On the Table and Under It: Social Negotiation & Drinking Spaces in Frontier Resource Extraction Communities

Megan Victor

Bloomfield Hills, Michigan

Master of Arts, The College of William & Mary, 2012
Bachelor of Arts, The University of Michigan, 2010

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Megan Rhodes Victor

Approved by the Committee, March, 2018

Signed for N. Norman

Committee Co-Chair
Associate Professor Neil L. Norman, Anthropoloy
College of William & Mary

Committee Co-Chair
Research Assistant Professor Danielle Moretti-Langholtz, Anthropology
College of William & Mary

Research Professor Marley Brown, III, Anthropology
College of William & Mary

for K. Dixon

Professor Kelly J. Dixon, Anthropology
University of Montana

ABSTRACT

Current research on frontiers describe these spaces as zones of meeting, interaction, dynamism, and change. Further, the geographic, ecological, economic, and political processes that are inherent within these locales shape them, rendering them far from static. These current scholars of frontier theory have sought to fight the image of frontier spaces as locations needing civilization, which is how they used to be approached. They have also stressed the presence of frontier locales outside of the United States, which was the focus of Frederick Jackson Turner's seminal work. Leonard Thompson and Howard Lamar, two prominent figures in the New West approach to frontier theory, argue that the only effective way to study frontiers is to do so through the use of comparative studies. While comparative studies are common in cultural anthropological research on frontiers in North America, the extant archaeology done has not taken a comparative approach nearly as often.

My study takes steps toward reintroducing a comparative approach to frontier archaeology. examine the way that the actions of frontier inhabitants (including negotiation, conflict, and cohesion) combined with geographic and ecological factors within two specific locations: Smuttynose Island, Maine, and Highland City, Montana. To make the comparison across space and time between these two locations, I analyze them through the framework of informal economy, trade and exchange networks and the negotiation of social capital through commensal politics. I argue that the inhabitants of frontier settlements interact with the processes at work within frontier zones in such similar ways that it materializes in the archaeological record. I explore tavern assemblages left behind by these frontier inhabitants, with a specific focus on ceramics and glass. Through an examination of the drinking spaces within both settlements, I shed light on the microeconomics of these two locales and of frontier spaces more broadly.

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Chapter I. Introduction

Scholarship on frontier spaces from over the past thirty years stresses the dynamic nature of frontiers and the need to study these places comparatively (Thompson & Lamar, 1981; Jordan-Bychkov, 1993; Cayton & Teute, 1998; Graeber, 2001; Parker & Rodseth, 2005; Sluyter, 2012). This body of work also emphasizes that frontiers can be compared across both time and space. Cultural anthropologists have used a longstanding comparative approach to study frontiers and borderlands. It is only within the past decade, however, that this process has gained momentum in the realm of anthropological archaeology. My dissertation intends to fill this lacuna by contributing a comparative archaeological study of two frontier spaces that are removed from one another both geographically and temporally: Smuttynose Island, Maine and Highland City, Montana. This project holds the potential to address the way that microeconomics and social negotiation materialize in the archaeological record. It also seeks to place Highland City and the Isles of Shoals within the larger anthropological dialogue on comparative political economies and in sequence with assemblages from the deeper archaeological past. I will examine the way that the geographic and ecological factors at work within frontier spaces, along with economic and political processes, shape the interactions of the people who live within these spaces. Drawing from the archaeological and documentary record, as well as from local oral histories, I will use a framework that focuses on trade and exchange networks, especially informal economy and illicit trade. I intend to use my examination of the microeconomics of these two locales to further address the informal economy of frontier spaces. This project will compare the strategies that frontier inhabitants used to negotiate power, especially within resource-extraction communities. To further add depth to the comparative nature of this project, I note here that these two locales are separated not only geographically and temporally, but they are also different in that one is a marine settlement and the other is terrestrial. I argue that the fishermen at the Isles of Shoals leveraged their position at a key node in the international cod-fishing trade for their own political and economic gain. The “Shoalers,” as the inhabitants called themselves, deployed their economic gains to negotiate social capital and to carry out transactions. The negotiations were often part of a larger network of informal economy and illicit trade that took place within the tavern on the northern shore of Smuttynose Island. If similar negotiations took place within the saloons at Highland City, then the archaeological assemblage will resemble that from the Isles of Shoals.

I will also address the ways that the inhabitants at these two locations negotiated social capital through commensal politics involving both food and drink. These frontier places, previously referred to as peripheries and accordingly given peripheral attention in the realm of research, are central to a more nuanced understanding of political economies. I intend to further examine frontier locales with a goal of illuminating the way that larger political economies taper into local ones by looking at trade networks and drinking spaces. Louise Steel conducted a similar study on the feasting practices from Late Bronze Age Cyprus, at that time a frontier to the larger Greek and Roman civilizations. In her article, "A Goodly Feast...A Cup of Mellow Wine" (2004), she analyzes the way that the frontier inhabitants of Cyprus created their own consumption and feasting practices in the face of "external influence" (Steel, 2004: 284). Steel draws her data from archaeological assemblages of ceramic serving vessels, bowls, and hollow wares used for wine. These indicate the "introduction of exotic alcoholic beverages" and the selective use of "exotic dining sets" acquired through trade networks with Mycenae (Steel, 2004: 297). She concludes that the Cyprians developed their own feasting practices that were locally unique. Negotiations and status exchanges are evidenced by highly valued objects obtained through trade networks, which are subsequently used for specific Cypriot practices.

Frontier locales like Smuttynose Island and Highland City are also crucial to understanding the ways that economic and social capital is negotiated within exchange networks and conceptions of value local to these frontier places. Following the work of David Graeber, value here is inherently connected to actions; when objects or people gain or lose value, they are evaluated through a network of actions, rather than a focus on things alone. It is the attached actions to any given object that aids in ascribing its value. The inherent connection to objects still exists, however, because "human action...can only take place through some kind of material medium and therefore can't be understood without taking the qualities of that medium into account" (Graeber, 2001: 83). As such, the negotiation of social standing and capital takes place through actions conducted within drinking spaces. As these actions, such as buying several rounds of alcohol for someone whose support is coveted, take place, they ascribe value to the objects used to carry them out. A certain liquor may gain a higher local value if it is new or foreign. In gaining prominence over more mundane, routinized goods, this liquor then becomes the tool by which inhabitants can affect their social capital and standing.

Frontier spaces are frequently bitterly contested locations where competing groups of inhabitants often struggle violently "for the power to define the structures and ideas of their worlds" (Cayton & Teute, 1998: 14). These aforementioned 'ideas of the world' include the determination of what objects and actions have political, economic, and social value and meaning. The frontier, inherently, witnesses struggles, very much the product of human choices, that are military, economic, and most importantly, conceptual. Often these conceptual struggles play out as strong reactions to acts of authority. When different groups of people interact in frontier zones, they bring their worldviews, perceptions of landscape, ideas about social organization, and systems of economics with them. Conceptual struggles occur when there is discord between two or more groups' perceptions of the social and physical space in which they are interacting (Cayton & Teute, 1998). Finally I will examine these two locales through the concept of an "Archaeology of Islands," after Paul Rainbird and Donald Hardesty. Smuttynose Island is physically an island in the traditional sense; it is a landmass bounded on all sides by the Atlantic Ocean (Rainbird, 2007). However, Highland City is also an island of sorts. In both contemporary nineteenth century descriptions and in recent archaeological literature, mining towns have been conceptualized as islands of settlement amidst otherwise daunting, barren, and remote landscapes both in nineteenth century descriptions and in recent literature on the archaeology of mining towns and miners (Hardesty, 1988; Hardesty, 2010).

An explorer examining either location would encounter a dramatic landscape of contrasts at both locales: harsh and barren-looking landscapes surrounded by natural riches. Located ten miles off of the Maine/New Hampshire border, Smuttynose Island is larger than many of the eleven craggy, rock-faced, and treeless islands that comprise the Isles of Shoals. The fishing settlement sat on the northern part of the island, not far from the shore, on top of what little arable soil there was on the island. The remains of Highland City, in southwestern Montana, lie twenty miles south of the nearest city of Butte. At an elevation of 8,000 ft above sea level, the mining town of Highland City was seated within a bowl-like valley within the Highland Mountains. The settlement was bounded on all sides by austere mountains, which were covered in pines that appeared to grow straight out of soil-less rock. The wind constantly blowing down from the peaks of the Highland Mountains battered what little soil collected in the depression. However, these daunting physical locations held a wealth of natural riches. Beneath the often iron-gray sea around the Isles of Shoals teemed with an abundance marine resources including mackerel, herring, and most importantly to the fishermen on Smuttynose Island - cod. Similarly, snaking through the limestone, dolomite, and shale of the Highland Mountains, and running through the creeks in the Highland Mining District, gold lay in abundance, along with smaller amounts of silver and copper as well as garnets.

Chapter II. Pushing Boundaries: A Theoretical Approach to Frontier Communities

Introduction

The concept of the frontier has been a much-contested subject in the writing of history and anthropology. Not only is it all too easy to slip into vague language when discussing as broad a term as 'frontier,' but the meanings that different nationalist traditions have ascribed to the frontier only further complicate the endeavor. I seek here to orient the reader to the complex discourse of frontier theory by providing a brief history of the major developments that the study of frontiers has taken from the end of the nineteenth century to the present day. The main goal of this section, however, is to call to attention several main trends found in writing on frontiers in the social sciences from the last twenty or so years, which separate these works from previous scholarship and place them into a new paradigm that has yet to be named officially named and which will be referred to as Contemporary Frontier theory. Specifically, these trends include a. a strong argument for the use of comparative case studies to illuminate the study of the frontier; b. a tendency toward clear and explicit definitions of an otherwise nebulous concept; c. an assertion of the frontier as a process; d. an emphasis on interaction, meeting, dynamism, and change; and e. the breaking down of the frontier into geographic and ecological, economic, and political components.

Frontier Theory - A Historiography

Turner & the Frontier Thesis

One of the arguably most formative works in the historical study of frontiers is the Frontier Thesis, posited in 1893 by Frederick Jackson Turner in an address to the American Historical Association. As such, it is where this history will begin. Turner conceived of the frontier as a boundary or line, which separated what he saw as a civilized society from the savagery of the wilderness – including its indigenous inhabitants. Specifically, the frontier was a process by which development and improvement, on one side of their 'line' progressed ever westward from the eastern seaboard of the United States to the nation's Pacific coast – through the theoretically uninhabited, undeveloped, and untamed unknown. This westward march, he argued, removed Americans from the influence of Europe with each expansion that took place; this distancing subsequently allowed them to develop a truly individual and extraordinary culture. The assertion that American society and its national character were products of a unique frontier experience is at the very heart of Turner's Frontier Thesis. Specifically, those American pioneers who lived on the boundary, which separated the edge of civilized lands from savage ones waiting to be developed were the foremost agents in forging the American identity. The American West, in Turner's view, was the crucible in which the processes of the frontier wrought the final and most influential cultural, political, and economic developments in the nature of the United Sates. For Turner, the frontier was very much a geographical concept – one which could be, and was, mapped onto the United States over time. These maps could show chaos, an inherent element of borderless lands, receding as the United States grew from the eighteenth to the nineteenth century. It is in the late nineteenth-century, around the time that the Frontier Thesis was written, that Turner saw the nation's frontier close. This geographical concept between civilization and savagery was applied in historical studies through the 1950s, with parallels to the American example found across the world, and still retains some lingering support today. (Turner, 1920; Sluyter, 2012; Thompson & Lamar, 1981; Parker & Rodseth, 2005; Hinderaker & Mancall, 2003; van Minnen & Hilton, 2004; Hornsby, 2005; Cayton & Teute, 1998)

The New Western Frontier Theory

However, the highly nationalistic and narrowly focused nature of the Frontier Thesis came under fire by the majority of the academic community by the end of the 1970s. They attacked the "ethnocentrism, triumphalism, gender bias, and linearity" which were viewed as inherent flaws in Turner's work (Cayton & Teute, 1998: 3). A new body of work emerged as a result of this reaction, which the historians who contributed to it termed the New Western or Revisionist Theory. At the heart of this movement was the argument that there were multiple frontiers, rather than a single boundary at work. Further, New Western historians focused on "variant perspectives on frontier experiences," rather than single American experience (Cayton & Teute, 1998: 5) Integral to these experiences were the interactions that went on within frontiers. Where Turner and his followers had spoken about white American settlers triumphing over, and pushing out of the way, the savagery of the wilderness and its native inhabitants, historians of this new paradigm highlighted the "collision and convergence of several worlds" that took place between intruding societies and those already living on the land (Cayton & Teute, 1998: 4). Further, in the 1970s and 80s, frontier histories began to include narratives from indigenous perspectives. Another trend that marked the New Western approach was a move away from "confrontational interpretations" of Turner's frontier theory van Minnen & Hilton, 2004: 16). Frontiers, they argued, were places of exchange, interaction, contact coexistence, and conflict – all often occurring at the same time in different locales within a broader frontier. Additionally, these exchanges, interactions, and conflicts were cultural, economic, political, and / or religious (Thompson & Lamar,1981; Parker & Rodseth, 2005; van Minnen & Hilton, 2004; Cayton & Teute, 1998)

White & the Middle Ground

In the 1990s, the New Western paradigm was further modified into the Middle Ground theory, which was based on Richard White's 1991 *The Middle Ground: Indians, Empires, and Republics in the Great Lakes Regions, 1650-1815*. White and those influenced by him wrote of a "middle ground," which is a physical, cultural, and/or ideological area in between two or more conflicting societies within a frontier. Middle Ground frontier histories characterized frontiers as cultural meeting places, which were the sites of "confluence and mixing" (Otto, 2004: 30). White and his followers looked at interaction, focusing heavily on the processes of accommodation that took place between distinct societies on a frontier. If Turner focused too much on conquest and white pioneer dominance, White focused too little upon such conflicts. The Middle Ground theory came to examine the adapting, blending and mixing of cultures so much that it lost sight of the often violent nature of frontiers. As the concept of cultural confluence dominated these histories, narrative stressing cultural continuities also fell away. As Paul Otto argued, the frontier is "as much about cultural persistence and the resistance of many of the frontier's participants as it is about accommodation" (Otto, 2004: 32). White and his followers were also criticized for their homogenization of Europeans, who were more diverse than Middle Ground histories portrayed them to be. The largest critique of the Middle Ground theory, however, was the fact that historians who wrote within this paradigm focused too narrowly on individual case studies that demonstrated cultural accommodation or blending. This subsequently meant that frontiers that showcased sharp cultural distinctions did not receive attention because they did not fit the specified model.

European Conceptions of Frontier Theory

Frederick Jackson Turner's Frontier Thesis had a strong influence in the field of history when it came out, but this was felt strongest in the United States. Due to the fact that the Atlantic World focuses on both sides of the Atlantic Ocean, this paper will briefly address the frontier scholarship trends in Europe. It should be noted, however, that this school of thought will not be the main focus of this historiography. In Europe historians, along with geographers, viewed the frontier at the end of the nineteenth century from a different point of view: that of an imperial perspective. Even more so than with Turner, for European scholars the frontier was first and foremost a geographical marker, which delineated imperial boundaries. Early European historians of the frontier, such as Curzon of Kedleston, Fawcett, and Febvre, viewed the frontier in terms of geographic features and political control; frontiers were contested areas that needed to be mapped, surveyed, and understood in order to have complete authority over them. Further, as imperial and nationalist programs drove the historians' understandings of the frontier, the narratives came to include information about "boundaries that had been traditionally claimed by various powers and peoples." There is still a strong correlation between history and geography in European historians' discussions of the frontier today (Curzon of Kedleston, 1907; Fawcett, 1918; Febvre, 1928:31-44; Kaiser 1998: 63-74; Sicking, 2008; Parker & Rodseth, 2005: 6) Further, this trend, as Sicking recently has observed, is one that has remained focused on the international imperial relations of France, Germany, and Great Britain, at the expense of other countries, such as the Netherlands (Sicking, 2008)

Contemporary Frontier Theory.

The complications of a narrow focus, then, characterized the scholarship on frontiers of both American and European historians. The present concerns and approaches to the history of frontiers, especially in North America, have sought to address this lack of breadth. As such, nearly all recent scholarship on frontiers, which this paper refers to as Contemporary Frontier theory, has taken a comparative approach to the concept of the frontier, focusing on “frontiers” rather than a single “frontier.” Leonard Thompson and Howard Lamar (1981) chose to compare frontier processes at work in both North America and southern Africa to better understand frontiers as a whole. Similarly, Terry Jordan-Bychkov (1993) compared cattle-ranching frontiers in Western Europe, the Caribbean, South America, and North America. Andrew Cayton & Frederika Teute (1998) focused more narrowly on North America, but even so, they examined the multiple frontiers that existed on the continent from 1750-1830 and drew comparisons from case studies that span from the Atlantic Ocean to the Mississippi. Eric Hinderaker & Peter Mancall (2003) also examined frontiers in North America, specifically looking at frontiers, or the backcountry, of British settlements from the late sixteenth century to the late eighteenth century; these backcountries are brought into conversation with backcountries in Wales, Scotland, and Ireland, which were England’s first frontiers. Cornelis van Minnen & Sylvia Hilton (2004) also looked at North America, specifically frontiers in the colonial and early republican United States; they sought to demonstrate the way that frontiers have changed across the country and to relate this to the Britain’s, and later the United States,’ processes of nation crafting.

Stephen Hornsby (2005) followed this trend and examines British colonies in North America, separating Canada and the colonies that later would make up the United States, and in the Caribbean in order to examine the differences that geographic boundaries and natural environments created on frontiers. Shane Runyon in his 2005 dissertation drew the tightest comparison, focusing on the frontier space that would become the Georgia colony and comparing it to nearby English South Carolina and Spanish Florida. Bradley Parker & Lars

Rodseth's book (2005) took the opposite approach to Runyon's work in terms of scale. They examined the way that frontiers have been found world-wide, and used as case studies empires in China and India, South America, North America, Ancient Egypt, and in Anatolia (in the Iron Age). Narrowing focus once more, to the Spanish Atlantic, Juliana Barr (2007) focused on the borderlands in Texas, comparing this region to general models of frontiers in the Atlantic World in order to show how they need to be reinterpreted. Finally, and most recently, Andrew Sluyter (2012) broadened the comparative approach to frontiers again in revisiting the notion of cattle-ranching frontiers – which Jordan-Bychkov had written about almost a decade earlier – to look for the role of "blacks" in the enterprise from Africa through the Caribbean to the Americas.

Setting Boundaries: Defining the Frontier as a Concept

Historians of the Contemporary Frontier paradigm have also acknowledged the pitfalls of viewing a nebulous subject like frontiers too broadly. In order to avoid writing too vaguely about such a large subject, contemporary historians have stressed the need for clear and concise definitions. As such, laying out one's particular conception of the term frontier is another one of the most prominent features of recent historical work, second only to the advocating of the comparative method. Although it is almost thirty years old, Leonard Thompson and Howard Lamar's 1981 *The Frontier in History* presented such cleanly and clearly defined conceptions of the term frontier that it has continued to be referenced by contemporary historians as an example to follow.

First and foremost, Thompson & Lamar stressed that the frontier should be viewed as a process or a phenomenon that has the same "basic characteristic wherever and whenever it has existed in history" (Thompson & Lamar, 1981: 4) As such, the frontier is not a static entity, but one that is ever-shifting. Immediately it becomes clear that the authors sought to distance themselves from the ethnocentric and nationalist narratives of frontier histories that preceded them. Next, they argued that a frontier, in addition to being processual, is a "territory or zone of interpenetration" rather than a line "between…previously distinct societies" (Thompson & Lamar, 1981: 7) Furthermore, one of the societies in this "intergroup situation" is usually intrusive (Thompson & Lamar, 1981: 5). There may be two or more groups in any given frontier, with multiple indigenous and/or intrusive societies coming together and competing for control. These groups may be so enmeshed in internal and external conflicts that it is difficult to disentangle the intruders and the native populations. All of the different, interacting groups in a frontier zone, however, are crucial actors who determine when the frontier process begins, or opens, and when it ends, or closes. The first moments of intrusion open the frontier and start the process. The frontier subsequently closes when one single group "establishe[s] hegemony over the zone" and enforces "political authority" over all of the other groups; this is a process that can take as little as a few years to complete or can stretch on for centuries (Thompson & Lamar, 1981: 7). Third, Thompson & Lamar posited three "essential elements" for any frontier: a. geography that sets the limitations for human activity; b. at least two distinct groups in contact and conflict with one another (as discussed above); and c. the development and subsequent crystallization of relationships between these groups, which moves the frontier process along. Neither geography nor interacting societies are monolithic and they should not be treated as such when considering frontiers. Fourth, Thompson and Lamar regarded the frontier as spaces that often "quickly initiate profound systematic changes," resulting in the eroding, strengthening, or blending of cultures. Contemporary Frontier historians citing these authors recently have stressed that all three cultural changes can occur to societies in frontier zones, thus distinguishing their work from that of Turner, the New West historians, and White. Thompson and Lamar argued that historians cannot "assume that intrusive society necessarily emerges as the winner in the struggle for hegemony" and that the indigenous society always will suffer cultural erosion (Thompson & Lamar, 1981: 10). Finally, in defining the frontier as a process, the authors did bring their work into conversation with that of Turner. They argued that Turner was describing a frontier process when he posited his Frontier Thesis and in that regard, he should be viewed as being on the right track, if too biased by nationalist fervor. After all, Turner's Western frontier was characterized by a "process that takes place whenever one people intrudes into terrain occupied by another" (Thompson & Lamar, 1981: 314-315).

Building off of Thompson & Lamar's work, Terry Jordan-Bychkov asserted his own definition of the frontier concept, which he applied to the case study of cattle ranching in Western Europe, the Caribbean, and the Americas. He too chose to conceptualize the frontier as a "zone of contact," although he reduced Thompson & Lamar's three characteristics into a more streamlined and approachable definition. Frontiers, he argued, are characterized by "two contrasting types of land use" wherein at least one society acts as the "bearers of new and different ways of using natural resources" who "advance, displacing older indigenous modes and peoples" (Jordan-Bychkov, 1993:7). Although Thompson & Lamar's work examined the effects of terrain and climate on interacting frontier groups, Jordan-Bychkov went a step further in arguing that physical environments are "of crucial importance" when conceptualizing frontiers (Jordan-Bychkov, 1993:9). Using his case study of cattle ranching, he argued that the different frontier environments that ranchers encountered affected the ways that ranching developed over time in those locales. He did caution, however, that he was not arguing for ecological determinism, but that the environment was important. Jordan-Bychkov wisely added an economic dimension to his definition of the frontier – an aspect which Thompson and Lamar did not address to the same degree. He argued that the frontier is a “refuge location” for enterprises that can only exist in “marginal and remote” locations due to the population density and high costs of land in national or imperial centers (Jordan-Bychkov, 1993:13). However, Jordan-Bychkov also warned against thinking of frontiers as economically determined. The final definition he provided is one more specific to the focus of his book. He stated that cattle ranching frontiers are a “temporal and geographical confusion” of sources, footholds, “implantations, environmental settings, adaptive strategies, and repeated blendings” (Jordan-Bychkov, 1993:308). As a result of all of these factors coming together, Jordan-Bychkov also concluded – like Thompson & Lamar – that the frontier is not a single, static entity.

In 1998 Andrew Cayton & Frederika Teute released an edited volume entitled *Contact Points: American Frontiers from the Mohawk Valley to the Mississippi, 1750-1830*. Like their predecessors, they put forth a clearly defined conception of a frontier. First, the editors of and contributors to this volume openly acknowledged their intellectual debt to Thompson and Lamar; they too conceived of the frontier as a zone, which was “composite” in nature and filled with “many meanings and patterns of existence” for its inhabitants (Cayton & Teute, 1998: 5). This multiplicity of meanings stems from the fact that “diverse peoples ordered the land and the people on it in divergent ways” (Cayton & Teute, 1998: 14). As a result, the authors argued that there can never be a single frontier, but instead a wide range of different frontiers had to exist. However, for the authors in this volume, geography was not as integral a feature as it was for Thompson & Lamar or Jordan-Bychkov. Further, they chose not to follow the latter’s example in focusing heavily on economic aspects of the frontier. Instead, Cayton & Teute’s second argument about the frontier sought to conceptualize frontiers as complex sites of human decision-making. In placing emphasis on the choices of frontier inhabitants, the editors and contributors further distanced themselves from narratives of ecological or economic determinism.

Finally, they also argued against any conceptions of frontiers as “stage[s] in the progress of the world;” instead, they highlighted the element of contingency that exists within any frontier, directly as a product of the influential role of decision-making. Frontiers, they argued, are “neither inevitable nor static.” Instead, frontiers are bitterly contested locations that often witness vast amounts of violence as competing groups on the landscape “struggled with each other for the power to define the structures and ideas of their worlds” (Cayton & Teute, 1998: 2, 14). This struggle, they argued, is the product of human choices, as is the outcome in each frontier that they examined. They clarified that the struggles that take place on the frontier are not only military, but also economic, social, and most importantly, conceptual. Finally, the editors and contributors bravely directed their efforts specifically to the United States – nearly a century after Frederick Jackson Turner presented his Frontier Thesis (although it should be noted that their case studies do not cross the Mississippi or the mid-point of the nineteenth century, perhaps in hopes of avoiding a strong backlash from opponents of Turner). Cayton & Teute summarized their assumptions about frontiers in asserting that the “essence of a frontier” is in fact the “kinetic interactions among many peoples,” which forged new cultural environments that were “distinctively American in their eclecticism, fluidity, individual determination, and differentiation.” The authors of this volume differed from Jackson and his followers in that they chose to examine not white pioneers but the “multisided negotiations of power” that were at work in creating “that most distinctive of American landscapes,” frontiers (Cayton & Teute, 1998: 2). Although they focused more on the role of individual choice than their predecessors, Cayton & Teute still allowed that the struggles that take place within frontiers are "in part an extension of the construction of power relations in larger political entities." They did clarify that these entities were not strictly European or even Euro-American, but included "Indian leagues, states or republics," thereby reinforcing their separation from Turner (Cayton & Teute, 1998: 10). They concluded that the frontier closed once a particular group "eventually controlled the discourse, giving names and meanings to terrain and peoples" and most importantly "imposing their landscapes" and ideologies on the land (Cayton & Teute, 1998: 14).

In another study that focused exclusively on colonial North America, Eric Hinderaker and Peter Mancall dropped the term frontier in exchange for backcountry. Published five years after Cayton & Teute's volume, *At the Edge of Empire: the Backcountry in British North America* did not address all frontiers as characterized by uniform processes. Instead Hinderaker and Mancall took a strongly geographic focus, stronger than that of their predecessors, and focused specifically on the "territory that lay beyond the core settlements of mainland English colonies and…beyond the control of an often weak imperial state." They termed this region the backcountry. Although they focused on a specific frontier, Hinderaker and Mancall still drew from the works of contemporary frontier historians and those that immediately preceded them. First, Hinderaker and Mancall defined their conceptual framework explicitly. They also argued, like their predecessors, that the backcountry – their conception of the frontier – was "not a fixed place" but instead that "its location and meaning shifted over time." Like almost all of the historians of the Contemporary Frontier history, the authors argued that the backcountry was a location where different societies "came together…for a variety of purposes" including trade and exchange, alliance formation, and skirmishes. Contact between the Anglo-American colonists and the Native Americans within the backcountry regularly "alternated between accommodation and violence, peace and war" (Hinderaker and Mancall, 2003: 4) Such an assertion separates the work of Hinderaker and Mancall from that of White and his followers, who often focused on accommodation at the expense of conflict. Aside from trade-based interactions within the backcountry, the authors did not view this region in economic terms like Jordan-Bychkov did. They did take into account demography, though, which is a subject touched upon by their predecessors. The backcountry progressed and changed, according to the authors, because of increased growth in colonial population in the seventeenth and eighteenth centuries.

The most notable contribution that Hinderaker and Mancall's work made was in the interpretation of the way that backcountry inhabitants viewed the region in which they lived. In this regard, they illuminated the individual nature of such liminal zones more clearly than Cayton & Teute, or Turner for that matter, did. The authors inherently defined the backcountry as a geographic locale that was distanced from the metropole and colonial center physically and administratively. As a result, this region was viewed as chaotic by colonial officials. In contrast to this, though, the "very qualities that made the backcountry threatening to outsiders made it an ideal locale" for its inhabitants. This hinterland lacked both structure and "traditional restraints on behavior and opportunity" which rendered it "a place of pure possibility" for many who lived there (Hinderaker and Mancall, 2003: 4) However, lest they sound like Turner, Hinderaker and Mancall quickly followed up this discussion with the caveat that "freedom for some did not mean success for all" and that the seemingly endless possibilities that accompanied the expansion of the colonies "came at the expense of Native American communities," who, the authors noted, "lost vast expanses of backcountry land." Echoing Thompson & Lamar, Hinderaker and Mancall's book showed that the frontier closed on the region from the Atlantic coast to the Mississippi when settlers displaced the local indigenous communities to the point that they no longer had authority in the region. This process also eliminated the backcountry from that area of the continent (Hinderaker and Mancall, 2003: 6).

Following in this trend of bringing the focus of frontiers back to the United States, Cornelis van Minnen and Sylvia Hilton argued in *Frontiers and Boundaries in U.S. History* (2004) that the frontiers in British North America and later in the United States – as well as frontiers worldwide – included "concepts of meeting or intergroup contact," which involved two or more "racial, ethnic, cultural, or national groups that [thought] of themselves as being different form each over a period of time" (Van Minnen & Hilton, 2004: 10). As historians of Contemporary Frontier theory, these authors made their definition clearly known. Over twenty years after Thompson & Lamar published their edited volume, van Minnen and Hilton still referred back to them in asserting that frontiers are "discernible and significant boundaries or zones of separation, differentiation, contact, and conflict" (Van Minnen & Hilton, 2004: 1). They also focused on ideological and political components of frontiers over geographical ones. In this way, their work was more similar to Cayton & Teute's conclusions about frontiers than it was to Hinderaker and Mancall's book. In fact, they stressed the political aspect of frontiers most. Many of the frontiers discussed were "frontiers of demarcation" which they defined as the products of the "tendency of states to demand, define, and defend continuous demarcation lines" in order to obtain a "measure of self-protection [and] national power." They argued that this political form of frontiers accompanied the United States as it "began its century-long expansion westward to the Pacific" and at each point at which the frontier shifted and changed (Van Minnen & Hilton, 2004: 3).

The emphasis on a political definition of frontiers can be found in Stephen Hornsby's 2005 *British Atlantic, American Frontier: Spaces of Power in Early Modern British America*. In many other ways, however, Hornsby represents a break with the Contemporary Frontier historians. He drew much of his theoretical underpinnings from Frederick Jackson Turner, whom he cited regularly, and from European geographical conceptions of frontiers. Rather than seeing these regions as zones of cross-cultural interaction, Hornsby conceptualized a single frontier, which he defined as a “geographic, political, and economic entity” represented by a “territorially oriented periphery or settler empire” that is distanced from the metropole. He put the frontier in direct contrast with what he referred to as the “Atlantic” or more specifically the “British Atlantic,” which he defined as an “oceanically oriented periphery or marine empire,” which was also distanced from the metropole (Hornsby, 2005: 5). A third category, the Intermediate Space, was also used to describe the British colonies that did not fit into the other two classifications; this third group was defined as a region comprised of “continental staples and port towns,” which had “links to both the continental interior and the world of Atlantic trade" (Hornsby, 2005: 5). As such, Hornsby used the concept of a frontier to “reconsider the geography of British America” in the early modern period (Hornsby, 2005: 2). He wrote of the frontier as a categorical device and a means by which to distinguish different peripheries in the larger British Atlantic World. All three of the categories that he discussed were “shaped by distinctive geographical configurations of power" (Hornsby, 2005: 6). These configurations depended largely on “staple production” locations, which pushed the frontier ever westward from Europe to eastern Canada to New England and the Caribbean, and finally to the interior of North America. Within his categories, Hornsby also focused heavily on economic differences in order to demonstrate that Britain’s colonies were diverse rather than homogenous. Each of the three locations was categorized by the agricultural or industrial benefit that they provided to Britain. This stemmed from the fact that land and staples, in his view, were the “media of social transformation” (Hornsby, 2005: 3).

As such, aside from his comparative approach and emphasis on diversity within the larger British colonies, Hornsby's conception of the frontier differed significantly from that of other Contemporary Frontier historians.

In the same year, Shane A. Runyon published his dissertation, 'Borders and Rumors: The Georgia Frontier in the Atlantic World," which articulated much more with the work of Contemporary Frontier historians, although he made one of the smallest-scale comparisons of any of the authors mentioned here. Runyon conceptualized the frontier as inherently problematic because it possessed a "fluid" and amorphous nature as a concept, especially when it has gained so many political, economic, geographic, social, and cultural meanings. However, he did produce a definition, which was that the frontier is "something on the periphery, far from the metropolis, and without a defined border" (Runyon, 2005: 5). Like his predecessors, Runyon wrote of the frontier as a process, drawing intellectually – if not explicitly – from Thompson & Lamar, as well as Cayton & Teute. Specifically, he argued that colonies "often started on frontiers, then acquired borders" from distant colonial authorities. Initially, these boundaries were not "defined by the limits of settlement," and colonists would live beyond the established borders. The frontier progressed when an area grew in population and the "borders became clearer." At this point, the frontier transitioned into a borderland. Borderlands, then, are areas where "a line has been established to separate nations, counties, states, colonies, or territorial distinctions" (Runyon, 2005: 6). The frontier closes once a borderland appears and the territory becomes a "more permanent and secure extension" of a nation. (Runyon, 2005: 4). Further, borderlands can only exist if they are recognized by neighboring communities; frontiers, in contrast, can be – and frequently are – contested spaces because "without a border, territorial sovereignty could be debated" which made "security difficult to maintain" (Runyon, 2005: 5-6.)Runyon did allow that it is difficult to determine the precise moment when a frontier truly begins or when it becomes a borderland. In this way, Runyon takes a more realistic approach to the concept of the opening and closing of frontiers discussed in depth by Thompson & Lamar.

This understanding of the frontier process reveals that Runyon also included geographic and political components into his conception of the frontier. This is seen most clearly by his portrayal of the frontier as a "buffer zone" between colonial powers, which none of the other historians mentioned had done (Runyon, 2005: 4). Inhabitants of the frontier, according to Runyon, were inherently more protected because they lived within this zone because neighboring authority structures did not have as much sway in areas that were not borderlands. In this way, his work was reminiscent of Hinderaker and Mancall's frontier of open possibilities, which stemmed from weak colonial authority structures.

Another history of frontiers that came out in 2005, Bradley Parker & Lars Rodseth's edited volume entitled *Untaming the Frontier in Anthropology, Archaeology, and History,* approached the concept of frontiers from an opposite perspective – the frontiers they examined as comparative case studies were as wide-ranging as Runyon's case study was narrow. Their scope went far beyond that of just the Atlantic World, upon which all of the other authors here had focused. However, they did use the Atlantic World as a case study, which they compared to frontiers ranging from Ancient Egypt to China. Parker & Rodseth clearly defined their concept of the frontier, in keeping with the pattern of Contemporary Frontier historians. Building off of their predecessors, Parker & Rodseth viewed the frontier as both a process and a zone. Specifically, the frontier was explained as a "shifting zone of innovation and recombination, through which cultural materials from many sources have been unpredictably channeled and transformed" (Parker & Rodseth, 2005, 4). This contingent nature of frontiers is reminiscent of

Cayton & Teute's arguments. Further, frontiers are always multidimensional because they function as places of meeting, zones of interactions, contact zones, and at times contested locations. The editors also distinguished between the terms frontier, boundary, and border, making similar distinctions to those made by Runyon. For Parker & Rodseth, a boundary is anything that indicates a limit and as such, it encompasses border and frontier into it, because it is the most general of the three terms. A border, in contrast, is more precise; it is a "legally recognized line, fixed in particular space meant to mark off one political or administrative unit from another." Above all, a border is a "formalized boundary" but a frontier is not (Parker & Rodseth, 2005, 10).

Also like their predecessors, Parker & Rodseth conceived of geography as an integral, but not determining, component to frontiers, which they argued, were "shaped in critical ways by topography, climate, vegetation, and the availability of water and other strategic resources" (Parker & Rodseth, 2005, 13). They also recognized an economic aspect to frontiers, arguing that all "frontier zones are inextricably linked to the economics of the core" (Parker & Rodseth, 2005, 15). Like other Contemporary Frontier historians they wrote about frontiers as zones that are "characterized by contact between previously distinct populations." Parker & Rodseth's book provided three new and important contributions to the Contemporary Frontier theory paradigm. The first is the guidelines for "world-historical comparison" that they established. (Parker & Rodseth, 2005, 4). The second is rooted in their well-crafted arguments about the political components of frontiers. The third contribution is in their reconceptualizing the concept of the frontier to include a "frontier of human activity" (Parker & Rodseth, 2005, 24). The editors and contributors identified several reoccurring processes of frontier history that are applicable across time and space. One of these processes is the "emergence of the frontier in relation to a center or core area" which is frequently a "densely populated region of concentrated wealth and political power." Next, "mutually structuring interactions between frontier and core area" are always present within frontier zones. Finally, the "development of social exchange, merger, or conflict between previously separate populations brought together on the frontier" always takes place, regardless of the actors involved (Parker & Rodseth, 2005, 4).

Parker & Rodseth argued that frontiers are inherently political because they are "zones of transition between two core areas, each of which contains a population center," which is a "center of political power." They boldly added that frontiers can "divide a core area from a wilderness in which there are few or no human inhabitants" (Parker & Rodseth, 2005, 10). However, they did not fall into the trap that Turner did because they recognized that this is only one role that frontiers can play. They noted as well that at times a frontier is "neither a boundary between imperial powers nor a gateway into open wilderness" (Parker & Rodseth, 2005, 10-11). The distinction comes from the fact that frontiers can exist whenever different societies line up next to one another – especially if there is a disparity between them in terms of technology or resources. Further, they argued that frontiers are "usually created by social expansion" which they defined as the "spread of people, goods, or cultural forms into new or marginal settings" (Parker & Rodseth, 2005, 23). Expansion, as other historians pointed out, does not have to involve military force; it can result from cultural, economic, ecological, religious, or linguistic factors at work. One of the most unique arguments that they made is asserting that frontiers are places of paradox; the frontier "separates peoples and brings them back into contact…preserves traditions and generates innovations" and "seems both a backwater and a land of opportunity" (Parker & Rodseth, 2005, 16).

The final and most important contribution of Parker & Rodseth's volume is their emphasis on a "frontier of human activity," which they define as a "zone in which old institutions are losing their grip," which results in the new forms needing to be "fashioned from the materials at hand, if they are established at all" (Parker & Rodseth, 2005, 24). This conception of the frontier derives from the fact that all frontiers represent "a kind of interstitial space in which some human enterprise…is extended beyond the effective control of established institutions." As a result, institutions are always breaking down and losing control within the frontier in a way that they do not within the core (Parker & Rodseth, 2005, 23). The editors and contributors of this volume have argued that while frontiers provide the chance for new institutional forms to emerge, not all of these formative processes happen at the at the same rate. This results in "multiple, moving frontiers each of which has its own characteristic set of organizational resources and predicaments." Due to this situation, Parker & Rodseth argued that that any study of a frontier must "tease apart the various modes of expansion" that have left their marks on the region's historical development (Parker & Rodseth, 2005, 24).

Parker & Rodseth's edited volume both demonstrated that their conception of the frontier was in keeping with the larger conversation in Contemporary Frontier theory and brought a refreshingly new perspective to the study of frontiers. They emphasized the frontier as a meeting place, a zone of interaction and innovation, and as a phenomenon that is inherently contingent. In this way, their work articulated with that of Cayton & Teute, Hinderaker & Mancall, Thompson & Lamar, Jordan-Bychkov, and van Minnen & Hilton. At the same time, however, they broke away from their predecessors by approaching the frontier in a way that previous authors had not. Ultimately, *Untaming the Frontier in Anthropology, Archaeology, and History* provided the best example of Contemporary Frontier theory and also made the most compelling arguments for the continued study of frontiers as well as for the ways that historians ought to go about doing so.

Juliana Barr's *Peace Came in the Form of a Woman: Indians and Spaniards in the Texas Borderlands* openly tested the theories and definitions espoused by the Contemporary Frontier historians. She too was explicit about her definition of a frontier or borderland; unlike Runyon, she used them interchangeably. She also followed the trend of conceptualizing frontiers as zones. Specifically, Barr defined borderlands as "zones of constant conflict and negotiation over power." The conflict and power struggles, she argued, stemmed from the fact that frontiers are "boundaries beyond the sphere of routine action" (Barr 2007, 7-8). Additionally, she accepted the notion of the existence of core and marginal locales. However, she wrote about the Texas borderlands with an eye to "reframe the picture" of the frontier by "visiting a world in which Indians dictated the rules and Europeans were the ones who had to accommodate, resist, and persevere" (Barr 2007, 7). Barr sought to test the theories of the Contemporary Frontier paradigm to see if they held true when indigenous people were in control of the political economic core and the intrusive settlers, in this case the Spanish, were marginalized. As was mentioned earlier, Thompson & Lamar had asserted thirty years prior that scholars ought not to assume that the intrusive society in a frontier zone would inherently emerge victorious. Barr's book proved that this situation could and did happen; in doing so, it also demonstrated that Thompson & Lamar's hypothesis was firm.

Additionally, while Thompson & Lamar, Cayton & Teute, and Hinderaker & Mancall all stressed the need to consider the roles of indigenous societies when examining frontier zones, Barr's work represents the best example of a historian who took this consideration to heart and used it to create a productive study of frontiers that is told from the indigenous perspective. Barr asserted that historians cannot fully understand the dynamics of the borderlands or frontiers unless they "move away from European constructions of power that are so familiar." Only with an understanding of both the intrusive and indigenous worldview can historians truly grasp the potential of the frontier. Barr's work also brought up a component of frontier inhabitants' experiences which is not often discussed – gender. Barr addressed the way that societies coming into contact on the frontier use "gender to understand and misunderstand each other" (Barr 2007, 8). Further, with all of the discussions in Contemporary Frontier theory of the transformative effects of the frontier, Barr was the only author to address gender as a "system of identity and representation based in performance" that could change within the frontier zone (Barr 2007, 11).

Barr's work also acted as a direct critique of Turner and of White. Unlike Turner's Frontier Thesis, the narrative that emerged in Barr's work on Texas is not one of "conquest colonization and expansion" (Barr 2007, 288). The indigenous inhabitants of the frontier were not dispossessed of their lands. Contrary to White's middle ground thesis, the frontier in Texas was also not characterized by cross-cultural relations of "commercial exchange, mutual accommodation, and mutual dependence." (Barr 2007, 287-288). Ultimately, Barr argued that the Texas borderlands demonstrated that the frontier could also be a location "where survival was contingent upon accommodating Indian nations with power greater than" that of the intruders (Barr 2007, 289). She concluded that the situation in Texas was not unique, but that it was a perspective which had not received enough focus on the overall narrative of frontiers.

The final and most recent work addressed in this study is Andrew Sluyter's 2012 *Black Ranching Frontiers: African Cattle Herders of the Atlantic World, 1500-1900*. Like Barr, Sluyter put the theories espoused by Contemporary Frontier historians under pressure as he discussed the role of race, not gender, on the frontier. Like his predecessors, Sluyter sought to define the frontier clearly and to conceptualize it (and the Atlantic World as a whole) as a "living space of flows" rather than a "dead space of separation." He argued that frontiers are "dynamic processes" rather than "static categories." Within the crucible of the frontier – and the Atlantic World – rigid categories, such as those that divide nationalities, begin to "dissolve into decentered networks of heterogeneous actors" (Sluyter, 2012: 3). In his focus on the actions of the individual, Sluyter's work is reminiscent of Cayton & Teute's assertions on the importance of human choice. Frontiers, in his view, are the arena in which information and goods can travel along "dynamic networks…to create novel social and environmental relations through hybridization and innovation" (Sluyter, 2012: 3). Sluyter's work directly called Jordan-Bychkov's 1993 book on cattle ranching frontiers into question. Sluyter asserted that the "predominant conclusion" that "blacks played a minor role beyond passive labor" is incorrect (Sluyter, 2012: 4). The cattle-ranching frontier was a place where actors of "African, European, native, and mixed origins from throughout the Atlantic world came together" to create new such frontiers. This interaction is not in conflict with Jordan-Bychkov's conception of ranching frontiers. However, Sluyter's subsequent argument, that on frontiers "any or all of those diverse actors may have played creative roles as well as providing labor," does directly question Jordan-Bychkov's work. (Sluyter, 2012: 17). On this subject, Jordan-Bychkov credits Europeans and other so-called Old World populations with originating the concept of ranching, and with creative change taking place on each subsequent ranching frontier from Europe to the Rocky Mountains. However, Europeans are the main agents of creative change on Jordan-Bychkov's ranching frontier. Sluyter, in contrast, began his examination of ranching in Africa and traced African traditions across the Atlantic to the Caribbean and then to South and North America. Sluyter and Jordan-Bychkov's conceptions of the frontier were similar in many ways; both included the blending of ideas and the innovation of novel techniques, the importance of geography, the portrayal of the frontier as a zone of interaction and exchange, and the stressing of the crucial role that individual creativity played. However, Jordan-Bychkov openly asserted that there is “no compelling evidence of meaningful African influence in the cultures and adaptive systems of the various American cattle frontiers” (Jordan-Bychkov, 1993:311-312). Sluyter attributed this assertion to a long-standing tradition that slavery in the Caribbean and the Americas was “so disempowering” that it did not allow enslaved Africans to “play active roles” (Sluyter, 2012: 17). Sluyter sought to use the definitions and conceptions of the frontier to argue against this tradition. Like Barr, who tackled a specific issue not addressed by Contemporary Frontier historians as a whole, Sluyter was incredibly well-supported and convincing in his argument.

Within the last twenty years, a new approach to frontier theory has emerged, which no longer shies away from addressing the United States in terms of the frontier, but also looks globally for comparative case studies. This new Contemporary Frontier theory focuses on processual frontier zones wherein individual actors enact small and large scale changes through their decisions. These individual choices gain the power that they do through a combination of cultural collision and weak institutional control due to distance from the metropole and administrative centers. Frontiers are dynamic locations of dramatic and gradual change, of fierce individualism and accommodation, of trade and violence. In short, frontiers are paradoxical locations that can act as a lens through which to view specific aspects of the lives of its inhabitants, such as gender constructions or racially assigned roles. The Contemporary Frontier theory is a body of historical work that no longer flees before the specter of Frederick Jackson Turner, nor do they ignore the ubiquitous nature of frontiers. The climate in historical writing at present is as charged as frontier spaces, aimed to tease apart the tangled networks that these locales weave in hopes of finding new and innovative ways to understand cultural contact in the past, particular in the early modern Atlantic World. This is an endeavor which has already achieved a measure of success and a field of inquiry perched on the edge of the exciting unknown.

The Frontier as it Applies to this Research

The particular frontier locations in this study are both settlements centered around resource extraction – namely fish and gold. As such, the relationship between frontier spaces and the environment is brought to the fore all the more when considering extraction communities. As mentioned earlier, the geography of a frontier zone sets the limitations for human activity therein; further, frontiers represent places where inhabitants “quickly initiate profound systemic changes” – often with regards to the local environment (Thompson & Lamar, 1981: 10; Hardesty, 1988, 1985). While current frontier theory is not deterministic, it also does not ignore the influence of the physical environment; Frontier locales like fishing settlements and mining towns were “shaped in critical ways by topography, climate, vegetation, and the availability of water and other strategic resources” (Parker & Rodseth, 2005, 13).

Along these same lines, historian Jerome O. Steffen’s seminal work *Comparing Frontiers, a Proposal for Studying the American West* (1980) asserts that there are two main factors at work within any given frontier zone: the “demands of the frontier environment” and the “mindset of those entering the confines of the situation” created by the frontier’s natural geography and weather conditions. Steffen continues that the amount of change wrought within a frontier zone – both to the environment and to the culture of the inhabitants there – depends on “how compelling and obvious environmental demands [are] for change and how deeply rooted

[are] prefrontier principles and practices" (Steffem, 1980: ix-x). These two forces at work shape the culture and the environment of a frontier zone as a compromise between natural and prefrontier cultural demands finally arises. Resource extraction communities interact with the environment more intensively than agrarian frontier settlements because they come to frontier locales with the express purpose of applying known techniques born of past experiences to directly to an environment that is simultaneously unfamiliar and yet similar to those utilized in the past. As is the case with the frontier, innovation always takes place; thus, while fishermen traveled to the islands and coast of Maine with ideas about cod fishing, they soon altered the practices that they brought with them in new ways to create something new and more effective. The same phenomenon took place on the mining frontier of the American West; miners came first to California, brining mining experience and tools from Georgia, Mexico, and Europe; once in California – and even more so once they reached the Rocky Mountains – the miners adapted their extraction approaches and created new, more efficient techniques to address the veins they encountered (Hardesty, 1988, 1985; Steffen, 1980). This phenomenon is best described by Parker & Rodseth's term: "a frontier of human activity," in which new techniques are "fashioned from the materials at hand," due to the distance between socio-political and economic centers and the frontier (Parker & Rodseth, 2005: 24).

Steffen provides two classifications of frontier, which aid in explaining the difference between agrarian and resource extraction frontiers; the first is that of the cosmopolitan frontier, wherein change is caused by factors that are not found exclusively within the frontier. Within cosmopolitan frontiers, inhabitants' daily practices – and even beliefs – stay more-or-less the same, sometimes with only slight location-based modifications. The second classification is the insular frontier. Within an insular frontier, "fundamental change" takes place, resulting in the “replacement or significant alteration of the very assumption upon which given practices were based;” further, this change is “caused primarily by factors exclusive to the frontier experience” (Steffen, 1980: xi). Unlike eighteenth and nineteenth-century agrarian frontiers, where “the number of interacting links between it and the main body of American civilization were few in number,” resource extraction communities “were financed, manned, and supplied form the urban centers of America and Europe” (Steffen, 1980: xii; Hardesty, 1988: 1). As a result, resource extraction communities fall into the category of cosmopolitan frontiers, due to their connection to a larger web of trade, travel, and communication on local, national, and international levels; unlike insular frontiers, resource extraction communities participated in larger world systems (Wallerstein, 1974, 1980). Ironically, it is viewing resource extraction frontiers as islands, as is discussed below, that most effectively proves that they are cosmopolitan, rather than insular, frontiers. The misconception of islands as being separated from larger societies and world systems is addressed in particular by anthropologists Paul Rainbird, Lars Rodseth, and Bradley J. Parker, and by archaeologist Donald L. Hardesty

Rainbird argues that the "encircling" of islands, in this study, the locations are surrounded by water or by an imposing terrestrial landscape, "creates the condition of insularity" (Rainbird, 2007: 3). This insularity then feeds into the "perception of islands" and the larger "concept of island" as both "a metaphor for isolation" and "a metaphor for boundedness" (Rainbird, 2007: 3, 8). Non-island inhabitants often view islanders as isolated and bounded, as a result, despite the extant presence of internal trade goods or representatives of the state. It is only during the **“**nonmarket-oriented pioneer stage” of development for resource extractions that inhabitants must “rely on themselves rather than on outside factors [such as trade networks] for success” (Steffen, 1980: xii). As a result, while Steffen’s classifications separating agrarian and resource extraction frontier communities are quite accurate, his naming itself falls into the same pitfall that Rainbird argues against – the assumption that islands truly are insular.

Island Archaeology

Viewing the Isles of Shoals and Highland City through a framework of island archaeology articulates well with conversations on frontiers and world systems. Like borderlands, islands are characterized by "remoteness" (Rainbird, 2007: 20). Further, in much of Western thought, "islands are strange places where strange things happen" - things that are unique to those island spaces (Rainbird, 2007: 7). As argued above, frontier zones are locations where cultures, ideas, and inhabitants themselves interact, mix, collide, and collude. Frontier zones are also incredible places of innovation and ingenuity, which results in them also being 'strange places where strange things happen,' as islands in a larger network of trade and socio-political power relations. Paul Rainbird states that "an island can be a small island anywhere;" as such, a location can be viewed as an island without necessarily falling into a traditional conception of a land mass bounded by water on all sides (Rainbird, 2007: 20). The Isles of Shoals are comprised of islands in the most traditional sense - "pieces of land surrounded by water" (Rainbird, 2007: 3).

While the archipelago of islands that comprise the Isles of Shoals do indeed fit into the stereotypical conception of islands remote Highland City, along with other mining towns, was an island as well. Donald L. Hardesty argues that "the mining frontier" ought to be "viewed as a network of "islands" colonized by miners" (Hardesty, 1988: ix). Further, he asserts that all "island colonies," be they water-bound or land-locked, "participate in world systems, linking the frontier to the heartland of American and European civilization" (Hardesty, 1988: ix). Mining towns, despite their harsh, often daunting surroundings, were nodes in a larger network of material and information exchange – one which people also travelled across.

Rainbird and Hardesty both argue that the unique nature and position of island communities foster "settlements for trade [and] exchange." As resource extraction communities within frontier zones, the island communities of the Isles of Shoals and Highland City are “inextricably linked to the economics of the core” (Parker & Rodseth, 2005: 15). The economic negotiations in this communities take place most within a "liminal zone;" these could be physically liminal, such as a beach or border piece of land, or socially liminal, such as a tavern; these zones “provide a neutral space for exchanges" (Rainbird, 2007: 17-18; Parker & Rodseth, 2005; Hardesty, 1988, 1985). The inhabitants of these island settlements are at the core of a world system of trade and exchange negotiations. This fact fits all the more with frontier theory, especially given the fact that most frontiers are “created by social expansion” through the “spread of peoppe, goods, or cultural forms into new or marginal settings” (Parker & Rodseth, 2005: 23). The connection between frontier communities and island settlements to larger world systems further emphasizes the fact that expansion does not have to take place through military force, but instead can come through the results of trade and exchange.

Similar to the approach discussed in frontier theory, island archaeology views island inhabitants as culturally separate from the general population of a country and as people characterized by an insider-outsider dichotomy. Island inhabitants, whether living in a community bounded by the sea or bounded by inhospitable terrain, frequently appear to be "wary, inward-looking, and suspicious of strangers," often with an "unwillingness to communicate" with outsiders except when doing business (Rainbird, 2007:18). The inhabitants of the Isles of Shoals and of Highland City were staunchly opposed to interference from authorities outside their own communities; one anecdote from the Shoals recounts an instance where the Shoalers stripped a colonial official and sent him back across the nine miles of open ocean to the mainland in a boat and naked (Jenness, 1874). Another account, this one from Highland City, mentions the formation of a vigilante justice committee, which hung a man that they felt officials had been too lenient on; however, when Virginia City's vigilantes, situated X miles to the south, began to interfere in Highland City affairs, the residents became vocally anti-vigilante justice, so as to not have non-residents affecting their affairs (Montana Post, 1866, 1867).

In studying island inhabitants, however, Rainbird cautions archaeologists not to "treat the area of the island and that of the human population as one community;" instead he suggests an examination of the "human social uses of such places" (Rainbird, 2007: 19). In this regard, viewing Smuttynose Island and Highland City as resource-extraction communities is key to understanding the activities and materiality of their inhabitants. Archaeology can aid in revealing activity areas and use of space on the landscape, further working to distinguish the natural bounded areas in which the settlements exist and the ways that the inhabitants understood, divided, and used these areas.

World Systems Theory and Political Economy

Within the larger theoretical conception of World Systems is the economic model of the center and periphery as it pertains to the emerging Atlantic World; it has commonly been used to explore and classify the early iterations of the hyper-connected world that we live in today. In the early 15th century, Europeans struck out from Western European ports in search of the trade goods that would sustain economies, which were previously buoyed by war booty acquired through crusading wars in the Middle and Near East. The early search for trade goods in northern and northwestern Africa quickly turned to a thorough scouring of the known world for raw materials to feed early industrialization. As plantations sprang up in colonial settings, labor—in the form of indentured and later enslaved-people –was brought from first Europe and then Africa; this was done to feed the "peripheral" settings that supplied metropoles with the raw materials needed for European factories. This economic escalation built throughout the 17th and 18th centuries, as did the demand for exotic trade items, new foodstuff, novel stimulants, and perennial favorites. This period was characterized by the forging of political alliances based largely on economic exchanges, and the wars based on them – or the lack thereof. This climate facilitated the negotiations of business deals and social capital, both within the confines of colonial law and under it. In these models, European metropoles were of central importance as they unprecedented concentrations of political, economic, and social exchanges. This describes what Immanuel Wallerstein (1976) and others refers to as a world-system, which is a large social network with bounded polities within which its members identified themselves as entities. Most importantly, though, a world system is characterized as an economic-material system which can function in a self-contained manner as it draws its strength from wide-spread divisions of labor within it and across the geographic space it encompasses (Wallerstein, 1976; Wolf, 1982). However, perhaps their centrality had been over valued vis-à-vis the colonies. In World Systems Theory, the 'core,' or metropole, is not only an economic center alone, but rather, it is also a social and political one. Ideas, fashions, and beliefs originate there, and then slowly dissipate out toward the colonies and the outer edges of their frontiers (Champion, 1995, Wallerstein, 1976). Due to the inherent delay the spread of such information from a colonial center, those in the colonies had limited contact with their homelands and thus limited enforcement of, or care for, mainstream Western European social norms and laws. In this system, trade and exchange took place through a series of nodes across the Atlantic World, with some existing solely to service others, namely the peripheries servicing the metropoles.

Application to the Isles of Shoals, Maine and Highland City, Montana

Frontier locales like Smuttynose Island and Highland City are crucial to understanding the ways that economic and social capital is negotiated within exchange networks and regimes of value local to these frontier locales. As mentioned above, these spaces are often bitterly contested areas where competing groups of inhabitants often resort to the use of violence in order to secure "the power to define the structures and ideas of their worlds" (Cayton & Teute, 1998: 14). These 'ideas' include the determination of what objects and actions have political, economic, and social value and meaning. As a result of their determinations and choices, inhabitants of the frontier partake in struggles that are military, economic, and social. Most importantly, they also engage in conceptual struggles as they try to enforce or defend their worldviews in the face of differing ideas. These conceptual struggles are crucial to the eventual closing of a frontier locale because they contribute to the eventual dominant power exerting hegemony over the other inhabitants.

As mentioned above, there is no single, uniform frontier theory that encompasses everything that takes place in frontier locales. However, one characteristic that is common to almost every theoretical work on the subject is the fact that the frontier is a process rather than a steady movement. There is no set period of time for a frontier zone to be opened or closed and a new zone can even open before a previous frontier has closed. In fact, the identification of complete political control as the factor that eventually ‘closes’ a frontier zone reexamines and calls into question Turner’s concept of the frontier as moving ever more westward and leaving ‘civilization’ in its wake. The natural environment and landscape of the frontier locale gives opportunities to those who settle it and “set[s] the limits for human activity there” by creating a ‘succeed or perish’ dichotomy for its inhabitants (Thompson & Lamar, 1981: 8). Of the the Isles of Shoals, the historian Russell M. Lawson writes, "that people have chosen to live on a place so seemingly unlivable is [a] wonder" (Lawson, 2007b: 20). Settlers first from England and later from the United States viewed any land as a frontier if it existed “beyond the pale of their civilization” embodied by metropoles such as London or Washington D.C. The distance from the conveniences of trading centers and the harshness of the environment often acted as a selecting force, with only those able to adapt and innovate in the ever-changing environment of cultural collision and collusion 'succeeding' instead of 'perishing.' With regards to the Shoalers, Lawson asserts that "the only people who could exist on such a remote and daunting place would be...those with perservering, hard, craggy personalities;" these people, he writes, were those who "had known trials and bitterness" and were "self-made people willing to risk it all on a chance to create a successful community" (Lawson, 2007b: 21)

Conversely, frontier locales like Smuttynose Island and Highland City viewed cities as trading partners, but not legal authorities. This is particularly apparent at the Isles of Shoals, where the fishermen developed a reputation as a "lawless outpost" with an "utter indifference" toward representatives of legal authority. As a result of this indifference, neither England nor her colonial authorities could exert hegemony over the Shoals. A similar pattern is emerging from the scant documentary record for Highland City, which kept non-inhabitants of the boomtown, especially the Federal government, from exerting hegemony over the Highland Mining District.

The motivating force behind much of the character of frontier inhabitants originates from the fact that they perceived state representatives - and the policies, developed in government buildings far from the frontier - as ineffective and lacking an understanding of the area about which they are concerned. Without substantial assistance from the metropoles, and faced with new environments and cultures, frontier inhabitants often create new ways to cope. For example, they will often act differently than authorities in the metropole demand. Rules are frequently bent or ignored because they do not make sense in the context of the frontier location, or because the threat of punishment is further removed. The Isles of Shoals and Highland City represent nodes in trade networks where wealth and goods flowed steadily both to and from the metropoles, but where the notion of an urbanized core exerting exclusive social control and political authority over peripheries falters because it is diluted and diminished. In locales such as these, it is often economic power - here drawn from natural resources - that aids in acquiring political power. The Shoals and Highland City were both hot-beds for rabble-rousing and their inhabitants were known for their staunch and sometimes violent personal views on politics and economic regulations.

Chapter III. Over the Table and Under It: Commensal Politics within Drinking Spaces

Introduction

Smuttynose Island, 1680

His clothes stank of salt and tar. The lashing rain outside seemed only to make it more pungent. The fire guttered smokily in the hearth as the squall battered the squat brick tavern. His captain sat bow-legged in his chair, deep in conversation with one of the island's fishermen. Two stoneware mugs sat between them, filled with strong ale. The young sailor picked at his stew. He was fairly sure he saw a feather next to the onion on his spoon. He opted for a sip of beer instead as he watched. He had been coming here with the crew for several years. In addition to being a welcome traveler's rest before heading inland, Smuttynose Island had been a useful place to arrange the sale of goods that might arouse the suspicions of the officials on the mainland. The tavern provided more than food and drink. Ten miles of open water separated it from the trade rules and regulations of New Hampshire. That same distance would separate captain and crew from some of their ill-gotten cargo when they set sail tomorrow, specie in hand.

Montana Territory, 1867

Shafts of dusty sunlight cut the murky brown darkness into a hazy patchwork of light and shadow. The scent of old beer and new whiskey lingers in the air like the dirt. A stocky man cleans several glass tumblers with a greasy rag. Behind him, the mirrored back bar dimly reflects the saloon. A long bar, polished by dozens of dirty hands and spilled drinks, takes up most of one wall. An old man leans against it with one boot resting on a long brass pole that runs its length. His face is as lined as the faded red kerchief he wears around his neck. A whoop of delight splits the dusty silence and three men push their way in through the swinging double doors. It's midday in a mining town. Pay dirt is the only thing that would send three young men racing back to town in the middle of the work day. "Round for the house, on me!" One of them calls out excitedly. The barman exchanges a glance with the older man at the bar before pulling out tumblers and filling them. He smiles as he hands pushes the glasses of whiskey forward. They'd likely be here until dark.

Mention of pirates conjures up raunchy scenes in a tavern, with ale and dubloons scattered across creaking tables. Similarly, a frontier town in the American West is incomplete without the obligatory saloon (or several), in which miners, cowboys, and outlaws drink, gamble, and brawl. Taverns and saloons are inseparable from the stereotypes of seventeenth-century pirates and nineteenth-century boomtowns; however, like most stereotypes, there is a hint of truth in this. Given their centrality in terms of their popularity and the spatial layout of frontier towns, as well as their centrality in terms of socializing, hosting political discussions, and planning “both legal and extralegal activities” these institutions are ideal locations upon which to focus a study of trade, social negotiation, smuggling, and piracy (Thorp, 1996: 662).

The Sociability of Drinking and Drinking Spaces

Taverns and saloons were institutions "specifically designed for the group consumption of alcoholic beverages;” as such, they reinforced the “social and sociable nature of drinking events,” including the feelings of camaraderie, commiserating, loyalty, and loosened inhibitions (Smith, 2008: 64). Thus, they were spaces wherein patrons experienced a lack of accountability; after all, "in drink men might abandon the constraints that governed interaction in most public situations" (Conroy, 1995: 2). Herein, patrons could act and speak in ways they could not outside of the tavern, which made these places inherently liminal because they stood outside of the standards established for social norms (Turner, 1967, 1969; Smith, 2008). Liminal places are ambiguous because those that move within them “elude or slip through the network of classifications,” which work to define the norms of “cultural space” (Turner, 1969: 95). Saloons and taverns, as liminal spaces, are “betwixt and between” the classifications “assigned and arrayed by law, custom, [and] convention” (Turner, 1969: 95). Taverns and saloons were unique, liminal features on the settlement’s landscape because they bore witness to conduct and ideas that could not exist within the quotidian norms of the community found outside of their walls. They acted as a "fertile breeding ground for new possibilities in social and political relationships" (Conroy, 1995; 2).

As argued by David Conroy, "public houses provide a window into much more than the drinking habits of colonists" (Conroy, 1995: 11). The exploration of taverns and saloons can shed light onto the quotidian activities of non-elites in the seventeenth, eighteenth, and nineteenth centuries. These institutions were “specialized places for socializing” and represented “centralized social anchors for members of dispersed...communities" (Smith, 2008: 67-68; Rockman & Rothschild, 1984) where alcohol drinking was “usually part of a larger social performance” (Smith, 2008: 63). In the seventeenth and early eighteenth century, a colonial town's tavern often contained a "cross-section of residents" (Powers, 2006: 147). By the middle of the eighteenth century, there emerged "a hierarchy among public houses," especially in larger towns (Conroy, 1995: 7). In towns with greater specialization in profession, taverns acted as meeting places for specific professions. For example, eighteenth century shipbuilders, sailors, and merchants would often meet at a particular tavern to carry out the details of a shipping contract, as was done at Tontine in New York (Rockman & Rothschild, 1984: 113). At the Wellfleet Tavern in Cape Cod, Massachusetts and John Earthy’s Tavern in Pemaquid, Maine, fishermen or whalers would gather at the end of a workday (Bragdon, 1993; Rockman &

Rothschild, 1984; Camp, 1975). This trend continued into the nineteenth century, where it became more prominent as "the former practice of classes sharing space within taverns...soon gave way to that of seeking separate venues" (Powers, 2006: 147). Saloons began to focus on specific patrons, seeking to attract certain social classes, who "further sorted themselves by occupation and ethnicity" (Powers, 2006: 147). As a result, saloons became "places where people found refuge" from the "array of groups [that] came in contact with each other" because these institutions "represented physical places where people of similar backgrounds could socialize and relax" (Dixon, 2006: 581).

Regrettably, "the more strictly oral culture of taverns does not invite investigation" through the use of historical documentary means; David Conroy asserts that "the conversations and activities inside taverns are largely lost to us" (Conroy, 1995: 2). This is where an archaeological examination of these institutions can truly aid in filling in the historical lacunae about the activities of tavern and saloon patrons. As with any investigation, it is important to note that while tavern and saloons functioned in many similar ways, the cultures in which they operated certainly varied from the seventeenth to the nineteenth centuries. As such, the two drinking institutions have been broken down, in order to see their particular, nuanced differences, but also to see their overall similarities.

The Tavern: The Drinking Institution of the Seventeenth and Eighteenth Century.

In the seventeenth and eighteenth centuries, taverns were the “most numerous public institution in colonial [America],” which gave them prominence on the social landscape due to their ubiquity alone (Conroy, 1995: 2). Taverns stood as integral locations in the daily lives for the inhabitants of England and her colonies and were places where often “the rich drank alongside the poor” (Salinger, 2002: 5). In the seventeenth and eighteenth centuries, alcohol was a part of "every public and private ceremony, every commercial bargain, every craft ritual, [and] every private occasion of mourning and rejoicing" (Thomas, 1971: 17). Further, beer was a "basic ingredient in everyone's diet," including children (Thomas, 1971: 17). According to duty records, each man, woman, and child drank roughly a pint a day, which amounted to roughly forty gallons of alcohol per person annually. This figure does not include privately-brewed beer, spirits, which grew more popular through the seventeenth century and into the eighteenth, or imported alcohol (Thomas, 1971). At their most basic, taverns were "places where rumors began and ended," where townsfolk gathered and both made and deepened acquaintances; most importantly, taverns acted as the places where "communities found an identity" (Cheever, 2015; 33-34).

Centers for Maintaining and Disrupting Cultural Norms

In the British colonies, taverns served as sites of myriad and complex activities and interactions, aside from the typical, and expected, processes of eating, drinking, and smoking (Cheever, 2015; Salinger, 2002; Conroy, 1995). Given the mixture of economic conditions of life, political inclinations, and occupations, taverns functioned as integral places of meeting (Cheever, 2015; Smith, 2008; Salinger, 2002, Conroy, 1995). Much of this comes from the fact that in the seventeenth century, “most colonial towns and villages boasted only two types of public buildings – churches and taverns," an arrangement which differed from towns in Europe (Salinger, 2002: 4). In fact, the tavern was "usually the first public structure" which "became the center of town" (Cheever, 2015: 31). Taverns would at one moment act as a meeting hall for officials, and at another function as a “hall where workers and employers looked for one another” (Thorp, 1996: 662; Conroy, 1995). This is partially because these buildings were often “the only large buildings, which could serve as places for groups of people to meet both formally and informally for secular purposes” (Rockman & Rothschild, 1984: 113). Seventeenth century colonial government officials saw taverns as central to the “establishment and maintenance of social, [political] and cultural norms” and often even went so far as to mandate that at least one tavern, if not multiple ones, be established in a new community, which gives some explanation of the large number of taverns (Thorp, 1996: 662; Conroy, 1995; Rockman & Rothschild, 1984). Seventeenth century taverns also secured their position as a favored meeting place for governmental business because of the "convenience of heat and light provided by tavernkeepers during the winter," which spared the officials the cost of heating and lighting public meeting houses (Conroy, 1995: 16). This was especially important, given the fact that meeting sessions could sometimes continue for as long as several days.

However, colonial taverns were also integral to the challenging of these same norms, because "every tavern was an island of freedom" (Cheever, 2015: 31). Rather than acting as "unchanging, uncontroversial" institutions, taverns were liminal spaces where one could act in ways they could not outside of the building’s walls, largely because of the space's association with alcohol (Cheever, 2015: 31). The seventeenth and eighteenth-century tavern was "a public stage upon which colonists resisted, initiated, and addressed changes in their society" (Conroy, 1995: 11). As Susan Cheever observes, "Virginia's Committee of Correspondence met and plotted against the king in the only safe place they could find in Williamsburg - Raleigh Tavern" (Cheever, 2015: 32). Additionally, the Sons of Liberty met in Massachusetts taverns (The Black Horse Inn and the Green Dragon) and Thomas Jefferson started the Declaration of Independence in a tavern (The Indian Queen). Additionally, Philadelphia's City Tavern was the site of a great deal of the planning of the American Revolution and Ethan Allen even based his headquarters in a tavern, the Catamount (Cheever, 2015; Conroy, 1995).

The controversial conversations and actions within taverns caused governmental officials to start attempting to regulate them at the end of the seventeenth century and through the eighteenth century. Taverns became "public spaces over which the ruling elite and the populace at large contested for control" (Conroy, 1995: 9). This became especially apparent as governmental regulations on taverns increased along with revolutionary sentiment in the second and third quarter of the eighteenth century. David Conroy observes that at this time, "the reform of drinking habits and related behavior seem[ed] so essential as the crisis of authority...deepened" (Conroy, 1995: 10). By the mid-eighteenth century, colonial magistrates, politicians, gentry, and yeoman alike "had become world famous for their drinking." In part, much of this came from the fact that "taverns and drinking fed the colonists' desire for independence" (Cheever, 2015: 34)

Eighteenth century colonists drank more than their seventeenth century counterparts, with the average man spending roughly a fourth of his income on alcohol of some sort. Not only did these colonists drink more than their predecessors, but "the use of alcohol throughout the population" was "unusual" (Cheever, 2015: 34). Babies and children drank, in addition to their parents and grandparents. Workdays and schooldays alike began with small beers or ciders; following this, "at eleven a.m., four p.m., at dinner, and after dinner, colonists drank." All of this fed into the "wildness of the drinking citizenry" (Cheever, 2015: 34-35). By the third quarter of the eighteenth century, the average man in British colonial North America drank "almost twice as much as the average person drinks today" and in general, it seemed that society was "ready to tolerate a blood alcohol level two or three times higher" than the modern legal standard of .08 (Cheever, 2015: 36, 38). Researchers such as Susan Cheever and W.J. Rorabaugh argue that the period around the American Revolution was when "American drinking habits hit their first peak," swinging toward this height like a "pendulum" that would eventually careen back in the other direction toward Prohibition, with smaller spikes in drinking and temperance along the way (Cheever, 2015; Rorabaugh, 1979).

On Tap at an Eighteenth-Century Tavern

As the amount of alcohol consumed in the colonies increased, so did the variety of drinks. Beer, both strong ales and porters with a higher alcohol content, and small beers with a lower alcohol percentage, was ever present. Historian Greg Smith argues that "all of the thoughts, feelings, and beliefs the colonists brought with them to North America were the result of society's millennia-old marriage with beer" (Smith, 1998: 2).

The Saloon: The Drinking Institution of the Nineteenth Century

To better understand the saloon as it stood in the nineteenth century, we must first examine the socio-political culture of its patrons. W. J. Rorabaugh, in his book *The Alcoholic Republic* explains that the nineteenth century witnessed what had been unparalleled change for which American society was “institutionally, ideologically, and psychologically unprepared” (Rorabaugh, 1979: 125). For example, a strong central government emerged out of what used to be “loosely formed confederation of former states,” only to later be thrust into the throws of civil war by 1865, only two-thirds of the way through the century (Smith, 1998: 130). However, before the nation could even reach this tumultuous point in its history, it waged several wars including the War of 1812 and the Mexican-American War, which spanned from 1846 to 1848. However, as is to be shown below, war was not the only cause of social upheaval in the United States. Both “rapid social and political change” in the decades following the American

Revolution “produced the undercurrent of anxiety that…feeds apocalyptic anticipation” (Husch, 2000: 15).

Technology

Fueled largely by the War of 1812, the nation became swept up in the embrace of the Industrial Revolution, a frenzy of technological advances and never-before-seen concepts. These new innovations – which included railroads, steamships, electrification, architectural steel refinement, and telecommunications in the form of the telegraph first, and then the telephone – were each on par with the invention of the television or the internet and yet happened in much more rapid succession. All of these inventions can be thought to be “destructive technologies” because they each wrought “creative destruction,” or the process by which old industries become obsolete and die in the face of new ones (Senge, et al., 2001). Senge et al., argue that a new age, such as the Industrial Revolution by the time it reached the nineteenth-century, create “fundamental shifts” in the ways in which economic systems affect the larger systems in which they are located, both “society and nature” (Senge, et al., 2001: 24). New technology can be as brutal to a society as the term ‘destructive technology’ implies. Any form of industrial progress, Senge, et al. point out, has “tended to destroy cultural as well as biological diversity” whether or not there is opposition from groups that have become marginalized because of it, such as farmers (Senge, et al., 2001: 25). The effects of these new technologies were made worse by the economic conditions of the period.

The Composition of the Nation

Accompanying these technological advances hand-in-hand was a series of massive expansions in the size of the United States. The first of these, and the most notable, was the Louisiana Purchase in 1803, which added roughly 830,000 square miles of land to the country;

this land included the land that now makes up part of at least fifteen present-day states: Arkansas, Oklahoma, Missouri, Kansas, Iowa, Nebraska, North Dakota, Montana, Wyoming, Colorado, New Mexico, Texas, South Dakota, Minnesota, and Louisiana (Louisiana State University Library, 2012; Clark, 1959; Branch, 1969). A little over forty years later, in 1846, the Oregon Territory was established, which included the land that makes up the present-day states of Idaho, Oregon, and Washington, as well as part of Montana. This rapid expansion of land did not stop there; only two years later, at the end of the Mexican-American War, the land comprising the present-day states of Nevada, Utah, California, Arizona and part of New Mexico. As a result of all of this new land, the population exploded both within the country and across it in the search for arable land. In response to a desire to populate all of the new land that the nation had acquired, the United States government passed the Homestead Act of 1862, which guaranteed 160 acres of land to anyone who claimed it, provided that they made improvements upon it over a five-year period (Our Documents, 2012; Clark, 1959; Branch, 1969). Despite the acquisition of land and the Homestead Act, guaranteeing settlement upon it, establishing towns would have been a fruitless endeavor were it not for the technology of the century, especially that of steamships and railroads (Corbin & Rodgers, 2008). The two forces, technology and westward expansion, were inextricably bound together.

During this period, the United States increased not only in physical size, but in population size as well. The century bore witness to the first large wave of immigrants since the colonial era; immigrants from both Europe and Asia swept into the fledgling nation (Smith, 1998; Rorabaugh, 1979). Particularly, midway through the century a large number of immigrants came from Ireland, fleeing the Great Potato Famine that lasted from 1845 to 1852, and from China to work on the railroads and to capitalize on the boomtowns springing up after the California Gold

Rush of 1849 (Husch, 2000). These mass movements of people lead to a large number of migrant farm hands who had productive harvest seasons and then were faced with the prospect of a "long, inactive, uncertain winter," which understandably caused great anxiety and drove them to drink, as will be discussed later in this paper (Rorabaugh, 1979: 128). Other members of the "new mobile class without customs, roots or social ties" included lumberjacks, canal builders, stage drivers, railroad workers, and river boatmen (Rorabaugh, 1979: 140). Another example of the forces of anxiety acting on nineteenth-century Americans can be seen in the changes that arose in transportation as canals and steam power transformed movement across the country. This added stress as Americans became integrated into a national market economy, which "destroyed local markets" and caused them to discover that "custom and tradition became less important" (Rorabaugh, 1979: 129). The movements of people into and across the country caused Americans to feel "bewildered, frustrated, and isolated amid a sea of strange faces" as neighborhoods broke down and travel increased (1979: 129). As these neighborhoods broke down, so did the American social hierarchy. Rorabaugh argues that the rapid changes of the nineteenth-century left Americans feeling "torn between the reality of inequality and the ideal of equality" (Rorabaugh, 1979: 138). He points out that the stress was "felt most keenly" on Americans born just after, or during, the Revolution (1979: 138).

The Reaction to the Climate of Nineteenth-Century America

All the factors above worked to create "perceptions of anarchic and uncontrollable change, of impending chaos, and of disorienting fragmentation" (Husch, 2000: 2). Because of this, there was a strong desire to articulate one's personal beliefs in the attempt to secure some measure of order and some sense of meaning in a world spun out of control (Husch, 2000; Rorabaugh, 1979; Doan, 1987; Gray, 2007; Moorhead, 1984). James Moorhead argued that

Americans in the nineteenth-century were in “especial need of the clarity with which apocalypticism endowed history” because of the very factors that contributed to the climate of the century, namely “relative geographic and social mobility,” the nation’s increasing “ethnic heterogeneity,” and the absence of a defined class structure or churches endorsed by the government (Moorhead, 1984: 535).

Alcohol Consumption

Change in the lives of Americans was followed closely by shifts in their drinking habits as well. This is evidenced by the fact that during this period, especially between 1790 and 1830, Americans “drank more alcoholic beverages per capita than ever before or since” (Rorabaugh, 1979: ix). This increase in alcohol consumption has been measured meticulously by W. J. Rorabaugh extensively through a combination of customs accounts, federal liquor taxes, ledgers from saloons and breweries, censuses, prohibitionists’ pamphlets and lectures, travel accounts, and newspapers. Rorabaugh argues that these new drinking habits were “not random but reflective of [American] society’s fabric, tensions, and inner dynamics” as well as its overall psychological state (Rorabaugh, 1979: xii). He continues that the rapid changes of the nineteenth-century left Americans feeling “torn between the reality of inequality and the ideal of equality” that was so heavily intertwined with the millennial notion of America as the Redeemer Nation (Rorabaugh, 1979: 138). This paradox placed such a stress on them that they drank to cope with it.

With industrialization came a sharp distinction between time designated for work and time designated for leisure; workers could no longer practice the seventeenth and eighteenth-century custom of ‘dram drinking,’ which entailed drinking small amounts of low-proof alcoholic beverages throughout the day. (Powers, 2006; Rorabaugh, 1979). Instead, they had to practice absolute sobriety while at work and thus, they could only drink was their workday was finished. As a result of this shift in customs, workers would go “directly from work to the public house” where they “stayed late and spent [their] day’s wages” (Rorabaugh, 1979: 15). Rorabaugh argues that the Americans of the nineteenth- century had “psychological needs that were met better by alcohol than by food “(Rorabaugh, 1979: 112). Americans sought a “means of relieving anxiety and acquiring happiness,” and those who could not find escape in religion alone, or at all, turned to alcohol to help them cope with their new and seemingly ever-changing world (Rorabaugh, 1979: 189; Smith, 2006). As a result, the nineteenth-century bore witness to the phenomenon of alcohol becoming “an accepted part of American life” (Rorabaugh, 1979: 15). It is important to note that alcohol was not confined to a single socio-cultural class but was “pervasive in American society” and crossed “regional, sexual, racial, and class lines” (Rorabaugh, 1979: 20). That said, those “most severely affected by the change” were the same groups that were “most given to heavy drinking” because they had the most to lose with the steady progression of the century: migrant workers, railroad men and steel drivers, farmers, miners, and factory workers (Rorabaugh, 1979: 125).

