessive rains in the Coast Range, causing liquefaction of the soils, causing historic materials to sink through the soil. However, it may also be caused by extreme erosional effects during the fort's operation and prior to its reforestation.

The integrity of this site has varied extremely from feature to feature, but it is largely intact. After the fort was decommissioned, the buildings were either sold off at auction and dismantled, or destroyed, leaving only two surviving structures. Due to Phillip Sheridan's fame, the site also experienced a large amount of looting over the years, concentrated on the Commander's House and the privies of Officer's Row. The site of the hospital has remained relatively intact, showing little signs of disturbance aside from previous logging activities. As

far as it is known, the privy is still intact, as no evidence of looting has even been found, but its location is still unknown.

11.2. Features

To assist in the explanation of excavations and features, arbitrary labels have been used to convey the positioning of units within the site. Each unit has been labeled A-Z and each block of units has been labeled 1-8. Units are labeled according to their position, reading east to west and north to south. Figure 27 depicts this labeling system. Table 8 displays the number of artifacts found in each unit and the percentage of the total assemblage. To assist in visualizing the distribution of artifacts, Figure 28 depicts artifact densities using the Kernel tool in ArcMap.

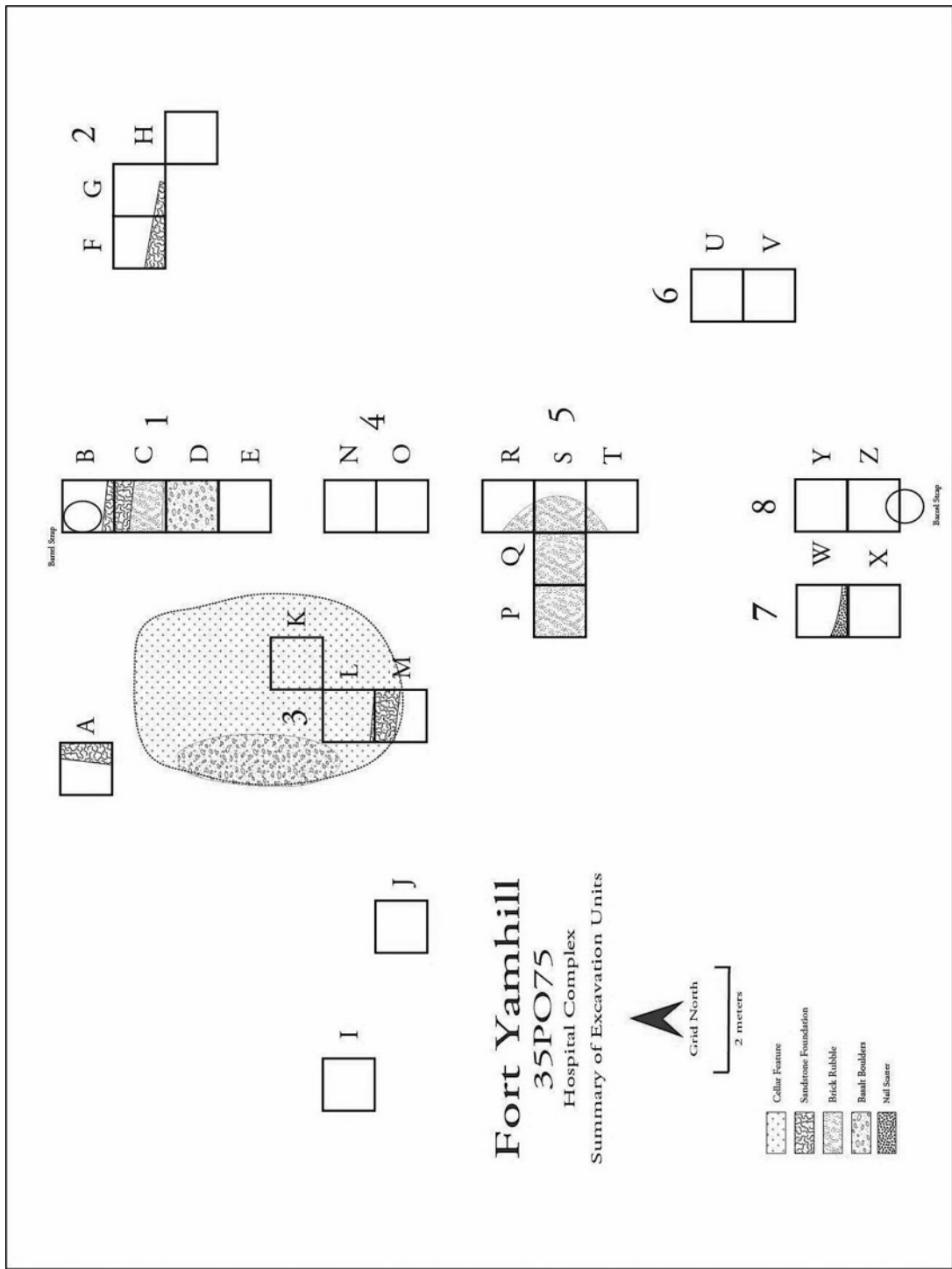


Figure 27. Excavation Map with Arbitrary Labels

Table 8. Artifact Counts by Unit

Unit	Artifact Count	% of Total
A	143	3.99%
B	118	3.29%
C	63	1.76%
D	7	0.20%
E	36	1.00%
F	147	4.10%
G	118	3.29%
H	51	1.42%
I	107	2.98%
J	44	1.23%
K	130	3.62%
L	76	2.12%
M	19	0.53%
N	17	0.47%
O	14	0.39%
P	197	5.49%
Q	199	5.55%
R	112	3.12%
S	241	6.72%
T	40	1.12%
U	34	0.95%
V	105	2.93%
W	585	16.31%
X	727	20.27%
Y	90	2.51%
Z	167	4.66%
Grand Total	3587	100.00%

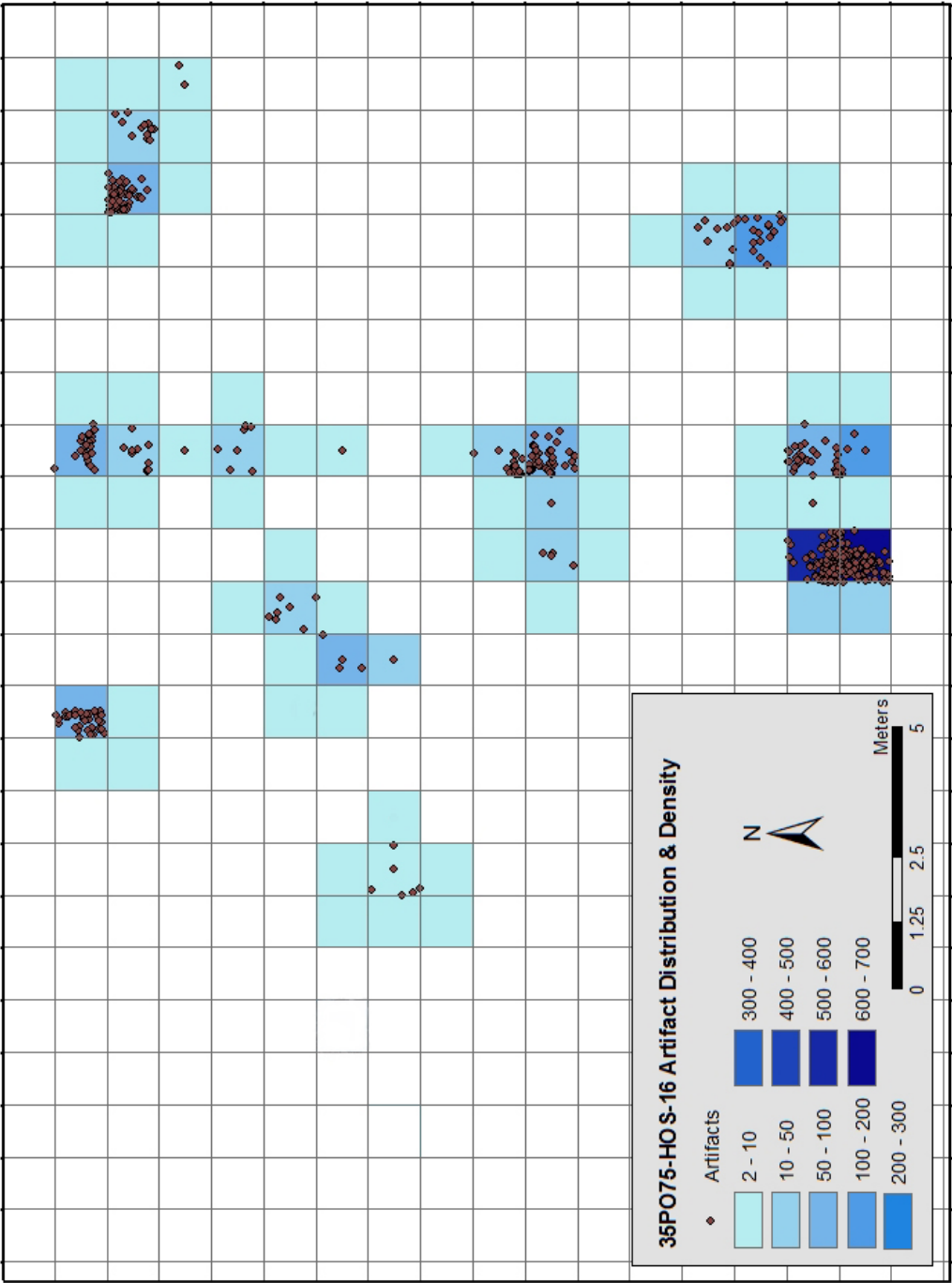


Figure 28. Artifact Distribution Map

11.2.1. Cellar (Block 3)

Upon discovering the hospital site, the most prominent feature of the hospital quickly became apparent. The cellar at first made itself known as an unnatural depression in the northwestern end of the site. About 5x4 meters in size and 1.5 meters deep, the feature was at first difficult to spot, until the site was cleared of vegetation. It was first identified from three irregular courses of basalt boulders, interspersed with loose bricks on the western side of the cellar and a few boulders randomly located in the bottom of the depression. The northern end of the depression tapered down the slope, creating an outlet that may have once been an entryway to the cellar.

A total of three excavation units were opened in the cellar area. One located on the southern end of the depression, at its highest point (Unit M); one in the bottom of the cellar (Unit K); and one mid-slope just south of Unit M (Unit L). These units were meant to find any evidence of a foundation, to determine the state of the cellar sediments, and to understand its method of construction. The western wall and the boulders of the cellar were left intact for future investigations. The two southern units, L and M, revealed that the cellar had been constructed to abut a foundation. At first it was thought that this was the foundation for the hospital itself, but later testing and excavation found that the excavated section was not continuous. The foundation was made in the same manner as the rest of the foundations uncovered at Fort Yamhill, being well-stacked shaped sandstone, averaging 15 inches (40cm) in width. Evidence of the sand-based mortar that would have held the stones in place has occasionally been found. Little of the sand-based mortar that would have held the stones in place remains, but the foundations were constructed well enough that unless disturbed they remain relatively intact despite weathering of the sandstone.

The sandstone comprising the foundation in the cellar units was significantly weathered, sloughing apart easily. This level of deterioration was likely due to the fact that a sizeable Douglas-fir grew less than a meter away and had numerous roots penetrating the foundation and surrounding area. Because of this state of decay, much of the foundation had slumped downhill, forming a scree pile that was at first mistaken for intact weathered bedrock. However, after some exploratory removal, it was determined that the debris was from the foundation and the majority of it was removed, exposing the depth of the foundation, which extended down 90cm (see Figure 29). Artifacts recovered in Units L and M included a small number of machine-cut nails, brick fragments, bottle glass, faunal bone, a walnut shell, a piece of clear plastic sheeting that was likely a remnant of logging practices, and some ash deposits.

The unit placed in the bottom of the cellar, Unit K, produced a variety of material, consisting mostly of nails. The artifacts removed from this unit consisted of brick fragments, a basalt boulder, machine-cut nails, a kaolin pipe fragment, bottle glass, and one brass military uniform button. Excavations were terminated when an impenetrable layer of clay was reached, making digging impossible. It is hypothesized that the cellar floor consisted of this unlined clay. For complete tables of unit assemblages, see Appendix E.



Figure 29. Detail of Cellar Foundation

11.2.2. Southern Firebox (Block 5)

The firebox foundation uncovered in the area of the southern wing of the hospital was the first remnants of such a feature excavated at Fort Yamhill. This feature consisted entirely a brick scatter interspersed with basalt cobbles, machine-cut nails, and sand deposits that were likely remnants of mortar used in the construction of the firebox. The majority of the bricks comprising this feature were fragmented. Those that were intact were of the make constructed by the brickyard of the nearby town of Ballston (Brauner 2016) and are characterized by a raised bevel edge. Although none of these bricks were found to be intact feature remnants, their concentrated spread was consistent with a fallen, or partially dismantled firebox. From the lack of these features on Officer's Row, it is likely that local inhabitants removed the majority of salvageable brick after the fort's abandonment, reusing it elsewhere.

Five units were used to expose this feature, three arranged linearly north to south (Units R, S, and T), and two running east to west of the middle unit (Units P and Q). The majority of the brick scatter was concentrated in Units P, Q, and S, while the perimeter of the spread tapered out in Units R and T (see Figure 30). These units were not excavated more than two levels, the majority of them only being exposed with one level. The purpose of this was to estimate the size of the firebox feature, determine its method of construction, and leave all debris intact for future study. Artifacts that were recovered from these units included various fragments of bottle glass, brass rivets, and a number of gastroliths.



Figure 30. Detail of Southern Firebox Foundation

11.2.3. Northern Firebox and Foundation (Block 1)

The most intact feature excavated at this site was the fire box foundation for the northern wing of the hospital and its northern foundation. This area was exposed with four units arranged on a north/south axis with the northernmost unit falling partially outside of the foundation (Units B, C, D, and E). Once fully excavated, these four units displayed a remarkable gradient from a relatively sterile southern unit, to a spread of basalt cobbles and boulders, to a scatter of bricks and cobbles abutting the sandstone foundation. Outside of the foundation, in Unit B, there was very little in the way of construction debris, but many interesting artifacts, including an intact barrel strap, bottle glass, a bottle finish with its cork and wire bail still in place, as well as a pewter spoon, and a glass bottle stopper. The gradient of basalt to brick to sudden contact with the foundation in Units C, D, and E produced many questions regarding the construction of the firebox and its placement within the original hospital structure. It appears that these features were adjacent to each other, differing from the layout shown in the Davison Map.

The two middle units, Units C and D, were not excavated more than two levels, leaving the firebox feature intact. The southernmost unit, Unit E, was excavated to a depth of 70cm, terminating excavations after digging through two sterile levels, while the northernmost unit, Unit B, was excavated to the base of the foundation, revealing a height of 54cm. This foundation segment was the most intact of those uncovered during this investigation, showing excellent preservation of the method of construction (see Figure 31). From the exposed portion, it was evident that a combination of large and small pieces of sandstone were used, providing a solid base for the building. Artifacts excavated in these two units included machine cut nails, bottle glass, gastroliths, and mirror glass.



Figure 31. Detail of Northern Foundation and Firebox Foundation

11.2.4. Northeast Corner Foundation (Block 2)

The three units placed in the northeastern corner of the northern wing, Units F, G, and H, exposed two meters of the northern foundation. This section was uncovered in the two units placed adjacent to each other along the foundation, Units F and G. All three of these units presented an interesting depositional environment as they were each under the decaying remnants of a large Douglas-fir. Each unit had at least 40cm of decaying wood lying on top of the mineral soil. Exposing these units made it apparent that at some point in time a large Douglas-fir fell diagonally across the northeast corner of the hospital, displacing some of the foundation and causing some damage to the sandstone on which it landed.

While Units F and G were placed directly on top of the foundation, Unit H was meant to come down onto the eastern wall. Unfortunately, what initially appeared to be a continuation of the northern foundation was later determined to be displaced, unsupported sandstone that had been knocked off when the tree fell. As a result, Unit H, came down just to the east of the foundation, missing it entirely (see Figure 32). It did become clear that the foundation turned in Unit G and its orientation was extrapolated to run just west of Unit H. These units divulged a variety of artifacts, including machine-cut nails, bottle glass, an iron fork, two iron tins, and a ceramic doorknob.