Likely in response to the increased demand for alcohol, the nineteenth-century also saw the rise of large breweries throughout the East and Midwest, from Boston to Milwaukee, and from Philadelphia to St. Louis (Smith, 1998). As Gregg Smith points out in *Beer in America*, these early nineteenth-century breweries were “instrumental in ensuring” that the United States continued to drink beer (Smith, 1998: 178). These breweries reached their peak in the late nineteenth-century, and Smith attributes this to the actors of the Westward expansion, namely “discoverers, settlers, pioneers, frontiersmen, soldiers, and statesmen” (Smith, 1998: 179). Beer was an “inseparable part of their lives,” which bolstered the role of drinking spaces – the saloons

– and turned breweries into “big businesses” (Smith, 1998: 179, Powers, 2006: 146). Much of this came from the fact that with Westward expansion came increased business activity; this translated into “more travelers, who…placed money directly in the pocket of the tavern owner” (Smith, 1998: 33). Smith argues that this was “all the motivations needed for frontier entrepreneurs” and as settlers, immigrants, and preachers moved westward, so did saloons and breweries (Smith, 1998: 33). In fact, breweries often bought saloons themselves or established exclusive supplier contracts with saloonkeepers (Powers, 2006). Despite the shift from breweries as personal enterprises to breweries as large businesses, whiskey still reigned as the American national drink in the nineteenth century, especially during Westward expansion (Rorabaugh, 1979).

The nationwide “preference for distilled spirits,” specifically whiskey, “reflected American needs” (Rorabaugh, 1979: 176). This drink was particularly attractive to frontier farmers because they could both afford it due to its low price, and could take part in an economic system set in place by the farmers who had come before them and had settled the Appalachian Mountains – whiskey created a market for these farmers’ excess grain, especially corn (Rorabaugh, 1979, Branch, 1969). In part due to the apocalyptic vision of the United States as the Redeemer nation and in part due to the anxiety caused by successive waves of immigrants, the nineteenth-century was a time of fervent national pride. As such, whiskey was particularly beloved because it was seen as a “binding force” and a “reason for union” due to its price, which nearly all socio-economic classes could afford (Rorabaugh, 1979: 91). It also represented a “waning reliance upon such foreign products as rum” and began to be seen as the “spirits of independence;” the very notion of independence, as described earlier, came to be idealized as a major step on the path toward the apocalyptic ending that was perceived to be coming all-too-soon. (Rorabaugh, 1979: 92; Husch, 2000). Whiskey and beer, provided in saloons, acted as major components of a diet which consisted otherwise of mainly meat and corn for the increasing number of Americans moving into the frontier lands acquired by the Louisiana Purchase and the Treaty of Guadeloupe-Hidalgo, which ended the Mexican-American War (Rorabaugh, 1979, Clark, 1959). Alcohol also provided its consumers with a comparatively safe alternative in the realm of beverages. For the first third of the nineteenth-century, coffee and tea were both incredibly expensive, milk was both costly and dangerous, and water was untrustworthy in its quality and even harder to find, especially on the Great Plains. As such, Westward expansion, spurred by the sizeable land purchases discussed earlier, greatly affected Americans' drinking habits as they moved away from ready supplies of fresh water and from large cities with varied drinking options (Rorabaugh, 1979).

The drinking spaces of the nineteenth-century also bore witness to, and reflected, these changes in culture, lifestyle, and mindset, as well as the physical and social landscape upon which they were situated (Powers, 2006). The seventeenth and eighteenth-century reciprocal relationships of the tavern, often seen in the relationship between a master craftsman and a journeyman, were dropped as employers and their employees in an industrial setting developed more adversarial opinions toward one another. Such attitudes led to a desire for separate leisure spaces when off-the-clock (Power, 2006; Conroy, 1995). In fact, the very appearance of the saloon differed from that of a seventeenth or eighteenth-century tavern. With the Industrial Revolution, glassware, gaming equipment, and furniture were mass-produced at such a scale larger than anything seen in the centuries prior and were then transported by steamboat or by rail out to saloons that sat miles from a major city (Powers, 2006). Additionally, amid the chaos that many customers felt in the nineteenth century, the saloon provided something familiar; its layout and the fare it served were likely to be incredibly similar to other saloons, whether they were "down the street or across the country" (Powers, 2006: 146). It came to represent a place, which was not "rattled by …life's uncertainties" (Powers, 2006: 146). As the nineteenth-century progressed, saloons became even more standardized and the conduct associated with them evolved into a tradition of sorts, which distinguished a frequent patron, who had a sense of belonging at the saloon, from a patron, who was new to the social scene of the saloon (Powers, 2006). This sense of belonging was crucial to a nation that felt that it was steadily steaming toward the end-times. This need to be a part of something recognizable was the same force that drove Americans both to join religious revivals and to become regulars at their local saloon. The saloon was still a place where "people went to relax and socialize" (Dixon, 2006: 581), but this was done in order to "soften the blow of the anxiety and hostility" associated with their "transition to a new life" on the frontier (Dixon, 2006: 581).

This regularity in appearance and function can be seen in the archaeological record as much as it can be seen in the documents of the period. The glassware, faunal remains, bottles, tobacco pipes, gas-light fixtures and glass pipes recovered at one saloon looks very similar in its archaeological signatures left behind by others (Dixon, 2006). Kelly Dixon argues that these "mundane items" work to indicate not only what was eaten and drunk at the saloon being excavated, but also to speak to its "interior atmosphere" (Dixon, 2006: 577). It should be noted, however, that the archaeological record reveals many fewer saloons than were inexistence in the nineteenth-century. This is largely due to two factors: the climate in which these saloons were located and the nature of the towns in which they sprang up. Many frontier sites are susceptible to the ever-present winds of the Great Plains, harsh snows, and dry climates; all of these factors serve to slowly erode away a building's archaeological signature by eating away the artifacts and architecture, as well as the actual soil itself. Additionally, many saloons existed in mining boomtowns, which are inherently sites of (often rapid) abandonment (Dixon, 2006; Stevenson, 1982). Those boomtowns which became ghost towns as quickly as they arose often were left by their inhabitants who had no intention of returning. In these circumstances only secondary refuse, or exhausted and broken items of little utility, are left behind for the archaeologist to recover. (Stevenson, 1982). When a boomtown is rapidly abandoned, but there is the intention of return, more de facto refuse gets left behind, which would ideally bolster the archaeological record; however, if the town's inhabitants do not end up returning, these resource-rich sites quickly get scavenged as prizes on the comparatively barren frontier (Stevenson, 1982).

Nineteenth-century saloons also served to quiet the anxieties of Americans in serving as places where patrons could express their ethnic identities. This, combined with prejudices of the time (a product of the waves of immigration from Europe, Westward expansion, and immigration into the cities), fostered a tendency for people to spend time with others of similar cultures, which in turn influenced saloon diversity (Powers, 2006; Dixon, 2006). Rather than acting solely as places of town-centered solidarity, as was the case in the seventeenth and eighteenth centuries' taverns, the saloon of the nineteenth century was a place of "refuge," away from the "array of groups" that collided on a daily basis within Eastern urban cities and Western frontier boomtowns (Dixon, 2006: 581; Powers, 2006; Conroy, 1995).

The stratification that began in the eighteenth-century reached its peak a century later; saloons encouraged separation of ethnic, racial, and social groups and acted as niches for myriad small groups which all "reflected the diverse social, cultural, economic, and ethnic milieu" of Western boomtowns (Dixon, 2006: 581: Powers, 2006). Saloons became places wherein patrons could "develo[p] collective response to the historical forces acting on their lives" (Powers, 2006:

145). Kelly J. Dixon argues that the nineteenth-century saloon acts as an “example of how a shared heritage of many groups played itself out” across America and simultaneously spurred on cultural diversity (Dixon, 2006: 581). As saloons became places of ethnic and occupational solidarity, they also became places of working-class solidarity. The more elevated social classes shifted away from the tavern-going pattern of the seventeenth and eighteenth century and chose instead to drink in private clubs or within their own homes (Powers, 2006).

Saloons in the nineteenth-century also represented hotbeds for counter-culture, for strong sentiments against the political and social norms, and for crime. Madelon Powers describes the nineteenth century saloon as having the reputation of being a “snake pit of vice” and an “incubator” for lore (2006: 145, 147). Laborers, who often used the saloon to organize union meetings, also used them to organize strikes and – at times – rebellions against their foremen. In discussing the crime-rates in nineteenth century Chicago, Jeffrey S. Adler states that the “leisure practices of young men shared the character of homicide” and that most murders occurred where these men “spent their leisure hours” (Adler, 1997: 256). He adds that 61 per cent of these murders took place in the street or in the saloon, with over 22 per cent definitively taking place in barrooms (Adler, 1997). Those violent conflicts that did take place in the street often started in the saloon. Overall, saloon fights were common in the nineteenth century largely because they were seen as “tests or declarations of status” within the “fluid, unstable world of working-class male sociability” (Adler, 1997: 256).

Scholarship on Feasting and Its Classifications

Taverns and saloons were central to communities as places to converse, celebrate, mourn, and rebel, but also as places to negotiate power and forge alliances. Societies are inherently both fragile and volatile, especially those on the frontiers; micro-politics are vehicles through which stability is maintained, coalitions are forged, and fractions formed to embrittle polities. These negotiations for power are what allow a society to escape its otherwise ephemeral and transient state, because it must always reinforce a degree of consent within its population. However, taverns, as institutions, are not formalized branches of the government, but rather represent locations that are red-hot in their capacity to subvert the influence of state power, especially because alcohol is prevalent within them, which numbs inhibitions and reduces accountability, as described above. Within taverns and saloons, inhabitants of the local community, carried out their quotidian activities and negotiated power through them; Fleisher & Wynne Jones argue that "locating power in everyday activity and interaction" is key to understanding manifestations of authority in the archaeological record (2010; 178).

Power itself has been classically defined as the "probability," regardless of its basis, that "one actor within a social relationship will be in the position to carry out his own will" despite any actions of resistance (Weber, 1964: 152 *in* Fleisher & Wynne Jones, 2010: 180). The concept of authority itself comes from the joint forces of obtained power and the legitimacy required to keep it. This process is an "ongoing negotiation" which is present within every social interaction, action, and relationship, including those taking place within taverns (2010: 179-180). Drawing from Foucault, the state is built upon relationships with its subjects, which are crucial to a society's stability because each one of these interactions stems from and reinforces the existing structures of power (Fleisher & Wynne Jones, 2010, Foucault, 2000).

Power, as a concept, does not necessarily act directly upon members of a society, but rather affects their actions because it shapes their worldview and the expectations that they have for the ways in which their relationships with others and their society will turn out. This makes a society or state's exercising of power something that is both pervasive and unseen by its subjects, who still actively participate in legitimizing that power. As a result of these interactions, power can manifest itself in a dialogue of many forms including cooperation, collaboration, negotiation, and empowerment (Spencer-Wood, 1999: 179 *in* Fleisher & Wynne Jones, 2010: 182). The form of power negotiated, reinforced, and challenged within taverns is referred to as "instrumental power" because it centers on the "possibilities of coercion and control" (Fleisher & Wynne Jones, 2010: 183).

One key way of addressing these issues of the negotiation of power, is through an examination of feasting and commensal politics. Michael Dietler has defined commensal politics, the structured sharing of food and drink, as "the ways in which the shared consumption of food and drink is marshaled in the negotiation of power" (2003, 272); an examination of these politics does not focus a 'top down' hierarchy, but rather shows how negotiations permeate society and social life at all levels and the ways in which consumption acts as a political practice. Within the frontier communities of the seventeenth, eighteenth, and nineteenth centuries, the "giving and receiving of drink" was frequently "invested with emotional and symbolic significance" (Conroy, 1995: 22). David Conroy observes that "the particular sequence, manner, and frequency with which food and drink are given and received can serve to define loyalties, obligations, contractual bonds, and status" (Conroy, 1995: 22). As such, the "social and political functions of feasting are closely intertwined" because "hospitality is used to establish and maintain social relations and to forge alliances" (Steel, 2004: 283). With regards to alcohol, "the gift of a drink, or the ability to provide drink, can become a token of esteem and trust," whether this gift was given informally or through the use of "elaborate ceremonies" it is still an important means of publicizing or affirming agreements" (Conroy, 1995: 22). Feasts can create a shared feeling of identity and belonging and allow the "host to accrue prestige and standing (symbolic capital) within a community" (Steel, 2004: 283). The "enhancement of the host's status within the community will buy influence over decisions made by the community" (Steel, 2004: 283). Authority figures or groups, defined as those whom members of a society accept and legitimize holders of power, are not the only ones who can host feasts (Fleisher & Wynne Jones, 2010). Social groups, households, and even individuals can host such events and negotiations of power, and it is this latter type of host that was usually present within the tavern-context. Alcohol in particular plays a large role in the negotiation of social capital. As a relative form of food, Dietler argues, alcohol can also be said to be "embodied material culture" (2006: 232). He goes on to explain that this makes it a special form of material culture that is made to be destroyed through ingestion. He argues that because of this relationship to the body, it has a close relationship to concepts of personhood and sense of self. Additionally, because the resources used to make alcohol are conspicuous and also must be replenished in order to make it again, it directly links domestic and political economies. Such embodied material culture "constitutes a prime arena for the negation, projection, and contestation of power," (2006: 232). Dietler views alcohol as a "versatile and highly charged symbolic medium and social tool" that is used in the "playing out" of politics and rituals, as well as the negotiations of social and economic relations (2006: 232). As embodied material culture, Dietler argues that alcohol can be seen as a "total social fact," following Marcel Mauss, who defined the term as a phenomenon that concerns both individuals and collective entities, and is simultaneously religious, legal, political and domestic, as well as economic because it involves accumulation, and consumption (Mauss, 1923; Dietler, 2006: 232). Louise Steel further supports this varied and all-inclusive meaning in stating that "alcohol serves to construct an ideal world" because it is "particularly appropriate" for both "ceremonial consumption and the forging of alliances." (Steel, 2004: 283). In societies "where the manufacture of alcoholic beverages is indigenous to the culture and economy," the purchase and consumption of alcohol act as more than "a source of recreation" but also as "vital" pieces in the "establishing and maintaining [of] communal bonds" (Conroy, 1995; 22). Especially in more isolated locations, such as frontier towns,

In "Feasts and Commensal Politics in the Political Economy Food, Power and Status in Prehistoric Europe," Dietler establishes three types of feasts, namely: entrepreneurial, patron-role, and diacritical (Dietler, 1996: 92 – 99); participants carry out each type with a different set of symbolic logic. As such, in order to examine the feasting and commensal politics taking place within taverns, the type of feast, and its intended goals, must first be ascertained. At heart, feasts are performances that involve food and drink. They differ from daily life because they provide a stage for the "highly condensed symbolic representation of social relations" (89). Feasts "express idealized concepts" including "the way people believe relations exist or should exist" (89). Dietler identifies three main types of feasts: entrepreneurial, patrol-role, and diacritical feasts. What follows is a summary of these three models of feasting, with an example to illustrate each type. Entrepreneurial feasts took place most often within taverns and saloons.

Entrepreneurial Feasts

A fitting example of an entrepreneurial feast comes from the folklorist and historian Roger D. Abrahams' *Singing the Master*. He focuses on the corn-shucking ceremony on nineteenth-century Southern plantations of the United States. Specifically, he examines how the power relationships of slavery were "dramatized" through "scenes" wherein slaves sang as they worked, participated in work and play activities with a competitive edge, and received a feast and a "good time" as a reward (Abrahams, 1992: 80-81). In this way, he is examining the very commensal politics discussed above, and the fact that the ceremony carried meaning for all members of the plantation society that were involved, even if it was viewed in different ways by different groups.

Following Dietler, entrepreneurial feasts involve the use of commensal politics and hospitality to gain social capital through "informal political power and economic advantage" (Dietler, 1996: 92). In this arrangement, the holder of the feast is looking to gain prestige, which is "the ability to influence group decisions or actions" that derives from relationships that are created and reinforced through "personal interaction" (92). It is this form of the feast that the corn-shucking ceremony embodies, especially because the hosts of entrepreneurial feast often used the "institution of the work-party feast" to gain political and economic power as well as increased social status (93). Dietler defines the work-party as a "labor mobilization device" wherein "a group of people are called together to work on a specific project for a day and then are treated to a meal and / or drink, after which the host owns the proceeds of the day's labor" (93). He further characterizes work parties as either "exchange" or "festive" types; in the former, the reward at the end is small as is the group working, but there is a strong obligation to reciprocate the work-party at another location with one of the worker acting as host. The latter, or "festive" type of work-party involves larger groups of people at work and the "obligation to provide reciprocal labor services is minimal or non-existent," while the "quantities of food and drink required are much greater" (94). Work-party feasts function as an "opportunity to make public statements about [the] prestige" of the host and as a "mechanism" to further social inequalities" (94). Abrahams' description of the corn-shucking ceremony was a work-party feast, and thus it negotiated power relations and portrayed an ideal model of such interactions; the planter would assemble neighboring planters and their slaves to join him on his plantation to shuck his corn. Afterwards, Abrahams points out, they were rewarded with large amounts of food and alcohol. It is important to note, however, that the shucked corn belonged to the planter not the slaves –despite the work that they put in to harvest and husk it. Further, the planters used the corn-shucking ceremony to display their patriarchal benevolence to the slaves present as well as fellow planters who attended. The reciprocal nature of an entrepreneurial feast comes in at the level of the planters, namely in that one wealthy plantation owner would invite other members of the planter class with the expectation that he would be subsequently invited over to his neighbor's corn-shucking ceremony.

Patron-Role Feasts

The category of the patron-role feast also involves the negotiation of social capital. In this model, "the formalized use of commensal hospitality" works to "symbolically reiterate and legitimize institutionalized relations of unequal social power" (Dietler, 1996: 97). The driving principle behind a patron-role feast is "the relationship of reciprocal obligation engendered through hospitality" (97). However, there is no expectation of equal reciprocation from the feast's guests. Instead, there is an acceptance of "a continually unequal pattern of hospitality" which is symbolically expressed through the motions of the feast; this acceptance "naturalizes the formalization through repetition of an event that induces sentiments of social debt" (97).

Enrique Rodrígez-Alegría, in "Eating Like an Indian: Negotiating Social Relations in the Spanish Colonies," presents a patron-role feasting relationship. He himself argues that feasting practices act as "cultural means for negotiating power" and specifically looks at eating and feasting practices in sixteenth and seventeenth century Mexico and the Andes and the way that the Spanish colonizers negotiated social capitol through food and alcohol (2005: 565). In his opinion, feasts were an "ideal way to make relationships of power and domination appear amicable and mutually beneficial" in a colonial setting (556). In such situations, power is "in flux" and thus, personal political power is best achieved through "charisma, informal leadership, and the right kinds of social relations" (557). Rodrígez-Alegría states that food and material objects related to food are "used in behaviors in which social relationships are negotiated and power is transformed" (551). He continues that "food production, preparation, and consumption" are all "imbued with symbolism and social meanings," and are crucial aspects of culture and society (552). Further, he argues that food is an important form of material culture because it gets ingested and the "biological need for sustenance and nutrition" is then connected to "culturally mediated social relations that make production, exchange, and consumption of food possible" (552). Rodrígez-Alegría's arguments fit into the patron-role feast category most when he argues that instead of viewing ceramics and other food-related artifacts and material culture as ethnic markers or evidence of wealth, archaeologists should view them as objects that worked to "naturalize relationships of domination" (Jamieson, 2000: 161-162, in Rodrígez-Alegría).

Diacritical Feasts

The third form of feast is the diacritical feasts, which Dietler defines as a feast that "involves the use of differentiated cuisines and styles of consumption" which function symbolically to "naturalize and reify concepts of ranked differences in social status" (1996: 98; Van der Veen, 2003). Louise Steel describes diacritical feasts in her article, "A Goodly Feast...A Cup of Mellow Wine" as "symbols of exclusive membership" which are usually "characterized by distinctive cuisine...and elaborate dining sets;" additionally, these feasts often "make reference to specialized knowledge of external, exotic social practices as means of demonstrating their exclusivity" (2004: 284). Further, the "symbolic force" of this type of feast comes from the "manipulation of an exclusive style that is closely guarded by the elite, through their privileged access to limited supplies of exotica" (284). Steel emphasizes that there is a "degree of fluidity in the choice of symbolic, ideological referents used by the elite" though, and that diacritical feasts are not strictly of one variety (284). Diacritical feasts, she argues, create a "distinctive package of practices that are readily identifiable in the archaeological record;" this 'package' usually includes "the debris of food and drink together with specialized apparatus for their service and consumption, patterns of differential disposal of faunal remains, and possibly the identification of specialized locations for the activities" (284).

What exactly would a feast look like at the frontier locations that are the heart of this research? Come look inside the tavern on Smuttynose Island, in 1648, once it was well established. A merchant sits in the corner, two stoneware tankards of ale sitting on the table in front of him. A fisherman trudges in, catches the man's eye and heads over. He sits, drawing the ale toward him; when he has drunk deeply, the merchant speaks. Feasting emphasizes, reinforces, and naturalizes differences in social status. The ale on the table is soon followed by a bowl of stew, also bought at the merchant's expense. Through this gift of food and drink, he reinforces his superior status over the fisherman. Between mouthfuls, the fisherman discusses the deal he can arrange with the merchant, making reference to the wealthier man's influential status. In accepting the food and drink, and in what he says, the fisherman has thus acknowledged the merchant's superior status. However, unlike a patron-role feast or a diacritical feast, this entrepreneurial feast has no focus on reciprocity or changing one's social status. This meeting is beneficial for both parties involved, though, because it solidifies their relationship and secures similar such arrangements in the future. The deal finalized, the fisherman pushes back from the table and ambles out of the door. The merchant sits back, drinking the ale. The money spent on the food and drink, the medium through which he secured his deal, was well-worth it.

Chapter IV. "Fishermen, Sailors, Smugglers, and Picaroons:" The Isles of Shoals Fishing Station

Introduction

Although it has been boldly claimed that “there is no industry in America that antedates the fisheries” (McFarland, 1911: i), investigations into the history of such a purportedly ancient industry have been largely limited to historical, and not archaeological, projects. Raymond McFarland, for example, wrote an exhaustive account entitled *A History of the New England Fisheries*, in 1911. The book sets out to demonstrate the “development and importance of the New England fisheries from pre-colonial days to the present” (McFarland, 1911: i). The volume aids in contextualizing Smuttynose and the Isles of Shoals, as well as Pemaquid, in terms of the regional political economy. Additionally, Harold Innis’s *The Cod Fisheries,* published in 1940, focuses on the structures of fishing villages, especially those in New England, and he details the historical processes that affected their founding; again, he takes a more historical approach to the issue of cod fishing and fisheries. More recently, Mark Kurlansky published *Cod: A Biography of the Fish that Changed the World* in 1997. He provides a grim picture of the ailing cod, and the industries that are failing because of it, from the vantage point of what he sees as “the wrong end of a 1,000-year fishing spree;” he reviews the history of cod fishing in North America from the first major discovery of the Grand Banks’ resources by the Basques to the present, and concludes with provocative, if disheartening, speculations about the fate of the species and the industries attached to it. (Kurlanksy, 1997: 14). Kurlansky’s book proves to be especially useful to situating the three case studies at the heart of this paper; he discusses the significance to fishing, specifically cod fishing, to New England and the way that fishing rights shaped legal policy during the region’s earliest days as colonies and their lasting legacies today. He also speaks of the rise of industrial centers in New England as a product of the cod fishing industry and continues that these powerful cities, like Boston, used both cod and the wealth gained from the resource to partake in larger-scale Atlantic trade, including the Triangle Trade. Kurlansky describes a certain product of the fishing industries, the West India cod, which was a low-quality dried and salted codfish sent to the plantations in the British West Indies, including Jamaica. After the American Revolution, the British stripped New England of its ability to trade with the British West Indies. As a result of this, among other factors, during the period from 1780 to 1787, 15,000 enslaved Africans died of hunger in Jamaica (Kurlansky, 1997). Thus Kurlansky shows the trade networks that connected fishing villages, like Pemaquid and the Isles of Shoals, with the Caribbean, specifically Jamaica, where Port Royal is located. Most recently, Peter Pope published *Fish Into Wine: The Newfoundland Plantation in the Seventeenth Century* (2004), which thoroughly describes the geographic, social, and economic place that the fishing plantations on the Grand Banks held in the seventeenth century in a way no other work has done. Like Kurlansky, Pope discusses the initial plumbing of the Grand Banks for fish in the sixteenth century and then describes the processes at work, which transformed the settlements in Newfoundland from migratory fishing camps into permanent locations. The fishing communities described in Pope's book provide a striking contrast to the one found on Smuttynose Island.

Smuttynose Island is one of nine rocky islands ten miles off of the coast of the present day Maine/New Hampshire border; taken collectively, these islands, which are just shy of 200 acres of above-surface and, are referred to as the Isles of Shoals. Situated within the Gulf of Maine, whose "cold, nutrient rich...waters are famous for herring, halibut, cod, whales, and lobster," the Isles teemed with a wide array of marine resources, especially in the seventeenth and eighteenth century (Robinson, 2012: 13; Jenness, 1874, Hamilton 2009, Drake 1875). The

Shoals' location was crucial to their eventual success as a highly profitable fishing community.

The Gulf of Maine stretches for 36,000 square miles (93,242 square kilometers) and is often referred to as a "sea within a sea;" this semi-enclosed body of water boasts a large variety of fish, sea life, and birds - roughly 3,300 different species are dependent on the Gulf. This dynamic ecosystem exists largely because of the forceful tides that mingle freshwater currents, which flow in from roughly 60 rivers with those that roil in from the larger Atlantic Ocean, all passing over a mottled terrain of shallow shoals and deep, glacier-carved basins. Further, the tides within the Gulf, especially at the Bay of Fundy, are some of the "most dramatic in North America" (Robinson, 2012: 13, Gulf of Maine Council on the Marine Environment). Close to the Isles is the mouth of the Piscataqua River, a relatively short river with an incredibly strong current. The Piscataqua was a highly navigable river, especially in the seventeenth and eighteenth centuries, due to its fast current and deep bed; because of this, historian Dr. Russel Lawson argues that "where river ends and sea begins is indistinct" (Lawson, 2007a: 13; Robinson, 2012). The fishing community on the Isles of Shoals lay only ten miles from the mouth of this great River and also roughly the same distance from the British settlement of Strawberry Banke, now present day Portsmouth. This was also critical to the Shoals because the Portsmouth, established in 1630, was "an important shipbuilding site and a world trade center in the colonial era" (Robinson, 2012: 15; Lawson, 2007a).

The Isles of Shoals' favorable location was also a source of contention and debate. The *Petition for a Charter of New England by the Northern Company of Adventurers of 1619*, and the subsequent *Charter of New England of 1620* issued by King James I, established a new colony in North America, north of the 40th parallel and extending to the 45th parallel, giving rights of settlement to the Plymouth Council, a joint stock company. (Petition for a Charter of New

England, 1620). Two years later, on August 10th, two English investors, Sir Ferdinando Gorges and Captain John Mason received a land patent for the colony that was to become Maine. The Plymouth Council issued the *Grant of the Province of Maine to Sir Ferdinando Gorges and John Mason*, which granted these two men "all that part or portion of that country now commonly called New England...lying and being between the latitude of forty and forty-eight degrees northerly latitude." (Grant of Province of Maine, 1622; Robinson, 2012; Lawson, 2007a; Lawson, 2007b). This extended the original land grant from the 45th to the 48th parallel. Most pertinently for the Isles of Shoals, the land patent also extended to "the seas and islands lying within one hundred miles of any part of the said coasts of the country aforesaid" as well as "all the lands, soil, grounds, havens, ports, rivers...pearls...fishings [sic], hunting [and] commodities" (Grant Province of Maine, 1622). In 1629, the two men split the territory and all of the rights mentioned above. Gorges retained the northern part from the Piscataqua River to the Kennebec, which he called Maine, while Mason renamed the southern portion, from the Merrimack River to the Piscataqua New Hampshire (Robinson, 2012: 16; Grant of the Province of Maine, 1639; Lawson, 2007a). In 1639, the *Grant of the Province of Maine* more firmly established Gorges' power in Maine, defining its boundaries as mentioned above. It also encompassed the "land from Piscataqua Harbor through Newichawannock River and also the north half of the Isles of Shoals together" (Grant of the Province of Maine, 1639). Similarly, the *Grant of the Province of New Hampshire to Mr. Mason* in 1635 states that Captain Mason's land grant, now called New Hampshire, stretches from the "Piscataqua through the Newichawannock River to the land northwest...and also all of the south half of the Isles of Shoals" (Grant of the Province of New Hampshire, 1635).

Captain John Mason had been no stranger to the economic power of fishing, having been the Proprietary Governer of Culper's Cove colony in Newfoundland from 1615 to 1621 (CITE SOURCE). He subsequently produced the first known English map of Newfoundland, which was published 1625. Five years earlier, as his governorship was coming to an end, he produced a tract entitled *A Brief Discourse of the New-Found-Land*. In it, Mason extols the virtues of Newfoundland's marine resources, especially fish. He writes that the area was "so diversified with several sorts of fishes abounding therein" that it he was hardly able "to comprehend or express the riches thereof." In trying to quantify the richness of the marine resources, he writes that "could one acre thereof be enclosed with creatures therein in the months of June, July, and August, it would exceed one thousand acres of the best Pasture with stock thereon which we have in England." As both a businessman and a seaman, Mason was also noted the economic aspects of such a rich marine harvest. He writes that Newfoundland witnessed a "great intercourse of trade" due to "fish being a staple commodity...and so sellable in other countries." The tract also enumerates the large amount of men who are employed in the fishing industry in the colony, and Mason argues that the fishermen would not be able "to gain half so much by another labor." He also observes that the fishing trade brings in business from French and Spanish, which amount to at least "ten thousand pounds yearly." He even comments on the colder climate of Newfoundland and the favorable effects that it has on the fishing trade (Mason, 1620). Given his familiarity with how lucrative the fishing industry could be, Mason's interest in the Isles of Shoals came from the fact that he saw it as "a potential gold mine for fishing," just as Newfoundland had been (Robinson, 2012: 48). The fact that the Isles of Shoals were mentioned by name in both land grants, while other islands along the coastline of both Maine and New Hampshire were subsumed into the general phrase "seas and islands," speaks to their importance - already established by the first quarter of the seventeenth century. The border between the present-day states of Maine and New Hampshire still causes conflict in the courts as fishing and harvesting rights at the Shoals differ, depending on the side of the border chosen for resource extraction.

The Station's European Discovery, Founding and Early Years

The fishing station at the Isles of Shoals is one of the oldest in New England (Jenness, 1875, Harrington, 1992, Levett, 1628, Drake 1875, Robinson, 2012; Lawson, 2007b). While Samuel de Champlain mentions notes the Isles of Shoals in his *Les Voyages de Samuel de Champlain au Canada, de 1603 á 1618* account of his exploration of North America (and New England), the earliest in-depth exploration of the Isles comes from Captain John Smith, of Jamestown fame. Published in 1616, Smith's *A Description of New England* describes his 1614 visit to the Isles as a shocking study in contrast. This was further supported by his 1631 *Advertisements for the Unexperienced Planters of New England*. The island themselves, he describes as "barren rocks, the most overgrown with such shrubs and sharp whins you can hardly pass them;" elsewhere, he refers to them as "a sore plaine spectacle of desolation" (Smith, 1631: 39; Bryant, 1881; Pecquet du Bellet, et al., 1907; Lawson, 2007a; Lawson, 2007b, Robinson, 2012). The waters around the Shoals, however, he calls "the strangest fishpond I ever saw" and that "those barren Isles so furnished with good...springs...fish, and fowl" (Smith, 1616: 36). Smith was so taken with the richness of the marine resources around the Isles of Shoals that he named them Smith's Isles, after himself. As the above-cited *Advertisements* suggests, Smith stressed the merits of the Isles of Shoals and encouraged the establishment of a "colony devoted to fishing," throughout the 1620s, even after gaining title to the Isles from the Council of New England in 1620 (Smith, 1631; Lawson, 2007b: 21; Robinson, 2012).

By 1622, however, when Phineas Pratt settled at Wessagusset in the Massachusetts Bay Colony, he noted that "Smith's Islands, first so called by Captain Smith" were "afterwards called Islands of Sholes" (Pratt, 1662). By the time the English Captain Christopher Levett visited the Isles in 1623, he noted that there was enough fish to support six ships, each with at least fifty men onboard (Levett, 1628; Lawson, 2007b; Robinson, 2012). In his 1630 *Journal*, John Winthrop describes five to six fishing shallops at busily at work at the Shoals. Given all of this, the historian John Scribner Jenness in his *The Isles of Shoals* (1875) concludes that “even before the first settlement of the mainland,” the Isles were “already the scene of a busier activity than any other spot” in New England, north of Plymouth, Massachusetts” (Jenness, 1875: 51). As such, while it is unknown when Europeans first starting fishing around the Isles of Shoals, by the 1620s, the Isles were busy with fishing activity. By the 1640s, the Shoalers, as the fishermen at the Isles referred to themselves, had set up permanent settlements on Hog Island (now called Appledore), Smuttynose Island, and Star Island (Jenness, 1875; Lawson, 2007b; Robinson, 2012). By 1660, the Shoals were considered "one of the best places for fishing in the land" (Maverick, 1660). Robinson observes the following:

> Commercial fishermen are hunters. They go where the fish are most plentiful, catch what their ships can carry, and transport their perishable consumable goods to market. If a fishing site is profitable, they return. If not, they move on, leaving little or no record of their travels (Robinson, 2012: 49).

The fishing was indeed profitable at the Isles of Shoals, for the fishermen and their investors, as well as the community of individuals that serve a fishing community, from boat owners and carpenters to tavern keepers and merchants. For a profession that was always prepared to "follow the money," a successful fishing area - one which could be visited regularly or inhabited permanently - could be as profitable as gold" (Robinson, 2012: 49). And at the Isles of Shoals, the mother lode surrounded them in the deepwater basins and on the shallow underwater steppes. At its height, from roughly 1710 to 1750, the Isles of Shoals and its resources could host a population of roughly 600 individuals (Harrington, 1992, Hamilton, 2009; Robinson, 2012; Lawson 2007b; Pecquet du Bellet, et al., 1907).

Cod is King - The Shoals' Hey-Day

One particular marine resource drew seventeenth century fishermen (and later their eighteenth-century counterparts) in particular: cod, the "perfect food" (Robinson, 2012: 49). Cod is a thick, mild-tasting fish, which is protein rich. Most significantly, cod lent itself well to splitting, salting, and drying. The cod at the Isles of Shoals were generally much larger than those caught at other contemporary Atlantic fishing centers and would have dwarfed those caught today. The largest of these historic codfish, *gadus morhua*, that weighed up to 200 lbs; by comparison, contemporary commercially-harvested cod average between 6 and 10 pounds, although even these have been fished to virtual extinction along the Grand Banks of Newfoundland and Labrador. This overfishing has taken place in the Gulf of Maine as well, and is only recently starting to reverse (Fisheries and Oceans Canada, 2006; Jenness, 1874, Hamilton 2009, Drake 1875; Kurlansky, 1997). In the seventeenth and eighteenth centuries, though, the cod in the waters around the Isles of Shoals were so "incredibly abundant" that fishermen using only handlines and baited hooks, instead of nets, could pull up 200 to 300 fish per man on a successful fishing trip, which sometimes took as little as a day (Lawson, 2007b: 37; Robinson, 2012). The Shoalers generally fished out of shallops, which are small, broad, open boats usually propelled with oars. Roughly six men could fit onto each boat. Men also fished out of schooners and small dories close to large sailing vessels (Lawson, 2007b; Robinson, 2012).

The Shoalers practiced dry fishing instead of wet fishing; the latter requires the fishermen to pack their catch on salt almost immediately after it, which was something that had to be done on the boat, along with the gutting of the fish. The dry and windswept climate of the Gulf of Maine's aided greatly in the dry fishing process. Little curing or processing needed to be done on the boats. However, once the fishermen brought their catch to shore, "an extensive operation on land" took place to thoroughly prepare the fish (Lawson, 2007b: 39). This curing process was referred to as *dunning* which made the fish thinner, allowing more to fit into a standard hogshead, yet used relatively little salt. This process, an invention of the fishermen at the Shoals, was possible largely because of the specific environment of the Isles of Shoals. The Isles offered the perfect natural site for drying fish" because "the cool wind blows constantly" which allows those processing the fish to "continually turn the drying fish on open racks and on wooden racks" (Robinson, 2012: 58). Further, the "shallow accessible areas at the Shoals" combined with the plentiful sun and the powerful tides "allowed fishermen to manufacture their own salt on location" (Robinson, 2012: 58). The environment of the Isles of Shoals also allowed the fishermen to harvest not only in the summer, as was done in Newfoundland, but in the winter as well. With the addition of a winter fishing season, "people began to overwinter on island sin the Gulf of Maine" to take advantage of the "cold-water fishing grounds" (Fagan, 2006: xvi).

The dunning process began when the Shoalers arrived back at the Isles. Wooden stages stood in the water, and it was upon these that the fishing crew tossed their catch. The drying process had specific tasks, each of which was performed by a specific individual, who all collectively were referred to as *dressers*. A man referred to as either a *cutter* or a *throater* would open the belly of each fish and slit its throat before handing it to the next man. The *header* would take the cut fish and break off the heads, hence their name, and then remove the inner organs, including the prized liver, which was used for fish oil, and any roe found in the fish. Thus prepared, the header would pass the fish to the *splitter*, who would remove the backbone of the fish, before splitting the body down the middle and spreading it open. Finally, the *salter* would salt each split fish and stack them. The fish would lie for as long as twenty hours. After this period of time, an assortment of inhabitants would wash the excess salt from the individual fish filets and then lay them out on drying racks called flakes. These flakes were usually made of salvaged wood and stood a couple feet above the ground. (Robinson, 2012; Lawson, 2007b). The salted and split fish filets stayed on the flakes for weeks, frequently being turned or gathered and spread out again, allowing the fish to dry in a different position. Once the fish were fully prepared they were kept in tilts, which were storage sheds erected solely to hold the cured fish. (Robinson, 2012; Lawson, 2007b; Thaxter, 1873). All in all, dunning required less salt than other saltfish but more drying time. The product of the dunning process was referred to as *dunfish* or *dumbfish*. The resulting fish filet was a tawny brown and often cut into nearly transparent strips. The lower salt content gave the fish a mellow, flavorful taste when it was cooked. This was done by hammering and then soaking and boiling the fish in water or milk to remove the salt and revive the fish's original flavor. Other saltfish still retained quite a salty flavor, while dunfish tasted almost fresh, a delicacy usually limited only to coastal inhabitants (Robinson 2012; Lawson, 2007; Fagan, 2006). Thus well-preserved, the fish were durable even in the warm climates to which they were shipped, such as Spain, Portugal, and the Caribbean (Robinson, 2012; Lawson, 2007b; Hamilton, 2009, Jenness, 1875).

The result of the dunning process was a highly profitable local economy. Furthermore, the market price for cod from the Shoals was three or four times that for those processed at other major fishing centers in the New World. Period commercial records and historical accounts show that during a time when cod was considered a highly valuable commodity, the ‘world’s price’ for this fish was gauged against those caught off of the Isles of Shoals. As such, merchants who received codfish in Europe and the Caribbean used Isles of Shoals cod as a *‘gold standard’* (Hamilton, 2009; Hamilton, 2011, Rutledge, 1997). The dunfish was "considered by connoisseurs in fish, the best in the world" (Massachusetts Historical Society, 1846: 249; Lawson, 2007b). As such, the combination of "careful processing, quality fish, and high demand meant that sellers of Shoals dried cod could name their price in the European market" (Robinson, 2012: 60; Hamilton, 2009; Hamilton, 2011). Dunfish was not the only product that the Shoalers produced from cod. They also sold fish oil, pickled tongues, and roe.

In addition to curing and trading in codfish, the location of the Shoals also served as an "important staging port," lively traveler's rest, and point of trade for ships coming to and from Europe - especially England. At the Shoals, large ships could unload their cargoes or take on supplies for the journey ahead. Along with dunfish, oil, roe, and other cod products, the Shoalers also sold and traded in other types of fish like mackerel and hake, as well as goods like pipes, tobacco, wine, rum, and sugar were imported from Europe and its New World colonies and subsequently distributed to mainland New England, the Maritime Provinces of British Canada, and the Caribbean (Jenness, 1875; Hamilton, 2009; Lawson, 2007b; Robinson, 2012). News was also passed through the Shoals on its way to North America or to Europe. The weather interfered with the Shoals ability to act as an informational "way station" from time to time; Sir Ferdinano Gorges once blamed the wind and weather around the Shoals for the lack of news from England to Maine. As an example of the crucial role that the Isles of Shoals played in communication, in 1649, it was a vessel launched from the Isles of Shoals which brought the announcement to the inhabitants on the mainland that Charles I had been executed. (Pecquet du Bellet, et al., 1907: 208). In short, the Isles of Shoals were "an exit point to make sail for England and an entry point for news from abroad" (Lawson, 2007b: 27) Even prisoners headed for Europe often arrived at the Shoals before finishing their journey east (Jenness, 1875; Lawson, 2007b). This position at the center of the fishing industry and other trade networks gave the community on the Isles of Shoals a considerable amount of economic leverage in the Atlantic world trade.

The Shoalers

The Shoalers, especially those whose names are most remembered today, came largely from West Country England, from cities such as Bristol, Devon, Cornwall, Dorset and Somerset (Robinson, 2012; Lawson, 2007b; Pecquet du Bellet, et al., 1907; Hamilton, 2009). The three famous Shoalers, brothers John, Richard, and William Seeley, came from Stoke-In-Teignhead, which is in the District of Devon. The Seeleys arrived on the Isles of Shoals around 1640 and all three became incredibly successful as "political and economic leaders at Smuttynose Island" (Lawson, 2007b: 27; Robinson, 2012; Baxter 1908) ; Richard was even designated as "one of the commissioners for settling controversies" on the Isles of Shoals, as well as being one of the "fishing masters" on Smuttynose Island (Baxter, 1908: 184; New England Historical Genealogical Society, 1877).

Another well-known Shoaler from the West Country was William Pepperell , who was born in Tavistock, also in Devon. He arrived at the Isles of Shoals in 1676, where he soon became a successful fishermen and "used the humble Shoals as a steppingstone to enormous wealth and status on the mainland" (Robinson, 2012: 67; Stark, 1907). Pepperell was another fishing master, who bought several boats - along with fishing equipment - which he leased to individual fishermen at the Shoals (Robinson, 2012; Stark, 1907). When Pepperell died in 1734, he left his son, also named William to continue the "business of fishing" and who, as a result "amassed great wealth and arrived at great honors" (Robinson, 2012; Stark, 1907: 205). Thanks to the Isles of Shoals, the Pepperells progressed from the lot of a "destitute young fisherman to the princely affluence and exalted station, civil, political, and military" (Stark, 1907: 205). Historian James Henry Stark attributes the Pepperell's success in amassing "the largest fortune then known in New England" to "the character of the early settlers" as well as to "the nature of their occupations, their commerce...and [the] relative importance of places of trade and the influence" associated with the Isles of Shoals (Stark, 1907: 205). While "the principal business of the Pepperells was done in the fisheries," such as owning and leasing fishing boats, they also sent "lumber, fish oil, and livestock" to the Caribbean, in exchange for "cargoes of rum, sugar, and molasses" and to "European markets" in excahnge for "dry goods, wine, and salt" (Baxter, 1907: 205). The Pepperells also engaged in trade domestically, sending fish and fish products to "the Southern colonies" in exchange for "corn, tobacco, and naval stores" (Baxter, 1907: 206).

Two prominent families came to the Shoals from elsewhere in the British Isles. The Cutt brothers, John, Richard, and Robert came from Wales, while the Kelly brothers, John, Roger, and William, came from western Ireland. The Cutt brothers, arriving in the 1640s, became fishermen, as well as merchants, shipbuilders, and eventually landowners; all three "enjoy[ed] economic success at the Shoals." Richard Cutt, in particular, is famous among the Shoals for "coming t own most, if not all, of Star Island" (Lawson, 2007b: 27). The Kellys came to the Isles of Shoals in 1653 and soon became "leaders of fishing and trade at Smuttynose," having "made a considerable figure in the early records of the Shoals" (Lawson, 2007b: 27; Robinson, 2012; O'Brien, 1937: 129-131). In writing of Roger Kelly, the historian Michael J. O'Brien remarks that he was referred to as "the ancient mariner and taverner" (O'Brien, 1937: 129). The most notable aspect of the Kellys, and of Roger in particular, is their reputation for ignoring rules for the Shoals written in Boston. He was brought to court numerous times. In 1664, he was tried for "imperiously and illegally withholding and improving and imploying without order his catch [a type of boat] called the Hope." This action caused Kelly to spend fifteen weeks in prison in Boston. In fact, O'Brien writes that "there are forty separate papers in the Court files in connection" with Roger Kelly (O'Brien, 1937: 129; New Hampshire Probate Records, 1635-1753). The New Hampshire Probate Records note that "on the turbulent Shoals, he and his wife, Mary, led a turbulent life, constantly in the courts" (New Hampshire Probate Records, 1635-1753). While Roger Kelly was most often in Court for "his civil actions with his crew and customers [which are] too frequent to detail," his wife was also in court, for swearing and for abusive language (Lawson, 2007b; New Hampshire Probate Records, 1635-1753). Roger Kelly did more than use his boat illegally; he was brought to Court in 1667 for selling wine and liquor without a license (O'Brien, 1937; New Hampshire Probate Records, 1635-1753; Linehan, 1905). Despite this, Kelly ran a tavern at the Shoals until 1693 (New Hampshire Probate Records, 1635-1753; Linehan, 1905). His association with the tavern and his willingness to ignore the rules of the mainland while running his fishing operations may be why Roger Kelly soon came to be the "representative of the Isles at Massachusetts General Court;" he was even referred to as "Captain of the Isles" and "King of the Isles" due to the "prominent position, which he held among the islanders" (O'Brien, 1907, 130). John C. Linehan obverseve that "the great man of the town , as a rule, was the tavern keeper and Roger was not an exception" (Linehan, 1905: 33).

Expanding the focus from the individuals on the Isles to the Shoalers as a whole, the community on the Isles of Shoals was a loosely-managed operation of ‘fishing masters’ who worked together to build *individual* capital. Successful fishermen could become quite wealthy. The Shoalers "worked at common tasks of joint occupation, pursuing the singular goal of gaining their sustenance from the sea" and, as a result, "residing in a close-knit community" where "personal and public lives merged" (Lawson, 2007b: 42). These fishermen lived in privately held and rather solitary transient structures along the Isles, first as bachelors, and then later in more substantial structures with wives and families (Harrington, 1992, Hamilton 2009, Jenness, 1875; Robinson, 2012; Lawson, 2007b). This emphasis on fishing masters was in contrast with other contemporary fishing stations, such as Pemaquid or Richmond's Island in Maine, or Cape Elizabeth on Newfoundland's English Shore (Camp, 1975: ix; Harrington, 1992; Pope, 2004). The men at these fishing stations worked on what was referred to as a fishing plantation, which was literally a 'planting' of people. Fishing plantations were the "waterfront premises from which the fishery was conducted" (Pope, 2004: 1). Seventeenth and eighteenth century plantation fishermen labored under an agent, who regulated almost every aspect of daily life; this agent usually acted in place of the establishment's planter, or landlord, who was often a wealthy European and frequently absent from the plantation itself. The planter owned the land and the boats, while the agent oversaw the quotidian activities involved in running the plantation and drawing in enough fish to turn a profit. The owner of a fishing plantation, especially a large one, “counted as an economic personality.” due to their social status and economic class (Pope, 2004: 1). The fishermen at these mainland stations were at constant risk of losing their jobs, because the proprietor could close the plantations at any time due to financial difficulties or mere boredom (Harrington, 1992, Hamilton, 2009). Operations like those at Pemaquid also resulted in a different type of social organization and settlement pattern with men living in a communal settlement structure. A single, large “Great House” acted as the center of domestic activity for the fishermen at the stations. The Great House was both a place where all the inhabitants lived together communally, and also served as a building in which all manner of work could be carried out while being protected from the elements.

Another distinction between fishing plantations like those in Newfoundland or Pemaquid and the Isles of Shoals is the fact that the mainland fisheries were organized and funded so as to be entrepreneurial enterprises. In the beginning of the seventeenth century, the term plantation was synonymous with colony and planters were planting people in the location as much as they were tending to the bringing in of fish (Pope, 2004). Within a broader framework of Atlantic World trade systems, these fishing plantations were part of a triangle trade, which was comprised of “two steady streams” of economic flow “and one trickle” (Pope, 2004:91). This is because the cod fisheries supplied the Mediterranean with dried cod; these European centers in turn exported both fruit and wine to more northern ports in owned by the English and the Dutch. From there, these ports then sent ships back to the fishing plantations, but these were never nearly as heavily loaded with goods and those that were on board were not very valuable. This is why Pope refers to the unequal flow of goods within this triangle of trade spanning the Atlantic (Pope, 2004).

As a collection of independent fishermen, the men on the Isles of Shoals were structurally distanced somewhat from this triangle just as they were geographically distanced from the larger fishing plantations of St. John’s in Newfoundland or Pemaquid, Maine and from the larger port cities such as Portsmouth, New Hampshire. The Shoalers were "living on the verge of society and the endless ocean," which created "a subtle sense of equality" in spite of the fact that the wealthier fishermen might "put on a few airs;" due to the conditions on the Shoals and the nature of the fishing business, overall dress was the same for the biggest as well as the smallest man" (Lawson, 2007b: 43). No matter what an individual's particular economic state was, for the

Shoalers "fish was their food, the topic of conversation, the basis for memory, [and] the hope for the future" (Lawson, 2007b: 43). Although the "core of existence" for the inhabitants of the Shoals was their fishery, the Shoalers were not ‘planted’ colonists funded by a European merchant. To the inhabitants at the Isles of Shoals, "fish was their money [and] the means of exchange. Debts and salaries were paid in fish" (Lawson, 2007b: 43) Not only did the Shoalers support themselves and the local microeconomy of the Isles with fish, but they also produced enough fish of a fine enough quality to be able to easily compete the mainland fishing plantations of the Gulf of Maine and the Grand Banks.

Illicit Trade at the Isles of Shoals

As noted in the above, the Isles of Shoals was a frontier location inhabited by, and attractive to, a “motley, shifting community of fishermen…sailors, smugglers, and picaroons who made the Isles of Shoals their rendezvous and their home” (Jenness, 1875:123; Lawson, 2007b; Linehan, 1905). The population as a whole had a reputation "swearing, hard-drinking, violent sons and daughters of Adam and Eve, who knew how to sin and did their very best to illustrate this peculiar talent in diverse ways" (Lawson, 2007b: 33). During the seventeenth and eighteenth centuries, the inhabitants of the Shoals had a very different relationship with the authorities of the colonial mainland than did the fishermen at mainland fishing plantations. Commenting on the Isles of Shoals, contemporary historians as well as later authorities, such as John Scribner Jenness and Samuel Adams Drake (1827 – 1879), recount that most complaints against the ‘Shoalers’ were for resisting and disrespecting officers of the law; they were frequently accused of going so far as to physically assault them. (Jenness, 1875:119, Drake, 1875). Moreover, the authorities of the time reported in frustration that the Shoalers seemed to be under no governmental restrictions at all, due to their “utter indifference” to the legal authority of the colonial mainland (Jenness, 1875: 124). Unlike the Shoalers, the inhabitants at mainland stations like Pemaquid frequently cooperated with local officials to settle continuous land disputes over the prosperous fishing waters and later, to protect them from violent raids. The contrast is striking given the fact that both communities subsisted off of cod fishing in the Gulf of Maine. That the Shoalers earned a reputation for being ill-behaved is especially notable given the fact that most fishermen at fishing stations were viewed as a “looser sort of people and ill-governed men” (Pope, 2004: 3); the men at the Isles of Shoals, then, were regarded as lawless among a crowd already known for its inherent coarseness and rowdiness. In fact, these fishermen were as “unconcerned with ideology or national borders as the fish they caught” (Smith, 2006: 27). This lack of identification with either side of the Atlantic manifested itself in the form of constant indifference, dislike, and “open defiance” towards all established authority, which would blossom at times to more vehement displays; at times, the fishermen would even “escape into the open sea” to “elude” officers of the law (Jenness, 1875: 119-123). Jenness supports this proposition by explaining that the Shoals were “too remote from the mainland to be within effective reach of the feeble governments established there” (Jenness, 1875: 123). Their “remoteness” led to a substantial inability to maintain order there (Jenness, 1875: 119). He reports that they “would naturally despise all courts” and their representatives and were more content to turn to their “own sturdy right arms alone for the redress of grievances.” To this end, Jenness reports one fisherman who was tried for assault and battery against an officer of the court; the man freely admitted that he had beaten up the officer (Jenness, 1875: 123; Lawson, 2007b; Linehan, 1905).

Furthermore, the Shoalers were associated with other lawless conduct, including drunkenness, illicit trade and piracy. The fishermen at the Shoals "knew hard drink befitting ahrd work in dangerous conditions" (Lawson, 2007b: 27). The often violent confrontations that the Shoalers had "was exacerbated by the prevalence of rum and wine, of which the Shoalers drank in abundance" (Lawson, 2007b: 28). Even "the few more moderate fishermen drank," although they preferred a concoction called *bounce*, which was made from spruce beer and wine, over straight liquor (Lawson, 2007b: 28). This "appetite for liquids" may have fueled the Shoalers' "contempt for the minions of the law" (Linehan, 1905: 33).

As for illicit trade, John Scribner Jenness reports that, in addition to attesting that smugglers and picaroons lived on the Isles, the “barren rocks were the resort of the Letter of Marque [the privateer] and the pirate” (1875: 170) and that “the islanders were generally indulgent, and sometimes friendly and serviceable in their intercourse with the numerous pirate ships which visited their harbor” (Jenness, 1875: 122). Jenness’s book is not the only source detailing the presence of pirates at the Isles of Shoals. Clifford Beal in *Quelch’s Gold* writes that the pirate ship the *Larrimore Galley*, captained by Thomas Larrimore, headed to the Isles of Shoals to gain men and provisions. He adds that “this was not a surprising destination” because “since the early seventeenth century the Isles had been a favorite waypoint for people looking to disappear” (Beal, 2007: 134). This is confirmed by several other sources including George Francis Dow’s 1923 *The Pirates of the New England Coast: 1630 – 1730*.

The Last Days of the Isles of Shoals Fishing Station

The Isles of Shoals position ten miles off of the coast protected it from many of the scuffles, uprisings, and land conflicts of the seventeenth and eighteenth centuries, each of which caused the population of mainland fishing plantations such as Pemaquid to decline then resurge again and again. There were at least four major uprisings on the New England mainland during the period when the Isles of Shoals boomed: King William's War, which lasted from 1689 to 1697, Queen Anne's War, which lasted from 1703 to 1713, Lovewell's War (also known as Dummer's War), which lasted from 1722 to 1725 and the Seven Years War (also known as the French & Indian War), which took place from 1754 to 1763. Smaller raids were also quite common at mainland stations; the fact that the Isles of Shoals were free of such raids stands as another reason for their economic success when compared to other fishing stations, and perhaps the disposition of its populace.

The population on the Isles of Shoals greatly decreased during the time of the American Revolution due to a mandatory evacuation by the newly-forming revolutionary American governments in Maine, New Hampshire, and Massachusetts, because they were "unsure of the political allegiance of the Shoalers," many of whom had Tory sympathies (Harrington, 1992: 258; Lawson, 2007b). In fact, it was found that the inhabitants of the Shoals "afforded sustenance and recruits to the enemy, early in the war" (Jenness, 1875: 107).

As a direct result of the "cessation of trade" and "soaring inflation" caused by the Revolutionary War, as well the forced evacuation, the Isles of Shoals never fully recovered financially or in population (Lawson, 2007b: 59). The War left a "growing number of poor" because the "inflation detroyed the lifestyles of...jobs related to fishing and trade" (Lawson, 2007: 59). After the Revolutionary War ended, a mere forty-four inhabitants still lived on the islands, having refused to evacuate. Without a steady income, those that did remain at the Shoals "turned to a degenerate and profligate way of living" (Lawson, 2007b: 60; Jenness, 1875). As before the War, there was "no government, no law and order" but also no fishing or network of trade connections (Lawson, 2007b: 60). By the end of the eighteenth century, the Isles of Shoals were "a faint echo of the bustling, noisy fishing port of a generation earlier" (Lawson, 2007b: 61). In desperation, the remaining Shoalers dismantled the buildings that they could afford to lose, such as their meeting house, and used the structure's timbers for fire wood (Lawson, 2007b). It may be largely because of this that there is little structural evidence left archaeological at the Isles of Shoals.

A final attempt at resuscitating the Shoals was made during the late eighteenth and early nineteenth century by Samuel Haley; for a brief time, Smuttynose Island became a “self-sustaining possession” (Drake, 1875:183, Hamilton, 2009, Jenness, 1875). Samuel Adams Drake points out, however, that this bustling operation at first “succeeded…in peace” but eventually, it all fell “to decay within his [Haley’s] lifetime” (Drake, 1875:183). By the end of the nineteenth century, the population at last completely disappeared, which is how Smuttynose Island and the Isles of Shoals stand today (Jenness, 1875, Harrington, 1992). Pemaquid, after being consistently ravished by war, suffered a long period of abandonment, but today is a thriving small town on the coast of Maine, which still makes part of its living today fishing.

Chapter V. Gold Towns & Ghost Towns: The Mechanics of Mining in the American West

Introduction

Highland City, Montana, a bustling gold town as early as 1866, has fallen from the historical memory of Montana and the larger American West. Despite its reputation for having the finest quality gold in its region, historians have largely forgotten the town of Highland City; as a result, its history, like the buildings itself, has required excavation and uncovering. Through a combination of archival and archaeological digging, the story of Highland City has emerged in myriad small pieces. Drawing on data collected through archaeological excavations, primary source documents, historic maps and other archival documents, and even ethnographic research with the miners' descendants, the history – and the very streets – of Highland City have begun to take shape. This chapter seeks not only to tell Highland City's story as completely as possible, but also situate the boomtown within the larger history of mining, Montana, and the American West.

The Wide West: Situating Montana within the American West

The Western Wilderness

One of the most influential characters in the story of the American West is the natural environment and any history about the region is incomplete without discussing the world of dry plains, naked rock, and deep canyons. While the environment is a key tenet of the frontier theory, as outlined previously, it is also crucial to a regional approach to Western history – a location-based perspective often seen as antithetical to the process-driven study of frontiers. However, as Andrew C. Isenberg argues, "a fully integrative understanding of the nineteenth-century western environment incorporates the perspectives of both process and place" (Isenberg, 2004: 80). A study of frontiers alone is “inherently limited,” because it focuses on “locating the source of environmental change in human agency;” similarly, a focus on a regional model alone creates too much of a narrative of environmental determinism (Isenberg, 2004: 80). As such, to fully understand the history of the American West, and Montana, attention needs to fall on “both the influence of people on the land” and the “influence of the land on its inhabitants” (Isenberg, 2004: 78). Largely, this is due to the fact that “frontier settlement was a series of ecological encounters,” with emigrants to the region changing their landscape only to be changed by it in return. The environment of the American West “was a dynamic partner in the encounter” with emigrants such as miners, ranchers, and farmers, rather than “simply a passive subject of human contemplation and alteration” (Isenberg, 2004: 80). New arrivals to the area “introduced exotic animals and microbes,” while the environment “imposed its constraints” through harsh and varied landscapes, drastic climate changes, and disease (Isenberg, 2004:80; Smith, 1992). It is important to note that while all environments inherently “create opportunities and impose constraints on their inhabitants,” the settlement and development of the American West contained its own unique challenges; in the most arid parts of the region, the “limitations of the environment often overruled its opportunities” (Isenberg, 2004:89). When inhabitants did capitalize on those opportunities, mostly appearing in the form of natural resources such as minerals and timber, they often “exacted significant social and environmental costs,” leaving scars that last far longer than any of the mining or lumbering boomtowns (Isenberg, 2004: 89).

Most crucial to this work is the region known as the Rocky Mountains, which covers an area that is bounded by the Great Plains to the east, the intermontane region of the Pacific Northwest to the west, and both deserts and humid subtropical areas to the South. The Rocky Mountains stretches from present-day British Columbia and Alberta in Canada down to

Colorado, although some argue that it stops even further south, in central Utah and northern New Mexico (Lavender, 2003; Jordan-Bychkov, 1993; Smith, 1992). The present-day state of Montana, and its earlier nineteenth-century incarnation as Montana Territory, is located within this region. The Rocky Mountains are essentially "vertically zoned," meaning that the flora and fauna vary based on elevation, as do the activities that humans can carry out (Jordan-Bychkov, 1993: 298; Lavender, 2003 Smith, 1992). These vertical zones have differing water levels as well, in part due to elevation and their closeness to nearby mountains. Many broad areas "lie in rain shadows" of mountains; this means that rainclouds get caught crossing the mountains and "seldom will yield more water until meeting another uplift" of cool air (Lavender, 2003: 13). As a result of these rain shadows, "between-range valleys and parks of the Rockies are arid" but moist enough that "true desert conditions do not appear" (Lavender, 2003: 13).

Another influence on the water levels in the Rockies comes from the east. The Great Plains are "far drier and colder" than the "humid subtropical" areas further south, such as Texas, Louisiana, and Arkansas (Jordan-Bychkov, 1993: 222). This border area is often referred to as the "Kansan biotic province," and stretches as far north as the North Platte River (through the present-day states of Nebraska, Wyoming, and Colorado) (Jordan-Bychkov, 1993: 223). North and west of the Kansan biome is the Saskatchewan biotic province, which covers much of the higher-elevation portions of the Rockies. The winters are harsher in this biome, but less arid than the Kansan biome, because it does not border the semi-arid Great Plains. Present-day Montana, and the nineteenth century Montana Territory, is located both in the Saskatchewan and in the Kansan biotic provinces. Montana itself is divided into two environmental zones: eastern and western Montana (MacDonald, 2012). The eastern portion rests in the Kansan biotic province, on the most northern part of the Great Plains. The western portion, which is in the Saskatchewan biotic province, is a land where "mountains abound" (MacDonald, 2012: 13).

Montana, and the Rocky Mountains as a whole, is filled with "myriad valleys, basins, holes, and parks" (Jordan-Bychkov, 1993: 298; Lavender, 2003; Langford, 1890; Meldahl, 2007; Smith, 1992). The farmers, ranchers, loggers, and miners of the region used these basins, parks, valleys, and holes differently because of the vertical zoning that resulted in different vegetation and water levels. Travelling from the lowest elevation to the highest, a miner would encounter first rolling prairies, then the foothills of the mountains. Once he started to head upward in elevation, he would encounter basins and valleys. The term basin refers to broad flats that were filled with grasses spread out in steppes. At the highest elevation, he would find holes and parks, which acted as high elevation grass and sage flats. (Lavender, 2003; Jordan-Bychkov, 1993; Langford, 1890; Meldahl, 2007). The valleys of the region are at an elevation of over a mile above sea level, with the mountain peaks soaring above them. The foothills of the mountains and the intermontane valleys of the Rocky Mountains are "rich in forests, high meadows and "sources of meltwater for irrigation" of both plants and animals (Jordan-Bychkov, 1993: 298; Perrault, 1997; Coburn, 1968). The lower valleys of the region sit among "timbered brushy foothills," while at the lowest elevation lie the "rolling prairies" (Coburn, 1968: 15; Lavender, 2003; Duane, 1992).

The lowest, semi-arid plains and prairies have plateaus "blanketed" by "gnarled junipers and piñon pines, while the lower prairies themselves are filled with buffalo grasses and bluestem tallgrass (Lavender, 2003: 7; MacDonald, 2012; Pearsall, 2012; Meldahl, 2007; Cummings, 2004; Jordan-Bychkov, 1993; Gilmore, 1919). The higher rocky foothills are home to ponderosa pines, known for their rich yellow bark, along with a continuation of buffalo grasses and bluestem tall grass, as well as blue grama grass, Western wheatgrass, and needlegrass. Climbing higher, mariposa and sego lilies bloom alongside bunchgrasses, sedge, and additional blue gramma grasses. Soaring above these are lodgepole pines and Rocky Mountain subalpine first. Bright, green, tough-grassed tundra meadows grace the very highest elevations, “spangled with tiny flowers” (Lavender, 2003: 7). The deep canyons that cut through the mountains are lined with alder, plains cottonwood, and willow. Experienced ranchers, miners, herders, and farmers used the "different bands of trees" and other wild flora as markers that measured the elevation at which they were walking (Lavender, 2003: 7; MacDonald, 2012; Persall, 2012; Cummings, 2004; Jordan-Bychkov, 1993; Gilmore, 1919).

Populating this landscape was a diversity and density of wild animals that “astounded early Euro-American observers” (Isenberg, 2004: 81). Bison, pronghorn antelope, elk, mule and white-tailed deer, moose, gray wolves, grizzly bears, red fox, coyote, mountain lions, ground squirrels, and badgers lived along the varied elevations of the Rockies (MacDonald, 2012; Stohlgren, 2006; Isenberg, 2004; Magoc, 2004). Environmental experts estimate that the American West may have once been home to “between twenty and thirty million bison, thirty-five million antelope, five million mule deer, between one and two million bighorn sheep, two million elk, and over one million wolves” (Isenberg, 2004: 81). This abundance of flora and fauna were what largely classified the American West as a ‘wilderness’ to those Euro-Americans that first sought to undertake the journey to reach it and subsequently sought to settle within it. The early explorers, miners, ranchers, and settlers all viewed the American West’s wildness “according to their cultural lights” Some viewed the wide array of plants and animals as “an Eden of superabundant wildlife” where “such superfluity could never be exhausted;” others saw not “the pristine West,” but instead a “place of wild beasts” and “bewilderment,” – literally “a howling wilderness” (Isenberg, 2004: 81; Roderick Nash, 1982: 2). For this second group, the untamed nature of the American West carried "threats of paganism and savagery," which could only be nullified by "clearing forests and destroying wildlife." To these more fearful settlers, removing the wildness of the West "was an extension of both civilization and Christianity" (Isenberg, 2004: 81).

Overall, though, the Rocky Mountains are a region of minerals and craggy stone, no matter how settlers interpreted the array of flora and fauna.. As Keith Heyer Meldahl eloquently puts it, "rock – naked, broken, mountainous rock – *is* the West" (Meldahl, 2007: 23). The very rock itself "seemed to harbor a rich treasury of natural resources…for those who dared to meet the mountains' challenge" (Smith, 1992: xi). However, as historian Duane A. Smith observes, the history of the Rocky Mountains is a story of "man in awe of these mountains, man versus the mountains, and man adjusting to them" because "no man or woman ever goes into these mountains and succeeds, except on the mountains' terms" (Smith, 1992: xi-xii). The emigrants that came to the region as miners, loggers, ranchers, farmers, hunters, explorers, and later tourists, each experienced their own encounters with the environment and formed their "own set of relationships between people and the nonhuman natural environment" of the "relentless, uncompromising, and unforgiving" Rocky Mountains (Isenberg, 2004: 80; Smith, 1992: xii). The so-called "magic of the mountains" spurred emigrants to the region in the nineteenth century and has inspired writers and painters since. Smith observes that "over all of man's activities towered the Rocky Mountains;" as a constant backdrop to all settlers' endeavors, the "ruggedness, the height, the loneliness, the larger-than-life environment, the natural wonders, the space, the abundant resources" of the Rockies secured their place permanently in the mythos of the American West and the image of the nineteenth-century frontier. While the Mountains seem to be ageless, filled with countless stories of men who "have attempted to match its high-country challenges" – and often have failed spectacularly, their presence as an ever-present backdrop for so many different nineteenth-century profession as created "a state of mind about a mythic frontier, which is just as timeless" as the Rockies themselves (Smith, 1992: xii). Rather than falling into the standard processual narrative of a wild frontier conquered by the ever-encroaching tide of 'civilization,' the history associated with the Rocky Mountains is one of the mountains' impacts on all of those individuals who encountered them. Even as loggers felled trees, miners dredged creeks, and ranchers claimed the snow-fed grasses, the Rockies "molded, influenced, refined by adversity, fooled by success, and, quite frequently, defeated man, who has yet to conquer them" (Smith, 1992: xii).

Crossing the Great American Desert

The story of settlement and mining in the American West, deep within the heart of the Rocky Mountains, is a tale of learning to navigate the canyons, foothills, and valleys of the region, while adapting to the climate that strongly bracketed their activities between the end of one winter and the beginning of the next. The climate, the last facet of the Rocky Mountain region, affected settlement in the Rockies nearly as much as the rugged stone. Many trails only thawed by the end of April or the beginning of May, with the snowmelt leaving swathes of mud in its wake. These trails had to dry before loggers, miners, ranchers, and farmers could use them. Spring grasses had to fully come up for any wagons carrying settlers or supplies to make the journey through the region, let alone across the Great Plains, known in the nineteenth-century as the 'Great American Desert,' due to its scarcity of water, unrelenting heat, and constant wind. The grasses were crucial, as they fed the engines of the era – oxen, mules, and horses (Meldahl, 2007; Richards, 2002; Smith, 1992; Watkins, 1971). Meldahl refers to a "holy trinity" of resources needed to survive traveling to the American West – or surviving in it after arrival:

grass, wood, and water" (Meldahl, 2007: 31). Of the three of these, emigrants could most easily find alternatives for wood, including buffalo chips, sagebrush, and greasewood. As heavily wooded as portions of the Rocky Mountains appear to be today – and were when the first settlers arrived – the trees soon came down, used for hearth fires, cabins, fences, storefronts, mineshaft supports, sluice-boxes, and in the ever-needy lumber mills (Meldahl, 2007; Smith, 1992). However, no alternative existed for water or grass. While both fueled the draft animals of the period, the emigrants placed many additional demands on their water supplies, least of which was using it as a potable source. Overall, water is the most precious commodity in the American West, largely due to its scarcity. Even in the Rocky Mountains, which are better watered than the American Southwest, water was still often difficult to find, especially if it lay bound in snow-caps during a late thaw or failed to come down as rain during droughts. Despite this scarcity, it was water that powered all techniques used for placer mining; water ran over pans, into rockers, and through sluice-boxes, carrying sediment downriver as it did so. As a result, "the streams quickly resembled sewers of sand, mud, and debris" (Smith, 1992: 9). In less than a year, only the headwaters of a stream or creek provided water that could simultaneously be used for drinking, bathing, and mining.

Watercourses also carried their own share of dangers, making water a deadly necessity in the American West and within the Rocky Mountains. Those traveling overland in wagon trains to arrive at the Rockies, as well as those already settled there, faced many threats, the greatest of which was disease. Water often acted as a silent partner in the spread of such illnesses. Cholera swept across the Great Plains and the Rocky Mountains, spread most by contaminated waterways, such as the North Platte and other Western rivers, which were wider than they were deep – and often slow-moving. Cholera continued to spread as poor sanitary practices tainted the water. Additionally, emigrants often buried the infected dead along rivers and streams, spreading disease even further. Ironically, water-borne cholera killed through dehydration, making the infected more likely than the healthy to interact with water sources. Nineteenth-century sources describe cholera as killing so quickly that members of a mining town or a wagon train would feel healthy in the morning and lie dead by nightfall. Along with cholera, emigrants to the American West and the Rocky Mountains suffered from a host of other illnesses, including "dysentery, tuberculosis, smallpox, mumps, pneumonia, and "mountain fever" (probably a tick-related disease." Diseases, aided in their spread by water, killed twice the number of emigrants than any of the other causes of death combined (Meldahl, 2007: 14). Water also drowned emigrants, especially during river crossings. Further, fording a river could easily drown oxen, mules, and horses, which often also resulted in their owners' demise, for without pack animals, they could not cross the same distances or carry nearly the same amount of supplies on their backs alone. Stranded with few supplies, starvation and exhaustion could quickly claim them. Finding a respite from the weather and the wildlife could be difficult, even if pack animals survived because "vast portions of the West remained unexplored and unmapped" until at least the third quarter of the nineteenth-century (Meldahl, 2007: 14; Eifler, 2017; Lynch, 2002; Richards, 2002; Watkins, 1971; Paul, 1963).

As unmapped as it was, however, emigrants poured into the American West, even before the 1849 California Gold Rush. Several factors motivated them: disease, financial difficulties, a desire for larger plots of land, and the less concrete "simple allure of new beginnings in an expansionist age – an age of Manifest Destiny" (Meldahl, 2007: 72). While disease haunted the trail westward, the inhabitants of the Eastern seaboard and the Midwest "regularly endured outbreaks of malaria, smallpox, flu, and cholera during the 1830s and 1840s." As such, there was great appeal in the fact that “Western promoters described Oregon and California as disease-free paradises” (Meldahl, 2007: 72).

The emigrants to the American West fled an unhealthy economy just as fearfully. The financial Panic of 1837 stifled the efforts of many American famers. The Panic came about as a result of several different, yet interconnected, factors. A decline in cotton prices, problems with the flow of international specie, or hard money, restrictive lending policies in Great Britain – and subsequently the United States, and a collapsing land bubble all contributed to the economic collapse. The Panic came immediately after a brief surge in economic expansion from around 1834 to 1836, with land, slaves, and cotton fetching higher and higher prices. The resulting trade tariffs and land purchases channeled large sums of money in federal revenue. This surge also resulted in substantial investments in capital from Great Britain; the state-backed bonds in British markets aided largely in funding transportation projects across the United States as it stood in the 1830s (Bilginsoy, 2014; Rousseau, 2002; Jenks, 1927).

However, by 1836 the Bank of England’s monetary reserves had declined so severely – largely due to poor harvests (especially wheat) that caused Great Britain to import foodstuffs – that the Bank raised interest rates to 5% (Jenks, 1927). Theoretically, an increase in interest rates would attract hard money – specie – because investors would put their money in the Banks that produced the highest return. In response to the interest increase from such a powerful world bank, American banks followed suit and raised their own interest rates, while also reducing their lending. This dropped the overall value of American security bonds. These measures hurt the United States economy, but they would not have crippled it had cotton prices not fallen at the same time. The demand for cotton grew so low that in February and March of 1837, prices tumbled down as low as 25% in some places (Jenks, 1927). The United States was largely an agricultural economy at this time, heavily depended upon stable crop export, especially that of cotton; these exports fortified the US dollar, balanced the trade deficit, and even funded schools. Additionally, farmers in the Midwest and the East produced crops for market rather than for subsistence and asked for large loans to fund not only land, but also the components required to produce at a larger, for-market scale: livestock and their associated costs, farming equipment, and transportation for the crops now produced in large quantities. When cotton prices fell, the economy went with it, especially in the South. The effects of the cotton collapse rippled through other sectors, including manufacturing. Additionally, the farmers that had been producing crops for export, such as wheat, found themselves selling their products for prices far less than the cost of raising and harvesting them. The weakened economy could not absorb the vast amounts of foodstuffs that farmers continued to produce, which caused prices of other farm goods aside from cotton to fall. The meat industry suffered as well, for it was dependent on the market for buying and selling crops. Meldahl reports that "prices of bacon and lard fell so low that river steamboats burned it for fuel" (Meldahl, 2007: 72; Eifler, 2017; Bilginsoy, 2014; Rousseau, 2002; Jenks, 1927). With all of the cheap food now available, the population soared, even as the economy plummeted, creating a need for more space. The economic and spatial pressures, when taken together, were strong motivators for Americans to head toward the open lands west of the Mississippi River, preferring the unknown West to the depression back East.

Another contribution to the Panic of 1837 came in the form of legislation that directly preceded it. In July of 1832, President Andrew Jackson vetoed a bill that would have rechartered the central bank, known as the Second Bank of the United States. While the Second Bank slowly ended its operations over the next four years, state and local banks maintained unsafe ratios of specie reserve, largely due to relaxed lending standards, especially in the Midwest and in the

South. As such, after the fall of crop prices, Americans fled to the banks to remove their specie – much of which wasn't available. On May 10, 1837, banks in New York announced that they would no longer redeem paper money for its full face value in specie (Oberg, 1985). Financial panic increased further, as most Americans had very little specie at any given time, and now could not retrieve it from the banks where they had thought it sat. Additionally, a year earlier the Specie Circular of 1836 had demanded that one could only purchase western lands with gold or silver; an attempt to curb land speculation in the West, the Circular instead highlighted the fact that most investors and potential purchasers did not have enough specie to buy land. Land and real estate prices fell in response.

The American public largely blamed President Martin Van Buren for the Panic, even though it happened only five weeks into his presidency. However, while many of the problems had roots in actions taken long before his inauguration, Van Buren did refuse to use any government intervention, such as emergency relief or an increase in infrastructure spending to attempt to reduce the unemployment rate, which was as high as 25% in some areas of the country. His refusal to take action likely contributed to the fact that the recession resulting from the Panic lasted approximately seven years. During this time, cotton and other crop prices continued to fall, as did those of livestock and real estate. Thousands became unemployed and both banks and businesses shut their doors. For those still employed, the market now wrestled with years of deflated prices and wages. (Eilfer, 2017; Meldahl, 2007: 72; Bilginsoy, 2014; Rousseau, 2002; Oberg, 1985; Watkins, 1971; Jenks, 1927). Given the economic chaos back East, the American West, even with its rumors of danger, seemed a better, brighter alternative, especially after the Preemption Act of 1841, which guaranteed that anyone who squatted for at least fourteen months on public land acquired first right to purchase up to 160 acres at a fixed price, once it had been surveyed. To the beleaguered farmers, manufacturers, and bankers east of the Mississippi, “the land was there for the taking,” and “many saw westward expansion as America’s God-given right” – a fitting reward for enduring the years of hardship after the Panic of 1837 (Meldahl, 2007: 72-73).

That available land increased dramatically after the Mexican-American War and the Treaty of Guadalupe Hidalgo, signed on February 2nd, 1848, which ceded the vast majority of the present-day American Southwest to the United States. This 525,000 square-mile cessation included the area of what is now western New Mexico, Arizona, Utah, western Colorado, Nevada, and California. Not surprisingly, the California Gold Rush occurred the next year. These lands nearly completed much of what is today considered the American West. They joined the 828,000 square miles acquired during the Louisiana Purchase in 1803, which included present-day Arkansas, Missouri, Iowa, Oklahoma, Kansas, Nebraska, western Minnesota, most of North and South Dakota, the northeastern corner of New Mexico, northern Texas, most of Colorado, Wyoming, and Montana, along with, of course, Louisiana. The Mexican cessation also bridged the gap between the lands acquired by the Louisiana Purchase and those of the Oregon Territory, established by a treaty with Great Britain in 1846, which included present-day Idaho, Washington, Oregon, Western Montana, and western Wyoming. On December 30, 1853, the final piece of the American West came under American control: The Gasden Purchase. The treaty signed with Mexico granted 29, 670 square miles, including present-day southern Arizona and southwestern New Mexico, to the United States for $10,000,000, which the cash-poor Mexican government desperately needed. It also satisfied American desires for a more efficient route for constructing a southern transcontinental railroad.

With all of the land now made available came additional legislation allowing emigrants to settle, including the Oregon Donation Land Claim Act of 1850 and the Homestead Act of 1862. The Oregon Donation Land Claim Act allowed 640-acre claims, given by the Oregon Provisional Government in 1843, to stand as legitimate, with 320 acres given individual male citizens over 18 and 320 acres given to their wives. It also allowed for any emigrant after 1850 to gain legal property to 320 acres in the Oregon Territory. By 1855, when the Act expired, roughly 30,000 white settlers arrived in Oregon Territory, claiming 2.5 million acres of land. The Homestead Act, signed by President Abraham Lincoln on May 20, 1862, further encourage migration westward. The Act guaranteed 160 acres of public land provided that homesteaders inhabited the tract for at least five years continuously; after that point, they could take ownership of the land after paying a filing fee of $10. After six months of residency, however settlers could choose instead to purchase the land from the Federal government at a rate of $1.25 per acre. By 1900, The Homestead Act of 1862 distributed 80 million acres of public land.