Figure 32. Detail of Northern Foundation Units

11.2.5. Southern Foundation (Blocks 6, 7, and 8)

Six units, three 1x2s, were placed on the southern end of the site, placed at the base of the cut bank. The purpose of these units was to locate the southern foundation of the southern wing. Surprisingly, they uncovered no sign of a foundation, suggesting that the southern wing of the hospital was placed without a foundation. The two easternmost units, Units U and V, were almost sterile and terminated quickly in a layer of hardened clay. The western four units, Units W-Z, produced a large amount of cultural material confirming that they were outside of the hospital foundation for at least a period of the fort's occupation. Two of these units, Units W and Y, additionally displayed a distinct line of nails, suggesting the possibility of wall that decayed in place. Curiously, like Unit B, Unit Z also produced what appeared to be a complete barrel strap, which was only partially excavated. Artifacts collected from these units included a wide variety of bottle glass, a glass bottle stopper, white earthenware, half an ironstone plate, blue willow transferprint, tobacco pipe fragments, a barrel strap, zinc sheeting, iron stove parts, and faunal bone.

11.2.6. Western Foundation (Unit A)

The last unit that was opened was located at the northern end of the cellar, and was placed in an attempt to find the northwestern of the foundation. As stated previously, this unit was located based on probing along the northern foundation until it seemed to disappear. What was revealed was a north to south oriented foundation that appeared to run along the western side of the cellar. The orientation of this foundation did not appear to match up with the other foundation segments, and failed to show the northwestern corner. Additionally, its distance from the northeastern corner of the hospital would have resulted in

a smaller structure than appears to be depicted in the Davison Map. It likely that this unit was a support wall for the cellar rather than the structural foundation.

Like other segments of the foundation, this section appeared to have been partially knocked over by a tree root that ran across its surface and through the foundation, resulting in a large amount of debris to the west of the intact feature. Brick fragments were also discovered in this unit, possibly due to debris scatter from the removal of the northern firebox. This unit was excavated to a depth of 50cm, exposing the base of the foundation (see Figure 33). Artifacts recovered from this unit include a large amount of bottle glass, and machine-cut nails.



Figure 33. Detail of Western Cellar Foundation

11.2.7. Featureless Units (Units I and J, and Block 4)

A total of four units were opened that revealed little in the way of information or material remains. Units I and J were the most western placed units, that were attempts to excavate an area in front of the hospital. These units showed no evidence of any foundation or other features and produced minimal amounts of artifacts. From this general lack of data, it is supposed that these units were still underneath the hospital structure. Artifacts recovered from these western units include bottle glass, machine-cut nails, white earthenware, and flat glass.

The other two units, Units N and O, were placed along the central line of excavations, just north of the southern firebox and south of the northern firebox. These two units also divulged very little information, producing less than 20 artifacts in each unit. Units N and O, were placed to locate the southern foundation of the northern wing, or evidence of the breezeway that was constructed between the two wings. No evidence of a feature was located and the units quickly became sterile. Recovered artifacts included machine cut nails, curved olive glass, and a prosser button.

11.3. Artifacts

The 2016 excavations produced a large variety of artifacts that have helped to both confirm and challenge the assumptions that were created through archival research of military medical practices and military hospitals. All excavated materials were analyzed using a modified version of Rodrick Sprague's 1980 functional classification system. This system categorizes artifacts based on how they were utilized rather than focusing on material type, giving researchers greater insight into the reality of culture rather than focusing on the material of manufacture. The advantage of this system is the result of a streamlined dataset where artifacts of like functionality but different material are grouped together. For this

assemblage, Sprague's classification was modified for ease of use and understanding, as well as to adjust the function of certain items. Specifically, liquor bottles in this assemblage are included in a new group, termed Medical, to convey their function as a prescription rather than a personal indulgence. Both medical and military items have been promoted to a major function category, rather than being subdivided under Commerce and Industry or Group Services to simplify the analysis of this assemblage and focus on the nature of this site. These groups are simply termed Medical and Military.

Two unclassified groups are included in this analysis, Unknown and Unattributed. Unknown artifacts are those that are deteriorated past recognition or that were damaged during deposition so as to make definitive identification impossible. Unattributed items include soil samples and wood samples.

Table 9 summarizes all functional groups and their subgroups including artifact counts for each group and the percentage of their contribution to the entire assemblage. The following sections detail each functional group and the artifacts that comprise them. See Appendix F for photos of some of the featured artifacts.

Table 9. Main Artifact Classes

Function	Artifact Count	% of Total
I. Personal	16	0.45%
Clothing	3	0.08%
Footwear	5	0.14%
Indulgences	4	0.11%
Tobacco	4	0.11%
Medical & Health	4	0.11%
Grooming	4	0.11%
II. Domestic	134	3.73%
Housewares	134	3.73%
Culinary	5	0.14%
Gustatory	128	3.56%
Unknown	1	0.03%
III. Architecture	2949	82.10%
Construction	2949	82.10%
Hardware	2852	79.40%
Material	97	2.70%
IV. Medical	387	10.77%
Pharmaceutical	386	10.75%
Record Keeping	1	0.03%
V. Military	9	0.25%
Accoutrements	5	0.14%
Arms and Ammunition	2	0.06%
Ignition System	1	0.03%
Propellant	1	0.03%
Uniform	2	0.06%
VI. Unknown	86	2.39%
VII. Unattributed	11	0.31%
Grand Total	3592	100.00%

11.3.1. Personal

Those artifacts that are classified as personal items include 16 artifacts related to non-military clothing and footwear, indulgences, and personal health related items (Table 10). Four of these are mirror glass fragments which are classified in functional terms as relating to personal health and grooming. Three different non-military buttons were recovered, all of which are white ceramic 4-hole, dish-type Prosser buttons (Sprague 2002:113). These buttons are each 11mm in diameter. This type of vitrified ceramic button was first manufactured in 1840 by Mr. Richard Prosser of London who patented the manufacturing process (Sprague 2002:113). Prosser buttons were a common fastener type during this period; they would have been used for a variety of clothing items, such as shirts, undergarments, or even vests and trousers (Putnam 2011:97). Items relating to footwear include five 3mm copper eyelets with remnant leather and one partial leather boot heel.

All items relating to personal indulgences are tobacco related, including one fragment of a spittoon, two pipe stems, and one fragment of a pipe bowl. The spittoon fragment belongs to a Rockingham spittoon of which a number of examples have been found at Fort Yamhill on Officer's Row. The spittoon was a 7-inch stoneware vessel with a Rockingham glaze. Rockingham ware is most easily characterized by its brown mottled glaze, which is extremely variable, but most often has a two-tone appearance of brown over cream (Claney 2004). The unique appearance was a product of the method by which the glaze was applied. It could be painted, dipped, spattered, or splashed on to create the mottled patterns that are so well known (Stelle 2001). Each pottery that manufactured this ware had different formulas for their fabric and glazes, and the end product varied greatly between workers as each vessel was decorated to the visual appeal of the artist (Stelle 2001). Rockingham ware was most commonly made with a yellow fabric, but less specialized producers often took

advantage of the market, manufacturing lower quality items of the same style (Claney 2004:32). This ware was manufactured between 1830 and 1930, rising and falling in popularity over the years, being most popular between 1840 and 1900 (Claney 2004; Stelle 2001).

Table 10. Personal Artifacts

Function	Artifact Count	% of Total
I. Personal	16	100.00%
Clothing	3	18.75%
Button	3	18.75%
Prosser	3	18.75%
Footwear	5	31.25%
Brass Eyelet	4	25.00%
Leather Boot Heel	1	6.25%
Indulgences	4	25.00%
Tobacco	4	25.00%
Rockingham Spittoon	1	6.25%
White Ball Clay Pipe Stem	2	12.50%
Campaign Pipe Bowl	1	6.25%
Medical & Health	4	25.00%
Grooming	4	25.00%
Mirror Glass	4	25.00%
Grand Total	16	100.00%

The three tobacco pipe fragments offer little in the way information. The pipe bowl rim fragment is part of an effigy-style presidential pipe made of a red fabric with a clear glaze. This pipe is most likely of German origin and was made using a mold (Zentgraf 2017). It is possible that this fragment is from a Henry Clay presidential campaign pipe that would have been manufactured in the early 1850s (Stephan 1995:171). Both pipe stem fragments have an interior bore diameter of 5/64th inches and are manufactured from white ball clay, also known as kaolin clay (Zentgraf 2017). White ball clay is being used over the misnomer

kaolin to express the diversity in clay recipes between manufacturers, which often included a mixture of ball clay, kaolin, quartz, and mica depending on the desired plasticity (Trubowitz 2004:146; Zentgraf 2017).

11.3.2. Domestic

The category of artifacts related to domestic life contains the widest variety of artifacts within this assemblage. All of these fall under the subdivision of Housewares, which includes culinary and gustatory items. Within these subdivisions are nestled appliances, utilitarian ware, dinnerware, food stuffs, and utensils. The domestic group accounts for 3.73% of the total assemblage, amounting to 134 artifacts, see Table 11.

Table 11. Domestic Artifacts

Function	Artifact Count	% of Total
II. Domestic	134	100.00%
Housewares	134	100.00%
Culinary	5	3.73%
Appliances	4	2.99%
Cooking	4	2.99%
Stove Part	4	2.99%
Utilitarian Ware	1	0.75%
Red Ware	1	0.75%
Salt-Glazed	1	0.75%
Gustatory	128	95.52%
Dinnerware	78	58.21%
Ironstone	19	14.18%
Soup Tureen	1	0.75%
Unknown	18	13.43%
Transfer Print	1	0.75%
10-inch Blue Willow Plate	1	0.75%
Tumbler	23	17.16%
Cut Glass	1	0.75%
Pressed Glass	22	16.42%
White Earthenware	35	26.12%

10-inch Molded Plate	18	13.43%
3.5-inch Molded Cup	1	0.75%
6-inch Molded Bowl	1	0.75%
Unknown	15	11.19%
Food Stuffs	47	35.07%
Faunal Material	39	29.10%
Bone	27	20.15%
Calcified Bone	2	1.49%
Gastrolith	10	7.46%
Food Preservation	6	4.48%
Aqua Paneled Glass	4	2.99%
Iron Can/Tin	2	1.49%
Fruit	2	1.49%
Peach Pit	1	0.75%
Walnut Shell	1	0.75%
Utensils	3	2.24%
Iron	2	1.49%
3-Prong Fork	1	0.75%
Unknown	1	0.75%
Pewter	1	0.75%
Spoon	1	0.75%
Unknown	1	0.75%
Iron Hook	1	0.75%
Grand Total	134	100.00%

11.3.2.1. Culinary Artifacts

There are only five artifacts that fall into this category. Four of these are termed as stove parts. Much like the red lead nails, these stove parts are painted with red lead, preserving them from oxidation. Stove parts found elsewhere at Fort Yamhill also display this characteristic. Few references allude to the practice of painting stoves with an anti-corrosive substance. In the late 1800s and early 1900s, it was widely expected that the best way to paint cast iron for the purpose of preserving it was to use a mixture of red lead and linseed oil applied on a thoroughly dry surface (Pearce 1898:170). However, none of the

sources discuss the use of this technique with cooking stoves, one of them suggesting that graphite paint would be more appropriate for this purpose (Hiscox 1910:496). From this lack of information, it is difficult to know why stoves at Fort Yamhill were treated in this manner, but it may likely have been due to the humid climate.

The other culinary artifact is a piece of utilitarian red ware that is hand thrown with a brown salt glaze. The single fragment represents a section of the vessel's side wall, showing that it was likely some kind of crock. The fabric itself is only partially oxidized, suggesting a reduced firing environment that was burning unevenly. From these features it is probable that the vessel was made locally and possibly obtained with the purchase of some locally made product.

11.3.2.2. Gustatory Artifacts

Of the 125 artifacts classified as Domestic, 119 are within the gustatory category. Of these, 78 are classified as dinnerware, consisting of ironstone and white earthenware dishes, as well as glass tumblers. Food stuffs also contribute largely to the gustatory subdivision. Faunal materials being the largest constituent, accounting for 34 of the 38 artifacts classified as food stuffs.

11.3.2.2.1. Dinnerware

The artifacts that can be termed "dinnerware" at this site consist of a variety of materials, including ironstone, white earthenware, cut glass, and pressed glass. White earthenware is the most commonly recovered material of these consisting of 35 fragments, while there is a total of 19 ironstone fragments, and 23 tumbler fragments, as well as one transferprint fragment. Within this assemblage are at least seven vessels: one ironstone soup tureen, one 9-inch Blue Willow plate, one cut glass tumbler, at least one pressed glass

tumbler, one 10-inch molded earthenware plate, one 3.5-inch molded earthenware cup, and one 6-inch molded bowl.

11.3.2.2.1.1. Ironstone

Of the 19 fragments of ironstone that were collected, only one of them can be identified as an individual vessel: a molded soup tureen rim fragment. This fragment shows evidence that the vessel had a lid, as well as at least one looped handle. This was a high quality vessel that was made out of true ironstone fabric with a pearl glaze, as evidenced by a slight blue tint to pooled glaze. Its exact dimensions are unknown as it was elliptical in shape. The remaining 18 ironstone fragments may in fact belong to the tureen, but attempts at crossmending were unsuccessful.

11.3.2.2.1.2. White Earthenware

A total of 35 white earthenware fragments are included in this assemblage, 18 of which are attributed to a 10-inch molded plate. Two other earthenware vessels were identified, each having one fragment, while the remaining 15 fragments are unattributed. The majority of these earthenware fragments could functionally be termed as ironstone, as they were often sold as ironstone, being cheaper replicas of the finer wares. The difference in fabric and quality is however reason enough to separate these two groups. While they functionally serve the same purpose, the intents of the seller and consumer should be kept in mind, as consumer choice often drove marketing strategies.

The 10-inch molded, round, ironstone plate was crossmended to be an almost complete half of a plate. Coincidentally, the complete maker's mark was included in this half of the plate. This vessel was made by William Adams and Sons of Tunstall. No reference to this particular maker's mark has been found, making dating impossible. However, similar marks date from the 1840s-1860s. Additionally, the molded pattern, a simple combination of

a 3.5-inch wide dipped scallop neighboring a 1-inch wide loop, has not been located in any reference.

One fragment belongs to a 3.5-inch diameter cup. This fragment represents a molded white ironstone cup that was decorated with a pattern known as Fig/Union Shape. This pattern is attributed to two different makers, J. Wedgwood of Tunstall, and Davenport of Longport and was first registered in November 1856, corresponding to the date of the site (Dieringer 2001:91).

The remaining vessel is a 6-inch bowl represented by a single rim fragment. This vessel was molded with some type of scallop design, possible the same as the W. Adams & Sons plate. No other information is known about this vessel.

11.3.2.2.1.3. Transferprint

One transferprint fragment was collected from this site, a rim fragment from a 9-inch plate printed with the ever popular Blue Willow pattern. This was a white earthenware vessel. The Willow pattern is one of the longest running patterns in the history of ceramics. It was first manufactured in the 1780s and is still manufactured today (Sussman 1979:235). Spode and Copeland were common producers of this pattern, but Blue Willow was not exclusive to these makers.

11.3.2.2.1.4. Glassware

Within this assemblage are 23 glassware fragments consisting of one fragment of cut glass and 22 pressed glass fragments. All of these fragments are assumed to be fragments of glass tumblers as there are three rim fragments that support this hypothesis. The pressed glass fragments can be attributed to at least two vessels, while the cut glass fragment indicates a third. Two patterns can be discerned from the fragments of pressed glass, each fluted designs. One of these consists of simple one-inch flutes, while the other is composed

of half-inch flutes of two varying heights and end styles, a rounded end and a flattened end. This second pattern may be composed of flutes of two varying sizes, the flutes with rounded ends being a half-inch in width, while the flutes with flattened ends may be one-inch wide. Additionally, there are three rim widths, one is 0.116 inches wide, another is 0.121 inches wide, while the third is 0.150 inches wide.