With the land available and pressures back East and in the Midwest spurring westward migration, the American West stood ready to accept emigrants. Much of the approximately 2,000 mile trip remained the same for settlers, whether they were homesteaders, ranchers, miners, or loggers. As noted above, they could only start their journeys once the trails had dried enough from the spring thaws and new grass had cropped up to feed their livestock. This placed the beginning of most trips at the end of April or the beginning of May. Often hard-pressed to complete the journey, emigrants had to beat the first heavy snowfalls, which sealed mountain passes in the Rocky Mountains and further west in the Sierra Nevada, that could occur as soon as October. The fact that winter bracketed the journey on either side resulted in the unfortunate situation where “some of the hardest sections of the journey…had to be crossed at the absolutely hottest time of year, in August and September” (Meldahl, 2007: 13; Lynch, 2002; Richards, 2002; Watkins, 1971). The voyage took roughly three to four months by pack train and four to five months by wagon train. Ox-drawn wagons generally covered around 15 miles per day, because while they could cover over 20 miles in clear weather on flat terrain, many impediments along the way could and did slow that pace. Sometimes there were days where no progress took place at all; some of these days were intentional, like those set aside for rest – especially if the train was religious, while others were unexpected, like days spent making repairs. Despite careful packing, planning, and timing, many emigrants never arrived at their final destinations. Between 1840 and 1859 alone, roughly 20,000 settlers died crossing into and across the American West, equating to roughly ten graves for every mile of trail crossed (Meldahl, 2007; Watkins, 1971). As previously mentioned, death often came at the hand of disease in the American West, whether traveling through it or settling there. However, "there were plenty other ways to die on the road west," including trampling and other injuries from pack animals, getting crushed beneath wagon wheels, accidental – or intentional – gunshots, stabbings, and blunt force injuries, at the hands of fellow travelers or those of the indigenous population, frustrated at the soiling of streams and disrupting of game, to name a few reasons (Meldahl, 2007: 14-15; Lynch, 2002; Richards, 2002; Watkins, 1971).

When forced to deal with injured, weakened or pack teams, settlers would discard anything viewed as non-essential along the trail; often they emigrants had brought quite a lot of non-essential equipment with them, usually tricked by so-called guide books that each proclaimed to contain the definitive list packing list for traveling west. The emigrants' overburdened wagons rarely arrived at their final location with everything with which they were originally loaded because "the further they went, the more they threw away" resulting in "highway littering on a scale that passes belief" (Watkins, 1971: 35). As they neared the end of their journey, if their situation still appeared desperate, even previously saved "valuable items hauled all the way from the Missouri River were tossed out into the wilderness." These included such varied and sundry items as kegs, baking ovens, jugs and other crockery, quilts and clothing, harnesses and chains, anvils, saws, scythes, mining tools, plows, augers, and even trunks and dressers (Meldahl, 2007: 19; Watkins, 1971). These items were readily picked up by scavengers, eager to gather what goods they could for sale in Oregon, Utah, or California, where goods were in high demand, especially after emigrants had overhauled what they needed to in order to complete their journey. A brief pedestrian survey along the routes of old trails and passes still reveal "bits of crockery, square nails, fragments of iron wagon wheel tires, rusted sections of barrel hoops," and a miscellany of other rubbish left as a consequence of traveling – and sometimes of more dire circumstances.

Pay Dirt: The Beginning of Mining in the American West

Mining has left its imprint on the history of the American West just as indelibly as it has carved the landscape. At the time of the first major mining rush, California's 1849 Gold Rush, the United States was still "a third-rate industrial power;" however, by the turn of the twentieth century, the country's industries "outproduced all other nations" (Isenberg, 2004: 81). Mining stood at the heart of this incredibly quick transformation, acting as a major driving force for both invention and production. The sheer wealth of natural resources, especially mineral resources, found in the American West provided the other main impetus for the United States' rise to industrial prominence. While capitalist economies require natural resources, they also need labor to extract them and capital to fund the endeavors and to pay wages. Shockingly, nineteenth-century America consistently lacked both enough capital and enough manpower to exploit its natural riches. That the nation still had such a rapid development even with such chronic pair of shortages emphasizes the abundance of the American West's natural resource and the allure that exploitation held – and gold and silver were far more tantalizing than even timber or furs. By the fourth quarter of the nineteenth century, individual prospectors and large mining corporations had pulled at least \$300 million in silver out of Western rock, along with over \$1 billion in gold. The bullion attracted "unprecedented capital" along with a steady "inflow of merchants and laborers," which transformed the American West into "a microcosm of the world's business economy" (Igler, 2004: 96). This powerful influx of immigrants and wealth also rapidly turned huge expanses of Western land first into territories and then into states, with California already achieving statehood at the far end of the continent by 1850. The Great American Desert that sat between the newborn state and the East Coast remained untouched for only roughly a decade more before mining attentions turned toward that unknown expanse (Isenberg, 2004; Igler, 2004; Rohrbough, 2004, 1997; Brands, 2002; Smith, 1992; Watkins, 1971; Paul, 1963)

It may have been gold that spurred the largest single influx of people in the nineteenth-century United States, the California Gold Rush of 1849, but it was a sawmill, not a mining operation, that sits at the heart of the discovery. On an unassuming morning, January 24th, 1848, carpenter James W. Marshall found gold flakes in the American River at Coloma, California, located on the eastern edge of the Sacramento Valley. As the foreman of the construction crew at Sutter's Mill, after its owner John Sutter, Marshall oversaw and monitored its progress toward completion. Winter almost had destroyed the nearly-completed sawmill, as high water levels from an early January storm tested the strength of the newly built damn. Marshall realized after the storm that while the channel leading into the mill, known as the headrace, was wide enough to handle the increased waterflow from the American River, the tailrace, or channel that fed water back into the river, was much too narrow and shallow for the amount of water needed to power the sawblade; this threatened to destroy the mill before its blade would ever lumber. The storm also gave Marshall the idea to let the River's force itself widen the tailrace until the channel was wide enough to be built upon. With the American River free to forge its own path under the mill, this also reduced the risk of a backup underneath the structure.

So as not to drown his workers, who labored around every part of the mill, including within the race, or channel, itself, Marshall opened the headrace's gates only at night, letting the water flow freely while his crew slept. Each morning, he would check its progress. It was this regular monitoring that found Marshall walking along the American River and examining the gravel and debris at the site of the expanding tailrace. More concerned with finishing the sawmill, Marshall looked at the ice-flecked rock in the channel as nothing more than a byproduct of the American River's overnight work. However, despite the ice and water, several of the pebbles glinted differently. Scooping up a few of the glinting rock pieces and scattered flakes, Marshall picked his way back to the mill to show the crew what he had found (Eifler, 2017; Holliday, 2015, Richards, 2008; Rohrbough, 2004; Brands, 2002; Lynch, 2002; Watkins, 1971; NPS, 1967; Paul, 1963; Parsons, 1870).

The crew soon attempted to test the pebbles and flakes, to see if they truly contained gold. The flakes withstood pounding with a hammer, which served only to flatten one into a thin sheet, as well as immersion in lye and contact with baking power. No frenzy emerged immediately from this find, however. As historian H.W. Brands remarks, "had anyone at Coloma known what everyone in the world knew later, Marshall's men would have dropped their tools at once and gone looking for more" (Brands, 2002: 17; Parsons, 1870). However, James W. Marshall was much more concerned with the sawmill than he was with the few ounces of gold that he had found. In accordance with the agreement made with John Sutter, Marshall wouldn't get pain until the mill was built, running, and sawing lumber. As such, his focus rested solely on the concrete facts of his current financial situation rather than on speculating about possible grand discoveries. After four days, however, Marshall left Coloma for Sutter's Fort, where John Sutter lived. He decided that he had to let his business partner know about the findings near the mill. Sutter tested the gold further and asked Marshall to keep the discovery a secret. He visited the sawmill a day after Marshall returned and repeated his request to the construction crew. He and Marshall granted them permission, however, to continue to look for gold on Sundays and whenever they were not working on the mill (Eifler, 2017; Holliday, 2015; Richards, 2008; Rohrbough, 2004, 1997; Brands, 2002; Lynch, 2002; Watkins, 1971; Paul, 1963; Parsons, 1870).

The discovery hardly stayed secret. Although interest in the gold remained lukewarm at first, with skeptics claiming the reports were rumors, by March of 1848, several newspapers had announced the presence of gold, including the *Californian* and the *California Star*, both out of San Francisco. The Treaty of Guadalupe Hidalgo, newly signed on February 2nd, placed the Central Valley of California squarely in American hands, which would further fuel American interest in the gold fields as the reports spread. By 1854, 300,000 emigrants had scrambled to California using overland trails and sailing vessels, some of which rounded Cape Horn while others briefly went across the Isthmus of Panama, using the American-built Panama Railway and braving mosquitoes and venomous snakes, then put to sea once more in the Pacific Ocean; some sailing vessels came straight across the Pacific, especially those that embarked from China. James W. Marshall's find launched the "greatest mass migration in the history of the young Republic up to that time" (Rohrbough, 2004: 115). Further, the gold deposits turned out truly to be quite lucrative, with mining efforts recovering $6 million in gold in 1848, $10 million in

1849, $42 million in 1850, and $76 million in 1851. In total, the California gold fields produced $300 million in gold between 1849 and 1855 (Eifler, 2017; Rohrbough, 2004, 1997; Lynch, 2002; Richards, 2002; Watkins, 1971; NPS, 1967; Paul, 1963).

The first goldminers in California dribbled in, arriving in small groups, mostly from elsewhere in California. As news spread additional miners came from nearby Oregon and Mexico, Latin America, and Hawaii – known as the Sandwich Islands at the time. However, by 1849, 80-90,000 would-be millionaires traveled to the gold fields, some covering thousands of miles by land and / or sea; they came from the United States, China, and across Europe. Historian Malcom J. Rohrbough attributes the allure to the fact that "the gold was available to everyone, regardless of education, family name, and technical skill;" he continues that the prospective prospectors viewed this openly available gold as part of a larger "game with an infinite number of winners that anyone with a pick, pan, and shovel could play" (Rohrbough, 2004: 115). The California Gold Rush altered the American West and its history irrevocably. The region quickly transformed from a foreign – and often terrifying – wilderness to an unknown land of endless possibility and "heretofore unimagined adventure and wealth" (Rohbough, 2004: 115). In drawing American, and later global, attention to the American West and its mining potential, the California Gold Rush literally paved the way for future mining endeavors. Had this phenomenon not taken place, the subsequent gold strikes in the Southwest and in the Rocky Mountain regions might not have taken place as quickly, if they happened at all (Eifler, 2017; Holliday, 2015; Richards, 2008; Rohrbough, 2004, 1997; Pérez Rosales & Loveman, 2003; Banks, 2002; Lynch, 2002; Mucibabich, 1977; Watkins, 1971; NPS, 1967; Paul, 1963).

California: The Proving Grounds of Frontier Government

The California Gold Rush of 1849 played an even more important role with regards to the future of Western mining, however – that of a proving ground. It was in the gold fields of the Central Valley that techniques for organizing individual ownership and claims over mineral rights first emerged. Present-day mining legislation has its roots in experiments undertaken and decisions made in the nineteenth-century gold fields of California. Gold seemed ubiquitous along the American River and throughout the drainage basin west of the Sierra Nevada mountains, clinging to the bottoms of tributary channels, eroding out of stream beds, glinting in rock faces. The widespread presence of gold turned the early days of the Gold Rush into "an open exercise for everyone" where "all that was necessary to participate were the most elementary and easily available tools" (Rohrbough, 2004: 117). The promise of riches for even those with a lack of training strengthened the allure of California gold. The gold-crazed emigrants began to arrive in the thousands by 1849, bringing with them a stark contrast to the activities that had taken place during the spring and summer of 1848. The first mining season in the gold fields had carried a recreational feel to it that the region and its inhabitants would never experience again. Locals looked in streams for gold flakes and chipped at outcroppings of rock with small knives in the evening or on weekends. Families from a few miles further afield would travel to the drainage basin, camp and mine together, and then return home (Eifler, 2017; Holliday, 2015; Pérez Rosales & Loveman, 2003; Brands, 2002; Lynch, 2002; Rohrbough, 1997; NPS, 1967; Paul, 1963)

By the end of the year, however, the dynamic had changed. Not only did the population increase dramatically, but they generally travelled to California, and subsequently worked together, in a group referred to as a company. These companies functioned as work units and initially they were made up of the members of the miners' hometowns or of the communities in which they lived before heading off for California. Some companies formed in small towns before anyone decided to set sail or take an overland route. Others came together in port cities, like Boston, just before a ship set sail across one of the two sea-routes to California. Sometimes individuals would join into a larger company that had already formed, hoping to increase their chance of success during the cross, especially those that went overland. Departure cities for the wagon trains, such as Independence, Missouri, often witnessed multiple companies coalescing, combining skills and supplies; these cities often saw would-be miners turn back when faced with the enormity of the six-month, 2,000-mile trip – especially when they heard stories and rumors of disease, accidents, hostile Indians, and gruesome animal attacks. Some of those individuals who ultimately shied away from traveling to California did so out of an overwhelming sense of familial duty. Most of the emigrants to California were young men, many of whom left behind equally young wives and little children or elderly parents. Letters posted from the gold fields speak heavily of concern for family members and often mention hopes of returning home once more – or bringing wives, children, and even parents out once funds were available. Much of the miners' correspondence carries with it the sense that they were undertaking the trip to California for the sake of their family; it took on a sense of familial duty in it of itself, even as families were left on the docks and in towns. Some of the forty-niners, as these early California gold miners soon were called, did succeed in bringing their families to California, gradually changing the demographics in the Central Valley by the mid-1850s. However, many more never scraped enough gold together to pay for the journey across the continent a second time. Some didn't survive long enough to keep their promises (Eifler, 2017; Meldahl, 2007; Rohrbough, 2004, 1997; Watkins, 1971).

Upon a successful arrival, some companies broke up, leaving individuals to pick their own way to fortune. Others stayed together in groups of between six and eight men, although some operated with just three or four people. The harsh techniques of the early days of the California Gold Rush, discussed below, easily exhausted individuals; as such, working in groups divided the physical labor more evenly, in addition to allowing the groups to collectively search through more dirt and gravel each day. Further, the emigrants soon encountered the incredibly high prices for goods and labor in California. Whether they docked in San Francisco or trudged to their trail's end in Placerville, everything cost more than the miners had budgeted. Once they had purchased any equipment they needed, or had to replace from the journey, the miners still faced the daunting task of getting their tents and gear to the gold fields. There were men available for hire, but they charged such an exorbitant rate at around $12 per day on average that paying for them as a group was often the most economical decision. A small company of four to six men could easily share a tent, further reducing the physical amount of gear that needed to be trekked out to the diggings. The disadvantages to working in a group generally became apparent only once the company struck gold. Conflicts over claims, shares of gold found, and division of labor erupted frequently and often violently. The tension in the gold fields remained high in part because mining "was uninhibited by institutional influences" (Rohrbough, 2004: 117). There were no licenses given out for any mineral claims or plots of land; further, the miners encountered unlimited access to the rivers and tributaries around the Central Valley. The gold fields, after all, were considered public domain. As a result, the miners soon developed their own means of portioning out mining claims and punishing claim jumpers – those who tried to mine on another man's claim (Eifler, 2017; Rohrbough, 2004, 1997; Lynch, 2002; Smith, 1992; Paul, 1963; Langford, 1890).

The mining laws and courts set up by the forty-niners were rudimentary but grew to become more and more effective through the early 1850s. The lack of federal influence was welcome because “all the miners wanted was something to guide their efforts and protect their claims,” ideally through the use of the “simplest and cheapest methods” (Smith, 1992: 9). These “extralegal controls” provided some stability to the camps around the gold fields by establishing a basic form of order and a methodology for obtaining, monitoring, and holding on to mineral rights. After the first mining seasons, the forty-niners started to establish mining districts and by the 1850s, all of the diggings were divided up. A mining district referred to a specific mineral-rich local area that had boundaries set by the miners working the placers there. Within each district, the miners with interests in the newly-bounded area established a local council, which created specific rules and regulations pertaining not only to mineral extraction but to behavioral conduct as well, frequently creating “designated procedures for settling disputes” (Smith, 1992: 9). These decision-making bodies were usually referred to as miners’ councils and their first task within each district was to set the district’s boundaries. Miners’ councils usually had either a president or an elected board of officers to oversee the drafting of regulations and the meting out of punishment. While the number and types of officers on a mining council varied from district to district, each one had a recorder, whose primary role was to keep track of all of the claims made within the district, a detailed description of each one, and the miner or prospector to whom they belonged (Eifler, 2017; Rohrbough, 2004, 1997; Lynch, 2002; Smith, 1992; NPS, 1967; Langford, 1870, Paul, 1963).

Each district council created a “code of “laws”,” which included “basic institutional forms for mining” and addressed the “number and size of claims a miner could hold” and the “amount of work necessary to hold a claim” (Paul, 1963: 23; Rohrbough, 2004: 118; Smith, 1992: 9). When miners in the district violated the claim regulations, or jumped another’s claim, the miners’ council took responsibility for trying them; sometimes a judge or a president pronounced a decision. Other times, the entire district's population listed to the case and voted on a decision, like a jury. As there were initially no jails within the mining districts, punishment had to be immediate, be it whipping, branding, banishment, or execution. In some mining camps, a separate vigilante group or committee oversaw the trying and punishment of an alleged criminal. The potential criminals usually faced a higher risk of injury or a fatal judgment when a vigilante committee was involved. The vigilante committees that emerged as a result of these "extralegal" district governments often "created problems of their own" as a result of their violent methods; this particular phenomenon will be discussed further below, as one of the most famous vigilante committees in the American West established itself in Virginia City, Montana, and it had members extending up into Highland City (Smith, 1992: 73; Eifler, 2017; Allen, 2004; Paul, 1963; Langford, 1870). The gold, silver, and copper strikes that followed the California Gold Rush elsewhere in the country saw these early regulations duplicated or used as a template for the ever-increasing number of mining camps that cropped up across the American West.

In fact, the forty-niners' "local laws, customs, and rules" eventually gained full-legal status in the form of the General Mining Act of 1872, also known as the Federal Mining Law of 1872. This act never could have come to pass without miners using the gold fields of California and other strikes across the West as proving grounds for "frontier democracy" that inherently operating on the "principle that mining was to proceed without interference from the federal government" (Smith, 1992: 8, 73; Rohrbough, 2004: 118). The Mining Law did not heal the "love-hate relationship" between policy makers in Washington DC and the miners in the American West, but it did act as a clear sign that by 1872 that the United States government "heartily endorsed" both the interests of miners in the west *and* "their customary law." This governmental support allowed for a "rapid and thorough development of mineral resources" while also maintaining an operating environment with "minimal federal regulations and fees" (Smith, 1992: 73-4; Rohrbough, 2004, 1997). The General Mining Act of 1872 created a nationwide policy on mineral extraction and "defined how claims should be marked," specified their size, set the guidelines for "how much assessment work had to be done annually…to avoid forfeiture" (Smith, 1992: 73). Further, it codified the procedure for obtaining a United States patent on a mining claim, what is now referred to as a patented mining claim, and what a miner had to do to make an unpatented claim.

Mining Claims and the General Mining Act: A Brief Introduction

The General Mining Act of 1872 allows all United States citizens "the opportunity to explore for, discover, develop, and purchase certain valuable mineral deposits" on any eligible federal lands (US DOI – BLM, 2015: 1; General Mining Act, 1872: 30 U.S.C. §§ 22-54 & §§ 611-615). As mentioned above, the Law established guidelines for mining claims and the standards to which each type of claim was held; the Mining Law still governs the process of mineral discovery and mining claims on federal land today, although it has had several amendments made to it, especially with regards to minerals that were not of interest in the nineteenth-century, such as gypsum. The Federal Mining Law regulates five different aspects of mining on federal lands: (1) the discovery of a valuable mineral deposit; (2) the establishment of the location of a mining claim and / or operating site; (3) the recording of claims and sites; (4) the amount of work that must be done annually to keep a claim (if unpatented); (5) and the process for acquiring a patented mining claim. (Burgex, Inc, 2016; US DOI – BLM, 2015; General Mining Act, 1872; 43 CFR §§ 3832.1-12). To better understand the Federal Mining Law, it is important to realize that the United States government recognizes three types of mineral deposits on federal land: locatable minerals, leasable minerals, and salable minerals.

The Federal Mining Law and its amendments govern the locatable minerals, defined as "most metallic mineral deposits," which include precious metals (i.e. gold, silver), along with base metals (i.e. copper, lead, nickel, zinc) including nonferrous metals, and light metals (i.e. magnesium, aluminum, titanium); additionally, the Law includes the rather vague addition of "certain nonmetallic and industrial minerals," which include gemstones, nonmetallic minerals (i.e. gypsum, mica, high-calcium limestone) and industrial minerals (i.e. ores for iron and steel like hematite and magnetite, tungsten, cobalt). The Act also includes "uncommon" stones or minerals as locatable; the Bureau of Land Management (BLM) reviews each uncommon mineral on a case by case basis, but thus far minerals rare types of pumice, silica, and sand (including fracking sand) have been granted locatable status. (US DOI – BLM, 2015: 1; Burgex, Inc, 2016; General Mining Act, 1872). Additionally, for a mineral to be considered locatable, it must fulfill three qualifications; it must be: recognized as a mineral by experts in the field, not subject to disposal under another federal law, and make the federal land more valuable for mining than it would be for agriculture (US DOI – BLM, 2015; Burgex, Inc, 2016; General Mining Act, 1872). There are so many different minerals classed as locatable, as just the small set of examples above has demonstrated, that it is often easier for present-day miners and mining companies, along with the BLM, to assume that most minerals that are not considered salable or leasable are classed as locatable.

Salable minerals, the second class of minerals, were first separated from locatable minerals on July 23, 1955. They generally refer to minerals that are low in monetary value, widespread, and usually used in construction or landscaping projects; they include "common varieties of sand, gravel, stone, pumice, pumicite, clay, and cinders" (US DOI – BLM, 2015: 3; Burgex, Inc, 2016). Congress placed these minerals under the Materials Act of 1947, which placed them in the same legal category as timber and other vegetative resources on public lands, such as cactus and mesquite. Under the Materials Act, the Secretary of the Interior and the Secretary of Agriculture "may dispose of" these minerals "to the highest responsible qualified bidder" provided the offer is publicly and formally advertised, the materials will be "used in connection with a public works improvement program on behalf of a Federal, State, or local government agency," and there is a clear sales contract or free-use permit (Materials Act of 1947. 30 U.S.C. 601 §§ 1-2; US DOI – BLM, 2015; Burgex, Inc, 2016). The money from salable minerals goes to support the administration of the land from which it was taken. Leasable minerals, the third category of mineral deposits on federal land, include minerals most often used for fuel. Since the early 1920s, the Federal government has leased minerals such as fossil fuels (i.e. petroleum, natural gas, and coal), along with other minerals including potash, sodium, oil shale, geothermal resources (i.e. dry steam wells), phosphate, native asphalt, and bitumen (solid and semisolid along with bituminous rock). New Mexico and Louisiana class sulphur as a leasable mineral as well (US DOI – BLM, 2015; Burgex, Inc, 2016). In short, salable minerals are commonly-found, widespread minerals used in construction and building projects. Leasable minerals are those minerals usually used for energy, chemical processes, or fuel. Locatable minerals are metals, nonmetallic industrial minerals, and occasional uncommon versions of minerals otherwise classed as salable or leasable. They are also the only type of minerals on which one can make patented or unpatented mining claim.

As established above, United States citizens can only establish mining claims on locatable, and therefore valuable, deposits. To make a claim, one must provide evidence or "physical exposure" of the deposit within the claim boundaries he or she has established. (US-DOI-BLM, 2015: 5; General Mining Act, 1872; 43 CFR §§ 3832.1-12). The Department of the

Interior has established the following criteria for physical exposure: (1) there must be a vein or lode deposit; (2) the deposit must contain a valuable mineral deposit; (3) the deposit and valuable mineral, when taken together, must be enough to warrant the time and money it would take to develop them (US-DOI-BLM, 2015; General Mining Act, 1872; 43 CFR §§ 3832.1-12). With the qualifications met, a miner – or corporation – can officially make a claim. Corporations can hold mining claims because they are “considered a citizen” if organized under state law; they are, however, “held to the same standards as a citizen” in the discovery and maintenance of a claim (US-DOI-BLM, 2015: 7; General Mining Act, 1872; 43 CFR §§ 3832.1-12). There is no limit to the number of claims that a corporation or citizen can hold, provided that they meet the Federal Mining Law’s requirements on each one. The General Mining Act of 1872 defines a mining claim as a “selected parcel of federal land, valuable due to a specific mineral deposit or deposits, for which one has asserted a right of possession” (US-DOI-BLM, 2015: 7; General Mining Act, 1872; 43 CFR §§ 3832.20-22). Further, the right of possession is protected from any challenges by another claimant – or by the United States – as long as there has been the discovery of a valuable mineral deposit before the challenge. There are two main types of mining claims: lode and placer claims. Lode claims encompass any vein or lode deposits that have well-defined boundaries; they also cover the rock through which the veins or lodes run, meaning that they would include the quartz deposit in which a gold lode existed. Lode claims generally resemble parallelograms with their long sides drawn parallel to the vein or lode deposit. A lode claim cannot exceed 1,500 feet in length or 600 feet in width (measured as 300 feet on either side of the lode’s center line). All lode claims are described by a metes and bounds survey that details the length and specific compass bearing for each of the claim’s boundary lines, measuring from a central point or an established monument to a corner post (US-DOI-BLM, 2015; General Mining

Act, 1872; 43 CFR §§ 3832.20-22). Originally, placer claims only included mineral-bearing sand and gravel deposits, especially those containing float or free gold; today, however, the Federal government defines placer claims as "those deposits not subject to lode claims" (US-DOI-BLM, 2015: 8; General Mining Act, 1872; 43 CFR §§ 3832.20-22). As a result, many of the nonmetallic locatable deposits are considered placer claims. The maximum size of a placer claim is 20 acres per individual or corporation, although individuals and corporations can form associations and increase their acreage. This means that two individuals can hold 40 acres, three individuals can hold 60 acres, and the pattern continues up to 160 acres for eight or more people. With corporations, they can form an association only if they join with another corporation or another individual on the claim (US-DOI-BLM, 2015; General Mining Act, 1872; 43 CFR §§ 3832.20-22).

In addition to lode and placer claims, the General Mining Act allows the use of federal lands for two types of claims that service mining operations – mill and tunnel sites. Mill sites can only exist on federal lands that have no mineral value and are noncontiguous to the lode or placer claims with which they are associated. The function of a mill site is to "support a lode or placer claim mining operation" or to "support itself independently of any particular [mining] claim by custom milling or reduction of ores" from at least one mine. Additionally, mills sites must have a mill on them, which is used for "grinding, crushing, flotation, or chemical processing of ores" or have a reduction works operation on it for the "chemical processing of ores" along with the "siting of furnaces," for roasting ores, and other "related facilities" that are "needed to reasonably support a mining operation" (US-DOI-BLM, 2015: 10-11; General Mining Act, 1872; 43 CFR §§ 3832.30-34). These related facilities can include waste dumps, chemical leach pads, and tailings. A mill site cannot exceed 5 acres and must also be described by a metes and bounds survey like a lode claim. To counteract the small acreage limit, "a claimant may hold as many mill sites as necessary for the support of mining operations" (US-DOI-BLM, 2015: 11; General Mining Act, 1872; 43 CFR §§ 3832.30-34). The second type of site covered, tunnel sites, literally refer to the tunnel used in the development of a vein or a lode deposit. Tunnels can also serve to discover previously unknown lodes and veins. Before excavation, tunnel sites must have two stakes placed up to 3,000 feet apart on the surface to create an axis for the proposed tunnel; like lode claims and mill sites, they must be described by metes and bounds survey. Any previously unknown deposits, referred to as blind veins or lodes, are eligible for a claim by the owner of the tunnel site, as long as they are within 1,500 feet of the tunnel's center line. This means that owners of a tunnel site can prospect and make lode claims on any vein or lode found within an area 3,000 feet wide and 3,000 feet long (US-DOI-BLM, 2015: 11; General Mining Act, 1872; 43 CFR §§ 3832.40-45).

The General Mining Act of 1872 states that all four of the land uses above "must be distinctly and clearly marked to be readily identifiable on the ground" (US-DOI-BLM, 2015: 13; General Mining Act, 1872; 43 CFR §§ 3832). The type of marker used is determined on a state-by-state basis, but most states follow the same basic patterns: the erection of a monument or post at each corner, and the posting of a notice of location "in a conspicuous place," which is usually on a post or monument at the point of discovery. The point of discovery itself must be connection to a "well-known, permanent object," like a bridge, stream, or road, and must have a monument built on it (US-DOI-BLM, 2015: 13; General Mining Act, 1872; 43 CFR §§ 3832). At its simplest, a monument is simply a cairn of stones stacked at least three feet tall. Regulations also allow for the use of a three-and-a-half-foot wide wooden post, provided that it is driven at least one foot into the ground and standing at least three feet above it. Additionally, one can use a metal rod that is at least two feet in diameter in place of the wooden stake; the claimant must drive it to the same depth and make sure that the rod stands at the same height above the ground as the wooden stake. Recent legislation at the state and federal level have now outlawed uncapped metal rods (like pipes) and perforated metal rods, because of the damage that they can do to wildlife. The provision that "all monuments should be wildlife safe" was not an original part of the 1872 legislation (US-DOI-BLM, 2015: 10, 13; General Mining Act, 1872; 43 CFR §§ 3832).

All mining claims in the United States, whether they are placer or lode claims, are considered unpatented claims unless the claimant undertakes the mineral patent process. This distinction is incredibly important when discussing nineteenth-century mining towns – and their present-day ghost town iterations – because patented mining claims established in the nineteenth century are still viable today. However, there have been no new patented mining claims since October 1, 1994 due to a Congressional moratorium on mineral patent applications, which gets renewed every year. When a claimant has a patented mining claim (placer or lode) or a patented mill site (tunnel sites are excluded), the Federal government has "conveyed title to the claimant, making it private land." Additionally, a patented mining claim givens "exclusive title to the locatable minerals" within the boundaries of the claim and, usually, those on the surface (US-DOI-BLM, 2015: 27; General Mining Act, 1872; 43 CFR §§ 3860). To establish a claim as patented, the claimant must do several tasks in addition to those required to establish a standard, or unpatented, claim; he or she must: (1) write a statement about the value of the minerals on the claim and furnish all of the documentation proving its worth; (2) have the claim surveyed by one of the U.S. deputy mineral surveyor that the BLM have listed; (3) post a "notice of intent to patent" both on the claim and as a legal notice in a local newspaper approved by the BLM (for

60 days); (4) show a complete title to the claim or mill site to the BLM; (5) furnish proof that at least $500 in development work or improvements have been spent on the claim; (6) give full evidence of proof of discovery; (7) and finally, pay a nonrefundable processing fee of between $2.50 and $5 per acre, which has not changed since 1872 (placer claims are $2.50/acre, lode claims are $5/acre, and mill sites' rates match the lode or placer claim with which they are associated) (US-DOI-BLM, 2015: 27-28; General Mining Act, 1872; 43 CFR §§ 3860). The patented mining claims established in the nineteenth-century do not expire, which means that the present-day claimant (frequently a descendant of the original nineteenth-century claimant) still has all of the same benefits on the land covered by the claim that the owner of any privately-held real estate. This also means that old mining towns, which are still functioning towns today, and those that stand only as ghost towns, still have much of their property on patented mining claims. Buildings and equipment sitting on patented mining claims are considered private property, as are any surface and subsurface artifacts. However, any patented mining claims determined to be completely abandoned become property of the United States and the federal agency on which they sit, such as the BLM or the Forest Service. It is through this abandonment clause that the property at Highland City, including buildings and artifacts, became property of the United States Forest Service.

The California Gold Fields: Laboratory for Mining Techniques

The legislative progress made by the practices of the mining districts originated in the gold fields of California and were modified by miners in the Southwest and the Rocky Mountains. The impact of the 1849 Gold Rush in the world of mining, however, is not limited to rules and regulations, which would have been an ironic legacy for a group of people who had a reputation for being uncouth and violent for much of the nineteenth century. The California Gold

Rush of 1849 also became the crucible into which all manner of mining methods was thrown; those that carried over into use at the Comstock Lode in Nevada or at Pike's Peak in Colorado were the techniques that worked successfully. By the time these mining methods arrived in Montana, they had been forged in California and honed in the gold and silver strikes of the 1850s across the American West. The earliest techniques used in California and the mining sites to follow centered on physical labor in the form of the "hard, repetitive labor of digging, carrying, and washing," which usually took place "in swift, ice-cold, moving water" under the unrelenting sun (Rohrbough, 2004: 116). The early activity at Western diggings was inherently exhausting, with a miner's strength and stamina determining the amount of dirt and gravel that he could search in a given day. Few miners in California had any experience with excavating prior to their arrival at the diggings, but there were a few more experienced individuals, especially those that had either mined in Georgia and North Carolina or in Europe; in particular, immigrants from England, Wales, Spain, and Italy brought techniques and ideas about how to improve them from their native lands to California. The digging became a field on which well-practiced practices, and improvisations to improve them, melded with new innovations tailored specifically for the American West. This intermingling of techniques from different origins at a single locale defined the California gold fields, also making them a quintessential frontier locale. (Eifler, 2017; Holliday, 2015; Safford, 2004; Rohrbough, 2004, 1997; Pérez Rosales & Loveman, 2003; Lynch, 2002; Smith, 1992, Watkins, 1971; Paul, 1963; Young, 1916).

Placer and Hard Rock Mining: A Review of Definitions and Techniques

Placer Mining

Alluvial mining methods were the earliest techniques used at the California diggings, and at other, subsequent Western strikes. These practices take advantage of ores that are "detrital or the result of deposition by erosional agencies," such as the past movement of glaciers and the present movement of water (Young, 1916: 350). Alluvial mining methods focus on secondary deposits carried by rivers, streams, and creeks both in the past and at present. Dry diggings, or dry placers, are alluvial deposits found along bottom of old river and streambeds, which have been pushed closer to the ground surface by geologic shifts. Due to the upheaval, they are usually covered with a layer of gravel and debris. Miners do not need to use water to access these deposits, which is how they received their name, and they can sift dirt, gravel, and sand or can shake it in a pan to collect the heavier ores. Dry diggings still fall under the category of alluvial deposits because waterflow still caused their deposition at some point in deep time. Deeper dry diggings still do not require hard-rock methods, which will be discussed below. Instead, shovels and picks are usually sufficient for clearing away the buildup of debris and rubble (Holliday, 2015; Lynch, 2002; Wilson, 1908). The most commonly-used alluvial mining techniques in the nineteenth century, however, was placer mining. The term placer refers to deposit of gravel and sediments, like sand and clay, that contain valuable heavy mineral or gemstones. These gems and ore bodies have come free from their original geological matrix as a result of wind and water erosion, glacial activity, and / or geological forces like shifting tectonic plates. Another important term, float, refers to rock fragments that have broken off of their primary matrix and have moved away from this original location as the result of exterior forces like glacier movement, geological upheaval, strong waterflow, or frost; these fragments generally contain part of a mineral vein incased in a small part of its original matrix. Float can be found near the surface of a larger, underlying mineral vein or it can be at quite a distance from its parent matrix, in a placer deposit.

(Eifler, 2017; Holliday, 2015; US-DOI-BLM, 2015; Encyclopedia Britannica, 2014; McVarish, 2008; Safford, 2004; Isenberg, 2004; Rohrbough, 2004, 1997; Pérez Rosales & Loveman, 2003; Brands, 2002; Lynch, 2002; Smith, 1992; Malone, Roeder, & Lang, 1991; Hardesty, 1988; NPS, 1967; Paul, 1963; Fay, 1920; Young, 1916; Wilson, 1908; Colliery Engineer Company, 1897; Mills & Blanchard, 1895, Raymond, 1881; General Mining Act, 1872). The most common placer minerals are gold, copper, platinum, cassiterite, also known as tin ore, magnetite, a frequently-used iron ore, chromite (used to make chromium, which is used is chrome-plating steel), zircon (used to make zirconium), and rutile (used to make titanium, to make refractory ceramics, like kilns and reactors, and as a bright, white, UV-absorbent pigment found in plastic, paper, paint, sunscreen, and food). Non-metallic minerals often form placer deposits as well. The most common placer gemstones are diamond, tourmaline, garnet, sapphire, topaz, and peridot. Other alluvial deposits include the lighter quartz-based gemstones, such as amethyst, aventurine, agate (also known as banded chalcedony), tiger's eye, rose quartz, smoky quartz, and rock crystal (clear quartz). Quartz itself often accompanies gold veins around the world and prospectors looked, and still do in places, for the quartz deposits further downstream as an indicator of a quartz-bound gold lode further upslope.

As alluvial deposits, it is water that dislodges the loose ores and sediments and carries them downward; rivers, streams, and creeks easily wash the lighter gravels and sands further along than the heavier placer ore bodies, which results in their deposition at the bottoms and banks of watercourses. The ore bodies found in placer deposits, which vary in shape and in size ranging from flakes and scales to the famed nuggets, are purer than deeper, hard-rock ores, which are still within their original geological matrix. When they come to rest, placer deposits still contain heavy minerals, like gold, but they are mixed into a "host" of gravel, rock, sand, or dirt, depending on the geographic location. When mining placer deposits, the main aim is to separate the valuable heavier mineral ore from its host, also referred to as “gangue” – a mining term used to refer to minerals or geological deposits with no monetary value. Placer deposits required very little expertise or technology to excavate and, as such, they frequently received the name of “poor man’s diggings” across the American West. (Eifler, 2017; Holliday, 2015; McVarish, 2008; Safford, 2004; Rohrbough, 2004, 1997; Brands, 2002; Lynch, 2002; Palmer & Neaverson, 1998; Smith, 1992; Malone, Roeder, & Lang, 1991; Hardesty, 1988; NPS, 1967; Paul, 1963)

Prospectors vs. Miners

Both prospectors and miners undertook placer mining, although the two had very different professions and goals. Prospectors explore areas looking for mineral ore deposits, either by testing placer deposits or by recognizing the geological changes in the local rock and using it to find primary deposits like mineral veins (Safford, 2004; Paul, 1963; Fay, 1920; Young, 1916; Raymond, 1881). In the nineteenth-century, they preferred to stake claims on placer diggings, as these proved much easier to test and to extract and had the added benefit of being at water-rich lower elevations. Additionally, prospecting for a hard-rock gold-bearing quartz lode required a much deeper understanding of geology and mineral-formation processes. A miner could find some prosperous ores in placer deposits, but prospectors had to be able to recognize the float in the deposits and then to identify the changes in the surrounding rock matrix that indicate how far the float, or small piece of preserved matrix, is from its larger, parent mineral vein or shelf. To accomplish this, prospectors quickly learned that certain mineral ores are generally associated with specific types of rock and soil. Gold and copper, for example, frequently run through quartz, granite, and limestone matrices, while coal is generally found with shale, clay, and sandstone (Young, 1916). Once prospectors moved on to tracking down the float's original matrix and the subsequent hard-rock deposits, they frequently worked in small groups, combining their knowledge and physical efforts to increase their chances of finding a substantial lode.

Most prospectors in the nineteenth-century American West were semi-nomadic, lingering in a town long enough to show off his ore samples and register his claim. After registering, and paying a fee where necessary, a prospector would return to his claim and set its boundaries as agreed in town with posts driven in as markers in the claim's corners (Safford, 2004, Paul, 1963). As a rule, prospectors do not perform the heavy labor that miners undertake. Today, mineral and mining companies employ prospectors to find potential areas for new mines, but hire miners to extract the minerals once the mine is established. In the nineteenth-century, prospectors rarely developed their claims into larger mining operations, content instead to only put in the amount of work necessary to confirm a deposit and ascertain its value. Instead, they would sell them if they needed the specie, or they would hold onto them until they received a favorable offer from a mining company, ore-crushing mills sprang up in an accessible location (reducing the cost of a mining operation), or they received sufficient capital from investors, usually located back East, to warrant undertaking the expensive process of setting up a mining operation (Safford, 2004).

In contrast to prospectors, miners are manual laborers who work within mines, be they established at a placer deposit, in an open pit, or deep underground at a lode. Traditionally, miners remove minerals and their ore bodies directly from the geological matrix, or rock face, for commercial purposes. Experience often gives them a strong geological knowledge of the area in which they are working, but miners not expected to have the same ability to locate deposits that prospectors have. In the mining operations of the nineteenth-century, miners were those who had direct contact with rock, including pickmen and hewers, who wore away at the rock face, and drillers who drove drills (initially using only manual force) into the rock to create holes for explosives like dynamite. Larger mines had employees still referred to as miners, such as loaders or bandsmen, who did not directly drill or break into the matrix but instead filled mining carts, hurries and putters or drags-men, who operated the carts, timberers, who used their carpentry skills to create supports to shore up mine walls and support their ceilings – and in open-pit mines, barrowmen who hauled the ore in wheelbarrows away from the rock face. On the surface of an underground mine, additional laborers handled the engines, lifts, and other machinery needed to transport miners and the ore to and from the rock face. Today, structural engineers also work as employees of mining companies, determining weak points in the rock matrix and assisting with relief when cave-ins occur. Additionally, many of the nineteenth-century job distinctions, still highly used in the early twentieth-century, have faded away, as technology made jobs such as barrowmen obsolete (Fay, 1920; Young, 1916; Raymond, 1881).

Placer Mining Technique: Panning

Used by miners and prospectors alike, panning was the simplest of the water-based placer mining techniques. Panning for gold literally involved the use of a metal pan; although these came in a variety of sizes, based on availability, the standard gold-mining pan in the nineteenth-century was made of tin or iron and was circular, with angled sides that made it narrowest at the bottom and widest at the top. The placer mining pans were rather shallow overall, to limit the amount of water retained inside it with the gravel. In 1897, the Colliery Engineer Company issued a guidebook on placer mining that contained specifics for a placer pan, including the stipulation that it be made out of “Russian iron,” with a diameter of 12 inches at its narrowest and sides angling out 30 degrees from the pan’s bottom. The guidebook also stipulated that the placer mining pan should be between three and four inches deep and must have a rim turned over a wire in order to be strong enough for use (Colliery Engineer Company, 1897: 96). The panning process involved placing a shovelful of dirt into the pan and submerging it in running water, such as a river or a creek. After letting the dirt soak for a few minutes, to help separate the adhering gangue, the miner or prospector then shook the pan in a circular motion, sometimes sticking his hand into the mixture to further agitate it. During this, the pan never left the water. Next, he angled the pan to one side to pour the water back into the stream, along with the lighter soils. The heavier sediment and minerals, like gold, would remain on the sloped sides of the pan and in the bottom. Any large flakes or nuggets would also become visible at this point. He then removed the pan from the water and picked out any valuable minerals or gems. The process was repeated on the remaining heavier sediment. As fresh water entered the pan, the miner agitated it faster and harder, which upset the gangue so that it washed out when the pan was dumped. Generally, the miner or prospector would repeat the process until the pan had been picked through thoroughly. The pan was then washed out completely and another shovelful of dirt went in, beginning the process all over again. On average, a miner or prospector, who was experienced in panning, could wash and process around fifty pans each day. The process of panning has not changed since the nineteenth-century, although it is used mostly by recreational prospectors, who look for gold and other minerals as a hobby. (Eifler, 2017; Holliday, 2015; Encyclopedia Britannica, 2014; McVarish, 2008; Safford, 2004; Isenberg, 2004; Rohrbough, 2004, 1997; Brands, 2002; Lynch, 2002; Smith, 1992; Malone, Roeder, & Lang, 1991; Hardesty, 1988; Mucibabich, 1977; Watkins, 1971; NPS, 1967; Paul, 1963; Fay, 1920; Young, 1916; Wilson, 1908; Colliery Engineer Company, 1897; Mills & Blanchard, 1895, Raymond, 1881).

A modification on panning used a wooden, V-shaped bowl called a batea. Bateas were usually painted black, to create a better contrast with the glinting mineral flakes, and generally used in two circumstances. The first was when there was not a strong supply of water near a placer deposit, either because of a slow-moving, shallow watercourse or because the deposit constituted dry diggings. In this circumstance, a miner would shovel a small amount of dirt into the batea and swirl it around, agitating it with motion alone; the steeper sides of the bowl encouraged the heavier particles to fall to the conical bottom and the lighter fraction of the dirt to rest at the top. The lightest sediments were poured off and valuable ore bodies picked out. The process continued – swirling, pouring, and picking – until it was free of minerals or gemstones. The slow-moving watercourse could not aid in this process because it did not provide sufficient water power to carry away discarded sediments and instead it would rapidly grow muddied.

The second instance in which one would have used a batea was for a technique called pan-assaying. Usually done by prospectors, pan-assaying involved float recovered from placer deposits. Because these metals were encased in rock, rather than in looser sediments like sand or clay, simple agitation would not separate the mineral from the gangue. In this instance, the prospector crushed the float, often with a rock hammer, and then panned the resulting powder as if it were sediment. The heavier parts of the float, including the metal or gem, fell to the bottom of the V-shaped bowl, while the lighter stone fragments, now resembling sand, rose to the top with the agitation, where the current carried them off. Although pan-assaying was biased against lighter ore particles, such as flakes, it did help locate heavier minerals in the coarse portion left behind in the batea (Safford, 2004; Young, 1916; Wilson, 1908). Pan-assaying generally occurred in the nineteenth-century when a prospector had found float and wanted to determine if it was worth his time to track down its parent matrix. If pan-assaying did not reveal any worthwhile metal in the float sample, a prospector could run a second test on the ore. After crushing it, as with pan-assaying, he would boil it in a pot of water with baking soda, salt, and a little bit of mercury. The soda and salt worked on the gangue, while the mercury adhered to minerals such as gold, creating a little metal pellet. If no little pellet formed, the float did not contain any minerals of note and the prospector would move on to another location. However, if he did pull a metal-and-mercury amalgamation from the pot, he would roast it over the cookfire, causing the mercury to vaporize. With the mercury gone, all that would remain would be a small nodule of pure metal, like gold. The amount of gold left behind after this process acted as a strong indicator of the amount of gold found in the float overall. If it was a substantial amount, the prospector would then alter his course to begin searching for the mineral's mother lode. As discussed above, prospectors knew the types of matrices that different mineral veins occurred within and often could ascertain by the color of the float or placer gravels whether or not it was worth panning, pan-assaying, or subsequently roasting. This knowledge allowed them to bypass many deposits and pieces of float that either likely contained no valuable minerals or did not contain enough to warrant searching for the lode or shelf from whence they came (Safford, 2004).

Placer Mining Technique: The Rocker Box

For deposits that were confirmed to have large amounts of metal, panning presented a problem, because it severely limited the amount of dirt that a man could process in a day. As a result, the miners in the California gold fields, who soon sought to extract more minerals than panning could produce, adopted the rocker box, also known as cradle or a rocker. Originally developed by miners in Georgia and North Carolina, the rocker box was just that – a rectangular wooden box roughly six to eight feet long and three feet wide, with a rudimentary grate or sieve at one short end. The grate was often little more than a series of wood pieces with holes bored into them, but it served its purpose to keep extra-large pieces of float and debris from entering the rocker. The other short end of the box was open, to allow water to flow out, turning the rocker into a rectangular tube of sorts. The bottom of the box, one of the long sides, had ridge-like obstructions made of wooden strips nailed to it, which were called riffles or cleats. The riffles helped to snag the heavier sediments like gold, which weighs almost nineteen times more than water. The lighter material continued down the tube, unobstructed by the wooden strips, and out into the water. The grate at the front-end of the rocker kept extra-large particles from entering the box. Two half-moon-shaped bases held up the rocker at a diagonal; the taller of the two supports held the head of the rocker box – the end with the grate –higher than the open end, which sat on the shorter of the two bases. The curved supports acted like the base of a baby's cradle and allowed the rocker to move smoothly back and forth (Eifler, 2017; Safford, 2004; Rohrbough, 2004, 1997; Pérez Rosales & Loveman, 2003; Brands, 2002; Lynch, 2002; Malone, Roeder, & Lang, 1991; Mucibabich, 1977; Watkins, 1971; NPS, 1967; Paul, 1963; Fay, 1920; Wilson, 1908; Colliery Engineer Company, 1897; Raymond, 1881). Vincente Pérez Rosales, a Chilean adventurer who worked in the California gold fields and published his memoirs in 1882, described the process by which miners operated the rocker box:

> "One man deposits gold-bearing soil on the screen, another pours buckets of water on it, a third rocks the cradle, and the last removes by hand the stones too large to pass through the screen, examines them, and if no gold is to be seen in them, throws them away. The water turns the soil on the screen into mud, which runs down the inclined plane; and the gold, along with other more or less heavy objects, is trapped by the wooden cross strips. The operation is interrupted every ten minutes to collect the gold dust and nuggets that, mixed with iron, have gathered in the angles formed by the strips; the yield is then deposited in a pan, to be further purified at night, and the operation goes on until day's end. (Pérez Rosales & Loveman, 2003: 259).

As evidenced by Péres Rosales's description, at least two men had to operate the rocker box, although companies as large as four to six men could work together to profit from the machine. The main appeal of the rocker was the fact that it allowed the miners to "pool their labor into larger units," thus creating a larger potential for yield, while still benifitting from being able to "let the water do the work of separating the gold from the gravel" (Rohrbough, 2004: 117-118). The main allure of both the pan and the rocker was the fact that they were "both simple to purchase or easy to make," which insured that whatever financial means an emigrant to California had, he could "have access to the latest technology in the gold fields" (Rohrbough, 2004: 118).

Placer Mining Technique: The Long Tom

Soon the desire to produce higher gold yields, combined with the thinning out of the gold on the surface of the placer deposits, led to the adoption of yet another innovation: the long tom. Originally also made of wood, the long tom was a device made out of three roughly rectangular troughs, which each measured between nine and twelve feet long. The miners set these troughs up in a stepped formation, with the first one sitting higher than the second, and the second higher than the third, which fed into the water. The first trough, known as the chute or sluice, was the narrowest and it served to funnel along the placer gravel that the miners shoveled into it; the chute generally measured about a foot and a half wide at both ends. Using gravity and waterflow, the gravel from the first trough fell into the lower second one. This middle trough, referred to as the tom and giving the device its name, measured just slightly larger than a foot and a half wide at the head, so as to accommodate the first without allowing anything to spill to the sides. It gradually widened to about two and a half feet wide at the end, which was also beveled, with its sides sloping outward from the bottom of the trough. The tom had an iron plate drilled through with large holes set into this wider, beveled portion of the trough and nailed into place. To reduce the damage done to the tom, the miners often lined this second trough in sheet metal. The third and lowest trough, the riffle box, was roughly two and a half feet wide at both ends. Wooden riffles ran across it at intervals, as they did in a rocker.

To operate the long tom, one miner threw a shovelful of dirt into the chute, or first trough. They then poured water down after it, usually using buckets. The waterflow and incline carried the gravels down the second trough, the tom, where headed to the metal plate at the end. Anything too large to pass through the holes congregated on top of the metal plate. A second miner shoveled this out and placed it into a single, separate trough to sort through later. He also stirred the slurry in the top with a large blunted pitchfork or a square shovel and scooped out any large rocks. The stirring helped to break up lumps of clay and other sediment that may have been too tightly adhered to pass through the holes at the end of the tom. The finer gravels passed into the riffle box and met the wooden obstructions, which stopped any smaller heavy minerals. The remaining light sediments in the deposit continued with the water back into the watercourse, while a third miner monitored the riffle-box for gold and picked it out (Eifler, 2017; Holliday, 2015; Brands, 2002; Lynch, 2002; Rohrbough, 1997; Malone, Roeder, & Lang, 1991; Mucibabich, 1977; Watkins, 1971; NPS, 1967; Paul, 1963; Fay, 1920; Wilson, 1908; Colliery Engineer Company, 1897; Raymond, 1881). The miners' techniques for using the long tom evolved the longer that they worked with the device. They increased the waterflow into the chute by constructing hoses fashioned of durable canvas or an additional, long, chute connected to the water higher upstream to create something of a continuous waterflow (or a rudimentary sluice). Some miners even dug ditches to divert the watercourses so that they ran over their long toms before rejoining the main body of the river or stream (Rohrbough, 2004; Smith, 1992; Paul, 1963). The miners preferred the long tom because they could wash gravels all day without removing the device from the water. However, like the cradle, the tom was biased against lighter sediments. To counteract this, they would sometimes lay blankets at the end of the riffle box in the attempt to catch fine flakes of gold dust. They would also pour small amounts of mercury behind each of the riffles in the riffle box to help catch the gold. While the long toms never had to leave the water, the miners still had to clean them periodically – usually two times each day. One miner would search the blankets for gold and then shake them out while others cleaned out the riffle box. They heated the mercury-gold combination in an iron retort, which separated the gold from the mercury, and threw out the other sediments that had collected against the riffles. A vapor condenser attached to the retort caught the mercury, which became a liquid again once it cooled and was thus reusable.

Placer Mining Technique: Sluicing

The long tom finally evolved into the sluice, which originally started as little more than a series of long toms connected together. At its most basic, a sluice was a "line of open troughs with cleats, blocks of wood, or other obstructions placed in the bottom" (Paul, 1963: 21). Those that were a little more complicated resembled a series of wooden riffle boxes, like those in long toms, cobbled together so that water could flow continuously through it. The long tom had allowed miners to process larger, rougher, and lower grade ore (and process it more quickly) than the rocker box, which in turn processed lower grade ore than a mining pan, the sluice, once introduced, allowed miners to work through the lowest grade of ore up to that point, which increased the likelihood of finding gold. They could now increase the sheer amount of dirt that they processed in a day and the speed at which they went through it. Further, they not have to stop to remove ore bodies that were too coarse nearly as often, which allowed them to dig gravel deposits straight from the bottom of a watercourse like a stream or a river. Like the long tom, sluices operated on an incline, utilizing gravitational force; the miners placed the head of the line of troughs at such a depth water from the nearby streak or river could easily flow into it and then into the rest of the sluice boxes. To harness the combined powers of water and gravity, sluices ranged in length from dozens to hundreds of feet long, even reaching a thousand feet in length if there was a strong enough current and enough men to oversee the operations. Additionally, the longer the sluice line was, the more riffles the miners could place into the boxes, which in turn increased the amount of chances that they had to catch gold – especially if the riffles had a coating of mercury on them. If deposits continued to yield, miners would add to their sluices by digging ditches to divert more water toward the sluice line. These ditches not only increased the flow of water into the sluice, but also aided in loosening the placer deposits within the ditches themselves.

There even existed a variation on sluicing, called ground sluicing, that utilized ditches alone, with steppes and riffles carved into the channels that had been dug into the rock and riverbanks. Miners loosened deposits that the waterflow in the ditches (or the ground sluices) could not. If they needed additional water power to operate the sluice, the miners would construct damns along the watercourse and then funnel the water, flowing with a higher-pressure as a result, into the ditches and sluices. If the head of the sluice sat on a terrace or high on a bank, they would construct flumes and pipelines (initially made of wooden tubes bound with heavy-gauge metal wire to keep them from expanding or splitting) to direct the flow of the water. If water power was unusually low and the miners deemed the deposits worth sluicing, they occasionally created a reservoir through the use of dams. Once the sluice was fully set up, they would open a gate-like mechanism to release the pent-up water, which escaped out of the pool with great force. This type of sluicing was known as booming.

Whether sluicing, ground sluicing, or booming, miners in the American West used picks and shovels to feed the sluices and worked in long lines along the often-considerable length of the device. The miners, often wage laborers for a claim owner at this point, picked out the gold and debris that caught against the riffles. If there was a lot of debris caught on the riffles, they would put it in a pan and wash it until they found the ore. The miners called the end of the sluice the dump or dumping ground because it is where much of the debris that traveled along the length of the line of troughs would end up as the water rejoined the watercourse. Sluices of all types occasionally had screens in them that resembled those set into long toms. These screens, called grizzlies, caught rocks and ore that were too rough for even the sluice to process. Not only did screening remove unnecessarily large pieces of debris, but it also improved the changes of finding gold, because the stream lost none of its velocity in pushing against the large pieces of rock. Sluices are still used by mining operations today, although they operate on a much larger scale, with bulldozers and other heavy machinery dumping dirt into a metal sluice-troughs through which machines pump fast-moving water. (Eifler, 2017; Holliday, 2015; Encyclopedia Britannica, 2014; Safford, 2004; Brands, 2002; Lynch, 2002; Rohrbough, 1997; Malone, Roeder, & Lang, 1991; Mucibabich, 1977; Watkins, 1971; Paul, 1963; Fay, 1920; Wilson, 1908; Colliery Engineer Company, 1897; Raymond, 1881).

Placer Mining Technique: Drift Mining / Coyoting

As easy-to-access placer deposits began to disappear, miners sought to extract gold from deposits further below the ground surface, known somewhat unoriginally as deep gravels.

Working with the conclusion that "the richest paydirt could be found by digging down to where it lay," miners dug vertical shafts through placer deposits until they reached the bedrock underneath the gulch in which they worked (Watkins, 1971: 185). Free gold often gathered on top of the bedrock due to the fact that it weighed more than much of gangue in which it sat. The bedrock sometimes consisted of a solid, nearly impenetrable clay. Whatever the bedrock was, the depth varied depending on where the miners were working, sometimes stretching up to sixty feet below the surface. The process of digging these shafts was called drift mining, although miners often more colorfully called it coyoting. The technique acquired this name because the irregular tunnels and shafts resembled the holes and burrows made by coyotes. Drift mining hit its peak in the mid-1850s in California and appeared throughout the American West as miners began to work deep gravels at each successive placer strike thereafter. For the coyote miners, the physical labor didn't end with digging coyote holes; once they located gold – which they called a pay streak, they had to dig horizontal tunnels to fully extract the deposit. They dug these tunnels under the pay streak, sometimes rising above the bedrock into the rimrock (the rock directly under a vein) to mirror a vein that rose upwards as well. By undermining the vein and digging deeper than the deposit went, they could be certain that they did not miss any gold; all of the valuable mineral deposits would be between the tunnel floor and sky. Often the miners dug their tunnels radially so that they stretched out from a central vertical shaft, or coyote hole, like the spokes of a wagon wheel. This allowed multiple miners to canvas a specific area more quickly, efficiently, and completely. Once the miners located and began to extract a deposit, they had to haul the ore out of the vertical shafts that they had created. Initially, some erected rudimentary hand winches to hoist the gravels up to the ground surface, rather like hauling water up from a well. Others worked together to build long ditches, sometimes miles in length, to connect the coyote holes and deeper tunnels; these sloped gradually toward the surface, so that they could push cartloads of the gravels out of the tunnels.

The miners still had to pick through the dirt hauled up by drift mining. Pans, rocker boxes, long toms, and sluices were the only means of extracting placer deposits until the introduction of hydraulic mining, which arrived first at the gold fields of California and then appeared at each mineral strike in the American West at a different time. Usually, miners turned to hydraulic mining once they had gathered all of the valuable ores that they could extract with pans, rockers, long toms, and sluices. Hydraulic mining offered a new way to tackle the coarse placer deposits that remained; it was simultaneously more efficient and less labor-intensive than drift mining. This method was to have a very lasting effect on the landscape of the American West, as is discussed below (Safford, 2004; Brands, 2002; Lynch, 2002; Watkins, 1971; Paul, 1963; Fay, 1920; Wilson, 1908; Colliery Engineer Company, 1897; Raymond, 1881).

Placer Mining Technique: Hydraulic Mining

Hydraulic mining, also known as hydraulicking, could give them access to those deposits buried beneath feet of heavy gravel. As its name suggests, hydraulic mining used waterpower to extract minerals like gold. Unlike previous placer methods, however, hydraulic mining used water as the excavation agent, replacing picks and pans. At its most basic, hydraulicking is defined as the washing of a hillside or bank, which was underlain by deeply buried valuable minerals, with high-pressured water conveyed through a series of hoses and / or pipes and shot out with a nozzle called a monitor. Historians credit miner Edward M. Matteson with inventing the first hydraulicking operation. He used a canvas hose with a wooden nozzle to direct water at the gravel slopes where he was working in the Yuba River diggings, near Nevada City, California.

For all hydraulic mining operations in the nineteenth-century, a series of flumes sat at a height above the diggings, suspended on trestle-like wooden frames; the flumes narrowed continuously as they dropped steeply in elevation until they met with ditches or fit directly into the hose. The highly-pressurized water, called a head, then coursed into the hose and shot out the nozzle, or monitor, in a powerful stream. Rivers and streams had the most water, and flowed the fastest, after the snowmelts of spring and summer. By autumn – and certainly with the freezes of winter – the streams often contained little more than a trickle of water. To allow for higher water pressure in the spring and summer, California miners dammed rivers, as they had with sluices, to create reservoirs. If they stored enough, they could use the reservoirs to continue hydraulicking even in the winter. The reservoirs always sat above the area they were preparing to wash down, sometimes at a height of one to two hundred feet above site. When the miners released the dammed water, it coursed down the flumes and channels, building power as fell down the hundred or more feet and into an ever-narrowing path that terminated with the hose and monitor. Whichever way that the water flowed into the hose, by the time it came out of the monitor it was highly-pressurized. To better conceptualize this waterpower, it is important to note that a single cubic foot of water weighs 62.5 pounds; this means that a cubic foot of water traveling at 10 feet per second will carry with it a substantial momentum of 625. The miners aimed this considerable force at the base of the gravel face or hillside. This strong water current thoroughly soaked the earth and gravel as it undermined it. The hillside quickly collapsed in on itself and fell in a more-or-less controlled landslide. The fast-moving water carried off the deep gravels, composed of often as much as two tons worth of large rocks, ore, gravel, and debris, first through a ground channel dug at the base of the hillside and then into a series of sluices. In the sluices, the water both washed over the gravels and pushed them along as each of the sluice trough stepped downward; the sluices, spanning a thousand feet or longer, aided in the separation of the heavy minerals from the much lighter soil, sand, and gravel. The weight and momentum shot out of the monitor only increased as the water and debris hit the sluices, because the water then carried heavier impurities like sand. The final effect was that the deep gravels and debris tumbled through the sluices at such a rate that they traveled in a stratified fashion toward the end of the line, with the heaviest materials snagging on the riffles and the lightest material traveling just below the surface of the water.

The hydraulicking system dumped the debris, to which miners gave the onomatopoeic name of slickens, at the end of the line of sluices back into the nearby river or stream. These designated waste dumps created large mounds of gravel, rock, and debris, which choked many of the watercourse over time. Each spring, as watercourses were swollen with snowmelt, the slickens coated nearby farmland. By 1880, an estimated 43,000 arable acres in the upper Sacramento Valley reported a depreciation of $2,597,634 in total. Further, in 1891, a survey done by a governmental corps of engineers revealed that hydraulicking along the American, Bear, and Yuba rivers dumped 210,746,100 cubic yards in slickens onto the plains (Watkins, 1971). Hydraulicking in the Sierra Nevada region of California finally came to an end on January 7, 1884, with the US District Court case of *Woodruff vs North Bloomfield Gravel Mining Company*, known even at the time as “The Mining Debris Case.” Two years in the making, the ruling from Judge Lorenzo Sawyer stated that hydraulicking was a “public nuisance” and the dumping of tailings into the Yuba River was “absolutely and wholly unlawful.” The Sawyer Decision, as the ruling is now known, did not stop hydraulic mining across the American West, but it did demand that “all tailings must stop” in the Sierra Nevada region (Sawyer, 1885: 515). The Sawyer Decision is credited as the United States’ first law focusing on environmental protection. The ruling also set a strong precedent for other landowners to protest hydraulic mining in California and across the American West. Most hydraulic mining in the region stopped in the twentieth century, although it continues today in in the South Africa's Rand Gold Fields and in kaolinite mining operations in Cornwall and Devon, England. Large tailing piles of broken rock and mounded gravel from nineteenth-century hydraulic mining endeavors still lay across the American West, from California to Nevada to Montana.

For most of the second and third quarters of the nineteenth-century, however, Western miners, who quickly realized that if they had "better control over water" and "more yards of gravel worked," then they would make "higher profits;" put the formula of factors together and concluded that "hydraulicking promised all of them" (Smith, 1992: 10). Profit, not environmental concern, drove their actions. As miners undermined and washed away entire hillsides in search of mineral-rich deep gravels, they created a steady supply of dirt and ore for the sluices in quantities far exceeding those acquired by panning, rockering, or using long toms. Hydraulicking removed the need for picks and shovels to loosen the deposits and toss them into the sluices. Commenting on the efficiency of hydraulic mining by 1857, the Sacramento Daily Union wrote that "banks of earth that would have kept a hundred men employed for months in its [sic] removal, will now be removed by three or four men in two weeks." (Sacramento Daily Union, 1857: 3). This efficiency would have consequences on the way that miners worked in the gold fields across the American West.

The miners in the Southwest and the Rocky Mountains further revised the hydraulic mining techniques until the 1860 and 70s, when the practice was at its height. Crinoline soon replaced canvas hoses until wood, iron, and steel pipes took the place of both hoses and flumes. While hoses were a problem because they could tear, flumes proved to be an even more costly part of hydraulicking of which miners were all too happy to rid themselves. The flumes could blow over in a strong wind, split if they were too dry, weaken and leak if they were too wet, and they could break and burst apart if they could not handle the force of the water pressure. Made out of wood, which quickly became a prized commodity in any mining district, flumes cost 90% more to repair than ditches did, making them one of the most expensive parts of the entire hydraulicking operation. As a result, pipes were a welcome innovation for hydraulic miners; further, pipes leaked far less than flumes or ditches, which lost water to ground absorption. Wooden pipes, briefly described above, consisted of several wooden staves, bound tightly into a tube-like shape with iron bands. They were especially useful when there was a high head, or strong water pressure, which required the pipe to be so tightly bound that it would be prohibitively expensive to fashion it out of iron or steel. The wooden pipes were fairly resilient as long as they remained wet; they only began to wear out if they dried. The iron bands around the wooden staves were slightly more susceptible to weathering, but the miners generally coated these in asphalt, or a similar substance, to protect them.

Miners fashioned iron pipes out of what they called boiler iron, which was a thick, "stout" variety of sheet iron. They either riveted strips of boiler iron together that were as long as the desired length for the pipe section or they created short sections, called joints, which – when riveted together – formed larger pipe section around 20 feet long. Making pipes out of iron provided the miners with more opportunity to accommodate variability in hydraulicking. They could forge thicker or thinner sheets of boiler iron depending on the expected water pressure. Further, the size of the rivets used – and the number of them – also depended on the water pressure that was to course through the iron pipe. Wrought-iron or steel pipes were the only type of pipe used if the hydraulicking system built up a great head, because these materials could withstand the pressure. The miners used boiler iron and wood pipes for everything else.

Once assembled, the miners anchored the pipes into the ground with posts on either side, which protected the pipes from avalanches and rock slides, while also keeping them from rolling down the hillsides on their own. Sometimes they seated the pipes in ditches and covered them with dirt to further protect them for the elements. With pipes now connected directy to the nozzles, new innovations on monitors emerged. A series of sometimes fatal attempts to make a flexible, elbow-like, ball-and-socket joint finally resulted a series of new monitors that grew into larger and more powerful water cannons. The hydraulic giant was last of these innovations. It could turn in a complete circle horizontaly through the use of a lever. Another lever allowed the controller to drop it ten degrees lower than its neutral resting place and fifty degrees higher. The giant sat anchored to heavy logs, which themselves were usually bolted to the bedrock. Boxes of rocks often served as counterweights for the nozzle so that the water pressure would not knock over the large machine. The largest giant had a nozzle that spanned 12 ¼ inches in diameter, could shoot water at a rate of over 40 cubic feet per second and weighed 3200 pounds. All giants, even the smaller ones, had nozzles stretching at least 100 feet.

Hydraulic mining represented the last of the placer methods and a transition to resource extraction on a larger, more mechanized – and more capitalized – scale. There were several pressing problems with the earlier, simpler placer methods: they were physically arduous, entailing hours spent working with bitterly cold water, often under a blazing sun; they primarily focused on one mineral at a time, be it gold or silver, while ignoring other valuable minerals; and finally, they were still inefficient, and placer miners “skimmed off only the best and most accessible gold” (Safford, 2004: 19). However, to acquire larger amounts of gold by processing greater amounts of (often deeply-buried) ore, the miners had to have enough capital to invest. As such, hydraulic mining not only represented a change in the scale of mineral extraction, it also represented a change in the way that miners worked the deposits. Companies of miners had started to operate multiple claims as one operation, digging small ditches and building long sluices to wash the gravels from the larger area that several claims encompassed. As a result, wage workers had started to appear in the teams that worked sluices. With hydraulic mining, however, a vast number of the miners were hired day laborers rather than the owners of a claim. They would receive a flat rate daily, weekly, or monthly, and worked for as a part of a larger force under the singular direction of a foreman or company owner; in return, the company provided the capital to set up the hydraulic operation and purchase all of the equipment. The Sacramento Daily Union noticed this phenomenon in California in the late 1850s, commending that hydraulic mining was "so very different from the operations of a few years ago," in that with earlier placer methods "men did the work, using the water merely as an auxiliary, and the amount of work done depended on the number of men employed;" with the mechanized system of hydraulic mining, by contrast, "the water is used as the laboring agent, and like machinery in manufacturing, only men enough to keep the machinery properly directed are required" (Sacramento Daily Union, 1857: 3).

As the mining system grew more efficient, there were fewer jobs for individual miners. The monitors could remove more gravel in a few weeks, operated by two or three miners, than a crew of a hundred miners could excavate in several months. After all, the water shooting out was strong enough to wash away a hillside – or to kill anyone that accidentally strode into its path. Many of these miners turned to the hydraulic companies for work, even if it no longer included specifically mining any deposits. Their labor, which was often all they had to offer, was soon directed elsewhere – into digging ditches, building and repairing flumes, and later building and repairing pipes. By the time hydraulic mining was at its height, somewhere between the late 1850s and the late 1880s depending on location in the American West, miners "were no longer individual entrepreneurs, but employees of large hydraulic mining corporations" (Isenberg, 2004: 88). Much of the capital came from eager investors both in nearby cities, such as San Francisco, and those back East, who wanted to be a part of the adventure of western gold rushes without mining. Along with hydraulic mining companies emerged water companies. This created another marked change in the way that miners interacted with the diggings. Water had been a commonly-shared resource in the late 1840s and early 1850s. However, once vast quantities of water became crucial to mining operations, that resource became a commodity. Those who came to California always had thoughts of riches in the forefront of their plans and many figured out how to gain that wealth without swinging a pick. The water companies saw that "although the supply of water doubles every year, from the increased number and capacity of ditches, still the deficiency seems to be as great now as ever" (Sacramento Daily Union, 1857: 3). They didn't hesitate to capitalize on that. This trend would only continue as the placers – even those access through hydraulic mining – finally failed to produce gold or other valuable minerals. Miners, and their investors, turned their attention to the source of the placers' float rock: the mother lode (Eifler, 2017; Holliday, 2015; Encyclopedia Britannica, 2014; Safford, 2004; Isenberg, 2004; Rohrbough, 2004, 1997; Brands, 2002; Lynch, 2002; Smith, 1992; Malone, Roeder, & Lang, 1991; Mucibabich, 1977; Watkins, 1971; Paul, 1963; Holland, 1942; Fay, 1920; Wilson, 1908; Colliery Engineer Company, 1897; Raymond, 1881).

Hard Rock Mining

Hard rock mining emerged in California and elsewhere in the American West once the miners had exhausted the placer deposits. Miners soon realized that placer gold was just part of the gold in store; as such, their main objective soon became "the original source" of the mineral (Safford, 2004: 9). Further, in order to have veins continue to produce valuable ores, "the basic methods of mineral extraction would have to be improved" (Safford, 2004: 18). As such, just as panning and sluicing gave way to hydraulicking, the most subterranean of the placer techniques, coyoting, gave way to hard rock mining. Also called lode mining, hard rock mining focused on mining veins or lodes *in situ*, rather than looking for free gold and float rock that had drifted away from its original place of geological deposition. Lode mining took place in open pits and underground in shafts and tunnels; however, the type of ore body determined the number of employed miners needed to extract the mineral. Veins that were part of outcroppings usually required open pit mining, as did those that did not dip downward too steeply. For veins that were narrow or that dipped sharply downward, underground mining was necessary. The type of ore body even determined how deep the miners had to dig and the amount of effort necessary to extract the minerals. Miners even developed their own terminologies to distinguish between different types of ore deposits. When lode mining focused on gold extraction, miners used the term quartz mining instead of hard rock or lode mining, because gold veins and lodes most commonly ran through quartz, as miners can still attest to today.

In the California gold fields, some miners had dabbled in hard rock mining as early as 1849 and there was even a speculation bubble between 1850 and 1852. However, inexperience quickly defeated these endeavors, with miners and investors alike abandoning the projects following a series of bankruptcies that lasted until 1853. Those foreign and domestic firms that continued to invest in mining chose to favor the less complicated placers. Miners still interested in veins and lodes continued to figure out who to successfully extract them, “learning painfully, by trial and error, further cementing California’s place in mining history as a laboratory for creating and testing extraction techniques. After several mining seasons, the forty-niners discovered how to “trace a vein, sink a shaft, break loose the ore, hoist it to the surface, crush it, and extract the gold from the resultant mass of ground-up material” (Paul, 1963: 31). As more immigrants continued to arrive in the gold fields, these determined miners learned techniques from and shared ideas with the immigrants who had experience mining in Europe and Mexico. As far back as at least the Roman Empire, there are details about lode mining practices; however the mines of the American West – especially the gold fields of California and the Comstock Lode in Nevada – marked a unique intersection of the combined knowledge of several waves of immigrants with new technologies including steam-powered drilling and dynamite blasting.

Hard rock mining began with cold mining, or the use of hand-powered methods, which had been used since antiquity. Over centuries, hard rock mining techniques evolved, adapting with each new technological advance in the field. Today, hard rock mining is a highly-mechanized process, employing engineers and mechanics alongside miners. Whatever the method used, however, nineteenth-century hard rock mining itself represented a new stage in the history of mining as a whole; well-practiced mining methods mixed with ever-improving technology and streams of capital not seen in previous eras. By the nineteenth-century, mining for precious metals and valuable ores became an endeavor on an unprecedently large scale. By the 1860s, when hard rock mining investment began in earnest, the get-rich-quick placer deposits had all but disappeared, exhausted by the efforts of eager forty-niners. Miners and prospectors already in California could rarely afford the amount of capital needed to develop their own claims successfully, but gone was the allure of reaching down into a riverbed and picking up a fortune-changing gold nugget and with it went the incentive for the wealthy to continue to travel to the gold fields. However, the enchantment of gold and the wealth it brought still caught the attention of investors in nearby San Francisco and back east in New York and Philadelphia. These men lacked the skills to mine and, most often, the desire to leave their comfortable, familiar lives to delve into hard rock mining. But they had capital to invest in improving a worthy claim and in paying a crew of miners to develop it. Some chose instead to invest in newly-established water companies, which proved to be as lucrative as gold mining endeavors – and often had a higher chance of continuous success. Hard rock mining took place at Highland City, Montana around 1869, after miners and prospectors had exhausted the placers. Eventually, the huge wealth of copper found in Butte, about 20 miles due north, gained the attention of Highland City's hard rock miners and the labor force moved from gold to copper. (Eifler, 2017; Holliday, 2015; McVarish, 2008; Safford, 2004; Isenberg, 2004; Rohrbough, 2004, 1997; Brands, 2004; Lynch, 2002; Smith, 1992; Malone, Roeder, & Lang, 1991; Hardesty, 1988; Wolle, 1983; Watkins, 1971; Paul, 1963; Holland, 1942; Fay, 1920; Wilson, 1908; Colliery Engineer Company, 1897; Hanks, 1886; Raymond, 1881).

Hard Rock Mining: The Basic Structure of a Mine

A little over a decade after the start of California's gold rush, the diggings saw the "displacement of individual miners with cooperatively capitalized operations," a process that begin with hydraulic mining and came to fruition with lode mining (Safford, 2004: 19). Much of the demand for capital with hard rock mining came from the fact that it was the "most technical of all kinds of mining" and still continues to be today in the American West and worldwide (Paul, 1963: 31). As Andrew Isenberg asserts, "mining was an economic activity rooted in a locality," be it a particular lode or a mineral-rich region, such as the California gold fields, but it was also “connected to far-flung economic processes;” Isenberg argues that this very “interaction of process and place,” which is a common feature in frontier zones, “remade parts of the West,” both in the nature of the physical landscape and the working population (Isenberg, 2004: 88). Hard rock mining was a much more complex process than all of the placer techniques before it. Much of its complexity came from the fact that this method inherently required a diverse array of components to run successfully. A successful mining operation included a variety of different laborers, both skilled and unskilled. The increase in the number of men involved in the operation, and the fact that some had very specialized knowledge, largely contributed to the costs of hard rock mining. The array of machinery required, from simple winches and windlasses to expensive drills, pumps, ore crushers, and stamp mills constituted the majority of the rest of the mining costs.

All of the hard rock mines that were not open pits had horizontal tunnels and vertical shafts that allowed miners access different parts of the often-complex subterranean network of the mine itself. Entrances to the mines, both horizontal and vertical, were called adits. Up until the early nineteenth-century, manpower and animal power were the only forces available to haul out miners and ore. Some mines had narrow steps carved into them for the miners to use, each of whom carried out ore. Later, hand-operated winches aided in lifting ore from the mine depths; these gave way to hydraulic winches and finally sturdier steam-powered windlasses as the mines grew deeper. Deep hard rock mines centered on a deep round or rectangular vertical shaft, which often plummeted to depths of a mile below sea level, as was the case with the Mile-High Mine in Butte, Montana and the Empire Mine in Grass Valley, California. The vertical shaft served two functions within the mine: the transportation of miners and ore and the removal of water. By the third quarter of the nineteenth century, most of these deep mines were characterized by a huge headframe, which sat astride the open shaft and housed the machinery used to move men and ore up and down the various levels of the mine. The vertical shafts became too deep for winches, hand-powered or hydraulic, to operate successfully; as such, the headframes housed the larger windlasses mentioned above. Within the gallows-like headframe, these stout devices hauled on heavy cables, which ran over the steel sheave wheel, to bring up skips filled with ore and cages carrying as many as 28 men at a time. By the late nineteenth-century, rectangular shafts could easily accommodate two skips and two cages, with room in the center for the ladderway and the pipes. The nearby hoist house held the massive steam engine that powered the windlass.

Deep hard rock mines were usually substantially below the natural water table. The bottom of a shaft, called the sump, was usually the deepest part of the mine and, as such, the place where ground water collected most. To drain the commonly flooded mines, miners originally dug additional adits below the water table level, to let gravity drain out much of the water. Windlasses also aided in removing water, as they powered buckets that bailed out the mine's tunnels and shafts. However, these techniques were not effective at lower depths; in response, the nineteenth century saw the emergence of steam-powered pumps, which drew the water out of the sump, up the shaft through a network of pipes, and out to the ground surface. The most commonly used machine was called a Cornish pump, designed on the same concept as a well-water pump, but capable of pulling up to the surface as much as four hundred gallons of water per minute. The whole arrangement was housed toward the middle of the shaft, in an area aptly named the pipeway.

Miners worked on deposits within drifts, which were tunnels that paralleled the ore veins and much as possible and often ran diagonally. Horizontal tunnels connected these drifts with the main vertical mine shaft discussed above. Tunnels' main function was to provide transportation.

They were pathways for laborers and frequently had tracks for ore carts. Intersecting the vertical shaft were multiple horizontal tunnels, each of which connect the shaft with drifts, which were often diagonal tunnels that paralleled (as much as possible) the ore veins that the miners were excavating actively. Adding to the complexity of this subterranean network, miners also carved out stopes, or large cavern-like rooms, when a deposit widened substantially. To aid in communication, ventilation, transportation, and further prospecting, stopes, drifts, and tunnels were often connected by cross-cuts, which were small horizontal burrows, and winzes, which were their vertical equivalent Winzes were, in short, shafts that never connected with the surface. To support this underground grid of excavations, mines employed skilled carpenters, called timberers, to make supports to hold up the rock face of the walls and ceiling. Good timberers knew that different types of parent rock required different types of frames and supports; mistakes that occurred in shoring up mines proved to be both costly and deadly. Millions of square feet of timber went into a large-scale hard rock mine, adding the cost of lumber to the expense of operation. (McVarish, 2008; Safford, 2004; Brands, 2004; Rohrbough, 2004, 1997; Smith, 1992; Hardesty, 1988; Watkins, 1971; Paul, 1963; Fay, 1920; Wilson, 1908; Colliery Engineer Company, 1897; Raymond, 1881).

Hard Rock Mining Technique: Cold Mining and Early Gunpowder Use

Cold mining refers to the process of extracting valuable ores without the use of gunpowder. This form of mining relied exclusively on sheer brute strength, which drove hand tools such as picks, hammers, and shovels directly into the rock face. Cold mining was labor intensive and time-consuming, only bringing profit when the ores were incredibly rich. While gunpowder and fuses date back to the 10th century in China, these did not reach Europe until the early thirteenth century. Despite this, cold mining remained the preferred method for hard rock mining for centuries. In 1574, gunpowder first appeared at a silver and lead mining operation in Schio, Italy. However, its lack of success deterred European miners from using the volatile substance until 1617, when the documentary record shows that the administrators at the copper mines at Thillot, France, placed an order for gunpowder "for exploding in the mountain and moving rock;" this makes the mines at Thillot "the first known example of the regular and large-scale use of explosives in a mining operation" (Lynch, 2002: 66). From this point onward, miners used gunpowder whenever the rock proved too hard to be hewn. Cold mining continued throughout the nineteenth century even after gunpowder – and later dynamite – allowed for higher rates of production with rock types previously too hard to excavate. The hand tools of cold mining became an accompaniment to, or component of, the larger mining operations of the second and third quarters of the nineteenth century (McVarish, 2008; Bown, 2005; Lynch, 2002; Hardesty, 1988; Watkins, 1971; Paul, 1963; Fay, 1920; Wilson, 1908; Colliery Engineer Company, 1897; Raymond, 1881).