11.3.2.2.2. Utensils

Three utensils were found at this site: a ferrous metal fork, a pewter spoon, and an unknown ferrous metal utensil. The fork is a three-prong fork that likely had a wooden handle sandwiching the ferrous metal shank of the fork, much like one found at Fort Hoskins. The pewter spoon is remarkably well preserved despite the fact that only a partial remnant of the bowl remains. This spoon was created with a mold and is of a style referred to as a tipped or fiddle pattern with a heart heel (Kenyon 2008:24). The last utensil is represented by a partial section of an iron handle that is tapered with two outer grooves, possibly from a spoon.

11.3.2.2.3. Food Stuffs

The components of the hospital assemblage that can be classified as food stuffs includes a variety of different artifact types, which are dominated by faunal materials in the form of bone and gastroliths. There are 23 different specimens of bone, most of these are significantly fragmented making identification difficult. Ten different gastroliths were found, all of which were excavated within the firebox features. Gastroliths commonly indicate the presence of birds, usually chickens, but potentially upland bird species, such as grouse or wild turkeys. One piece of calcified or cooked bone was found. Four aqua bottle glass fragments representing two bottles are included in this category. The exact function of these bottles is as yet unknown, though they appear to be condiment bottles. Other food stuffs

that were located were two iron tins or cans that may have been used to preserve fare such as sardines, and a partial piece of a peach pit, as well as half a walnut shell. The walnut may likely have deposited post fort era as it shows little sign of decomposition.

11.3.3. Architecture

The architecture group includes all artifacts related to the construction of the hospital and its features. This group constitutes the greatest percentage of this assemblage, accounting for 82.10% of the entire assemblage. The majority of this group consists of hardware and within this subdivision, machine cut nails are the majority, accounting for 99.37% of all hardware and 78.90% of the total assemblage. Only 4.72% of the nails recovered were whole, the rest being fragmented remains of varying condition. Recovered nails varied in size, ranging from 6d to 30d (2-4.5 inches). The remaining 0.61% of artifacts in this hardware category include a handful of 2-inch screws, three spikes, an iron hinge, iron nut, and a ceramic doorknob. In addition to hardware, this functional group also includes building materials, which include brick, mortar, zinc sheeting, and clear flat glass (see table 12).

Table 12. Architecture Artifacts

Function	Artifact Count	% of Total
III. Architecture	2949	100.00%
Construction	2949	100.00%
Hardware	2852	96.71%
Bennington Door Knob	1	0.03%
Finishing Nail, Shank	1	0.03%
Iron Hinge	1	0.03%
Iron Nut	1	0.03%
Machine Cut Nail	134	4.54%
Machine Cut Nail, Head	1464	49.64%
Machine Cut Nail, Shank	1236	41.91%
Machine Cut Tack	2	0.07%
Screw	8	0.27%
Spike	3	0.10%
Finishing Nail Head	1	0.03%
Material	97	3.29%
Brick	5	0.17%
Clear Flat Glass	80	2.71%
Cobblestone	2	0.07%
Mortar	6	0.20%
Zinc Sheetting	3	0.10%
Mortar and Sand	1	0.03%
Grand Total	2949	100.00%

11.3.3.1. Red Lead Machine Cut Nails

Out of all the machine cut nails, both whole and fragmented, about 3.5% of these nails are preserved with a coating that has been termed “red lead” by those who participate in excavations at Fort Yamhill as they are a common find within the site. Historically, red lead paint was used extensively as a method of preserving iron and steel, preventing corrosion (Gayle et al 1992). Early references recommend using lead coated nails in the installation of slate roofs over using tin or galvanized nails because of their superior

durability (Western and Company 1884:281). An XRF analysis of these nails determined that these coated nails also had titanium, manganese, cobalt, copper, and strontium components, in addition to lead, suggesting that they were made with a higher quality iron mix, verging on steel. The combination of higher quality metal and lead coating has resulted in almost perfect preservation of these nails for over 150 years in a coastal region that experiences high seasonal rain averages.

11.3.3.2. Ceramic Door Knob

The ceramic doorknob is of the type that is commonly referred to as a “Bennington” doorknob, but is not in fact a Bennington doorknob according to the Antique Doorknob Collectors of America. Bennington doorknobs much resemble Rockingham wares, consisting of a solid cream-colored fabric covered with the classic Rockingham glaze, giving it its marbled or mottled appearance (Joslyn 2008). The doorknob collected from this site is made in a different manner. Instead, its marbled appearance is a result of its fabric or clay. This doorknob was created by combining two fabric types, a red clay and a white clay, which were mixed together to create a cohesive swirled body which was then fired with a clear or “Albany slip” glaze, emphasizing the swirled fabric (Joslyn 2008). While this is commonly referred to as a “Bennington” knob today, this style is actually a “mineral” knob (Eastwood 1976:48). Mineral knobs were first patented in 1841 when John G. Hotchkiss of New Haven, Connecticut invented the hardware for securing a metal shank or spindle to a knob made of a mineral material such as clay or glass (Hotchkiss 1841). Doorknobs made in this manner became increasingly popular throughout 1800s and were still readily available in the early 1900s through mail order catalogs, such as Sears and Roebuck (Lyons ed. 2007).

11.3.3.3. *Cast Iron Hinge*

The iron hinge included in this assemblage is small to mid-sized rectangular cast iron hinge measuring two inches tall with leafs that are approximately one-inch-wide for a potential spread of two inches and a leaf thickness of 3/8 inch. Because of its dimensions and the fact that it only has two holes in each wing, it is likely that this hinge was used for hanging a cabinet door (Kilian Hardware). Although the iron is fairly corroded, it appears to be a lift off style hinge that would have been commonly used for shutters, rather than the loose pin style that is more indicative of a cabinet hinge. However, as it does not conform to the leaf style normally used with shutter hinges, known as the parliament style that features longer t-shaped leafs, it is still considered a cabinet hinge (Priess 2000:61). This particular style has been referred to as a lift-off butt hinge, or a loose joint butt hinge (Donaldson 1999 and Priess 2000:60).

11.3.4. Medical

The group of medical related items consists largely of bottles of various types, along with two bottle stoppers, and one glass inkwell (Table 13). Classifying the bottles within this assemblage was a matter of some debate. The variety of bottles included medicine bottles, as well as liquor bottles. Liquor bottles were included in this category because of the function of alcohol within the medical department was that of a prescription medicine and not of a personal indulgence. A number of the vessels included in this group were not represented by defining features, making the classification of their function difficult and many could be placed within the “unknown” category. However, for the purpose of providing an enhanced discussion of these materials, they remain within this group. Only one artifact was found that can be classified within the category of record keeping: an aqua base of an umbrella ink bottle.

Table 13. Medical Artifacts

Function	Artifact Count	% of Total
IV. Medical	387	100.00%
Pharmaceutical	386	99.74%
Aqua Curved Glass	14	3.62%
Unknown	7	1.81%
Vessel #1	7	1.81%
Aqua Paneled Glass	23	5.94%
Unknown	3	0.78%
Vessel #2	5	1.29%
Vessel #5	14	3.62%
Vessel #6	1	0.26%
Clear Curved Glass	122	31.52%
Unknown	95	24.55%
Vessel #10	1	0.26%
Vessel #11	1	0.26%
Vessel #12	1	0.26%
Vessel #13	10	2.58%
Vessel #3	13	3.36%
Vessel #9	1	0.26%
Clear Glass Stopper	4	1.03%
Squibb	1	0.26%
Hollow	3	0.78%
Clear Paneled Glass	24	6.20%
Unknown	15	3.88%
Vessel #8	9	2.33%
Green Curved Glass	17	4.39%
Vessel #4	17	4.39%
Olive Curved Glass	156	40.31%
Unknown	8	2.07%
Vessel #16	11	2.84%
Vessel #17	15	3.88%
Vessel #18	52	13.44%
Vessel #19	1	0.26%
Vessel #20	7	1.81%
Vessel #21	32	8.27%
Vessel #22	9	2.33%
Vessel #23	6	1.55%

Vessel #24	7	1.81%
Vessel #25	8	2.07%
Olive Paneled Glass	26	6.72%
Unknown	2	0.52%
Vessel #15	23	5.94%
Vessel #26	1	0.26%
Record Keeping	1	0.26%
Ink Bottle	1	0.26%
Grand Total	387	100.00%

11.3.4.1. Pharmaceutical

This assemblage includes 389 fragments of glass, containing at least 26 different vessels of varying color and type. There is one discernable aqua bottle, two paneled aqua bottles, one aqua case bottle, six clear bottles, two clear paneled bottles, one green bottle, ten olive bottles, and two olive case bottles. Of these bottles, only one has been positively identified, an olive square bottle with embossed lettering, an Udolpho Wolfe's Aromatic Schnapps bottle.

Udolpho Wolfe's Aromatic Schiedam Schnapps were imported to the U.S. in 1848, and were sold under this name until 1870, when Wolfe passed away and the brand's name changed to Udolpho Wolfe Company (Meyer 2013). Schiedam schnapps were a type of gin that was native to the city of Schiedam of South Holland, in the Netherlands (Meyer 2013). Aromatic schnapps include the additional ingredient of a fragrant Italian berry (Meyer 2013). This product was heavily advertised for its medicinal properties as a diuretic beverage, promising to treat numerous maladies that were caused by drinking unclean water (Meyer 2013). These claims were well supported by numerous reviews written by physicians and other experts, making this item exceedingly popular around the world (Meyer 2013). These

characteristics likely made this product popular with members of the Union and Confederate armies as they struggled to deal with unsanitary camp conditions.

11.3.4.1.1. Aqua Glass

Of the numerous glass fragments that are contained within this collection, 34 are aqua glass; 20 of these belonged to paneled bottles, while the remaining 14 can be attributed to cylindrical bottles. Only three individual vessels have been identified, but very little information has been recovered on them. There is one large (3.75-inch diameter) round aqua bottle with a hand applied prescription style finish that is approximately 1.75-inches in diameter with an interior diameter of 1-inch (Fike 1987). This vessel is represented by 7 fragments. There are two paneled vessels with embossing, one is labeled “NEW YORK” down one side panel, while the other vessel is embossed with a partially recovered “/BO.../PHIS...” that may be a bourbon whiskey bottle. The third paneled vessel is a deep aqua square bottle that has no recovered embossing, but may be a Pine Tree Cordial bottle.

11.3.4.1.2. Clear Glass

There are 146 clear glass bottle fragments included in this assemblage. From these, seven different vessels have been identified from 25% of the fragments. The remaining 75% are unidentified and unattributed. Of the seven vessels identified, four of them are small bottles represented by a single fragment, two prescription finishes, one shoulder, and one ¾-inch base, the remaining three vessels have greater representation. The most well represented bottle, consisting of 13 fragments, is the most easily distinguished; a large (3.5-inch diameter) plain round, manganese glass bottle. A clear paneled bottle, represented by 9 fragments, is more diagnostic in that its side panels are embossed with “...EY & Co.//...LIFOR...” which have not been identified, although the second half is likely “California”. The last

vessel to be mentioned is represented by 10 fragments and is a plain, cylindrical bottle, made of thick clear glass.

Two other artifacts that are made of clear glass are two bottle/jar stoppers that were recovered. One, found intact, is a 1/2-inch Squibb ground glass stopper with that is 1.5-inches tall. Stoppers such as this, those made for bottles with narrow, long necks, were often used for corrosive or volatile liquids as the liquid could be easily controlled when pouring and the stopper would not degrade from contact with the contents (Putnam 1965:108). This type of bottle was referred to as a tincture bottle that often required a well-fitted stopper, especially when they were used to store acids (Parrish 1856:326). The other stopper, is a hollow wide-mouth, ground glass stopper, that would have been used with jars that were made to contain solids or viscous liquids, referred to as salt-mouthed jars (Parrish 1856:19). These stoppers have been referred to as flat oblong head stoppers and were hollow for multiple reasons (Jones and Sullivan 1989:153). They were lighter than solid stoppers, making them easier to handle, and they could be used to measure out contents when preparing prescriptions (Parrish 1856:47).

11.3.4.2.3. Olive Glass

Olive glass accounts for the largest percentage of this collection's glass assemblage. Because of the variety of color variations and mold textures, as well as variety in the quality of glass and bubbling characteristics, it was possible to sort this glass to a much greater degree than other glass types. Each fragment was thoroughly examined and sorted into groups based on similarities. Each group represents at least one vessel and a total of twelve groups were created, including the Schnapps bottle that was previously discussed. These twelve olive glass bottles include two square bottles, and ten cylindrical bottles, all of which likely held some type of liquor. Three of these vessels have bases, and two have shoulders.

Only one finish was found, its cork and bail still in place, and is roughly of the double oil or mineral style (Fike 1987:8). This finish is not attributed to any of the twelve vessels, as a match could not be definitively made. It appears to have been sheared off of the bottle.

11.3.5. Military

Within the category of military related artifacts are usually items relating to accoutrements, arms and ammunition, uniforms, all of which are found in this assemblage (Table 14). Unfortunately, this group contains only eight artifacts, exemplifying how removed the hospital was from everyday military practices. Those artifacts related to accoutrements include five cast copper rivets that are approximately 11mm long, with end discs varying between 14 and 19mm in diameter (Haecker 1994:138). It is probable that these rivets were part of a knapsack or cartridge box, or another type of field bag (Haecker 1994:138). Two artifacts can be classified as arms and ammunition: a long arm percussion cap, characterized by its top hat shape, and an E.I. DuPont lead stopper for a gun powder can. Lead stoppers were used for this purpose because they would ignite the powder by creating sparks when removed.

Table 14. Military Artifacts

Function	Artifact Count	% of Total
V. Military	9	100.00%
Accoutrements	5	55.56%
Cast Copper Rivet	5	55.56%
Arms and Ammunition	2	22.22%
Ignition System	1	11.11%
Percussion Cap	1	11.11%
Long Arm cap	1	11.11%
Propellant	1	11.11%
Gun Powder	1	11.11%
Powder Can Stopper	1	11.11%
Uniform	2	22.22%

Button	2	22.22%
4-Hole Pewter	1	11.11%
Rifleman	1	11.11%
Brass	1	11.11%
Grand Total	9	100.00%

The final military related items are two buttons. One is a brass Rifleman uniform button that was manufactured by Scovills & Co. This button is made from two parts and is 15mm in diameter. It has an impressed back stamp that reads “SCOVILLS & CO. ★★” that was used by this company between 1840 and the early 1850s (Tice 1997:31). Mounted riflemen were once 2nd Dragoons, but were transformed in 1842, and were later joined by a second regiment in 1846 (Tice 1997:128). Both of these were reorganized into the 2nd and 3rd Cavalry regiments during the Civil War (Tice 1997:128). These men served as highly mobile infantry that were armed with long hunting rifles that were especially advantageous during the Indian Wars (Tice 1997:128). There were never any Rifleman companies stationed at Fort Yamhill, making it likely that this button belonged either to a volunteer who wore a used uniform or a Union soldier who had previously served as a Rifleman. The other button is a 4-hole pewter button that is 13mm in diameter. It is possible that this was a military button, used for enlisted men’s fatigues or pants (Haecker 1994:136).

11.3.6. Unknown

There are 84 artifacts whose function is unknown. Of these, nine are ferrous strapping fragments, or in one case, a complete barrel strap. The sizing of these straps varies $\frac{3}{4}$ to 2 inches in width, suggesting a variety of barrels and casks that would have served as storage containers for a variety of goods or they may be attributed to other items that strapping was used in the construction of, such as buckets. The other 48 fragments of

ferrous metal may be from strapping, but are not complete enough to provide positive identification. Table 15 lists all of the artifacts that are classified as unknown.

Table 15. Unknown Artifacts

Function	Artifact Count	% of Total
VI. Unknown	86	100.00%
Ash	1	1.16%
Brass	1	1.16%
Washer	1	1.16%
Charcoal	13	15.12%
Chert	1	1.16%
Copper	1	1.16%
Coil	1	1.16%
Ferrous Metal	57	66.28%
Strapping	9	10.47%
Unknown	48	55.81%
Glass	9	10.47%
Melted	9	10.47%
Plastic	2	2.33%
Sheeting	1	1.16%
Unknown	1	1.16%
Unknown	1	1.16%
Grand Total	86	100.00%

12. Discussion

The research surrounding this project was extremely helpful in both answering questions relating to military medical practices and their application at Fort Yamhill. Additionally, this research also created a number of questions concerning the missing three years of the Register of Sick and Wounded, and the interaction of the hospital with the reservation. Similarly, excavations of the hospital site to date have done little to enlighten on the hospital's size, layout, and construction, creating more questions than were initially asked. However, while numerous questions still remain in regards to this site, a number of conclusions can be made from this research.