Hard Rock Mining Technique: Drilling and Blasting

While gunpowder became more commonplace in hard rock mines, it presented many challenges in terms of preservation and safety. In damp conditions, the powder could become too wet to use. When kept dry, it was highly volatile, exploding easily when in contact with flames, high heat, or sparks – the latter being commonplace in mines, where steel struck stone all day. While the powder was safer when stored in barrels, the greatest danger to the miners, and the mine itself, came when the gunpowder was used in operations. To place the powder in the right place to blast away large pieces of rock, the miners drilled holes directly into the rock face, and then inserted the powder. Until 1875, when compressed-air drills finally came into widespread usage, a set of miners known as drillers bored into the solid rock with a hand drill known as a jack. The simplest drilling process was known as single-jacking and it involved a single driller. He steadied a steel rod in one hand and drove it into the rock with a four-pound sledgehammer in the other hand; he turned the rod after each blow, to keep it from sticking in the rock, a problem called fitchering. Single-jacking evolved into double-jacking, which involved two to three drillers. One driller held and turned the rod, while the other one or two miners pounded it into the rock with eight-pound sledgehammers. Double-jacking averaged at least 50 blows per minute. Drillers drove the rods two to three feet deep into the rock face for each hole. To ensure that an ample amount of rock came loose, drillers usually drove in seven holes in a triangular pattern into each place in the lode where blasting was to take place. The drillers then cleaned the holes of debris and turned the rest of the job over to the blasters.

These miners inserted the gunpowder into the holes and tamped it in place with a pointed copper rod they referred to as a needle; copper and wood were often used, as they were less likely to create sparks around the gunpowder. Pulling out the needle, the blasters would pack soft clay into the hole, securing the powder behind the plug, and would place a length of rope in the cavity left by the needle. Known as a quill, the piece of rope acted as a fuse. One of the blasters would call out to clear the area – usually the well-known "fire in the hole!" – and then touched a slow match, called a splitter, to the quills in the central holes, to create a cavity and weaken the rock face. The blaster(s) then lit the fuses in the holes above and next to the central holes and, finally, the hole drilled at the very bottom. This blasting order allowed the ore to best break free; once the charge in the final hole went off, the blast lifted the ore out of the cavity and into the drift for easy removal. This function gave the final hole it's nickname of the lifter. Ideally, the drilling and blasting process would continue as described. However, as mentioned above, gunpowder was highly volatile and even if inserted into the drillers' holes without incident, the charges still posed a danger while the blasters ignited it. The quills were long and theoretically their length gave the blasters enough time to get to safety. However, the ropes burned irregularly, sometimes reaching the gunpowder charges too quickly. In other instances, they would break, preventing the flame from reaching the powder. If moisture seeped into the quills, they would smolder instead of burning quickly. Not only did this have the potential to prevent the powder from exploding, it also created a long wait before the blasters could determine whether or not the powder would go off. This waiting period suspended all mining operations, wasting time and manpower. Unfortunately, quills determined to be smoldered misfires often had enough of a dry spot near the powder that they would smolder until reaching this point, and then set off the powder charge – with the drillers, pickmen, hewers, and other miners all back at work on the rock face.

On September 6, 1831, the Bickford fuse entered the world of mining and finally added a measure of security to mining with gunpowder. Also known as the safety fuse, William Bickford’s fuse consisted of a cylindrical paper cartridge of gunpowder, which was wrapped with two layers of jute rope, which wrapped around the tube in opposite directions. He varnished the wrapped strands with tar once they were wrapped. The varnished rope resisted water and burned at a predictable rate, usually advertised as 30 seconds per foot or 1 second per centimeter, which greatly reduced the number of gunpowder-based mining deaths. It was this high number of deaths, particularly in his native Cornwall, that first had driven the merchant Bickford to experiment with a safer way to blast rock. Miners quickly adopted the safety fuse, aided by the fact that it cost about as much as the unpredictable quills. The Bickford fuse revolutionized the world of hard rock mining, making blasting more feasible; however, it had another effect on the profession as well: the safety fuse inspired the work of Swedish chemist, engineer, and inventor Alfred Nobel.

In 1867, Nobel obtained both English (May 7) and Swedish (October 19) patents for dynamite and introduced it to the world of construction and mining as a safer alternative to gunpowder. He combined the highly explosive oil nitroglycerin, invented by his colleague Ascanio Sobrero, with non-explosive, absorbent kieselguhr, which is now known as diatomaceous earth. Kiselguhr occurs naturally as a soft, silica-rich, sedimentary rock and was found near the area where Nobel had been experimenting. To these two substances, he added a small amount of sodium carbonate antacid, which stabilized the mixture. Nobel molded all three ingredients into a cylindrical stick, which he wrapped in greased, waterproof paper. A blast cap sat at the end of each stick, which could ignite in two different ways. The first method involved a blaster inserting a Bickford fuse into the cap and igniting it. When the jute rope finished burning, it would ignite the blast cap rather than a charge of black powder. The blast cap created enough of a force to set off the nitroglycerin in the dynamite. The second method of ignition involved attaching a wire to the blast cap and blasting the dynamite with an electrical current. Inspired by the Bickford fuse, dynamite followed the same pattern, quickly becoming the explosive of choice for miners (McVarish, 2008; Bown, 2005; Brands, 2004; Lynch, 2002; Smith, 1992; Hardesty, 1988; Watkins, 1971; Paul, 1963; Fay, 1920; Young, 1916; Wilson, 1908; Colliery Engineer Company, 1897; Raymond, 1881).

Hard Rock Mining Technique: Hauling Ore

Successfully blasted from the rock face, the ore lay in the drift, awaiting the work of a new set of miners. Loaders and muckers filled ore carts with long-handled shovels, colloquially referred to as ‘getting rocks into the box;’ to do this, they separated out the valuable ores from the gangue – referred to as waste rock in hard rock mining. Hurriers, putters, and dragsmen first drove mules and their loaded ore-carts through the tunnels; later, these miners operated machinery to guide the ore carts along railways to the skips, where they rose to the surface up the mine shaft and emptied themselves. The ore bins themselves varied in shape and size, some small and round and others large and rectangular. The smaller ore bins were usually made of wood, while the larger ones were made of steel or even concrete (and sometimes a combination of the two materials). Steam-powered engines often transported the ore carts along miles of track from the mine to the waste dumps, if they were filled with waste rock, and to the mills and smelters if they contained valuable ores. In the American West, some ore bins even traveled in water-filled flumes, and the ruins of these large structures still speckle the landscape (McVarish, 2008; Hardesty, 1988; Watkins, 1971; Paul, 1963; Fay, 1920; Young, 1916; Wilson, 1908; Colliery Engineer Company, 1897; Raymond, 1881).

Hard Rock Mining Technique: Milling

Once the miners freed the ores, whether they came from a coyote hole, a shallow mine, an open pit mine, or a deep, hard rock mine, they had to crush the rock into fine enough particles that they could separate the metal from the gangue and create bullion. In California and much of the American West, gold ores were often "free milling," which meant that they easily amalgamated with mercury once crushed. The ideal mill was built near the mining site; this prevented the loss (or theft) of the valuable ores and reduced the expense of transport, which was often quite high in the remote regions where the ores were found. The easiest, and arguably the oldest, method of milling was the arrastra. Comprised of a round expanse of flat rock surrounded by a retaining wall, the floor of the arrastra provided a hard surface against which miners could crush the ores. At the center of the arrastra floor stood a large pole with an attached cross-beam.

Fixed to one end of the horizontal beam were at least two large boulders; a team of mules, or sometimes a waterwheel, moved the other end, dragging the boulder over the jagged fragments of mercury-covered ore. The tedious process continued until the ore was crushed into fine enough particles that the metal, especially gold, successfully amalgamated with the mercury. Some mining operations used a Chili Mill, which improved the design of the arrastra slightly, by using stone wheels in place of boulders; this created finer ore particles. The arrastra was popular in Mexico, South America, and Spain, where it originated. However, Americans soon grew impatient with the arduous process, and soon larger mining operations sought out a faster alternative; after all, they “hadn’t the time to sit in the sun watching a couple of mules walk around” (Watkins, 1971: 193).

By the second half of the nineteenth century, the California stamp mill replaced the arrastra and in the history of mining still “stands forth as a Californian contribution of international technological importance” (Paul, 1963: 32). Stamp mills crushed rock fragments into a rough sand using the up-and-down motion of a steam-powered camshaft with several heavy iron stamps attached to it. The stamps pounded down onto an anvil-like die that was most often made of iron, although some were made of concrete or even wood. The die sat within a mortar box, called a battery, whose walls held the ore in place while the stamp worked on it. The stamp operated like a nutcracker, separating the metal from the gangue like nuts from their shells. Mining operations either dry stamped or wet stamped their ores. When dry stamped, they first roasted the ores in a kiln before crushing them; when wet stamped, they pumped water into the mortar box so that the stamps would create a pulp-like mixture of ore and water. They ran this slurry over mercury-covered amalgamating plates to collect the metal. The parts of the mixture not trapped by the plates went through a series of screens, sluices and riffles, not unlike placer mining, which caught those particles too fine for the stamp mill to crush. Curiously, if the millers felt the ore was still too large, they would often send the mixture to an arrastra for finer milling. In the 1860s, miller, especially at Nevada's Comstock Lode, began to patent smaller versions of the arrastras; these took the form of circular iron grinding pans, measuring four to five feet across, each fitted with a heavy iron device called a muller, which ground and stirred the mixture. To heat the slurry, they pumped steam into the pans, which sped up the milling process. The use of grinding pans, known as the "Washoe Pan Process" of finely milling ore, named for the Washoe district where the Comstock Lode lay, was "the West's second major contribution to the technology of working gold and silver ores" (Watkins, 1971: 194). If California started the American's West's mining laboratory and left its mark with the California Stamp Mill, Nevada's Carson River Valley advanced mining into a fully industrial science, with the Washoe Pan Process standing as just one of its advances (Lynch, 2002; Hardesty, 1988; Watkins, 1971; NPS, 1967; Paul, 1963)

Once blasting allowed for larger pieces of rock and ore to dislodge from the mine walls, mining operations often added an additional process to the milling process: rock crushing. Screens known as grizzlies allowed all rock small enough to go to the stamp mills through into a separate ore bin. Those caught by the grizzly went instead to the rock crusher. Also known as a jaw crusher, these nineteenth-century machines broke rock between two heavy metal plates. One plate was fixed in a vertical position, while the other one moved back and forth with a piston and crankshaft. Using the same nutcracker-like principle of the stamp mill, jaw crushers trapped large ore pieces between the two plates and chewed them up into smaller fragments, which tumbled down onto a channel-like tray. Those operating the rock crushers then removed the smaller rock pieces with a long, narrow, and rectangular shovel. The most popular jaw crusher was the Blake Rock Crusher. Invented in 1858 by Eli Whitney Blake, nephew of the inventor Eli Whitney, of cotton-gin fame, Blake wanted to create a device that would replace the labor-intensive (and as a result costly) method of crushing rock with hand hammers. Subsequent jaw crushers – even those used in large-scale rock crushing operations today – took their design inspiration from the Blake Rock Crusher (McVarish, 2008; Brands, 2004; Rohrbough, 2004, 1997; Smith, 1992; Hardesty, 1988; Watkins, 1971; Paul, 1963; Fay, 1920; Young, 1916; Wilson, 1908; Sturtevant Mill Company, 1903; Colliery Engineer Company, 1897; Hanks, 1886; Raymond, 1881).

Gold Fever: The Epidemic of the West

Armed with knowledge and skills gained in the California gold fields, miners eagerly fled from the waning placers to new strikes in the West. By the mid-1850s, California held "a growing army of the "industrially desperate"" who eagerly fell victim to contagious gold "manias, fevers, and hysterias" (Paul, 1963: 37, 39). Even stampedes that ended in little gold, or none at all like at Kern River, British Columbia, did little to cool the miners' relentless fever for riches. The rushes of the 1850s and 60s powerfully blended miners' desperation to overcome past failures with a ravenous lust for riches, and a frenzied disregard for environmental challenges from both landscape and weather. Forty-niners were hardly the only miners infected with gold mania; tens of thousands of would-be miners and prospectors poured into the American West from the Missouri frontier, starting their journeys in the Mississippi and Ohio Valleys, or even in the cities along the Atlantic seaboard. Just shy of its centennial, the young United States experienced a roiling population movement, as eager gold-seekers simultaneously ran westward from the Missouri frontier and eastward from California; they scrambled northward into Idaho and Montana and south into Nevada and New Mexico. The period from 1858 to 1868 experienced a great opening-up of land in the interior of the American West, which had been acquired – through the Louisiana Purchase, the Treaty of Guadalupe-Hidalgo, or the Gasden Purchase – but heretofore marginally explored. The allure of the gold fields and silver mines of the American West proved that the "the age of Manifest Destiny was manifestly restless," with a population characterized driven relentlessly "forward on a daily basis through a combination of restless energy, hope, self-interest, and group loyalty" (Meldahl, 2007: 73; Rohrbough, 2004: 116-117). For at least a decade, "great crowds of itinerant miners seemed always to be in motion in motion from the Pacific to the Rockies," driven relentlessly (Paul, 1963: 39). Further, after each failed endeavor, "the population as a whole seemed not to be at all discouraged" despite the fact that "many individuals lost every cent they had accumulated or borrowed" (Paul, 1963: 38). The undying dedication to mining in the American West eventually did result in large strikes of gold, silver, and copper spanning a distance from Nevada to Idaho; however, for each successful strike, the history of the American West is as scarred by failed rushes as its landscape is littered with abandoned claims (Meldahl, 2007; Rohrbough, 2004; Lynch, 2002; Smith, 1992; Watkins, 1971; NPS, 1967; Paul, 1963).

The Bust at Pike's Peak: Colorado Enters the Mining Scene

Georgian prospector Lewis Ralston stopped at a small stream off of Clear Creek in western Kansas territory on June 22nd, 1850 on his way to the California gold fields. While his party rested, he brought his pan to the water and pulled out a quarter troy ounce of gold, which was worth about $5 at the time. While his traveling companions noted the gold, they were all too enchanted by California, which purported to have enough gold for every man to grow rich. As such, Ralston left with his companions. Before they packed up their camp, they named the little stream in honor of their friend to acknowledge the gold he had found there. Lewis Ralston returned eight years later with another Georgian prospector, William Greeneberry "Green" Russell. Russell had prospected in California just as Ralston had, but they now sought new diggings as the placers petered out. They had both heard rumors of gold along the South Platte river, which were confirmed by Ralston's own story of finding gold. Green Russell organized a party of miners and prospectors to head for the river, leaving California in February of 1858. The party grew to roughly 107 people by the time it arrived in Pike's Peak Country, which spanned western Kansan Territory and southwestern Nebraska Territory. On May 23rd, they stopped to prospect at the intersection of Cherry Creek, Ralston Creek, and the South Platte River. They had little success until July, when Russell and another prospector, Sam Bates, found 20 troy ounces, or 622 grams, of gold on nearby Little Dry Creek. The placer deposit at the mouth of the small creek became the first major gold discovery in the Rocky Mountains. Ralston, Russell, and Bates founded several small towns around the confluence of the rivers and creeks. Most of these have been subsumed into present-day Denver, while others have changed names; Auraria, the first town founded in the area, is known today as Arvada (Brown, 2002; Smith, 1992; Watkins, 1971; NPS, 1967; Paul, 1963; Villard, 1932).

In 1859, several prospectors, also with experience from California, headed up into the canyons cared by the South Platte's tributaries, drawing on the lessons learned about free gold in the canyons of the Sierra Nevada. One of these men, George A. Jackson, found a substantial placer deposits along Chicago Creek on January 5, 1859. The town of Idaho Springs, which stands to this day, soon sprang up near Jackson's deposits. Jackson's strike was the largest strike in the region at the time of its discovery. At almost the same time, John S. Gregory found gold along north Clear Creek. However, heavy snowfall and a lack of adequate supplies kept him from declaring his strike until the snow had melted. On May 6 of the same year, he not only declared his strike in the area he named Gregory Gulch, but also found a large quartz outcropping of a gold vein, which he named the Gregory Lode. Within two months, he struck additional veins. Shortly afterward, two cities sprang up at either end of the Gulch: Central City and Blackhawk City, which was to become a famous smelting city later in the century. A final January strike took place in 1859 on the 15th, in the Boulder Creek drainage on a spot named Gold Hill; The city of Boulder sprang up approximately 10 miles to the southeast shortly thereafter. The discovery at Little Dry Creek sparked what was to become the second largest gold rush in American History - the Pike's Peak Gold Rush. The subsequent strikes at Gregory Gulch, Chicago Creek, and Gold Hill turned that spark into a blaze of speculation and interest – much of which would end up being mere exaggeration (Brown, 2002; Lynch, 2002; Smith, 1992; Watkins, 1971; NPS, 1967; Paul, 1963; Villard, 1932).

The Rush created a frenzy, largely spurred on by Midwesterners who missed 1849 California Gold Rush and wanted to join in the gold mining experience. A slightly smaller number also came from California, including those who were unsuccessful in the California gold fields, and those who merely longed for more gold and another chance to 'strike it rich.' Some prospectors raced to the region as early as the winter of 1858, but were unable to prospect or pan until the snow melted. Historians estimate somewhere between 50,000 and 100,000 miners flooded into Pike's Peak Country from the time the rush stared in July 1858 until February 28, 1861, when Colorado achieved territory status. The region, and the rush, were both somewhat erroneously named; the gold strikes took place roughly 85 miles north of Pike's Peak. At 14, 115 feet above sea-level, the summit was the most noticeable landmark nearby and it did act as a waypost for the incoming miners. As a result, the region and the rush took its name. The other nickname adopted by, and for, the miners was the term “the fifty-niners,” commemorating the fact that the Pike’s Peak Gold Rush took place roughly a decade after California’s Rush. The huge influx of miners created the first major Euro-American population in the area and established both the towns of Denver and Boulder, which remain prominent Colorado towns to this day.

For the first decade, miners quickly clustered into several locations: first near Denver and along the South Platte River, at the base of the Rocky Mountains; then on to placer deposits in Gregory Gulch and Idaho Springs; next, they laid in claims at in Clear Creek canyon to the west and further up in the mountains; from there, the mining stretched along the Colorado Mineral Belt, which is a 200 mile-long diagonal alignment of mineral deposits that snakes across the southern Rocky Mountains from the northeast to the southwest; finally, the miners took mountain passes to mine the deposits at Breckenridge in South Park and at the headwaters of the Blue River. Thus, during the 1860s, the region encompassed by present-day Colorado wore a sash-like diagonal band of simultaneous mining endeavors. At each of the diggings, miners consulted the “Old Californians,” who were those who had worked the gold fields in 1849 and the early 1850s – and who had frequently returned east with their profits – but now returned to mining, enchanted by the prospects of Pike’s Peak Country. Some of these men were even doubly experienced, such as Green Russell and Lewis Ralston, having worked first in the mines of Georgia. These seasoned miners “were an invaluable element” for a mining population that was, on the whole, “distinctly amateurish” and in need of education with regards to not only mining techniques, but also commonly-held mining laws and the particulars of camp life (Paul, 1963: 42).

Unlike California, lode mining in Colorado began at the same time as placer mining, with roughly two-fifths of the total gold produced between 1858 and 1867 coming from hard rock mining. The quick transition from placer mining to hard rock mining “happened with a rapidity not known in California” and set the pattern for Rocky Mountain mining endeavors to come (Smith, 1992: 10). Where simple techniques like panning and sluicing dominated much of the diggings, it was largely due to the overall inexperience of the mining population. While the miners at the Colorado diggings encountered few difficulties with their work, the overall amount of gold pulled from the region was much smaller than that from California, or from the later strikes in Nevada, Idaho, and Montana. The placers were indeed rich in several places, but these rich strikes were not widespread, especially when compared with California, or with the strikes to come in Idaho and Montana. Overall, the gold fields only produced $25,000,000 during the first decade; the height of gold mining came in 1862 and 1863, when miners extracted $3,400,000 in gold. The fact that the Pike’s Peak Gold Rush attracted so many miners and produced such a small amount of gold “makes it clear how greatly exaggerated were the early ideas about Colorado gold;” renamed the “humbug of humbugs” and the “humbug of hope,” the Pike’s Peak Gold Rush soon produced an “exodus of the disillusioned and discontented,” many of whom returned to Missouri and to the Midwest (Paul, 1963: 115). Those that remained in Colorado repeated many of the mistakes made in California, for too few of the miners had been in the gold fields in the 1850s. Further, even the “Old Californians” had never placer mined at an elevation of 10,000 feet, where oxygen was scarcer than in the foothills of the Sierra Nevada mountains and winter more plentiful, with an earlier arrival and a much later thaw. The Pike Peak Gold Rush, while a crippling failure for some, did result in the establishment of the Colorado Territory, on February 28, 1861 and of Clark, Gruber, & Co on July 25th, 1860, which was the private mint that eventually became the official US Denver Mint (Brown, 2002; Smith, 1992; Watkins, 1971; NPS, 1967; Paul, 1963; Villard, 1932).

The Territory's salvation would indeed come from mining, but it would be largely too late for the original participants of the Pike's Peak Gold Rush. Although hard rock mining was "inherently slower, more difficult, and more expensive to develop," lode mining booms in silver and lead in the late 1870s and in gold in the early twentieth-century restored Colorado's reputation as mineral-rich country (Paul, 1963: 117). Its lode mining success could not have happened, however, without the industrial advances that took place in the deep hard rock mine of Nevada's Comstock Lode. The miners in Nevada demonstrated that even the most skilled among them had to "struggle through years of technological mistakes and inadequate financing" before the lode mines became profitable (Paul, 1963: 117). The lessons learned from the Comstock Lode, when applied to silver, lead, and gold hard rock endeavors, eventually led to Colorado's statehood on August 1, 1875 (Brown, 2002; Lynch, 2002; Smith, 1992; Watkins, 1971; NPS, 1967; Paul, 1963; Villard, 1932).

Hard Rock Mining's Silver Lining: Nevada's Comstock Lode

Often viewed as the successor of to California in the world of mining, Nevada's Comstock Lode honed the skills learned during the 1849 Gold Rush. Further, the endeavors differed from the activities in Colorado: the Comstock Lode immediately centered on deep hard rock mining and it attracted more seasoned miners and prospectors, directly from California, who did not fall victim to the mistakes made in California's early days – or in Colorado's gold fields. Where Colorado's mining population consisted of many first-time miners, the Nevada miners were "highly experienced in their specialty," creating "quite a professional operation" (Paul, 1963: 43). As mentioned earlier, California acted as a proving ground for miners and mining technology; the experience of Gold Rush of 1849 taught the new miners of the American West "the fundamentals of a new profession" as they encountered the "first lessons learned in precious metal mining” (Paul, 1963: 57). While Colorado miners re-established this school near Pike’s Peak, the miners in Nevada used their time working on the Comstock Lode as “an advanced school in which they discovered how to mine in depth and on a large scale” (Paul, 1963: 57). These skills in complicated machinery, in the removal of tightly-adhered silver and gold, and in the organization of vast numbers of miners at one mining endeavor eventually reached Colorado, and rescued the hard rock mining endeavors there; however, these skills came from the new laboratory of Nevada’s Carson River Valley (Rohrbough, 2004; Lynch, 2002; Hardesty, 1988; Watkins, 1971; NPS, 1967; Paul, 1963)

Minimal prospecting began in the 1850s around Nevada’s Carson River, but all of it took place with rudimentary panning techniques, separated by 100 miles from the advances of the California gold fields. In 1859, a group of miners, led by Henry P.T. Comstock and James Fennimore, nicknamed “Old Pancake” and “Old Virginia” respectively, began work at a set of placer diggings that they named Gold Hill, which sat at the head of the equally imaginatively-named Gold Canyon. Nearby, two Irishmen, Patrick McLaughlin and Peter O’Riley, also laid in a gold claim. However, they had trouble separating the gold that they found from a dark, black substance that appeared sometimes as rock and sometimes as dirt and which clung to their pans and rocker boxes. They also ran into bluish quartz and blue-black sand. These troublesome materials proved to be nearly pure silver. Their little claim turned into what would become the famous Ophir mine. Historians argue as to how “Old Pancake” truly got involved with the two Irishmen, but by the time the mine was heavily producing, Comstock was in full partnership with McLaughlin and O’Riley. The trio quickly learned that they hadn’t stumbled across a placer deposit, but instead were picking at a heavily decomposed vein outcropping.

Ironically, the trio initially threw aside the "blasted blue stuff," not knowing what it was. They had recognized the black sand as silver alloyed with gold and accepted that they would receive less money per ounce of gold that they turn in because of it. The blue rock and heavy sand of the same color were new minerals and seemed only to get in the way of their gold exploitation. One of the now-combined little group of miners decided to send away the bluish quartz to California, where an assayer could determine its composition. The news sent back to the Carson River valley was disappointing. The quartz was, in fact, a silver-rich ore body; the revelation "caused an abrupt exodus from the county" (Paul, 1963: 59). However, the news of a silver-rich strike in Nevada blazed through California by word of mouth. The original assayers of the silver ore, along with those that they had told about the find, quickly rode off to lay in claim in the Carson Valley before "Old Pancake" and his partners understood the true value of their discovery. Comstock and O'Riley's Gold Hill soon turned into a bustling little settlement of tents, lean-tos, and hastily-cobbled together shanties; the Irishmen's claim evolved into Virginia City, which – according to legend – was named after "Old Virginia" O'Riley, because he had dropped his whiskey bottle on the ground near the claim. A third city – Carson City – sprang up as a mining center as well, situated close to Virginia City and the end of the California Trail. Both the city and the river than ran nearby the Lode were named after the famed frontiersman Kit Carson (Lynch, 2002; Watkins, 1971; NPS, 1967; Paul, 1963).

"Old Pancake" himself lent his name to the lode, although the fact that Henry P.T. Comstock earned the fame for the discovery has chaffed mining historians and Nevadans since. The Lode was the product of prehistoric fissures and the movement of heated mineral-bearing fluids into those fissures. The heated fluids deposited gold and silver into the fissure and sloshed the minerals up its sides; however, they did not lay them down evenly along the length of the crack in the rock. Instead, the minerals clustered into large, wide spaces called ore chambers, into thin channels called ore shoots, and into snaking ore branches. When a miner struck a chamber, or even a shoot, he found a bonanza, a term which came from the Spanish term for clear skies. The rock that lay between and around these chambers, shoots, and branches were very mineral poor; the unlucky miner that hit one of these barren patches found a borrasca (Spanish for storm) instead. The hit-and-miss nature of the Comstock Lode fueled a speculation frenzy; miners bought patches near known locations of the Lode, hoping to find the next subsequent part of the vein. In total, the Comstock Lode stretched, curved, and twisted across two and a half miles from the head of Gold Canyon at the south to the head of Six-Mile Canyon to the north, across Mt. Davidson's eastern face and underneath both Gold City and Virginia City. The area encompassing these towns and canyons along the Carson River soon gained the name of Washoe.

While primary sources clearly demonstrate that miners soon raced to Nevada, many left shortly thereafter; some returned to California and sold speculative claims or supplies, now that they could boast to have been to the site and to know what was needed. Another cause of traffic away from Washoe was the frustrating realization that, unlike in California or Colorado, "individual miners had little opportunity" in the Carson River Valley (NPS, 1967: 25). Both prospectors actively at work in the American West and eager readers of the newspaper back East conceived of mining as a "validation of individual enterprise" where "lone men panning by streambeds were rewarded with large fortunes" (Isenberg, 2004: 88). Realistically, this kind of luck came to only a few men in California, and even fewer in Colorado, although this did little to discourage would-be millionaires. The nature of the Comstock Lode abruptly changed this Romantic notion, as mining became a "corporate enterprise with a large labor force, sophisticated technology, [and] large capital investment" (Rohrbough, 2004: 118). Lone miners, or even small work groups lacked the experience, the capital, and often both of these components, to succeed in a settlement based not only on lode-mining, but on lode mining minerals other than gold. This two-way traffic makes it difficult to accurately ascertain exactly how many people rushed to the Comstock Lode. Most conservative estimates place the influx of people at 10,000 people, which others expand that number to as high as 20,000. The character of the working population at Comstock strike differed from that of Colorado's Pike's Peak largely due to the strikes' geography. Virginia city sat 101 miles from Placerville, much closer than Pike's Peak, which sat closer to the Missouri River frontier. This hundred-mile distance only took several days instead of several months to reach, even with the poor road conditions and often-heavy snow crossing the Sierra Nevada. The closer distance to California would benefit Nevada technologically and economically. Some "Old Californians" bought claims along the Carson River only to sell them immediately back in California for exaggerated prices. At its height, the Comstock Lode lay underneath approximately 17,000 different claims, most of which were speculative. At most, only ten or so of the over 3,000 working mining claims ever yielded profits. The profits that came from these bonanzas, however, made up for the staggering proportion of borrascas in the Valley and kept the population – and later on investors – hopeful (Rohrbough, 2004; Lynch, 2002; Watkins, 1971; NPS, 1967; Paul, 1963).

The men that remained came with the new advances in hard rock mining fresh in their minds. They did more than lay in claims. They build arrastras and simple stamp mills; they set up banks, saloons, and hotels. The more enterprising individuals established toll roads. For many of the new emigrants to the Carson River Valley, speculating in claims, selling and trading them by the thousands, became their full-time profession. Even the famous writer and satirist Mark Twain became a salesman and trader these often-fictive mines. The “Old Californians” who chose to focus on mining had to apply everything they had figured out in California to try and break the silver from the thick quartz that encased it. One such man was George Hearst, who had been in Nevada City, California when the first mysterious blue rocks from the Comstock arrived. He raced to the Washoe and bought a 1/6th share in the Ophir mine. Hearts and his fellow miners pulled 38 tons of silver ore from the mine in 1859, the first year that they worked the Lode; this generated a profit of $91,000 for the owners of the Ophir. This incredible fortune caused the already frenzied speculation in the Carson River Valley to mount to an even more feverish pace. It also attracted investors, both foreign and domestic.

These investors’ interest was incredibly timely, for the miners at the Comstock soon realized that the Lode ran deeper beneath the ground surface than anyone had originally guessed. The Ophir needed machinery for stamp mills, ore crushing, and hard rock drilling. It needed feet upon feet of track for the ore carts to ride. All of this had to be carted over the treacherous Sierra Nevada mountains from California to the Washoe, which dramatically increased the cost of the already-expensive machine shop purchases. The Ophir needed wood as well, and this desire stripped the nearby mountains of all available timber. Flumes and buildings were made of wood. Fires ran on wood, as did many steam engines; it supported mineshafts, tunnels and drifts as well, which were increasingly becoming a major component of mining the Lode. By the spring of 1860, Hearst and the other owners of the Ophir had hired ten miners to dig as deep as fifty feet below the surface. They soon ran into a problem that was to plague all hard rock mines to come; they hit the water table for the area’s ground water. They began to experiment with steam-powered pumps and windlasses, such as those described earlier in this chapter. By January of 1861, the Ophir mine plummeted down 180 feet, although it was on a steep incline rather than in the form of a vertical shaft. Hearst and his miners followed the path of the vein, digging deeper only when it snaked downward. It was at this depth that the Comstock provided another lesson in hard rock mining. The vein opened into an ore chamber that spanned 65 feet at its widest. All previously known methods of supporting tunnels failed to work at the Ophir, which resulted in numerous cave-ins and a deadly, ever-present danger to the miners within (Rohrbough, 2004; Lynch, 2002; Hardesty, 1988; Watkins, 1971; NPS, 1967; Paul, 1963).

Hearst and his companions needed to find a solution quickly before the next cave-in buried their workers alive, along with hundreds of thousands of dollars, if not millions, in silver ore. The laboratory of the Comstock Lode was about to begin another experiment: how to extract ore that seemed "too dangerous to be touched" (Paul, 1963: 65). The Ophir's salvation came in the form of a young engineer from Germany, Philip Deidesheimer. He had arrived in California in 1851 and soon was overseeing the excavation of a hard rock mine there. Deidesheimer came out to the Comstock Lode and, astoundingly, took only a month to invent a system that would forever change hard rock mining. The "square set" system set up mortised and tenoned timbers in a series of hollow cubes, each of which could be attached to another endlessly. The cubes could also be stacked into a column along an ore shoot or into a pyramid-like structure to work an ore chamber at different levels simultaneously. The "square sets" distributed the weight of the rock more evenly, allowing miners to work on a lode at depths – and widths – never previously achieved. Deidesheimer's "square set" gained international attention, with miners, engineers, and investors coming to Virginia City to examine the "enormous timer-supported caverns of the Comstock" (Watkins, 1971; 193). Deisdesheimer's system soon filled not only the Ophir mine but all of the other mines on the Comstock Lode (Lynch, 2002; Hardesty, 1988; Watkins, 1971; NPS, 1967; Paul, 1963).

The success of the Comstock Lode led to increased capital, which allowed for further innovation in hard rock mining. Soon, the Carson River Valley produced specialized air compressors for drills, reducing the time and manpower needed to work the rock face; advances in shaft technologies, including air blowing ventilation machines, powerful and efficient water pumps, self-dumping ore carts – skips – along with complicated tramways which carried ore and waste rock to mills and dumps. The Washoe led to inventions and improvements within hard rock mining, but that was not its only legacy. Some Comstock silver easily separated from the lead, gold, and waste rock in which it was encased. Other ores were much more stubborn. However, the region hardly lacked for capital and soon the engineers at the Comstock found a solution to processing the ores – just as they had come up with advances in extraction; they increased the size of the California Stamp Mill with sometimes twenty-four stamps pounding at once, and added the Washoe Pan Process, which has been discussed earlier. By the 1890s, the mines of Comstock Lode – along with those in Colorado, Idaho, and Montana, would become vast industries with smelters, stamp-mills of 100 or more stamps working at once, on-site machine-shops, and huge manual labor forces. The advances begun at Nevada's Comstock Lode not only proved that lode mining could be – and was – profitable, but also transformed mining from "the most individual of enterprises" into a heavily industrialized business with complicated technology and huge capital investments. The dangerous, exhausting work of hard rock mining underground "became a permanent condition," which is largely how the field of mining operates to this day (Rohrbough, 2004: 123-124).

Ironically, the greatest beneficiaries of the Comstock Lode were the large mining companies that formed in the 1870s. Small mining companies had worked the vein of gold and silver until 1873, when the Consolidated Virginia Company bored directly into a lode filled with gold and silver, stretching 54 feet wide. This strike was likely the “richest single find in mining history” (NPS, 1967: 25). The find required a greater labor force, more complicated machinery, and larger-scale organization than small mining companies could provide; further, the larger the company, the more likely investors were to send funding. The Big Bonanza, as the strike was called, marked the point at which “big companies gained the ascendancy” in Nevada, setting a pattern that would continue at lode mines across he American West. The original discovers of the Lode all sold their claims relatively early in the process. They chose to take quick money offers, some in amounts of several thousand dollars, which seemed a fortune to miners who lived on five dollars a day; many of them had likely never seen that much money in their lives up to that point, let alone possessed such a quantity. Peter O’Riley was the last of the six Ophir miners to sell his stock, but eventually even he succumbed to the larger companies, receiving $40,000 for his portion. Even this seemingly astounding amount turned out to be far below the true value of O’Riley’s share. Even Henry P.T. Comstock himself sold his claims for quick money, taking $11,000 in exchange. He lived the rest of his life haunted by his decision and ruing the fortune that he almost had. Investors, like George Hurst, fared better. He became a founding member of the private mining firm Hearst, Haggin, Tevis, and Co. and ended up gaining interests not only in the Ophir Mine, but elsewhere along the Comstock Lode. Additionally, he gained interests in the Utah’s Ontario silver mine, Deadwood, South Dakota’s Homestake gold mine, and the Anaconda Copper Mine in Butte, Montana. The latter he acquired through Marcus Daly, whom he had met at the Comstock. Daly suggested, correctly, that he invest in the Ontario mine and gladly gave him a share in the Anaconda Copper Mining Company in exchange for financing. The Company proved to be one of richest copper mines in the United States, operating from 1881 to 1947 and producing 94,900 tons of copper during that time. That Hearst’s interests eventually ended up in the lodes of Montana follows the general pattern that took place in the American West. As the Comstock Lode ran out, prospectors, miners, and investors looked elsewhere in the American West for their next great mineral strike. Montana did not disappoint them.

The Treasure State: Mining in Montana

The 1860s found prospectors further north in the Rocky Mountains. The placer deposits were exhausted in California, Colorado, and Nevada. Hard rock mining became more industrialized and left little room for independent miners at the Comstock Lode, or at the increasing number of quartz mines in Colorado. The allure of gold did not peter out with the more southern placer deposits, though; rather, the population of the American West continued to be a roiling, churning thing characterized by a "persistent American restlessness" along with a "pervasive addition to speculation and a desire to exploit virgin natural resources under conditions of maximum freedom" (Paul, 1963: 41). Neither Nevada or Colorado had duplicated the California Gold Rush's abundance of free milling placer gold, which, crucially, could come lose using simple techniques like pans and sluices. Montana offered a fresh start – largely because it was an unknown for prospectors. Rumors of gold in Montana had only trickled out since the 1850s, although few tried to flesh them out, largely due to the region's extreme isolation. The area that would become the state of Montana sat far from overland routes like the Oregon Trail and, landlocked as it was, had no strong connection to shipping traffic along the Pacific Coast. The few miners who did journey out in the 1850s with trappers into the rocky landscape found gold, but in small enough amounts the allure of Colorado or Nevada proved to be too strong until the 1860s. Three "Old Californians," James and Granville Stuart, brothers who would later greatly influence mining history in Montana, and Reece Anderson first came to the region at the end of 1857. They stayed there through the spring of 1858 and in May, found gold on the aptly named Gold Creek, where a small amount of gold had been recovered five years prior. The three prospectors determined that the placer deposit they found was too small to be worth the effort of excavating it, given Montana's isolation from both trade routes and the large cities of the American West. The Stuarts and Anderson returned to California, determining that they would return to Montana if they heard more favorable news. The mineral wealth that was to come from Montana would prove to be worth the wait, as it "seemed to offer the reincarnation of early Gold Rush California" complete with opportunities for "individual prospectors and small companies" to produce "substantial profits" (Rohrbough, 2004: 120; Lynch, 2002; Smith, 1992; Malone, Roeder, & Lang, 1991; Wolle, 1983; Spence, 1978; Watkins, 1971; Burlingame, 1969; Oviatt, 1969; Paul, 1963; Raymond, 1871).

The year 1862 marked the first major gold strike in Montana. Prospector John White found a large gold lode was found at Grasshopper Creek in July. News traveled with astounding speed, considering Montana's isolation, and soon the diggings developed into the Montana's first boomtown, "a hell-for leather burg" that the men named Bannack (Malone, Roeder, & Lang, 1991: 65). The "Old Californians" James and Granville Stuart had returned to Montana in 1860 and were present at Grasshopper Creek when White found his placer deposit. By the fall of 1862, approximately 500 prospectors clustered along the creek. Those that arrived early enough weathered the winter and continued to exploit their choice claims. The latecomers found relatively little left for them. By the spring of 1863, the deposits at the Grasshopper Creek diggings began to run out. Many of the prospectors left Grasshopper Creek, and the town of Bannack, behind for the chance of finding more promising diggings. However, the town retained enough of a population that it earned the title of Montana's first territorial capital on May 26, 1864, when President Abraham Lincoln signed Montana Territory into being, carving it from the massive Idaho Territory (Rohrbough, 2004; Lynch, 2002; Smith, 1992; Malone, Roeder, & Lang, 1991; Wolle, 1983; Spence, 1978; Watkins, 1971; Burlingame, 1969; Oviatt, 1969; NPS, 1967; Paul, 1963; Raymond, 1871).

As the placers at Grasshopper Creek were started to vanish, James and Granville Stuart, along with Bill Fairweather and Henry Edgar, found gold only approximately 75 miles away from Bannack at Alder Gulch on June 6, 1863; the placer deposits found far overshadowed those from Grasshopper Creek, with one pan pulling up five dollars in gold at once. The gold from the Gulch would launch the "greatest placer rush in Montana's history" (Malone, Roeder, & Lang, 1991: 65). The Stuarts' prospecting party desperately wanted the lucrative gold deposit to remain a secret and it is with this directive that several prospectors from the Stuarts' group returned to Bannack for supplies. Though they claimed to have said nothing – and perhaps their body language alone spoke enough – roughly 400 eager miners trickled over to Alder Gulch behind the hapless, newly-provisioned prospectors. Unable to deter the motley assortment of men tailing them, the prospectors confronted them and forced them to agree to giving them claims of 200 feet in size, as was their due for first discovery. While the crowd agreed – and celebrated their mutual good fortune with the members of the Stuarts' group – the beleaguered prospectors still scurried off in the night while the large group slept off the evening's revelries. This allowed them to arrive at Alder Gulch early enough to strike claims as near to the Stuarts' original find as possible. The gaggle of eager gold seekers quickly caught up. By the end the month, Virginia City sprang up, fully laid out. By autumn, Alder Gulch wore a string of smaller towns like a necklace. Three cities stood out along this chain: Virginia City, Nevada City, and Summit City. Claims stretched for almost 15 miles along Alder Gulch, all worked by a population of roughly

12,000 prospectors. The population was so scattered along the Gulch that the area quickly gained the nickname of “Fourteen-mile City.” The more organized boomtowns had higher concentrated populations, with Virginia City holding 4,000 people by September of 1863 (Rohrbough, 2004; Lynch, 2002; Smith, 1992; Malone, Roeder, & Lang, 1991; Wolle, 1983; Spence, 1978; Watkins, 1971; Burlingame, 1969; Oviatt, 1969; NPS, 1967; Paul, 1963; Raymond, 1871).

As will be discussed in the next chapter, Virginia City quickly gained fame not only for its active gold diggings, but for its even more active group of vigilantes. The great wealth of Alder Gulch attracted more than miners and shop owners to support them. Soon the roads around the town were plagued with outlaws who both robbed and murdered the residents of the Gulch; they caused roughly 100 deaths between 1863 and 1864, which prompted the formation of the Montana Vigilantes and their notorious Vigilance committee. In short, the Vigilantes caught at least 15 outlaws and hung them in Virginia City between December of 1863 and January of 1864. The most notable death was that of Henry Plummer, who not only was the supposed leader of the outlaw gang that had been plaguing the Gulch, but was also the sheriff of nearby Bannack. While controversial, the Montana Vigilantes added to Virginia City’s prominence, along with the gold in the Gulch, and on February 7, 1865, the Montana Territory’s legislature relocated there from Bannack. Virginia City also had the distinction of having Montana’s first newspaper, the Montana Post, which Thomas Dimsdale began on August 27, 1864, and Montana’s first public school, which opened in March of 1866. While Alder Gulch was productive, and produced gold through the 1870s, the deposits couldn’t support the whole population that had clustered there. Luckily, Montana had established itself as a gold-bearing land and in the years after the strike on Alder Gulch, prospectors made one prosperous strike after another. Within the span of roughly ten years, Montana prospectors made strikes on gold and silver at least once a year. By the

1880s, the Territory's prospectors struck the copper that would bring eventually bring the soon-to-be-christened Treasure State the most profit (Rohrbough, 2004; Lynch, 2002; Smith, 1992; Malone, Roeder, & Lang, 1991; Wolle, 1983; Spence, 1978; Watkins, 1971; NPS, 1967; Paul, 1963; Raymond, 1871).

The next major gold strike in Montana's history would prove to be its most important as well. On July 14, 1864, a group of prospectors known as the "Four Georgians" decided to mine along a creek that they called Last Chance Gulch, located roughly 120 miles north of Virginia City. The group, comprised of John Cowan (the only prospector from Georgia), John Crab (from Iowa), D. J. Miller (from Alabama), and Reginald "Robert" Stanley (from Cornwall, England), had found a small amount of gold there in the spring, but had left it for the rumor of greater deposits to the north. The summer found them back at the creek, having found only disappointment that spring. The creek got its name from the fact that the party of four had decided to give up their gold mining and find another profession if they found nothing during this 'last chance' at prospecting. In an event that has become Montana legend, the men sank two prospecting pits along the Gulch and hit a substantial gold deposit. The placers eventually became the most extensive ever found in Montana; over the course four years, they produced approximately $19 million in gold. As with many other gold strikes, when two of the "Georgians," Crab and Cowan, went to Virginia City for supplies, "the usual horde of mines followed them back" (Malone, Roeder, & Lang, 1991: 67). This horde soon settled along the length of Last Chance Gulch and established the town of Last Chance. The new prospectors found lode deposits at nearly the same time as the placer deposits; James Whitlatch discovered the first gold lode in September of 1864. His claim would become a very prosperous hard rock mine, known as the Whitlatch-Union mine. Much of Last Chance Gulch's gold was free-milling, making it all the more attractive to gold seekers. The gold's easy amalgamation saved them costs, which they could invest elsewhere. Gold, silver, and lead lode claims quickly sprang up in the hills around the Gulch as placer claims dotted its banks. The town of Last Chance gathered over 200 residents by the autumn. By winter, many of the town's tents and shacks became wood cabins, to combat the cold; the presence of these sturdier buildings added an air of permanence to the boomtown as well.

As the population continued to grow, along with many of the residents' wealth, many began to take issue with the name "Last Chance," and called for a new name for the boomtown. On October, 30, 1864, a small self-appointed group gathered to make an official layout for the town, elect city commissioners and, most importantly, give it a more respectable name. Oddly enough, some of the first names suggested lacked the proud air that the committee doubtless sought; Pumpkinville and Squashtown were two proposed options, commemorating the fact that the committee was meeting before Halloween. Crabtown was another suggestion, after one of the "Four Georgians," John Crab. Other committee members suggesting naming the town after northern or southern cities from the Midwest or the East, none of which gained much in the way of approval. Finally, one group member, a Scot named John Summerville, proposed the name Helena. This satisfied all parties present, who each had their own specific reason for approving of the name, from its resemblance to Helena, Arkansas to its similarity to Helena Township in Minnesota. Less luck was had with the town layout, which wasn't surveyed until 1865 and by then the town had made permanent the snaking, twisting, and often dangerous paths taken by the miners from their cabins and tents to the Gulch. As a result, Helena's city blocks to this day are of varying shapes and sizes, with streets that often veer off sharply on an angle. The strange layout did not deter the prospectors or those who came to Helena to supply and service them.

The town's first hotel, boldly named The International, appeared in November of 1864. By the summer of 1865, Helena had become a fully-stocked boomtown of 3,000 people and proudly boasted fourteen saloons, seven restaurants, forty-five food stores, twenty dry goods stores (most of which sold clothing as well), and fifteen separate feed stables and corrals. Additionally, there were seven carpenters, who offered furniture repair as well, eleven blacksmiths, sixteen lawyers, and ten doctors. Notably, by 1889, Helena had roughly 50 millionaires, which was a greater number, per capita, than any other city in the world. On November 8th of the same year, Montana gained statehood and Helena became its capital; the city fought with nearby Butte and Anaconda over its right to remain the state's capital until 1898, when a vote finally established its permenance as Montana's state capital. Helena remained Montana's most populous city until 1900. The Georgians themselves worked the deposits until the summer of 1867, when they sold their claims and headed back East; Stanley returned to England, where he established a small town and a brickyard (Helena Area of Chamber of Commerce, 2014; Rohrbough, 2004; Lynch, 2002; Smith, 1992; Malone, Roeder, & Lang, 1991; Wolle, 1983; Spence, 1978; Watkins, 1971; Burlingame, 1969; Oviatt, 1969; NPS, 1967; Paul, 1963; Raymond, 1871).

The subsequent strikes in Montana happened consistently and often near the locations of earlier strikes. Writing about the phenomenon in 1871, Dr. Rossiter Raymond, who was the United States Commissioner of Mining Statistics at the time, observed that the miners' "exploitation seems to travel in a circle" where they would desert a gold camp but return for "a second and more careful examination" which often would locate "paying placers remarkable for richness and extent" (Raymond, 1871: 253). Late autumn of 1864 witnessed another gold strike, a little over forty miles to the east of Last Chance Gulch. Three Confederate soldiers on parole, Jack Thompson, who originally came from England, Washington Baker, and Fountain M.

“Pomp” Dennis, found gold on a creek that they patriotically-named Confederate Gulch. By the winter of 1864-65, over 500 prospectors were working on the Gulch and a little town of Diamond City sprang up. In the spring of 1865, a small group of German prospectors found rich gold-bearing sands in Gold Hill, which sat above the Gulch. They had found the beginning of the Montana Bar. Sitting seventy to eighty feet above Confederate Gulch, the Bar was the largest bench of pay dirt in the area. It stretched for two acres and went as deep as 300 feet in several places. As miners raced to the Bar from across Montana and the country, the bench of pay dirt gained a reputation as “the richest two acres on earth” and remained as such until the gold strike in Nome, Alaska the following year (Burlingame, 1969: 72). Prospectors panned in the Gulch near the bar, while others used picks, shovels, and sluices to work the Bar, which produced millions of dollars in gold until 1869. Diamond City boomed from 1866 to 1869 with a population of 10,000 living within the boomtown and on Confederate Gulch. Mining continued elsewhere along Confederate Gulch and its tributaries until 1880, when hydraulicking, dredging, and lode mining began to get poor yields. In total, $12 million in gold came from Confederate Gulch and the Montana Bar, with another $5 million in gold pulled from adjacent gulches and tributaries.

Attracted by both the allure of gold and the Gulch’s name, Diamond City gained a large population of Confederates and Southern sympathizers during its years as a boomtown. Historian Rodman Wilson Paul observes that “something of the deplorable social instability” of Montana “can be attributed to the hostility of recent opponents who were unable to forget their antipathies when they met in the Rockies” (Paul, 1963: 42). As will be discussed in the next chapter, Montana quickly gained a reputation for having a lawless and aggressive population. At the start of the Civil War, Montana was a remote and often-forgotten region, but by the last years of the

War, it was well known as a gold-filled country. The chaos of the Civil War sent many civilians on both sides of the conflict fleeing with a "yearning to go west to escape the horror and suffering." (Smith, 1992: 24). The allure of gold and the horror of war also spurred Union and Confederate soldiers to cross the Mississippi and risk by wagon train or by steamship travel up the Missouri. As an aside, the Missouri was the only river in the Rocky Mountains to hold a substantial role in carrying prospectors and suppliers to major mining rushes. The conflict remained very fresh in the minds of these emigrants, who often were in Montana Territory as the Civil War came to an end; perhaps due to a lack of closure, the tensions between the two sides remained fierce long after the War had ended. The resulting chaos that frequently spilled over in saloons and out onto the streets attracted those who had no strong opinions about the Civil War, but relished the opportunity to pursue less-than-savory agendas. Montana soon became a home to murders, thieves, and road agents. In response, many mining towns, of which Virginia City is only the most well-known, developed vigilante justice committees to keep the peace between the warring Northern and Southern factions, and to ensure protection against criminals and the "nagging fear" that a seemingly peaceable neighbor" planned to gain his stake by robbing those who had already acquired one" (Smith, 1992: 25; Rohrbough, 2004; Safford, 2004; Lynch, 2002; Malone, Roeder, & Lang, 1991; Wolle, 1983; Spence, 1978; Watkins, 1971; Burlingame, 1969; NPS, 1967; Paul, 1963; Langford, 1890).

Prospectors hit gold in the 1860s and silver in the 1870s and early 1880s; however, the true riches of the Treasure State would come from copper, reducing gold and silver to profitable by-products of a much larger industry. The Western pattern of mining took place in Montana on an accelerated scale, with prospectors making claims on placer and lode deposits simultaneously. These strikes "sowed the seeds for industrialization" and the eventual success of large-scale mining corporations. Nowhere in Montana was this progression more notable than in Butte, Montana. Located in southwestern Montana, Butte first appeared as a silver town in 1875. Seven years later, in 1881, Marcus Daly, who had worked on the Comstock Lode, purchased the Anaconda Silver Mine. As mentioned earlier, Daly borrowed money from another Comstock veteran, George Hearst, to develop the mine further. He found a huge copper deposit. In May of 1883, the miners at the Anaconda hit a copper vein, alongside of which ran gold and silver, at six hundred feet below the ground surface. In the span of one year, the Anaconda became a leading copper producer, affecting world copper prices, challenging Michigan's supremacy as the copper center of the United States, and turning Butte into a major industrial center. Copper strikes soon occurred on the steep hills around Butte, earning the town the nickname of "the richest hill on earth," as it became clear that Butte sat at the top of a large, deep dome-shaped copper deposit. Much of Butte's success came from the fact that by the time its copper deposits were exploited, advances in smelting, milling, and hard rock mining had taken place for several decades. In short, Butte, and Anaconda twenty-six miles away, was the "beneficiary of a generation of western experience" (Smith, 1992: 93). Montana's mineral wealth would indeed surpass that of the Comstock Lode, but it would be with Butte and Anaconda's copper, rather than with gold or silver. Butte and Anaconda were the sites of technological advances in copper mining, especially in smelting, which had constantly been a problem due to the pollution that smelters created. In spite of this, Montana remained the "last untapped Rocky Mountain railroad region" and it wasn't until the 1890s that the railroad finally eliminated the high costs of freighting by steamboat and wagon (Smith, 1992: 102). The railroad increased industrialization and urbanization in Montana at a frenzied pace – especially in the increasingly industrialized copper mines of Butte. In 1902, as much as 20% of all copper produced in the United States came from

Butte. By 1950, Butte's copper mines had produced $2 billion in copper ore. The underground mines of Anaconda continued to produce copper until 1983, when the underground mines closed and the smelter finally shut down. Butte continues to yield around 50,000 tons of copper ore each day (Rohrbough, 2004; Safford, 2004; Lynch, 2002; Smith, 1992; Malone, Roeder, & Lang, 1991; Wolle, 1983; Spence, 1978; Watkins, 1971; Burlingame, 1969; Oviatt, 1969; NPS, 1967; Paul, 1963).

Gold in the Highlands - The Story of Highland City, Montana

Montana's mining history began with a lengthy series of substantial gold strikes, and it is into this narrative that the gold strike at Highland City falls. The succession of successful strikes soon made it clear that the miners in Montana profited from their endeavors far more than those in Colorado or Idaho, with prospectors locating "five hundred gold-bearing gulches, besides numerous placer bars" (Smith, 1992: 85).

On a hot July 25th, 1866, three prospectors, J.B.S. Coleman, E.B. Coleman, and William Crawford found gold while panning on Fish Creek, at the base of the towering Red Mountain. News spread quickly and the soon the typical gold-seeking horde of miners poured scrambled up into the Highland Mountains, through which Fish Creek, along with Basin and Moose Creeks, ran. This latest stampede drastically reduced the population of nearby Butte, although the miners would return to the city by the 1880s, answering the call of copper. Leading the rush to the Highlands were prospectors Thomas Hall, Frank Beck, J.B. Dunlap, Thomas W. Rutter, and Dan "D.L." Parker. They were rewarded for their punctuality with wealthy claims. The rush of prospectors soon resulted in the creation of Highland City. While the Coleman brothers found the gold, along with William Crawford, mysteriously, no further mention of them can be found in newspapers or in any archives. It is assumed that the discoverers sold their claims for quick money and moved on, as many prospectors do, to find another gold strike to work briefly and then sell. The prospectors certainly would have had good reason to sell; the ore that they initially pulled out of Fish Creek was exceptional in its purity and it sold for $20 an ounce. By comparison, gold from nearby Butte sold for only $16 per ounce. D. L. Parker used his early arrival on Fish Creek to his advantage; his claim was incredibly productive, yielding several thousand dollars of gold. A group of three prospectors who also arrived in the summer of 1866, William Owsley, Tom Hall, and Franck Beck, reportedly pulled up $3,100 in gold over the course of a single day on their claim. Irishman Jim Murphy found a sizable placer deposit near Fish Creek as well and, generously, let his friends work the claim and keep whatever they found on it whenever he took a break from the work. Gold ran not only in Fish Creek, but also through a dry gulch, named Cooley's Gulch that sat below Highland City. William Cooley and James McChord, along with another miner whose identity has been lost, placed a claim in this gulch after they found gold on September 4th, 1866. The diggings were rich, but this proved to be the small company's undoing. While the three men feared that each of their partners would steal the gold dust – or the claim altogether – their foreman ultimately ended up robbing them of all of the dust that they had uncovered after a particularly lengthy clean-up session on the claim. The man, along with $27,000 in gold dust, disappeared and was never heard from again. Basin Creek and Moose Creek run near Fish Creek on the western slope of the Highland Mountains and the prospectors who fanned out from Fish Creek immediately came across gold in both. In 1866, Basin Creek yielded prospectors George Popple and his brother, whose name is no longer known, between $4 and $10 in gold daily. The three creeks quickly resulted in two separate mining districts: Highland and Moose, which sat directly on top of the Continental Divide.

Within the districts were three towns: Moosetown, on the eastern side of the Divide, Highland City, at the head of Fish Creek and on the western side of the Divide, and Red Mountain City, curiously located under a mile away from Highland, to the southwest.

Prospectors found gold-bearing lode gold almost immediately after finding placer gold. Jim Murphy's Murphy Mine was the first hard rock mine set up, and the first to have an arrastra. Nevin Hill Mine and the Tilton Mine soon followed, along with other claims on the slopes of around Highland and Red Mountain Cities. The ore from the Highland lodes was free-milling, which eliminated the need for the miners to build anything other than an arrastra, although these they ended up building in great number. The Tilton Mine, which changed its name to the Only Chance, proved to be the richest of the lode mines. Its surprisingly shallow shaft, which stretched only fifty feet, produced so much ore that the mine owner had had eight arrastras built to grind it. In addition to the arrastras, the mine also ran three separate amalgamation mills. The last of these, named Tilton's Red Mill and built at the end of the mine's life, ran from 1912 to 1915. Prospectors located at least 100 different lodes in the area by 1869 and the claims on them were numerous, each measuring roughly 100 x 200 ft on the surface. Many miners at both placer and lode claims built flumes to bring additional water onto their claims; keeping water on the claims was difficult, given the fact that the Highland and Moose Mining districts sat at the very top of the Continental divide – cresting elevations of between 7,000 and 10,000 feet – and water enthusiastically ran downhill. The elevation also contributed to heavy winter snows, which held up the water until spring. The resulting snowmelt, however, was always fast and strong enough to attract additional miners to the area.

The most well-known mine in the Highland Mining District was the Ballarat Mine, which eventually led to Red Mountain City's ruin. Four men discovered the claim in 1867, immediately built a cabin nearby, and extracted ore, which they jealously stored, convinced of its worth – about which they spoke boldly to other miners in the area. When eventually the men decided to crush the ore, they discovered that their claim contained very little gold. Unable to swallow their pride after so vigorously boasting about their luck in Highland City, Red Mountain City, and Moosetown, they concocted a scheme; they melted the small amount of gold that they did recover into a small button, which looked like an assayer's sample – rather than the sum total of all of their ores' gold. News of their rich claim spread quickly and attracted the attention of Deer Lodge's Professor George C. Swallow. He gained the interest – and the capital – of several capitalists in Saint Louis. Almost immediately, Swallow and the investors formed a company, which bought the goldless claim from the four miners, as well as several adjoining claims for $15,000. Instead of an arrastra, the company installed a huge, $100,000 twenty-four stamp mill to crush the ore from the Ballarat. For four years, the company dug ore and ran it through the mill, although the investors never received any dividend payments from the endeavor. They sent out Professor Philip Knabe to analyze the mine and figure out why no money had arrived in Saint Louis. Knabe wrote a brief, but scathing report about the Ballarat, exposing it for the worthless claim that it truly was: "the whole gulch isn't worth two bits" (Wolle, 1983: 184). The Ballarat mine shut down and much of the population of Red Mountain City left as well.

Two months after the first discovery of gold in the District, the population of Highland City numbered roughly 600 people. During the height of the town's boom, 1868-1872, some estimate the population at 20,000. It is unclear whether this estimate includes nearby Ned Mountain City or not. At its largest, Highland City had 300 wooden houses and cabins, five dance halls for hurdy-gurdy girls, ten saloons, several general stores, and a cemetery. Highland City also garnered enough attention within Deer Lodge County that it had its own stop on the post route, along a road called the Highland Trail, which ran from Alder Gulch to the Highland Mountains. Within the space of a year, Highland – Red Mountain City became the largest settlement in southern Deer Lodge County, which was a notable feat; Deer Lodge county stretched all the way up to Canada and swallowed present-day Silver Bow County – and Butte. Highland City sat so close to Red Mountain that even the towns' inhabitants often referred to them as a single conglomeration. Red Mountain City rapidly developed a complicated water system of wooden pipes, made out of ten-foot long logs, and hydrants. This leant the town an air of sophistication, along with a hotel, run by a Mr. and Mrs. Beden. Red Mountain City also boasted a blacksmith shop, two general stores, one of which had a Masonic Lodge on the second floor, and a sawmill. Charles Wunderlich ran the former store, while Rod Leggat and E.S. Stackpole operated the latter and the Lodge. Highland and Red Mountain City even had a doctor, Dr. Seymour Day. Both Highland City and Red Mountain appeared frequently Virginia City's Montana Post almost immediately after they sprang up. At least 1,000 prospectors from the Highlands voted in Deer Lodge County's first election. They even held a winter ball, and excavated the snow from over six miles of road between Butte, Deer Lodge, and Highland – Red Mountain City so that the whole southern portion of the country could easily attend the festivities. The two-town conglomeration were connected by long main street and had nine smaller tent camps sprawled out between and around the cities. These "suburban camps," as they were called, replied on both Highland and Red Mountain Cities for supplies, services, and entertainment. Highland City also had a Chinese population, which had been indicated fleetingly in the archival records, but which archaeology has definitively confirmed.

Highland City also had its fair share of cattle rustlers, bank robbers, gunfighters, and outlaws. One such individual, known only as Douglas, was a cattle thief who had already been caught in Helena and, apparently, exonerated. When confronted in the Highlands about his reputation and what he would do if left on his own in the area, Douglas reportedly replied "Give me a rope and I'll show you;" the vigilante group took his casual reply as a promise that he would continue to steal cattle; some may have even taken it as a threat. As such, Douglas was indeed given a rope and was hanged from a tree near Wood Gulch, a smaller creek within the Highland Mining District. His body reportedly lies, neglected, in a grave by the tree. Another marker of Highland City's violent past lies in the form of the gruesomely named Bloody Bone Ridge, which looks over a heavily-wooded section of the Highland Trail from Alder Gulch. The hapless stretch of road in sight of the Ridge was a frequent site of "holdups" by road agents; additionally, "so many were robbed and murdered" on that the section of the trail that it gained the name of the Bone Ridge Trail "because at times it was littered with rotting bones" (Wolle, 1983: 186). The crime was so bad that for years no prospectors ever attempted to lay in a claim in view of Bloody Bone Ridge and that section of the Highland Trail remained completely unexplored. One bold prospector, named Coyote Bill, decided to search for gold along the Bone Ridge Trail sometime between 1866 and 1869, disregarding his comrades' warnings. After he failed to return for quite some time, his friends rode out from Highland City to see if anyone had seen him. They returned with no information. As the story goes, the following spring, a group of miners found Coyote Bill's body propped up against a tree, as if he were sitting. Rather than let him join the rest of the rotting bones on the Bone Ridge Trail, the miners decided to honor him with a porper grave. As they dug, they found gold. Immediately, the miners staked a claim on the area, naming it the Bone Ridge claim. They remembered the circumstances that allowed them to find the pay dirt, however, and they buried Coyote Bill at the end of the Highland Trail in Virginia City, with a marble headstone above the grave as in appreciation of his final act:

pointing them in the right direction. A final colorful character from Highland City's past was a dancing girl named Lulu, although she has been remembered by the name "Shotgun Liz." Reportedly, she earned the nickname after shooting a man who molested her. She died from illness after only a year at Highland City; however, during that time, she made a strong friend in John Kern, who was the last resident of Highland City, living there from 1866, newly-arrived by wagon train, until his death in 1923. After Shotgun Liz passed, Kern faithfully tended her grave until his death and asked only that he be buried next to her when he passed. Heavy snows prevented his burial in the Highlands, and instead he was interred in Butte. Perhaps one day, however, his bones will be reinterred at the Highland City Cemetery.

As of 1874, Highland City and Red Mountain City had very few inhabitants. By 1882,

they were completely abandoned – with the exception of John Kern. There are hardly any secondary sources on Highland City; those that do exist have been cited here. As such, precious little else is known about the town, especially with regards to its layout and demographics. To piece together the history as it stands right now, I have comb through archival documents the Montana State Archives in Helena and in the Silver Bow County archives in Butte. As a result of this dearth of knowledge, the history of Highland City, and Red Mountain City, has turned into a chronology woven together from the memories of the descendants of towns' original inhabitants, claim and plat maps from the Bureau of Mining and Geology, and primary sources, such as journal entries and newspaper articles. Because so little is known, archaeology truly has a chance to reveal crucial details about history of Highland City and the lives of its inhabitants in a way that often does not happen with historic sites (Wolle, 1983; Wilcox, 1954).

Chapter VI. Archaeological Research

Previous Archaeology

Excavations at the Isles of Shoals

Little archaeological work has been published on the Isles of Shoals. The most comprehensive publication on them thus far is Faith Harrington's "Deepwater Fishing from the Isles of Shoals" in 1992, although she published several other preliminary research papers in the 1980's. Harrington's research focused on the earliest occupation of the Shoals as well as the transitions the fishing station there underwent as it gradually progressed from a temporary to a permanent habitation throughout the course of its years of operation; she saw the Shoals as "a case study" for examining about "the process of establishing and maintaining a fishery" and about the "religious, social and economic" activities at New England fisheries during the early 17th century (Harrington, 1992: 249). Her work centered for the most part on the largest island in the Isles of Shoals, Appledore Island and it is mainly from this island that her larger conclusions were drawn. She then contrasted this information with Richmond's Island, which she considered to be a typical fishing station, with Appledore; which she characterizes as atypical. Harrington relied in part on an analysis of pipe-stems and bowls from a total of 355 fragments to study an occupational history of Appledore Island. Aside from her work on Appledore, she also initiated some preliminary survey and excavation on Smuttynose Island and Malaga Island, also located in the Isles of Shoals, in the 1990s.

More recently Nathan Hamilton of the University of Southern Maine, has conducted excavations on Smuttynose Island, including recent and ongoing excavations, which started in 2008 (Hamilton, Brack, and Seeley, 2009). Already, a wealth of artifacts has been recovered, in larger numbers than found by Harrington on Appledore. Faith Harrington had been looking for the island where the majority of the fishermen lived, in her excavation on Appledore and survey of Malaga; Nathan Hamilton located the best candidate yet on Smuttynose Island.

Hamilton's research has focused heavily on analysis of faunal and malacological (the study of shellfish) remains found from Smuttynose Island, both in using invasive species in the archaeological record to help tighten his chronologies, and in using fish remains to document temporal changes in the size of gastropod and fish species in and around the Shoals, and not on the ceramics found. In particular, he has focused on the gastropod known as the smooth periwinkle, or *Littorina obtusata* to tighten his chronologies, because shell morphology changed between 1890 and 1905 as the species adapted to the arrival of an invasive crab; as such, the periwinkle looks different pre-1890 than it does after roughly 1905.

A large number of fish bones, was recovered in excavations, including many diagnostic bones, such as vertebrae and premaxilla, which are used to tell a fish's age, weight and/or size. As another example comes from the assemblage of otoliths found at the site; these are small bones within a fish's ear that add an alternating opaque or translucent layer on for every season that a fish lives – two bands indicate one year in the fish's life. These can be used to estimate a fish's age (Hamilton, 2009, Hamilton, Brack, and Seeley, 2009). From all of the remains found, Hamilton has noted a trend in the fish's size. They got smaller over time. This pattern is supported stratigraphically in excavation units from Smuttynose – the lower levels of the units, which contain older deposits, have much larger fish remains than those found closer to the top.

The only other archaeological work done on the Shoals, aside from that of Harrington and Hamilton, is that done by myself from 2009 to 2010 at the University of Michigan for my Undergraduate Honors Thesis, and from 2010 to 2011 at the College of William & Mary for my Master's Thesis. In the first project, I sought to compare the assemblages from Smuttynose Island with those from Pemaquid, specifically looking at the ceramics form the two sites. I examined the ceramics' places of manufacture and the relative value ascribed to the different ware types. I concluded that the pattern of the ceramics in terms of their value differed greatly between the two sites. The ceramics at Pemaquid formed a bimodal distribution, with clustering at the very expensive and the very inexpensive ends of the spectrum. At Smuttynose Island, however, most of the ceramics were of a middling-class type, although there was a large amount of low-end, utilitarian wares present in the assemblage. There was not a very large concentration of high-end, expensive, and high-status wares found on the island, although some were found. Additionally, there were anomalous ceramics found at the site, such as the pieces of white German Westerwald ceramics, was in the period normally commissioned, and a Blue Willow bowl which does not match any standard mass-manufactured patterns for the period and also might relate to have been a private commission. Most of the ceramics at the Isles of Shoals came from England, with fewer Rhenish, French, and Dutch ceramics than were expected. There were also far fewer Chinese porcelains and Mediterranean ceramics present in the assemblage than was originally predicted for such a productive trading site. However, this supports the results that most of the ceramics on the Isles of Shoals were of a middling class variety and that the Shoalers' great wealth was not used in purchasing large quantities of high-end prestige ceramics. My Masters Thesis built upon this work and focused heavily on the tavern that sat on Smuttynose Island.

Excavations at Highland City, Montana

Very little work has taken place at Highland City and the excavations for this research were the first large scale and the first subsurface projects at the site. The Forest Service ran several survey projects at the site when determining whether or not to protect the area as a historic district. No subsurface excavations were conducted, and everything found through pedestrian survey was noted and left in situ. The Highland Mining District did in fact get attention as a historic district and is now under the protection of the Forest Service. No subsurface archaeology had been done prior to the excavations conducted for my dissertation

Data Recovery at the Two Archaeological Sites

Data Recovery at the Isles of Shoals

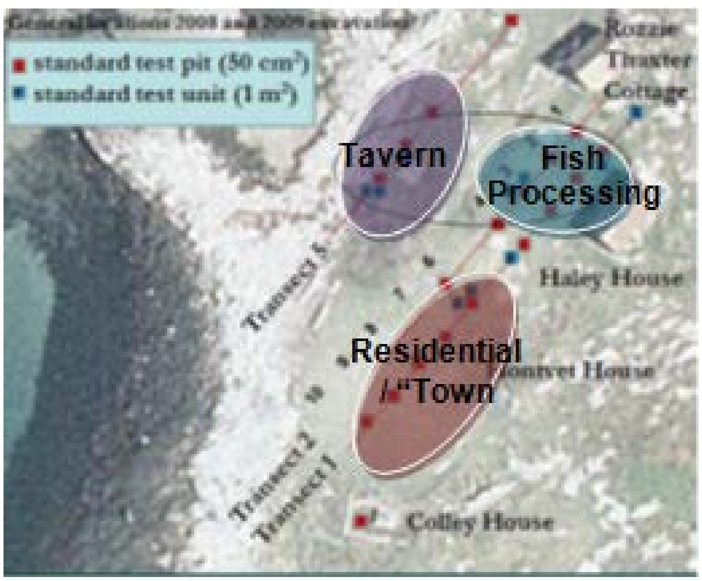
My data for this portion of the project comes from the 2009 - 2012 excavations on Smuttynose Island, led by Dr. Nathan Hamilton in a joint partnership between The University of Southern Maine and the Shoals Marine Laboratory (run by the University of New Hampshire and Cornell University). Excavations took place in three stages: a. systematic survey through five transects of 50 cm x 50 cm STPs (18 in total); b. initial data recovery and further testing through 1 x 1 meter units along the five transects near where the STPS proved to be most artifact rich (21 in total); and c. data recovery with slot trenches (3 4 x 1 meter trenches excavated as 12 separate test units) in the activity area thought to be associated with the tavern.

First, five transects were laid out systematically across the site and Sample Test Pits (STP's) of $50cm^2$ were set into this grid 5 meters apart; 18 STPs were laid in. Dr. Hamilton, who followed the survey with in Test Units (TU) of $1m^2$ along the five transects. The TUs were concentrated near those STPs that proved to be the most artifact rich; 21 TUs were laid in. The final stage was that focusing on data recovery, specifically from the area speculated to be where the tavern once stood. A new set of 12 TUs were laid in along the island's old shore line, where the previous two stages of excavation had recovered promising indicators of the tavern's presence. These 12 TUs were placed in three different transects which were set three meters apart from one another. Four test units were placed along each transect, eventually creating three trenches that measured 1m by 4m in area. These were excavated down to the island's culturally sterile bedrock, which generally lay 60 to 80 cm below the surface.

The Excavation of the Tavern on Smuttynose Island

The three transects mentioned above proved to be very productive, yielding the signature pattern of a tavern and confirming the inferences made by the previous two stages of excavation. Specifically, TUs 8,9,11, 13, 14, 15, and 16 contained artifacts relating to the tavern and it was specifically those seven units which prompted the data recovery phase of the project.

Figure 6.1: Smuttynose Island Activity Areas.



Architectural Features

These excavations, specifically data recovery trench 116, revealed an area of worn, non-local stone which was placed onto the bedrock. This was below a layer of brick rubble and debris that likely comprised the tavern's walls and suggests that the stone area was a portion of the tavern's floor. In this same trench, two large metal locks were found, parallel and back-to-back, spaced about 5 cm apart from one another in the ground; below these, big metal pintels were found, suggesting the presence of a door, although it is unclear at this time whether this door served as a front or back door for the tavern. Other architectural features found in trench 116 aside from the brick rubble and the door hardware include lead flashing, window glass, and large metal nails, likely used for timber. Evidence for the tavern has currently been found in a 7 x 4 m^2 wide stretch on the western side of the island. The actual tavern is expected to be much larger than this; however, a thick covering of poison ivy, thorns, and dense bushes lay across what is believed to be the tavern's southern end and excavations have not continued further to the north of the last 4x1 laid in this past summer (2011). Additionally, the project director has not yet laid in further units to the east of the tavern. To the west is a rocky, bald shoreline. In contrast to the tavern architecture, the domestic, or 'town,' architecture of the community is ephemeral; it leaves no structural traces in the archaeological record. According to period documents, the Shoalers' houses were small, insubstantial wooden structures. As such, only the activities that took place within these houses leave a trace in the site's record.

Tavern Artifacts

An in-depth discussion of the ceramics from the tavern found in the area is to follow. First, however, this paper turns to a discussion of on other artifacts found which point strongly to the presence of a tavern on Smuttynose Island. An ivory die and a lead token with what appears to be "XXX" were found in the area of the tavern. The token was likely made from a flattened lead bullet and used as a form of currency, redeemable only at the tavern on Smuttynose. Noel Hume writes, in his extensive *A Guide to Artifacts of Colonial America,* that they had "no monetary value" like copper and brass tradesmen's tokens, nor did they have a wide circulation; he concludes that as a result, it may be that these were "associated with taverns" (Hume, 1970: 173). Additionally, a large proportion of faunal bones were found in the area associated with the tavern, namely those associated with cattle, pigs, sheep/goats, fish, and what may be seabirds. Remains from a large animal found in trench 116 may be those of a horse. These remains included jaws (upper and lower mandibles), teeth, leg-bones, ribs, and vertebrae. Combined with the ceramic and glass assemblage found, it is likely that these remains are connected to the food that was served at the tavern during its operation

Data Recovery at Highland City, Montana

The data recovery at Highland City took place over the course of three field seasons during 2013, 2014, and 2016 and involved the use of pedestrian survey Shovel Test Pit (STP) excavations, and Test Unit (TU) excavations. Over the course of the three years, I laid in nineteen transect lines, with the help of many wonderful volunteers. The area covered by these transect lines, each spaced 10 meters apart, stretches for approximately 316 meters. At its longest – spanning the distance from the northernmost point to the southernmost point – the site grid is 130 meters across; at its widest – running from the easternmost to the westernmost lines – the site spans approximately 290 meters. To put the site area into perspective, the grid covers the length of roughly two American football fields. With the aid of volunteers each of the three seasons, I ultimately conducted pedestrian survey along all nineteen transect lines and at each of the 299 grid points that comprise them. The section below will describe the artifacts in more detail. In brief, the western half of the site – spanning XX, YY, ZZ, & A through O – yielded 19,191 artifacts in total, while the eastern half of the site – comprising Transects P through Z – yielded 4,081 artifacts. An additional 34 artifacts from 2014 & 2016's excavations have no known provenience. The non-provenienced artifacts from 2013's excavations (n = 12) all came from the western half of the site and they are added in to the number above. This brings the site total to 23,272 artifacts recovered from pedestrian survey.

We dug Shovel Test Pits at each of the 299 grid points along the nineteen transects; however, there were 45 grid points that did not allow for excavation, due to the density of the soil or the presence of such a large outcropping of rock that we could not offset the STP. Of the remaining 254 grid points, all of which allowed the excavation of an STP, 106 STPs were positive, yielding at least one artifact, while 148 of the STPs dug were considered negative and yielded no artifacts. The STPs yielded a total of 2,662 artifacts, with 1,821 artifacts coming from the western half of the site, excavated mostly in 2013 with three transects added in 2014, and 841 artifacts coming from the eastern half of the site, excavated in 2014.

The final form of data recovery that took place at Highland City was that of Test Units. In total, we excavated 4 TUs, 3 of which were 1 x 1 meter square units and 1 of which was a 2 x 2 meter square unit. I placed one unit in a high density area near the western edge of the site, another in a low density area, along a transect that had only negative STPs, a third in a medium density near the northern edge of the site (this unit ended up becoming the 2 x 2 square meter unit), and a final test unit near L5, the most productive STP on the site and likely the site of one of the town's ten saloons. In total, 3,695 artifacts combined came from the four TUs.

In August of 2013, I undertook a pilot study at Highland City with the goal of better understanding the layout of the mining town and, in particular, of locating at least one of the mining town's ten saloons using systematic survey. As has been explained earlier, no maps of the town survive; as such, the excavations, which amounted to three seasons of digging in total, serve to outline the boundaries of the town and possible roadways, just as much as they provide information on the saloons there. The 2013 pilot project served the first season of excavations at Highland City. Over the course of two weeks, I laid out a grid over the Highland City area, which was the first time that this had been done at site 24SB67. With the dedicated assistance of a University of Montana student, Kelli Cassias, and the aid of two Forest Service archaeologists once or twice, when they were able to join us at the remote location, I was able to lay in fifteen transect lines, all of which run north-south. Comprised of 173 points spaced 10 meters apart from one another in all four cardinal directions, the fifteen transects covered half of the visible site area, the boundaries of which were unknown before these doctoral excavations. Working most often as a crew of two, Kelli and I carried out pedestrian survey on all fifteen lines in advance of shovel test pit excavations. We were surprised to find artifacts along every transect, although the density of artifacts varied widely. We also located eight separate heavy artifact scatters during the pedestrian survey; the artifacts from these were given separate contexts due to their concentrated density. The pedestrian survey from the 2013 excavation yielded 3,228 artifacts, 812 pieces of which came from the eight scatters mentioned above.

After we completed pedestrian survey along the newly laid-in transects, Kelli Cassias and I dug STPs along all fifteen lines. Of the 173 grid points that we had marked out, just over 81% (141 points in total) had enough soil to allow excavation; 50 of these points were positive, yielding at least one artifact, while remaining 91 pits were negative. The remaining 32 grid points were either located on a present-day gravel ATV trail, and as such we could get no purchase with the shovel (despite our best efforts) or had so little soil that we could not drive a shovel into the ground, but instead encountered bedrock. Additionally, no grid points exist north of 990 North along transect A, due to large piles of rubble and placer tailings. These STPs all comprise the data set for the western half of the excavation site; in total, they yielded an additional 1,332 artifacts. Overall, the first year of excavations at Highland City proved to be a productive one. In two weeks, we laid in, surveyed, and excavated 15 transects, all of which yielded 4,560 artifacts. These span a large variety of artifact classes including glass, including two whole bottles, ceramics, ferrous, lead, and copper alloy objects, faunal remains, both mammal and bird, synthetic polymers, including rubber button and Ebonite, lithics, and, excitingly, artifacts preserved by the high desert climate of the site, such as leather, buckskin, wood, and fabric.

The data recovery from the first year of excavation started to give an indication of the northern and southern boundaries of the site; the pedestrian survey and the STPs both showed dwindling artifact densities as the transects encountered the timber line to the north and the south. We found very little north of 1030 North, and nothing at 1050 North on any of the transects on the western half of the site; the number of artifacts decreased substantially one south of 970 N. Pedestrian survey from 2014 and 2016, along with excavations from 2014, further verified this. Additionally, from the pedestrian survey and the systematic survey's STPs reveals that we likely located two activity areas: one of the town's original ten saloons, near the center of the site area, and a domestic assemblage close to the western edge of the site. The excavations located the tavern assemblage through both pedestrian survey along the J, K, & L transects – an area which also includes the 205 artifacts recovered from Artifact Scatter # 1 and the 107 artifacts recovered from Artifact Scatter #8 – as well as with an STP, referred to as L5, which revealed a midden only several centimeters below the ground surface. This single STP yielded 679 artifacts, which is just over half (51%) of the 1,332 artifacts recovered through the use of STPs in 2013. The assemblage from L5, which I discuss in further detail in the artifact analysis chapter that follows, includes a small intact druggist's bottle, a large intact French liqueur bottle from the 1850s, evidence of at least another four bottles, at least two glass lamps, 164 nails, 12 tacks, and one screw, along with 285 mammal bones, 64 of which were cut and / or sawn, and 5 bird bones. The vast majority of the faunal remains recovered were meat-bearing parts of the animals' skeletons; no hooves, feet, or cranial fragments came from the STP. Of note, however, is the fact that no ceramics came from STP L5.