12.1. Remote Sensing

Locating the hospital site remotely, prior to entering the field, was extremely beneficial to this project. When the site was first visited, it was possible to walk directly to the site using GPS coordinates that were taken of the LiDAR maps. The advantage of locating sites remotely in this way is readily apparent, the amount of time that could be saved in the field is immense especially in environments where the landscape or vegetation make it difficult to discern features on the ground. It is the hope that these methods will become more widely used as this technology becomes more accessible. However, it should always be accompanied by groundwork as remote sensing data is not always reliable or readily interpretable. Additionally, some features may not be readily visible if they are subtly differentiated from the landscape.

12.2. The Hospital

The 2016 excavations succeeded in locating the hospital and determining its orientation, which had not been clearly indicated on historic maps. Excavations confirmed a number of details regarding both wings of the hospital. Both structures had glass filled windows, as evidenced by the presence of clear flat glass. Additionally, they both had fireboxes as shown in the Davison Map and both of these appear to have been constructed with a combination of brick and stone. While excavations were not able to create a clear picture regarding the construction of these fireboxes, it was determined that they were composed of both brick, and basalt boulders and cobbles. In studying the archaeological report of Fort Lane in southern Oregon, it was found that this contemporary fort utilized similar materials in its hospital firebox, using granite boulders, rather than basalt (Tveskov 2008:36). Excavations conducted by Southern Oregon University, uncovered the majority of this firebox, revealing granite boulders that were set in a squared U-shape, forming the base of the fireplace (Tveskov 2008:36). Smaller cobbles were then scattered around the front, possibly forming the hearth (Figure 34) (Tveskov 2008:36). This design is remarkably similar to that found at Fort Yamhill, specifically the hospital's northern firebox. The northern wing did in fact have a cellar as Mansfield's Inspection Report stated. However, excavations did not produce any knowledge substantiating that there was a breezeway built to connect the two structures as is shown on the Davison Map, although it is assumed that this did in fact exist, given the detail with which it was rendered. From the Davison map it appears that three doorways were in place in the breezeway, providing access to both rooms of the northern wing and the northern room of the southern wing.

12.2.1. The Northern Wing

In regards to the construction of the hospital, the exact dimensions of the northern



Figure 34. Detail of Fort Lane's Hospital Firebox (Tveskov 2008:37)

wing are still unknown, as the Davison Map does not produce measurements that seem to correspond with those found during excavations. This is however limited by the fact that only two positive foundation walls were located, the northern wall and eastern wall. The eastern wall, of course, was not actually excavated, but its location was established. These two walls were not able to offer information regarding the width or length of the building. Figure 35 depicts an overlay of the hospital's plan on top of the excavation map to show an estimate of the hospital's construction. The one southern foundation section found on the southern end of the cellar may coincide with that of the building wall, but all attempts to follow this section were unsuccessful, suggesting that it was an isolated support wall. By overlaying the building plan onto the excavation map, it is clear that either the cellar was larger than the original wing or that the portions of western and southern foundation are not

building foundations. The placement of the fireboxes, however, does fit with these dimensions, which would make the original wing about 13 feet wide and 38 feet long. If, however, these dimensions and placement are correct, the units that were placed to the far west of the site fail to support this theory as they offered little data to suggest that the building had terminated, instead supporting the concept that the northern wing was longer than 55 feet making it about 16 feet wide. If this is the case and if the relative dimensions shown on the Davison Map are accurate, the building would have been approximately 16 feet wide. But this does not in fact work with the distance between the cellar's southern edge and the northern foundation, which is approximately 20 feet. If instead, this 20-foot measurement is used, the hospital should have been approximately 68 feet long, placing the end of the hospital much further out than the topography seems to suggest. By stretching the building plan to this length, the hospital no longer fits within the site, suggesting that the smaller size is in fact accurate, leaving the issue of the cellar being too large.

It seems unlikely that the hospital would have been 68 feet long, especially considering the fact that the Davison Map shows the two rooms of the northern wing being approximately equal in size. Measuring from the approximate location of the eastern wall to the location of the northern wing's firebox produces a distance of about 23 feet, which would mean that the front room of the house would have been twice as long as the back room. This would have been a more appropriate size for the hospital's ward room in comparison to its kitchen, but once again, this is contradicted by the Davison Map. It is known that the Davison Map shows an accurate representation of the houses on Officer's Row, their dimensions have been confirmed by excavations of both House 1 and House 2. But from these excavations of the hospital, it seems unlikely that Davison accurately reproduced the scale of the hospital.

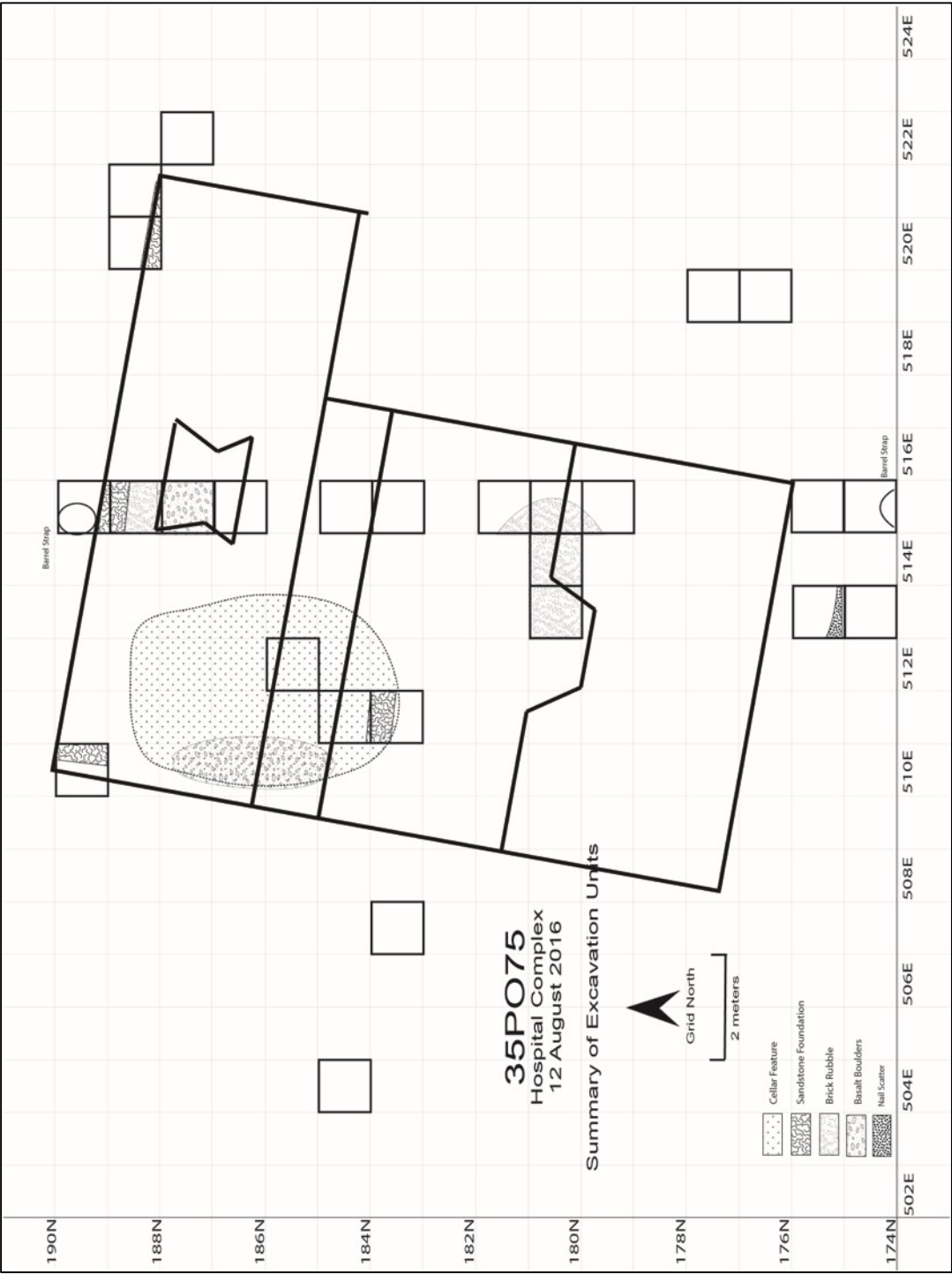


Figure 35. Hospital Excavation Map with Building Plan Overlay

12.2.2. The Southern Wing

Excavations produced only two pieces of evidence for the southern wing, the most obvious being the southern firebox. This firebox appears to have been constructed differently than the northern firebox, showing a hastiness in its construction through a lack of large basalt boulders, instead using basalt cobbles. Once again, it is unclear how exactly these fireboxes would have appeared. The basalt material may have acted as a façade or a hearth, or as in wall stabilization that would have been hidden from sight. There was no indication that any of the boulders or cobbles were used in conjunction with mortar, reducing the likelihood that they were used for facing or for the hearth. However, any such signs may have deteriorated. The other piece of evidence alluding to the presence of a southern wing is a nail scatter found in Unit W. This scatter is extremely dense, exhibiting an unexpected concentration of machine cut nails. The most telling feature of this scatter is its delineation which shows a marked line of deposition, suggesting that the nails may have fallen from the deteriorating wall.

Through the examination of all of the maps of Fort Yamhill, it was determined that the second wing that was brought up to the hospital in 1862, as mentioned in Bensell's diary, was the easternmost laundress quarters. In Davison's summary of public buildings, it was stated that only two of the six laundress quarters were occupied, make it a practical choice for expanding the hospital. Site excavations determined that it was unlikely that this addition was installed with a permanent foundation, as no evidence of one was located. At this point in time, the California Volunteers stationed at Fort Yamhill were hoping to be sent back east to join in the war. Bensell makes it clear in August 1862, that while they may have been preparing for winter's stay at the fort, they never knew when they might be ordered to pack up and move (ed. Barth 1959:42). Because of this anticipated departure, it is logical that the

men working on the hospital's expansion would not have bothered to take the time to ensure that it had a proper foundation. These various features lend themselves to exemplifying the transitory nature of the fort during this time and its move from a well-built garrison that was designed to last to a temporary post, manned by volunteers who eagerly awaited leaving.

12.3. Artifact Assemblage

The general lack of medical related items in this assemblage, such as surgical tools, medical instruments, or beakers can be explained by how well curated these items would have been. The Medical Department was highly possessive of items that they had to issue to fort surgeons, such as surgical kits. This may have been a residual of General Surgeon Lawson's focus on budget expenditures that caused the department to keep a keen eye its property, demanding annual reports of items on hand and an explanation of their condition (Trussell 1996). The 1860 inspection report of Fort Yamhill even commented on the fact that Glisan had yet to receive a field kit, exemplifying how reluctant the department was in its expenditures on equipment (Emery 1860). As a result, it is extremely unlikely that any obvious items, such as a stethoscope, would be excavated at these sites, meaning that the signature of a hospital must be based on more disposable items. In addition to this, excavations were concentrated on areas that would have been underneath the hospital that would not have been exposed for deposition of material.

If this site's assemblage was to be analyzed in isolation of the fact this was Fort Yamhill's hospital, its function would likely not be classified as a medical facility. Artifacts recovered yield little information in regards to medical practice, providing no clear picture of the building's use. However, this signature is not in fact restricted to this site. Trussell (1996) also commented on the distinct lack of medical related artifacts in the assemblage excavated

from Fort Hoskins' hospital. In his comparisons to other hospital assemblages, recovered at Cantonment Burgwin in New Mexico, and Fort Churchill in Nevada, he revealed that there was, in fact, a commonality between all three sites in the overall absence of items related to medical practice (Trussell 1996:120). Additionally, these sites all displayed a distinctly higher percentage of bottle glass in comparison to the rest of the fort, particularly that of liquor bottles (Trussell 1996:120).

Fort Hoskins is known to have operated with a prohibition on alcohol, legally limiting the use alcohol on the fort (Trussell 1996). As a result, the hospital was one of the few places where alcohol was legally stored and used, resulting in a higher use rate than other areas of the fort, explaining the disparity in the assemblage. While it is unknown whether Cantonment Burgwin or Fort Churchill were also dry forts, the fact that the medical department was known to require the stocking of alcohol for medicinal purposes explains the presence of larger than usual quantities of bottle glass. In comparing the assemblage from this study to that of these previous studies, it appears that the military hospitals of this era could in fact be characterized not by the presence of medical related items, but to larger quantities of bottle glass, particularly that of alcohol bottles.

An examination of Fort Lane's (in southern Oregon) artifact assemblage that was recovered from the fort's hospital, shows a surprisingly similar signature to that found at Fort Yamhill's hospital. Only 227 artifacts were recovered from these excavations, but 86.78% of those artifacts were machine cut nails or other hardware, and 11.89% of the assemblage was glass (Tveskov 2008:45). This is in comparison to Yamhill's assemblage which consists of 79.40% hardware and 10.75% bottle glass. Unfortunately, Fort Lane's glass assemblage consisted of window glass more than bottle glass (Tveskov 2008:46).

12.4. Hospital Operation

The majority of information that was deduced regarding the operation of the hospital was confined to the archival record. However, site excavations were able to confirm some of these findings. In regards to the hospital having its own kitchen, there is artefactual evidence confirming that men were both cooking and consuming food in the hospital, corroborating Mansfield's report and Bensell's journal. Additionally, excavated containers confirm that food was stored at the hospital as well.

According to the Regulations for the Medical Department, it was against regulations to have any arms or ammunition in the hospital, although the Hospital Stewards Manual suggests that these items were collected from patients upon their arrival and stored separately while patients were being treated (Army Medical Department 1856 and Woodward 1862). The powder tin stopper and percussion cap that were excavated suggest that Fort Yamhill may not have fully prescribed to these regulations, although their provenience places them outside of the hospital, rather than inside.

As many of the manuals have stated, the Medical Department called for the stocking of alcohol in the hospital for multiple reasons. In addition to the manuals, the hospital inventory records the storage of dozens of bottles of whiskey and sherry. This archival evidence was matched by that of the archaeological record in the form of hundreds of fragments of bottles, much of which was from alcohol bottles. The exact nature of the use of this substance in Fort Yamhill's hospital is not known as it likely changed with each incoming doctor. However, entries from Bensell's diary suggest that at least Dr. Tompkins embraced its use as a prescription medication.

12.5. Conclusions on Fort Health

In comparison to both the records of Fort Hoskins and the entire U.S. Army, Fort Yamhill deviates in a number of different ways, in terms of recorded complaints. While Fort Yamhill shows lower than average numbers for alcohol related illnesses and digestive complaints, it registered greater than average numbers for both respiratory complaints and venereal diseases. Fort Yamhill showed 150 percent more cases of STD's than Fort Hoskins, 600 percent more than the national military count (Trussell 1993 and RS&W). Additionally, there were 100 to 150 percent more cases of respiratory illness. Both Fort Hoskins and Fort Yamhill experienced similar numbers of digestive issues, being close to 200 percent lower than the national military rate.

Fort Yamhill's extremely high rate of venereal diseases is likely a result of its close proximity to the Grand Ronde Reservation where it has been recorded that men would often spend time with native women, often paying them for their services (ed. Barth 1959). Fort Hoskins was much further removed from the Siletz Reservation, making access to these indulgences more difficult. Nationally, very few posts likely allowed such freedom of movement and boredom to drive men towards visiting upon women in this manner. This was especially so in the east at a time when the troops were thoroughly preoccupied with dealings of war.

In regards to respiratory illness, the difference between Yamhill and the national average can be attributed the colder, coastal climate of Fort Yamhill, in comparison to those climates found elsewhere. The difference between Fort Hoskins and Fort Yamhill is less obvious as they share very similar climate regimes. The only supposed difference is that Fort Yamhill likely experienced colder temperatures due to its latitude and elevation. Additionally, it was ten miles closer to the coast, as the crow flies.

Interestingly, Fort Hoskins displayed a significant number of injuries, 160 percent more than those experienced nationally, and 270 percent more than those at Fort Yamhill (Trussell 1993:84). Surprisingly, the majority of these injuries were sustained during the regular period in the form of contusions, subluxations, and incisions (Trussell 1993:82). In examining the hospital records by cases per year, Fort Yamhill also followed this trend, corresponding to the decrease in garrison strength. However, the reason for Fort Hoskins' significant difference in the number of injuries sustained is curious and unknown, but may be associated with alcohol use.

12.6. Alcoholism and the Forts

Fort Yamhill and Fort Hoskins, while being known as sister forts and being inextricably linked, appeared to have drastically different operating procedures in terms of alcohol use. Fort Hoskins is known to have consistently imposed a ban on alcohol, either official or unofficial, throughout its operation (Trussell 1993:33). However, even with these bans, men were frequently intoxicated. The largest difference that is seen between Fort Hoskins and Fort Yamhill is in the hospital register. Fort Hoskins recorded a total of 50 cases of alcohol related illness between 1857 and 1865, amounting to 3.5% of all recorded cases (Trussell 1993:84). In contrast, Fort Yamhill hospital only recorded 11 cases of alcohol related illness, accounting for 1.7% of all cases between 1859 and 1866 (RS&W). In contrast, the percentage of alcohol related cases that were recorded for the entire U.S. Army between 1857 and 1865 was 1.9% of all recorded medical cases (Trussell 1993:84).

While these numbers may suggest that Fort Yamhill did not struggle with the consumption of alcohol, both Glisan's and Bensell's diary disagree. Glisan's numerous mention of the dangers of alcohol and their role in violence at the fort are the first glimmers of the nature of Fort Yamhill's operation. The numerous deaths and injuries that occurred at

Fort Yamhill are quoted to have arisen with the assistance of alcohol, as mentioned in Glisan's diary and fort records. Bensell's diary paints a clear and vibrant picture where men were frequently sent off fort to purchase whiskey or lager for the consumption of the enlisted men. He provides numerous accounts of men being drunk, both on duty and off duty, and even recounts a day when a commissioned officer was drunk while leading drills (ed. Barth 1959:29). It is clear that Fort Yamhill's men frequently enjoyed the libations of liquor, but why then do the hospital records not more closely resemble that of Fort Hoskins'?

At Fort Yamhill, there is no lack of documentary evidence of men being arrested and placed in the guardhouse for being drunk and disorderly. Bensell rarely goes a week without writing of such a case. However, men were certainly not being incarcerated just for being inebriated, as the entire fort would likely be under lock and key if that were the case. While Corporal Hilleary's diary from Fort Hoskins fails to mention many such events, although this just may be representation of a short period in 1865 (ed. Nelson and Onstad 1965). Bensell, in contrast, spent some time at Fort Hoskins, and writes of various escapades that involve alcohol consumption (ed. Barth 1959). Apparently it was also a common occurrence for men at Fort Hoskins to experience demotions, jail time, and hard labor as a result of their behavior (Bowyer 1993:29). This suggests that both forts were treating drunken and disorderly men in the same manner.

What may truly be the difference between these forts is not the treatment of inebriated men, but how drunk they were. With its prohibition on alcohol, Fort Hoskins restricted the access to alcohol and limited the consumption of it. At Fort Yamhill, in contrast, men were allowed to drink every day, if they so wished, which would have resulted in greater tolerance to the effects of alcohol. The men at Fort Hoskins however, were liable

to over indulge when they had access, increasing the possibility that they would become dangerously drunk. This combination would result in a larger percentage of alcohol related cases in the hospital as men were more likely to become ill.

Fort Yamhill recorded four cases of chronic alcoholism, and only two cases of delirium tremens, suggesting that the fort had an abundance of alcohol and few dry spells. In contrast, Fort Hoskins recorded eight cases of delirium tremens with no cases of chronic alcoholism, suggesting that men were certainly becoming alcoholics, but frequently had to experience times when their addictive substance was not available.

12.7. Treatment of Non-Military Persons

As was determined previously, it is known that the medical staff at Fort Yamhill treated not only military personnel, but also their families, Europeans in the neighborhood, and Native Americans. One of the most unexpected outcomes of this research was the finding that at least one Native American was treated in the fort's hospital. It had been formerly thought Native Americans were only allowed on the fort for the purposes of criminal punishment, but it is now clear that Native Americans were, at least occasionally, invited into the garrison. Aside from Chief Sampson's treatment, it is also known that one Native American female doctor was murdered within the confines of the garrison by her own people, when she lost a patient and ran to the fort for protection (Sheridan 1888:110). Before she was able to make it to safety, she was shot sixteen times in the back by sixteen men (Sheridan 1888:110). It was apparently not uncommon for native doctors to flee to the fort to escape persecution, often hiding in Lt. Phil Sheridan's cellar (Sheridan 1888:109).

Aside from Native Americans, it has been established that the fort's medical staff were also treating civilian men, women, and children, not only those related to military personnel, but also those that lived in the surrounding area. This treatment was a byproduct

of the Hippocratic oath that medical men stationed here took when they entered into the profession. It is unknown how often these people were treated at the fort's hospital, it being more likely that medical staff would travel out as need be to service their clients.

12.8. Military Families

Of the doctors that served at Fort Yamhill, at least two arrived at the fort with their families in tow. These men were G.K. Smith and Dr. Horace Carpenter (ed. Barth 1959). Additionally, Capt. Scott also had his family with him while he was in command. It has been well-established that Fort Hoskins was home to the large family of Captain Auger, who commanded the fort during the Army Regular period (Bryant 2014). In addition, Bensell's diary has clear references to the presence of these families, the most prominent being when Captain Scott's wife was ill, and later when his young daughter died. However, evidence of Fort Yamhill's familial component has yet to be thoroughly discussed.

Aside from the families of commissioned officers and medical staff, Bensell also refers to a number of instances when men at the fort married young women from the surrounding area. It was not uncommon for these people to meet at the numerous events that were hosted at Fort Yamhill, including balls, Sunday masses, and singing schools. According to Glisan, it was custom for men to choose their wives based on the standards of higher society, selecting women of intelligence, with admirable social and moral accomplishments (Glisan 1874:452). When such marriages occurred, it was common practice for the women to move into the laundress quarters, living on fort and assisting with duties such as washing for both the company and the hospital (Glisan 1874:453).

Excavations conducted by OSU during the summer of 2013 at Officer's Row, produced archaeological evidence corroborating Bensell's statements, in the form of doll parts, marbles, and figurines that would have been favored by women. Additionally, hair

combs were also excavated, as well as perfume bottles, hair pins, jewelry items, beads, and decorated buttons. The laundress quarters have yet to be excavated, resulting in little knowledge of the lives of families of enlisted men on the frontier.

13. Conclusion

13.1. Summary

This research has produced a detailed look at archival materials related to the operation of Fort Yamhill's hospital and life at Fort Yamhill. Through the thorough examination of these materials, many different conclusions were made which have produced an interpretive model for the fort's hospital and its operation. Preliminary archaeological excavations were conducted to confirm or deny those assumptions made from the archival record. Through this combination, the following conclusions were made:

- The hospital was located approximately 95 meters to the south of Officer's Row.
- The building consisted of two wings, both had fireboxes constructed of basalt stones, brick, and sand mortar; the original wing was built with a sandstone foundation and the other apparently without one, meaning that construction standards changed over time.
- The hospital was expanded in 1862 with a temporary installation of one of the laundress quarters and was likely motivated by the need for a larger ward room.
- The hospital was a largely self-efficient unit within the fort, having its own food storage, kitchen, and privy, as shown in historical maps and inspection reports, and in the artifact assemblage.
- Medical staff treated military personnel, military families, settlers, and Native Americans, both on and off the fort, but not all were treated in the hospital or recorded in the hospital register.

- Medical staff came from a variety of educational backgrounds, which are exemplified in the hospital register by differences in diagnosing, and in the biographical histories of the various men stationed at Fort Yamhill.

The hospital at Fort Yamhill has proven to be both a rich and fascinating site in terms of the information it has provided and the questions that it has generated. On one hand archival research often proved disappointing in that records that could have answered dozens of questions relating to the hospital's operation did not survive, including the Prescription Book, Hospital Muster Rolls, and quarterly returns. On the other hand, archival research produced many interesting anecdotes, as well as confirming previous theories, regarding life at the fort. The excavations that were conducted in concert with this research produced similar results, where there are now more questions than answers.

13.2. Recommendations for Future Research

This research has only skimmed the surface of the story of Fort Yamhill's hospital and could use much expansion, particularly in terms of archaeology. Full site excavations could reveal abundant amounts of information regarding the hospital's layout and construction, as well as medical practices and hospital operation. Complete excavations of the hospital and its perimeter would produce a much larger assemblage of artifacts, offering greater insight into the fort's hospital and the people it served. Additionally, excavating the surgeon's quarters would provide much insight into the domestic lives of the medical officers as well as their families.

In terms of archival research, it would be beneficial to request the personal files for the remaining surgeons to see if any other records exist that pertain to the service of these men at Fort Yamhill. While Preston E. Onstad performed extensive research at the National

Archives regarding Fort Yamhill, it is well known that the archives are continually working to properly archive historical records, adding them to their database. In addition to searching for military records pertaining to Fort Yamhill, it would also be useful to thoroughly examine correspondence records from the Indian Agency and the Oregon Superintendencey to locate all letters relating to medical care of Native Americans and their association with Fort Yamhill. Finally, collaborating with the Grand Ronde and Siletz tribes to establish an oral history of the fort and its hospital, and its relationship with the reservation would also provide a unique perspective that has not yet been explored.

It is recommended here that future excavations focus on determining the dimensions of the north wing, in order to estimate the dimensions and placement of the south wing. Additionally, the cellar and firebox foundations should be fully exposed to determine their construction and use. More attempts should be made to locate the hospital's privy, as well as areas where they were dumping refuse. If the north wing is fully defined, it should be possible to delineate the hospital's front porch, and hopefully, the breezeway, in addition to determining how the cellar was accessed.

All of this information, including excavations and research, would greatly contribute to the interpretive program currently in place at Fort Yamhill State Heritage Area. By interpreting the lives of medical staff and the ways in which they contributed to fort life, a more complete picture of the fort could be presented to the public, increasing awareness of the fort and the role it played.

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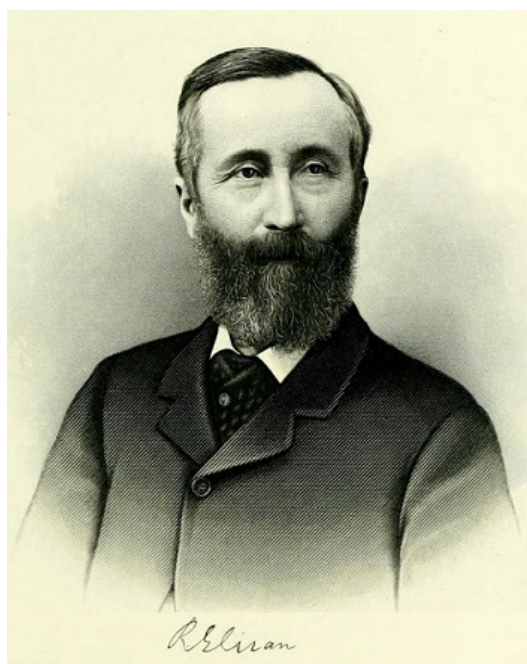
Zentgraf, Diane

2017 *Personal Communication*. Department of Anthropology, Oregon State University, Corvallis, Oregon.

Appendix A. Photos of Fort Yamhill's Medical Staff



Appendix Figure 1. Surgeon C.H. Crane
(Gillett 1995)



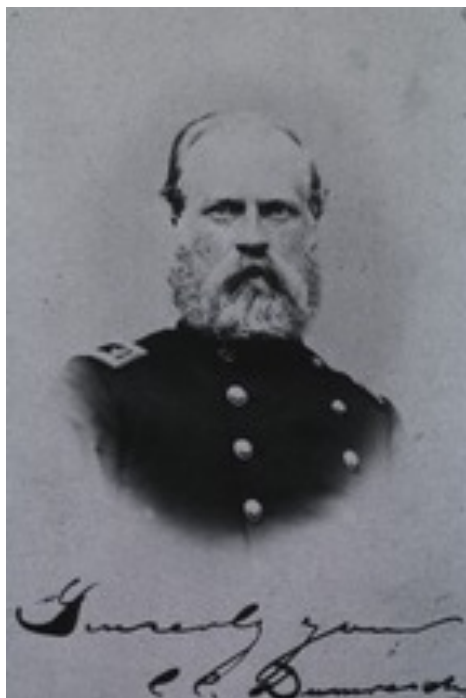
Appendix Figure 2. Assistant Surgeon Rodney
Glisan (Dr. Rodney 2013)



Appendix Figure 3. Assistant Surgeon John F. Randolph (John F. 2016)



Appendix Figure 4. Assistant Surgeon Horace Carpenter (Abell Photo n.d.)



Appendix Figure 5. Surgeon Conrad C. Dumreicher (C.C. Dumreicher n.d.)



Appendix Figure 6. Acting Assistant Surgeon G.W. France and Wife (Dr 2008)

Appendix B. Complaints at Fort Yamhill

The disease names that were used in the register vary with time and with the attending surgeon. Initially, complaints were recorded in their Latin form, later switching to their more modern and recognizable form. Appendix C gives definitions for many of these complaints. Appendix Table 1 shows each type of complaint, and shows how many cases were recorded each year for that complaint type, as well as the percent of total cases.

Appendix Table 1. Complaints Registered at Fort Yamhill

Complaint	'59	'60	'61	'62	'63	'64	'65	'66	Total
Alcohol		4	1		3	3			11
Chronic alcoholism					1	3			4
Delirium tremens			1						1
Ebrietas		4			2				6
Circulatory	1	7	1	7	1				17
Angina				3					3
Angina maligna		2							2
Angina retens				2					2
Angina simplex	1	5	1						7
Enlargement of veins				1					1
Hemorrhage				1					1
Hypertrophy of the heart					1				1
Constitutional	6	6	7	29	2	3	7	1	61
Arthritis				1	1				2
Debiletis			1						1
Lumbago				3		1	1		5
Rheumatism			3	21		2	6	1	33
Rheumatismus acuta	2	4	2	4	1				13
Rheumatismus chronic	4	2	1						7
Digestive	19	20	17	22	7	3	17	4	109
Cholera morbes							1	1	2
Colica		2					1		3
Constipation	3	3		3	4	1	3		17
Diarrhea			11	5			6		22
Diarrhea acuta	11	2		2	2	1	1		19

Complaint	'59	'60	'61	'62	'63	'64	'65	'66	Total
Dysentaria acuta	2	7					2		11
Dyspepsia		1							1
Enteritis				1					1
Fistula							1		1
Gastric derangement	1			2					3
Gastritis		2	3	2					7
Hemorrhoids			1	6			1		8
Hernia				1					1
Peritonitis		1							1
Piles						1	1		2
Ptylismus					1				1
Stomatitis	1								1
Tonsillitis	1	2	2					3	8
Ear			2						2
Otalgia			1						1
Otitis			1						1
Eye	7	4	1	2			4	1	19
Cataracta		1							1
Conjunctivitis	3	1					2	1	7
Ophthalmia	4	2	1	2			2		11
Genito-Urinary	36	52	50	45	8	9	12		212
Bubo			3	6	2	1			12
Bubo syphiliticus	3		4	6	2				15
Disease of Prostate						2			2
Gonorrhea	15	14	22	14	2	1			68
Nephritis chronic							1		1
Orchitis	1	4	2	3		2			12
Phymosis	1								1
Stricture urethra				3					3
Syphilis			2	1			3		6
Syphilis consecutiva	12	22	10	5	1	3	8		61
Syphilis primitiva	4	12	7	7	1				31
Integumentary	16	11	7	6	4	7	2	2	55
Abscesses	11	7	3	2	2	5			30
Anthrax					1				1
Boils						1	1	2	4
Excoriation	1								1
Herpes						1	1		2