By way of example of the richness area encompassed by these three transects, the pedestrian survey along the L transect (970 E) in 2013 yielded 664 artifacts. This represents a little over one fifth of the total artifacts gathered during pedestrian survey. The assemblage from the L transect also encompasses a wide array of artifact types; of these, glass sherds are the most prominent (n=332) and indicate the presence of at least 20 vessels, including eight bottles, one dish, one bowl, and four cups or mugs, along with a nineteenth century four-hole milk glass button and a lamp. The L transect also contained ceramics (n=93), unlike STP L5. The sherds speak to the presence of at least 9 vessels, including ironstone and whiteware plates, saucers, and bowls, as well as a thin, white stoneware bowl and a dark gray stoneware mug. Faunal remains were recovered (n=39) from pedestrian survey along the transect as well, all of which came from mammals; fifteen of the bone fragments had been cut and / or sawn and five of these were burned. An additional six pieces of mammal bone were burned but bear no indication of having been cut or sawn. Four teeth from a large herbivore were also found. The L transect assemblage also contains a metal kerosene (or early electric) base component, shoe leather, cast iron dinner plate fragments, a small ferrous key, and a lock & hinge component made of iron and copper alloy. The abundance of artifacts found within L5 and along the L transect speak to the presence of a large building midden. The types of artifacts recovered point to the large-scale consumption of both food, indicated by cut and sawn meat-0bearing mammal bones, and drink, evidenced by sherds of liquor, liqueur, and beer bottles.

Ultimately spanning from the YY transect (840 E) to the D transect (890 E), the large domestic assemblage mentioned above was also first located by the 2013 pedestrian survey and STPs. Of note is the fact that three of the site’s four extant structures lie within the boundaries of this assemblage. In total, 1,474 artifacts came from surface collection undertaken across the area during the 2013 field season. Systematic pedestrian survey of the transect lines ZZ (850 E) through D yielded 974 artifacts, while surface collection from the scatters, which – with the exception of Scatter # 1 and Scatter # 8 – are all located within the assemblage area, yielded 500 artifacts. The STPs excavated along transects A (860) through D recovered another 451 artifacts in total. It should be noted that while YY and ZZ were not officially laid in until 2014, pedestrian survey did take place ten meters west of the A transect, along the path of what became known as the ZZ transect. STP excavations along the YY and ZZ transects also did not take place until the 2014 season.

The 2013 surface collection assemblage alone acts as a representative sample of the domestic activity area, characterized by a large number of glass fragments (n=486) & ceramic sherds (n=123). Pedestrian survey recovered evidence of at least 77 unique glass vessels, including 51 bottles, five cups, fie jars, three lamps, three small dishes, two porcelain-lined caps, and a serving vessel. Additionally, the pedestrian survey recovered at least 50 unique ceramic vessels, including bone china teaware, Celadon porcelain bowls, teacups, and teaware, Chinese and Japanese porcelain teacups, Bristol glazed stoneware crocks, jugs, and pots, heavy and refined white stoneware mugs, and a Rockingham vessel. The most numerous type of ceramic vessels in the area, however, were ironstone vessels: no less than 22 unique ironstone plates came from the pedestrian survey, along with four bowls, four saucers, and at least one piece of teaware. Additionally, surface collection recovered faunal remains (n=201), most of which were mammal bones, although there were 8 bird bones found as well. Of the 193 mammal bones found, 26 pieces were cut or sawn and another 15 pieces were burned. The domestic assemblage also contained 290 ferrous can fragments, along with a buckle, a button, several stove fragments, flatware, eight mattress coils, nails, and the handle from a silver-plated fork or spoon.

The STP excavations during the 2013 season also revealed two separate, unique areas of very low artifact density, running north-south: the entirety of the E transect (900 E) and, 100 meters to the west, the entirety of the O transect (1000 E) both contained only negative STPs. These two transects represent the only points on the site where we found no positive STPs along the full length of the grid lines. None of the transects dug in 2014 yielded the same trend of negative STPs from the southern edge of the site to the northern edge. Pedestrian survey along transects E and O also produced relatively few artifacts, with only 49 artifacts recovered from transect E and 37 artifacts from transect O. Further, neither of the transects were abridged by ditches, heavily wooded areas, steep drop offs, or mining pits; both transects E and O contain 11 grid points, running from 950 N to 1050 N. No gravel road ran into any of the transects' grid points and all points sat on enough soil to allow for excavation. With the absence of these factors, the paucity of artifacts from transects E and O stands out; the presence of dense artifact concentrations ten meters to the west of both transect lines highlights this absence all the more. It is possible that these two transects represented roads, running north-south across the town site. The constant activity along these paths may also have contributed to the higher artifact densities west of the transects.

The second season of field excavations took place over the course of six weeks in August and September of 2014. The project was fortunate to have been selected by the United States Forest Service as a site at which to conduct a Passport in Time (PiT) Project, and the work of the volunteers was invaluable. As with the first year of excavation, the season began by laying in transect lines. With the help of the two PiT project volunteers, Nancy McQuinn and Dave Shimamura, as well as a Helena native named Bill Prendergast, the site grid was further expanded to include fourteen more lines, with a total of 126 additional grid points added. With all of the lines set in, the eastern half of the site now spanned from transect P (1010 E) to transect Z (1110 E). Additionally, we set in three transects to the west of Transect A, in order to determine better the western edge of the site and to gain a more complete understanding of the domestic activity area there, which had first been identified during the 2013 excavation. I gave these transects the names XX (830 E) through ZZ (850 E). It was the addition of these transect lines to the east, and the few to the west, that brought the site to its full size; it is within this grid that the 2016 excavations operated as well. The two PiT Project volunteers and two Forest Service archaeologists assisted me with pedestrian survey along the new eastern half of the site and along the three far western transects. Additionally, a heavy winter between the 2013 and 2014 seasons had caused a great deal of erosion along Transect B (870 E). As such, we conducted pedestrian survey on the B line in 2014 as well. This decision was made, in part, to protect the site from theft. A very large number of artifacts along the transect had become visible by the summer of 2014, and had already begun to attract the attention of those who visited why we were laying in transect lines on the eastern half of the site. Their interest, combined with the presence of a family of illegal prospectors near the edge of the site, influenced my decision to conduct a pedestrian survey on Transect B. The pedestrian survey from 2014 yielded 9,216 artifacts in total, with a concentration of artifacts appearing down at the eastern edge of the grid, and running from the southern edge of transects U (1060 E), V (1070 E), and W (1080 E) diagonally to the northern edge of transects X (1090 E), Y (1100 E), and Z (1110 E). The pedestrian survey done along Transect B recovered 1,643 of the 9,216 artifacts found.

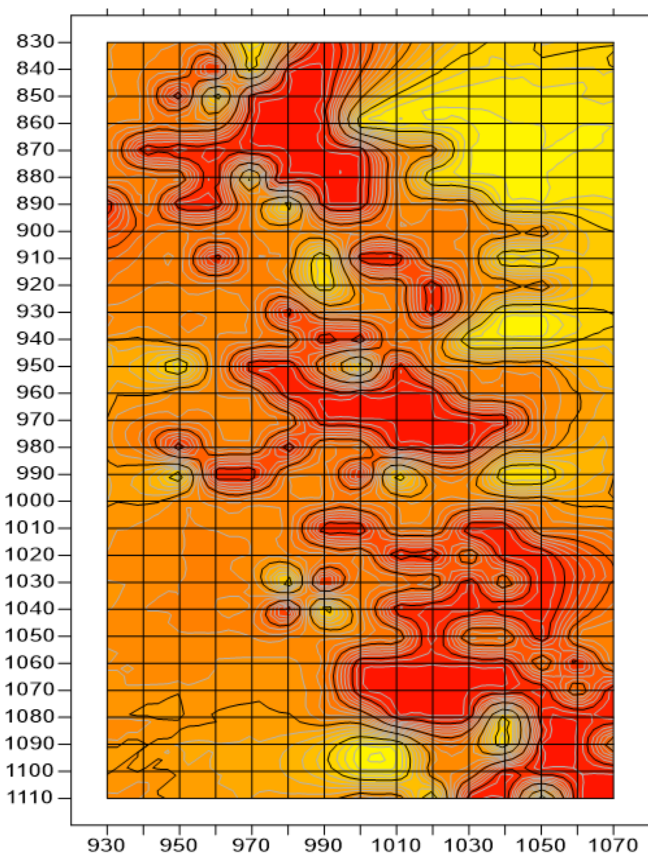
After the pedestrian survey, we dug shovel test pits along the new transects, as we had done with the 2013 excavations. The Pit Project lasted for two weeks, after which point Dave Shimamura and the Forest Service archaeologists went on to other projects, after having helped my research efforts tremendously by fully completing the pedestrian survey and much of the STP excavations. Nancy McQuinn generously offered to remain at the site and to continue to assist with the excavations. Between the two of us, we completed the excavation of the STPs Of the 126 points laid in, only 13 of them lacked the soil for putting in an STP; this amounts to just over 10% of the total number of new points set in, The remaining 113 grid points that allowed for excavation were almost evenly divided between positive and negative STPs; there were slightly more negative test pits (n=58) than positive ones (n=55). The STPs from the 2014 season yielded an additional 1,315 artifacts**)**. The data from the 113 additional STPs helped to establish the boundaries of the settlement area of the Highland City site and, in doing so, reinforced several patterns seen during the 2013 excavations; they also further supported the presence of a concentrations of artifacts spanning from transect U to transect Z.

One pattern that had emerged during the first year of excavations was the reduction of artifacts on the ground surface and subsurface along the transects at points north of 1030 North and south of 970 North. This trend continued at the transects on the eastern half of the site, effectively confirming the southern boundary of the site. The 2014 excavations recovered little south of 990 North and we found nothing south of 970 North. The pedestrian survey revealed that site appeared to stop at the timberline to the south; we placed STPs past the tree line in 2013 and 2014 to verify this and the assumption was proven to be correct. The trees extend northward after transect T (1050 E) and the site grid curved to accommodate the shifting timber line, although we continued to place STPs past the edge of the trees to insure against data loss due to new tree growth. East of transect T, however, we could not easily lay in any additional STPs south of 990 N, due to the presence of many steep drop offs into mining pits and heavy tree growth. The three transects laid at the far western edge of the site also revealed a paucity of artifacts at the timber line, although this occurred closer to 950 North.

The 2013 excavations had established a possible northern site boundary at 1040 to 1050 N. This was also reflected in the eastern transects, although not with the same definitive absence of artifacts that marked the site's southern boundary. Transects P (1010 E) and U (1060 E) had negative STPs at 1050 N, while the STPs dug at 1050 N in Transects Q, S, and T each only recovered a single artifact. The pedestrian survey also recovered little from the far northern edge of transects P through U. It is likely, then, that 1050 North does indeed mark the northern boundary of the settlement area of Highland City from its western edge to as far east as 1060 East. Heavy piles of rubble prevented any excavation north of 990 North at transects XX, YY, and ZZ, just as they had done at transect A in 2013. The northern boundary of Highland City does appear to follow the timberline, just as the southern boundary does; the edge of the woods lies at around 1030 North at transects D through S and extends further south to 1020 N west of transect D. At transect T (1050 E), the trees open up into a broader plain of sage and mountain grasses, similar to that at the center of the site. Despite this, the artifact density remained low at 1050 North through transect U (1060 E).

From transect V (1070 E) through transect Z (1110 E), no clear northern boundary could be ascertained. In part, this was due to the presence of an artifact concentration both on the ground surface and below it; however, we did not set in any grid points north of 1070 North at the request of the Forest Service. The fence surrounding the current Highland City cemetery lies very close to the 1070 Northing. Further, the true boundaries of the cemetery are unknown. The present-day fence, according to the Forest Service and several local historians, was erected sometime in the third quarter of the twentieth-century by a well-intentioned local history enthusiast, who wanted to protect the headstones that remained. At some point between 1980 and 2013, the town's remaining nineteenth century headstones were stolen, likely as souvenirs of a visit to the ghost town. The lack of clear grave markers, combined with the constant challenge presented by the absence of any map of the settlement, has made it difficult to ascertain the exact location of the original cemetery. As such, out of respect for the dead, which may possibly lay outside the boundaries of the twentieth-century fence, no excavations or survey took place north of 1070 North from transects V through Z. The second season of excavations also confirmed the western boundary of the town at transect XX (830 E), beyond which lies a sharp drop into a rock-strewn gulch, which was the product of the mechanical dredging of Fish Creek in the early and mid-20th century.

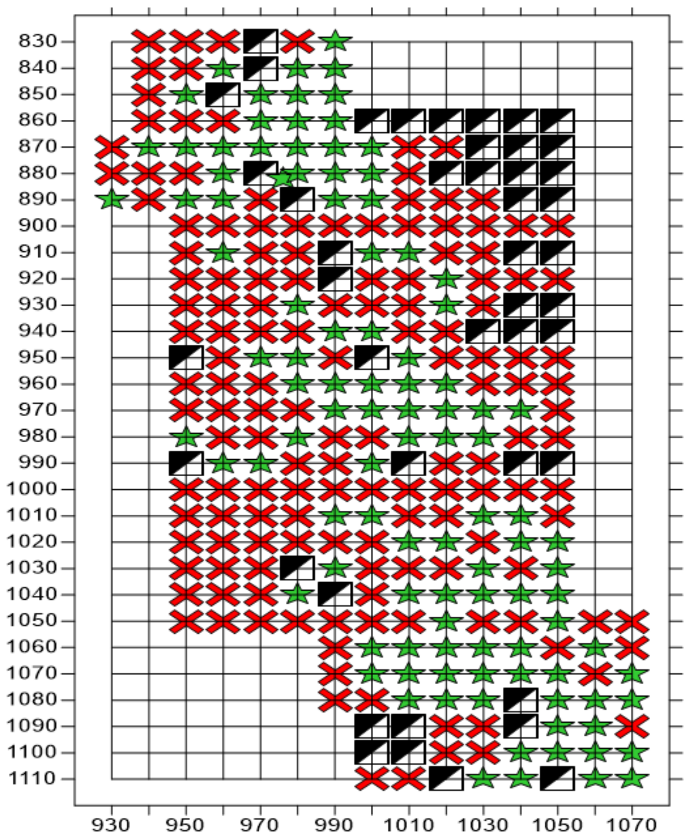
Figure 6.2: High and Low Density Areas at Highland City, Generated through STP Data



At the end of the six-week field season, Nancy McQuinn and I were able to place a 1 x 1 square meter Test Unit in the western half of the site, just east of the extant buildings and within the domestic artifact concentration located in 2013. This TU represented the first effort made to test the artifact densities and paucities on the site, as revealed by the STP results (See Figure 6.2). The artifact density map shows the areas of the site that the STP data predict to have higher densities of artifacts, seen in red, along with those that are less likely to have a heavy concentration of materials, indicated by the orange yellow areas, with the latter color represented the least artifact-rich areas on the site. The pedestrian survey and Shovel Test Pit data from the 2013 excavation season determined the high density of artifacts in the area. In an effort to confirm the apparent artifact hot spot, I made the decision to set in Test Unit 1, triangulating off of B4 (970 N / 870 E) as the TU’s Northeast corner. The excavations proved to be very productive, supporting the projection derived from the data generated by 2013 excavation season. In total, 1,094 artifacts came from this unit, almost all of which came from the first of the unit's two stratigraphic layers (n = 1,056). The second layer contained only 38 artifacts. The unit ended when excavations came down on a mixture of rock and hard-packed clay subsoil. At least four ceramic vessels came from TU 1: two plates, one made of ironstone and one made of whiteware, a Rockingham vessel, and a hollowware stoneware vessel likely of Chinese origin. The glass assemblage from the Test Unit revealed the presence of at least 20 vessels, including at least seven bottles. The Test Unit also recovered 248 nails, most of which were square cut nails, although the a small amount of round wire nails came from the first layer (n=13), along with horseshoe nails (n=3) and a finishing nail. Several fasteners came from TU 1 as well, including tack buttons, a ferrous 2-hole button, a copper alloy snowshoe buckle, and several ferrous and copper alloy grommets.

In total, the 2014 excavation season yielded 11,558 artifacts from the combined efforts of the pedestrian survey, the STP excavations, and the TU excavation. The second year of excavations yielded just over two and a half times the number of artifacts recovered from the 2013 season. Without Test Unit 1 added in to the assemblage, so that the comparison between the two seasons involves only pedestrian survey and STP data, the 2014 excavation still produced 10,531 artifacts, which is roughly two and a third times the number of artifacts

Figure 6.3: Map of Positive and Negative STPs at Highland City



recovered from the first season. The second excavation season revealed the presence of a third high density artifact concentration at the eastern edge of the site and also expanded the known boundaries of the large domestic assemblage found in 2013. Figure 6.3 shows the 299 grid points laid out at Highland City during the 2013 ad 2014 excavations seasons. The visual representation of the site grid contains symbols, indicating whether an STP was positive (represented with a green star), negative (represented with a red X) or unable to be dug (represented with a black & white square). Both Figures 6.2 and 6.3 aided in the determinations made during the last excavation season at Highland City.

The third and final year of excavations at Highland City took place in August of 2016 over the course of ten days. This excavation season was made possible largely through the support of the Dean's Research Fund. In addition to these generous funds, the Forest Service coordinated to have five Americorps Saint Louis volunteers assist with the excavations for seen of the season's ten days. Nancy McQuinn also came back to assist with the excavations, as she had done in 2014. Their hard work and enthusiasm was absolutely crucial to the success of this project's final season, especially given the season's time constraints. The season began with the excavation of three additional Test Units, which we set in with the intention of further testing the projections of artifact presence and absence drawn from the 2013 and 2014 seasons' data. We placed the second 1 x 1 square meter unit (Test Unit 2) on transect O, setting O5 (990 N / 1000 E) as the unit's southwest corner. As indicated above, all STPs had been negative along this transect and the pedestrian survey collected relatively few artifacts; as such, we sought to test the prediction that this was an area of low artifact density by placing a unit as close to the center of transect O as possible. Only one artifact came from TU 2, and it was recovered almost immediately after removing the topsoil. The artifact was a large, triangular piece of wood with a round nail driven through it. The rest of Stratum 1 and the subsequent Stratum II proved to be negative, although the dirt was very densely packed, confirming the STP's predictions once more. Excavations terminated on hard-packed rock and clay subsoil. The fact that such an artifact-rich site had an entire 110-meter strip wherein no artifacts were found is statistically significant. It is likely that this densely-packed, artifact-free area represents the path taken by one of Highland City's streets.

The next Test Unit excavated was placed near the artifact-rich STP L5 located in 2013. This area, like the domestic area in which Test Unit 1 was set, had been identified as an artifact-dense activity area in 2013 – one that was likely associated with a saloon. We set in TU 3 using L5 (990 N / 970 E) as the unit's northwest corner. Test Unit 3 proved to be very productive, yielding 2,600 artifacts from five strata and a feature. Faunal remains (n=1033) comprised the largest portion of the Test Unit's assemblage, comprising just under 40 % (39.7%) of all of the artifacts recovered from TU 3. Of these, 183 of the bones showed evidence of being cut or sawn, which is just under 18% (17.7%) of the faunal assemblage; a total of 380 bones and bone fragments were burned, 44 of which were sawn or cut. Meat-bearing mammal bones comprised nearly all of the assemblage, which meat-bearing bird bones represented in smaller amounts.

Commensals were also present, including rats and voles. Test Unit 3 also recovered evidence of at least 12 ceramic vessels, including seven ironstone plates, an ironstone saucer and teacup, two whiteware plates, and a whiteware saucer; another 31 glass vessels came from TU 3, including 24 bottles, 1 Union Clasped Hand flask, and at least one lamp. Eight of the bottles found were olive champagne-style bottles, one of which was whole. A second whole bottle came from the excavation as well: an aqua ring-necked pickle bottle. As will be described in the next chapter, Test Unit 3 also yielded at least five buckles along with buttons of various materials, shoe leather fragments, a hook and eye closure, bolts, screws, tacks, and 739 nails. Stratum V, the final layer of TU 3, terminated on hard-packed rock and clay subsoil. The location of Test Unit 3 was shown in red as a hotspot, or artifact-dense area, on the density map seen in Figure 6.2. The productivity of TU 3 indicates that STP L5 truly was part of a larger subsurface midden, rather than a small, concentrated cache of artifacts. Test Unit 3 and STP L5 speak to the large-scale consumption of food and drink, especially beef and alcohol. As such, the two likely indicate that one of Highland City's ten saloons was located somewhere around the middle of transect L, likely extending west toward transect K as well.

The fourth and final Test Unit dug during the 2016 excavation season was placed along Transect E, using STP E8 (1020 N / 900 E) as its southeast corner; the unit ultimately measured 2 x 2 square meters. This expansion proved necessary because of a feature, which sat right on the edge of the originally plotted 1 x 1 square meter Test Unit. Test Unit 4 was sunk into an area that corresponds with a medium-density projection on the STP data map. Only three artifacts came from the first stratum of TU 4: two pieces of ferrous wire and a round wire nail. Stratum II yielded a single artifact – a retouched flake of golden chert with a large bulb of percussion and two retouched edges. Like the other units at the site, excavations at TU 4 terminated on hard-packed rock and clay subsoil. While fewer artifacts came from Test Unit 4 than expected, we did find a post hole, which had been lined and shored up with large rocks, in the western half of the unit. Each course of rocks within the deep post hole had been placed in an approximately square shape. This post hole may have been used to hold a flag pole, as the unit was on the northern edge of the site; from here, miners could see the flag from quite a few different mines and adits, all of which are within a clear sightline of the posthole's location. I decided not to set in any Test Units in the artifact concentration identified during the 2014 excavations because of the proximity of the area to the above-mentioned Highland City cemetery. Should I go back to Highland City for excavations in the future, I would work with the Forest Service to possibly find a way to probe the easternmost artifact concentration, while still maintaining a respectful distance from area where the settlement's former residents may still be buried.

After we excavated the three Test Units, we began a final pedestrian survey on all 19 of the site's transects, starting at transect XX (830 E) and ending at transect Z (1110 E). The Americorps Saint Louis volunteers assisted with the first two days of pedestrian survey before their time with me ended. After that, Nancy McQuinn assisted me in conducting surface collection. On the final day of pedestrian survey, I was also assisted by my stepfather, Steven McCollum. With their help, I was able to complete the pedestrian survey of the site. Our timing proved to be fortuitous, for no sooner had we climbed into the truck to leave the site, then a lightning storm broke on the mountain and it started hailing and raining heavily. In total, the pedestrian survey from the 2016 season yielded 10,906 artifacts; combined with the 2,605 artifacts from the three Test Units dug, this brings the grand total of artifacts recovered from the final year of excavations to 13,511. The 2016 excavation season was the most artifact rich thus far, producing just shy of 3 times the number of artifacts recovered from the first season (2.99) and 1.16 times the number of artifacts found during the second season.

Methodology

Questions at Hand:

Specifically, my project will address two different sets of questions. The first of these are questions concerning drinking spaces, their archaeological signature, and their socio-economic and political role in frontier communities. Is there a specific pattern than can arguably be a 'tavern' pattern (Smith, 2008; Dixon, 2005, 2006; Rockman & Rothschild, 1984)? Are there objects within the tavern or saloon that can speak to its role in the fishing village and the mining town? Do drinking spaces occupy the same social place in the nineteenth century mining town that they do in the seventeenth century fishing settlement? It is important that the search for such an assemblage does not became rigid, but nevertheless, it is important to theorize what signature a tavern makes on the archaeological record, as compared with the assemblage that a domestic space leaves behind. The second set of questions focus on the presence of an informal economy as a part of the larger political economy in these borderland settlements. Can illicit trade be seen in the archaeological record? What objects speak to the presence of an informal economy? How are local conceptions of value and worth, socially, economically, and politically, at work on the Shoalers and Highland City miners' material world of objects and buildings?

Hypotheses:

My dissertation will test hypotheses related to Highland City's saloons.

H1: The saloons at Highland City contain a higher proportion of high value and high status goods, such as expensive imported ceramics and pricey liqueurs, than other areas, similar to the pattern at Smuttynose Island.

H2: The saloons at Highland City do not contain a higher proportion of high value and high status goods and are different than Smuttynose Island's tavern.

I expect to find that the saloon assemblages will contain expensive imported ceramics, liquors, and liqueurs, just as the tavern assemblage on Smuttynose Island did. I also expect to find uncommon artifacts within the saloons in Highland City. On Smuttynose Island, excavations recovered several ceramic vessels that appeared to be custom orders, which were far above the expected income level of seventeenth and eighteenth-century fishermen. I expect to find something similar in the saloon assemblages. The pilot study last summer already revealed a small laudanum bottle and a liqueur bottle, both of which would have been expensive items in the latter half of the nineteenth century. To gain more insight into what kind of goods were uncommon and what had economic and social value, I will look to documentary sources such as ledger books, diaries, and newspaper articles.

Chapter VII. Bringing a Ghost Town Back to Life: An Analysis of the Complete Highland City Artifact Assemblage

A Summary of Assemblage Trends & Introduction

The excavations at Highland City yielded a total of 29,629 artifact over the course of three years of excavation, which included pedestrian survey, Shovel Test Pit (STP) excavations and Test Unit Excavations (see Table 7.1). While pedestrian survey produced artifacts from every transect on the site, those found clustered in three main activity areas. The STP excavations further supported these concentrations, as did the four Test Units excavation, which were placed in areas of projected high and low artifact densities. The two Test Units in areas predicted to be high density did indeed prove very productive; one Test Unit dug in a low density area confirmed the paucity of artifacts there as well. The final Test Unit, placed in an area of projected medium artifact density yielded few artifacts but did recover a stone-lined posthole feature, likely used for anchoring a flagpole on the northern edge of the city.

Table 7.1: Highland City Artifact Totals, Organized by Means of Collection

	Total	Pedestrian Survey	STPs	TUs
2013	**4,560**	3,228	1,332	0
2014	**11,558**	9,138	1,330	1,090
2016	**13,511**	10,906	0	2,605
Total Artifacts (n=)	**29,629**	**23,272**	**2,662**	**3,695**

The 2016 excavation (n = 13,511), although the shortest season in terms of number of field days, produced 45.6% of the overall assemblage.

Metal represents the single largest artifact class recovered from Highland City, with a total of 12,726 individual piece, which represents roughly 43% of the total number of artifacts found at the site (See Table 7.2). Metal artifacts made of the largest percentage of each year’s assemblage as well, indicating that the size of the metal assemblage is a sitewide trend, rather

Table 7.2: Highland City Artifact Class Totals

	Total	Pedestrian Survey	STPs	TUs
Metal	**12,726**	9,613	1,413	1,700
Glass	**9,288**	8373	439	476
Bone Objects & Faunal Remains	**4,004**	2,312	527	1,165
Ceramics	**2,224**	2,072	76	76
Other	**1,351**	880	197	274
Lithics	**36**	22	10	4
Total Artifacts (n=)	**29,629**	**23,272**	**2,662**	**3,695**

than a bias related to one year of excavation. The second-largest artifact class recovered from Highland City is glass, with an assemblage of 9,288 sherds (31.3% of the overall artifact assemblage). As with the metal assemblage, the glass sherds recovered comprise the second-largest artifact class within each year's assemblage.

The third largest artifact class recovered from Highland City encompasses both worked bone objects and faunal remains. In Total, 4,004 bone fragments came from the site. As before, the majority of the bone pieces came from pedestrian survey (n=2,312), but the STPs and Test Units also yielded bone. As will be discussed below, of note is the fact that much of the bone recovered was cut or bore cut and saw marks. Ceramics represent the next largest group of artifacts, with a total of 2,2224 fragments recovered from the three years of excavation. Of these, almost all of the sherds came from pedestrian survey (n = 2,072).

The final two artifact categories are those objects that fall into the Other category and lithics. Within the Other category (n = 1,351) are fragments of shell, wood, cork, charcoal, coal, ore, slate, early plastics, fabric, leather, buckskin, and paper. The last class, lithics, include debitage, flakes, and worked stone. This group also represents the smallest artifact class recovered from Highland City (n = 36). What follows is a discussion of the artifacts recovered, divided into six separate assemblages, sorted by the six artifact classes mentioned. This discussion examines each of the classes in turn, addressing them in order of size. As such, metals are the first category examined, followed by glass, et cetera.

Metal

In total, 12,726 individual pieces of metal came from site 24SB67, making up roughly 43% of the entire artifact assemblage of 29,629 artifacts. The 2013 excavations yielded 1,291 metal artifacts, with 797 pieces found through pedestrian survey and 494 excavated from Shovel Test Pits (STPs); the largest assemblage came from 2014, with 5,856 metal objects recovered. Of these, pedestrian survey once again yielded the highest number of metal artifacts (n=4,405), while the STPs contributed another 919 metal pieces and fragments to the assemblage. Test Unit 1, the only 1x1 meter square excavation unit dug in 2014, produced an additional 532 pieces.

Table 7.3: Metal Totals, Organized by Means of Collection

	Total	**Pedestrian Survey**	**STPs**	**TUs**
2013	**1,292**	798	494	0
2014	**5,858**	4,407	919	532
2016	**5,576**	4,408	0	1,168
Total Sherds (n=)	**12,726**	**9,613**	**1,413**	**1,700**

The final year of excavations in 2016 yielded nearly as much metal (n=5,576), in spite of the fact that it took place over only ten days, which is just under a third of the time spent during the 2014 excavations; of this number, 4,408 metal pieces came from pedestrian survey, 1,167 pieces came from Test Unit 3, and one additional piece came from Test Unit 4 (See Table 7.3). I have divided the metal artifacts and fragments recovered into six main groups: Hardware & Tools, Accessories & Fasteners, Cookware & Household Objects, Equestrian & Transportation, Storage, including cans, barrel hoops, strapping, and bottle closures, and Ammunition. I discuss each of these six groups below; however, an additional 172 metal fragments did not fall into any of categories, largely because they consisted of pieces of sheet metal, small fragments of cast iron with unknown functions, and unidentifiable metal objects.

Tools & Hardware

The excavations at Highland City yielded a total of 2,985 pieces of hardware and tools, including nails, screws, spikes, tacks, various gauges of wire, hinges, files, and shovel fragments (see Tables 7.4 and 7.5). Nearly all of hardware and tool fragments were ferrous, non-cast iron (n = 2,947 or 98.7%) objects, although there were a few pieces made of cast iron (n = 19), copper alloy (n = 9), lead (n = 1), and steel or aluminum (n = 3).

Table 7.4: Hardware & Tools Totals

	Total	2013	2014	2016
Hardware & Tools	**2,985**	**248**	**1,589**	**1,148**
Hardware	**2,956**	**245**	**1,579**	**1,132**
Total from Ped. Survey	1,603	35	1,195	373
Total from STPs	339	210	129	0
Total from Test Units	1,014	0	255	759
Tools	**29**	**3**	**10**	**16**
Tools (Ped. Survey)	24	3	6	15
Tools (STPs)	0	0	0	0
Tools (TUs)	5	0	4	1

In all three seasons of excavations, square, hand-forged nails dominated the hardware assemblage; in total, the excavations recovered 2,647 square nails, which amounts to roughly 88.7% of the total amount of hardware and tool pieces found & 20.7%, or just over a fifth, of the total amount of metal on the site. Excavations also yielded round, wire nails (n = 111), although there were far less of these, as well as nails with more specific purposes, including horseshoe nails (n = 9), finishing nails (n = 8), and flooring nails (n = 2). The excavations at Highland City also yielded screws (n = 20), all but one of which were flat-head screws, small tacks (n = 35), large spikes (n=8), and bolts (n = 8). While not fully conclusive, the large number of square hand-forged nails reinforces the nineteenth-century dating of the site; flat-head screws, while present today, also pre-date Phillips-head screws and were present in the nineteenth century.

Table 7.5: Hardware & Tools

	Total	2013	2014	2016
Blades	**5**	0	1	4
Bolts	**8**	0	6	2
Brackets	**3**	1	1	1
Files	**2**	0	0	2
Hinges	**9**	0	6	3
Hooks	**3**	0	2	1
Keys	**2**	1	1	0
Locks & Latches	**4**	1	3	0
Nails, square	**2,647**	218	1,422	1007
Nails, round / wire	**111**	3	67	41
Nails, horseshoe	**9**	0	6	3
Nails, finishing	**8**	2	1	5
Nails, flooring	**2**	0	0	2
Other, hardware	**14**	0	10	4
Other, tools	**5**	0	2	3
Rings	**4**	0	2	2
Scale Plate	**1**	1	0	0
Screws	**20**	2	14	4
Screwdrivers	**1**	0	0	1
Shovel fragments	**8**	1	2	5
Spikes	**8**	2	1	5
Springs	**6**	0	5	1
Tacks	**35**	12	9	14
Washers	**4**	0	3	1
Wedges	**4**	0	4	0
Weights	**1**	0	1	0

The wide variety of hardware located at the site speaks to a range of activities and structures at Highland City. Wood screws, finishing nails, and flooring nails are all specific pieces of hardware used in building construction. The hardware indicates the presence of gates, locking doors, and latching windows as well. Nine hinge mechanism components came from the site, including one piece that was still fully functional and another hinge, from a gate piece, that was attached to a lock-plate. A final notable piece of hardware came from the neighboring Transect ZZ. Made of cast iron, the object is a heavy, circular collar with three rectangular ridges set equidistant from one another along its exterior; measuring 7.5 cm in diameter – and 5.5 cm in the interior, the collar may have secured a hose or spigot to a storage container or a machine.

With regards to the tools recovered, shovel fragments (n = 8) were the most commonly recovered, followed by wedges (n = 4), knife blades (n = 3) and files (n = 2). The site also yielded an adze head, a hacksaw blade a screwdriver, a clamp, and a chainsaw blade (1905+). There is little surprise that shovels were the most numerous tool found at the mining town; in total, the excavations recovered three shovel heads, one of which was whole, which were attached to shovel sockets, another shovel head without a socket, two sockets without heads, and a rivet from a shovel socket. All of the shovel components are likely manufactured by Oliver Ames & Sons, which operates now as AMES / True Temper. In 1870, Oakes Angier Ames invented the handle-bending machine, which allowed users to make the same level of progress with the shovel without exerting as much effort. By 1879, Oliver Ames & Son produced over 60% of the world's shovels. The company also trademarked several rivet-backed spade shovels for digging, mining, and for ore moving; in fact, they marked the "St. Louis," a riveted-back spade shovel, specifically as a "mining shovel." This shovel closely resembles several of the shovel fragments recovered. Further, all of the shovel head and socket fragments are riveted or rivet-backed and they all date to somewhere between 1870 and, likely, the 1930s – although they more resembled those found in late nineteenth-century catalogues.

Of the rest of the tool assemblage, the files provided the tightest dating chronology; both files are triangular tapered files and one still has a full tang attached. It is this object that provides the tightest time date out of all of the tools and hardware recovered. Found during the 2016 season's pedestrian survey, the complete file has "Wheeler Madden" stamped on the tang. This maker's mark refers to one of two iterations of a the Monhagen Saw Works, in Middletown, New York: either Wheeler, Madden, & Blackwell, which operated from 1853 to 1860, or Wheeler, Madden, & Clemson, which operated from 1860 to 1890. The operating chronology for Wheeler, Madden, & Blackwell predates the founding of Highland City by six years, although miners were in Montana Territory (and its earlier iteration of Idaho Territory) before the founding of the town. The file reinforces a nineteenth-century presence on the site and also speaks to the wide trade networks associated with the mining town; it either attracted a miner from New York or – more likely – attracted the attention of a miner, who ordered the file from New York via one of the Saw Works' catalogues.

Of slightly less diagnostic utility is a watchmaker's screwdriver, found in 2016 during pedestrian survey. The small screwdriver is likely made of tempered steel, due to the lack of corrosion product found on ferrous and copper alloy objects. The screwdriver is stamped with: "JAPAN", and the font suggests that this is likely a tool made by the Seiko Watch Company, which was established in 1881 in Tokyo, Japan. Although the head is broken off, its small, delicate size and shape indicate that it is, indeed, a watchmaker's screwdriver – and one which matches those made by Seiko Watch Company.

The tool and hardware assemblage provided one additional notable artifact type: knives. In 2014, pedestrian survey along Transect ZZ (850 E), at the western edge of the site, yielded a blade from a large hunting, or Bowie, knife. Pedestrian survey along the transect in 2016 recovered a pocket knife with multiple ferrous blades, encased in a copper alloy (likely brass) case. Set into either side of the case are cavities with two small pins of the same material; these cavities would have held the inlay for the pocket knife, although it is unclear whether it was wood, bone, or shell. The 2016 pedestrian survey also found another knife blade along the midpoint of the site – Transect J (950 E); this final knife fragment had a small piece of a tang or a bolster still attached, although the type of knife to which the blade originally belonged it is unclear.

Finally, classed with the hardware and the tools are two artifacts, which likely belonged in an assayer's office, although they were found at opposite ends of the site. In 2013, pedestrian survey along Transect C (880 E), in the western portion of the site, recovered part of a scale. Both made of iron, the object consisted of a round plate attached with a flat-head screw to a circular arm. The next year's pedestrian survey efforts along the far eastern edge yielded a cast iron weight. It was circular and resembled a hockey puck; it weighed 1 lb, 1.45 oz (495 grams). This extra 1.45 oz might have been a casting flaw in the weight, but – more likely – it represents an attempt to literally weight the scales in the assayer's favor, by using a weight that was over 9% heavier as it should have been.

Accessories & Fasteners

A total of 49 metal fasteners and accessories came from the combined assemblages from all three years of excavations; these include buttons, buckles, grommets, straight pins, snaps, and even the catch to a purse. Most of the fasteners came from pedestrian survey (n = 29 or 59.2%), with the second highest proportion coming from Test Units (n = 16 or 32.5); an additional four fasteners came from STPs (8.7%).

Table 7.6: Accessories & Fasteners Totals

	Total	2013	2014	2016
Accessories & Fasteners	**49**	**9**	**16**	**24**
Total from Ped. Survey	29	6	8	15
Total from STPs	4	3	1	0
Total from Test Units	16	0	7	9
Buttons	**19**	**6**	**5**	**8**
Buttons, 4-hole	6	4	0	2
Buttons, 2-hole	1	0	1	0
Buttons, other	12	2	4	6
Buckles	**16**	**2**	**4**	**10**
Buckles, single tongue	10	1	3	6
Buckles, double tongue	2	0	0	2
Buckles, snowshoe	4	1	1	2
Grommets	**5**	**1**	**3**	**1**
Other	**9**	**0**	**4**	**5**

The most numerous type of accessory and fastener found were buttons; the site yielded a total of 19 buttons, half of which came from the 2016 excavations (See Table 7.6). The majority of the buttons recovered during the three years at 24SB67 came from pedestrian survey efforts (n = 12), while five buttons came from Test

Unit excavations and another two came from STPs. Highland City yielded a wide variety of buttons, including two-hole buttons, (n = 6), tack buttons (n= 7), at least two two-part buttons, one two-hole button, and two military buttons. Nearly half of the buttons recovered were ferrous, with the remaining buttons made out of copper alloy, most likely brass, (n = 7) or a mixture of metals, including two ferrous and copper alloy buttons and one tin and ferrous button. Most of the buttons recovered appear to date to sometime between the mid-nineteenth century and the early twentieth century, which fits the chronology of the occupation at Highland City.

With regards to the distribution of the buttons, most of them came from the western edge of the site, in an area spanning from Transect ZZ (850 E) to Transect B (870E) (n = 12); pedestrian survey, STP excavations, and Test Unit Excavations all yielded the same trend. The remaining seven buttons came from the site midpoint at Transect J (950 E) (n = 3) and from just to the east of it at Transect L (970 E) (n = 4). Transects J and L are both areas of relatively high artifact density, with Transect L running through a midden left from a saloon or general store.

Six buttons, in particular, have much tighter dating utility. In 2013, pedestrian survey efforts along Transect J (950 E), the midpoint of the site, recovered a brass, loop-shank, United States Army uniform button. The obverse of this two-part button is molded with an eagle, whose head is tilted upward and to the left. It is holding an olive branch in its left talon and arrows in its right talon. Across its breast is a wide shield with an “R” inside it. The eagle’s wings spread out on either side of the shield. The design on the obverse of the button further identifies the button as one from the uniform of a Federal Rifleman. The manufacturer’s information on the reverse reads: “SCOVILLS & CO.”

Established in 1802, Scovill produced the first gilt buttons in the United States, utilizing newly-discovered brass-making techniques. In 1812, Scovill acquired its first contract with the

US Army and Navy. The United States military used Scovill buttons from the first quarter of the nineteenth century up through the 1970s; the manufacturer's buttons were most prolific on military uniforms in the years leading up, and during, the Civil War. The company's name went through several iterations, each of which provide very tight dating utility. In 1811, the original company name of Abel Porter & Company changed to Leavenworth, Hayden, & Scovill, after all of the original partners had retired. James Mitchell Lamson (J.M.L.) Scovill bought his partner's shares in the business and brought in his brother, William H. (W.H.) Scovill in 1820. This changed the brass company's name to J.M.L. & W.H. Scovill. This name remained until 1840, when it was changed again, this time to Scovills & Co., which is how it appears on the Federal Rifleman's button mentioned above. The name lasted for ten years, until the company once more underwent a renaming, this time to reflect the fact that they had expanded their products to include brass lamps, early camera pieces and daguerreotype plates, and artillery fuses. The company operated under the name of Scovill Manufacturing Co. from 1850 until around 1960, when it underwent its final name change to Scovill Fastener, Inc. The company still manufactures apparel and light industrial fasteners to this day.

Thanks to the multiple changes in the manufacturer's name, Scovill buttons provide very tight diagnostic utility on sites. The Federal Rifleman's button found in 2013 dates to between 1840 and 1850 and, as a result, predates the establishment of Highland City by at least 16 years. The one exception to Scovill's chronology was on small buttons, especially those on military uniform cuffs. Pedestrian survey along Transect B (870 E) in 2016 recovered a brass, two-part Federal General Service uniform 14 mm cuff button. The obverse is decorated with an eagle very similar to that on the Rifleman's button, but the shield has no lettering within it. Instead, the upper half of the shield is decorated with horizontal stripes and lower half with vertical stripes.

The reverse reads: "SCOVILLS & Co. / EXTRA." The company reverted back to its older name in 1850s and 60s because they had trouble fitting Scovill Manufacturing Company onto the backs of the small buttons. The cuff button found in 2016 dates to sometime between the 1850s and 1865. Scovill may have manufactured two additional buttons found on the site, although these are much harder to determine.

Two copper alloy tack buttons came from pedestrian survey along Transect B (870 E) – one from 2013 and one from 2014. Both have the same pattern on the obverse of two raised rings with a sunflower petal-like band in between them; these match Scovill Manufacturing Co.'s button 1263, which was sold on button cards during the early twentieth century (and possibly as early as the late 19th century).The two remaining buttons with diagnostic utility found date to the first half of the twentieth century. Pedestrian survey from 2014, also along Transect B (870 E), yielded a copper alloy tack button with a ferrous shank; the obverse reads: "CROWN / [image of a crown] / OVERALL." Oscar Berman founded the Crown Overall Manufacturing Company in Cincinnati, Ohio in 1903. In the 1930s, Crown merged with Headlight Overalls from Detroit to form Crown and Headlight, which operated until 1960, when Carhartt bought the company. As such, this tack button came from a men's workwear garment and dates to sometime between 1903 and the 1930s.

The final button with a tighter dating chronology came from Test Unit 1, excavated in 2014 between Transects B and C. Cleanup done after a ground squirrel burrowed through the incomplete Strat I recovered a donut-style copper alloy tack button, molded with: "UNION / MADE." These buttons were found on men's workwear throughout the first half of the twentieth century and appeared on clothing from several different manufacturers including Crown Overall and Black Bear Carpenters. The jeans manufacturer, Lee, eventually used buttons that read

Union Made after 1936 and reissued them in the 1940s, with buttons that read “UNION MADE by Lee.” The button found in Test Unit 1 likely dates to sometime between 1900 and the late 1930s and, given its proximity to Transect B, where the Crown Overall button came from, it may have even come from the same garment.

Buckles represent the second most common fastener found on at Highland City, with 16 individual buckles found over the course of three years. As with the buttons, the majority of the buckles came from pedestrian survey (n = 10 or 62.5%). The remaining six buttons came from Test Unit 1 (n = 1) and Test Unit 3 (n = 5). Over sixty percent of the buckles recovered were single-tongue buckles (n = 10 or 62.5%), six of which have rollers under the tongue. Four of these single-tongue buckles are the same shape and size and all came from Test Unit 3, Strat I. They are narrow enough that they may have been buckles used on horse tack. They could have been used on other small straps in men or women’s clothing as well and – as such – they are not classed as equestrian artifacts.

Only two double-tongue buckles came from Highland City, and both were recovered in 2016: one from pedestrian survey along Transect B (870 E) and one from Test Unit 3, Strat III. This second buckle provides substantial diagnostic utility. Stamped with “PATENT 1855”, this buckle is one made using S.S. Hartshorn’s July 10, 1855 buckle patent. The double-tongue buckle had many uses, including on suspenders, jean straps (used before tack buttons), women’s skirt and undergarment strap, such as those holding crinoline, men’s vests, and men’s undergarments, referred to as suspensories. Hartshorn’s buckles were used from 1855 through the 1920s, a chronology which falls right into Highland City’s habitation timeline. Ratcheting buckles are the final type of buckle found at site 24SB67 (n = 4). Three of these came from pedestrian survey along Transects A (860 E) (2016) and M (980 E) (2013, 2016) and one came from Test Unit 1, Strat I, excavated in 2014. These four buckles all look rather similar to one another and to old belt and snowshoe buckles dating back to at least the 1920s.

The remaining fasteners and accessories consist of grommets (n = 6), straight pins (n = 2), a matched hook and eye set, snaps (n = 2), a clothing rivet, and one side, or half, of a small purse catch. The grommets were found across the site and through the use of pedestrian survey (along Transects ZZ & A), STPs (found in STP F7 and Y5), and Test Units (found in Test Unit 1, Strat I and the resulting clean-up of Strat I). The grommets all appear to be more clothing-oriented rather than industrial, such as those found on canvas tarps and tents. As will be discussed further below, two of the leather pieces recovered on the site had grommets still attached to them. A large, nearly whole spat, recovered in 2013 through pedestrian survey along Transect E (900 E), had two rows of 14 grommets each, of which only three appeared to be missing. A piece of curled, black leather found by pedestrian survey along Transect B (870 E) in 2016 had a neat row of five grommets in place. The six loose grommets found are all roughly the same size as one another and as those found on the spat and the leather fragment; only one grommet differs and it is much smaller and more delicate than the other five. Additionally, three of the grommets recovered had small pcs of dark material trapped within them, which appeared to be either leather or vulcanized rubber.

Two final notable fasteners found on the site are the matched hook and eye set above and a snap with the maker's mark still legible. The hook and eye are both quite small, and likely came from a woman's undergarments. The two pieces both came from Test Unit 3, Strat I, excavated in 2016. The snap, also found in 2016, came from pedestrian survey along Transect A. Only the female half remains, along with a small fragment of leather, which is attached to it. The snap reads: "RAUF. CO. / PROV. R. I.", which refers to the Rau Fastener Co. out of Providence, Rhode Island, which operated from 1911 through 1968. Rau made many of the snaps used by United States soldiers during both World Wars. Without the male half of the snap, it is difficult to determine the snap's age, although even the resurgence of population at Highland City reportedly ended with the federal ban on mining during World War II, making it unlikely that the snap dates any later than the 1940s.

Cookware & Household Objects

The excavations at 24SB67 yielded a total of 62 metal artifacts that are either cookware or household objects. These include fragments of plates, pots, pans, and flatware. Over a third of the objects found were fragments of cooking vessels (n = 25 or 40.3%), which include pot (n =24) and pan (n = 1) fragments (see Table 7.7). Aside from cookware, this assemblage category also includes plate fragments (n =8), flatware pieces (n = 4), cooking tool handles (n =2), stove fragments (n = 8), mattress coils (n = 14), and other household objects, such a lead syringe nozzle. Just under 80% of the artifacts classed as cookware and household objects came from the western half of the site (n = 50 or 79.4%). This adds strong evidence to the assertion that the westernmost artifact concentration is a domestic assemblage associated with the extant wooden cabins still standing in that section of the site.

Within the western portion, all fragments came from the eight westernmost transects on the site, which span from Transect XX (840 E) to Transect E (910 E). On the eastern half of the site, all cookware pieces found came from the six easternmost transects, which span from Transect U (1060 E) to Transect Z (1100 E); specifically, six of the eight objects came from Transects X (1090 E) and Y (1100 E). Three fragments came from the centerline of the site – Transect J (950 E) – and another three fragments came from the transects directly to the east of the centerline, with one fragment from Transect K (960 E), one from Transect L (970 E), and one

Table 7.7: Cookware & Household Objects

	Total	2013	2014	2016
Cookware & Household Objects	**62**	**14**	**32**	**16**
Total from Ped. Survey	48	13	28	15
Total from STPs	2	1	1	0
Total from Test Units	0	0	1	0
Pot Fragments	**24**	**1**	**19**	**4**
Rim Fragments	8	1	5	2
Base Fragments	4	0	4	0
Body Fragments	10	0	9	1
Other Fragments	1	0	1	0
Lid Fragments	1	0	0	1
Pan Fragments	**1**	**0**	**1**	**0**
Stove Fragments	**8**	**2**	**5**	**1**
Door Fragments	4	0	3	1
Other Stove Fragments	2	2	0	0
Stove / Boiler Fragments	2	0	2	0
Flatware	**4**	**2**	**2**	**0**
Forks	1	1	0	0
Spoons	2	0	2	0
Unknown	1	1	0	0
Cooking Tool Handles	**2**	**0**	**0**	**2**
Plate Fragments	**8**	**1**	**4**	**3**
Mattress Coils	**14**	**8**	**1**	**5**
Bonnell	8	4	0	4
Marshall	6	4	1	1
Other Household	**1**	**0**	**0**	**1**

from Transect M (980 E). When combined with the artifacts from Transect J, a total of six artifacts in the cookware and household objects category came from the center portion of the site.

Most of the fragments recovered that were associated with cooking were pieces of pots (n = 23), including rims, bases, body sherds, and even a handle. Pedestrian survey from all three seasons located 21 of the 23 pot fragments, with one fragment coming from STP A5 and one fragment coming from Test Unit 1, Strat I, both excavated in 2014. The majority of the pot fragments (n = 20) clustered around the five westernmost transects of the site – Transects XX, YY, ZZ, A, & B – with only three fragments found further east, two at Transect U and one near the edge toward the eastern edge of the site at Transect X. No pot fragments came from the center of the site.

Eight of the pot fragments recovered were rim fragments (n = 8), all of which, save one, were made of cast iron and were recovered between Transects XX and A; the exception is a cast iron fragment from 2014's Test Unit 1, which is just west of Transect B (971N / 869E). This fragment was the only pot rim embossed with lettering, which reads: "RLAIN & CO". Of the remaining pot rim fragments, one piece came from STP A5, while the rest came from pedestrian survey efforts in 2014 and 2016; one rim was found in 2016 on the surface between STPs A4 and A5, but it does not mend with the rim excavated in 2013. One of the rim fragments found along Transect ZZ in 2014 has a loop soldered onto it, as well as a small piece of handle still intact. Two fragments found along the same Transect, specifically at point ZZ4, in 2016 are likely from the same pot; one is a rim fragment, while the other is an intact lid from a small, cast iron pot, measuring 12 cm in diameter. The pot lid has a small, u-shaped handle attached at the center and a ring running around the underside to anchor the lid inside the pot.

Also found nearby in 2016, between ZZ4 and ZZ5 was a body sherd from a cast iron pot, which appears to have broken just after the rim. A raised pattern of horizontal and diagonal lines decorates the fragment, which also has a red tinge on the exterior, possibly from extremely high heat. Six additional body sherds came from Transect ZZ, as did two basal sherds, which are perhaps related. One of these basal sherds is from a bowl-like cast iron pot with a piece of a wire handle attached. The other basal sherd appears to be the base of a coffee pot and is molded with annular ridges. A additional pot fragment, also a body sherd, came from Transect B, which was corroded and very red – likely exposed to high heat. Another two pot fragments may be from one vessel, although they do not mend. Both fragments are basal fragments recovered along Transect YY in 2014. One fragment has a portion of the pot's sidewall attached; the other bears a small mark, which looks as though it was hand-written during the process of casting a pot and which reads: "6H". Unfortunately, the meaning of this engraving is unknown.

The remaining three pot fragments were recovered during pedestrian survey and all came from the eastern half of the site; in total, two body sherds were found at from Transect U, and a pot handle came from Transect X. The three fragments do not appear to be associated with one another. Pedestrian survey along the eastern edge of the site, Transect Y, in 2014 also yielded a fragment of an iron pan. It is unclear whether this fragment is part of a pan’s rim or part of the edge of a pan’s lid.

Plate fragments comprised an additional eight pieces of the assemblage, of which, two pieces were made of cast iron and six pieces were ferrous. Half of the plate fragments came from pedestrian survey along Transect B in 2014 and all four fragments were from the same vessel, likely a dinner plate; further, three of the four pieces were rim sherds, with two of the ferrous fragments forming a contiguous mend. Pedestrian survey in 2016 yielded three additional plate fragments, from two separate vessels; found near STP J5, two of the fragments were rim sherds, which also formed a contiguous mend. The rim sherds came from a thin, round plate, which may also have been a dinner plate.

The third plate fragment found in 2016, near STP M6, was made of cast iron and unlike the rest of the vessels found. The fragment was roughly one quarter whole (9.7 cm at widest x 6.2 cm at tallest), with a pronounced rim raised three centimeters above the plate’s surface. Aside from its raised rim, the plate was also thicker than most of the other plate fragments found on the site, measuring 0.4 cm thick. The last plate fragment from the site assemblage came from pedestrian survey during the first year of excavations at the site (2013). The fragment consists of roughly two-thirds of a round dinner plate, including intact rims, and spans 20 centimeters in diameter. In total, the excavations yielded at least four different dinner plates.

Excavations also recovered four pieces of flatware from the site: a fork, two spoons, and an unknown flatware handle (likely from a fork or a spoon). The two spoons both came from the 2014 excavations and both were found intact. The first spoon came from pedestrian survey along Transect YY on the western edge of the site; it was likely modern and appeared to be made of stainless steel. The second spoon was found while excavating STP Z2, on the far eastern edge of the site grid; it appeared older and was made of silver-plated iron, which had begun to corrode. The fork fragment recovered from Highland City came from the 2013 pedestrian survey efforts near the middle of the site – Transect J. Made of cast iron, fork piece had a finished edge below the transition, which indicates that likely, it was seated into a wood or bone handle. The head of the fork was three-tined, although only one of the tines was fully intact. The final flatware fragment also came from pedestrian survey in 2013.

Found closer to the western edge of the site, along Transect A, this flatware fragment proved to be the most diagnostic flatware piece, despite the fact that it was a handle, which broke just before the transition to the implement's head (although it was either a spoon or a fork, based on the shape and thickness of the handle). The handle was silver-plated iron and incised with the letter "E" – written in copperplate script – on the obverse side, near the end of the handle. The pattern with which the handle was decorated remained clear enough to also be identified; this flatware fragment was decorated with William Rogers & Son's Florida Pattern, which dates to 1894; other iterations of William Rogers & Son, including William Rogers & Bros, and Simpson, Hall, Miller, & Co, also sold this design style.

Although William Rogers & Son became William Rogers & Bros in 1855, then William Rogers Manufacturing Company in 1865, and, finally, Simpson, Hall, Miller, & Co took over the hallmark in 1878, in the silver produced still bore previous iterations of the name at times.

However, there are no extant indications that the International Silver Company (INSICO) sold the Florida pattern, which means that this pattern must have been available only until William Rogers & Son / William Rogers & Bros and / or Simpson, Hall, Miller, & Co merged with the International Silver Company, both in 1898.

One similar artifact also came from the western portion of the site: a handle to a kitchen tool, such as a ladle or large spoon was recovered through pedestrian survey at STP C5 in 2016. The handle fragment was very heavy and ferrous – possibly even cast iron – and had one finished end. A small hole was punched neatly through the very end of the handle, which likely once allowed a leather thong, a string, or a piece of twine to pass through, creating a means to hang the tool. The hole is just wide enough, it may even have been used alone to hang the implement from a hook or a nail in the wall. On the obverse of the handle, just set just slightly inward from the edge, is a raised, decorative outline, although the pattern is unfamiliar. A second cast iron handle was found just west of the centerline at point G1 also during 2016's pedestrian survey. It was flattened and ended with a hook-like shape, possibly originally formed to go over the rim of a pot.

The final subset of cookware are those artifacts pertaining to stoves. In total, eight stove fragments came from 24SB67, all through pedestrian survey efforts. Pedestrian survey along the western edge of the site in 2013 yielded two similar stove fragments, likely from the same piece. Made of cast iron, both fragments are roughly square-shaped and have a raised criss-cross pattern on one side, possibly used for grilling. One fragment came from Transect B (870 E) and one came from Transect D (890 E). The remaining six stove pieces are all doors of various shapes and sizes. Three of these are definitively from stoves, while the other three are possibly from boilers or furnaces instead.

Two of possible boiler doors both came from Transect B in 2014; one of them is undecorated and slightly curved. The other is molded with "NCB – 7", which may refer to the National Coal Board. Coal has been found at the site, including along Transect B, and – as such – could have fed this machine, be it a stove, boiler, or furnace. The final possible stove door piece was found in 2014 in the eastern portion of the site, along Transect X (1090 E). It is molded with a raised, linear, horizontal ridge on one side and a raised, vertical ridge on the other, although it is unclear which side is the exterior and which is the interior of the door fragment.

All three of the door fragments that are most likely from stoves come from pedestrian survey along Transect Y (1100 E) in 2014 and 2016. One rectangular door is intact and still has a hinge mechanism attached; the exterior is decorated with several concentric rectangles. Another door, this one circular, is also intact, although it has no hinge. Two raised, concentric rings decorate the exterior. The final door piece is a fragment with only one finished edge at the bottom. It is decorated with a series of raised, rounded bands and marked with: "HAR'8 [could be S or 3] – 1 [or I]…". The marking is unidentifiable.

Finally, fourteen mattress coil fragments came from the three years of excavations at 24SB67 and all came from pedestrian survey efforts; of these, eight are Bonnell coils and 6 are Marshall coils; these coils represent the largest group in this artifact class, with two more pieces than the second largest group, pot fragments (n = 12). Most of the mattress coils recovered came from the 2013 excavations (n = 8) and all of the coils came from the western half of the site, except for one found in 2016. Of the coils found in 2013, four of the coils were Bonnell coils and four are Marshall coils; all of them were found between Transects B and D. Only one mattress coil, a Marshall coil, came from the 2014 pedestrian survey efforts and it came from Transect YY. Finally, five mattress coils came from the 2016 season, four of which were Bonnell coils and one of which was a Marshall coil. All of the Bonnell coils came from the western half of the site, between Transects B and E; the single Marshall coil came from Transect M, and was the only coil to come from anywhere west of Transect E.

Bonnell coils are the oldest type of mattress coils still in use today (and arguably *the* oldest metal mattress coil system). Inspired by the upholstery-covered carriage and buggy springs of the nineteenth century, Bonnell coils are hourglass-shaped, which allows for a flexible yet wide surface on which to sit or lay. The narrow middle of a Bonnell coil allows the support system to respond more immediately the bodyweight on a seat or mattress. The Bonnell coils are usually made of a thicker-gauge metal wire, which is tied off in a small knot toward the wider part of each hourglass. Also referred to as a single coil system, a mattress with the Bonnell support system contains a series of Bonnell coils, which are held together with spiral-shaped wires, which run perpendicular to the vertical hourglass shapes. Due to the ease of manufacture and familiar feeling, Bonnell coils are still used today, especially in budget mattress such as those found in hotels and dormitories.

In contrast, Marshall coils, which are also known as pocket springs, are barrel-shaped metal coils, which were invented in 1899 by James Marshall, an English engineer living in Canada. The coils are knotless and are usually made of a much thinner gauge wire than that found in Bonnell coils; most notably, each Marshall coil is encased in a pocket of fabric, as their other name above suggests. Additionally, Marshall coils are not wired together, which allows each coil to adjust to body weight independently; further, increase in weight on one coil does not affect a nearby coil, because the two are not connected. Finally, Marshall coils were – and still are – pre-compressed before they are inserted into a mattress frame. This allows the coils to expand slowly over time and provides a firmer mattress. The Marhsall coils likely date to the second occupation of Highland City, which lasted until the mid-twentieth century, while the Bonnell Coils found most resemble those manufactured up until 1900 and, as such, likely date to the original occupation of the site.

Figure 7.1: Lead Syringe from Highland City

One final artifact of note is a lead syringe nozzle, found in 2016 during pedestrian survey at A4 (See Figure 7.1). The only syringe found at the site, its location on Transect A places it within the artifact concentration associated with the domestic activity area on the site.

Equestrian & Transportation

The nine horseshoe nails mentioned in the hardware section above speak to the presence of horses, and possibly mules, at the site. Even more convincing evidence comes in the form of those artifacts classed in the Equestrian & Transportation category (See Table 7.8). The three years of excavations yielded a total of four horseshoes found on the site. STP excavations in 2013 at STP L5, near the middle of the site, yielded a horseshoe fragment with one nail hole intact and two additional partial holes. Although only roughly a quarter of the horseshoe remains, its curvature is enough to determine that the shoe fit a small horse or possibly a mule. Pedestrian survey in 2014 recovered two horseshoes, both of which were quite large.

Table 7.8: Equestrian & Transportation Totals

	Total	2013	2014	2016
Equestrian & Transportation	**9**	**1**	**5**	**3**
Total from Ped. Survey	6	0	3	3
Total from STPs	3	1	2	0
Total from Test Units	0	0	0	0
Equestrian	**7**	**1**	**5**	**1**
Horseshoes	4	1	2	1
Rings	3	0	3	0
Transportation	**2**	**0**	**0**	**2**
Wagon Components	2	0	0	2

One whole horseshoe came from Transect T (1050 E), in the eastern half of the site. At 13 cm in diameter at its widest, this large, heavy shoe came from a draft horse. The shoe shows heavy wear and is worn down on the left side, toward the front, which is often a sign of a horse digging its hooves in to pull a heavy load. The wear on the shoe, combined with the fact that it still had one horseshoe nail present in one of the holes, suggests that this shoe may have been thrown as by a draft horse at work. The second horseshoe recovered was nearly whole and also likely came from a draft horse; it was found at the other end of the site, however, along Transect YY. The final horseshoe recovered came from pedestrian survey efforts in 2016 along Transect L. This horseshoe, like the one excavated from nearby STP L5, was very small. Half-intact, the shoe likely fit a pony, donkey, or mule. The two holes in the shoe are both quite small, further indicating the fact that it was made for a smaller hoof.

The excavations at 24SB67 also recovered three brass rings, all of which are the correct size to have come from horse furniture, such as a bridle or halter's headstall, or from a harness. All three rings came from the 2014 excavations and all three were found on the far eastern edge of the site. One ring came from STP X4 and the other from STP Y4, ten meters to the east; these two STPs are on the same northing (1050 N) and, as such, the two rings may have been associated. They are very similar, both are circular, rather than oval and made of copper alloy – likely brass. Additionally, both rings have a small piece of hardware riveted on to them, which may have come from horse furniture. The final ring came from pedestrian survey along Transect Z (1110 E), the easternmost transect on the site. Like the two rings found at STPs X4 and Y4, this ring is also circular, likely made of brass, and has a small piece of hardware attached to it with a small rivet. Given their proximity to one another, it is possible that all three rings might have even come from the same piece of tack.

Figure 7.2: Nineteenth-century Buggy Suspension

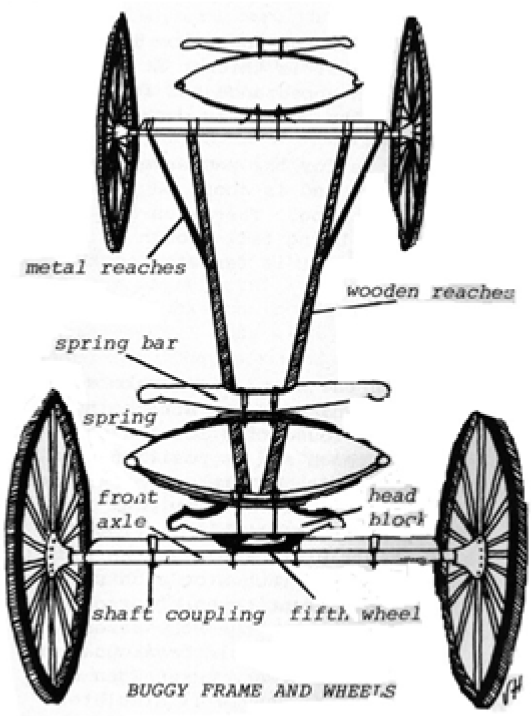


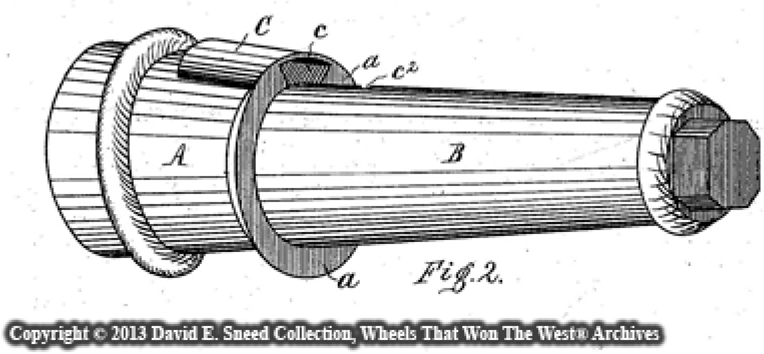
image courtesy of thelibrary.org

The two final objects in the equestrian and transportation category are both components of either wagons or buggies and both came from 2016's pedestrian survey. The first artifact, found along Transect A (860 E), is a ferrous spring from a wagon or buggy frame. Bent into a wide arch, one end of the spring is curled, where it would have fit into a matching spring, which bowed out in the opposite direction; this formed a lemon-like shape just forward of the buggy's rear wheels (See Figure 7.2). One ferrous rivet remained intact in the spring.

The second artifact is a whole cast iron axle skein, found along Transect N (990 E) and is from a much larger wagon. The cast skein is cylindrical and is much narrower at one end than at the other; at its widest, it measures 11.7 cm in diameter and at its narrowest – where the skein is threaded – it measures just 4 cm in diameter. In total, the skein is 46 cm long.

Wooden axles have been found on wagons in North America as early as the eighteenth century. These axles initially had tapered ends, which fit into a set of iron strips, referred to as clouts. However, wagon makers soon sought a more efficient axle set-up in response to the fact that the lower clout would always wear before the upper clout did, which increased the likelihood for a broken axle. The solution, known as the cast skein or cast thimble skein, reduced the amount of maintenance needed on the axle while also increasing its durability.

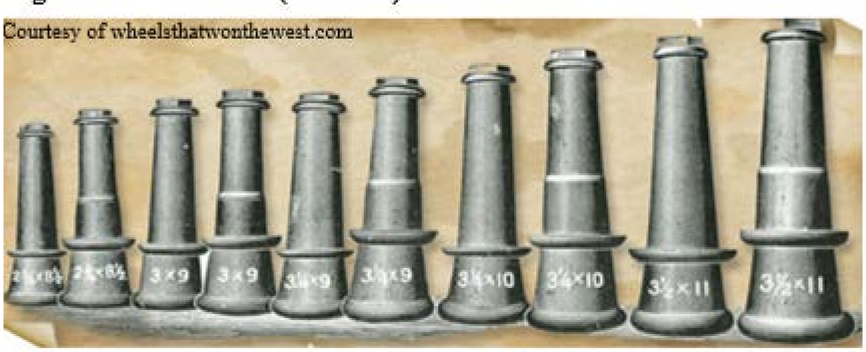
Figure 7.3: Cast Iron (Thimble) Axle Skein



The cast skein consisted of a hollow, cone-shaped metal cylinder which fit snugly over the end of the wooden axle and so effectively replaced clouts that nearly all wagon makers using wooden axles transitioned quickly to using it (See Figure 7.3).

The earliest known patents for cast thimble skeins date to the 1840s and a Schuttler wagon found on the Steamboat Arabia, which sank in 1856, was equipped with cast thimble skeins. It is difficult to determine who first invented the cast thimble skein, as there are several sources, each of which purport to know the designer of the axle component that revolutionized the wagon industry. The most likely guess is the wagonmaker Louis Espenschied of St. Louis, Missouri, who operated the Espenchied Wagon Company (1843-1930s). Espenshied patented a later version of the cast skein, one which was sel f-lubricating, in 1878 and this patent implied that he was improving upon skeins which he already manufactured. Cast thimble skein axles generally appeared on large wagons such as those used for freight and for farm work and those used to cross the American West overland, such as Conestoga Wagons and Prairie Schooners; by

Figure 7.4: Cast Iron (Thimble) Axle Skein Sizes



the 1850s, the Espenchied Wagon Company was well known for making wagons for westward migration and even outfitted the Mormons for their 1853 journal to Utah. By the 1870s, Espenshied specialized in heavy wagons for farm and freight use.

The cast thimble skein found at Highland City came from either a heavy freight or farm wagon and was definitively manufactured in St. Louis, although the manufacturer is unknown. Near the base of the skein, the following is embossed: “KB[?]… / ST.LOUIS 3 1/2”. The 3 ½ refers to the size of the thimble skein and, as a result, the weight that the wagon and its axles could bear; the largest of the thimble skeins were marked as 3 ½ x 11. All others were marked with a number between 2 ¾ and 3 ¼ (See Figure 7.4). As such, the cast thimble skein found in 2016 was from a very large wagon capable of carrying a very heavy load. Given this, it is no surprise that, just two transects away to the west, two large draft horseshoes were recovered.

Storage

Storage-related objects comprise the largest portion of the metal assemblage, and of the overall site assemblage, recovered at 24SB67 and include cans (as well as their lids and keys), buckets, bottle closures, barrels, and strapping (See Table 7.9). In total, 9,317 individual pieces came from all three years of excavation, which makes this category the largest of the six categories in the

Table 7.9 Storage Totals

	Total	2013	2014	2016
Total Storage	**9,317**	**971**	**4,076**	**4,270**
Total from Ped. Survey	7,628	698	3,044	3,886
Total from STPs	1,054	273	781	0
Total from Test Units	635	0	251	384
Can Components	**9,050**	**930**	**3,975**	**4,145**
Whole Cans	100	17	32	51
Whole Lids / Bases	111	10	100	1
Fragments	8,837	903	3,841	4,093
Can Keys	2	0	2	0
Bucket Components	**35**	**22**	**3**	**10**
Whole / Nearly Whole	2	1	1	0
Handle Pieces	5	0	1	4
Rim Fragments	27	21	0	6
Fragments	1	0	1	0
Drum Fragments	**13**	**0**	**2**	**11**
Other Containers	**1**	**0**	**0**	**1**
Barrel Hoops	**2**	**0**	**2**	**0**
Strapping	**198**	**16**	**84**	**98**
Closures	**13**	**1**	**6**	**6**
Bottle Foil	**7**	**2**	**4**	**1**

metal assemblage, comprising 73.2% of the total metal assemblage and 31.4% of the entire assemblage of 29,629 artifacts recovered from Highland City.

Within the storage category, the majority of the artifacts found were can components, with 9,050 individual pieces, which is 97% of the artifacts in this group overall. These can fragments mark the largest single artifact group recovered from the site, making up 71.1% of the overall metal assemblage and 30.5% of the complete artifact assemblage from the site.

The can fragments recovered include 100 whole round and square cans, just over half of which came from the 2016 season, and an additional 111 complete square and round can lids (or bases), which nearly call came from the 2014 season's excavations. The two can keys recovered from the site also came from the 2014 excavations, one of which had a thin strip of can lid still wrapped around it; both can keys came from pedestrian survey at the far western edge of the site, along Transects XX and YY. The remaining 8,835 can fragments, nearly all ferrous, were unmarked all body fragments. (N.B.: It is possible that I sorted several small lid or base fragments that possessed no identifying characteristics into this artifact type as well).

While the storage category is the largest of the six metal categories, largely because of the presence of the can components, the single largest individual artifact type found at Highland City was that of the can body fragments. These fragments dominated the assemblage of each of the three years of excavation at the site (See Table 7.7) and not only comprised 97.6% of the can components groups and 94.8% of the storage category, but just under 70% of the metal assemblage (69.4%) and almost a third of the overall site assemblage (29.8%). While most can components recovered had few identifying features, several fragments proved to be quite informative.

Six of the can pieces likely came from larger spice tins or shakers; one ferrous can fragment, found in 2013 along Transect G, was stamped with "…CES," likely the second half of the word "SPICES." Another piece, a complete, round, tin, can lid, had many small holes punched into it, through which finely ground spices like black pepper, salt, paprika, or cinnamon sprinkle out; a complete square lid had six such holes punched through it as well. Three additional round, ferrous, can lid pieces (two of which came from the same original lid) also had holes in them to act as shakers, although the small holes looked manually punched in with a small awl or needle-sized tool.

The most exciting can fragment found was the lid of a rectangular Colman's Mustard dry mustard tin, which made an incredibly long journey from Norwich, England to Highland City, Montana – likely in the early 1880s. Colman's mustard, known for its iconic yellow tin, was established by Jeremiah Colman in 1814 in Norwich, England; he mixed brown and white mustards to create its signature tang. It acquired its famous yellow packaging and signature bull head in 1855 and moved to a larger factory location in 1865, where is still operates today. The following year, it was granted the Royal Warrant as Queen Victoria's official manufacturers of mustard and it continues to be the official mustard provider for the royal family. It wasn't until the 1880s, however, that it began to be exported to the United States. As discussed earlier, William Crawford, J.B.S. Coleman, and E.B. Coleman (ironically, of no relation to mustard-making family) found cold in Fish Creek in 1866, resulting in the establishment of Highland City in 1866. By the 1880s, the miners had a fair amount of bargaining power, as a result of the purity of the gold veins that rain through the Highlands. The results of this influence manifested in the archaeological record in several forms, in the form of imported oysters and clams, Champagne, expensive liqueurs, and this little Colman's mustard tin.

The mustard tin fragment recovered was a nearly-complete lid, found during pedestrian survey in 2014 along Transect XX, one of the transects with a very high artifact density and located within the domestic / residential activity area. This lid, from a rectangular dry mustard tin, was embossed with Colman’s information, although this has since weathered away. The interior side of the lid, however – into which Colman’s stamped their information – remained legible for the most part, although in reverse. Through the use of straking, or angled light, which illuminated the edges of the stamped letters enough to render their impressed edges visible, the label text emerged. The inscription, when put into the correct direction, reads as follows: “Net / J&J COLMAN / LIMITED / LONDON”, as is seen in Figure 7.5.

Figure 7.5: J&J Colman Mustard Tin Lid

The style of writing on the can, the style of the can itself, and the artifacts found near-by all speak to the early 1880s, which coincidences with the time that Colman's mustard first appears in the United States, as discussed above. The demand of the miners was such that this small mustard tin traveled from Colman’s factory in Norwich across the Atlantic, likely to New York or Boston, and then overland across the prairies of the young United States and finally up into the Rocky Mountains to arrive at the frontier mining camp of Highland City, Montana; this journey covered at least 5,956.72 miles (9,586.41 km) from manufacture to miners.

Another indicative can piece also came from pedestrian survey in 2014, slightly to the east along Transect B: a lid to a Copenhagen tobacco tin. Whole and circular, although rather corroded, the lid embossed lettering reads: “Long Cut / Copenhagen / fresh cope / it satisfies since 1822”. The arrangement of the words and the placement of a large diamond shape indicates that the lid dates to circa 1930, which coincides with the second settlement of the site. A second can piece dates to roughly the same time: an intact can, missing only its lid, which was found in 2016 through pedestrian survey. It came from the area around STP J10, near the center of the site. The base of the can reads: “SOLD BY THE CALIFORNIA COMPANY / SAE / 30 / DENVER” and identifies the can as an oil can manufactured by the California Company, which was a subsidiary of Socal (Standard Oil Company, California). Due to the operating dates of the California Company, before it further merged into large corporations, the oil can dates to sometime between the 1930s and 1940s.

The final can of note from the excavations was found during the excavation of STP L5, near the center of the site, in 2013. L5 was one of the most productive STPs excavated at Highland City and likely marks the presence of a saloon or even a general store. The can found was rectangular and made of copper alloy, as indicated by the cuprous oxide on the body. When excavated, the can was found completely flattened, with both of its ribbed long edges intact and one of its smooth, short sides intact as well. All three sides lay flat, extending out from the base of the tin, like a cardboard box awaiting construction (See Figure 7.6). This rectangular tin may have been put together similarly, or perhaps it was taken apart and flattened by an individual who wished to stave off boredom. The

Figure 7.6: Opium Tin Recovered from Highland City

Figure 7.7: Opium Tin. Private Collection, Vancouver, B.C.

Courtesy of the Chinese in Northwest America Research Committee (CINARC) http://www.cinarc.org/Opium.html

shape of the tin – a narrow rectangle – and the material – copper alloy – both speak to the possibility that this artifact is an opium tin (See Figure 7.6).

Generally, opium tins, which were made of brass, all contained roughly 6.5 ounces – or 5 Chinese *liang* – of refined opium; in the United States, ads referred to these tins as "half-pound" tins, which they considered to be close enough to the actual weight (See Figure 7.7). Each tin ranged in price, depending on the quality of the opium within; in 1891, a single tin cost wholesale merchants between from $6.80 to $9.00. The opium produced in Victoria, British Columbia, the largest nineteenth-century producer of opium located outside of Asia was the cheapest available kind and consumers referred to it simply as Victoria opium (Culin, 1891; CINARC, 2016). In 1891, Stewart Culin, in the *American Journal of Pharmacy and the Sciences Supporting Public Health* (Vol. 63: Series 4, Vol. 21) observed that this Victoria opium was "regarded as weaker and inferior to the opium manufactured in China, a difference which the Chinese explain as due to the water used in its preparation." Culin reports that Victoria opium sold for roughly $6.80 per 6.5-ounce tin in Philadelphia, in 1891 (Culin, 1891: 498; CINARC, 2016).

On the opposite end of the spectrum was opium produced by two Anglo-Chinese firms that had a monopoly over master refining and cooking techniques in Hong Kong: Lai Yuen and Fook Lung. Nineteenth-century opium users regarded Hong Kong opium as the finest product available. Culin observes that opium produced by these two “syndicates” was considered to be “superior opium” and therefore was worth the increased cost, much of which was due to the annual sum the firms paid to the British Government and additional markups from “American agents in San Francisco” and store owners (Culin, 1891: 498; CINARC, 2016). In Philadelphia, Culin writes that Lai Yuen opium sold for $9 per 6.5-ounce can and Fook Lung for $8.85, in 1891. Of note is Culin’s assertion that “opium is not sold directly from the can by the retail merchants, but always from a large pottery vessel” and that “many of the purchasers are provided with a small horn box” in which to store the refined opium; cheaper purchases often went out of the store in “ordinary playing cards ingeniously cut and folded into a small shallow box” or even in small, carved-out lychee nuts (the pit inside the lychee fruit). (Culin, 1891: 500). He further notes that “keepers of opium joints,” or what were more pejoratively referred to as opium dens, would buy “two boxes” of the finest Hong Kong opium, another two of Victoria opium, and a third set of two boxes containing the “refuse” scraped out of opium pipes and bowls; they would mix these three products to create a blend for their patrons. The presence, then, of what is likely a 6.5-ounce opium tin at Highland City suggests the presence of either a “retail merchant” or an “opium joint,” rather than simply the existence of several opium smokers (Culin, 1891: 500).

Christopher Merritt, a scholar out of the University of Montana, has observed that is fairly common for the larger opium tins to remain in fairly good condition at archaeological sites, whether remote or urban. After conducting analysis on 17 opium tins recovered from four different archaeological sites in Montana, Merritt concluded that the tins were all made of brass or copper alloy – something asserted by Stewart Culin – instead of tinned iron. Additionally, the solder on the tins was lead or a lead-arsenic alloy. This lead or lead-arsenic alloy solder was commonly used in the nineteenth-century on tinned iron cans as well, but, when combined with the antimicrobial effects of copper, it doubly contributed to opium tins' preservation (Merritt, 2009; CINARC, 2016). Manufacturers and consumers of opium in the nineteenth century also noticed the cans' ability to resist corrosion; as such, the tins often were refilled and re-used, although the application of a second solder usually made it rather obvious that the tin had already been filled once before.