Complaint	'59	'60	'61	'62	'63	'64	'65	'66	Total
Morbi cutis	3			1					4
Paronychia		2			1				3
Pernio	1								1
Ulcus		2	4	3					9
Nervous	1	2	5	6	6		1	1	22
Cephalalgia	1	1	3		3				8
Neuralgia		1	2	5	2		1	1	12
Paralysis				1	1				2
Respiratory	33	21	25	23	13	3	14	6	138
Bronchitis			7	12	1		8	4	32
Bronchitis acuta	11	12	4		3		5	2	37
Bronchitis chronic							1		1
Catarrhus	10	1	5			2			18
Laryngitis					5				5
Phlegm	2	1		1					4
Phlegm & Abscesses	1								1
Phthisis			1						1
Phthisis pulmonalis		4							4
Pleuritis	2	1	2	1	3	1			10
Pleurodynia	7		2						9
Pneumonia		2	4	9	1				16
Teeth	2	2	2	2					8
Odontalgia	2	2	2	2					8
Unknown			1	1			5		7
Caliss			1						1
Surchitis				1					1
Unknown							5		5
Various Diseases	5	2	1	14					22
Morbi varii	5	2	1	14					22
Violent	15	5	6	14	6	3	6	2	57
Ambustio		1	1						2
Bruise							1		1
Contusis	8		2	5	3	1			19
Fracture of malleolus					1				1
Fracture of Rib							1		1
Gunshot wound						2			2
Lacerated wound								1	1
Luxatio			1						1

Complaint	'59	'60	'61	'62	'63	'64	'65	'66	Total
Sprain				1	1		1	1	4
Sub laxation	4	4	2	6					16
Vulnus contusion	1								1
Vulnus miasmus	1								1
Vulnus morsum							1		1
Vulnus puncture				2	1				3
Vulnus sclopeticum	1								1
Wounds							2		2
Zymotic	5	3	8	32	18		6		72
Cynanche parotidea					14				14
Erysipelas		1			1				2
Febris congestion				1					1
Febris continua comm.			1						1
Febris intermittans	5	2	6	14	2				29
Febris remittans				4	1				5
Febris typhoides			1						1
Fever				11			2		13
Influenza							4		4
Tenea capitis				2					2
Total	146	139	134	203	68	31	74	17	812

Appendix C. Complaint Definitions

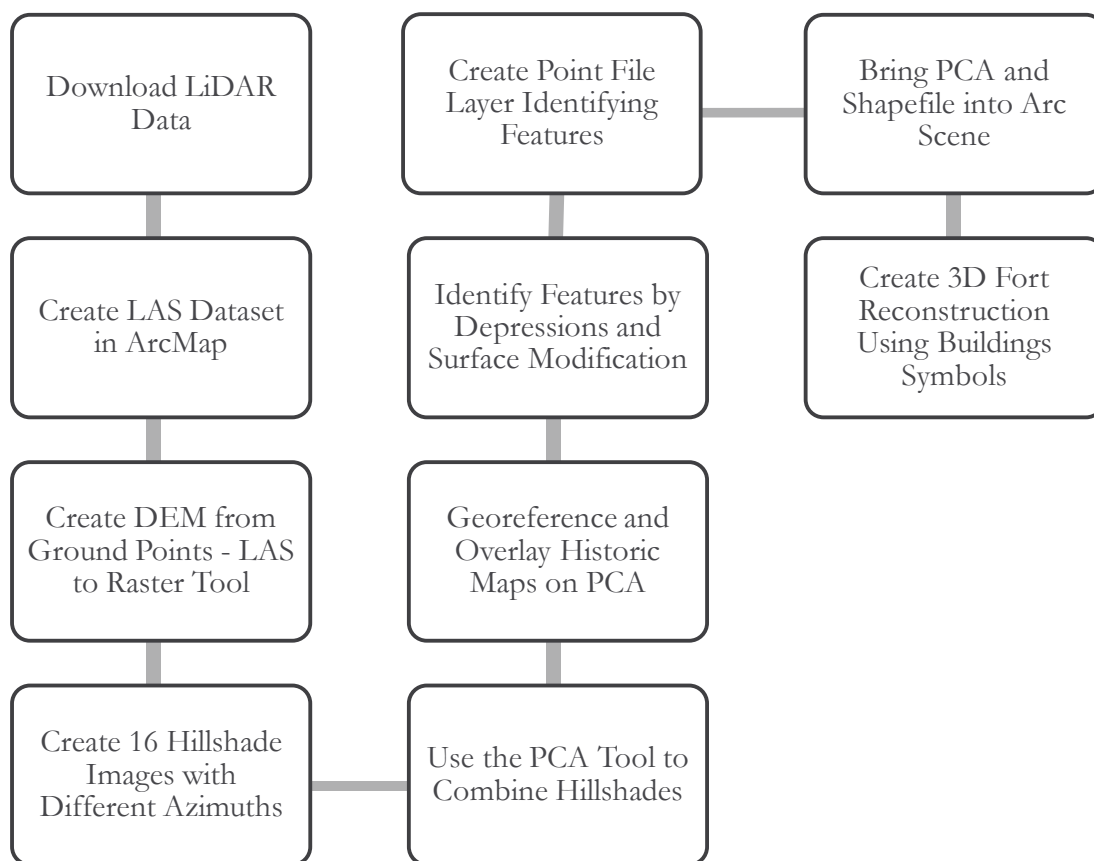
Appendix Table 2. Complaint Definitions (Cazalet 2009; Dunglison 1856; Old Disease n.d.; Plan of n.d.)

Complaint Name	Definition
Ambustio	Epidermal burn.
Angina	Sore throat or isthmitis.
Angina maligna	Diphtheria.
Angina simplex	Isthmitis.
Bronchitis acuta	Acute bronchitis.
Bronchitis chronic	Chronic bronchitis.
Bubo	Swelling of the inguinal glands.
Bubo syphiliticus	Syphilitic inflammation of inguinal glands.
Cataracta	Cataracts.
Catarrhus	Upper respiratory infection.
Cephalalgia	Pain in the head caused by dilation of cerebral arteries or muscle contractions or a reaction to drugs or headache.
Cholera morbes	Gastrointestinal illness characterized by cramps, diarrhea, and sometimes vomiting.
Chronic alcoholism	Severe illness characterized by four key symptoms including: craving, loss of control, tolerance and physical dependence on alcohol.
Colic	Severe, often fluctuating pain in the abdomen caused by intestinal gas or obstruction in the intestines.
Conjunctivitis ophthalmia	Inflammation of the conjunctiva of the eye.
Contusis	A region of injured tissue or skin in which blood capillaries have been ruptured; a bruise.
Cynanche parotidea	Mumps.
Debilitas	Weakness or feebleness.
Delirium tremens	A psychotic condition typical of withdrawal in chronic alcoholics, involving tremors, hallucinations, anxiety, and disorientation.
Diarrhea acuta	Acute diarrhea.
Dysentaria acuta	Acute dysentery.
Dyspepsia	Indigestion.
Ebrietas	Drunkenness, intoxication.
Enteritis	Inflammation of the intestine, especially the small intestine, usually accompanied by diarrhea.
Erysipelas	An acute, sometimes recurrent disease caused by a bacterial infection.
Excoriation	A raw irritated lesion.

Complaint Name	Definition
Febris congestion	Malaria.
Febris continua	Continual fever that fluctuates no more than 1° C between morning and evening.
Febris intermittans	Fever that alternates every few hours between 40°C (104°F) and normal body temperature. Associated with malaria.
Febris remittans	Fever that fluctuates between 1-2° C between morning and evening.
Febris typhoides	Typhoid fever
Fistula	A permanent abnormal passageway between two organs in the body or between an organ and the exterior of the body.
Gastric derangement	Acute gastritis with much pain, swelling, tenderness at the pit of the stomach, especially if vomiting of food occurs.
Gastritis	An inflammation, irritation, or erosion of the lining of the stomach.
Gonorrhea	A sexually transmitted bacterial infection that, if untreated, may cause infertility.
Hemorrhage	An escape of blood from a ruptured blood vessel, especially when profuse.
Hemorrhoids	Swollen and inflamed veins in the rectum and anus that cause discomfort and bleeding.
Hernia	A bulging of an organ or tissue through an abnormal opening.
Herpes	Any of a group of viral diseases caused by herpes viruses, affecting the skin (often with blisters) or the nervous system.
Hypertrophy of the heart	Ventricular hypertrophy is the thickening of the ventricular walls (lower chambers) in the heart. Although left ventricular hypertrophy is more common, enlargement can also occur in the right ventricle, or both ventricles.
Inflammation of Pleura	Pleurisy involves inflammation of the tissue layers (pleura) lining the lungs and inner chest wall. Pleurisy is often associated with the accumulation of fluid between the two layers of pleura, known as pleural effusion.
Lumbago	Lower back pain.
Luxatio	An inferior shoulder dislocation.
Morbi cutis	A skin disease.
Morbi varii	Various diseases.
Nephritis chronic	Chronic inflammation of the kidneys.

Complaint Name	Definition
Neuralgia	Sharp and paroxysmal pain along the course of a sensory nerve.
Odontalgia	Toothache.
Ophthalmia	Inflammation of the eye.
Orchitis	Inflammation of one or both testicles.
Otalgia	Earache.
Otitis	Middle ear infection.
Paronychia	A painful, pus producing inflammation at the end of a toe or finger.
Peritonitis	Inflammation of abdominal area.
Pernio	Skin sores or bumps that occur after exposure to cold temperatures, also known as chilblains.
Phlegmon	Inflammation, especially of the connective tissues, leading to ulceration or abscess.
Phthisis pulmonalis	A wasting away of the body, tuberculosis.
Phymosis	Also known as phimosis, where the foreskin is too tight to be pulled back over the head of the penis.
Pleurisy	An inflammation of the pleura, which is the moist, double-layered membrane that surrounds the lungs and lines the rib cage.
Pleuritis	See Pleurisy
Pleurodynia	Sudden occurrence of lancinating chest pain or abdominal pain attacks.
Ptylismus	May refer to increased saliva production.
Rheumatismus acuta	Acute rheumatism
Rheumatismus chronic	Chronic rheumatism
Stomatitis	Inflammation of the mouth.
Strictum urethra	Constriction of the urethra, a known side effect of gonorrhea.
Sub laxation	An incomplete dislocation.
Syphilis consecutiva	Secondary syphilis, beginning after six weeks of infection, usually within four months.
Syphilis primitiva	Syphilis in its primary stage, usually appearing 10-40 days after infection.
Tinea capitis	Fungal infection of the scalp also known as ringworm of the scalp.
Tonsillitis	Inflammation of the tonsils.
Ulcus	Ulcer
Vulnus laceration	Laceration wound
Vulnus morsum	Bite wound
Vulnus puncture	Puncture wound

Appendix D. LiDAR & GIS Workflow Diagram



Appendix Figure 7. GIS Workflow Diagram

LiDAR Metadata

Grand Ronde LiDAR – 45123A5-124

From OLC Yamhill-Hebo - Delivery 6

Collected by Watershed Sciences

Contracted by Oregon Department of Geology and Mineral Industries

Data acquisition occurred from March 5th to May 15th 2010

LAS point density: 8pts/m²

PCS: Oregon Statewide Lambert, NAD 83, Intl Feet

GCS: North American 1983 Harn

LiDAR Survey Specifications

Sensor: Leica ALS60, Leica ALS50 Phase II

Survey Altitude (AGL): 900m and 1300m

Pulse Rate: >105 kHz

Pulse Mode: Single

Mirror Scan Rate: 52 Hz

Field of View: 28° ($\pm 14^\circ$ from nadir)

Roll Compensated: Up to 15°

Overlap: 100% (50% Side-lap)

Useful Attributes: Bare ground data points, high-resolution point data

Data Quality Issues: Low point density in forested areas

Relevance to analysis: High-resolution terrain data for feature identification

Data Uncertainty

Unfortunately, the remote sensing aspect of this project has numerous aspects of data uncertainty. From the initial data acquisition of LiDAR, errors can occur if the plane experiences turbulence or other movement for which it is not calibrated to compensate. Additionally, having an inaccurately referenced base station could throw off the geospatial coordinates by a few feet. The creation of LAS files and datasets can also cause error if data transformations are not done correctly. For this project in particular, its reliance on predetermined ground return files created an immense source of uncertainty because the classification of ground points can be incredibly inaccurate in forested areas. Additionally, these areas create a large amount of uncertainty due to the fact that as little as twenty percent of laser pulses may hit the forest floor, depending on the density of the canopy, making the digital representation of forest floors extremely generalized.

The making of DEMs is also a point of creation for uncertainty and error, as different parameters have different impacts on the output, affecting accuracy and resolution. There were numerous different test runs done to create a high resolution DEM, but only two were successfully created and they did not differ significantly in clarity.

Appendix E. Artifact Tables by Unit

Appendix Table 3. Unit A Artifacts

Function	Artifact Count	% of Total
II. Domestic	3	2.10%
Housewares	3	2.10%
Gustatory	3	2.10%
Food Stuffs	3	2.10%
Food Preservation	3	2.10%
Aqua Paneled Glass	3	2.10%
III. Architecture	57	39.86%
Construction	57	39.86%
Hardware	56	39.16%
Machine Cut Nail, Head	31	21.68%
Machine Cut Nail, Shank	24	16.78%
Screw	1	0.70%
Material	1	0.70%
Clear Flat Glass	1	0.70%
IV. Medical	82	57.34%
Pharmaceutical	82	57.34%
Aqua Curved Glass	3	2.10%
Vessel #1	3	2.10%
Aqua Paneled Glass	1	0.70%
Vessel #6	1	0.70%
Clear Curved Glass	25	17.48%
Unknown	12	8.39%
Vessel #3	13	9.09%
Green Curved Glass	15	10.49%
Vessel #4	15	10.49%
Olive Curved Glass	36	25.17%
Unknown	2	1.40%
Vessel #16	10	6.99%
Vessel #17	10	6.99%
Vessel #18	1	0.70%
Vessel #20	2	1.40%
Vessel #21	6	4.20%
Vessel #23	3	2.10%

Function	Artifact Count	% of Total
Vessel #25	2	1.40%
Olive Paneled Glass	2	1.40%
Vessel #15	2	1.40%
VII. Unattributed	1	0.70%
Grand Total	143	100.00%

Appendix Table 4. Unit B Artifacts

Function	Artifact Count	% of Total
I. Personal	3	2.54%
Footwear	1	0.85%
Leather Boot Heel	1	0.85%
Medical & Health	2	1.69%
Grooming	2	1.69%
Mirror Glass	2	1.69%
II. Domestic	3	2.54%
Housewares	3	2.54%
Gustatory	3	2.54%
Dinnerware	1	0.85%
White Earthenware	1	0.85%
Unknown	1	0.85%
Food Stuffs	1	0.85%
Faunal Material	1	0.85%
Bone	1	0.85%
Utensils	1	0.85%
Pewter	1	0.85%
Spoon	1	0.85%
III. Architecture	51	43.22%
Construction	51	43.22%
Hardware	44	37.29%
Machine Cut Nail	2	1.69%
Machine Cut Nail, Head	30	25.42%
Machine Cut Nail, Shank	12	10.17%
Material	7	5.93%
Clear Flat Glass	7	5.93%
IV. Medical	59	50.00%
Pharmaceutical	59	50.00%
Aqua Paneled Glass	1	0.85%
Unknown	1	0.85%
Clear Curved Glass	17	14.41%
Unknown	17	14.41%
Clear Glass Stopper	1	0.85%
Squibb	1	0.85%
Clear Paneled Glass	4	3.39%
Unknown	4	3.39%

Olive Curved Glass	20	16.95%
Unknown	2	1.69%
Vessel #17	2	1.69%
Vessel #18	3	2.54%
Vessel #19	1	0.85%
Vessel #20	2	1.69%
Vessel #21	6	5.08%
Vessel #22	1	0.85%
Vessel #23	1	0.85%
Vessel #24	1	0.85%
Vessel #25	1	0.85%
Olive Paneled Glass	16	13.56%
Unknown	2	1.69%
Vessel #15	13	11.02%
Vessel #26	1	0.85%
VI. Unknown	2	1.69%
Charcoal	1	0.85%
Ferrous Metal	1	0.85%
Strapping	1	0.85%
Grand Total	118	100.00%