In addition to the can fragments, excavations at Highland City also yielded 34 bucket pieces, including one intact bucket, one nearly intact bucket, four bucket handle pieces, and 28 additional bucket sidewall and rim fragments. The whole bucket was ferrous and found in 2013 during pedestrian survey along Transect C in the western half of the site. The nearly whole bucket was larger and made of galvanized steel; it was recovered in 2014 through pedestrian survey along Transect Z, at the far eastern edge of the site. Both buckets were flattened and had several tears in the metal of their sidewalls. Of the remaining 28 bucket fragments, 27 of them were rim fragments, with two pieces made of galvanized steel and the rest of iron alloy; further, all of the rim fragments came from the western portion of the site, between Transects YY and D, and all came from pedestrian survey in 2013 and 2016.

Transect B yielded the largest number of rims with 18 pieces from 2013 and 2 pieces from 2016. Four of the fragments recovered in 2013 were likely from larger, heavier, possibly industrial, buckets than the other fragments, due to the thickness of the iron. Additionally, one rim fragment from 2013 had a rivet punched through it. Finally, one rim fragment from 2016, found at point A3 along the A transect, had a small, moveable ring on side, which would have accommodated a handle for what was once a medium-sized bucket. The only bucket piece, which was neither a handle nor a rim fragment, was made of galvanized steel and found in 2014 during pedestrian survey along Transect W in the eastern half of the site; it has a curved, almost rounded corner and a single, clean hole punched through it and may be part of a bucket.

The five bucket handle fragments recovered all came from pedestrian survey, with four pieces recovered in 2016 and one in 2014. The handle fragments from 2016 were spread evenly across the site, with one found in Transect B, another at Transect K, a third at Transect M, and the last at Transect W. All four handles were made out of heavy gauge wire and three of the four fragments were arch-shaped (the bucket handle from Transect B ended in right angles and that from Transect K ended in S-hooks, while it is unclear how the handle from Transect M ended), while one was rectangular, with two short sides and one long side. This handle, found at point W7 along Transect W also terminated on one side in a wide hook, which ran between two ferrous held together with two rivets. The other bucket fragment with notable features was that found at point M7 along the M Transect had two large pieces of iron hanging from it and was encased in a ferrous tube, possibly to prevent the wire handle from cutting into the hand of the individual carrying it. The handle fragment from 2014, found along Transect YY, was likely another tube-like handle protector, as it is a curved piece of iron, which is wrapped around a heavy-gauge wire fragment.

An additional 13 ferrous fragments from the site likely came from large, industrial drums, with 11 pieces found at point A6 along Transect A and two pieces found at different points along the Transect X at the opposite end of the site. These latter two pieces form a contiguous mend which, when put together, forms a wide, thin circle with flattened edges – likely the base of a large, cylindrical drum. The 11 pieces from Transect A all appear to be from the same vessel, with the largest piece measuring 22 cm long and 14 cm wide; additionally, three of the pieces had industrial-looking rivets driven through them.

Aside from cans, buckets, and drums, the storage category also includes artifacts connected to barrels, as well as those associated with bottles, such as bottle caps, foil, and even a galvanized steel bottle fragment. Two complete barrel hoops were recovered from 24SB67, both during the 2014 excavations; one of the barrel hoops came from pedestrian survey along Transect X and the other from the excavation of STP S9. Both hoops were made of a heavy iron alloy and the one from Transect X was likely fashioned from a wide band of cast iron, held with two rivets. The second barrel hoop, from STP S9, came from a small barrel, likely from a firkin. This smaller hoop still had several small pieces of wood attached to the interior and many small wood fragments came from the STP as well, which will be discussed later in this chapter.

This category also encompasses strapping found at the site, much of may have come of cooper's hoops. In total, 198 fragments of strapping came from the excavations; just under half of the fragments came from the 2016 season and nearly all of the rest of the pieces came from 2014. The 2013 excavations recovered only 16 fragments of strapping. The majority of the strapping fragments recovered were ferrous, but not made out of cast iron (n = 129 or 65.2%); an additional 58 strapping fragments, however, were fashioned from cast iron (29.3%). The remaining strapping fragments were made out of copper alloy (n = 7), tin (n = 2), or galvanized steel (n =1), with one fragment made of either tin or steel, although its condition and size make it difficult to determine. Excavations recovered strapping from nearly every transect on the site. The largest number of fragments (n = 102) came from the eight westernmost transects, Transect XX through Transect E, which includes Test Unit 1 as well, which is between Transects B and C. Another 56 fragments came from the area between Transect G and Transect R and, finally, 40 fragments came from the eight easternmost transects, Transect S through Transect Z. With regards to the methods of collection, most of the strapping fragments came from pedestrian survey efforts (n = 181 or 91.4 %), 15 fragments came from STP excavations, and two fragments came Test Unit 1.

Another subsection of this category relates to metal bottle components and closures, including bottle caps, and foil. In total, excavations recovered 11 cork crown bottle caps, one of which came from 2013, five from 2014, and five from 2016; all came from pedestrian survey efforts. Seven of the bottle caps came from the westernmost portion of the site, between Transect ZZ and Transect D and four caps came from the center of the site, between Transect J and Transect Q. Four of the cork crown caps had 21 teeth, which dates them to some time between 1930 and 1960; the only aluminum bottle cap recovered is in this group. Another six of the bottle caps had 24 teeth, which was the original, patented design on cork crown caps; as such they date to some time between 1856 and 1930. These bottle caps, all ferrous, likely date to the initial occupation of Highland City, given the population decline at the site during the latter years of the 24-tooth cork crown cap's usage.

The caps with 21 teeth likely date to either the second occupation at the site, or to the presence of hunters, campers, or hikers at the site. The last bottle cap was ferrous but missing too many teeth to allow for identification. The two remaining closures recovered from the site were a ferrous jar lid and a component of a lightning bottle closure; both fragments came from pedestrian survey along Transect ZZ, with the jar lid recovered in 2014 and the lightning bottle closure component recovered in 2016. The lightning bottle closure component was half-moon-shaped and made of thin, ferrous wire, bent to curve around the neck of a glass bottle; lighting bottle closures appeared on soda and beer bottles largely between the 1880s and the 1920s and this bottle piece, as a result, dates to the first occupation at Highland City.

The other main bottle-related artifact type in this assemblage is foil, all of which came from pedestrian survey efforts at the site (n = 7). Four of the fragments came from the western portion of the site, two came from the center of the site, and the one remaining fragment came from the eastern portion of the site. One of the two foil fragments that came from the 2013 season, which was found at Transect O, was the most indicative of the foil pieces. Likely made of a thin sheet of lead – as it wasn't completely phased out of bottle foils until the 1990s – the foil piece is embossed with: "H. R. … Co. / RHIEMS" and a picture, which resembles a bunch of grapes. Rhiems is an older spelling of the French town of Reims, France – commonly referred to as the center of the country's Champagne growing region. This foil fragment, combined with the bottle fragments recovered from the site, described further below, speaks to the presence of authentic French champagne from the Champagne region at Highland City. The remaining six foil fragments have no identifying markings, although at least four of the fragments are likely made of lead and one is more modern and likely made of aluminum. The final artifact in the storage category came from pedestrian survey in 2016 at point A4 on Transect A. Made of galvanized steel, the object is the lip and neck of a bottle-shaped container.

Ammunition

In total, the three years of excavations at Highland City recovered 130 artifacts classed as ammunition, including shell casings, bullets, and sprue (See Table 7.10). Of these artifacts, shell casings comprised 90% of ammunition assemblage (n = 117). The 2014 and 2016 excavations yielded nearly the same number of ammunition related artifacts (n = 50 and n = 49, respectively). With regards to distribution across the site, the majority of the ammunition (n =

Table 7.10: Ammunition Totals

	Total	2013	2014	2016
Total Ammunition	**130**	**31**	**50**	**49**
Total from Ped. Survey	111	25	37	49
Total from STPs	10	6	4	0
Total from Test Units	9	0	9	0
Shell Casings	**117**	**28**	**48**	**41**
.22 Shells	65	18	24	23
.32 Shells	5	0	3	2
.38 Shells	7	5	0	2
.44 Shells	11	2	6	3
.45 Shells	7	1	3	3
9 mm Shells	7	2	2	3
Shotgun Shells	2	0	1	1
Other Shells	11	4	3	4
Bullets	**10**	**1**	**1**	**8**
Sprue	**3**	**2**	**1**	**0**

58) came from the six westernmost transects, between Transect ZZ and Transect C; this number increases to 67 artifacts, or 51.9 % of the assemblage when accounting for the artifacts found in Test Unit 1, located between Transects B and C. The other substantial concentration of artifacts comes from the Transects around the centerline of Transect J. The area between Transect J and Transect O yielded 37 ammunition-related artifacts.

The most common caliber recovered was that a .22 shell, which include the variations on the caliber such as a .22 Hi-Power shell, manufactured by the Savage Arms Corporation and dating to between 1912 and 1950, a .22 Short Henry shell, manufactured by the Winchester Repeating Arms Company and dating to between 1932 and 1962, a .22 Long shell with an indeterminate head stamp, and a .22-250 Winchester shell, manufactured by the Remington Arms Company and date to after 1965. The remaining 61 .22 shells were manufactured by a variety of companies and date to several different periods. Four of the cartridges bear a “C” head stamp and were made by Cascade Cartridge Inc (CCI) and date to after 1951.

The most common head stamp was the Federal Cartridge Company’s impressed “F,” found on 21 shells, which date to after 1922. Shell casings impressed with an “Rem” were the second largest variety of .22 shells recovered; manufactured by the Remington Arms company, these shells all date to a period between 1916 and 1928. Also represented among the shells found were one “R” head stamped modern shell, manufactured by the Remington Arms Company, nine shells with an unknown “H” head stamp, one of which appeared to have smaller cartridges within the legs of the letter H and all of which are likely modern, and one shell with a “SUPER X” head stamp, which was manufactured by the Western Cartridge Company and is also modern. Three additional brass .22 shells had no head stamp and, as such, could not be further identified.

In total, 11 .22 cartridges likely date to the initial occupation at Highland City. Three of these shells bore a raised “H” of the Winchester Repeating Arms Company’s early Henry shells, dating to between 1890a and 1906. One shell had a “P” head stamp, which marked it as manufactured by the Peters Cartridge Company some time between 1887 and 1934. Another two shells bore the “W” head stamp of the Western Cartridge Company and date to between 1898 and 1944. Finally, four .22 shells had a “U” head stamp, indicating that the Remington Arms Company manufactured them after 1885. A final shell bore no head stamp, but was made out of copper rather than brass (or nickel-washed brass) and, as such, likely dates to the end of the nineteenth-century or the early twentieth century.

Five .32 shells were recovered from the excavations, three of which came from 2014 and two of which came from the 2016 excavations. Four of the shells bore head stamps indicating that Winchester Repeating Arms manufactured them, while the fifth shell, the only rimfire .32 recovered, had no head stamp and was made of copper. One copper shell bore a “U. S. / 32 W.C. F.” head stamp, which indicated that the United State Cartridge Company, now owned by Winchester, manufactured as a lever action .32-20 Winchester Center Fire cartridge between 1882 and 1911. Another two shells, one copper shell stamped with: “W.R.A. Co / 32 W.C.F” and one brass shell stamped with “W.R.A. / W.C.F”, were Winchester Center Fire cartridges and also date to between 1882 and 1911. The final .32 shell casing found was a brass .32 Winchester Special rifle shell, stamped with "W. R. A. / WS" and dating to after 1901.

Seven .38 caliber shells came from the excavations, including two .38 Long shells, two .38 Short shells, and three .38 Special shells. Both of the .38 Long shells bore a "PETERS / 38L" head stamp, indicating that the Peters Cartridge Company manufactured them, likely around 1913. The Remington Arms Company manufactured both of the two .38 Short shells, although at different times. The older of the two copper shells bore the head stamp: "REM-UMC / 38 SHORT" and was made for a Single Action centerfire revolver between 1874 and 1880, which dates it to the time of the first occupation at Highland City. The second copper shell had a head stamp which reads, "REM-UMC / 38 S & W SPL" and was made by the Remington Arms / Union Metallic Company for a Smith & Wesson revolver in the early twentieth century. Of the remaining three .38 Special shells, the Remington Arms / Union Metallic Company manufactured one of the copper alloy shells for a .38 Special Smith & Wesson revolver, stamped it with: "REM UMC / 38 S&W SPL" between 1912 and the 1960s. The two remaining .38 Special shells were both manufactured by the Winchester Repeating Arms company for the same Smith & Wesson .38 Special between 1900 and the 1940s.

Eleven .44 caliber shells came from the site and all date to time periods coinciding with the first occupation at Highland City. One of the oldest cartridges recovered was a copper shell casing with no head stamp, which indicates that it likely dates to between 1873 and 1885, during which time cartridges did not have an identifying head stamp. Another relatively old cartridge found at the site was a .44 Henry rimfire shell with a head stamp of an H in a circle, which dated to between 1860 and the 1930s. Another shell found was likely manufactured in the late 19th century and bore a "U.M.C. / C.F.W." head stamp, which indicates that the Union Metallic

Cartridge Company manufactured it as a Center Fire Western rifle cartridge. Six copper cartridges were made by the Winchester Repeating Arms Company and were stamped "W.R.A. CO / 44 W.C.F". These six shells predate the Smokeless Powder .44 cartridges and date, as a result, date to between 1886 and 1895. Another copper shell found likely dates to just after 1886, when Winchester first began to put their head stamp on their .44 Winchester Center Fire cartridges; the head stamp on the cartridge reads: W.R.A. / W.C.F". The final .44 shell recovered was made of brass and stamped with "W.R.A. / S&W," which indicates that the Winchester Repeating Arms Company made this cartridge for Smith & Wesson's .44 caliber Model 3 revolver some time between 1869 and 1940.

An additional seven .45 caliber cartridges came from the three years of excavation at Highland City; all of the shells were made of copper, except for the two .45 Auto shell, which were brass. Remington-Peters, a version of the Remington Arms Company, manufactured one of the .45 Auto shells and it is likely modern. The other .45 Auto shell was manufactured by Federal Premium Ammunition, bore the head stamp "FEDERAL" and dates to after 1922. Four of the remaining .45 caliber cartridges date to before 1886, as they are made of copper and have no head stamp; as explained above, cartridge manufacturers, like Winchester, did not stamp their cartridges until after 1886. The last .45 cartridge recovered was copper and was crushed and torn badly, making any further description impossible.

The excavations also recovered two shotgun shells, one 10-gauge shell and one 12-gauge shell. The 10-gauge shotgun shell was marked with "UMC CO / No 10 CLUB" and was made by the Union Metallic Cartridge Company between 1885 and 1891. The 12-gauge shotgun shell was marked "W.R.A. Co. / No 12 / STAR" and was made by the Winchester Repeating Arms Company between 1884 and 1894. Additionally, excavation recovered one .30 shell, made by

Winchester between 1895 and 1924, two .40-82 shells manufactured by Winchester between 1885 and 1947, a .30-06 shell manufactured by the Twin Cities Ordinance Plant in 1952, a modern Winchester .308 SUPER shell, a .223 Remington shell manufactured after 1964, a .243 Winchester shell manufactured after 1955, a 7 mm Remington Magnum, manufactured after 1962, a Russian 7.62 x .39 mm shell manufactured by Wolf Performance Ammunition after 1944, and seven 9 mm shells made by Winchester (n = 2), Lake City Army Ammunition (n = 4), and Herters Inc. (n = 1) all dating to between 1973 and the present. Finally, one brass and two copper shell casings came from the 2016 and 2014 excavations, respectively, and can not be identified further. The brass shell casing appears to have exploded, with one end in ragged, flattened strips. One of the copper shell casings is flattened as well, and the other casing is only a small fragment of a larger cartridge.

A total of 10 lead bullets came from the site excavations, with a single bullet recovered in 2013, and in 2014 and the remaining eight bullets found in 2016; all bullets came from pedestrian survey efforts. Four bullets came from the western portion of the site, between Transect YY and Transect B; the remaining six bullets all came from the area near the centerline of the site, Transect J. Two bullets were found along Transect J, another two along Transect K, and one was found at Artifact Scatter #8, between Transects J and K.

The last bullet was found furthest to the east, 50 meters away along Transect Q. No bullets were recovered from anywhere east of Transect Q. Almost all of the bullets showed evidence of being fired, with the exception of one unfired bullet found in 2016 and a flattened bullet, which looked as though it had been fired, but was still in its copper jacket – perhaps the product of a misfire. The fired condition of most of the bullets made it difficult to asses their caliber; only two bullets were intact enough to make a determination – one of which was unfired.

The unfired bullet had a round nose and 2 crimp lines at the base; it is likely a .45 caliber bullet. The other bullet, which was fired, was either a .44 or a .45 caliber. Finally, three pieces of lead sprue came from the site, two pieces from the 2013 excavation of STP L5 and one piece from the 2014 excavation of Test Unit 1, Strat I. These are included in this group because they appear to have been snipped off of lead similar to that used in the bullets discussed above.

Glass

The second-largest artifact class recovered from Highland City was glass. In total, 9,288 individual glass pieces came from the site, the majority of which were recovered through pedestrian survey (n = 8,373 or 90.1%). An additional 476 glass fragments came from the Test Units, in particular Test Unit 1 and Test Unit 3; the STPs yielded the fewest number of glass sherds with 439 pieces (See Table 7.11). The glass assemblage indicated the presence of at least 711 glass vessels at the site, including wine,

Table 7.11: Glass Totals from All Three Years of Excavation at Highland City

	Total	2013	2014	2016	**Vessels**
Ped Survey	**8,373**	**1,505**	**3,069**	**3,799**	
Shovel Test Pits	**439**	**251**	**188**	**0**	
Test Units	**476**	**0**	**278**	**198**	
Amber	**979**	182	414	383	**145**
Amethyst	**10**	0	7	3	**3**
Black	**6**	4	0	2	**3**
Blue Glasses					
Aqua	**1,176**	343	312	521	**159**
Cobalt	**5**	1	3	1	**1**
Pale Blue	**774**	279	218	277	**47**
Colorless Glasses					
Colorless Non-Window	**2,214**	458	829	927	**169**
Colorless Window	**2,712**	218	1,240	1,254	**N/A**
Solarized Colorless	**488**	87	223	178	**71**
Green Glasses					
Emerald	**7**	0	4	3	**6**
Green	**53**	12	4	37	**6**
Olive	**698**	139	239	320	**64**
Pale Green	**76**	19	22	35	**13**
Milk	**90**	14	24	52	**24**
Total Sherds	**9,288**	**1,756**	**3,539**	**3,993**	**711**

liquor, ale, and beer bottles, punch cups, drinking glasses, tumblers, dishes, compotes, patent medicine, bitters, and proprietary blend bottles, jars, jugs, and bowls.

For analysis, the glass assemblage was divided into 14 categories, based on color, which aided in determining the objects' relative age and vessel type (if applicable), and consequently their function.

Amber Glass

In total, 979 pieces of amber glass were recovered from the site; pedestrian survey yielded 917 amber glass pieces, while the STPs yielded 40 sherds, and the Test Units 22 sherds (See Table 7.12). Overall, the amber glass assemblage comprised 10.5% of the total glass found at Highland City. The largest number and highest proportion of amber sherds came from the 2014 excavations (n=414 or 11.7%). In contrast, the 381 sherds recovered in 2016 comprised only 9.5% of the total glass assemblage recovered that year, while the amber glass from 2013 (n = 182) made up 10.4 % of the total glass assemblage from the initial excavation season, even though it represented the smallest amount.

Table 7.12: Amber Glass Totals, Organized by Means of Collection

Amber Glass	Total	Pedestrian Survey	STPs	TUs
2013	**182**	155	27	0
2014	**414**	388	13	13
2016	**383**	374	0	9
Total Sherds (n=)	**979**	**917**	**40**	**22**

Amber glass refers to a wide variety of glass that ranges in color from yellow to a darker golden color to dark brown. Additives such as sulfur, carbon (added as charcoal, wood chips, or coal), and nickel helped give glass batches their amber color, as did natural impurities such as manganese and iron, when present in high amounts. Amber glass cannot provide as tight a chronology as some other glass types, because of the broad amount of time that its production spans (including the present). However, there are a few minor characteristics that can sometimes assist in narrowing down the amber glass chronology. Machine manufacturing of bottles, especially amber ones, came about around the 1920s, which resulted in a standardizing of bottle colors. As such, after 1920, amber glass is more uniform in both its color and shade. This means that very light and very dark amber fragments pre-date the 1920s. Additionally, amber glass with a greenish tint, a color referred to as "old amber" rarely appears after 1890. Finally, as a rule, most amber glass bottles are only found on archaeological sites after 1860 (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989).

Amber glass is occasionally seen in molded plates, saucers, and shallow dishes (such as candy dishes); however, it is most commonly used for beer bottles, because it provides the correct amount of light-based protection. Light-colored bottles can let in too much light and affect the taste of the beer, as can very dark bottles. Amber glass is still used to manufacture beer bottles today; as a result, amber glass is also sometimes referred to as "beer bottle glass" (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989).

<u>Body sherds</u>

Most of the amber glass sherds recovered were non-diagnostic body sherds (n = 672). The body sherds indicated the presence of at least 19 different vessels, based on sherd color, thickness, projected vessel size, and vessel molding: 14 cylindrical bottles – three dark amber bottles, four amber bottles, four light amber bottles, one green-amber bottle with bubbles trapped throughout, and two pale yellow-amber bottles, one also with bubbles trapped within – one holloware vessel, and five planed bottles – one amber, bottle, two dark amber bottle, one light amber bottle, and one pale yellow-amber bottle. There was also a small amount of body sherds (n = 26), which proved to be semi-diagnostic, in that these sherds had fragments of writing or designs that indicated the presence of other unique vessels on the site (See Table 7.13).

Table 7.13: Recovered Amber Glass Sherd Types

	Total (n=)	Pedestrian Survey (n=)	STPs (n=)	Test Units (n=)
Non-diagnostic body sherds	**672**	621	31	20
Semi-diagnostic body sherds	**26**	24	1	1
Diagnostic body sherds	**65**	62	3	0
Shoulder sherds	**14**	13	1	0
Neck sherds	**25**	25	0	0
Lip sherds	**16**	16	0	0
Basal sherds	**157**	152	4	1
Rim sherds	**1**	1	0	0
Whole bottles	**1**	1	0	0
Handle Sherds	**2**	2	0	0
Total Number of Sherds				**979**

The semi-diagnostic sherds speak to the presence of at least ten additional unique hollowware vessels: one dark amber hollowware vessel molded with large squares, one amber hollowware vessel molded with wide horizontal bands, two amber hollowware vessels with raised ribs, two thin, light amber hollowware vessels with raised ribs, one amber hollowware vessel molded with a mesh-like pattern, one hollowware vessel molded with an arch and leaf pattern, and one hollowware vessel molded with a moon, sun, stars and raised bands. One additional semi-diagnostic sherd had a tree-like image pressed into it and may have come from the moon, sun, and stars vessel. Of the sherds with writing in the semi-diagnostic category, none retained enough lettering to prove diagnostic. A final body sherd proved interesting not because it was diagnostic of any particular vessel, but because it had evidence of possible pressure flaking / knapping along one edge.

<u>Neck and Shoulder Sherds</u>

An additional 26 neck sherds and 14 shoulder sherds also came from the excavations. The neck sherds, all of which came from pedestrian survey in 2014 and 2016, speak to the presence of at least 21 vessels: 14 cylindrical amber bottles, six cylindrical dark amber bottles, and one cylindrical green-amber bottle with bubbles trapped within throughout. The shoulder sherds came from all three years of excavation and all save one were the result of pedestrian survey efforts; one dark amber shoulder sherd came from STP X5 in 2014. The shoulder sherds indicate that there were at least 12 vessels: seven cylindrical amber bottles, one of which had orange peel-like stippling on the shoulder and two of which had machine-molding seams, two planed, square / rectangular amber bottles, one cylindrical dark amber bottle, one cylindrical amber jug or large bottle, and one amber inkwell, of which two shoulder fragments were found in 2013.

Handle and Rim Sherds

The excavations at Highland City also yielded two handle sherds and one rim sherd. One amber handle sherd came from Transect B in 2013 and the other, made of dark amber glass, came from Transect T (at the opposite end of the site) in 2014. Both handle sherds were undecorated. The rim sherd, from pedestrian survey along Transect B in 2016, comes from an indeterminate vessel; the fragment recovered is rounded on one half and flat on the other.

Basal Sherds

In total, 157 amber basal sherds came from the three years of excavation at Highland City, nearly all of which came from pedestrian survey efforts at the site. These basal sherds indicate the presence of at least 126 vessels. 91 cylindrical bottles – 40 amber bottles (one with a line of yellow glass blown in), 44 dark amber bottles, three light amber bottles, three pale yellow-amber bottles (one with bubbles trapped within), and one green-amber bottle – 22 square / rectangular bottles – five amber bottles, 13 dark amber bottles, four light amber bottles – two hexagonal amber bottles, six pressed amber dishes / compotes (one of which had scalloped walls), and five Log Cabin-style bitters bottles.

A portion of the basal sherds recovered provided diagnostic information in tightening / confirming the site's chronology. Ten round amber bottles and two square / rectangular amber bottles had post base molds, which dates them to sometime between the 1850s and the 1890s. Six bottles had steep kicks created by turn molds, and – as a result – date to between the 1880s and the early 1910s. Another bottle had a key mold made to look like a post base mold and dates to between the 1860s and the 1880s. Another amber bottle had a machine-molded cup-bottom base, which dates it back to between the early 1900s and the 1920s. A final sherd recovered, proved to the be most diagnostic of the amber basal sherds; this sherd came from a round bottle pressed with "IG," which is part of the I.G. Co. logo for the Illinois Glass Company, based out of Alton, Illinois (1873-1929). This particular mark appeared on beer and soda bottles between the 1870s and 1900. All of these bottle bases, while all recovered by pedestrian survey, speak to a presence at the site between at least the 1860s and the 1920s.

Lip Sherds

The excavations also yielded 15 amber lip sherds, all of which came from pedestrian survey in 2014 and 2016. Two of the fragments consisted of a lip, neck, and shoulder portion of the bottle, another three lip sherds had attached neck fragments, and the final ten pieces consisted of bottle lip fragments alone. Thirteen of the lip sherds proved to be diagnostic; the other two were indeterminate due to breakage. Two sherds had applied oil / ring lip finishes with ground rim finishes and came from larger dark amber planed bottles. Another three sherds had oil / ring lip finishes, two with a ground rim finish and one with a machine-ground finish; a fourth sherd had a possible oil / ring finish, although its condition made a certain identification difficult. All six of the lip sherds with the oil / ring lip finish date to between the 1830s and the 1920s. Oil / ring lip finishes appeared on a wide variety of bottle types during this period, including patent medicine bottles – especially those for bitters – condiment bottles, and occasionally on gin bottles.

Two of the sherds recovered had blob lip finishes, one of which had a ground rim finish and one had a machine-ground finish; both of these bottles likely once had lightning closures and were beer or patent medicine bottles, both dating to between the 1870s and the 1910s. Another lip sherd had a prescription lip finish with a ground rim finish; this sherd came from a square / rectangular prescription or druggist bottle dating to some time between the 1870s and the early 1910s. Two lip sherds came from large canning jars, one of which had an applied groove ring wax seal finish, which dates it to between the 1860s and the 1880s, and one had a wide mouth external thread lip finish with a ground rim finish, dating to between the 1860s and 1910.

The last two lip sherds had a small mouth external thread lip finish and a crown finish, which date to between the 1890s and the early 1920s and between the 1890s and the present, respectively. Small mouth external thread lip finishes appeared on condiment, beer, soda, and perfume bottles, and even on liquor flasks. The crown finish, made to accommodate the cork crown cap – today's classic bottle cap – eventually replaced the small mouth external thread lip finish on soda and beer bottles, especially once machines became the main method of manufacturing bottles for carbonated beverages (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989).

The lip sherds support a similar timeline put forth by the basal sherds and confirm habitation at the site between the 1860s and the 1920s at the latest. They also confirm the presence of at least 11 vessels on the site: two dark amber, planed patent medicine or condiment bottles, four cylindrical amber patent medicine, condiment, or liquor bottles, two beer or patent medicine bottles with lightning bottle closures, one amber, planed prescription or druggist bottle, two amber jars, an amber beer or soda bottle, and an amber bottle which could have held beer, soda, condiments, perfume, or liquor.

Whole Bottles

Finally, one whole, intact bottle came from pedestrian survey at Highland City. The final amber glass artifact recovered was an intact, whole amber bottle, found during pedestrian survey along Transect H in 2016. The bottle was machine-made with a seam extending into the neck and crown lip finish. Pressed onto the base is the following: "6 / [Owens-Illinois symbol of an O and an I] / 7 / 101. The number 6 on the base indicates that the bottle came from Owens-Illinois's plant in Charleston, West Virginia, which opened in 1930; the number 7 on the base represents either 1937 or – less likely – 1947. The final number on the bottle base, 101, refers to Owns-Illinois' mold number. The company used the particular Owens-Illinois symbol featured on the bottle between 1929 and 1954. Given all of this information, supported by the 1933 Owens-Illinois catalogue, the bottle recovered was a beer or ginger beer bottle dating approximately to 1937.

Log Cabin-style Bitters Bottles

One particular vessel type appeared in the glass assemblage for each year of excavation and manifested in the form of body sherds and basal sherds: Log Cabin-style bitters bottles. Originally designed by John H. Garnhart, of St. Louis, MO in 1862, Log Cabin-style bitters bottles began with Old Cabin Bitters, molded into a four-sided "log cabin" shape, with the pattern of logs, windows, a door, and a thatched roof, which read: "OLD CABIN / BITTERS". Despite its design in 1862, the Old Cabin Bitters bottles featured, on one short side just below the roof, the following: "PATENTED [in an arc] / 1863". One year later, Garnhart entered into a partnership with James B. Kelly, who manufactured bitters in New York. Kelly's Old Cabin Bitters officially entered the market in 1863 and, like Old Cabin Bitters, these bottles too had pronounced, rounded "logs," criss-cross patterned windows, rectangular doors and sidewalls.

Kelly's bottles also featured a thatched roof, which read: "KELLY S / OLD CABIN / BITTERS". Identically to the patent information found on Old Cabin Bitters, the short side, just under the roof, on Kelly's Old Cabin Bitters read: "PATENTED [written in an arc] / 1863." Both Old Cabin Bitters and Kelly's Old Cabin Bitters are not only unique in their appearance, but also both ceased production around 1875, after Garnhart's arrest in the Great Whiskey Ring of 1875, wherein distillers tried to avoid paying excise tax on spirits (Meyer, 2012b). Most of the vessel fragments recovered appear to have come from either Old Cabin Bitters bottles or Kelly's Old Cabin Bitters bottles. However, a few "corner" sherds are ambiguous enough that they may have once been part of an American Life Bitters bottle instead. These bottles were also rectangular, but had curved "roofs" instead of the sharply triangular roofs seen on the other two types of bitters bottles. Peter E Iler created the bitters blend for American Life Bitters and manufactured them out of Tiffin, Ohio and Omaha, Nebraska. These bitters existed for roughly the same amount of time, appearing in 1865 (two to three years after the other two brands) and disappearing by 1875 as well (Meyer, 2012a).

In total, 70 Log Cabin-style bitters bottle sherds came from Highland City, representing a minimum of six vessels. Pedestrian survey yielded 66 of these sherds, while subsurface excavations at STPs yielded another four fragments. The most common pattern found on the sherds was that of the horizontal "logs" that made up the straight walls of the log cabin bottles; twenty-five sherds recovered had these horizontal logs, but no other molded images. These 25 sherds came from Old Cabin Bitters (1862-1875), Kelly's Old Cabin Bitters (1863-1875), or American Life Bitters (1865-1875). Eight of the sherds recovered were corner-shaped body sherds, molded with bead-like "ends" of the cabin's logs. The corner pieces could have come from any of the three different types of Bitters above. Two additional corner pieces has small, criss-cross patterned “window” fragments attached, as well the bead-like log ends; because the lattice-work in the windows was parallel to the body of the bottle (instead of at a diagonal), these two sherds could only have come from an Old Cabin Bitters or a Kelly’s Old Cabin Bitters bottle. Another five sherds had fragments of both windows and logs and one sherd was only a window fragment; all six pieces were straight, wall-like body sherds; again, the pattern on the windows indicates that they could not have come from an American Life Bitters bottle. Four body sherds recovered were molded with horizontal logs and fragments of either the cabin’s “door” or a blank bottom half of the “sidewall,” found on the short sides of the rectangular bottles and another four were corner pieces featuring both logs and a door or sidewall. All three manufacturer’s bottles had this feature on their bottles’ short sides.

Fifteen additional sherds all came from either Old Cabin Bitters or Kelly’s Old Cabin Bitters bottles. One sherd was a fragment of the “thatched roof” featured on the bottles. Another four sherds came from the same bottle and featured the thatched roofing as well; two of the thatched pieces form a contiguous mend, which reads: "K… / OLD … / BIT…". Another set of four sherds recovered have writing on them, along with thatching, but are illegible. Three separate sherds form a contiguous mend which, when put together, reads: “PATENTED / 1863). One additional sherd, found elsewhere on the site reads “PATE” and another reads: “TED / …3” with part of the thatched roof attached to it. A final sherd simply reads “T”.

Five basal sherds associated with the Log Cabin-style bitters also came from Highland City; four had fragments of logs attached to them and one was the correct size and shape for the bitters bottle base and came from STP X5, along with two body sherds that were fragments of at least one Log Cabin bitters bottle. One of the basal sherds featured the impression of a key base mold, which had been fashioned to resemble a post base mold. One final sherd came from the site and, while it did feature horizontal logs, these were much thinner than those found on the other bottles. This particular body sherd is the only truly ambiguous Log Cabin fragment in the assemblage. Given the history of the Log Cabin bottles, though, it likely still falls within the time frame of somewhere between 1862 and 1875. These 70 bottle sherds aid quite a lot in tightening and reinforcing the chronology on the site, due to their manufacturing window of roughly 10 to 13 years. The fact that three of the sherds came from STP X5, and therefore from a subsurface provenience, further adds to their diagnostic utility. The Log Cabin-style bitters bottles speak to a presence at Highland City between the 1860s and 1870s.

Distribution of Amber Sherds

The 763 amber body sherds' distribution across the site clustered in the three main activity areas / artifact concentrations identified within the metal assemblage, with one concentration within the westernmost quarter of the site, between Transects XX and D, a second concentration in the center of the site, between Transects I and N, and a third concentration at the eastern edge of the site, clustering between Transects W and Z. In total, 390 amber body sherds (51.1% of the overall amber body sherd count) came from the western quarter of the site, between Transect XX and Transect D, with 148 sherds (19.4% of the total amber body sherds) recovered from Transect B alone and another 105 amber sherds (13.8%) recovered from Transect ZZ. The second quarter of the site, from Transect E to Transect K, yielded 107 amber sherds (14% of the amber body sherds), with the area between Transect I and Transect K yielding 103 of the sherds. The third quarter of the site, between Transect L and Transect R, produced the fewest amber sherds with 59 pieces recovered (7.7%). The final quarter of the site, from Transect S to Transect Z (coinciding with the easternmost artifact concentration), yielded 108 sherds (14.2%), with the majority (n = 74) clustering between the three easternmost transects, Transect

X through Z; additionally, the body sherd with possible knapping came from this quarter as well (Transect S).

A similar distribution occurred with the more diagnostic basal, lip, neck, and shoulder sherds, with the largest concentration of sherds consistently occurring in the westernmost quarter of the site. The majority of the 155 basal sherds (n = 55, or 35.5%) of the amber basal sherd assemblage) came from the first quarter of the site, between Transect XX and Transect D and concentrating most between Transects XX and B, just as it had with the body sherds. This same pattern also appeared in with the 16 lip sherds, where 10 sherds (62.5% of the amber lip sherd assemblage) came from the westernmost quarter of the site, with the 25 neck sherds, where excavations recovered 20 sherds (80 %) from the westernmost quarter, and with the 14 shoulder sherds, where 11 sherds (78.6% of the amber shoulders), came from the same quarter.

The second largest concentration in the body sherds came from the easternmost quarter of the site, between Transects S and Z. The lip and neck sherds recreated this pattern too, with four lip sherds (25%) and four neck sherds (15.4%). The lip and neck sherds did not fully follow the rest of the body sherds' pattern, as there was one lip sherd and one neck sherd in the second quarter and in the third quarter of the site; two lip sherds did come from the area between Transects J and M, as did the two neck sherds.

The amber basal and shoulder sherd assemblage did not echo any specific pattern beyond having the majority of sherd in each category in the westernmost quarter of the site. Forty-two basal sherds (27.1%) came from the third quarter of the site – making it the section with the second-highest percentage (and total) of amber basal sherds; twenty-nine basal sherds (18.7%) came from the easternmost quarter of the site and twenty-eight sherds (18.1%) came from the second quarter, between Transect E and Transect L. The second largest concentration of shoulder sherds, however, came from that second quarter (n = 2 or 14.3%), with only one sherd (7.1%) recovered in the easternmost quarter.

Amber Vessels

The amber sherd assemblage indicates the presence of at least 144 vessels at Highland City (See Table 7.14). The vessel fragments recovered came, for the most part, from cylindrical bottles (n = 96); these likely once contained beer, soda, condiments, perfume, or patent medicines.

Table 7.14: Minimum Number of Amber Vessels Found

	Total (n=)	Amber	Dark Amber	Light Amber	Other Amber
Cylindrical Bottles	**96**	41	45	5	5
Planed (Rectangular or Square) Bottles	**24**	5	14	4	1
Planed (Hexagonal) Bottles	**2**	2	0	0	0
Log Cabin Bottles	**6**	2	4	0	0
Dishes / Compotes	**6**	5	1	0	0
Inkwells	**1**	1	0	0	0
Hollowware / Pressed Glass	**10**	7	1	2	0
Total Vessel Minimum	**145**	**63**	**65**	**11**	**6**

A total of 24 planed, rectangular or square vessels also came from the site; most of these vessels once held patent medicines, although several may have contained perfumes or condiments. Two hexagonal bottles, likely used for patent medicines or specific, proprietary condiment, tonic, or herbal blends or patent medicines, also came from Highland City. Additionally, there was at least one small inkwell, six molded, small dishes or compotes – one of which had scalloped walls and one had vertically-ribbed walls – six Log Cabin-style bitters bottles, and ten hollowware vessels with pressed glass designs, such as raised ribs or a sun, moon, and stars pattern.

The amber glass found, although it is comprised just over a tenth of the overall glass assemblage (10.5%), provided strong diagnostic data toward tightening the site chronology, through the presence of the Log Cabin-style bitters bottles, post base molds on basal sherds, and lip finishes with substantial dating utility. The amber glass assemblage reinforces the fact that

Highland City did indeed have a thriving population on the site from the third quarter of the nineteenth century through at least the early years of the twentieth century – and possibly up through the 1910s.

Amethyst Glass

Amethyst glass, along with pink glass and its darker variant red or ruby glass, is rather rare in the archaeological record, especially before the late 19th and early 20th centuries. These richly hued glasses usually come from the addition of manganese and / or nickel oxides, often with selenium oxide added in as well. Some glassmakers even use gold oxide to create a deep red color in their vessels. The manganese oxide mentioned here is the same used to decolorize colorless glass and is the reason why solarized glass looks purple, as will be discussed below. However, if enough manganese is added, glassmakers can intentionally turned glass vessels light or dark purple. When this occurs, the glass is referred to as true purple or amethyst glass. These purples, when mixed with redder oxides, can change the purple color of a glass batch into something closer to pink (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989).

With regard to diagnostic utility, amethyst glass, along with pink glass and red glass, does not appear on archaeological sites before 1840 and rarely exists after 1880 in the form of bottles. As tablewares, amethyst glass was favored in a form of pressed-glass known by collectors as Depression glass. This usually translucent glass gets its name from the Great Depression in the United States and it was often distributed for free or at a very cheap cost. Some companies even included a piece of glass in food boxes as a purchasing incentive. Most Depression glass had uranium oxide added to it, as it was relatively cheap until uranium supplies grew scarce during the Cold War. Much of the Depression glass manufactured came from the Ohio River Valley, which had a cheap source of materials and power. Depression glass was manufactured as early as the 1880s and appears as late as the 1940s (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989).

A total of ten amethyst glass sherds came from the excavations at Highland City, all recovered through pedestrian survey in 2014 and 2016 from the area between Transect XX and Transect A (See Table 7.15). All ten fragments were undiagnostic body sherds, although seven fragments, which were found along Transect XX at the far western edge of the site, likely all came from the same bottle. The other three body sherds came from two separate, unknown hollowware vessels – one of which was quite thin. The sherds possess no defining characteristics other than their color. However, as one set of sherds comes from a bottle, it dates to sometime between 1840 and the 1880s. The other two hollowware vessels date to anywhere between 1840 and the 1940s.

Table 7.15: Amethyst Glass Totals, Organized by Means of Collection

Aqua Glass	**Total**	**Pedestrian Survey**	**STPs**	**TUs**
2013	**0**	0	0	0
2014	**7**	7	0	0
2016	**3**	3	0	0
Total Sherds (n=)	**10**	**10**	**0**	**0**
Total Vessels (n=)	**3**	**3**	**0**	**0**

The Blue Glasses

The glass fragments in this section fall into three main categories: aqua, cobalt and pale blue glass fragments. This section will discuss each category's fragments, including possible vessels, and their diagnostic utility for dating the Highland City site of 24SB67.

Aqua Glass

In total, 1,176 pieces of aqua glass were recovered from the site, which represents 12.6% of the total glass assemblage from all three years at Highland City. Pedestrian survey efforts yielded 1,058 sherds, while 99 sherds came from STP excavations, and 19 sherds from the Test Units (See Table 7.16). The 2016 excavation season had the largest amount of aqua glass sherds

Table 7.16: Aqua Glass Totals, Organized by Means of Collection

Aqua Glass	Total	Pedestrian Survey	STPs	TUs
2013	**343**	256	87	0
2014	**312**	298	12	2
2016	**521**	504	0	17
Total Sherds (n=)	**1,176**	**1,058**	**99**	**19**

(n=521), while the 2014 season had the smallest amount (n = 312). As with the amber glass, the relative proportion that each aqua glass assemblage comprises differs from the raw numbers; while the 2016 assemblage yielded the largest number of aqua sherds, the 343 sherds recovered in 2013 comprise just shy of 20% of all of the glass found that year (19.5%). In contrast, the sherds from 2016 comprise only 13% of the final season's overall glass assemblage; however, 2014's aqua assemblage is both the smallest of the three years' assemblages in terms of number of sherds and in terms of portion of the season's overall glass assemblage (8.8%).

The term aqua glass encompasses glass that is best described as a mixture of blue and green in color. Aqua, or aquamarine, glass is different from truly blue or green glass, which is why it has a category of its own. Like other colors of glass, aqua glass can range in color saturation from pale aqua to dark aqua. The blue-green color of aqua glass stems from the iron found in most glassmaking sand. If glass makers add nothing to remove the color of the glass (creating colorless glass), the end product will range from aqua glass, if there is relatively little iron in the sand, to black or dark green glass, if the sands contain a lot of iron. Amber glass, by contrast, comes from a very high profusion of iron impurities in a batch of glassmaking sand, although color additives are often still needed, as explained above. The range of colors from blue-green to dark green also comes from the heat of the fire used to melt and blow or mold the glass. A more intense fire will make a greener glass, while a cooler fire will make a bluer glass (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989).

Aqua glass is incredibly common, as a color, and a wide array of bottles manufactured before the 1920s were aqua, rather than green or amber. Due to this ubiquity, glassmakers, especially in the United States, often called aqua glass "bottle glass." Aqua glass appears archaeologically around the beginning of the nineteenth century and stays present on sites throughout its length. The early twentieth century saw aqua glass replaced with colorless glass, which manufacturers felt better displayed the product within (although Coca-Cola still uses aqua glass bottles to the present day). As such, bottle fragments recovered from an archaeological site generally can confirm a nineteenth century occupation – or at least an occupation that pre-dates the 1920s. Fruit or mason jar glass, known as Ball blue, is a subset of aqua glass, although its color tends to be a more intense, saturated aquamarine. Over half of all of the fruit jars manufactured in the early nineteenth century United States came from the Ball Company, which ended up giving its name to the unique color of mason jars. By the 1930s, though, colorless glass became the glass of choice even for fruit jars. The presence of mason jars on a site pushes the latest possible date of occupation into the 1930s. Aqua glass rarely appears in any vessel forms other than bottles or jars (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989).

Body sherds

A total of 796 aqua glass sherds recovered were undiagnostic body sherds (See Table 7.17). These sherds possessed no markings of diagnostic utility and, as such, only indicated the presence of a minimum of 19 vessels, based on the sherds' color and shape. These vessels were as follows: seven cylindrical bottles, nine planed, rectangular or square bottles, and three jars, one of which was one Ball blue.

An additional 60 sherds, classed as semi-diagnostic body sherds, provided minimal diagnostic utility, with regards to patterns and lettering. Thirty-seven sherds had lettering on

Table 7.17: Recovered Aqua Glass Sherd Types

	Total (n=)	Pedestrian Survey (n=)	STPs (n=)	Test Units (n=)
Non-diagnostic body sherds	**796**	703	89	4
Semi-diagnostic body sherds	**60**	59	1	0
Diagnostic body sherds	**21**	13	0	8
Shoulder sherds	**15**	12	2	1
Neck sherds	**45**	45	0	0
Lip sherds	**75**	70	4	1
Basal sherds	**144**	140	4	0
Rim sherds	**7**	5	2	0
Lid sherds	**1**	1	0	0
Whole/Nearly Whole Bottles	**11**	6	1	4
Bottle Stopper	**1**	1	0	0
Total Number of Sherds				**1,176**

them (six of which likely came from the same vessel), although there were not enough letters to positively determine a specific brand or manufacturer; one sherd did read "Co.", but it is impossible to determine to which company the small fragment refers.

Another 19 semi-diagnostic body sherds indicated the presence of seven additional vessels, all of which had pressed patterns; long, thin, grass-like ovals decorated one vessel, while at least one rectangular bottle had inset smaller rectangles, which bore an X-like quilted or lattice pattern (four sherds scattered across the site had this decoration). Large, horizontal ribs ran across at least two hollowware vessels. One of the pressed glass sherds had large, almond-shaped depressions and likely match a basal sherd found (and described below). One additional sherd appears to have broken off of the foot of a compote dish; however, it is both melted and badly chipped and, as such, cannot definitively be considered a basal sherd.

A final semi-diagnostic sherd likely came from a condiment bottle, as it was molded with a raised band, which ran above arches very similar to those found on French's mustard jars. One body sherd, classed above in the non-diagnostic body sherds, has evidence of potential pressure flaking / knapping along one end; this is evident in a line of small, scallop-like chips on one edge of the light aqua sherd.

The last group of body sherds (n = 21) are those which lead to positive identification of a specific vessel type or product; thirteen sherds came from pedestrian survey and six sherds came from the Test Units, specifically Test Unit 3. One large aqua sherd came from a planed rectangular dark aqua gothic, cathedral-style bottle with Greco-Roman columns on the bottle's sides, each of which are topped with a triangular, spear-like pattern. Given the complexity of the pattern – and the presence of the pillars – the sherd very likely came from a gothic-style pickle bottle manufactured between the 1860s and 1870s (Lindsey, 2017).

A second diagnostic body sherd recovered likely also came from a pickle jar, this one dark aqua and hexagonal. The body sherd was large and molded into three panes, representing roughly half of the bottle's body. Three additional body sherds from pedestrian survey came from one dark aqua vessel and formed a continuous mend which, when put together, reads: "…RFECT / …ON". These sherds are fragments of a Ball's "Perfect Mason" jar, manufactured between 1913 and 1960.

Another diagnostic body sherd recovered indicates the presence of a Lea & Perrins Worcestershire bottle on the site; the sherd has pressed lettering, which reads: "…A & PERR…" in Lea & Perrins's trademark embossed font. The company, the original creators of Worcestershire sauce, first exported their signature sauce in club-style sauce bottles; the bottle form originated with the company and soon was favored by other sauce manufacturers for their products as well. These bottles consist of a cylindrical body with a long, tube-like neck, which finishes with the equally unique club sauce finish, which is comprised of two small rings above and below a large, wide, and slightly flared center ring. Lea & Perrins, established in Worcester, England, is the oldest bottled condiment imported into the United States, first arriving in an order placed by New York businessman and entrepreneur, John Duncan in 1839. Demand was immediately high, and Lea & Perrins has shipped to the United States since. The bottle of which this sherd was a part dates to between the 1850s and 1920 (Lindsay, 2017; Lea & Perrins, 2015).

Four body sherds, three of which were from the same light aqua vessel, came from rectangular Ayer's Sarsaparilla bottles; one sherd reads "AYER'S" and another, one of the set of three sherds from the same bottle, reads, "AYER…". Sarsaparilla, now known as a root beer-like flavoring, began as a medicine in the mid-nineteenth century. Ayer's Sarsaparilla, established in 1848 in Lowell, Massachusetts, was a widely consumed product – and even more widely advertised – throughout the second half of the nineteenth century and well into the mid-twentieth century. Sarsaparilla was made out of plant roots in the *Smilax* family, including greenbriers in the Untied States, Mexico, Honduras, Jamaica, and across South America. The root extracts were mixed with alcohol and other plant extracts to provide relief for a wide suite of diseases, especially blood ailments. It was even purported to cure syphilis.

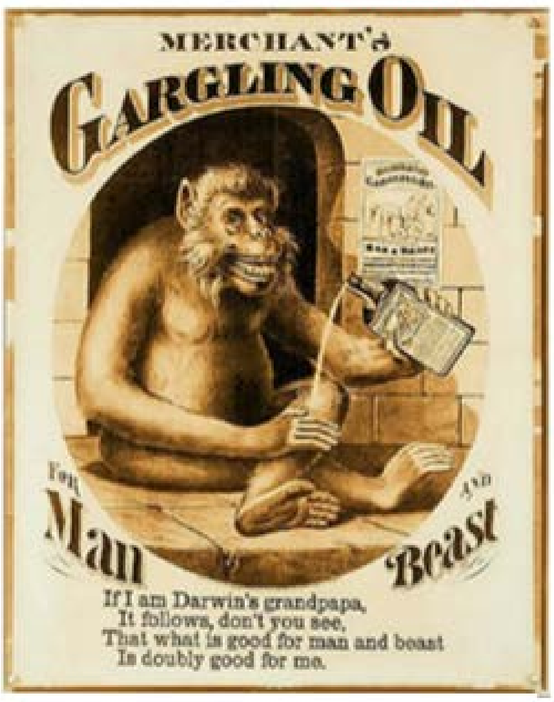
Sarsaparillas were incredibly popular in the mid-nineteenth century, when they first emerged for wide-scale consumption; as a result, this period earned the name "the sarsaparilla era." The first quarter of the twentieth century saw the transformation of sarsaparilla from a medicine to a drink flavoring at soda fountains. By this point, root extract rarely appeared in the flavoring syrup, but instead sassafras oil, sweet birch, or wintergreen replaced it. Consumption still remained high, however, perhaps in part because of its past medicinal reputation. The two bottles from which the four sherds mentioned above came likely date to between 1855 and 1920. Another two sherds came from the same style of rectangular bottle with inset rectangles in its two wider sidewalls; one was molded with "Y" and the other with "[illegible lettering]

/…AS…”. These two sherds likely came from an Ayer’s Sarsaparilla bottle as well. (Lindsay, 2017; New England Historical Society, 2016; Dr. J.C. Ayer & Co., 1860).

Another diagnostic body sherd came from a different type of patent medicine – Jamaica Ginger. The sherd reads: “…ROW… / ESS OF … /…AICA GIN…/ …DA…”. This sherd came from Frederick Brown’s Essence of Jamaica Ginger, which was manufactured by Frederick Brown, a druggist from Philadelphia. In particular, it comes from an oval aqua bottle, which Brown’s used between 1854 and 1882. Jamaica Ginger was made from macerated ginger root in alcohol, which allowed the ginger root and oil to retain its flavor. Ginger loses its flavor when in water for more than a few hours, but maintains its distinctive taste in alcohol. Jamaica Ginger originally served two functions: it added fresh ginger flavor to mixed drinks without the need to hand press ginger and it provided relief from a range of stomach and digestive diseases. In the third and fourth quarters of the nineteenth century, the concoction of was very popular for its taste and its high alcohol content, which often exceeded 70%. Jamaica Ginger earned a dire reputation during the Prohibition Era (1920-1933). United States government officials soon realized that patent medicines like Jamaica Ginger contained so much alcohol that they placed regulations on the ratios of alcohols to solids (like pieces of ginger root) in each bottle. This caused the drink to not only lose its alcoholic potency, but it became incredibly bitter, which led to far less consumption.

Some manufacturers tried to get around these regulations and the bitter taste by adding oils, sugar, or molasses. Two amateur chemists, Harry Gross and Max Reisman, tried to add a synthetic polymer called tricresyl phosphate, which gave the product more weight, but didn’t affect any of the taste. Unfortunately, it soon became clear that tricresyl phosphate was hardly harmless – it was a neurotoxin. Because of the tainted batches of Jamaica Ginger, at least 30,000 to 50,000 individuals had been affected by neuropathy and paralysis. The affected lost the ability to control their hands, feet, and / or leg muscles and often lost the ability to use them all together. These muscles frequently atrophied because of the neurotoxin. This led to a strange, flopping walk that became known as the jake walk or jake leg. Once the link between the paralysis and Jamaica Ginger was established, the patent medicine never regained popularity, as the general public had come to fear it and did not trusted any batches to be safe (Odyssey Marine Exploration, Inc., 2017; O'Neil, 2011 Munsey, 2005).

Figure 7.8: Merchant's Gargling Oil Advertisement c. 1873. Peachridge Glass



Library of Congress, Prints and Photographs Division, Washington D.C.

One final sherd from pedestrian survey came from a planed, rectangular bottle of G.W. Merchant's Gargling Oil. Originally established in Philadelphia in 1833, Merchant's Gargling Oil manufactured a liniment for animals out of Lockport, New York, which supposedly could cure nearly any misfortune livestock contracted. In 1875, Merchant added a product for humans, separated by a white label rather than a yellow one, which also purported to claim whatever ailed its consumer. Like the liniment for animals, Merchant's produced their Gargling Oil for humans in Lockport, New York as well. While ownership changed hands several times, the liniment for "man and beast" (see Figure 7.8) was manufactured until the Lockport factory burned down in 1929. The Gargling Oil, in spite of its name, did not actually require gargling, but merely oral consumption.

Figure 7.9: Clasped Hand Flask, Courtesy of sha.org

Figure 7.10: Clasped Hand Flask Fragments Recovered from 24SB67

The body sherd found through pedestrian survey at ZZ2 reads: “GARGL… / LOCKPOR…” and likely dates to between 1875 and the late 1880s.

The remaining eight body sherds came from Test Unit 3; seven sherds came from Stratum I and one sherd came from Stratum IV. Two sherds from Stratum I form a contiguous mend with the fragment found in Stratum IV. When put together, they form the iconic “clasped hands” of a Union Clasped Hands pressed glass flask, which dates to sometime between the 1860s and the 1870s (See Figure 7.9 for an example of an intact flask and Figure 7.10 for an image of the contiguous mend from Highland City). The Clasped Hands flask emerged at a time when efforts to preserve the union of the United States dominated conversation and the newspapers.

The Clasped Hands flasks captured the spirit of cooperation and unity with their image of two hands, clasped in friendship, often with a shield in the background. Some flasks even had bald eagles in flight on the reverse side. The Clasped Hands motif appeared on several different flask sizes, including half-pint, pint, and quart measurements. Many of the Clasped Hands flasks were manufactured by A. R. Samuels and the Keystone Glass Works, in Philadelphia, which operated between 1866 and 1874. It is very possible that the fragments recovered from Highland City also originally came from a flask produced by Keystone Glass Works.

<u>Neck and Shoulder Sherds</u>

An additional 45 aqua neck sherds and 15 shoulder sherds also came from the excavations. The neck sherds, all of which came from pedestrian survey, speak to the presence of at least 39 vessels: 13 cylindrical aqua bottles, two cylindrical dark aqua bottles, 20 cylindrical light aqua bottles, including three ring-neck pickle bottles (explained further below under Whole Bottles section), two planed, rectangular aqua bottles, one planed, rectangular light aqua druggist's bottle (see the whole bottle section for further description), and one hexagonal light aqua condiment bottle.

The shoulder sherds came from all three years of excavation and all three excavations types; one sherd came from Test Unit 3, two sherds came from STPs (Additional STP #1 on Transect C and STP Y5), and 12 sherds came from pedestrian survey. The shoulder sherds indicate that there were at least 13 vessels: three cylindrical aqua bottles, one cylindrical dark aqua bottle, three cylindrical light aqua bottles, one planed, rectangular aqua bottle, one planed, rectangular dark aqua bottle, three Ball blue canning jars, and one light aqua jug.

<u>Rim and Lid Sherds</u>

The excavations at Highland City recovered seven aqua rim sherds, which came from the 2013 and 2016 seasons. Five of the sherds came from pedestrian survey, while the remaining two sherds came from STPs. Most of the rim sherds were fragments of indeterminate hollowware vessels, although one sherd indicated the presence of a small plate or saucer. Another rim sherd matched a body sherd lying next to it; both pieces had pressed pattern of small, raised almond or eye-like shapes. These sherds likely came from a small dish or compote. The rim sherds speak to the presence of at least one small plate, one small dish, and four indeterminate hollowware vessels. Pedestrian survey in 2014 also found a small lid fragment at the western edge of the site; this fragment likely was part of a larger jar lid.

Basal Sherds

A total of 144 basal sherds came from the three years of excavation, four of which were found through STPs and the remainder of the assemblage through pedestrian survey. These basal sherds indicate the presence of at least 133 vessels: 60 cylindrical bottles – 30 aqua bottles, nine dark aqua bottles, 21 light aqua bottles (one with bubbles trapped within) – 47 square / rectangular bottles – 24 aqua bottles, nine dark aqua bottles, 14 light aqua bottles – two hexagonal aqua bottles (one dark and one light), three pressed dishes / compotes (one dark), 11 jars, one inkwell, one eight-petalled, flower-shaped hollowware, and eight additional unknown hollowware vessels (four light).

A portion of the basal sherds recovered provided diagnostic information in tightening / confirming the site's chronology. Nine aqua bottles had post base molds, which dates them to sometime between the 1850s and the 1890s. Six bottles had steep kicks created by turn molds, and – as a result – date to between the 1880s and the early 1910s. One aqua bottle had a machine-molded cup-bottom base, which dates it back to between the early 1900s and the 1920s. Two basal sherds provided even tighter dating utility. One circular basal sherd had the following molded on it: "B.G.M. / 90 / CO." which indicates that Adolphus Busch Glass Manufacturing Company produced it. This fruit jar dates either to between 1893 and 1905 or to between 1908 and 1920, depending on the specific manufacturing factory, which is unknown. The second circular basal sherd reads: "AB [connected together]". This is the symbol for the Adolphus Busch Glass Manufacturing Company and, due to the merger, the American Bottle Company.

This soda or ginger beer bottle dates to between 1904 and 1907. All of the bottle bases recovered speak to a presence at the site between at least the 1860s and the 1920s.

Lip Sherds

The excavations also yielded 75 amber lip sherds. Sixty-eight of the lip sherds proved to be diagnostic; of the remaining seven fragments, five were indeterminate due to breakage and two were small pieces of external threads, which had broken off of a larger finish. Thirteen vessels had wide mouth, external thread lip finishes with ground rims. These indicate that they were canning or ointment jars dating to between 1858 and 1909. Two additional jars with wide mouth external thread lips had machine-ground rims and, as such, dated to after 1915. One bottle had an internal thread dating to between the 1880s and 1920. This bottle finish was made to accept a glass bottle stopper (like the one described below) and, as such, the bottle would have held sauces, liquor, wine, perfumes (or colognes), or even chemicals.

Ten bottles had double ring finishes and ground rims, dating to between 1850 and 1910; another two bottles had double ring finishes and machine-ground rims, dating to the late nineteenth century or early twentieth century. These bottles would have held food, liquor, condiments, or patent medicines. Two bottles had applied oil / ring lip finishes (one with a ground rim, and one with a machine-ground rim). Another two had machine-applied oil / ring lip finishes. All four bottles with the oil / ring lip finish date to between the 1830s and the 1920s. Oil / ring lip finishes appeared on a wide variety of bottle types during this period, including patent medicine bottles – especially those for bitters – condiment bottles, and occasionally on gin bottles. Six bottles had a wide bead lip finish with a ground rim, dating to between 1850 and the 1890s. These bottles would have held food, condiments, or even druggists' pills. Quite often, these were found on pickle jars – especially ring-necked pickle jars.

Ten vessels had patent / extract lips, four with ground rim finishes and six with machine-ground rim finishes. All of the bottles would have been used for tonics, bitters, patent medicines, or extracts; however, the bottles with the ground rim finishes date to between the 1850s and the 1890s, while the machine-ground finishes date to between the 1880s and the 1890s. Another four bottles had prescription lip finishes and were machine ground; these were used for prescription and druggists' bottles between the 1870s and 1920. Four vessels had bead lip finishes. One bore an applied bead lip with a ground rim, which dates to between the 1870s and the 1890s. The remaining four lips were machine-ground and date to the early twentieth-century. These finishes appeared on nearly every type of bottle, from food to liquor to condiments.

The two final vessels had a packer lip finish with a machine-ground rim, dating to between the 1870s and 1920, and a club sauce lip finish, which was too chipped to ascertain the rim grinding. Packer lips appeared on many different types of bottles, including ale, mineral water, beer, and even port. It was made to accommodate "liquid or semi-liquid products." Club sauce lip finishes date to between the 1850s and the 1920s and appeared on condiment and sauce bottles (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989). The lip sherd assemblage supports a similar timeline put forth by the basal sherds and confirm habitation at the site between the 1860s and the 1920s at the latest. They also confirm the presence of at least 57 vessels on the site.

Whole Bottles and a Bottle Stopper

Four whole bottles also came from the site, along with two nearly whole bottles. Two bottles recovered were nearly identical and came from roughly the same area, subsurface (STP L5 and Test Unit 3). Both had prescription lips with ground rim finishes and were made in two-part molds. The mold line stops partway up the neck for each vessel. The bases of these two small bottles are slightly uneven. The bottles are roughly 6.6 cm tall with an opening at the top that measures only 1 cm in diameter. These bottles are druggists' utility bottles and would have been used to administer small doses in the 1850s and 60s.

Three additional bottles recovered are also nearly identical. One bottle is whole, one is missing a small portion of its base, and the last bottle is split into three equal-sized parts which, which cross-mend. This third bottle, when mended, comprises a bottle from the shoulder to base; the neck and lip are missing. All three bottles came from the western edge of the site (Transects YY and ZZ). These are also druggists' utility bottles, although they are very narrow and almost column-shaped with thin, delicate prescription lips. A neck sherd from a third, small, column-shaped bottle also came from Transect ZZ; this bottle neck may have been associated with the broken bottle mentioned above, which was recovered nearby. These bottles date to between the 1850s and the 1860s.

The final bottle is ring-necked pickle bottle with a bead lip finish and a ground rim finish. The bottle has a bead-like neck ring just before the shoulder, giving it its name. Square-shaped and free-blown (it has no visible seams), like bottle was likely made in a pattern mold. Ring-necked pickle bottles date to between the 1850s and the 1890s, although the style of this one is very similar to those produced in the 1880s. One complete, intact bottle stopper came from the 2016 pedestrian survey efforts along Transect B. Embossed in a raised circle on the top of the stopper is the following: "LEA & / PERRINS". This stopper came from a Lea & Perrins Worcestershire sauce bottle like those described above.

Distribution of Aqua Sherds

The 856 aqua body sherds' distribution across the site clustered in the three main activity areas identified, just as the amber sherds did. In total, 397 aqua body sherds (46.4% of the overall aqua body sherd count) came from the western quarter of the site, between Transect XX and Transect D, with 260 sherds recovered from Transect B alone. The second quarter of the site, from Transect E to Transect K, yielded 197 aqua sherds (23% of the aqua body sherds), with the area between Transect I and Transect K yielding 193 of the sherds. The third quarter of the site, between Transect L and Transect R, produced 144 pieces (16.8%); this is the quarter of the site from which the body sherd with potential pressure flaking came and is also the one that encompasses the productive Test Unit 3, which yielded the Union Clasped Hands flask. The second artifact concentration on the site runs between Transects I and N; the sherds found in the second and third quarters of the site cluster, for the most part, within the boundaries of this second artifact concentration. The final quarter of the site, from Transect S to Transect Z, yielded the fewest sherds with 134 fragments (15.7%), the majority of which (n = 83) clustered between the three easternmost transects, Transect X through Z, where the easternmost artifact concentration lies.

A similar distribution occurred with the more diagnostic lip and shoulder sherds, with the largest concentration of sherds consistently occurring in the westernmost quarter of the site. The majority of the 75 lip sherds (n = 33, or 44%) came from the first quarter of the site, between Transect XX and Transect D and concentrating most between Transects XX and B, just as it had with the body sherds. This same pattern also appeared in with the 15 shoulder sherds, where eight sherds (5.3%) came from the westernmost quarter of the site. The similarities between the body sherds, the lip sherds, and the shoulder sherds do not extend further. The remainder of the lip sherds are spread almost equally across the second, third, and last quarter of the site, with 13, 15, and 13 sherds respectively (17.8-19.2%). One additional lip sherd came from the spoils of the site and, therefore, has no provenience. The shoulder sherds, however, have their second-highest concentration in the easternmost quarter of the site (3 sherds / 20%), while the second and third quarters of the site each yielded two shoulder sherds (13.3%).

The distribution of the 144 basal sherds was nearly bi-modal; the first quarter of the site yielded 46 sherds and the second quarter, 24. A total of 44 sherds came from the third quarter and 30 sherds came from the fourth quarter. The first half of the site yielded 70 sherds, while the second half yielded 74., with in the first and third quarters and similar lower amounts in the second and fourth quarters. Both the neck and the rim sherds found on the site cluster most in the middle of the site grid, between the second and third quarters of the sites (Transects E to R). The second quarter of the site yielded 20 of the 45 neck sherds (44.4%) and three of the seven rim sherds (42.8%); another 14 neck sherds came from the third quarter of the site (31.1%), along with five rim sherds (71.4%). For both assemblages, the sherds clustered most between Transects I and M. Only five neck sherds came from the first quarter of the site (11.1%), as did one rim sherd (14.3%). The easternmost quarter of the site yielded six neck sherds (13.3%), but no rim sherds.

Finally, two of the whole bottles and the two nearly whole bottles came from the western edge of the site, specifically between Transects XX and YY. The single Lea & Perrins bottle stopper came from the first quarter as well (Transect B). The remaining two whole bottles came from subsurface excavations Transect L, in the third quarter of the site, near the artifact concentration there.

Aqua Vessels

The aqua sherd assemblage indicates the presence of at least 159 vessels at Highland City (See Table 7.18). The vessel fragments recovered came, for the most part, from cylindrical bottles (n = 61); these likely once contained beer, soda, condiments, perfume, or patent

Table 7.18: Minimum Number of Aqua Vessels Found

	Total (n=)	Aqua	Dark Aqua	Light Aqua
Cylindrical Bottles	**61**	31	9	21
Planed (Rectangular or Square) Bottles	**48**	25	9	14
Hexagonal Bottles	**2**	0	1	1
Small Druggist's Bottles	**5**	2	0	3
Jugs	**1**	0	0	1
Jars	**20**	11	9	0
Plates	**1**	1	0	0
Dishes / Compotes	**4**	3	1	0
Inkwells	**1**	1	0	0
Flasks	**1**	1	0	0
Hollowware / Pressed Glass	**15**	11	0	4
Total Vessel Minimum	**159**	**86**	**29**	**44**

medicines; at least one bottle held Lea & Perrins Worcestershire sauce and another was likely a condiment bottle, such as those that held French's mustard. A total of 48 planed, rectangular or square vessels also came from the site; most of these vessels once held patent medicines, although several may have contained perfumes or condiments.

At least four of the bottles, as discussed above, contained specific patent medicines, namely Ayer's Sarsaparilla, Brown's Essence of Jamaica Ginger, and Merchant's Gargling Oil. Three hexagonal bottles, likely used for patent medicines or specific, proprietary or herbal blends also came from Highland City. Hexagonal bottles also held condiments during this period, and – as such – the three bottles may have held condiments instead. Additionally, there was at least one small hexagonal inkwell. The site also yielded five small druggist's bottles, one jug, 20 jars, one plate, four pressed glass compotes, one Union Clasped Hands Flask, and 15 pressed glass hollowware vessels, some decorated with ribbing and others with raised patterns.

The aqua glass found comprised just over 12% of the overall glass assemblage (12.6%) and provided strong diagnostic data toward tightening the site chronology through several identifiable products, post base molds on basal sherds, and lip finishes with substantial dating utility. The aqua glass assemblage reinforces the fact that Highland City did indeed have a thriving population on the site from the third quarter of the nineteenth century through at least the early years of the twentieth century – and possibly up through the 1910s.

Cobalt Glass

Cobalt glass gets its name from the fact that glassmakers would add cobalt oxide to the glass to color it a rich, brilliant blue. They would also use copper as an additive to glass batches, but as cobalt oxide was more widely used, the name cobalt glass stuck. Lighter cobalt glass is sometimes referred to as sapphire or cornflower glass, while darker cobalt glass has earned the name midnight blue glass. These other names, however, are all simply conventions to describe variations on the larger spectrum of cobalt glass (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989).

Generally, cobalt glass was used to make bottles, especially medicine, cosmetic and poison bottles, as well as flasks and ink wells. At the end of the eighteenth century and beginning of the nineteenth century, cobalt glass also appeared as salt dishes and decanters. This glass type, however, does not provide a very tight dating utility, as cobalt glass appeared at the end of the eighteenth century and continued in use through the twentieth century. Some tighter ranges emerge, when examining specific vessel types. Medicinal, poison, and cosmetic bottles fall into a general pattern of usage between 1890 and 1960. Mineral and soda water bottles appear in cobalt glass from around 1840 through the early twentieth century. Inkwells appear around the same time and disappear from the archaeological record after the 1930s. While not as tight as other glass types, the presence of cobalt glass does at least reaffirm that there was a habitation at 24SB67 during the nineteenth century, which continued at least through the first quarter of the twentieth century.

Table 7.19: Cobalt Glass Totals, Organized by Means of Collection

Cobalt Glass	Total	Pedestrian Survey	STPs	TUs
2013	**1**	1	0	0
2014	**3**	3	0	0
2016	**1**	0	0	1
Total Sherds (n=)	**5**	**4**	**0**	**1**

Five pieces of cobalt glass came from the excavations at Highland City, with one fragment found in 2013, three fragments found in 2014, and one fragment found in 2016 (See Table 7.19). Four cobalt sherds came from pedestrian survey efforts in 2013 and 2014 and one piece came from Test Unit 3, in 2016. All five of the cobalt glass fragments recovered were undiagnostic body sherds and represent the presence of at least two cylindrical bottles at Highland City, one of which was very thin and likely dates to between the 1870s and the 1890s.

The distribution of the sherds ranges across the site. Two body sherds came from Transect ZZ on the western edge of the site, where the westernmost artifact concentration lies. Another came from the artifact concentration in the middle of the site – specifically from Transect K, while a final sherd found through pedestrian survey came from along Transect Z, at the far eastern edge of the site, where the third artifact concentration is located. Test Unit 3, which yielded the fifth body sherd was found, is located off of Transect L and, therefore, within the artifact concentration located in the middle of the site as well.

Pale Blue Glass

In total, 774 pieces of pale blue glass came from the two excavations at the site, which is 8.3% of the total glass assemblage recovered. Pedestrian survey yielded 723 sherds, STPs yielded

Table 7.20: Pale Blue Glass Totals, Organized by Means of Collection

Pale Blue Glass	Total	Pedestrian Survey	STPs	TUs
2013	**279**	268	11	0
2014	**218**	203	6	9
2016	**277**	252	0	25
Total Sherds (n=)	**774**	**723**	**17**	**34**

17 fragments, and the Test Units yielded 34 pieces (See Table 7.20). The 2013 excavation season had the largest amount and proportion of pale blue glass sherds (n = 279 or 15.9%), while the 2014 season had the smallest amount and proportion (n = 218 or 6.2%). The pale blue glass from 2016 (n=277) comprised 6.9% of the total 2016 glass.

Pale blue glass is very difficult to definitively date, as pale blue glass vessels are generally either made of pale aqua glass or blue-tinged colorless glass and glassed as pale blue when a distinction cannot be made. As stated above, aqua glass appears archaeologically in the earthy nineteenth century and remains on archaeological sites through the early twentieth century; bottles and jars, in particular, can confirm an occupation on the site from sometime between the first quarter of the nineteenth century and the 1920s. Colorless glass, discussed below, generally is not found before 1870s and is most common in assemblages from the early to mid-twentieth century; some forms of colorless glass are still used today. The reason that colorless glass may appear to be pale blue is due to the fact that one of the decolorizing agents that was frequently used, selenium dioxide, usually went into the glass mixture along with cobalt oxide, which is blue. As a result, a bluish tinge can be possible in colorless glass. Pale blue glass vessel forms are also similar to that of aqua and colorless glass and include bottles, tableware, and jars (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989).

<u>Body Sherds</u>

The majority of pale blue glass sherds found were undiagnostic body sherds (n = 662). These sherds possessed no markings of diagnostic utility and, as such, only indicated the presence of a minimum of nine vessels, based on the sherds' color and shape. These vessels were as follows: four cylindrical bottles, three planed bottles, one cup, and one dish. An additional 40 sherds, classed as semi-diagnostic body sherds, provided minimal diagnostic utility, with regards to patterns and lettering (See Table 7.21). Eleven sherds had lettering on them, although there were not enough letters to positively determine a specific brand or manufacturer.

Table 7.21: Recovered Pale Blue Glass Sherd Types

	Total (n=)	Pedestrian Survey (n=)	STPs (n=)	Test Units (n=)
Non-diagnostic body sherds	**662**	621	16	25
Semi-diagnostic body sherds	**40**	38	0	2
Diagnostic body sherds	**1**	1	0	0
Shoulder sherds	**8**	8	0	0
Neck sherds	**12**	10	0	2
Lip sherds	**9**	8	0	1
Basal sherds	**38**	33	1	4
Rim sherds	**3**	3	0	0
Whole/Nearly Whole Bottles	**0**	0	0	0
Other	**1**	1	0	0
Total Number of Sherds				**774**

Another 18 semi-diagnostic body sherds indicated the presence of ten additional vessels, all of which had pressed patterns. One planed, rectangular bottle had inset squares on its side, and another had inset squares decorated with a lattice-like diamond pattern. Large, wide, horizontal ribs stretched across one holloware vessel and thin, narrow horizontal ribs decorated another. A third holloware vessel had horizontal ribbing that was rounded or bowed, rather than completely linear. The sherds also indicated the presence of a holloware vessel pressed with a gently undulating, almost wavy, surface. One vessel, likely a small bowl, had a pressed, scalloped pattern on the body and one small holloware vessel had a frosted appearance. Thin, raised ridges decorated one final glass object, which likely was the bell of a lamp or lantern. A final group of semi-diagnostic body sherds (n = 10) all came from the same vessel, a pale blue canning or fruit jar, similar to those made by Ball.

The assemblage also yielded one diagnostic body sherd, found though pedestrian survey along Transect ZZ at the western edge of the site in 2016. The sherd reads “MAN…”. The font used is a unique one, used by Steelman & Archer Co., Wholesale Druggists, a pharmacy out of

Philadelphia. Steelman & Archer Co. manufactured Laben's Essence in rectangular bottles that would match the fragment found. This "elixir" contained "1.82 grains" of "granulated opium," which was suspended in "alcohol, 45.6 per cent" (information taken from bottle label; see Figure 7.11 for an intact bottle of Laben's Essence, with the label attached). This late nineteenth-century proprietary blend was, to say the least, potent.

Figure 7.11: Laben's Essence Bottle, with Original Label

Photo Credit: Stephanee Lee, Helena, MT

Neck and Shoulder Sherds

An additional 12 pale blue neck sherds and eight shoulder sherds also came from the excavations. The neck sherds came, for the most part, from all three years of pedestrian survey (n = 10), although 2016's Test Unit 3 did yield two neck sherds. The sherds speak to the presence of at least 12 vessels: 11 cylindrical pale blue bottles, two of which are small, and one planed, rectangular bottle. Pedestrian survey in 2014 and 2016 produced all eight of the pale blue shoulder sherds; they speak to the presence of eight vessels: six cylindrical bottles and two planed, rectangular bottles.

Rim Sherds and Lid Sherd

Three rim sherds came from the 24SB67, one sherd from 2014 and two from 2016, all recovered through pedestrian survey. The rim sherds indicate the presence of three vessels: one bowl with a machine-ground rim, one cup with a similar machine-ground rim, and one unknown holloware vessel. Pedestrian survey in 2014 also yielded one pale blue glass lid fragment, which came from a round canning jar; the following was molded onto the lid fragment: "…AS…", possibly for "MASON", but it is indeterminate.

Basal Sherds

The excavations yielded 38 basal sherds, which came from all three years of excavations and all three excavation methods. These basal sherds indicate the presence of at least 36 vessels: 19 cylindrical bottles – four of which are small – eight square / rectangular bottles, three cups – one with a foot ring – one tumbler, one pressed dish / compote, one jug, and three additional unknown hollowware vessels. Two of the basal sherds provided minimal diagnostic information. One bottle had a steep kick created by a turn mold, which dates to between the 1880s and the early 1910s. Another appears to have been mouth-blown, likely dating to between 1810 and 1870.

Lip Sherds

The excavations also yielded nine pale blue lip sherds, which came from all three years of excavation; all but one of the sherds came from pedestrian survey – the last sherd came from 2016's Test Unit 3. Seven of the lip sherds proved to be diagnostic; the remaining two fragments could only tentatively be identified as one possible extract lip and one possible bead lip, the rim finishes of both unknown, due to breakage. One lip sherd had a club sauce lip finish, dating to between the 1850s and the 1920s; club sauce finishes appeared on condiment and sauce bottles, such as those that held Worcestershire sauce. A machine-applied oil lip finish was on another bottle, which dated to between the 1830s and the 1920s. As mentioned above, oil / ring lip finishes appeared on a wide variety of bottle types during this period, including patent medicine bottles, condiment bottles, and occasionally on liquor bottles.

Another two bottles had prescription lip finishes, one of which was ground and one machine-ground; these were used for prescription and druggists' bottles. The ground bottles date to between the 1830s and 1920, while the machine-ground rims date to between the 1860s and 1920. Another two vessels had bead lip finishes, which date to between the 1850s and the early twentieth-century. These finishes appeared on nearly every type of bottle, from food to liquor to condiments. A final lip sherd had a wide bead lip finish with a machine-ground rim, which dates to between the 1850s and the 1880s. These bottles would have held food, condiments, or even druggists' pills. Quite often, these were found on pickle jars – especially ring-necked pickle jars. The lip sherds confirm the presence of at least seven bottles on the site.

<u>Distribution of Pale Blue Sherds</u>

The 703 pale blue body sherds' distribution across the site clustered in the three main activity areas identified, just as the amber sherds did. In total, 254 pale blue body sherds (36.1% of the overall pale blue body sherd count) came from the western quarter of the site, between Transect XX and Transect D, with 99 sherds recovered from Transect B alone. Another 158 sherds came from the second quarter of the site, from Transect E to Transect K (22.5% of the pale blue body sherds), with the area between Transect I and Transect K yielding 193 of the sherds. A total of 205 sherds were recovered from the third quarter of the site, between Transect L and Transect R and 82 sherds came from the final quarter of the site, which stretches from Transect S to Transect Z. The body sherds, as with previous glass assemblages, clustered in three main areas: between Transects XX and B, between Transects J and L, and between Transects X and Z. A final four sherds had no known provenience and, as such, were classed as spoils.

A similar distribution occurred with the more diagnostic basal sherds. Of these 38 sherds, the majority also came from the first quarter of the site (n = 15 or 39.5%) and – like the body sherds – the second most productive quarter was the third, which stretches from Transect L to Transect R (n = 14 or 36.8%). The basal sherds follow the trend established by the body sherds in terms of the two least productive quarters of the site as well. As with the body sherds, the fewest basal sherds came from the easternmost quarter of the site (n = 4 or 10.5%). The second quarter of the site, between Transects E and K yielded 5 basal sherds (13.2%).

The westernmost quarter of the site also yielded the majority of the nine lip sherds and eight shoulder sherds. Four lip sherds (44.4%) and five shoulder sherds (62.5%) came from the area between Transect XX and Transect D. These two assemblages differ from the basal and body sherds beyond this, however. The second largest proportion of shoulder sherds (n = 2 or 25%) came from the easternmost transect, while the second quarter of the site, between Transect E and Transect K yielded one additional sherd (12.5%); no sherds came from the third quarter of the site. The eastern half of the site, encompassing the third and fourth quarter of the site, yielded four lip sherds, with two sherds (22.2%) recovered from each of the two quarters. The second quarter of the site yielded the fewest lip sherds, with only one sherd recovered (11.1%).