Appendix Table 5. Unit C Artifacts

Function	Artifact Count	% of Total
II. Domestic	2	3.17%
Housewares	2	3.17%
Gustatory	2	3.17%
Food Stuffs	2	3.17%
Faunal Material	2	3.17%
Gastrolith	2	3.17%
III. Architecture	37	58.73%
Construction	37	58.73%
Hardware	33	52.38%
Machine Cut Nail	1	1.59%
Machine Cut Nail, Head	17	26.98%
Machine Cut Nail, Shank	15	23.81%
Material	4	6.35%
Clear Flat Glass	4	6.35%
IV. Medical	23	36.51%
Pharmaceutical	23	36.51%
Aqua Paneled Glass	1	1.59%
Vessel #5	1	1.59%
Clear Curved Glass	10	15.87%
Unknown	10	15.87%
Olive Curved Glass	8	12.70%
Vessel #18	1	1.59%
Vessel #21	4	6.35%
Vessel #23	1	1.59%
Vessel #25	2	3.17%
Olive Paneled Glass	4	6.35%
Vessel #15	4	6.35%
VI. Unknown	1	1.59%
Glass	1	1.59%
Melted	1	1.59%
Grand Total	63	100.00%

Appendix Table 6. Unit D Artifacts

Function	Artifact Count	% of Total
III. Architecture	3	42.86%
Construction	3	42.86%
Hardware	3	42.86%
Machine Cut Nail, Head	3	42.86%
IV. Medical	4	57.14%
Pharmaceutical	4	57.14%
Clear Curved Glass	2	28.57%
Unknown	1	14.29%
Vessel #10	1	14.29%
Olive Curved Glass	2	28.57%
Vessel #18	1	14.29%
Vessel #20	1	14.29%
Grand Total	7	100.00%

Appendix Table 7. Unit E Artifacts

Function	Artifact Count	% of Total
I. Personal	1	2.78%
Medical & Health	1	2.78%
Grooming	1	2.78%
Mirror Glass	1	2.78%
II. Domestic	1	2.78%
Housewares	1	2.78%
Gustatory	1	2.78%
Food Stuffs	1	2.78%
Faunal Material	1	2.78%
Bone	1	2.78%
III. Architecture	20	55.56%
Construction	20	55.56%
Hardware	20	55.56%
Machine Cut Nail, Head	12	33.33%
Machine Cut Nail, Shank	8	22.22%
IV. Medical	12	33.33%
Pharmaceutical	12	33.33%
Clear Paneled Glass	1	2.78%
Unknown	1	2.78%
Olive Curved Glass	10	27.78%
Unknown	1	2.78%
Vessel #18	6	16.67%
Vessel #22	1	2.78%
Vessel #24	2	5.56%
Olive Paneled Glass	1	2.78%
Vessel #15	1	2.78%
VI. Unknown	2	5.56%
Charcoal	2	5.56%
Grand Total	36	100.00%

Appendix Table 8. Unit F Artifacts

Function	Artifact Count	% of Total
I. Personal	1	0.68%
Indulgences	1	0.68%
Tobacco	1	0.68%
White Ball Clay Pipe Stem	1	0.68%
II. Domestic	8	5.44%
Housewares	8	5.44%
Gustatory	7	4.76%
Dinnerware	1	0.68%
Tumbler	1	0.68%
Pressed Glass	1	0.68%
Food Stuffs	5	3.40%
Faunal Material	2	1.36%
Bone	2	1.36%
Food Preservation	2	1.36%
Iron Can/Tin	2	1.36%
Fruit	1	0.68%
Peach Pit	1	0.68%
Utensils	1	0.68%
Iron	1	0.68%
3-Prong Fork	1	0.68%
Unknown	1	0.68%
III. Architecture	128	87.07%
Construction	128	87.07%
Hardware	116	78.91%
Machine Cut Nail	7	4.76%
Machine Cut Nail, Head	55	37.41%
Machine Cut Nail, Shank	53	36.05%
Screw	1	0.68%
Material	12	8.16%
Clear Flat Glass	12	8.16%
IV. Medical	6	4.08%
Pharmaceutical	6	4.08%
Clear Curved Glass	2	1.36%
Unknown	2	1.36%
Green Curved Glass	2	1.36%
Vessel #4	2	1.36%

Olive Curved Glass	2	1.36%
Vessel #24	1	0.68%
Vessel #25	1	0.68%
V. Military	1	0.68%
Arms and Ammunition	1	0.68%
Propellant	1	0.68%
VI. Unknown	3	2.04%
Charcoal	1	0.68%
Glass	2	1.36%
Melted	2	1.36%
Grand Total	147	100.00%

Appendix Table 9. Unit G Artifacts

Function	Artifact Count	% of Total
III. Architecture	110	93.22%
Construction	110	93.22%
Hardware	102	86.44%
Iron Hinge	1	0.85%
Machine Cut Nail	3	2.54%
Machine Cut Nail, Head	54	45.76%
Machine Cut Nail, Shank	43	36.44%
Screw	1	0.85%
Material	8	6.78%
Clear Flat Glass	8	6.78%
IV. Medical	6	5.08%
Pharmaceutical	6	5.08%
Clear Paneled Glass	5	4.24%
Unknown	5	4.24%
Olive Curved Glass	1	0.85%
Vessel #18	1	0.85%
VI. Unknown	2	1.69%
Ferrous Metal	2	1.69%
Unknown	2	1.69%
Grand Total	118	100.00%

Appendix Table 10. Unit H Artifacts

Function	Artifact Count	% of Total
III. Architecture	50	98.04%
Construction	50	98.04%
Hardware	45	88.24%
Ceramic Door Knob	1	1.96%
Machine Cut Nail, Head	29	56.86%
Machine Cut Nail, Shank	15	29.41%
Material	5	9.80%
Clear Flat Glass	5	9.80%
IV. Medical	1	1.96%
Pharmaceutical	1	1.96%
Olive Curved Glass	1	1.96%
Vessel #17	1	1.96%
Grand Total	51	100.00%

Appendix Table 11. Unit I Artifacts

Function	Artifact Count	% of Total
II. Domestic	1	0.93%
Housewares	1	0.93%
Gustatory	1	0.93%
Dinnerware	1	0.93%
White Earthenware	1	0.93%
Unknown	1	0.93%
III. Architecture	102	95.33%
Construction	102	95.33%
Hardware	90	84.11%
Machine Cut Nail, Head	63	58.88%
Machine Cut Nail, Shank	27	25.23%
Material	12	11.21%
Clear Flat Glass	12	11.21%
IV. Medical	4	3.74%
Pharmaceutical	4	3.74%
Aqua Paneled Glass	2	1.87%
Unknown	1	0.93%
Vessel #5	1	0.93%
Olive Curved Glass	2	1.87%

Vessel #22	1	0.93%
Vessel #25	1	0.93%
Grand Total	107	100.00%

Appendix Table 12. Unit J Artifacts

Function	Artifact Count	% of Total
III. Architecture	40	90.91%
Construction	40	90.91%
Hardware	32	72.73%
Machine Cut Nail, Head	23	52.27%
Machine Cut Nail, Shank	9	20.45%
Material	8	18.18%
Clear Flat Glass	8	18.18%
IV. Medical	4	9.09%
Pharmaceutical	4	9.09%
Clear Curved Glass	1	2.27%
Unknown	1	2.27%
Clear Paneled Glass	2	4.55%
Unknown	2	4.55%
Olive Curved Glass	1	2.27%
Vessel #16	1	2.27%
Grand Total	44	100.00%

Appendix Table 13. Unit K Artifacts

Function	Artifact Count	% of Total
I. Personal	1	0.77%
Indulgences	1	0.77%
Tobacco	1	0.77%
White Ball Clay Pipe Stem	1	0.77%
III. Architecture	89	68.46%
Construction	89	68.46%
Hardware	86	66.15%
Machine Cut Nail	5	3.85%
Machine Cut Nail, Head	36	27.69%
Machine Cut Nail, Shank	42	32.31%
Spike	3	2.31%
Material	3	2.31%
Brick	1	0.77%
Clear Flat Glass	1	0.77%
Mortar	1	0.77%
IV. Medical	35	26.92%
Pharmaceutical	35	26.92%
Clear Curved Glass	2	1.54%
Unknown	2	1.54%
Olive Curved Glass	32	24.62%
Unknown	1	0.77%
Vessel #18	29	22.31%
Vessel #20	1	0.77%
Vessel #25	1	0.77%
Olive Paneled Glass	1	0.77%
Vessel #15	1	0.77%
V. Military	1	0.77%
Uniform	1	0.77%
Button	1	0.77%
Rifleman	1	0.77%
Brass	1	0.77%
VI. Unknown	3	2.31%
Charcoal	2	1.54%
Ferrous Metal	1	0.77%
Unknown	1	0.77%

Function	Artifact Count	% of Total
VII. Unattributed	1	0.77%
Grand Total	130	100.00%

Appendix Table 14. Unit L Artifacts

Function	Artifact Count	% of Total
II. Domestic	4	5.26%
Housewares	4	5.26%
Gustatory	4	5.26%
Food Stuffs	4	5.26%
Faunal Material	3	3.95%
Bone	2	2.63%
Calcified Bone	1	1.32%
Fruit	1	1.32%
Walnut Shell	1	1.32%
III. Architecture	63	82.89%
Construction	63	82.89%
Hardware	61	80.26%
Machine Cut Nail	9	11.84%
Machine Cut Nail, Head	25	32.89%
Machine Cut Nail, Shank	27	35.53%
Material	2	2.63%
Brick	1	1.32%
Mortar	1	1.32%
VI. Unknown	4	5.26%
Ash	1	1.32%
Charcoal	2	2.63%
Plastic	1	1.32%
VII. Unattributed	5	6.58%
Grand Total	76	100.00%

Appendix Table 15. Unit M Artifacts

Function	Artifact Count	% of Total
II. Domestic	2	10.53%
Housewares	2	10.53%
Gustatory	2	10.53%
Food Stuffs	2	10.53%
Faunal Material	1	5.26%
Bone	1	5.26%
Food Preservation	1	5.26%
Aqua Paneled Glass	1	5.26%
III. Architecture	15	78.95%
Construction	15	78.95%
Hardware	15	78.95%
Machine Cut Nail	1	5.26%
Machine Cut Nail, Head	5	26.32%
Machine Cut Nail, Shank	9	47.37%
IV. Medical	1	5.26%
Pharmaceutical	1	5.26%
Olive Curved Glass	1	5.26%
Vessel #20	1	5.26%
VI. Unknown	1	5.26%
Ferrous Metal	1	5.26%
Unknown	1	5.26%
Grand Total	19	100.00%

Appendix Table 16. Unit N Artifacts

Function	Artifact Count	% of Total
I. Personal	1	5.88%
Clothing	1	5.88%
Button	1	5.88%
Prosser	1	5.88%
III. Architecture	15	88.24%
Construction	15	88.24%
Hardware	15	88.24%
Machine Cut Nail, Head	7	41.18%
Machine Cut Nail, Shank	8	47.06%
IV. Medical	1	5.88%
Pharmaceutical	1	5.88%
Olive Curved Glass	1	5.88%
Vessel #18	1	5.88%
Grand Total	17	100.00%

Appendix Table 17. Unit O Artifacts

Function	Artifact Count	% of Total
III. Architecture	14	100.00%
Construction	14	100.00%
Hardware	14	100.00%
Machine Cut Nail, Head	9	64.29%
Machine Cut Nail, Shank	5	35.71%
Grand Total	14	100.00%

Appendix Table 18. Unit P Artifacts

Function	Artifact Count	% of Total
II. Domestic	7	3.55%
Housewares	7	3.55%
Gustatory	7	3.55%
Food Stuffs	7	3.55%
Faunal Material	7	3.55%
Gastrolith	7	3.55%
III. Architecture	177	89.85%
Construction	177	89.85%
Hardware	167	84.77%
Machine Cut Nail, Head	64	32.49%
Machine Cut Nail, Shank	102	51.78%
Finishing Nail Head	1	0.51%
Material	10	5.08%
Brick	1	0.51%
Clear Flat Glass	5	2.54%
Mortar	3	1.52%
Mortar and Sand	1	0.51%
IV. Medical	11	5.58%
Pharmaceutical	11	5.58%
Aqua Curved Glass	4	2.03%
Unknown	2	1.02%
Vessel #1	2	1.02%
Clear Curved Glass	4	2.03%
Unknown	4	2.03%
Clear Paneled Glass	1	0.51%
Unknown	1	0.51%
Olive Curved Glass	2	1.02%
Vessel #18	1	0.51%
Vessel #23	1	0.51%
V. Military	2	1.02%
Accoutrements	2	1.02%
Cast Copper Rivet	2	1.02%
Grand Total	197	100.00%

Appendix Table 19. Unit Q Artifacts

Function	Artifact Count	% of Total
I. Personal	1	0.50%
Medical & Health	1	0.50%
Grooming	1	0.50%
Mirror Glass	1	0.50%
II. Domestic	1	0.50%
Housewares	1	0.50%
Gustatory	1	0.50%
Food Stuffs	1	0.50%
Faunal Material	1	0.50%
Bone	1	0.50%
III. Architecture	173	86.93%
Construction	173	86.93%
Hardware	172	86.43%
Machine Cut Nail, Head	82	41.21%
Machine Cut Nail, Shank	90	45.23%
Material	1	0.50%
Mortar	1	0.50%
IV. Medical	21	10.55%
Pharmaceutical	21	10.55%
Aqua Paneled Glass	2	1.01%
Vessel #2	2	1.01%
Clear Curved Glass	18	9.05%
Unknown	12	6.03%
Vessel #13	6	3.02%
Olive Curved Glass	1	0.50%
Vessel #21	1	0.50%
V. Military	1	0.50%
Uniform	1	0.50%
Button	1	0.50%
4-Hole Pewter	1	0.50%
VI. Unknown	2	1.01%
Ferrous Metal	2	1.01%
Unknown	2	1.01%
Grand Total	199	100.00%

Appendix Table 20. Unit R Artifacts

Function	Artifact Count	% of Total
II. Domestic	3	2.68%
Housewares	3	2.68%
Culinary	1	0.89%
Utilitarian Ware	1	0.89%
Redware	1	0.89%
Salt-Glazed	1	0.89%
Gustatory	2	1.79%
Dinnerware	1	0.89%
Ironstone	1	0.89%
Soup Tureen	1	0.89%
Food Stuffs	1	0.89%
Faunal Material	1	0.89%
Bone	1	0.89%
III. Architecture	94	83.93%
Construction	94	83.93%
Hardware	94	83.93%
Machine Cut Nail	6	5.36%
Machine Cut Nail, Head	38	33.93%
Machine Cut Nail, Shank	50	44.64%
IV. Medical	13	11.61%
Pharmaceutical	13	11.61%
Aqua Paneled Glass	1	0.89%
Vessel #2	1	0.89%
Clear Curved Glass	11	9.82%
Unknown	9	8.04%
Vessel #13	2	1.79%
Olive Curved Glass	1	0.89%
Vessel #18	1	0.89%
VI. Unknown	2	1.79%
Ferrous Metal	2	1.79%
Unknown	2	1.79%
Grand Total	112	100.00%

Appendix Table 21. Unit S Artifacts

Function	Artifact Count	% of Total
II. Domestic	1	0.41%
Housewares	1	0.41%
Gustatory	1	0.41%
Food Stuffs	1	0.41%
Faunal Material	1	0.41%
Gastrolith	1	0.41%
III. Architecture	211	87.55%
Construction	211	87.55%
Hardware	210	87.14%
Machine Cut Nail	6	2.49%
Machine Cut Nail, Head	74	30.71%
Machine Cut Nail, Shank	130	53.94%
Material	1	0.41%
Clear Flat Glass	1	0.41%
IV. Medical	24	9.96%
Pharmaceutical	24	9.96%
Aqua Curved Glass	6	2.49%
Unknown	4	1.66%
Vessel #1	2	0.83%
Clear Curved Glass	16	6.64%
Unknown	14	5.81%
Vessel #13	2	0.83%
Olive Curved Glass	2	0.83%
Vessel #22	2	0.83%
VI. Unknown	3	1.24%
Ferrous Metal	3	1.24%
Unknown	3	1.24%
VII. Unattributed	2	0.83%
Grand Total	241	100.00%

Appendix Table 22. Unit T Artifacts

Function	Artifact Count	% of Total
III. Architecture	40	100.00%
Construction	40	100.00%
Hardware	40	100.00%
Iron Nut	1	2.50%
Machine Cut Nail, Head	24	60.00%
Machine Cut Nail, Shank	15	37.50%
Grand Total	40	100.00%