The 12 neck sherds recovered follow a different pattern than those described above. Each half of the site yielded six sherds, or half of the assemblage. However, the highest concentration of neck sherds (n= 4 or 33.3%) came from the third quarter of the site, between Transect L and Transect R, while the fewest neck sherds came from the easternmost quarter of the site (n = 2 or 16.7%). The western half of the site also yielded six neck sherds, as mentioned above, which were split equally between the first and second quarters (n = 3 or 25%). Finally, three rim sherds came from the site, all of which came from the westernmost quarter, with one sherd found at Transect ZZ, one sherds at Transect B and one at Transect D. The one lid sherd in the pale blue glass assemblage also came from the western edge of the site, at Transect YY.

Pale Blue Vessels

The pale blue sherd assemblage indicates the presence of at least 47 vessels at Highland City (See Table 7.22). The vessel fragments recovered came, for the most part, from cylindrical bottles (n = 19); these likely once contained beer, soda, condiments, perfume, or patent medicines; at least one bottle held Steelman & Archer's Laben's Essence. A total of ten planed, rectangular or square vessels also came from the site; most of these vessels once held patent medicines, although several may have contained perfumes or condiments. Additionally, the pale blue glass assemblage indicates that there was at least one tumbler, three cups (one of which had a foot ring), one jug, one jar with a glass lid, one dish or compote, three bowls (one of which had a pressed, scalloped pattern), one lamp bell from a kerosene lamp, and eight hollowware vessels (five of which were decorated with patterns or frosted).

Table 7.22: Minimum Number of Pale Blue Vessels Found

	Total (n=)
Cylindrical Bottles	**19**
Planed (Rectangular or Square) Bottles	**10**
Bowls	**3**
Dishes / Compotes	**1**
Tumblers	**1**
Cups	**3**
Jugs	**1**
Jars	**1**
Lamp Bells	**1**
Hollowware / Pressed Glass	**8**
Total Vessel Minimum	**47**

The pale blue glass found comprised just over 8% of the overall glass assemblage (8.3%), but contributed a small amount of diagnostic data toward tightening the site chronology through one identifiable product and lip finishes with substantial dating utility. The pale blue glass assemblage also reinforces the fact that Highland City had a large population at the site from the mid-nineteenth century through the early twentieth century.

Black Glass

Six pieces of black glass came from the site in total, all through pedestrian survey efforts in 2013, which yielded four sherds, and in 2016, which recovered two sherds (See Table 7.23).

Table 7.23: Black Glass Totals, Organized by Means of Collection

Black Glass	Total	Pedestrian Survey	STPs	TUs
2013	**4**	4	0	0
2014	**0**	0	0	0
2016	**2**	2	0	0
Total Sherds (n=)	**6**	**6**	**0**	**0**

Black glass is a slight misnomer, as it is usually a very dark olive, amber, or purple when held up to a strong enough light. However, black glass does often appear to be glass in the direct light of a room or sunlight. Forms of black glass have appeared since at least the early sixteenth century and are found on sites up through the nineteenth century. However, black bottles, in particular, saw a resurgence during the second and third quarters of the nineteenth century. It is believed that the surge in black glass during the end of the eighteenth century and during the nineteenth century came largely from a switch in the fuel used in glassmaking fires; coal replaced wood as the cheapest fuel source (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989).

Glassmakers used black glass frequently to make cheap ale, wine, and liquor bottles, especially whiskey bottles; these were all mass-manufactured and often of poor quality, but their dark color protected their contents. Additionally, ink wells, snuff bottles, and mineral water bottles were made out of black glass; occasionally, there were black medicine bottles, but they were very rarely used for condiments.

Black glass does provide a strong starting date for a chronology, but does furnish a tight end date. It is rarely found after 1890 on archaeological sites and American-made black glass drops off around 1880. Black glass inkwells disappear earlier, around the 1870s. The one 20th century example of black glass that appears on sites is an overall exception to the rule; black amber bottles made by Mission Dry Orange, a soda company, date from 1929 to around 1935 (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989).

Table 7.24: Recovered Black Glass Sherd Types

	Total (n=)	Pedestrian Survey (n=)	STPs (n=)	Test Units (n=)
Non-diagnostic body sherds	**5**	5	0	0
Semi-diagnostic body sherds	**1**	1	0	0
Total Number of Sherds				**6**

Nearly all of the black glass sherds recovered from Highland City were undiagnostic body sherds (n = 5), which indicated only the presence of a at least two black glass holloware vessels at the site (See Table 7.24). Four of the fragments were small and came from the same original, indeterminate vessel. The fragments were all found trapped within a crushed lightbulb base. The single semi-diagnostic fragment is less opaque than the other fragments found and may possibly be a lens fragment from a pair of (likely modern) sunglasses. The black glass body sherds were clustered in the first quarter of the site, where one of the artifact concentrations lies; specifically, all of the fragments were found between Transect A and Transect D.

Colorless Glass

Colorless glass is the term used to describe class that has no other color in it. This term is used rather than referring to it as “clear” because the goal is to discuss a glass vessel’s color, not its opacity. Other terms used for colorless glass include “flint” and “crystal.” While truly colorless glass has been sought after since the origin of glassmaking as a trade, true colorless glass generally is not found on assemblages before the 1870s and is most common on assemblages from the early to mid-twentieth century, after the automatic bottle press emerges, although colorless glass does still exist today.

The later date for true colorless glass comes from that fact that it is very difficult to manufacture. In order to produce colorless glass, glassmakers must use sand / silica batches that are as free of iron and other impurities as possible. The stabilizer used in the mixture must also be nearly free of impurities. The terms “crystal” and “flint” above get their name from earlier fifteenth-century Venetian and eighteenth-century English attempts respectively to create colorless glass, both of which used a very pure quartz rock, referred to as calcined flint. It is due to improved glassmaking techniques (and better knowledge of chemistry) at the end of the nineteenth and beginning of the twentieth centuries that colorless glass as it is known today truly emerged. It soon became both easier and cheaper to create colorless glass batches, courtesy of newly recognized additive types. Potash-lime, potash-lead, and soda-lime glass are the three main varieties of glass that can be colorless and the latter two glasses are still manufactured today (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989).

It is important to note that even glass referred to as true colorless glass may have some faint color, generally a byproduct of the decolorizing agents used in the glass batch. Manganese dioxide produces faint purple or pink hues and, as discussed below, can even turn colorless glass a deep purple after long exposure to sun. Greenish tinges generally come from selenium dioxide or impurities from copper or iron. Aqua or blue tinges occur when cobalt oxide is present in a batch containing selenium dioxide. Arsenious oxide, which is derived from arsenic, produces a yellowish or amber tint, often referred to as “straw” coloring; this is especially seen when arsenious oxide is combined in a batch with selenium and or cobalt oxide. “Straw” colorless glass has a strong diagnostic utility, as it rarely appears before the 1910s or after the 1950s in machine-made vessels; “straw” mouth-blown vessels generally date to the first quarter of the twentieth century, although they sometimes can appear as early as the mid-nineteenth century. Finally, colorless glass can sometimes have a greyish tint to it, which often comes from lead oxide (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989).

Table 7.25: Colorless Non-Window Glass Totals, Organized by Means of Collection

Colorless Non-Window Glass	Total	Pedestrian Survey	STPs	TUs
2013	**458**	417	41	0
2014	**829**	625	48	156
2016	**927**	888	0	39
Total Sherds (n=)	**2,214**	**1,930**	**89**	**195**

Colorless Non-Window Glass

The second-most common type of glass recovered from the site was colorless, non-window glass, comprising just under a quarter of the whole glass assemblage from Highland City (n= 2,214 or 23.8%) and falling second only to colorless window glass. The vast majority of the colorless non-window glass came from pedestrian survey (n = 1,930 or 87.2%), while an additional 195 sherds came from the Test Units (See Table 7.25). The STPs produced the fewest colorless non-window glass sherds (n = 89).

As has become the trend, while the 2016 colorless non-window glass assemblage was the largest (n = 927 or 23%), it comprised the smallest proportion of the total glass assemblage collected for the season, when compared to the relative proportions of the other two years of excavation. The 2014 excavation season yielded 829 sherds, which is just over 23% (23.4%). The smallest number of colorless non-window glass sherds came from the 2013 season; however, this amount, 458 sherds, makes up over a quarter of the total glass found that first season (26.1%) and, as a result, 2013's assemblage contains the largest proportion of colorless non-window glass.

Body Sherds

The majority of the colorless sherds recovered were undiagnostic body sherds (n=1,630 or 73.6%% of the total colorless assemblage). Of these, six fragments were melted and another eleven had soot trapped within them. The undiagnostic body sherds did indicate the presence of at least 32 vessels. These are as follows: six round bottles, six planed, rectangular or square bottles, three jars, one large jug, one punch cup, seven drinking glasses or cups, one tumbler, one possible inkwell (or small tumbler), and seven hollowware vessels, one of which was thick-walled (0.75 cm thick) and likely burned. One additional body sherd, found during pedestrian survey along Transect E in 2016, appeared to have knapping along one edge, evidenced by a line of scalloped divots look pressure flaked.

Table 7.26: Recovered Colorless Glass Sherd Types

	Total (n=)	Pedestrian Survey (n=)	STPs (n=)	Test Units (n=)
Non-diagnostic body sherds	**1,630**	1,426	59	145
Semi-diagnostic body sherds	**118**	101	11	6
Diagnostic body sherds	**10**	2	0	8
Lamp / Lantern Glass	**106**	80	4	22
Shoulder sherds	**27**	26	1	0
Neck sherds	**16**	11	3	2
Lip sherds	**73**	65	5	3
Basal sherds	**185**	173	4	8
Rim sherds	**41**	39	2	0
Handle sherds	**4**	4	0	0
Unknown	**4**	3	0	1
Total Number of Sherds				**2,214**

Another 118 colorless body sherds proved to be semi-diagnostic (See Table 7.26). Seventeen sherds had lettering on them, although there were too few letters to make any brand or product-related determinations. Seventeen of the sherds recovered had remnants of labels on them; of these, sixteen likely came from the same modern bottle, which had a light blue paper label. Two of the sherds had red paint on them as well, although it is unclear whether or not they came from the same vessel; one had a thin, narrow red line painted on the glass and the other had a thin, red Y—like shape painted on it. The most prevalent semi-diagnostic sherds were those molded with an orange peel-like pattern (n = 38), indicating the presence of at least one short, squat cup (likely for punch and associated with a basal sherd with the same pattern) and two jugs, one large and one planed and square or rectangular, all molded with an orange peel pattern.

Additionally, the semi-diagnostic sherds spoke to the presence of at least one tumbler with raised, vertical ribs (n = 8 sherds), a hollowware vessel with a faint fabric-like imprint (n = 8), a shallow bowl or dish with raised, horizontal ribs (n = 2), which match a basal sherd below, one jug with a wide, pebble-like band and a heavy tankard with deep, oval depressions across the entirety of the body (n = 4), which match a rim sherd with attached handle, discussed below. Overall, the colorless semi-diagnostic body sherds indicated the presence of at least 26 vessels: one tankard, one tumbler, three jugs, one punch cup, one shallow bowl or dish, and 19 hollowware vessels.

Of the hollowware vessels, the colorless semi-diagnostic body sherd assemblage indicated that the site once had one pressed glass hollowware vessel molded with pronounced ridges, one frosted hollowware vessel, one hollowware vessel with horizontal and diagonal rib-like bands, one hollowware vessel with narrow ribs and another with horizontal, raised annular bands; further, the site also yielded evidence of a hollowware vessel with a narrow, horizontal scalloped pattern running just below the rim, a vessel with a band of four tight horizontal lines, another hollowware vessel with rounded bands of raised ribbing, and one with a wide band of raised dots. Finally, the sherds also indicated the presence of a vessel molded with raised stars, another with a molded triangle, and a third with a raised circle on the body.

The last group of body sherds found were diagnostic body sherds (n = 10). One fragment came from a measuring cup or a beaker and has frosted lettering on it and horizontal bars representing level marks; the sherd reads: "8 TEA… / 6 / 4 / 2 [number partially missing]". The fragment came from pedestrian survey in 2016 at ZZ5, which is within the domestic assemblage activity area on the western edge of the site. The other nine sherds came from two Kerr "Self Sealing Trademark Reg Mason" jars, usually used for canning. One sherd, found at A6 through pedestrian survey in 2016 came from a Mason jar manufactured after 1915; it reads: "…LING" / …G 31 1915 / …ASON". The full text would have read "KERR / "SELF SEALING" / TRADEMARK REG. / PAT. AUG 31 1915 / MASON".

The eight remaining sherds all came from the same Kerr jar; two sherds, when put together, read "…SON", from MASON. Another sherd reads: "…ING" " and includes the quotation marks that Kerr used in the phrase Self Sealing. Another sherd reads: "…ARK R," which would have been TRADEMARK REG. Four pieces from this vessel all contained pieces of Kerr's logo as it looked around 1903. As such, this second jar dates to sometime after 1903 (likely between 1903 and 1915). These two diagnostic body sherds indicate that there was a presence at Highland City during the first quarter of the twentieth century.

<u>Neck and Shoulder Sherds</u>

A total 16 colorless neck sherds and 27 shoulder sherds also came from the excavations at 24SB67. The neck sherds came from all three years of excavation and all three excavation means. These sherds speak to the presence of at least 14 vessels: four cylindrical bottles, two narrow, cylindrical bottles, three small, cylindrical bottles (at least one of which is a druggist's bottle), one jug, two jars, two molded bottles, one with a concave, rib-like pattern and one with vertical ribs half-way down the length of the body.

A total of 27 shoulder sherds came from 24SB67. All but one of these sherds came from the three years of pedestrian survey; the remaining sherd came from STP excavations at Y5 in 2014. The shoulder sherds indicate that there were at least 21 vessels: six round bottles (one of which is quite small), one wide round bottle, one narrow round bottle, one planed, rectangular or square bottle, two jars, two jugs, two punch cups, two dishes / compotes (one of which was sharply angled and one was molded with horizontal bands), one small bowl, and three hollowware vessels (one of which was molded with a ripple-like pattern and one of which had an orange peel-like pattern). Two shoulder fragments came from a glass French's mustard jar; one sherd was molded with French's signature ribbed archways. The other has lettering, which reads "IT'…", part of IT'S FRENCH'S, which was on the glass bottles in the early twentieth century. This sherd also has the beginning of the ribbed archways below the writing fragment. French's mustard used this jar style from February 23, 1915 through the early 1950s. These shoulder sherds indicate that there was at least presence at 24SB67 in the early twentieth century.

<u>Rim and Handle Sherds</u>

The excavations yielded 41 rim sherds, all of which, save two, came from all three years of pedestrian survey; the remaining two sherds came from STP excavations at U6 and W8 in the easternmost quarter of the site. In total, the rim sherds indicated the presence of at least 36 vessels: eight drinking glasses, three punch cups, one tumbler, 12 cups (further identification not possible), one heavy tankard with a thick handle and molded with deep, oval indentations, one bowl, one casserole dish, one serving dish, one saucer (the fragment of which runs from rim to base on one side), two dishes or compotes (one with a faint orange peel-like pattern), one possible measuring cup with a beaker-like rim (possibly associated with the measured body sherd discussed above), and four hollowware vessels (one of which is badly melted).

In total, four colorless handle sherds came from the site, all from pedestrian survey. One additional handle sherd was discussed above in the section on rim sherds and, as such, is not counted or described here. The handle sherds came from two of the places of highest artifact density on the site: Transect B, in the domestic activity area, and Transect L, in the saloon or general store activity area. One handle sherd, recovered in 2013, had seam lines on the interior and exterior indicating that a two-part mold created it. The two sherds recovered in 2014, both from Transect B, likely came from the same mug or punch cup; the handle itself has a very acute curvature. The final handle sherd, found in 2016, was very thick and heavy. These handle sherds indicate the presence of three vessels on the site: a punch cup (or mug), and likely two tankards.

Basal Sherds

A total of 185 basal sherds came from the excavations at Highland City, the majority of which were recovered through pedestrian survey (n = 172), with another four sherds from the STPs and eight sherds from the Test Units. These basal sherds indicate the presence of at least 150 vessels: 56 cylindrical bottles, two narrow cylindrical bottles, three small cylindrical bottles, eight square / rectangular bottles, one oval bottle, one hexagonal bottle, one hexagonal inkwell, 15 jars, three dishes or compotes, three small bowls, nine punch cups, 13 tumblers, five drinking glasses, eight indeterminate cups, one teacup, five jugs, and 15 unknown hollowware vessels. Fifteen of the basal sherds, all jars and bottles, bore letters or numbers which could not be further identified as patent, mold, or factory numbers.

Another basal sherd came from a pressed glass dish or compote, which was molded faintly with four- and five-pointed stick-like stars. A portion of the basal sherds recovered, however, provided some diagnostic information in tightening / confirming the site's chronology. Two bottles had steep kicks created by turn molds, and – as a result – date to between the 1880s and the early 1910s. Another five bottles all have stippling on their bases and date to sometime between the mid and late twentieth century.

Finally, ten vessels had known manufacturers or had hallmarks that related to only a handful of glassmakers and – as such – provided tighter dating utility. Hazel-Atlas manufactured three of the vessels recovered from the site. One was a large, cylindrical jug molded on the bottle with "II / [Hazel-Atlas log of H w/ small A under it) / 0-5113". Another two jars only bore the

Hazel-Atlas logo. All three vessels date to sometime between 1923 and 1964. Two colorless bottles from the site were made by Owens-Illinois. One was struck with: "[modern Owens-Illinois symbol of I inside of O w/out diamond]" and "DES. PAT / 162147." This particular bottle dates to sometime around 1951; patent 162147, according to the US Patent Office, refers to a "jug or the like" (USD162147 S, 1951). The second Owens-Illinois bottle is older, bearing an earlier logo, which dates to between the early 1930s (Lockhart & Hoenig, 2015). Another vessel proved to be Jumbo Peanut Butter jar; it was molded w/ : "JUM… / JUNE 24, 1930 / GOOD ENU… / D 81439 / FOR ME / 5…". Originally reading "JUMBO / GOOD ENUF / FOR ME" with an image on an elephant, these jars date to the 1930s.

The excavations also recovered a Heinz mustard jar, molded on the bottom with "H…Z CO. / H / 301". The original would have read: "H. J. HEINZ CO. / H / 301 / PATD". This jar dates to between the 1920s and the 1930s. Metro Bottle Company, from Jersey City, New Jersey, also manufactured one of the bottles on the site. The base was round with stippling around the edge; at the center, it was molded with "…10[number surrounded by a square] / M [surrounded by a hexagon]" and dates to sometime between 1949 and 1981. The last two bottles have hallmarks that are somewhat ambiguous. One bottle is stamped with: "L[in a circle]", which either stands for W. J. Latchford Co. (1930s-1957) or Latchford Glass Co. (1957-1987). The other bottle has stippling along the edge of the base and reads: "L" and "…81202". The letter "L" without a circle around it belongs to W. J. Latchford Co. (1925-1949), the Lamb Glass Co. (1940s-1960s), or Laurens Glass Works (1968-1990), although this last one is unlikely, given the occupation history at the site. The colorless glass found at the site in the basal sherds indicates a presence at the site at least during the twentieth century.

Lip Sherds

A total of 73 lip sherds came from the excavations at 24SB67; the majority of these came from pedestrian survey (n = 65), although lip sherds were also found in STPs (n = 5) and in test units (n = 3). The lip sherds indicate the presence of at least 56 vessels. Of these, only one was too badly chipped to further identify.

Twenty-eight vessels had wide mouth, external thread lip finishes. Three of these had ground rims, which indicate that they were canning or ointment jars dating to between 1858 and 1909. Another three jars with wide mouth external thread lips had machine-ground rims and, as such, dated to after 1915. One jar had a transitional rim, which existed during the period when ground rims were transitioning to machine-ground rims (1900-1915). The remaining 21 jars' rims were indeterminate. Two sherds had small mouth, continuous external threads (also referred to as a helix finish) with ground rims. These two bottles both date to between the 1890s and the 1920s and were often used for condiments (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989).

Four vessels had bead lip finishes. One bottle lip was machine-ground and dated to the early twentieth-century. The other three finishes were badly chipped and devitrifying and, as such, the rim finish was indeterminate. These bottles date to sometime between the 1870 and the early twentieth century. These finishes appeared on nearly every type of bottle, from food to liquor to condiments.

Two lip sherds had double bead or ring finishes and ground rims, dating to between 1850 and 1910. One of these lips came from a bottle, likely used for patent medicine or proprietary blends, liquor, sauces and condiments, or food. The other lip sherd was a large sherd comprised of a lip, neck, handle, and shoulder. The vessel had double seams continuing into the lip finish and measured 3.5 cm across at the lip and widened to 11.5 cm across the shoulder. The large sherd came from a late nineteenth-century jug, likely used for liquor. Another lip sherd had a wide double bead or ring lip and was both melted and flattened, making it impossible to determine whether the bottle once had a ground or machine-ground rim. The wide double bead rim also dates to sometime between 1850 and 1910.

Two bottles had machine-applied oil / ring lip finishes and date to between the 1830s and the 1920s. Oil / ring lip finishes appeared on a wide variety of bottle types during this period, including patent medicine bottles – especially those for bitters – condiment bottles, and occasionally on gin bottles. One bottle had a double oil / mineral finish, which dates to the period between the 1820s and 1880s. As the name may suggest, these lip finishes frequently appeared on bottles of mineral water. However, they also helped seal soda, ale, wine, porter, liquor, and even patent medicines (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989).

Four vessels had patent / extract lips, two with ground rim finishes and two with machine-ground rim finishes. All of the bottles would have been used for tonics, bitters, patent medicines, or extracts; however, the bottles with the ground rim finishes date to between the 1850s and the 1890s, while the machine-ground finishes date to between the 1880s and the 1890s. Another large sherd made up of a planed square or rectangular bottle's lip, neck, and the beginning of a shoulder had an applied, wide patent lip finish and a ground rim; dating to between the mid-1850s and the 1890s, this bottle type held patent medicines, foods, sauces and condiments, extracts, and oils.

An additional lip sherd had a reinforced extract lip with a indeterminate rim finish; this lip finish dates to between 1900 and 1920 and usually appeared on medicine and apothecary bottles. One additional sherd may have a patent / extract lip, but might be the end of a small syringe; the sherd is badly chipped, which makes determinations difficult.

Another four bottles had prescription lip finishes and were machine ground; these were used for prescription and druggists' bottles between the 1870s and 1920; of these, two of the bottles were quite small and narrow. One bottle had a wide prescription, or flared, lip finish. The lip is much thinner than the prescription or extract lip finish although the function is similar to other prescription bottles, in that this finish usually appeared druggists' bottles and those holding patent medicines; it also appeared of medicinal vials and ampules. Dating generally to between 1800 and the 1870s, the 1850s briefly saw this finish used on decanters, inkwells, cologne and perfume bottles, and chemical bottles (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989).

One sherd, comprised of a lip and a neck, had a packer lip finish with a ground rim, which dates to between the 1850s and 1920. Packer lips appeared on many different types of bottles, including ale, mineral water, beer, and even port. It was made to accommodate "liquid or semi-liquid products." Another lip sherd had a capseat or "common sense" finish, which usually appeared on milk bottles between 1900 and the 1940s. The last lip sherd has a crown finish, which dates to between the 1890s and the present. The crown finish, made to accommodate the cork crown cap – today's classic bottle cap – eventually replaced the small mouth external thread lip finish on soda and beer bottles, especially once machines became the main method of manufacturing bottles for carbonated beverages (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989). The lip sherd assemblage supports a similar timeline put forth by the basal sherds and confirm habitation at the site between the 1860s and the 1940s at the latest.

Lamp Sherds

In total, 106 colorless lamp sherds came from Highland City; most of these sherds came from pedestrian survey (n = 80), although 22 sherds came from the test units and another four were recovered from STPs. Of these sherds, 103 fragments were thin body sherds from lamp bells / shades, although it is unclear whether they came from kerosene lamps or early gas lamps. An additional three sherds of lamp glass were more diagnostic. Two fragments came from the rim of a lamp bell / shade (kerosene or gas), while one sherd came from the neck-like narrow portion of a kerosene lamp's bell.

Unknown Colorless Glass Sherds

Four colorless glass sherds could not be identified. Two sherds found during pedestrian survey along Transect B in 2013 were too heavily melted to discern shape or function; another sherd, found in 2016's Test Unit 3, was also melted into a strip-like shape and impossible to further identify. The final unknown colorless glass sherd came from pedestrian survey at C6 in 2016. This sherd is a triangular tube of colorless glass with a white streak of white glass or paint running through it. It may possibly be an electrical component, but this is unknown.

Distribution of Colorless Non-Window Sherds

The 1,755 colorless body sherds' distribution across the site clustered in the three main activity areas identified. In total, 1,271 colorless body sherds (57.4% of the overall colorless body sherd count) came from the western quarter of the site, between Transect XX and Transect D, with 542 sherds recovered from Transect B alone. The second quarter of the site, from Transect E to Transect K, yielded 175 amber sherds (roughly 10% of the colorless body sherds), with the area between Transect I and Transect K yielding 136 of the sherds. The third quarter of the site, between Transect L and Transect R, produced the fewest sherds, with 146 pieces recovered; the final and easternmost quarter of the site, from Transect S to Transect Z, yielded the fewest sherds, with 160 fragments, the majority of which (n = 81) clustered between the three easternmost transects, Transect X through Z.

All of the more diagnostic sherds, including basal, rim, lip, neck, shoulder sherds, also had their largest distributions in the westernmost quarter of the site, between Transects XX and D; lantern glass did as well. In total, 129 of the basal sherds (69.7%), 17 of the rim sherds (41.5%), 60 of the lip sherds (82.1%), 12 of the neck sherds (75%), 22 of the shoulder sherds (81.5%), and 65 of the lamp glass sherds (61.3%) came from the westernmost quarter of the site. The distribution of sherds varies widely beyond this point. The second quarter of the site, between Transects E and K yielded the second-largest number of basal (n = 29 or 15.7%) and rim sherds (n = 13 or 31.7%), just as with the body sherds. However, the third quarter of the site, between Transect L and Transect R, yielded the third-largest amount of both basal sherds (n = 16 or 8.7%) and rim sherds (n = 8 or 19.5%). The easternmost quarter, between Transects S and Z, yielded the fewest basal and rim sherds, with 11 (6%) and five sherds respectively (12.2%).

The second-largest number of shoulder sherds, however, did come from the easternmost quarter of the site (n = 3 or 11.1%). The third quarter of the site yielded two sherds (7.4%) and no sherds came from the second quarter of the site. No neck sherds came from the second quarter of the site either. The remaining four neck sherds were equally distributed between the two eastern quarters (n = 2 or 12.5 each).

The lip sherds also experienced something of an equal distribution after the first quarter. Four lip sherds were found in the second, third, and fourth quarters (n = 4 or 5.4% each). The lamp glass, saw the second-largest number of sherds come from the third quarter of the site (n =

30 or 28.3), while ten sherds came from the easternmost quarter (9.4%) and one sherd came from the second quarter (0.94%).

Colorless Vessels

The colorless sherd assemblage indicates the presence of at least 169 vessels at Highland City (See Table 7.27). The vessel fragments recovered came, for the most part, from cylindrical bottles (n = 56); these likely once contained beer, soda, condiments, perfume, or patent medicines. A total of eight planed, rectangular or square vessels also came from the site; most of these vessels once held patent medicines, although several may have contained perfumes or condiments. One hexagonal bottle, likely used for patent medicines or specific, proprietary condiment, tonic, or herbal blends or patent medicines, also came from Highland City, along with an oval bottle, three small cylindrical bottles, two narrow cylindrical bottles, and two pressed-glass, molded bottles. Additionally, there were at least two small inkwells, one of which was cylindrical and one of which was hexagonal. Additionally, the colorless glass assemblage yielded a large number of drinking vessels, including nine punch cups, thirteen tumblers, eight drinking glasses, and 12 cups, which are drinking vessels that could not be further identified; the site also yielded a colorless teacup and saucer.

Table 7.27: Minimum Number of Colorless Vessels Found

	Total (n=)
Cylindrical	**56**
Planed (Rectangular or Square)	**8**
Planed (Hexagonal)	**1**
Molded, Patterned	**2**
Narrow, Cylindrical	**2**
Small, Cylindrical	**3**
Oval	**1**
Cup	**12**
Drinking Glass	**8**
Tumbler	**13**
Tankard	**2**
Punch Cup	**9**
Teacup	**1**
Saucer	**1**
Dish / Compote	**3**
Small Bowl	**3**
Serving Dish	**1**
Casserole Dish	**1**
Measuring Cup	**1**
Jar	**15**
Jug	**5**
Lamp Bell / Shade	**2**
Hollowware / Pressed Glass	**19**
Total Vessel Minimum	**169**

The colorless assemblage also indicated other domestic vessels, including a serving dish, a casserole dish, three small bowls, three small dishes / compotes, a measuring cup, and five jugs. Highland City also yielded 15 colorless jars, including two Kerr Self Sealing Mason jars, a French's Mustard jar and a Heinz Co. mustard jar. Finally, the site indicated the presence of 19 pressed glass hollowware vessels, including those molded with stars, triangles, circles, and raised, rib-like bands running vertically, horizontally, and vertically.

The colorless glass assemblage found comprised just under a quarter (23.8%) of the overall glass assemblage, although only a few of the fragments found provided diagnostic data toward tightening the site chronology. However, colorless non-window glass, as a whole, dates to as early as the 1870s and was used extensively in vessels through the 1950s, before plastic replaced it. The colorless glass assemblage does reinforce the fact that Highland City had a population on the site from the third quarter of the nineteenth century through the first half of the twentieth century.

Colorless Window Glass

A subset of colorless glass, which has been counted above as a separate category, is that of window glass. There are two main types of window glass found on historic sites in the United States: Crown glass and Cylinder glass. Crown glass gets its name from the fact that glassblowers blew molten glass into a globe, known as crown. While still hot, this would be spun until it became a flattened circle. After the glass cooled, window glass makers cut squares out of the circle, each of which became a window pane. No two Crown glass pieces are alike, because the glass cylinder varied in thickness across its length, with the thickest pieces of glass at the center. Additionally, the flattened crowns had a smaller pool of cooled glass at the very center, called a ponty mark (a variation on pontil mark), similar to that seen in blown-bottles. Crown glass manufacture continued until the mid-nineteenth century.

Cylinder glass began in the beginning of the nineteenth century and soon became the main method of window glass manufacture after the 1850s. Glassblowers, and later machines, swinging a molten ball of glass into a long tube-like shape. The ends of the cylinder were then removed and the remaining glass was cut, length-wise, as it was cooling. The large semi-open cylinder was flattened and then cut into smaller panes once it cooled. Cylinder glass fragments have a uniform thickness, which separates them from Crown glass pieces. Toward the end of the nineteenth century, and into the twentieth century, Cylinder glass became thicker and thicker, finally evening out at roughly 3 mm (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989). All of the glass recovered from the site were manufactured using the Cylinder technique, which further reinforces the narrative of habitation at Highland City between the mid-nineteenth century through the mid-twentieth century.

In total 2,712 pieces of window glass came from the site (See Table 7.28). The window glass assemblage comprises 29.2% of the overall glass assemblage recovered from Highland City, which makes it the largest single glass category. As with the other glass assemblages described thus far, the majority of the colorless window glass came from pedestrian survey (n = 91.7%). Of these window glass sherds, nearly all of them had a faint bluish tinge to them (n = 2,226 or 82.1%). An additional 13 pieces had a green tint, one piece had a faint purple tint, and five were more modern, with a straw tinge. Finally, nine sherds had part of a

Table 7.28: Colorless Window Glass Totals, Organized by Means of Collection

Colorless Window Glass	Total	Pedestrian Survey	STPs	TUs
2013	**218**	178	40	0
2014	**1,240**	1,067	88	85
2016	**1,254**	1,243	0	11
Total Sherds (n=)	**2,712**	**2,488**	**128**	**96**

finished edge, indicating the edge of a pane.

Distribution of Colorless Window Glass Sherds

The colorless window sherds fell into a similar distribution as the other artifacts recovered and discussed thus far, grouping in three main areas of concentration: one in the first quarter of the site, between Transects XX and D, one in the middle of the side (in the second and third quarters) between Transects I and N, and one in the easternmost quarter of the site, between Transects S and Z (especially along the three easternmost transects). The highest concentration of window sherds came from the eastern half of the site overall (n = 1,414 or 52.1%); the third quarter of the site yielded 513 sherds (19.2%), including 11 pieces from Test Unit 3, while the fourth quarter of the site, which runs from Transect S to Transect Z and encompasses the entirety of the artifact concentration there yielded 901 sherds (33.8%). Transect Z, at the far eastern edge of the site, yielded 457 fragments alone.

The first, and westernmost, quarter of the site yielded 913 window glass sherds (33.7%), which is the largest amount of window glass out of any of the quarters. A total of 85 of these fragments came from Test Unit 1, off of Transect B. The second quarter of the site, between Transects E and K, produced the fewest window glass fragments, with only 368 sherds (13.6%).

Examining the area between Transects I and N, which sits in the second and third quarters of the site, the excavations recovered a total of 648 fragments, which does, in fact, support the presence of a building with glazed windows in the middle of the site. This is especially noticeable given the low amounts of window glass recovered between Transects E and H and between Transect O and R. Overall, the window glass fragments – all of which was cylinder glass – indicate the presence of at least three buildings with glazed windows at the site, which correspond to each of the three identified activity areas.

Solarized Colorless

Solarized glass is a form of colorless glass, which has become light to medium-hue purple, due to sun exposure reacting with the manganese dioxide that was used in the decolorizing of the glass. Solarized glass is also referred to as sun-colored amethyst glass and as sun-purpled glass. For the purposes of this examination, particularly due to its diagnostic utility, solarized colorless glass has been classed as a separate glass category. This glass type is rather helpful in determining the age of a site, as its manufacture dates to a specific time frame, 1870 to 1930, although some argue that this time frame is more specific, placing the age somewhere between 1890 and 1920. As such, the presence of solarized glass inherently helps to refine the site chronology and confirm a presence on the site during the late nineteenth and early twentieth centuries (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989.

Table 7.29: Solarized Colorless Glass Totals, Organized by Means of Collection

Solarized Colorless Glass	**Total**	**Pedestrian Survey**	**STPs**	**TUs**
2013	**87**	74	13	0
2014	**223**	215	5	3
2016	**178**	178	0	0
Total Sherds (n=)	**488**	**467**	**18**	**3**

A total of 488 solarized colorless glass sherds came from the site, which amounts to roughly 5.3% of the overall glass assemblage recovered at Highland City. As with the other glass types discussed, pedestrian survey yielded most of the solarized colorless glass assemblage (n = 467 or 95.7%). With this particular glass type, as Table 7.29 shows, fewer fragments than usual came from the STPs and the Test Units (n = 5 or 1% and n = 3 or 0.6% respectively). In terms of sherds recovered by excavation year, the 2014 yielded both the largest amount of sherds (n = 223) and the largest proportion of sherds relative to the overall glass assemblage recovered that year (6.3%). The 2013 season yielded the fewest pieces of solarized colorless glass (n = 87 or 5%), while the 2016 season produced the smallest proportion of solarized colorless glass with only 4.5% (n = 178).

Body Sherds

A total of 347 solarized colorless glass body sherds were recovered from the three years of excavations; of these, 94.2%, or 327 pieces, were undiagnostic body sherds (See Table 7.30). These sherds possessed no markings of diagnostic utility and, as such, only indicated the presence of a minimum of 14 vessels, based on the sherds' color and shape; these vessels were as follows: four cylindrical bottles, four planed bottles, two hollowware vessels, one punch cup, one cup, one drinking glass, and one small dish or bowl.

Table 7.30: Recovered Solarized Colorless Glass Sherd Types

	Total (n=)	Pedestrian Survey (n=)	STPs (n=)	Test Units (n=)
Non-diagnostic body sherds	**327**	318	6	3
Semi-diagnostic body sherds	**20**	20	0	0
Diagnostic body sherds	**0**	0	0	0
Shoulder sherds	**6**	6	0	0
Neck sherds	**12**	12	0	0
Lip sherds	**17**	17	0	0
Basal sherds	**58**	58	0	0
Rim sherds	**13**	13	0	0
Handle Sherds	**2**	2	0	0
Lid Sherds	**2**	2	0	0
Lamp sherds	**30**	18	12	0
Total Number of Sherds				**488**

An additional 20 sherds, classed as semi-diagnostic body sherds, provided minimal diagnostic utility, with regards to patterns and lettering. Six sherds had lettering on them, although there were not enough letters to positively determine a specific brand or manufacturer. One body sherd had a circle of white glass blown into it, although this was the sherd's only defining feature. Another 13 semi-diagnostic body sherds indicated the presence of 6 additional vessels. One hollowware vessel had horizontal bands, and a second had a faintly raised checkered pattern. Two bottles had rounded, vertical ribs, which were narrow on one vessel and wide on the other – these likely were condiment bottles. One body sherd from a bottle had a deep, annular groove or channel running horizontally through it, although it is unclear what product once used this design. Finally, the last semi-diagnostic body sherd indicated the presence of a bottle, likely used for a proprietary blend, which was planed on the bottom half and circular on the top half. No diagnostic solarized colorless body sherds came from the site.

Neck and Shoulder Sherds

An additional 12 aqua neck sherds and six shoulder sherds also came from the excavations. The neck sherds, all of which came from pedestrian survey, speak to the presence of at least 12 vessels: seven cylindrical aqua bottles, one narrow cylindrical bottle with thin, raised vertical ribs, two small, cylindrical druggist's bottles, one jar, and one planed bottle.

All six of the shoulder sherds also came from pedestrian survey efforts. These sherds indicate the presence of at least 6 vessels: three cylindrical bottles, one small, cylindrical druggist's bottles, one cylindrical bottle molded with a scallop-like pattern on the shoulder, and one planed bottle.

Rim. Lid, and Handle Sherds

The excavations at Highland City recovered 13 solarized colorless rim sherds, which came from all three years' pedestrian surveys. The sherds speak to the presence of 12 vessels: two small bowls (one with a protruding lip), one small dish or compote, decorated with a frosted apple pattern, three cups, one punch cup, two planed tumblers (one with crimping below the rim), one drinking glass (likely with a machine-ground rim), one jar with a ground rim finish and a raised ring just below the rim, and two hollowware vessels, one of which had a scalloped rim.

Two solarized colorless lid sherds also came from pedestrian survey. One fragment of a handled jar lid came from 2014 and two pieces from the same casserole dish lid came from 2016;

both came from the westernmost quarter of the site. These lids indicate the presence of at least one jar and one casserole or lidded serving dish at the site.

Finally, pedestrian survey in 2016 yielded two handle sherds, also both from the westernmost quarter of the site. One sherd is complete and attached to part of the body of a punch cup. The handle is shaped like the number “7” and is pressed to resemble two leaf-covered branches. One branch runs horizontally, while the other runs on a diagonal. Where the two intersect, the branches form a cross-like corner. The handle shed appears to be from an Early American Pressed Glass cup. The second handle sherd is a smaller fragment, with two finished, slightly rounded edges. It is uncertain from which vessel type this handle originated. As such, the handle sherds indicate the presence of one EAPG punch cup and one hollowware vessel with a handle.

<u>Basal Sherds</u>

A total of 58 basal sherds came from the three years of pedestrian survey at 24SB67. These basal sherds indicate the presence of at least 55 vessels: 23 circular bottles, five of which are large, thick, and heavy, 12 planed, square or rectangular bottles, one hexagonal bottle, one oval-shaped bottle, one small, cylindrical druggist’s bottle, three cups, four tumblers, one stemware glass (only the foot was recovered – the stem and cup of the glass had broken off), three footed cups or compotes, one small bowl or dish, one jar, one jelly jar tumbler and three unknown hollowware vessels.

A portion of the basal sherds recovered provided diagnostic information in tightening / confirming the site’s chronology. Two cylindrical bottles had kicks likely created by turn molds, which date to between the 1880s and the early 1910s. One circular bottle’s basal sherd had “BORDEAUX” embossed on the bottom, which is particularly curious, as Bordeaux wines generally shipped in olive glass bottles, while hock wines from the beginning of the twentieth-century occasionally used colorless glass (Lindsey, 2017; University of Utah, 1992). The final basal sherd mentioned here is the most indicative. The sherd came from a jelly jar tumbler and has a horseshoe embossed on the bottom. This jar, which often functioned as a drinking glass, originally held jam or jelly and likely dates to some time between 1900 and 1930 (the tail end of the solarized glass production window). These few more diagnostic basal sherds all fall within the general timeline for solarized colorless glass – 1870 to 1930 – and also further support an occupation at Highland City during the same period.

Lip Sherds

The excavations also yielded 17 solarized colorless lip sherds, all of which came from pedestrian survey. Of these, only two lip sherds had indeterminate lip finishes, due to breakage. One bottle had an oil / ring lip with a ground rim finish, which dates to between the 1830s and the early 1900s. These finishes appeared on a wide variety of bottle types during this period, including patent medicine bottles – especially those for bitters – condiment bottles, and occasionally on gin bottles. Another bottle had a double oil finish with a bead ring below it (giving it the appearance of a triple oil finish, which is not a standard lip finish). Double oil finishes, also called mineral finishes, generally date to between the 1840s and the 1880s, although they first appeared in the 1820s. While the finish fell out of favor in the late 1880s, it continued to appear on liquor bottles into the twentieth century. Double oil finishes appeared on mineral water, soda water, ale, and porter bottles, as well as medicinal, liquor, and wine bottles (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989).

Six vessels had patent / extract lips, one of which was an applied lip and one of which was a wide lip. Five of the lip sherds had ground rim finishes (including the applied and the wide finishes) and one had a machine-ground rim finish. All of the bottles would have been used for tonics, bitters, patent medicines, or extracts; however, the bottles with the ground rim finishes date to between the 1850s and the 1890s, while the machine-ground finish dates to between the 1880s and the 1890s. Three vessels had bead lip finishes, two of which had ground rim finishes and one of which had a machine-ground finish. The two bead lip finishes with ground rims date to between the 1870s and the 1890s. The bead lip with the machine-ground rim finish dates to the early twentieth-century. As stated before, these finishes appeared on nearly every type of bottle, from food to liquor to condiments (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989).

The remaining four vessels had brandy / wine finishes two of which were ground and two of which were machine-ground. One of the lips with a ground finish had a single bead ring below the finish, while one of the machine-ground lips had two bead rings below the finish. Brandy / wine finishes generally date to between the 1860s and the 1920s, when they are steadily replaced by threaded finishes. The lips with ground rim finishes are older than those with machine ground finishes, which likely date to the end of the nineteenth century and beginning of the twentieth century. Brandy / wine finishes appeared on flasks, liquor bottles, and large medicine bottles. The lip sherd assemblage supports a similar timeline put forth by the basal sherds and confirm habitation at the site between the 1860s and the 1920s at the latest. They also confirm the presence of at least 15 vessels on the site.

<u>Distribution of Solarized Colorless Sherds</u>

The 347 solarized colorless body sherds' distribution across the site also clustered in the three main activity areas identified. In total, 227 solarized colorless body sherds (65.4% of the overall solarized colorless body sherd count) came from the western quarter of the site, between

Transect XX and Transect D, with 72 sherds recovered along Transect ZZ and another 43 sherds recovered from Transect B. The second quarter of the site, from Transect E to Transect K, yielded the fewest sherds (n =31) and the lowest proportion of body sherds (8.9%), with all of the sherds coming only from the area between Transect I and Transect K, which is the western half of the second artifact concentration on the site. The third quarter of the site was the second densest, with the area between Transect L and Transect R producing 50 sherds (14.4%). The fourth and easternmost quarter of the site, from Transect S to Transect Z, yielded 37 sherds (10.6%), with the majority (n = 33) clustered between the three easternmost transects, Transect X through Z. The third artifact concentration on the site spans from Transect S to Transect Z, encompassing all 37 sherds.

All of the more diagnostic sherds, including the neck, shoulder, basal, rim sherds, and lip sherds, had their largest concentrations of sherds in the westernmost quarter of the site. The majority of the 58 basal sherds (n = 41 or 70.7%) clustered between Transects XX and D; similar proportions occurred with the 12 neck sherds (n = 9 or 75%), the six shoulder sherds (n=4 or 66.7%) and the 13 rim sherds (n = 8 or 61.5%). Of the 17 lip sherds recovered, the largest concentration of sherds also occurred in the westernmost quarter, although the overall percentage was smaller (n = 8 or 47.1%). Further, all three lid sherds and both of the handle sherds came from the first quarter of the site, specifically from the area between Transect YY and B.

The basal and the lip sherds follow a similar distribution pattern for the remainder of their sherds. Both had the second-highest concentration of sherds in the easternmost quarter, where another artifact concentration lies. Ten basal sherds (17.2%) and four lip sherds (23.5%) came from the area between Transect S and Transect Z, clustering specifically between Transect V and Y. The third quarter, between Transects L and R, yielded the fewest basal and lip sherds (n = 3 or

5.2% and n = 2 or 11.8%, respectively). Finally, the second quarter of the site, between Transects E and K yielded four basal sherds (6.9%) and three lip sherds (17.6%). As with other sherds, the artifacts in these two quarters fell mostly toward the eastern half of the second quarter and the western half of the third quarter, where one of the artifact concentrations lies (between Transects I and N).

The neck and shoulder sherds had similar distributions as well. The three neck sherds that did not come from the westernmost quarter of the site were split evenly between the remaining three quarters (n = 1 or 8.3% each). The two easternmost quarters each yielded one of the two remaining shoulder sherds not recovered from the first quarter of the site (n = 1 or 16.7% each). The second quarter of the site yielded no shoulder sherds. The 13 rim sherds followed a different pattern after having the highest concentration in the first quarter of the site. The second highest concentration of rim sherds came from the area between Transects J and K, in the second quarter of the site (n = 7 or 53.8%). This amount is nearly the same number that the first quarter of the site yielded. The last remaining sherd came from Transect N in the third quarter (7.7%), while no rim sherds were found in the easternmost quarter of the site.

The lamp glass recovered followed a unique pattern of distribution, clustering most around the artifact concentration in the middle of the site, which spans the area between Transects I and N. The largest amount of lamp glass came from the third quarter of the site, all of which was recovered between Transects L and N (n = 21 or 70%). Transect K in the second quarter of the site yielded another 6 lamp glass sherds (20%). Two sherds (6.7%) came from the westernmost quarter of the site and came from the artifact cluster there, which runs from Transect XX to Transect C; specifically, one sherd came from Transect YY and one from

Transect ZZ. One final sherd (3.3%) came from the easternmost quarter of the site, along Transect U, which is on the western edge of the final artifact concentration identified at the site.

Solarized Colorless Vessels

The solarized colorless sherd assemblage indicates the presence of at least 71 vessels at Highland City (See Table 7.31). The vessel fragments recovered came, for the most part, from cylindrical bottles (n = 23); these likely once contained beer, soda, condiments, perfume, or patent medicines. A total of 12 planed, rectangular or square vessels also came from the site; most of these vessels once held patent medicines, although several may have contained perfumes or condiments. One bottle, likely a patent medicine bottle, was planed (likely square or rectangular) on the bottom half and cylindrical on the top. Three cylindrical bottles with narrow, vertical ribbing – likely condiment bottles – were recovered, along with a bottle with a scalloped design on the shoulder and one with a deep groove running across the shoulder. One hexagonal bottle and one oval bottle, both likely used for patent medicines or specific, proprietary condiment, tonic, or herbal blends or patent medicines, also came from Highland City. Two small druggist's bottles also came from the site.

Table 7.31: Minimum Number of Solarized Colorless Vessels Found

	Total (n=)
Cylindrical	**23**
Planed (Rectangular or Square)	**12**
Planed (Hexagonal)	**1**
Small, Cylindrical	**2**
Patterned / Pressed Bottle	**6**
Oval	**1**
Cup	**3**
Drinking Glass	**1**
Tumbler	**4**
Punch Cup	**2**
Stemware	**1**
Jelly Jar Tumbler	**1**
Jar	**2**
Dish	**1**
Footed Cups / Compotes	**3**
Small Bowl	**2**
Casserole Dish	**1**
Lamp Bell / Shade	**1**
Hollowware / Pressed Glass	**5**
Total Vessel Minimum	**71**

Additionally, there excavations recovered at least two punch cups (one of which was pressed with an intricate botanical design), three cups, one drinking glass, four tumblers (one of which had crimping below the rim), one stemware glass, three footed cups or compotes, one small dish with a frosted apple design, two small bowls, one jar, one jelly jar tumbler (with a horseshoe on the bottom), one casserole dish, and five pressed glass hollowware vessels (two decorated with ribbing and one with a scalloped pattern).

The solarized colorless glass found comprised just over 5% of the overall glass assemblage (5.2%), but it provided strong diagnostic data toward tightening the site chronology, as the type itself was manufactured only between the 1870s and the 1920s. Several lip finishes aided with further dating. The solarized colorless glass assemblage reinforces the fact that Highland City had a substantial population from the third quarter of the nineteenth century through at least the early years of the twentieth century – and possibly up through the 1920s.

The Green Glasses

The glass fragments in this section fall into four main categories: emerald, green, pale green, and olive. glass fragments. This section will discuss each category's fragments, including possible vessels, and their diagnostic utility for dating the Highland City site of 24SB67.

Non-Olive Green Glass

Non-olive bottle glass ranges widely in color from pale to medium to dark greens, often with varying levels of blue or yellow in the color as well. Non-olive green glass can get its color either from the addition of copper oxide, especially in eighteenth- and nineteenth-century table glass, or from the introduction of iron, which results is lighter shades of green. Overall, the wide range of green glass shades and the long production history (even non-olive glass dates back at least to the eighteenth century) make it very difficult to assign any diagnostic utility to non-olive green glass alone. Instead, information from vessel form and manufacture generally provide clearer information on the dating of the objects and the site.

There are a few shades which provide some aid in assemblage dating, however. Bright greens, often referred to as “7-up green” because of the soda’s bright green bottle, usually appear on twentieth century sites alone, with only a few showing up at the very tail end of the nineteenth century on some sites. Further, dark emerald green bottles, often referred to as “Congressville green” bottles, generally appear on 19th century sites alone, and usually pertain to mineral or soda water. Their unique color usually comes from adding chromium oxide and then reducing the glass in the furnace. Most non-olive glass was used to make bottles, especially for mineral water, soda water, and other beverages, as well as tableware, including dishes, plates, saucers, cups, flasks, decanters, and even vases (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989).

Emerald Glass

A total of seven emerald glass fragments came from the excavations, all of which were recovered by pedestrian survey in 2014 and 2016 (See Table 7.32). The emerald glass makes up far less than 1% of the total glass assemblage recovered on the site, but its presence does confirm an occupation at the site between the 1850s and the early 1900s. The majority of the sherds recovered were non-diagnostic body sherds, which do little to tighten the site’s chronology further. However, they do indicate the presence of at least one thick, cylindrical bottle and two hollowware vessels.

Table 7.32: Emerald Glass Totals, Organized by Means of Collection

Emerald Glass	Total	Pedestrian Survey	STPs	TUs
2013	**0**	0	0	0
2014	**4**	4	0	0
2016	**3**	3	0	0
Total Sherds (n=)	**7**	**7**	**0**	**0**

<u>Diagnostic Sherds</u>

Additionally, one basal sherd, one rim sherd, and one lip sherd came from the excavations at 24SB67

(See Table 7.33). The basal sherd, found along Transect B in 2014, came from a planed, square or rectangular bottle likely produced in a post-bottom mold. The base style, combined with the likelihood that this was a bottle used for proprietary blends or medicines, dates the bottle to sometime between the 1860s and 1900. Also found along Transect B during the same year was a lip sherd with what is likely a tooled champagne lip finish and machine-ground rim finish, which dates to between the 1880s and the 1920s.

Champagne finishes occur most often on wine and champagne bottles, from whence they get their name; it first appeared on these bottles during the early nineteenth century and continues to be the preferred lip finish for wine and champagne today. The champagne finish also occurs on mid- to late nineteenth-century bitters and liquor bottles, as well as medicines and even flasks. It even appeared on soda water, ale, and beer bottles during the third quarter of the nineteenth century (Lindsey, 2017; University of Utah, 1992).

Table 7.33: Recovered Emerald Glass Sherd Types

	Total (n=)	Pedestrian Survey (n=)	STPs (n=)	Test Units (n=)
Non-diagnostic body sherds	**4**	4	0	0
Lip sherds	**1**	1	0	0
Basal sherds	**1**	1	0	0
Rim sherds	**1**	1	0	0
Total Number of Sherds				**7**

The final emerald sherd from the excavations came from pedestrian survey in 2016 at ZZ5; a single rim sherd was recovered, which was once part of a pressed glass compote or dish with a sawtooth rim and ribbed body. At least one rib panel on the sherd has a vertical line of beads. While the particular EAPG pattern could not be identified, the vessel likely dates to the late nineteenth century.

Distribution of Emerald Glass Sherds

The distribution of the seven sherds is weighted heavily toward the westernmost quarter of the site; all sherds came from this first quarter of the site, except the one body sherd from a thick cylindrical bottle, which came from Transect S in the easternmost quarter of the site. The site's only emerald rim sherd came from Transect ZZ, while the lip sherd and one body sherd came from Transect A. The emerald basal sherd and the two remaining body sherds were found along Transect B. The area between Transects ZZ and B falls within the area covered by the westernmost artifact concentration. Interestingly, Transect S is slightly to the west of the artifact concentration located within the easternmost quarter of the site.

Emerald Vessels

Although only seven emerald sherds came from the three years of excavation, they speak to the presence of at least six emerald glass vessels at Highland City (See Table 7.34). These vessels are as follows: two cylindrical bottles, one planed, rectangular or square bottle, one EAPG dish or compote, and two hollowware vessels. While the emerald glass assemblage comprises less than 1% of the overall glass assemblage, it not only contributes to the overall minimum vessel count on the site, but also confirms an occupation at the site between the mid-nineteenth century and the early twentieth century.

Table 7.34: Minimum Number of Emerald Vessels Found

	Total (n=)
Cylindrical	**2**
Planed (Rectangular or Square)	**1**
Dish / Compote	**1**
Hollowware	**2**
Total Vessel Minimum	**6**

Green Glass

A total of 53 green glass sherds came from the excavations at Highland City. These non-olive sherds fell into the green category if they were too dark to be pale green glass and too light (or too bright, as with 7-Up green glass) to be emerald glass. Pedestrian survey from all three years

Table 7.35: Green Glass Totals, Organized by Means of Collection

Green Glass	Total	Pedestrian Survey	STPs	TUs
2013	**12**	12	0	0
2014	**4**	4	0	0
2016	**37**	37	0	0
Total Sherds (n=)	**53**	**53**	**0**	**0**

of excavation yielded the entirety of the green glass assemblage, with 37 fragments recovered in 2016, 12 fragments recovered in 2013 and only four fragments recovered in 2014. The green glass assemblage comprises 0.6% of the total glass assemblage from Highland City.

Body Sherds

The majority of green glass sherds recovered were body sherds (n = 43 or 81.1%). Of these, 14 sherds were non-diagnostic body sherds (32.6%), with little or no defining characteristics. The sherds did, however, indicate the presence of at least five vessels. These vessels are as follows: three cylindrical bottles, one hollowware, vessel, and one possible flask. The body sherd from one of the bottles is likely associated with a lip and a neck sherd, described below; similarly, the body sherds from the flask are likely from the same vessel as a basal and a neck sherd, also discussed below.

Table 7.36: Recovered Green Glass Sherd Types

	Total (n=)	Pedestrian Survey (n=)	STPs (n=)	Test Units (n=)
Non-diagnostic body sherds	**14**	14	0	0
Semi-diagnostic body sherds	**29**	29	0	0
Diagnostic body sherds	**0**	0	0	0
Shoulder sherds	**1**	1	0	0
Neck sherds	**2**	2	0	0
Lip sherds	**6**	6	0	0
Basal sherds	**1**	1	0	0
Rim sherds	**0**	0	0	0
Total Number of Sherds				**53**

Most of the body sherds recovered from the site were semi-diagnostic (n = 29 or 67.4%); no diagnostic body sherds were recovered (see Table 7.37). All of the semi-diagnostic body sherds were “7-Up Green,” which is a bright yellow-tinged green used widely to bottle the 7-Up soft drink; interestingly, the color was so associated with the soda that it is still mimicked today in plastic. This color also appeared on other soda bottles and jars, especially those manufactured by the Owens-Illinois Company. 7-Up Green appears at the end of the nineteenth century, but it is generally considered to be a hallmark of the twentieth century – and is still used today. The 29 7-Up Green sherds speak to the presence of at least two soda bottles on the site, one of which is definitively modern, due to the stippling seen at the bottom of the body sherd where the basal sherd would have connected. Nearly all of the 7-Up Green sherds were recovered in 2016, with the exception being one fragment recovered in 2014.

Neck and Shoulder Sherds

Two green neck sherds and one shoulder sherd came from the excavations. One neck sherd was recovered in 2013, while the other neck sherd and the shoulder sherd came from 2016. The neck sherd found during the 2013 season came from a cylindrical bottle and had a small lip fragment attached, which is too small to identify. The second neck sherd, likely associated a basal sherd and eight body sherds, may have come from an EAPG flask. The only molded decoration appeared on the basal sherd, discussed below. The shoulder sherd found was 7-Up Green and is likely associated 25 of the 7-Up Green body sherds, all of which were found at B4. This cylindrical bottle is likely modern. The neck and shoulder sherds indicate the presence of at least two cylindrical bottles, one of which was likely a twentieth-century soda bottle, and one possible flask.

Basal Sherds

Pedestrian survey in 2013 along Transect K yielded one green glass basal sherd, which is likely associated with a neck sherd and body sherds found near it. The basal sherd is pressed with an EAPG design of two laurel or olive branches; further, it is the same shade of green as a neck sherd and eight body sherds also found along Transect K. As such, the basal sherd indicates the presence of one figured flask, which likely dates to the very end of the nineteenth century or to the early twentieth century.

Lip Sherds

A total of six green glass lip sherds came from the excavations at Highland City, representing a total of four bottles. One lip sherd, with a large neck fragment attached, had an applied bead lip, which likely dates to the sometime between the 1890s and the early twentieth century. Bead finishes appeared on nearly every type of bottle, from food to liquor to condiments. A second lip sherd had a club sauce lip finish, which dates to between the 1850s and the 1920s. Club sauce finishes generally appeared on condiment and sauce bottles. This club sauce lip is likely associated with a neck and a body sherd found nearby.

The last four lip sherds had a crown finishes, which date to between the 1890s and the present. The crown finish, which was made to accommodate the cork crown cap, eventually replaced earlier finishes such as the small mouth external thread lip finish on soda and beer bottles, especially once machines became the main method of manufacturing bottles for carbonated beverages (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989). While excavations required four green crown finishes, three of these are from the same vessel, resulting in a minimum of two green vessels on the site with a crown lip finish. Further, all four sherds (both bottles) were 7-Up Green and likely modern.

Distribution of Green Glass Sherds

As with the other glass sherds on the site, the green glass fell into the same pattern of artifact concentrations, with most sherds coming from Transect B in the westernmost quarter of the site. Thirty of the 43 body sherds (69.8%) came from the first transect, along with five of the six lip sherds (83.3%), the only shoulder sherd, and one of the two neck sherds on the site. Transect B alone yielded 26 body sherds, two lip sherds, and the single neck and shoulder sherds.

Transect K in the second quarter of the site (and in the middle of the artifact concentration at the center of the site) yielded eight body sherds (18.6%), the only basal sherd, and the second neck sherd on the site. Transect N, in the third quarter of the site and within the same artifact concentration, yielded another two body sherds. Transect Q in the same quarter (just east of the artifact concentration at the center of the site) yielded one more body sherd, bringing the total of body sherds in the third quarter to three (7%). The easternmost quarter of the site, where the third artifact concentration on the site lies, yielded two body sherds (4.7%) and one lip sherd (16.7%) from Transect Z and Y respectively.

Green Vessels

Table 7.37: Minimum Number of Green Glass Vessels

	Total (n=)
Cylindrical	**4**
Flask	**1**
Hollowware / Pressed Glass	**1**
Total Vessel Minimum	**6**

The green glass assemblage indicates the presence of at least six vessels at Highland City (See Table 7.37). In total, at least four cylindrical bottles – two of which are 7-Up Green – as well as one EAPG flask decorated with laurel branches and one hollowware vessel.

Pale Green Glass

A total of 76 pieces of pale green glass came from the excavations, which is 0.8% of the total glass assemblage (See Table 7.38). Little diagnostic utility comes from pale green glass in the assemblage other

Table 7.38: Pale Green Glass Totals, Organized by Means of Collection

Pale Green Glass	**Total**	**Pedestrian Survey**	**STPs**	**TUs**
2013	**19**	14	5	0
2014	**22**	20	2	0
2016	**35**	35	0	0
Total Sherds (n=)	**76**	**69**	**7**	**0**

than the fact that the color itself is generally found in late nineteenth-century and twentieth-century assemblages, which aids a bit in tightening the site chronology. Pale green glass sherds came from all three years of excavations and, while most of the sherds came from pedestrian survey (n = 69 or 90.8%), seven sherds did come from the STPS. The largest number of pale green glass sherds came from the 2016 season (n = 35 or 0.9%), while the largest proportion came from the 2013 season (n = 19 or 1.1%). The 2014 season had the smallest proportion of pale green glass with 22 sherds (0.6%). The pale green glass assemblage comprises 0.83% of the overall glass assemblage found at Highland City.

Body Sherds

Body sherds comprise the majority of the pale green glass assemblage (n = 68 or 89.5%). Of these, over 80% (n = 59 or 86.8%) of the sherds were non-diagnostic body sherds (See Table 7.39). While these sherds possess no diagnostic markings, they do indicate the presence of seven cylindrical bottles, one planed, rectangular bottle, one possible cup, one small dish or bowl, and one conical hollowware vessel, likely a pitcher. The remaining nine semi-diagnostic sherds speak to the presence of at least three additional vessels. One sherd, from a thick bottle, is molded with "A&…", but this could not be further identified.

Table 7.39: Recovered Pale Green Glass Sherd Types

	Total (n=)	Pedestrian Survey (n=)	STPs (n=)	Test Units (n=)
Non-diagnostic body sherds	**59**	52	7	0
Semi-diagnostic body sherds	**9**	9	0	0
Diagnostic body sherds	**0**	0	0	0
Shoulder sherds	**1**	1	0	0
Neck sherds	**1**	1	0	0
Lip sherds	**1**	1	0	0
Basal sherds	**3**	3	0	0
Rim sherds	**2**	2	0	0
Total Number of Sherds				**76**

Seven of the semi-diagnostic body sherds likely came from the same pressed compote or small bowl. These sherds, found through pedestrian survey at D5 and K6 in 2016, are associated with a rim sherd and a basal sherd, both also found at K6. All of the sherds are pressed with a pattern of raised, almond-shaped lozenges on the interior. The last diagnostic sherd also came from D5 and is associated with a rim sherd, pressed with a floral vine motif; the vessel was likely a shallow dish. No diagnostic body sherds came from the site, although one non-diagnostic body sherd, found through Pedestrian Survey along Transect B appears to have evidence of pressure flaking, or working, along one edge – something which is very noticeable when the sherd is held up to the light.

Neck and Shoulder Sherds

The excavations at Highland City yielded one pale green neck sherd and one shoulder sherd, both recovered through pedestrian survey in 2014 along Transect B. There are no defining characteristics on the neck sherd, although it does indicate the presence of a pale green bottle; the shoulder sherd is molded with: "…IRE…", but this fragment cannot be identified further. The neck and shoulder sherds speak to the presence of at least one cylindrical bottle on the site.

Rim Sherds

Two pale green rim sherds were found in 2016 through pedestrian survey. As mentioned above, the rim sherd found at D5, associated with a semi-diagnostic body sherd, likely came from a small, shallow dish, which was pressed with a faint, raised, vine-like floral design on the exterior. The second rim sherd, found at K6 and associated with seven semi-diagnostic body sherds and a basal sherd, likely came from a compote or small dish, which was pressed with raised, almond-shaped lozenges on the interior. As such, the rim sherds indicate the presence of two additional vessels on the site.

Basal Sherds

The pedestrian survey efforts in 2016 also yielded all three of the pale green basal sherds from the Highland City assemblage. One sherd, as mentioned prior, came from K6 and was molded with raised almond-shaped lozenges on the interior; this basal sherd is likely associated with the rim and body sherds discussed earlier. The other two basal sherds came from bottles, one of which came from a planed, square bottle (also found at K6), while the other was from a thick, heavy, circular bottle (found to the east at X8). The basal sherds indicate the presence, overall, of two bottles and a compote.

Lip Sherds

One lip sherd came from the excavations at Highland City and was also found in 2016 through pedestrian survey at D5. The sherd had a bead lip finish, although whether it had a ground or machine-ground rim is impossible to say, due to chipping on the sherd. Bead finishes appeared on nearly every type of bottle, from food to liquor to condiments; this particular bottle likely dates to the late nineteenth century or early twentieth century.

Distribution of Pale Green Glass Sherds

As with the other glass sherds on the site, the pale green glass recovered all fell into the same pattern of three separate artifact concentrations, with most sherds coming from Transect B in the westernmost quarter of the site. Forty-six of the 68 body sherds (67.6%) came from the first transect, the single lip sherd, shoulder and neck sherds on the site. Transect B alone yielded 27 body sherds, as well as the neck and shoulder sherds.

Transect K in the second quarter of the site (and in the middle of the artifact concentration at the center of the site) yielded nine body sherds (13.2%) and two of the three basal sherds (66.7%) on the site. Transect J, ten meters to the west and within the same concentration, yielded another six body sherds, bringing the number of body sherds from the second quarter of the site 15 in total (22.1%). Transects L, in the third quarter of the site and within the same artifact concentration, yielded another two body sherds (3%). Transect R in the same quarter (and east of the artifact concentration at the center of the site) yielded one more body sherd, bringing the total of body sherds in the third quarter to three (4.4%). The easternmost quarter of the site, where the third artifact concentration on the site lies, yielded four body sherds (5.9%) from Transect U and V, and one basal sherd (33.3%) from Transect X.

Pale Green Vessels

Table 7.40: Minimum Number of Pale Green Glass Vessels

	Total (n=)
Cylindrical	**7**
Planed, Rectangular	**1**
Cup	**1**
Compote	**1**
Dish	**1**
Small Bowl	**1**
Hollowware / Pitcher	**1**
Total Vessel Minimum	**13**

The pale green glass assemblage indicates the presence of at least 13 vessels at Highland City (See Table 7.40). In total, at least seven cylindrical bottles, one planed, rectangular bottle, one possible cup, one small EAPG dish pressed with a raised, vine-like pattern on the exterior, one small bowl, one EAPG compote pressed with raised, almond-shaped lozenges on the interior, and one conical hollowware vessel, which is likely a pitcher. The pale green glass, although not as diagnostic as other ware types, did contribute to the overall minimum vessel count and also confirms at occupation at Highland City between the late nineteenth and early twentieth centuries.

Olive Glass

A total of 698 pieces of olive glass were recovered from Highland City through pedestrian survey (n = 560), STP excavations (n = 39) and Test Unit excavations (n = 99). Olive glass, like amber and aqua glass, is one of the more prevalent glass types and – as a result –

Table 7.41: Olive Glass Totals, Organized by Means of Collection

Olive Glass	Total	Pedestrian Survey	STPs	TUs
2013	**139**	113	26	0
2014	**239**	219	13	7
2016	**320**	228	0	92
Total Sherds (n=)	**698**	**560**	**39**	**99**

sherds were recovered from all three years of excavation and all three excavation types (See Table 7.41). The fewest olive sherds came from 2013 (n = 139 or 7.9%), while the smallest proportion of olive glass came from the 2014 excavations (n = 239 or 6.8%). The 2016 season yielded the largest number of olive sherds and the largest proportion, just edging past that from the 2013 season (n = 320 or 8%) Overall, the olive glass assemblage comprises roughly 7.5% of the total glass assemblage recovered from Highland City.

Olive glass stands as its own category of glass, having more yellow-green or brown-green color than other green glasses. Glassmakers created olive glass through both sand impurities and the addition of iron and copper oxides. Imported olive glass from Western and Central Europe is often referred to as potash-lime glass and contains, as the name suggests, both potash and lime, in addition to iron-rich silica. This glass usually comes from regions lacking in enough soda for glassmaking. When potash-lime glass was green instead of colorless, European glassmakers often referred to it as *waldglas*. Potash-lime glass, including its olive varietal, appears around 1680 and is used up through around 1900 (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989).

American-made olive glass is most prevalent in the nineteenth century, with a few twentieth century exceptions. Overall, olive glass is used for bottles, especially wine bottles, although it also used for liquor bottles until around 1910. Some champagne and scotch bottles are still made out of olive glass, usually as a nod to tradition. Especially after the 1920s, a lighter olive glass appears, which is tinged with amber. It is this newer glass that is used for present-day champagne and wine bottles and its brighter color aids in distinguishing it from its older counterpart. Olive glass also came in the form of mineral water bottles, inkwells, and some condiment bottles until the 1880s, flasks (especially those with figures) and snuff bottles until the 1870s, and even medicine bottles until roughly the 1860s. Rarely did glassmakers use olive glass to make perfume, drug, poison, or cologne bottles (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989).

Body sherds

Of the 587 olive glass body sherds recovered, the vast majority (550 or 93.7%) were non-diagnostic body sherds, which lacked any defining features other than slight variations and curvature. These differences, however, were enough to determine the presence of at least 61 vessels, of which 59 were cylindrical bottles and two were indeterminate hollowware vessels. Nine additional sherds were classed as semi-diagnostic (See Table 7.42). One of the sherds, a fragment from a bottle found during pedestrian survey in 2016 at Z8, had a small piece of foil still attached to it, similar to the foil found on the two, intact champagne or French liqueur bottles found at the site (discussed below). A second semi-diagnostic sherd is associated with a basal sherd, found near it at L4 during 2016's pedestrian survey.

Table 7.42: Recovered Olive Glass Sherd Types

	Total (n=)	Pedestrian Survey (n=)	STPs (n=)	Test Units (n=)
Non-diagnostic body sherds	**550**	466	35	49
Semi-diagnostic body sherds	**9**	2	0	7
Diagnostic body sherds	**28**	0	0	28
Shoulder sherds	**8**	7	0	1
Neck sherds	**31**	30	1	0
Lip sherds	**14**	11	1	2
Basal sherds	**54**	42	1	11
Rim sherds	**1**	0	0	0
Handle sherds	**1**	0	0	0
Whole Bottles	**2**	0	1	1
Total Number of Sherds				**698**

The seven other semi-diagnostic sherds came from Test Unit 3, Strat III and are semi-diagnostic rather than diagnostic because it is uncertain whether they all are associated with a lip and a shoulder sherd found in the same context; the curvature of the fragments suggests the presence of two bottles, one of which may be similar in shape to the intact bottles found and one may resemble more of a lady's leg-shaped bottle. The 28 diagnostic sherds recovered from the site all come from the same vessel, which would resemble the two intact bottles recovered, if cross-mended. These sherds also came from Test Unit 3, Strat III, which is located off of Transect L.

Neck and Shoulder Sherds

A total of 31 neck sherds came from the excavations at Highland City, nearly all of which came from pedestrian survey (n = 30). The remaining neck sherd came from STP L5, excavated in 2013. The neck sherd assemblage indicates the presence of at least 22 bottles, likely wine, champagne, and liqueur bottles.

Pedestrian survey at Highland City also yielded seven of the eight of the shoulder sherds in the olive glass assemblage. These sherds speak to the presence of at least five bottles on the site, one of which was very thick and dark, while another seemed to be larger than the other bottles found at the site. A final shoulder sherd of note from the pedestrian survey had foil on it, similar to that found on the body sherd mentioned above and on the intact bottles recovered. The last shoulder sherd recovered from the site came from 2016's Test Unit 3, Strat III. It forms a continuous mend with a lip and neck sherd from a champagne or liqueur bottle, which is discussed in more detail below.

Rim and Handle Sherds

One rim sherd came from pedestrian survey along Transect D in 2013; the sherd has a straight, ground edge with bubbles trapped deep within the glass. There is very little curvature to the piece, although it is a large, thick fragment, which suggests that is may have come from a relatively straight-walled vessel, such as a flask or snuff-box. One handle sherd also came from Highland City, although it was found at the opposite end of the site, along Transect W, during the 2014 season's pedestrian survey. Made of dark olive glass, the sherd is shaped like a curving rod, similar to a thick mug or teapot handle. Its original vessel is unknown, although it may have come from a jug.

Basal Sherds

A total of 54 basal sherds were recovered from Highland City, with pedestrian survey yielding 43 sherds, the STPs 1 sherd, and the Test Units 11 basal sherds. The basal sherds, which came from all three years of excavation, speak to the presence of at least 42 vessels, all of which are bottles. Several of the basal sherds had kicks, which provides further diagnostic utility.

Two of the basal sherds had post base molds, which dates them to sometime between the 1850s and the 1890s. One bottle had evidence of a three-piece or Rickett's mold, dating it to between the 1830s and the early 1900s. Twenty-two of the olive basal sherds recovered had kicks. Five of these appear to have kicks produced by turn molds, which date to between the 1880s and the 1910s. At least one of the basal sherds with a kick was free-blown, with a bubble-like kick and a noticeable pontil scar. The remaining sixteen basal sherds show little to no evidence of a mold, but this may be a product of the way in which they broke; as such, these were either free-blown or produced by a turn mold.

Lip Sherds

In total, 14 olive lip sherds came from the excavations at Highland City, which indicate the presence of 13 different vessels, all bottles. Of these, only one lip finish was too badly chipped to be determined. One other lip sherd was very chipped, but enough remaining of the finish to identify it as a mineral or double oil finish; the chipping did prevent the identification of whether the rim was ground or machine-ground. Double oil finishes date to between the 1840s and the 1880s, on the whole, although some date to as early as the 1820s; these finishes were seen on mineral water, as their other name suggests, as well as soda, ale, porter, medicine, wine, and liquor bottles. After the 1880s, mineral or double oil finishes continued only on liquor bottles into the early twentieth century (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989).

Another lip sherd bore a double bead finish, dating to between the 1850s and the 1920s; these finishes appeared most on patent medicine, food, liquor, and sauce bottles. A third lip sherd had a grooved ring lip finish and likely came from a mouth-blown, imported European liquor or ale bottle dating to 1860 to 1890. A fourth lip sherd bore an oil finish, dating to between the 1830s and the 1920s. Oil lip finishes were found on medicine bottles, condiments, and even liquor bottles.

The nine remaining lip sherds all bore champagne finishes. Six of these, all from separate bottles, were applied finishes with ground rims and date to the period between 1845 and the 1880s. These finishes appeared on wine and champagne bottles, as well as liquor, liqueur bottles and occasionally bitters and medicines. Between the 1850s and 1870s, the finish also appeared on beer and ale bottles. These six bottles were all likely wine, champagne, liqueur, or bitters bottles. Another champagne lip sherd had a ground rim finish, but – due to chipping – may have been applied or may have been tooled; if tooled, it likely dates to between the 1880s and roughly 1920. One of the champagne lips was too chipped to determine its rim finish and the final champagne lip sherd had a machine-ground rim finish, dating likely to the 1910s. The olive glass sherds speak to the presence of at least nine separate wine, champagne, or liqueur bottles, as well as four lip sherds that could also have come from liquor or ale bottles.

Whole Bottles

The excavations at Highland City also produced two nearly-identical whole bottles, one of which came from STP L5 and one from Test Unit 3, Strat III, located nearby. Both bottles were dark olive with applied champagne lips that featured ground rim finishes. The bottles likely came from France and were either liqueur or champagne bottles (Hume, 2014).

Distribution of Olive Glass Sherds

The distribution of the 587 body sherd distribution fell into the same artifact concentrations seen by the other glass types. The first quarter of the site, where the westernmost artifact concentration lay, yielded 201 olive sherds (34.2%), seven of which came from Test Unit 1. The second artifact concentration falls between the second and the third quarter, stretching from Transect I to Transect N. The olive sherds clustered around this concentration as well. The third quarter yielded 84 sherds (14.3), all of which came from between Transects I and K, which comprise the first half of the concentration. The third quarter yielded another 204 sherds (34.8%), 77 of which came from Test Unit 3. Of the sherds, 145 of them clustered between Transects L and N (including Test Unit 3), which make up the second half of the concentration in the middle of the site. The easternmost quarter of the site, where the final artifact concentration lay, yielded 97 sherds (16.5%).The main difference between the olive body sherds and the majority of the other glass types is the fact that most sherds came from the center artifact concentration – where a saloon and possibly a brothel and general store stood – rather than from the westernmost concentration – which is largely a domestic assemblage.

This pattern continued with the diagnostic sherds as well. Of the 52 basal sherds recovered, 29 fragments came from the center artifact concentration; six pieces came from the second quarter (11.5%), two pieces from Transect J and four from Transect K. The remaining 23 sherds came from the third quarter of the site (44.2%), all between Transects L and O. Transect O lies just to the east of the artifact concentration. Fifteen basal sherds came from the easternmost quarter (28.8%), although they were spread fairly evenly between Transects S and Z. The westernmost quarter of the site yielded ten fragments (19.2%), all of which came from the artifact concentration there, between Transects XX and B.

The largest quantity of the 31 neck sherds (n = 14 or 41.2%) also came from the third quarter of the site. Eight sherds came from between Transects L and N. The least productive quarter for neck sherds, the second quarter, yielded only two sherds – but they both came from Transect K, within the second artifact concentration. Another nine neck sherds (29%) came from the easternmost quarter of the site, six of which clustered between Transects X and Y. Finally, six neck sherds (19.4%) came from the artifact concentration in the first quarter of the site, between Transects YY and B. Similarly, half of the fourteen lip sherds recovered came from the third transect, two of came from Test Unit 3. Six of the seven sherds were from the artifact concentration in the middle of the site, with the additional sherd recovered from nearby Transect O. The second quarter of the site yielded two lip sherds (14.3%), both of which also came from the artifact concentration, with one sherd found at Transect J and one at Transect K. The five remaining lip sherds (35.7%) came from the first quarter of the site, all between Transects ZZ and B. No lip sherds were recovered in the fourth quarter of the site.

Finally, half of the eight shoulder sherds came from the third quarter of the site, three of which were from the artifact concentration. Transect K in the second quarter of the site yielded an additional two shoulder sherds (25%). Two shoulder sherds (25%) also came from Transect ZZ at the western edge of the first quarter. Both whole bottles also came from the artifact concentration in the middle of the site, specifically from the area around Transect L in the third quarter of the site. The single rim sherd recovered came from the artifact concentration in first quarter of the site (found along Transect D) and the single handle sherd was recovered from the artifact concentration in the easternmost quarter of the site, having been found along Transect W.

Olive Vessels

Although the olive glass assemblage comprised under 8% of the total glass assemblage (7.6%), it indicates the presence of at least X vessels: approximately 60 cylindrical bottles, most of which held wine, champagne, liquor, or liqueur, one possible flask (or snuff box), two hollowware vessels, and one handled vessel – possibly a jug (See Table 7.43). The fact that the majority of the vessels pertain to the consumption of alcohol confirms the presence of saloons at the site; their clustering most at the artifact concentration at the center of the site helps to confirm that it is indeed a saloon assemblage, as does their presence at the artifact assemblage on the eastern edge of the site, where another saloon assemblage lies. Finally, it is notable that while most of the artifact types clustered in the westernmost quarter of the site, where the domestic artifact assemblage lies, this concentration was least represented among the three for these alcohol-related bottles.

Table 7.43: Minimum Number of Olive Vessels Found

	Total (n=)
Cylindrical	**60**
Flask	**1**
Jug or Hollowware w/ Handle	**1**
Hollowware	**2**
Total Vessel Minimum	**64**

Milk Glass

In total, 90 pieces of milk glass were recovered from the site, the majority of which came from pedestrian survey (n = 80 or 88.9%). An additional three fragments came from STPs and seven sherds came

Table 7.44: Milk Glass Totals, Organized by Means of Collection

Milk Glass	**Total**	**Pedestrian Survey**	**STPs**	**TUs**
2013	**14**	13	1	0
2014	**24**	19	2	3
2016	**52**	48	0	4
Total Sherds (n=)	**90**	**80**	**3**	**7**

from Test Units in 2014 and 2016. The largest number of milk glass fragments came from the 2016 excavation (n = 52); unlike with other glass types, the 2016 excavation also saw the largest proportion of milk glass in relation to the total amount of glass recovered for the season (1.3%). The 2013 excavations yielded 14 sherds, which comprise 0.8% of the first year's overall glass assemblage, while the 2014 assemblage had the smallest overall proportion of milk glass with 24 sherds or 0.7%.