Appendix Table 23. Unit U Artifacts

Function	Artifact Count	% of Total
II. Domestic	1	2.94%
Housewares	1	2.94%
Gustatory	1	2.94%
Dinnerware	1	2.94%
Ironstone	1	2.94%
Unknown	1	2.94%
III. Architecture	29	85.29%
Construction	29	85.29%
Hardware	29	85.29%
Machine Cut Nail	1	2.94%
Machine Cut Nail, Head	18	52.94%
Machine Cut Nail, Shank	10	29.41%
VI. Unknown	4	11.76%
Charcoal	1	2.94%
Chert	1	2.94%
Ferrous Metal	2	5.88%
Unknown	2	5.88%
Grand Total	34	100.00%

Appendix Table 24. Unit V Artifacts

Function	Artifact Count	% of Total
II. Domestic	2	1.90%
Housewares	2	1.90%
Gustatory	2	1.90%
Dinnerware	1	0.95%
Tumbler	1	0.95%
Cut Glass	1	0.95%
Utensils	1	0.95%
Iron	1	0.95%
Unknown	1	0.95%
III. Architecture	90	85.71%
Construction	90	85.71%
Hardware	88	83.81%
Machine Cut Nail	2	1.90%
Machine Cut Nail, Head	45	42.86%
Machine Cut Nail, Shank	41	39.05%
Material	2	1.90%
Clear Flat Glass	2	1.90%
IV. Medical	8	7.62%
Pharmaceutical	8	7.62%
Clear Curved Glass	3	2.86%
Unknown	2	1.90%
Vessel #12	1	0.95%
Clear Paneled Glass	1	0.95%
Vessel #8	1	0.95%
Olive Curved Glass	4	3.81%
Unknown	1	0.95%
Vessel #18	1	0.95%
Vessel #21	2	1.90%
VI. Unknown	5	4.76%
Charcoal	1	0.95%
Ferrous Metal	2	1.90%
Unknown	2	1.90%
Glass	2	1.90%
Grand Total	105	100.00%

Appendix Table 25. Unit W Artifacts

Function	Artifact Count	% of Total
I. Personal	1	0.17%
Indulgences	1	0.17%
Tobacco	1	0.17%
Campaign Pipe Bowl	1	0.17%
II. Domestic	36	6.15%
Housewares	36	6.15%
Culinary	3	0.51%
Appliances	3	0.51%
Cooking	3	0.51%
Stove Part	3	0.51%
Gustatory	33	5.64%
Dinnerware	25	4.27%
Ironstone	6	1.03%
Unknown	6	1.03%
Tumbler	10	1.71%
Pressed Glass	10	1.71%
White Earthenware	9	1.54%
10-inch Molded Plate	3	0.51%
6-inch Molded Bowl	1	0.17%
Unknown	5	0.85%
Food Stuffs	8	1.37%
Faunal Material	8	1.37%
Bone	7	1.20%
Calcified Bone	1	0.17%
III. Architecture	485	82.91%
Construction	485	82.91%
Hardware	482	82.39%
Machine Cut Nail	22	3.76%
Machine Cut Nail, Head	261	44.62%
Machine Cut Nail, Shank	199	34.02%
Material	3	0.51%
Clear Flat Glass	1	0.17%
Cobblestone	1	0.17%
Zinc Sheeting	1	0.17%
IV. Medical	43	7.35%
Pharmaceutical	43	7.35%

Function	Artifact Count	% of Total
Aqua Curved Glass	1	0.17%
Unknown	1	0.17%
Aqua Paneled Glass	14	2.39%
Vessel #2	2	0.34%
Vessel #5	12	2.05%
Clear Curved Glass	3	0.51%
Unknown	2	0.34%
Vessel #11	1	0.17%
Clear Paneled Glass	5	0.85%
Vessel #8	5	0.85%
Olive Curved Glass	19	3.25%
Vessel #17	2	0.34%
Vessel #18	1	0.17%
Vessel #21	12	2.05%
Vessel #22	4	0.68%
Olive Paneled Glass	1	0.17%
Vessel #15	1	0.17%
V. Military	1	0.17%
Accoutrements	1	0.17%
Cast Copper Rivet	1	0.17%
VI. Unknown	18	3.08%
Charcoal	1	0.17%
Copper	1	0.17%
Ferrous Metal	14	2.39%
Unknown	14	2.39%
Plastic	1	0.17%
Unknown	1	0.17%
VII. Unattributed	1	0.17%
Grand Total	585	100.00%

Appendix Table 26. Unit X Artifacts

Function	Artifact Count	% of Total
I. Personal	1	0.14%
Clothing	1	0.14%
Button	1	0.14%
Prosser	1	0.14%
II. Domestic	43	5.91%
Housewares	43	5.91%
Gustatory	43	5.91%
Dinnerware	35	4.81%
Ironstone	9	1.24%
Unknown	9	1.24%
Transfer Print	1	0.14%
10-inch Blue Willow Plate	1	0.14%
Tumbler	4	0.55%
Pressed Glass	4	0.55%
White Earthenware	21	2.89%
10-inch Molded Plate	14	1.93%
Unknown	7	0.96%
Food Stuffs	8	1.10%
Faunal Material	8	1.10%
Bone	8	1.10%
III. Architecture	661	90.92%
Construction	661	90.92%
Hardware	653	89.82%
Finishing Nail, Shank	1	0.14%
Machine Cut Nail	37	5.09%
Machine Cut Nail, Head	363	49.93%
Machine Cut Nail, Shank	246	33.84%
Machine Cut Tack	2	0.28%
Screw	4	0.55%
Material	8	1.10%
Brick	1	0.14%
Clear Flat Glass	7	0.96%
IV. Medical	8	1.10%
Pharmaceutical	8	1.10%
Clear Curved Glass	3	0.41%
Unknown	3	0.41%

Function	Artifact Count	% of Total
Clear Paneled Glass	4	0.55%
Unknown	1	0.14%
Vessel #8	3	0.41%
Olive Curved Glass	1	0.14%
Vessel #18	1	0.14%
V. Military	1	0.14%
Accoutrements	1	0.14%
Cast Copper Rivet	1	0.14%
VI. Unknown	12	1.65%
Brass	1	0.14%
Washer	1	0.14%
Charcoal	1	0.14%
Ferrous Metal	10	1.38%
Strapping	4	0.55%
Unknown	6	0.83%
VII. Unattributed	1	0.14%
Grand Total	727	100.00%

Appendix Table 27. Unit Y Artifacts

Function	Artifact Count	% of Total
I. Personal	5	5.56%
Footwear	4	4.44%
Indulgences	1	1.11%
Tobacco	1	1.11%
Rockingham Spittoon	1	1.11%
II. Domestic	7	7.78%
Housewares	7	7.78%
Culinary	1	1.11%
Appliances	1	1.11%
Cooking	1	1.11%
Stove Part	1	1.11%
Gustatory	6	6.67%
Dinnerware	4	4.44%
Tumbler	4	4.44%
Pressed Glass	4	4.44%
Food Stuffs	2	2.22%
Faunal Material	2	2.22%
Bone	2	2.22%
III. Architecture	67	74.44%
Construction	67	74.44%
Hardware	62	68.89%
Machine Cut Nail	6	6.67%
Machine Cut Nail, Head	32	35.56%
Machine Cut Nail, Shank	23	25.56%
Screw	1	1.11%
Material	5	5.56%
Clear Flat Glass	3	3.33%
Cobblestone	1	1.11%
Zinc Sheeting	1	1.11%
IV. Medical	6	6.67%
Pharmaceutical	6	6.67%
Aqua Paneled Glass	1	1.11%
Unknown	1	1.11%
Clear Curved Glass	2	2.22%
Unknown	2	2.22%
Olive Curved Glass	3	3.33%

Function	Artifact Count	% of Total
Vessel #18	2	2.22%
Vessel #24	1	1.11%
VI. Unknown	5	5.56%
Ferrous Metal	4	4.44%
Strapping	1	1.11%
Unknown	3	3.33%
Glass	1	1.11%
Grand Total	90	100.00%

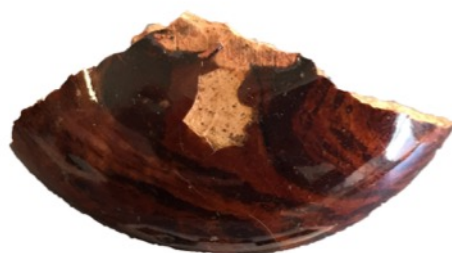
Appendix Table 28. Unit Z Artifacts

Function	Artifact Count	% of Total
I. Personal	1	0.60%
Clothing	1	0.60%
Button	1	0.60%
Prosser	1	0.60%
II. Domestic	8	4.79%
Housewares	8	4.79%
Gustatory	8	4.79%
Dinnerware	7	4.19%
Ironstone	2	1.20%
Unknown	2	1.20%
Tumbler	3	1.80%
Pressed Glass	3	1.80%
White Earthenware	2	1.20%
3.5-inch Molded Cup	1	0.60%
Unknown	1	0.60%
Food Stuffs	1	0.60%
Faunal Material	1	0.60%
Bone	1	0.60%
III. Architecture	125	74.85%
Construction	125	74.85%
Hardware	122	73.05%
Machine Cut Nail	26	15.57%
Machine Cut Nail, Head	63	37.72%
Machine Cut Nail, Shank	33	19.76%
Material	3	1.80%
Clear Flat Glass	3	1.80%
IV. Medical	14	8.38%
Pharmaceutical	13	7.78%
Clear Curved Glass	3	1.80%
Unknown	2	1.20%
Vessel #9	1	0.60%
Clear Glass Stopper	3	1.80%
Hollow	3	1.80%
Clear Paneled Glass	1	0.60%
Unknown	1	0.60%
Olive Curved Glass	6	3.59%

Function	Artifact Count	% of Total
Unknown	1	0.60%
Vessel #18	2	1.20%
Vessel #21	1	0.60%
Vessel #24	2	1.20%
Record Keeping	1	0.60%
Inkwell	1	0.60%
V. Military	2	1.20%
Accoutrements	1	0.60%
Cast Copper Rivet	1	0.60%
Arms and Ammunition	1	0.60%
Ignition System	1	0.60%
Percussion Cap	1	0.60%
Long Arm cap	1	0.60%
VI. Unknown	17	10.18%
Charcoal	1	0.60%
Ferrous Metal	13	7.78%
Strapping	3	1.80%
Unknown	10	5.99%
Glass	3	1.80%
Grand Total	167	100.00%

Appendix F. Artifact Photos

Architecture Artifacts



Appendix Figure 8. Mineral Doorknob



Appendix Figure 9. Cabinet Hinge

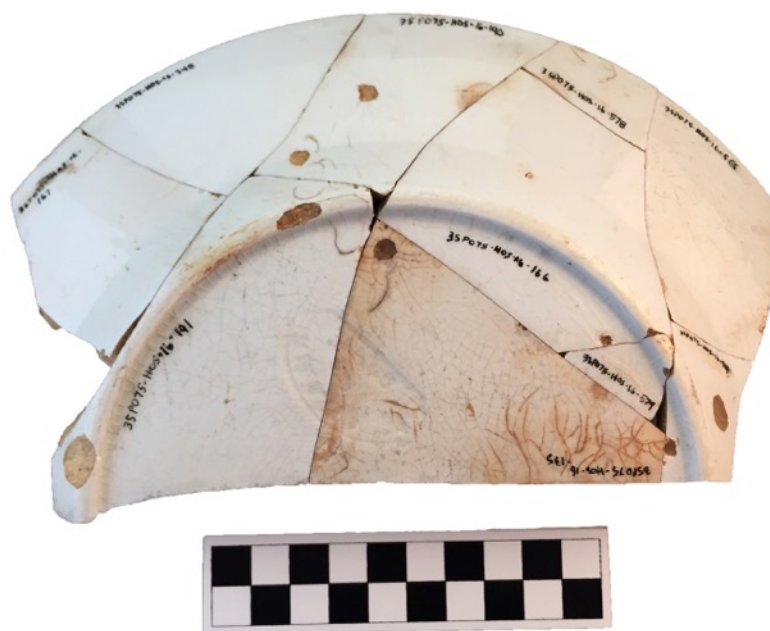


Appendix Figure 10. Machine Cut Nails

Domestic Artifacts



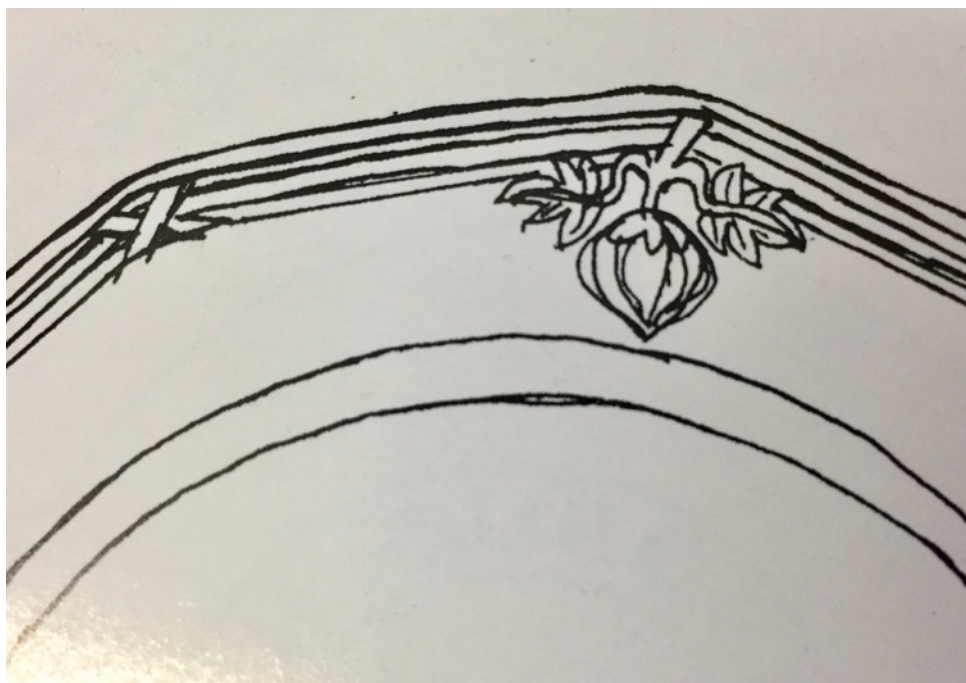
Appendix Figure 11. 10-Inch Ironstone Plate, Front



Appendix Figure 12. 10-Inch Ironstone Plate, Back, W. Adams & Sons



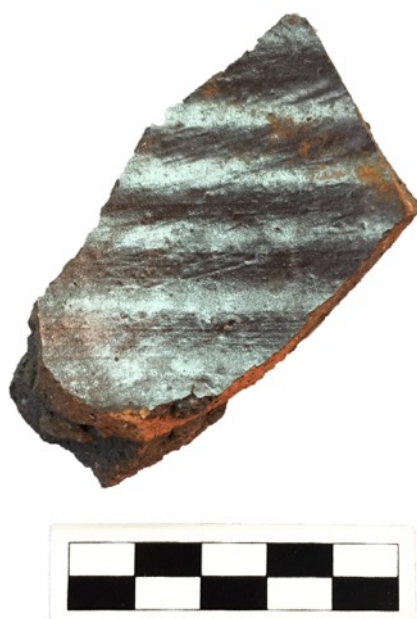
Appendix Figure 12. Fig/Union Shape Cup



Appendix Figure 14. Detail of Fig/Union Shape Pattern (Dieringer & Dieringer 2001)



Appendix Figure 13. 10-inch Blue Willow Plate



Appendix Figure 16. Utilitarian Vessel with Salt Glaze



Appendix Figure 14. Pewter Spoon and Iron Fork

Medical Artifacts



Appendix Figure 15. Clear Ground Glass Stoppers



Appendix Figure 19. Udolpho Wolfe's Aromatic Schnapps

Military Artifacts



Appendix Figure 16. Brass Rifleman Button (SCOVILE & CO. ★ ★ ★) and Pewter Button



Appendix Figure 21. E.I. DuPont & Co Powder Tin Stopper



Appendix Figure 17. Brass Rivets

Personal Artifacts



Appendix Figure 19. Rockingham Spittoon, Presidential Campaign Pipe, and White Ball Clay Pipe Stems



Appendix Figure 18. White Ceramic Prosser Buttons