Milk glass is the name used for opaque white glass, also sometimes called opal glass, which is created by adding zinc or tin oxide to glass, along with phosphates and fluorides. Occasionally, its characteristic color was made by adding animal horn and bone to glass. Milk glass is, essentially, an opaque colorless glass – no coloring agents were added. This glass type can also assist in determining the age of a site; archaeologists and material culture experts have found no evidence of milk glass before 1870.

Manufacturers used milk glass to make cosmetic and perfume bottles until around 1920; ointment and cream jars also were made out of milk glass from around 1890 through the middle of the twentieth century. During this time period, milk glass also appears in the form of ink, liquor, bitters, and medicinal vessels, although not as commonly. However, it was not a glass type associated with soda, wine, beer, or mineral water. Further, milk glass from the end of the nineteenth century and the early twentieth century (before the Great Depression) was a higher-status item, while it became a low-status item after the Depression. The most common post-Depression vessel shapes are those of plates, cups, and bowls – dinnerware – and these were made as late as the 1960s. The older milk-glass tends to have elaborate molded patterns and is thinner and finer than its later counterparts. The presence of milk glass at 24SB67 inherently helps to refine the site chronology and confirms a presence on the site during the late nineteenth century, which continues through at least the first half of the twentieth centuries (Lindsey, 2017; University of Utah, 1992; Jones & Sullivan, 1989).

One final common use of milk glass was in jar liners, in particular Boyd's Genuine Porcelain Lined Caps and similar caps from competitors, despite their name. These liners prevented jars' contents from having a metallic taste (caused by direct contact with the canning jar's lid). These liners were first produced in milk glass in 1871, with production continuing through the 1950s. The earlier liners were embossed with BOYD or BOYD'S on them.

<u>Body Sherds</u>

A total of 20 milk glass sherds recovered were undiagnostic body sherds (See Table 7.45). These sherds, all recovered through pedestrian survey, possessed no markings of diagnostic utility and, as such, only indicated the presence of a minimum of seven vessels, based on the sherds' color and shape. These vessels were as follows: one narrow, thin-walled cylindrical bottle, two cups (or mugs), and at least four hollowware vessels, one of which had a possible medallion-like shape on it. This particular sherd was associated with eight other fragments, although none of the fragments provided enough diagnostic utility to be considered semi-diagnostic body sherds. One body sherd, however, did possess a unique-enough shape to be considered semi-diagnostic. This sherd, which formed a sharp right angle, is likely associated with two basal sherds

Table 7.45: Recovered Milk Glass Sherd Types

	Total (n=)	Pedestrian Survey (n=)	STPs (n=)	Test Units (n=)
Non-diagnostic body sherds	**20**	20	0	0
Semi-diagnostic body sherds	**1**	1	0	0
Diagnostic body sherds	**11**	11	0	0
Shoulder sherds	**0**	0	0	0
Neck sherds	**0**	0	0	0
Lip sherds	**0**	0	0	0
Basal sherds	**7**	7	0	0
Rim sherds	**22**	21	0	1
Buttons	**29**	20	3	6
Total Number of Sherds				**90**

Figure 7.12: Intact Sazerac Aromatic Bitters Bottle, Courtesy of Norman C. Heckler & Company, 2012

discussed below, which also form 90-degree angles. The sherd may have come from a divided serving dish, such as a relish dish, or from a small, snack tray – also used for entertaining.

An additional eleven body sherds were classed as diagnostic body sherds, because they lead to positive identification of a specific vessel type or product. Five of the sherds were fragments from porcelain lined caps, although none of them bore any manufacturing information; three of these sherds were associated with rim sherds from the same caps, which are described below. The remaining six sherds likely came from at least one lady's leg-style PHD & Co's Sazerac Aromatic Bitters bottle, which dates to the period between 1865 and the early 1880s. The diagnostic sherds indicate the presence of at least three porcelain lined caps, one Sazerac bottle, similar to the whole one shown in Figure 7.12, and one small serving dish or tray at Highland City.

<u>Rim Sherds</u>

A total of 22 milk glass rim sherds came from the excavations at Highland City; all of these, save one piece, came from pedestrian survey efforts. The remaining sherd came from Test Unit 1. The majority of rim sherds found (n = 18 or 81.8%) were the rims, or edges, of porcelain lined caps, such as those discussed above. The sherds indicate the presence of at least 11 porcelain lined caps on the site. Another three rim sherds, all of which were very thick and opaque, came from a High Victorian men's shaving cup molded with the devil-like face of

Figure 7.13: Milk Glass Mephistopheles Cup, Recovered from Highland City; two views

Mephistopheles. Two of the three rim sherds formed a contiguous mend; these two sherds were also associated with a basal sherd.

All three of the rim sherds came from Transect ZZ in the westernmost quarter of the site. The Mephistopheles cup, shown in Figure 7.13, dates to between the 1860s and the 1880s. The last remaining rim sherd comes from an semi-translucent holloware vessel. Altogether, the milk glass rim sherds recovered speak to the presence of 11 porcelain lined cups, one shaving cup with an image of Mephistopheles, and one unknown hollowware vessel. The rim sherds also indicate a presence on the site between the 1860s and the first half of the twentieth century.

<u>Basal Sherds</u>

A total of seven basal sherds came from the excavations at Highland City – all of which were recovered through pedestrian survey efforts. One basal sherd came from the same Mephistopheles shaving cup mentioned above and was found next to the two mending rim sherds. The base of the shaving cup was pedestal-like, with a concave depression on the bottom.

Two basal sherds likely came from the same vessel, although it is difficult to determine the vessel's exact function. The sherds are narrow and rectangular, with one fragment making a neat, right angle, similar to that seen in the body sherd discussed above. These basal sherds came from pedestrian survey at ZZ2, and the body sherd came from closer to YY2. As such, it is likely that all three sherds are from the same vessel. As mentioned above, the vessel may have been a divided condiment dish, such as those used for relish, or a small, rectangular snack dish; both vessel types would have been used for entertaining in the home – or for serving snacks and condiments in a saloon or parlor house.

Another three basal sherds came from bottles. One of these had a small part of a possible kick, similar to those found on bitters bottles. A second had a more definitive identification. Written around the edge of t ring-like bottom of the basal sherd was the following: "…TIC BITTER…". This sherd comes from a Sazerac Aromatic Bitters bottle and may come from the same one identified by the body sherds mentioned above. A third basal sherd, found ten meters away along the same transect (Transect L) had a a small, raised ring, similar to that on the base of the Sazerac bottle. As such, this second sherd likely came from bottle.

The final basal sherd found was less opaque than the other sherds recovered, but was too dark to be frosted colorless glass. The sherd came from an unknown hollowware vessel. Overall, the basal sherds indicated the presence of one Mephistopheles shaving cup, a serving, snack, relish dish, at least one Sazerac Aromatic Bitters bottle, and a hollowware vessel. The sherds also further supported the fact that Highland City had a population during the second half of the nineteenth century.

Buttons

A total of 29 milk glass buttons came from the three years of excavation at Highland City; of these, 20 buttons came from pedestrian survey, three buttons came from STP excavations, and six buttons came from Test Unit excavations. Milk glass buttons first appear around the 1840 and quickly rise to popularity by 1850, gradually replacing metal buttons for certain articles of clothing, including men's shirts and women's bodices; they fell out of fashion around the 1940s, in favor of new synthetic polymers.

Table 7.46: Recovered Milk Glass Buttons

	Total (n=)	Pedestrian Survey (n=)	STPs (n=)	Test Units (n=)
One-piece, Four-eyed	**27**			
0.9 cm diameter	2	2	0	0
1 cm diameter	5	3	2	0
1.1 cm diameter	6	5	1	0
1.2 cm diameter	1	1	0	0
1.3 cm diameter	1	1	0	0
1.5 cm diameter	1	0	0	1
1.6 cm diameter	2	1	0	1
1.8 cm diameter	1	1	0	0
1.9 cm diameter	2	2	0	0
Unmeasured diameter	5	3	0	1
Cone-shaped	**1**	**0**	**0**	**1**
Dome-shaped	**1**	**1**	**0**	**0**
Total Number of Buttons				**29**

Nearly all of the buttons recovered (n = 27) were molded / pressed, one-piece, sew-through buttons with four eyes, or holes (See Table 7.46). The buttons recovered were standardized, each measuring roughly the same in diameter: one centimeter across. The smallest four-eyed sew-through button measured 0.9 cm and the largest measured 1.9 centimeters. Most of the buttons, however, measured between 1.0 and 1.1 centimeters in diameter (n = 11). All three of the buttons recovered from STP excavations were one-piece, sew-through four-eyed buttons, as were three of the six buttons recovered from Test Unit excavations.

Two of the 29 buttons recovered were originally two-part buttons, having separate shanks rather than sew-through eyes. One of these was round and dome-shaped, with a threaded hole in the center of the reverse, which would have accommodated a screw-in shank. On the obverse, the button had a small, raised rim around the circumference of the dome-shape and a small, raised circle at the center. Like many of the four-eyed buttons above, the dome-shaped button measured one centimeter in diameter. The button came from the second stratum in Test Unit 3, which was located near the artifact concentration in the middle of the site. The second button recovered had a circular base, but came to a triangle-like point, forming a short cone shape. On the reverse, was a ferrous, loop shank, which measured roughly 0.3 centimeters in diameter. The button itself measured 0.9 cm in diameter, which puts it within the same size range as the other buttons recovered from the site. This second button was recovered during pedestrian survey along Transect P, just east of the artifact concentration in the middle of the site. The presence of a milk glass buttons, be they sew-through or two-part, on the site further provides evidence of occupation at Highland City sometime between the mid-19th century and the first half of the 20th century.

Distribution of Milk Glass Sherds

The distribution of the 23 milk glass body sherds on the site follows the pattern established by much of the glass thus far – it clusters at the three main artifact concentration locations on the site. The largest amount of body sherds came from the artifact concentration in the middle of the site, which spans the area between Transects I and N. The third quarter of the site produced 13 body sherds (56.5%), of which 12 fragments came from between Transects L and N. One additional sherd came from Transect Q, to the east of the artifact concentration. The second-most productive quarter for milk glass body sherds was the second quarter of the site, where Transect K yielded nine sherds (39.1%); no other transects in the quarter yielded any sherds. The first quarter of the site, where the westernmost artifact concentrations lies, yielded six body sherds (26.1%), with three of these coming from Transect ZZ. The least productive quarter of the site was the easternmost quarter, between Transects S and Z. This area of the third artifact concentration yielded only three sherds (13%).

The 22 rim sherds found came, for the most part, from the westernmost quarter of the site (n = 21 or 95.5%), specifically between Transects XX and C. The last remaining rim sherd was recovered along Transect Y in the easternmost quarter of the site. The seven basal sherds had a similar distribution. Five of these sherds were recovered from the westernmost quarter (n = 5 or 71.4%), while one basal sherd (14.3%) came from the third quarter of the site (from Transect L) and one came from the easternmost quarter of the site (from Transect Z).

The 29 buttons recovered from the site also clustered along the artifact concentration areas. Thirteen buttons (44.8%), four of which came from Test Unit 3, came from the third quarter of the site, with nine buttons clustering within the site's middle artifact concentration. Another three buttons came from Transect K in the same concentration, which is located within the second quarter of the site. No other transects in that quarter yielded any buttons. The westernmost quarter of the site yielded eight buttons, two of which came from Test Unit 1; these all clustered between Transects YY and C, in the westernmost artifact concentration. Finally, five buttons came from the easternmost quarter of the site; while two of these came from the artifact concentration there (at Transects Y and Z), the buttons were fairly evenly scattered across the quarter.

Milk Glass Vessels

Although the milk glass assemblage comprises just under 1% of the overall glass found at Highland City (0.97%), this glass type not only indicates the presence of at least 24 vessels, but also provides substantial evidence of an occupation at the site between the 1860s and the 1900s (See Table 7.47). The majority of these (n = 11) were porcelain-lined caps, such as those made by Boyd's; as discussed above, these can liners date to between the 1870s and the 1950s. Additionally, three cylindrical milk glass bottles were recovered, one of which was narrow and thin-walled, possibly used for a proprietary blend. The other two were likely both bitters bottles, although only one was positively identified as PHD & Co.'s Sazerac Aromatic Bitters, produced between 1865 and the 1880s.

Table 7.47: Minimum Number of Milk Glass Vessels Found

	Total (n=)
Cylindrical	**2**
Sazerac Bitters Bottle	**1**
Cup	**2**
Shaving Cup (Mephistopheles)	**1**
Relish Dish / Snack Tray	**1**
Porcelain Lined Cap	**11**
Hollowware / Pressed Glass	**6**
Total Vessel Minimum	**24**

Two cups or mugs came from the site, as well as one men's shaving cup, pressed with the face of Mephistopheles, which dates to between the 1860s and the 1880s. Finally, one possibly divided relish dish or snack tray and six hollowware vessels came from 24SB67.

Bone Objects and Faunal Remains

A total of 4,004 bone fragments were recovered from the three years of excavation at Highland City (See Table 7.48). The majority of the bone recovered was in the form of faunal remains, although two pieces of worked bone – a toothbrush and a button – also came from the site. The faunal remains fell into two different categories: mammal and bird bones. The analysis which follows is an initial one only. This particular artifact class has the potential for much deeper exploration and analysis in the future. As with the metal and glass assemblages, the faunal remains clustered mainly in the three main activity areas found on the site. The largest proportion of bone came from the artifact assemblage in the center of the site, rather than from the domestic area in the westernmost quarter of the site – although this activity area did yield the second-largest bone concentration.

Table 7.48: Bone Totals, Organized by Means of Collection

Bone	**Total**	**Pedestrian Survey**	**STPs**	**TUs**
2013	**722**	287	435	0
2014	**992**	768	92	132
2016	**2,290**	1,257	0	1,033
Total Bone (n=)	**4,004**	**2,312**	**527**	**1,165**

Mammal

Mammal bone comprised the largest portion of the bone object and faunal remains assemblage with 3,925 pieces, or 98% of the overall assemblage (See Table 7.49). The mammal bone clustered at the three artifact concentrations on the site. The first concentration – coinciding with the domestic activity area in the westernmost quarter of the site – stretches from Transect XX to Transect D and includes Test Unit 1. A total of 1,353 mammal bones and bone fragments

Table 7.49: Mammal Bone Totals, Organized by Means of Collection

Mammal Bone	**Total**	**Pedestrian Survey**	**STPs**	**TUs**
2013	**707**	279	428	0
2014	**962**	750	88	124
2016	**2,256**	1,231	0	1,025
Total Bone (n=)	**3,925**	**2,260**	**516**	**1,149**

came from the first concentration (34.5% of the overall mammal bone assemblage), with an additional 124 fragments from Test Unit 1; in total, 1,477 mammal bones came from the westernmost concentration on the site (37.6%).

The second concentration on the site stretches between Transects I and N and is associated with a saloon as well as a possible general store and brothel. Test Unit 3 also falls within this concentration, which stretches across the second and third quarter of the site. The area between Transects I and N yielded a total of 934 mammal bones and bone fragments (23.8% of the overall mammal bone assemblage); Test Unit 3 yielded another 1,025 mammal bones. This concentration in the center of the site produced the largest amount of mammal bone, with 1,959 pieces (49.9%). The easternmost artifact concentration, also associated with a saloon (although there is no evidence of any other assemblages set up alongside it), stretches from Transect S to Transect Z, encompassing the easternmost quarter of the site. In total, 317 mammal bones and fragments came from this concentration (8.1%).

The two areas between the artifact concentrations – Transects E to H in the west and Transects O to R in the east – produced comparatively few bones and fragments, which was not unexpected after examining the concentrations from the metal and glass assemblages. The area between Transect E and Transect H yielded 57 mammal bones, while the area between Transect O and Transect R produced 69 mammal bones.

For analysis, the mammal bones were divided by mammal size and, if possible, by bone type. The size of the original animal could not be determined for 3,301 mammal bone fragments; for many of these, the bone fragments were too small to provide any diagnostic utility. The bone fragments from animals of an unknown size comprise 84.1% of the total mammal bone assemblage recovered (See Table 7.50). Large mammals made up the largest number of bone

Table 7.50: Mammal Bones, Sorted by Mammal Size

	Total	Burned
Rodent	**223**	1
Small	**8**	0
Medium	**74**	1
Medium or Large	**25**	1
Large	**237**	2
Very Large	**56**	1
Unknown	**3,301**	738
Total Remains (n=)	**3,925**	**744**

fragments that could be identified (n = 237 or 6%), followed by rodent bones (n = 223 or 5.7%). The remaining bone fragments were classes as coming from very large mammals (n = 56 or 1.4%), mammals that were either medium or large (n = 25 or 0.6%), medium mammals (n = 74 or 1.9%), or small mammals (n = 8 or 0.2%). The large mammal bones recovered appear to be, for the most part, from cattle, while the very large mammal bones include bison and possibly elk and / or moose.

Of particular note with the mammal bones is the number of cut, saw, and / or sliced bones in the assemblage (See Table 7.51). Of the 3,925 animal bones recovered, just under a quarter of them were considered cut bone (936 or 23.8% of the overall assemblage). Further, 744 (19% of the overall assemblage) mammal remains were burned. Of these, 116 pieces were burned cut bones (15.6%). The burned cut bone assemblage comprises 12.4% of the total cut bone assemblage and 3% of the total mammal bone assemblage. The cut bone, both burned and not burned, clustered in the three main activity areas on the site, with the largest amount of bone coming from the westernmost and middle artifact concentrations. A total of 258 cut bones came

Table 7.51: Cut / Sawn Mammal Bones, Sorted by Mammal Size

	Total	Burned	Sliced
Rodent	**0**	0	0
Small	**0**	0	0
Medium	**29**	0	3
Medium or Large	**5**	1	0
Large	**171**	2	16
Very Large	**54**	1	0
Unknown	**677**	112	12
Total Cut / Sawn Remains (n=)	**936**	**116**	**31**

from the first artifact concentration in the first quarter of the site. An additional 29 cut bones came from Test Unit 1. The second artifact concentration, which runs from Transect I to Transect O yielded 250 cut bones. The second quarter of the site overall yielded 65 cut bones and the third quarter, 235 cut or sliced remains. Test Unit 3, off of Transect L in the third quarter, yielded an additional 195 cut bones and fragments. The easternmost quarter of the site, the entirety of which is covered by the third artifact concentration on the site, yielded 139 cut bones.

The mammal bones which had been cut into even slices followed a slightly similar pattern. The first quarter and artifact concentration yielded six bone slices with Test Unit 1 provided one more. The second quarter of the site did not yield any sliced bone – consequently, the first half of the second artifact concentration also had no sliced bones. Interestingly, the largest amount of sliced bone still came from this artifact concentration, however; the second quarter yielded 10 sliced bones, one of which came from Transect P to the east of the concentration. Test Unit 3 yielded an additional eight sliced bones. Finally, six sliced bones – the same number as was found in the first artifact concentration – came from the third artifact concentration on the site, in the fourth and easternmost quarter.

The non-cut bone recovered followed the same pattern as the cut bone, indicating that the cut bone did not cluster in a specific, significant manner. A total of 1,074 non-cut bone pieces came from the first quarter of the site, with an additional 95 bone fragments recovered from Test Unit 1. The artifact concentration in the center of the site yielded 684 non-cut pieces with Test Unit 3 yielded an impressive 830 additional bone fragments. In total, 381 bones and fragments came from the second quarter of the site, from Transects E to K, and 379 non-cut mammal bones came from the third quarter of the site, between Transects L and R. Finally, the easternmost quarter of the site – and the third artifact concentration – yielded 211 non-cut bones and fragments.

Bird

Far fewer bird bones and bone fragments came from the site (n = 72), although all three years of excavation and all three excavation methods did recover bird bone (See Table 7.52). In total, the bird bones recovered comprise only 1.8% of the overall bone assemblage. The bird bones recovered followed roughly the same trend as the mammal bones in terms of distribution. A total of 41 bird bones (56.9% of the total bird bone assemblage) came from the westernmost quarter of the site – and the first artifact concentration – with Test Unit 1 yielded eight additional bird bone fragments. The excavations recovered no bird bones from the second quarter of the site (or the first half of the second artifact concentration). The area of the second artifact concentration, between Transects I and O yielded 13 bird bones (18.1%), all from Transect L in the third quarter; another seven bird bones were recovered from Test Unit 3. The easternmost and final quarter of the site (and the third artifact concentration) recovered three bird bones (4.2%).

Table 7.52: Bird Bone Totals, Organized by Means of Collection

Bird Bone	**Total**	**Pedestrian Survey**	**STPs**	**TUs**
2013	**15**	8	7	0
2014	**30**	18	4	8
2016	**27**	20	0	7
Total Bone (n=)	**72**	**46**	**11**	**15**

Notably, the percentage of bird bones recovered in the first quarter of the site is far higher for the bird bones than for the mammal bones. Without factoring in the Test Units, roughly 34.5% of the mammal bones recovered came from the first quarter and concentration of the site, while 56.9% of the total bird bones came from the same area. Additionally, 23.8% of the mammal bone assemblage came from the second artifact concentration, while only 18.1% of the bird bones recovered came from this area between Transects I and O. The third artifact concentration yielded the smallest percentage of both mammal and bird bones, although there were still enough bones of each category for the are to be considered a concentration withinthe bone assemblage. The easternmost quarter of the site, and the third artifact concentration, comprised 8.1% of the mammal bone assemblage and 4.2% of the total bird bone assemblage.

No burned bird bones came from the excavations at Highland City, although there were six cut or sawn bird bones. Only the westernmost and the easternmost quarters of the site yielded cut bird bones, with no cut bird bones found in the second or the third quarters – or the second artifact concentration – of the site. Two cut bird bones came from Transect ZZ in the westernmost quarter, with two additional cut bones recovered from Test Unit 1. Transect S and Transect Z, in the easternmost quarter, each yielded a cut bone as well, bringing the total for the fourth quarter of the site to two cut bones.

Worked Bone

The final bone category is that of worked bone, of which there were two examples from Highland City. Pedestrian survey at B5 in 2016 yielded six fragments of a bone toothbrush, all of which fit together to form a contiguous mend (See Figures 7.14 and 7.15). The head of the toothbrush measures 1.4 centimeters in width and 4.7 centimeters in length; a small portion of the shaft still extends from the head and measures 0.9 centimeters in width and 2 centimeters in length. The presence of a toothbrush in the westernmost quarter of the site, where the first artifact concentration lies, further confirms that this area is indeed a domestic activity area.

Figure 7.14: Bone Toothbrush Fragments Recovered from Highland City

The second worked bone artifact also came from the 2016 excavations; one sew-through button with five holes, or eyes,

Figure 7.15: Bone Toothbrush Fragments Recovered from Highland City

came from Test Unit 3, Strat II (in the second artifact concentration on the site). Nearly whole, the circular button measures 1.6 centimeters in diameter and has a circular indentation on the obverse, making the front of the button appear slightly concave.

Other

A total of 1,351 artifacts fell under "Other" artifact class; within this category were eight smaller subcategories: Architectural; Charcoal, Wood, & Cork; Coal, Clinker, & Slag; Electrical; Leather, Buckskin, Fabric & Paper; Ore; Shell; and Synthetic Polymers. As with the other artifact classes, most of the artifacts in the Other class came from pedestrian survey (n = 880 or 65.1%). While pedestrian survey recovered artifacts during each of the three years of excavation, the 2013 season saw a larger number of Other artifacts recovered from STPs (n = 95), whereas pedestrian survey yielded the largest number of Other artifacts from the 2014 and the 2016 seasons (See Table 7.53).

Table 7.53: Other Totals, Organized by Means of Collection

	Total	**Pedestrian Survey**	**STPs**	**TUs**
2013	**146**	51	95	0
2014	**536**	311	102	123
2016	**669**	518	0	151
Total Pieces (n=)	**1,351**	**880**	**197**	**274**

The artifacts classed as Other did fall into the three main activity areas identified by the other artifact types; however, the majority clustered around the westernmost quarter of the site and the first artifact assemblage (n = 725 or 53.6% of the overall Other assemblage); Test Unit 1, also in the first quarter, yielded an additional 123 Other artifacts. The second artifact

Table 7.54: Recovered Other Artifact Categories

	Total (n=)	Pedestrian Survey (n=)	STPs (n=)	Test Units (n=)
Architectural	**222**	194	2	37
Charcoal, Wood, & Cork	**217**	50	109	58
Coal, Clinker, & Slag	**48**	19	4	25
Electrical	**20**	20	0	0
Leather, Buckskin, Fabric, & Paper	**202**	121	25	56
Ore	**173**	160	8	5
Shell	**66**	43	4	19
Synthetic Polymers	**403**	273	45	85

concentration on the site, split across the second and third quarters of the site, yielded a total of 161 Other artifacts (11.9%) without taking Test Unit 3 into account. The Test Unit added an additional 151 Other artifacts. The second quarter of the site itself yielded 40 artifacts (3%), while the third quarter of the site yielded 150 artifacts (11.3%). Test Unit 2 contributed one additional artifact and Test Unit 3, another 150 pieces. The fourth and easternmost quarter of the site, across which the third artifact concentration stretches, yielded 139 artifacts (10.3%). This section will now briefly discuss eight the divisions of the Other artifact class (See Table 7.54).

Architectural

A total of 222 artifacts fall into the Architectural category, which encompasses pitch (n = 2), tar paper pieces (n = 94), tar droplets from re-tarring roofs and seals on equipment (n = 12), roofing slate (n = 7), fragments of roofing insulation (n = 101), brick fragments (n = 4), and mortar pieces (n = 2). Nearly all of the architectural Other artifacts came from the westernmost quarter of site, between Transects XX and C (n = 181). This is unsurprising, as the four extant standing buildings on the site are within this same area.

All but one of the slate roofing tile fragments, however, came from the L Transect with one fragment recovered from STP L5 and five fragments recovered from nearby Test Unit 3. The single remaining slate roofing fragment came from Transect C. As for the remainder of the objects outside of the westernmost quarter of the site, two solidified tar droplets came from pedestrian survey along Transect G and one brick fragment came from Transect Z, as did 11 pieces of burned tar paper. The tar paper fragments recovered indicate that the buildings in westernmost quarter of the site had roofs covered in tar paper some time during their use history; one of the buildings still retain a small amount of tar paper across its beams. The fragments also indicate that at least one building had a tar paper covered roof on the far eastern end of the site, where the third artifact cluster lies.

With regards to roofing, the roofing insulation fragments are notable. These fragments, which dominate the architectural assemblage, all came from pedestrian survey at A3. Made of rubber-like material, the roofing insulation is comprised of blue and white hexagons held together by a woven fiber mat

Figure 7.16: Roofing Insulation at Highland City

Figure 7.17: Insulation Attached to Roofing Beams, Found During Pedestrian Survey at Highland City

(perhaps hemp or burlap) adhered to the underside (See Figures 7.16 and 7.17). The largest piece recovered through pedestrian survey measures 13 centimeters in length and 7.5 centimeters in width. This material originally may have been used for flooring, but a large sheet still lies across the roof beams of one of the standing cabins on the site, between Transects A and B, confirming the function of the fragments recovered on the ground surface nearby.

Of final note are the brick and mortar fragments found, all recovered through pedestrian survey. Three small fragments with evidence of burning or scorching came from Transect ZZ, 20 meters away from Transect B, where two mortar fragments were found. One additional brick fragment came from Transect Z at the far eastern edge of the site. This brick fragment was very coarse with many small inclusions; it had remnants of whitish mortar still attached to it on one side. None of the brick or mortar fragments recovered speak to much other than the presence of brick on the site; it is unlikely that any of the buildings were built of brick, although they could have had brick floors or hearths.

Charcoal, Wood, & Cork

A total of 217 artifacts came from the Charcoal, Wood, & Cork category. This category, as the name suggests, includes charcoal (n =123), pieces of wood (n = 76), including barrel staves, and cork fragments (n = 18). The majority of the artifacts in this category came from STPs (n = 109), with an additional 58 pieces recovered from Test Units. The third quarter of the site yielded the largest number of artifacts in this category with 71 pieces; Test Units 2 and 3 contributed one and 36 additional artifacts, respectively. The second quarter of the site yielded only four Other artifacts in this category, two of which came from Transects within the second artifact concentration. This second activity area yielded 69 artifacts without taking the artifacts from Test Unit 3 into account. The easternmost quarter of the site yielded 56 artifacts and the westernmost quarter, 26 artifacts; Test Unit 1, off of Transect B, contributed an additional 21 pieces.

The charcoal fragments came largely from subsurface excavation methods, with the Test Units yielded 48 pieces and the STPs, 57. Pedestrian survey yielded an additional 18 fragments. Most of the charcoal found came from the second artifact concentration (n = 51), with an additional 36 pieces from Test Unit 3. Sixteen charcoal fragments came from the first artifact concentration, along with twelve fragments from Test Unit 1. Seven pieces came from the third and easternmost quarter. One charcoal fragment came from Transect H between the first and second artifact concentrations.

The wood fragments totaled 76 pieces. Twenty-seven wood fragments came from pedestrian survey. Among these were a gate component with wire and ferrous hardware, including latches, 11 rods sawn cleanly on both ends, five sawn wood blocks, a curved, rib-shaped piece of wood, which had been smoothed on a lathe, one possible Masonite fragment, and a piece of wood with brown lacquer or veneer coating it (and punched through with a rivet). Another 40 wood pieces came from the STPs, including two sawn wood pieces and 20 wood fragments – most with iron staining – had come from a small barrel, the hoop of which had come from the same STP. Finally, the test units yielded nine wood fragments; eight fragments from Test Unit 1 and one from Test Unit 2. Of these, one piece was painted with a black, pebbled coating on one side and another piece was a sawn triangular block with a round-head nail driven through it.

Finally, 18 cork artifacts came from the excavations, five of which came from pedestrian survey, twelve from the STPs, and one from Test Unit 1. Four fragments came from STP L5 in the second artifact concentration, the largest of which had black and white coating on it. Another eight cork pieces came from STP Y5 in the easternmost artifact concentration; these fragments came from an intact iron can, also found in the STP. The cork fragment from the Test Unit 1 was tube-shaped and burned – likely a fragment of a pipe. The five cork pieces recovered from pedestrian survey all came from a single, white-painted toilet seat, which had been scattered across Transects P and Q.

Coal, Clinker, & Slag

A total of 48 artifacts fell into the Coal, Clinker and Slag category; all except two pieces came from the first quarter of the site and the domestic artifact assemblage. One piece of coal came from Transect P in the third quarter of the site, just east of the second artifact concentration, and one piece of clinker came from Transect V in the easternmost quarter of the site; both artifacts were recovered during pedestrian survey.

Thirteen pieces of coal came from Highland City, with one piece recovered during the excavation of STP B5, four pieces recovered during pedestrian survey, and nine pieces recovered from Test Unit 1. Most of the fragments recovered were too small to identify as to coal variety, but two pieces of Lignite coal came from the westernmost quarter of the site, from Transect A and Transect D, and the single piece of coal found east of the first quarter of the site was bituminous coal.

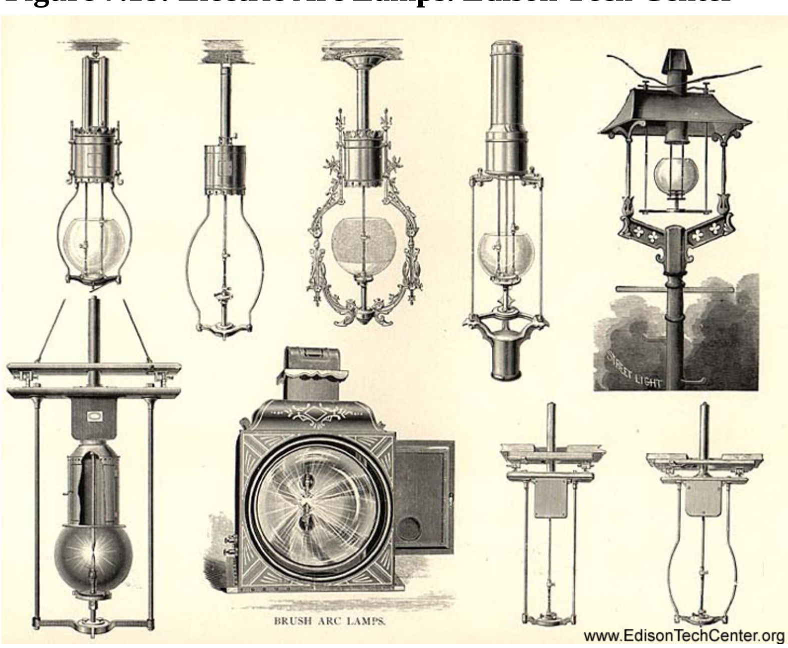
Twenty-three pieces of clinker came from the excavations, with seven pieces found through pedestrian survey and 16 pieces recovered from Test Unit 1. All of the fragments came from the area between Transects ZZ and C except for a single iron-rich piece, which was found at V5 in the easternmost quarter of the site. One clinker fragment is notable in that it has a thin line bisecting its profile, resembling two different strata; this may have been a burned piece of Lignite coal.

Eleven pieces of slag came from the site, all of which were recovered from Transects A and B. Eight pieces came from pedestrian survey, while the remaining three pieces came from STP B4. Of the six fragments found along Transect A, two slag pieces had a small, circular fragment of white-painted cork trapped within them and a third had wood fragments caught inside. Both of the slag fragments from Transect B appeared to have fallen on a graven walkway, as one had a small white stone inclusion and another had a gray-brown stone inclusion of roughly the same size.

Electrical

The Electrical category had the fewest artifacts (n = 20), all of which came from pedestrian survey. All of the artifacts in this category were graphite electrodes (or fragments). These electrodes are cylindrical graphite rods finished at both ends with a copper alloy cap, to aid with electricity conduction. Lighting in the form of electric arc lamps utilized graphite electrodes between the 1870s and about 1900; generally, graphite electrodes were used for street lighting and for lamps in commercial and public buildings (See Figure 7.18).

Figure 7.18: Electric Arc Lamps. Edison Tech Center



The presence of these electrodes at Highland City is significant; not only do these electrodes confirm an occupation at the site during the last quarter of the nineteenth century, but also in they also indicate that Highland City had access to the latest advancements in lighting for the period, despite its remote location in the Highland Mountains. The lamp glass discussed above fits the thickness and curvature of that used in arc lamps, further confirming their presence at the site. The discovery of the electrodes at Highland City further indicates that the town had access to far more in terms of resources and technology than the historical narrative indicates; the electrodes found are only one type of artifact to support this assertion, as indicated by the glass and metal findings above and the shell below.

A final note of interest, with regard to the Electrical category, is the distribution of the graphite electrodes on the site. While the activity areas overall indicate the presence of at least two saloons, one in the center of site and one at its eastern edge, the graphite electrodes came, for the most part, from the first quarter of the site, where the domestic area lies. Nineteen of the twenty electrodes found came from between Transects ZZ and D, which encompasses the area of the four extant buildings (including a cabin and a barn) as well as the transect ten meters to the west. Only one electrode fragment came from elsewhere on the site; the fragment came from Transect G, in the second quarter of the site. This transect actually sits in the area between the first and second artifact assemblages. Further excavation is necessary to determine if a different lighting source illuminated the saloons, or if this current distribution changes with subsequent seasons of archaeology.

Leather, Buckskin, Fabric, & Paper

A total of 202 artifacts fell into the Leather, Buckskin, Fabric, and Paper category. This particular category attests to the excellent preservation within Highland City's high desert climate. The majority of these artifacts came from pedestrian survey (n = 121), with another 21 artifacts recovered from STPs and 56 from Test Units.

Leather fragments comprised the largest portion of this artifact category with 160 pieces (79.6% of the category's assemblage). The leather came from across the site, with a nearly bi-modal distribution. A total of 60 leather pieces came from the western half of the site (42 fragments from the first quarter and 18 from the second quarter) and 59 leather pieces came from the eastern half of the site (44 fragments from the third quarter and 15 from the fourth). As with the other artifacts, the leather fragments clustered, for the most part, along the three artifact concentration areas. In addition to the 42 fragments found through pedestrian survey and STPs in the first quarter, Test Unit 1 also yielded two leather fragments. The second artifact concentration yielded 50 artifacts, with Test Unit 3 contributing another 39 leather pieces. The third and easternmost concentration was the smallest, with only 15 pieces.

Fifty-two of the leather pieces recovered had at least one finished edge with evidence of stitching along it; nearly all of the stitched fragments were made of stiff, black leather (n = 43), although there were five dark gray pieces (possibly faded black) and two brown or undyed pieces. A total of 47 stitched fragments likely came from shoes; these fragments were curled into cone or tube-shapes and the stitching along the finished edges was nearly identical from piece to piece. Two of the five remaining stitched leather pieces were brown or undyed. One had a line of whip-stitching along the edge, while the other pieces was curved into a semi-circle and had two thin lines of stitching. Two additional pieces were both rectangular, strap-shaped pieces with stitching along the long edges. One pieces had a small second piece of leather attached to it by a small knot of leather cord that ran through a hole in both pieces.

The last stitched leather piece, found along Transect N, was made of a dark olive-green leather with stitching along one finished edge. Running vertically down the middle of the fragment was a line of nine small, square, ferrous nails. This particular piece may be part of an olive-green leather men's spat which was also found at Highland City, although along Transect E. The spat found had a dark brown interior, which was flaking in several places. The spat would have laced closed, as evidenced by two lines of 14 grommets each, one on either side of the garment. Only one and a half grommets are missing from one side of the spat and only two are missing from the other. The holes through which the grommets attached to the leather are all present.

Eleven additional shoe pieces had holed punched through them; the holes looked as though they could have accommodated either small nails or hardware for lacing. Two fragments, found along Transect M, had scalloped edges, similar to those seen on dress shoes; these fragments likely came from the upper part of a shoe. One of the fragments had four holes punched through it, with a small, square, ferrous nail still present in one of them; this likely came from the sole of a shoe. Another fragment had three small ferrous, possibly round nails or tacks embedded within it and likely also came from a sole

Also of note was the discovery several pieces from the heel of a woman's dancing shoe or boot. A total of 13 fragments of this shoe heel were found in Test Unit 3, Strat III (in one of the activity areas associated with a saloon). The fragments each consisted of several layers of leather, which were held together by small, square, ferrous nails. One fragment had at least 12 small nails, while five other pieces bore between one and four small nails. Three fragments found had no nails and three small nail fragments, which may have come from these pieces, were found with the fragments; these pieces – although technically metal, were categorized with the heel fragments, in order to keep the pieces of the whole artifact together. Another piece, comprised of five sheets of leather held with three, small, ferrous nails, came from pedestrian survey at A2. This particular shoe fragment was found on the surface, rather than subsurface, and it lay over a meter to the west of Test Unit 3, where the other shoe fragments were found. As such, it may have come from a second women's shoe. Including all of the shoe heel fragments, the total leather assemblage yielded 126 leather shoe fragments.

The remaining 82 leather fragments no stitching, grommets or holes punched through. Of these, 54 pieces were likely shoe fragments, while 19 pieces were thick, leather fragments with a rubber coating on at least one side – if not both. One leather piece found appears to be comprised of two thin leather sheets. Two other very thin, flexible leather fragments came from the site, one of which was dark brown and the other black. Three black leather strips came from the site, although their function is unknown. Two were nearly identical (although found along Transects Q and S), comprised of thick, stiff black leather with at least two finished edges; the fragment found along Transect S had three finished edges – two long edges and a short one. The final leather strip was also black, but was rather thin and narrow, measuring only one centimeter in width. The final four pieces of leather found were also difficult to identify. Three fragments were very smooth on one side and very porous on the other. One piece was rectangular shaped with a large cut in the middle, which nearly bisected it. The final leather fragment was very coarse-grained and very dry.

A single fragment of buckskin came from the site. The piece found had was a yellow-brown, tanned, rectangular strip with two finished edges (the long edges). Along the finished edges was evidence of stitching in the form of small holes and a few remnants of thread or sinew.

Two fragments of plant-based fiber, likely cotton, came from the excavations, one found along Transect XX and one along Transect YY. The first piece was impregnated with a synthetic polymer and then coated with rubber (which appears to have been poured on). The second piece was similar, although in addition to the rubber coating and polymer-impregnation, the fragment had a second, rectangular piece attached to it with four large, ferrous bolts and square nuts.

A total of 35 fabric pieces were recovered at Highland City. Pedestrian survey yielded 2f pieces, all of which came from the area between Transect XX and Transect A, while the remaining 14 pieces came from Test Unit 3, off of Transect L. Ten gray fabric fragments, likely cotton, were found along Transect XX, while a small, tan, woven piece of cotton came from Transect YY. Four pieces of fuchsia, machine-woven cotton fabric came from Transect ZZ and are likely modern. Six fragments of a coarse, woven, fibrous material with red-brown staining – possibly from iron – came from Transect A. These hemp or burlap-like fabric pieces are similar to those found in Test Unit 3 – and may have even come from the same cloth. The fourteen pieces of fabric from Test Unit 3 were all definitively from the same original piece of cloth. They are coarse, woven in a criss-cross pattern, fibrous, brown, and very fragile. One piece came from Strat I and another from Strat II. The final 12 pieces came from Strat III.

Finally, the last two artifacts in this category are both made of paper. One, found through pedestrian survey at the far western edge of the site, is white with blue flowers printed on it; it appears to be a fragment of wallpaper, perhaps from one of the cabins roughly 30 meters to the east. The second fragment came from Test Unit 3, Strat III, along Transect L, and is a small white piece of paper with flaking red color on one side. This paper fragment is very small and delicate and, given the other artifacts found in the layer, dates to the third quarter of the nineteenth century.

Ore

A total of 172 ore pieces came from Highland City; these were recovered through pedestrian survey (n = 160), STPs (n = 8), and Test Unit excavations (n = 5). The vast majority of the ore fragments collected (n = 140) came from the westernmost quarter of the site, between Transects XX and D, with 69 fragments recovered from Transect ZZ. Test Unit 1, in the same quarter, yielded an additional three ore pieces. The second quarter of the site yielded the fewest ore fragments, with only three pieces found along Transect K, which lies in the western half of the second artifact concentration. The third quarter of the site yielded 11 ore pieces and Test Unit three contributed another three. The four and westernmost quarter of the site yielded 14 ore fragments. Most of the ore fragments, as a result, came from the western half of the domestic assemblage area; this is also the area, as mentioned above, from which the majority of the coal, clinker, and ore fragments came. The domestic area of the site may also have been an area where ore processing took place. The mine claims ring the site, but Fish Creek runs close to the western edge of the site – so much so that the creek itself eventually was dredges in the late nineteenth and early twentieth centuries.

Although a gold mining site, no gold fragments were found during the course of the excavation; the presence of such gold likely would have led to a continued habitation at the site and, therefore, the lack of such findings is not surprising. Iron and Chalcopyrite, an ore body containing both iron and copper ore, were most represented in the assemblage with 72 and 70 pieces, respectively (See Table 7.55). Excavations also recovered copper ore (n = 12), mica (n = 8), and galena, a type of lead ore (n = 1). Also found were several raw gemstones including malachite (n = 6), tourmaline (n = 1) and one rather large piece of raw garnet. Two pieces of bluish silver ore came from the excavations as well, although these were streaked with green copper ore.

Table 7.55: Recovered Ore Types

	Total (n=)
Iron	**27**
Chalcopyrite	**70**
Copper	**12**
Mica	**8**
Malachite	**6**
Silver	**3**
Garnet	**1**
Tourmaline	**1**
Galena / Lead	**1**

Finally, and most significantly, pedestrian survey in 2016 recovered a large piece of silver ore along Transect M, which is in the second artifact concentration on the site. This particular ore body was oval shaped and measured 6.2 centimeters in width and 9.8 centimeters in length; it was 3.6 centimeters thick and weighed 815 grams, or just under two pounds (1.8 lbs). This silver ore also shows that the process of refining it and removing the baser metals within the ore body had begun. The ore body still contains its baser metals, perhaps including lead, and is partially slag and partially raw ore.

Shell

A total of 66 shell buttons and fragments came from the excavations at Highland City; most of these came from pedestrian survey (n = 43), but four shell fragments were recovered in the STPs and an additional 19 came from the Test Units. The shell fragments and shell buttons came, for the most part, from the westernmost quarter of the site (n = 24), with Test Unit 1 yielded two additional shell fragments. Four shell pieces came from Transect K in the second quarter, and five shell pieces came from Transect L in the third quarter of the site. Both of these transects, along with Test Unit 3, which yielded 17 fragments, fall within the second artifact concentration on the site. Only one shell artifact, a button, came from easternmost quarter of the site.

Clam shell fragments comprised just under 40% (n = 26 or 39.3%) of the shell assemblage from Highland City (See Table 7.56). This indicates that the inhabitants of the town had enough economic influence to not only import clams into landlocked Montana, but to have them at Highland City, which sits at an elevation of nearly 10,000 feet in the remote Highland Mountains. The

Table 7.56: Recovered Shell Types

	Total (n=)
Clam	**26**
Oyster	**1**
Mother of Pearl	**5**
Eggshell	**21**
Buttons	**13**

historical record indicates that Highland City was important enough to be a stop on the US Post Road; these clam shells, along with the French champagne and liqueur bottles mentioned above, provide physical support for this assertion.

Also found at the site were five mother of pearl fragments, 21 eggshell pieces, and one oyster shell fragment. With regard to the eggshell fragments, these were likely not recent, modern wild bird shells, as nearly all of them came from a subsurface context. STP L5, in the saloon midden, yielded four eggshell fragments and Test Unit 3, within the same midden, recovered another 15 fragments.

A total of 13 shell buttons also came from Highland City. Two were found in Test Unit 3, while the other 11 buttons were recovered through pedestrian survey; six buttons came from the westernmost artifact assemblage, all found between Transects YY and B, four came from Transects K and L in the assemblage found in the middle of the site, and one came from Transect V in the easternmost artifact assemblage. All of the buttons recovered likely came from men’s and women’s shirts, as well as on undergarments. While shell buttons have existed in North America at least as early as the 16th century, they were almost all imported until the 1890s. As such, the presence of these shell buttons further indicates the inhabitant’s ability to import freshwater or ocean white and smoked pearl buttons (Marcel, 1994).

Three buttons recovered were two-hole, sew-through buttons. All three buttons measured 1.2 centimeters in diameter. Another three buttons may once have been two-hole, sew-through buttons, but the divider between the two buttonholes has broken. One of these broken buttons also measures 1.2 centimeters in diameter. The other two buttons measure 1 centimeter and 0.5 centimeters in diameter. The smallest broken button was one of the two recovered from Test Unit 3.

Finally, six of the buttons found were four-hole, sew-through buttons. These buttons, on average, measured between 1.8 and 1.9 centimeters in diameter, although one measured 1.2 centimeters across. One of these six buttons had a gray tint, indicating that it likely was a smoked pearl button. One final button, measuring 1.3 centimeter in diameter, had a very large hole in its center, although it was likely once a four-hole button as well.

Synthetic Polymers

In total, 403 artifacts and fragments fell into the synthetic polymer category, making it the largest category within the Other artifact class. Pedestrian survey recovered 273 artifacts, the STPs recovered 45 pieces, and the Test Units recovered 85 synthetic polymer artifacts. As has now been the established pattern, the synthetic polymers on the site fell largely into the three artifact concentrations on the site. A total of 247 fragments came from the first and westernmost quarter of the site, with Test Unit 1 contributing another 49 pieces. The second quarter of the site had the fewest artifacts; only seven fragments were recovered, all of which came form Transects J and K, in the second artifact concentration. The third quarter of the site yielded 21 artifacts, while Test Unit 3 contributed another 36 artifacts. The second artifact concentration itself, which extends from Transect I to Transect O encompassed 24 artifacts. Finally, the fourth quarter of the site, where the third artifact concentration lies, yielded 41 synthetic polymer fragments, 38 of which came from Transect Y.

Table 7.57: Recovered Synthetic Polymer Types

	Total (n=)
Rubber Coating	**265**
Rubber Fragments	**66**
Rubber w/ Cotton	**14**
Carpet Padding	**11**
Rubber Button	**6**
Celluloid	**6**
Ebonite	**6**
Shoe Fragments	**5**
Rubber Ball	**3**
Tire Fragments	**3**
Vegetable Ivory	**1**
Plastic Thimble	**1**
Unknown	**14**

The synthetic polymers fell into 13 subcategories, the most numerous of which were pieces of rubber coating (See Table 7.57). The 265 fragments recovered came mostly from the westernmost quarter of the site, clustering between Transects XX and B (n = 150). A total of 44 rubber coating fragments also came from Test Unit 1. Only two fragments came from the middle of the site – from Transect L; Test Unit 3 also provided another 33 fragments. Finally, the area between Transect U to Transect Z yielded 36 rubber coating pieces, with 34 pieces recovered from pedestrian survey and STPs along Transect Y. All of the fragments, although varied in color, were smooth on the obverse side and had an imprint, usually of a textile, on the reverse. They flaked off of objects like the rubber-coated leather and the synthetic polymer impregnated cotton fiber artifacts above. They likely served a domestic or industrial function, especially given the location from which nearly all of the fragments came. The rubber coating fragments are significant only because they dominate the assemblage.

Other synthetic polymers found proved to be both more significant and more diagnostic. A total of six rubber buttons were found at Highland City, four of which came from pedestrian survey and the other two from Test Unit 3. Rubber buttons gained popularity after Goodyear's 1851 patent and generally appear on archaeological sites after 1855.

Two buttons came from the westernmost artifact assemblage. The first, found along Transect YY, was a circular vulcanized rubber two-hole, sew-through button; embossed on the obverse side were two raised rings, one around the edge of the button and one around the two holes in the center. The reverse bore an obscured makers mark; the legible portion read: "GOODYEAR". The second button, found at B4, was also a circular vulcanized rubber, two-hole sew-through button. Like the previous button, this one also had a raised ring embossed on the obverse side, which ran around the button's edge. Instead of a circle around the two button holes, however, this one had a raised almond-like shape. No information was visible on the reverse side.

The four remaining rubber buttons all came from the second artifact assemblage near the middle of the site. Two were found along Transect K and two came from Test Unit 3. One of the buttons was similar to that found at B4, with two holes surrounded by an almond-like shape. However, roughly eight concentric circles were embossed on the obverse between the button's edge and the almond containing the two button holes. No information was visible on the reverse side. The second button found along Transect K, at K6, had a ferrous loop shank on the reverse, around which was embossed: "N.R. Co / Goodyear P.T. 1851". This indicates that the manufacturer was the Novelty Rubber Company under Goodyear's 1851 vulcanized rubber patent. The obverse was molded into a shallow cone, embossed with two concentric rings at the center. The last two buttons both came from Test Unit 3. Both were round, vulcanized rubber buttons with ferrous loop shanks (or possibly loop-and-plate shanks with plate under a seemingly melted adhesive). On the obverse, both buttons were embossed with a small bead-like shape, one of which had gold flecks. The two buttons appear to have come from the same garment.

Also made of rubber were six Ebonite fragments recovered from Highland City. Two pieces were fragments of combs, one from Transect B in the first artifact concentration and one from Transect J in the second artifact concentration. The first comb fragment consisted of the comb shaft and four teeth. The second consisted of a shaft with five teeth remaining. Both combs date to between the 1850s and the 1930s. The four remaining Ebonite fragments came from indeterminate objects, although one had three finished edges and curvature as if from a vessel and another had three finished edges, two of which are rounded. The fragments were scattered across the site, one from the first concentration (Transect B), one from the second concentration (Transect M), one from just past the second concentration (Transect P), and one from the final and easternmost concentration (Transect Y).

Five fragments of celluloid an early plastic, came from the site as well. The first two fragments, likely made of Bakelite, came from Transects YY and ZZ; from Transect YY came a comb tooth, which was yellowed, although it faded to white at the tip. The second piece was a comb shaft, likely associated with the tooth mentioned above. Another two pieces of celluloid, also likely Bakelite, came from Test Unit 1 in the same area of the site. These two fragments were pieces of tubing. Finally, a cigarette filter came from Test Unit 3, although it is unclear what form of celluloid it is. The final synthetic polymer of note came from the center of the site and the second artifact concentration (Transect K). Likely made of vegetable ivory, the object was round with concentric circles embossed on one side and beaded concentric squares molded on the other. The piece was likely a gaming piece, perhaps for checkers or go.

Lithics

A total of 36 lithic came from the excavations at Highland City, found during all three years and through all three excavation methods (See Table 7.58). As with the other artifact classes, the majority of the lithics came from pedestrian survey (n = 22). Eight lithics came from the first quarter of the site, with Test Unit 1 yielding one additional fragment. Eleven pieces came from the second quarter of the site, the third quarter yielded eight fragments, with an additional two pieces from Test Unit 3 and one fragment from Test Unit 1. The fourth quarter yielded four fragments. As for distribution within the artifact concentrations, eight lithics came from pedestrian survey in the first concentration and one came from Test Unit 1, coinciding with the first

Table 7.58: Lithic Totals, Organized by Means of Collection

	Total	Pedestrian Survey	STPs	TUs
2013	**10**	3	7	0
2014	**8**	4	3	1
2016	**18**	15	0	3
Total Sherds (n=)	**36**	**22**	**10**	**4**

Table 7.59: Lithic Types

	Total (n=)
Scraper	**1**
Retouched Primary Flake	**2**
Primary Flake	**2**
Retouched Flake	**9**
Flake	**4**
Debitage	**7**
Unknown Worked Stone	**11**

quarter of the site. The second artifact concentration on the site yielded fourteen fragments, with Test Unit 3 contributing an additional two pieces. The third artifact concentration coincides with the easternmost, and fourth, quarter of the site with four fragments.

The lithic assemblage included of a scraper, primary flakes, two of which were retouched, flakes, roughly half of which were retouched, debitage, unknown worked stone and a stone tile (See Table 7.59). The scraper, found along Transect J during the 2016 pedestrian survey efforts, is made of a dark gray quartzite cobble with what appears to be evidence of retouching along is edges.

Four primary flakes were found, two from pedestrian survey, one from Test Unit 3, Strat III, and one from the deepest layer of Test Unit 4. One of the primary flakes, found along Transect M, was made of a red quartzite and had possible evidence of work along one edge. The other three primary flakes were made of chert. One, found along Transect T, was made of a fine-grained, yellow-gray chert with a calcium deposit on the exterior and evidence of pre-working on the interior. Another retouched primary flake, found in Test Unit 3, was made of a fine-grained chert that was honey yellow and retouched on its edges. The final retouched primary retouched flake, that found in Test Unit 4, was also a honey yellow chert. It had a large, visible bulb of percussion and two edges were retouched.

Also in the assemblage were nine (non-primary) retouched flakes, six of which were made of chert, two of obsidian, and one was made of quartzite. Six of the retouched flakes came from pedestrian survey (five from 2016 and one from 2014). Two of the flakes came from the westernmost quarter of the site. One flake, found along Transect B, was a dark red chert flake with evidence of retouching on three of its four edges; another, found along Transect ZZ, was made of a white chert with thin brown and gray inclusions and retouching along one edge.

Another two retouched flakes came from the second quarter of the site. One, found along Transect G, was made of obsidian with retouching on one edge; the other, found along Transect I, was a nearly-translucent white chert flake with retouching along all edges except for its base. The last two retouched flakes came from the third quarter of the site. One, made of dark red chert, came from Transect L but was made of the same material as the flake found on Transect B. This particular flake also had a very clear, rippling bulb of percussion and evidence of retouching along one edge. The final retouched flake found through pedestrian survey, along Transect P, was made of a red quartzite similar to the primary flake found along Transect M. One edge was worked.

Two of the retouched flakes came from STPs dug in 2013: STP M7 and N2. The first was made of black and white chert with streaks of dark, rust red. One edge was retouched. The second flake, also retouched on one edge, was made of obsidian. The final retouched flake came from Test Unit 1, Strat I. Made of a dark red chert, similar to that described above, it had a clear bulb of percussion and retouching along one edge.

The lithic assemblage also contained four flakes with no evidence of retouching or work; three were made of chert and one of quartzite. One of the chert flakes was found during pedestrian survey along Transect J. It was a salmon pink in color with gray mottling. The other three pieces all came from STPs. One, found at STP ZZ4, was made of a dark red chert similar to that already described and was both small and very thin. Another, found at STP K6, was made of the same red chert and had a small but visible bulb of percussion. The final flake found in the STPs came from P10 and was made of a purple-red quartzite, although it could have been a

Table 7.60: Lithic Source Material

	Total (n=)
Quartzite	**5**
Dark Red	3
Dark Gray	2
Quartz	**1**
Semi-Opaque White with Red-Brown Inclusions	1
Chert	**18**
Dark Red	6
Honey Yellow	3
White	3
Yellow -Gray	1
Yellow, Translucent	1
White, Translucent	1
White with Brown & Gray Inclusions	1
White with Black & Red Inclusions	1
Salmon Pink with Gray Mottling	1
Obsidian	**2**
Granite	**3**
Unknown	**7**

variation in a larger piece of red quartzite. If so, that it could have come from the same source material as the other red quartzite lithics mentioned above (See Table 7.60).

Seven individual pieces of debitage also came from the excavations at Highland City; five fragments came from pedestrian survey and two from STP excavations. One small fragment of white chert came from Transect B and another fragment of the same material came from Transect G and a third from Transect I. One fragment of dark red chert was found between Transects J and K. The final piece of debitage found through pedestrian survey came from Transect W, in the fourth and easternmost quarter of the site. It was made of a semi-translucent, thin, white quartz with dark red-brown inclusions.

Both of the fragments recovered from the STPs were made of chert. A small, honey yellow fragment came from STP D0. A yellow chert fragment, which appeared almost translucent, came from STP F6. The debitage fragment may have been honey yellow if it was thicker, but as this is difficult to determine definitively, it is considered to be from a different source material.

The final components of the lithic assemblage are the most difficult to identify. Eleven pieces of worked stone came from the excavations at Highland City: seven from pedestrian survey, three from STPs and one from Test Unit 3. One fragment, found along Transect B, was hewn and appears as if it was turned, due to its almost bowl-like curvature. Although clearly modified stone, its function is unknown.

Another piece of modified stone came from ten meters to the east, along Transect C. It was comprised of a shaft with a point at one end and a round ring, which was broken at the top, at the other. At the center of the intersection between the base of the ring and the shaft was a small iron pin, driven into the stone. At the top of the ring, where the break is, another, smaller ring fragment is attached, this one sitting perpendicular to the first. The smaller ring fragment had copper staining on the inside as well as threading. Across from this small ring, on the other side of the break in the largest of the rings, is evidence of a third ring, equal in size to the second one. Not enough of it remains to determine if it was threaded as well. Once again, the function of this piece is unknown, although clearly someone spent time carving and threading it.

Four worked stone fragments came from just east of the middle of the site, two pieces from Transect K and two from Transect L. One unknown worked stone piece had two deep grooves scored into its surface, creating a pattern of three wide ribs. The other fragment that came from Transect K was made of a dark gray stone, possibly granite. It had three cleanly finished edges and was hewn into a square shape, measuring roughly 1.6 centimeters on all sides and 0.3 centimeters thick. The two pieces of worked stone from Transect L both appeared dressed. One was a near-evenly hewn rectangular strip 1.1 centimeters wide by 2.5 centimeters long. The other was a very straight fragment with one cleanly hewn edge. Both are made of either quartzite or granite. The final piece of worked stone found during pedestrian survey came from Transect Y. This particular piece was very dark with a criss-cross pattern scored across the surface of one edge.

One of the three fragments found in the STPs was made of quartzite and came from STP B2. It looked as though it may have had work along one edge, which looked like a notch, but it was too weathered to definitively be classed as a flake. Another fragment of worked stone, this one of an unknown material, came from STP B6 and had a deep U-shape carved into one side. The last worked stone fragment from the STPs came from STP S4 and was made of a very porous stone, which had been carved into a pedestal-like shape. One final worked stone fragment came from Test Unit 3, Strat I. It was an unknown stone object with rust-staining and threading carved around the exterior. Although found 90 meters to the east of Transect C, perhaps the threading was associated with the threaded holes on the object found during pedestrian survey there.

Ceramics

The final artifact class is ceramics. These have been saved until the end of this chapter, so as to better compare and contrast them with those found at Smuttynose Island, in the Isles of Shoals. What follows is a description of the ceramics from Highland City. This will be followed at the beginning of the next chapter by a discussion of those found at Smuttynose Island. Along with a discussion of each of the 22 ware types found at Highland City is a brief overview of the three main classifications of ceramics: earthenwares, stonewares, and porcelains.

A total of 2,2224 ceramics came from the three years of excavations at Highland City, which comprises roughly 7.5% of the total site assemblage of 29,629 artifacts. As mentioned at the beginning of the chapter, the ceramics are the fourth largest group of artifacts, surpassed by the assemblages of metal, glass, and faunal remains.

All three excavation types yielded ceramics, with 2,072 fragments recovered from pedestrian survey, 76 sherds recovered from the STPs, and 76 from the Test Units (See Table 7.61). The 2016 excavation season yielded the largest number of ceramic fragments (n = 960 or 7.1% of the season's assemblage), while 2013 yielded the largest overall proportion of ceramic fragments compared to the total artifacts recovered that year (n = 603 sherds or 14% of the season's assemblage). The 2014 season fell in the middle with 624 sherds recovered, which comprises 5.4% of the season's assemblage.

A total of 252 ceramic vessels came from the Highland City, including 167 earthenware vessels, 49 stoneware vessels, and 36 porcelain vessels, including

Table 7.61: Ceramic Totals from All Three Years of Excavation at Highland City

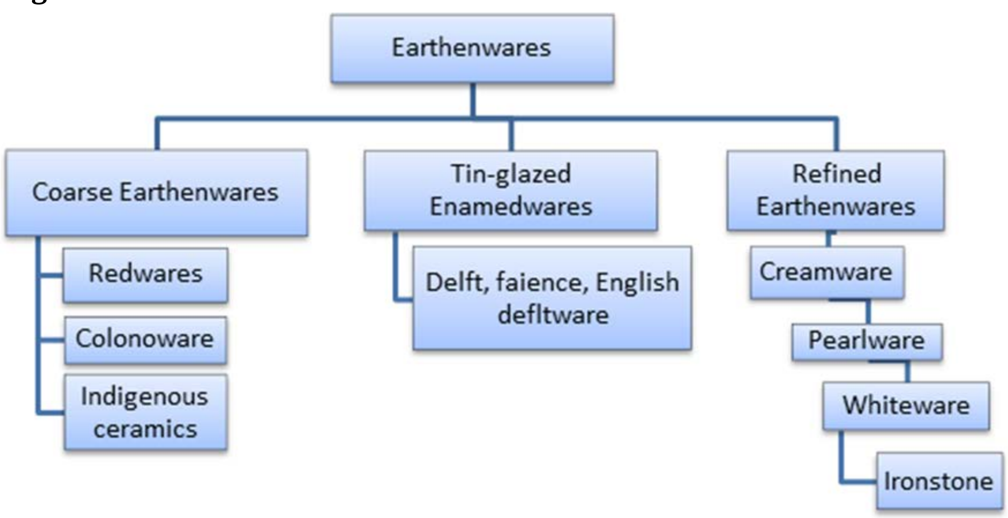
	Total	2013	2014	2016	**Vessels**
Ped Survey	**2,072**	593	571	908	
Shovel Test Pits	**76**	47	29	0	
Test Units	**76**	0	24	52	
Earthenwares (11)	***1,869***	***568***	***467***	***834***	***167***
Earthenware, Unknown, Coarse	**7**	0	5	2	**6**
Smoking Pipe Fragments	**10**	1	6	3	**9**
Clay Pigeon	**522**	147	36	339	**N/A**
Tile, Earthenware	**2**	0	1	1	**N/A**
Tin-Glazed Enamelware	**11**	0	1	10	**1**
Earthenware, Unknown, Refined	**3**	0	2	1	**2**
China Ware	**4**	0	0	4	**2**
Rockingham	**17**	2	9	6	**1**
Agateware	**1**	1	0	0	**1**
Lustreware	**2**	0	2	0	**1**
Whiteware	**634**	213	188	233	**64**
Ironstone	**656**	204	217	235	**80**
Stonewares (6)	***238***	***42***	***112***	***84***	***49***
Bristol Glaze	**47**	7	12	28	**12**
Chinese Brown-Glazed Stoneware (CBGS)	**94**	1	68	25	**15**
Chinese Dry-Bodied Stonewares	**7**	0	5	2	**2**
Unknown Chinese	**3**	0	0	3	**2**
Unknown Gray	**12**	4	4	4	**6**
Unknown White	**75**	30	23	22	**12**
Porcelain (5)	***117***	***30***	***45***	***42***	***36***
Bone China	**18**	3	7	8	**10**
Celadon (Winter Green)	**29**	7	10	12	**3**
Chinese Porcelain	**11**	0	10	1	**5**
Japanese Porcelain	**12**	5	4	3	**4**
Other Porcelain	**47**	15	14	18	**14**
Totals	**2,224**	**640**	**624**	**960**	**252**

plates, saucers, teacups, mugs, jars, jugs, crocks, pots, pitchers, opium pipe bowls, and hollowware vessels.

Coarse and Refined Earthenwares

Earthenwares are ceramics fired at low temperatures and have soft, usually porous bodies. As such, these vessels have to be glazed, or otherwise sealed, to be able to hold liquid. The temperature at which potters fire their wares determines whether or not they will become earthenwares, stonewares, or porcelains (See Figure 7.19). The types of clay chosen reflect the decision to fire at higher or lower temperatures. Low-fired earthenwares are the earliest ceramics in most regions of the world. Most historical archaeology focuses, as a whole, on earthenwares produced in Europe – especially England – during the Middle Ages, with production beginning in the Americas roughly around the 1620s. This class of ceramics has a wide range of functions, based its level of refinement.

Figure 7.19: Division of Historic Period Ceramics



Coarse earthenwares are the least refined and most porous of the earthenwares, due to the low temperature at which they are fired. They generally appear in the archaeological record in the form of utilitarian vessels like storage jars, pipkins and milk pans. Most early indigenous ceramics are also classified as coarse earthenwares, as is Colonware, which is attributed both to

Native Americans and to enslaved populations. Refined earthenwares, which are fired at a higher temperature and are slightly less porous (although still need to be glazed), originally emerged as decorative prestige ceramics, such as tin-glazed enamelware (which is semi-refined). By the mid-18th century, refined earthenwares become more widespread until the 19th century, when they replaced coarse earthenwares in ubiquity as utilitarian vessels (Maryland Archaeological Conservation Lab, 2015; FLMNH, 1995-2010; DAACS, 2004; Stelle, 2001; Deetz, 1996; Hume, 1970).

Overall, earthenwares comprise about 84% of the ceramic assemblage with 1,869 individual sherds; further, 167 of the site's 252 ceramic vessels (66.3%) were made of earthenware. The earthenwares found at Highland City fell into 11 different ceramic types, which the following section discusses.

Unknown Earthenware, Coarse

The excavations at Highland City recovered seven coarse earthenware sherds which could not be further identified. Three of these were rim sherds and four were body sherds. One of the sherds came from an STP and the rest were found during pedestrian survey (See Table 7.62). The first rim sherd, from a hollowware vessel, had a coarse buff body with a dark green glaze on the exterior and interior. It was found along Transect YY. The second rim sherd also had a coarse buff body and was unglazed and wheel-thrown. The fragment came from a cup or a small bowl and might be Chinese. It was found ten meters to the east along Transect ZZ. The final rim sherd came from STP T8 at the easternmost quarter of the site. The sherd had a gray speckled body, which

Table 7.62: Unknown Earthenware, Coarse Sherd Totals, Organized by Means of Collection

Unknown Earthenware, Coarse	Total	Pedestrian Survey	STPs	TUs
2013	**0**	0	0	0
2014	**5**	4	1	0
2016	**2**	2	0	0
Total Sherds (n=)	**7**	**6**	**1**	**0**

resembled concrete. The interior and exterior were both coated in a thick, shiny glaze of bright red, dark yellow, and yellow-gray that resembles industrial paint. The curvature indicated that it came from a narrow, bowl like hollowware vessel. It may have been part of a pipe, but was not clear enough to be determined a pipe fragment like those discussed below. One of the body sherds, found along Transect T, was made of the same gray concrete-like earthenware. It too had the same thick, mottled industrial looking glaze and also appeared to come from a hollowware vessel.

The three remaining body sherds did not correspond to any of the rim sherds found. One fragment, found along Transect ZZ, was a body sherd with a light gray body and clear glaze from an unknown vessel. Another sherd, found along Transect A 10 meters to the east, was a redware sherd with a clear glazed exterior and bisque interior. A partial fingerprint was visible on the interior. The final body sherd, found along Transect P, was a buff earthenware with one edge burned a gray white; the sherd resembled a small bone fragment.

Of the seven earthenware sherds, four fragments came from the first artifact concentration in the first quarter of the site, another two came from the third artifact concentration in the easternmost quarter of the site, and one came from Transect P, just east of the second and middle artifact concentration.

Smoking Pipe Fragments

Ten ceramic pipe fragments came from the excavations at Highland City, all located through pedestrian survey. All three excavations seasons produced pipe fragments, although the majority came from the 2014 pedestrian survey (n = 6). The 2013 season only yielded one pipe

Table 7.63: Smoking Pipe Fragment Totals Organized by Means of Collection

Smoking Pipe Fragments	Total	Pedestrian Survey	STPs	TUs
2013	**1**	1	0	0
2014	**6**	6	0	0
2016	**3**	3	0	0
Total Sherds (n=)	**10**	**10**	**0**	**0**

fragment and the 2016 season recovered just three pieces (See Table 7.63). Eight of the fragments recovered were made of course earthenware, two of which were redware; the last two pipe fragments appeared to be made of kaolin, or at least a white ball clay. The majority of the pipe fragments recovered came from pipe bowls (with one whole bowl recovered), although there were two pipe fragments which may have come from a bowl or a wide stem (See Table 7.64). The pipe fragments had a bimodal distribution, with half of the assemblage found in the westernmost quarter of the site (n = 5) and half found in the easternmost quarter of the site.

Two pipe fragments came from Transect ZZ. One was dark gray-bodied with a red exterior and bisque interior. The other was a red-bodied pipe bowl rim sherd with a thinly glazed exterior and unglazed interior. Transect A yielded another pipe bowl rim sherd, this one made of a coarse earthenware with a rolled rim and horizonal ribbing on the body below the rim. The interior of the bowl had a bisque finish, but the exterior had trace remains of black slip on the rim and green and brown slip on the body of the bowl. Found between Transects A and B was a very course earthenware pipe bowl fragment, tempered with sand or fine micaceous gravel. It was also charred on the interior. This fragment may possibly be an indigenous ceramic. The last pipe fragment from the first artifact concentration on the site was made of a white ball clay, likely kaolin. This bowl fragment was white and bisque

Table 7.64: Recovered Smoking Pipe Fragment Types

	Total (n=)	Pedestrian Survey (n=)	STPs (n=)	Test Units (n=)
Non-diagnostic pipe sherds	**2**	2	0	0
Bowl sherds	**8**	8	0	0
Total Number of Sherds				**10**

Figure 7.20: Molded Pipe Bowl, Recovered from Highland City

on the exterior and brown with use on the interior. Pedestrian survey along Transect B recovered it.

The five pipe fragments from the easternmost quarter of the site came from Transect S (n = 1), Transect Y (n = 3), and Transect Z (n = 1). Transect S yielded a bisque, undecorated redware pipe bowl fragment, which was about 1/3 complete. Of the three pipe fragments found along Transect Y, two came from the same pipe and were made of white ball clay, possibly kaolin. Both bowl fragments were molded on the exterior with a raised, scalloped or rib-like pattern (See Figure 7.20). One fragment showed the ends of the pattern, which indicates that it did not go all the way around the pipe bowl (perhaps it terminated near the beginning of the stem). The other fragment showed evidence of use or burnishing, as the exterior was stained brown and slightly shiny. The interior was white and bisque. The third pipe fragment found on Transect Y wad dark gray in body and black on the interior.

The last pipe fragment found came from Transect Z and was a buff bodied stubbed-stem pipe bowl (See Figure 7.21). The presence of a short, attached stem piece with a finished edge, referred to as a stubbed-stem, indicates that the bowl attached to a removable stem, possibly made of reed. Stub-stemmed pipes appear frequently on nineteenth century sites. The bowl was undecorated, although it appeared burnished – perhaps from use.

Figure 7.21: Stubbed-stem Pipe Bowl, Recovered from Highland City

In total, the pipe fragments indicated the presence of nine pipes: one buff-colored stub-stemmed pipe, two pipes made of kaolin pipes, another two made of redware, one of dark gray earthenware, one buff-colored pipe decorated with black, green, and brown glaze, and one low-fired, coarse, fine gravel-tempered pipe that is possibly indigenous.

Clay Pigeon

Clay pigeons, also called clay targets, first appear in the early 1880s, with one patent granted in 1880 and another in 1883; early pigeons, often originally referred to as mud saucers, were made of a course earthenware and were fired in batches like bricks. These came in answer to the search for a target that flew more like a bird when shot out of a trap. Previous shooting targets varied widely, from metal propeller-like devices to glass balls, some of which even contained feathers inside seem more realistic. Trap shooting grew in popularity in the 19th century as Americans and Britons sought ways to hunt for sport without the expenses of actual hunting parties. The early mud saucers flew better and no longer left sharp sherds of metal of glass on the shooting range.

The sport of clay trap shooting took off almost immediately, especially in the United States. The first national clay trap shooting competition took place in 1885 and by the 1890s, Americans were purchasing millions of clay traps each year. Much of the appeal came from the fact that George Ligowsky, the first to receive a patent for clay traps, hired the sharpshooters Captain Adam Henry Bogardus and his rival William Frank “Doc” Carver to promote his disks. Carver himself had garnered a reputation with Buffalo Bill’s Wild West Shows and both men agreed to a 25-match series using Ligowsky’s clay pigeons exclusively to demonstrate their shooting prowess.

A major change to clay pigeons occurred around 1884, when the material make-up of clay pigeons changed. Soon, what became known as composition targets replaced mud saucers. These pigeons were manufactured from a mixture – or composition – of limestone, pitch, and clay; other mixtures emerged but the limestone-pitch combination was the most successful and is still the most widely used today. The pitch givens the pigeon a dark black color, which is often painted for visibility and a flashy explosion of color when the pigeon is shot.

Table 7.65: Clay Pigeon Fragment Totals, Organized by Means of Collection

Clay Pigeon Fragments	**Total**	**Pedestrian Survey**	**STPs**	**TUs**
2013	**147**	127	20	0
2014	**36**	26	0	10
2016	**339**	339	0	0
Total Sherds (n=)	**522**	**492**	**20**	**10**

Excavations at Highland City recovered a total of 522 fragments of limestone-pitch composition clay pigeons from the site (See Table 7.65). Clay pigeon fragments came from all three excavation years and all three excavation methods, although the largest amount – by far – came from pedestrian survey efforts (n = 492 or 94.2%). The fragments came largely from the western half of the site, with 155 pieces found between Transects ZZ and D – with another ten pieces recovered from Test Unit 1 – and 328 pieces found between Transects E and K. Transect L, in the third quarter of the site, yielded 29 clay pigeon fragments, but no fragments were found on any transect further east.

Nearly all of the pigeon fragments recovered were unpainted and black (n = 453 or 86.8%); however, 69 fragments did have paint on them. Of these, 21 fragments had white paint, 14 had pale orange paint, another 14 had a bright orange paint, 11 fragments had pale yellow paint, four pieces had dark yellow paint, three had pale orange and white paint, and, finally, two had a faded red or pink paint. Very little archaeology has been done on clay pigeons. However, as these pigeon fragments were all composition pigeons, they date to after 1884. No extant chronology for clay pigeon paint colors exists thus far. As such, the bright orange and dark yellow clay pigeons are likely modern. The remaining colors are indeterminate as to age. As a fragment of clay pigeons, these sherds do not contribute to the overall ceramic vessel count for the site, especially as it is very difficult to ascertain the minimum number of individual saucer-like targets

Earthenware Tile Fragments

Two earthenware tiles came from the excavations at Highland City, found during pedestrian survey in 2014 and 2016. Both pieces were made of a buff-colored fabric, one of which had a gray glaze or veneer on the obverse side (the underside is bisque). Flooring tiles are nearly impossible to date without further identifiers, such as wire meshing – which appears in the early twentieth century – or identifiable glaze types – such as eighteenth-century Dutch tin-glazed enamelware tiles. Given the even edges of the tiles, they likely date to the late nineteenth or early twentieth century, but can provide no definitive diagnostic utility. Unsurprisingly, both tile came from the domestic activity area assemblage in the first quarter of the site, having been found along Transect XX and Transect A.

Tin-Glazed Enamelware

Tin-glazed enamelwares are a semi-refined earthenwares, as they are softer in body than refined earthenwares, on average, but slightly harder – or more refined – than most coarse earthenwares. To counteract the porous nature of the ware type's soft body, a thick glaze of lead and tin oxide is applied. The tin-glaze is usually poorly adhered, leaving it subject to flaking off of the body, rather than spalling away with some of the body attached when placed under stress. As a result, tin-glazed enamelware often resembles an M&M with its thick, poorly adhered glaze flaking off as easily as the candy coating off of the chocolate once broken.

Dutch tin-glazed enamelwares are often the best known, especially in archaeological contexts, coming from the region around Delft and giving this name to a wide variety of seventeenth and eighteenth-century tin-glazed earthenwares. The English soon produced an imitation of Deft, which is referred to as delft or delftware. In addition to Dutch and English potteries, tin-glazed earthenwares known as faience came from France and those referred to as majolica came from both Mediterranean Europe, including Italy, Portugal, and Span, and the Middle East (Maryland Archaeological Conservation Lab, 2015; FLMNH, 1995-2010; DAACS, 2004; Stelle, 2001; Deetz, 1996; Hume, 1970). Most of the tin-glazed enamelwares emerged as an attempt to replicate the white and blue color palette of Chinese porcelain – a highly coveted and expensive ware type.

White tin-glazed enamelwares first appeared in the sixteenth century, they usually do not appear on archaeological sites until the seventeenth century (with some earlier examples in areas of Spanish colonization). In North America, tin-glazed enamelwares saw heavy use through the end of the eighteenth century before refined earthenwares replaced them in the nineteenth century. Tin glazed enamelwares continued to appear in the nineteenth century in the form of cosmetic pots and storage jars, until they too were replaced by refined earthenwares like ironstone. That said, however, a subset of tin-glazed enamelwares – referred to was Victorian majolica – persisted through the nineteenth century.

The term Victorian majolica now frequently refers to a mass-produced earthenware from Europe and the United States with brightly colored, durable lead glazes on wares depicting natural and Classical High Victorian motifs. The original Victorian majolica was a true tin-glazed enamelware manufactured only in the United Kingdom. It featured an opaque, white tin-glaze – similar to that seen on earlier delftwares – decorated with hand-painted designs inspired by Mediterranean majolica. The most prominent maker of true Victorian majolica was Minton & Co. out of London. This ware was first manufactured in 1848 and gained popularity after its success at the Great Exhibition at London's Crystal Palace. Minton & Co. produced Victorian majolica through the 1880s and were soon joined by Josiah Wedgewood & Sons, George Jones & Sons, Joseph Holdcroft, and even porcelain maker Copeland. By 1900, most of the demand for Victorian majolica had died down (Spode Museum Trust, 2017; Karmason, 2000).

Table 7.66: Tin-Glazed Enamelware Sherd Totals Organized by Means of Collection

Tin-Glazed Enamelware	Total	Pedestrian Survey	STPs	TUs
2013	**0**	0	0	0
2014	**1**	1	0	0
2016	**10**	10	0	0
Total Sherds (n=)	**11**	**11**	**0**	**0**

A total of 11 fragments of tin-glazed enamelware came from the excavations at Highland City, all through pedestrian survey efforts in 2014, which yielded one fragment, and 2016, which yielded the remaining 10 fragments (See Table 7.66). Eight of the sherds came from the westernmost quarter of the site ad may have even come from the same vessel or set. The fragment found in 2014 was found along Transect B. Five of the sherds found in 2016 were recovered between B6 and B7 and another three came from C7, ten meters to the east. The last two sherds found came from the easternmost quarter of the site and also were recovered near one another; one fragment came from point S8 and the other from point T9, ten meters to the east and one meter to the north.

The fragments found along Transect B consisted of one rim sherd, one basal sherd, and four body sherds (see Table 7.67). All of the sherds had a thick, yellow-buff body with a white, tin-enamel glaze and no further decoration. The basal sherd indicates that the vessel was circular and likely a bowl or small cosmetics pot; the curvature of the rim sherd found also indicates that the vessel was a small pot or bowl. Three additional body sherds came from Transect C, likely

Table 7.67: Recovered Tin-glazed Enamelware Sherd Types

	Total (n=)	Pedestrian Survey (n=)	STPs (n=)	Test Units (n=)
Non-diagnostic body sherds	**6**	6	0	0
Semi-diagnostic body sherds	**3**	3	0	0
Basal sherds	**1**	1	0	0
Rim sherds	**1**	1	0	0
Total Number of Sherds				**11**

associated with the same vessel. These three sherds had crazing in the glaze, which almost appeared intentional or superficial; the sherds found on Transect B lacked this crazing or pattern.

The two tin-glazed enamelware fragments found in the easternmost quarter of the site both had a thick, buff-colored body as well and an opaque, white tin-enamel. The glaze on these two sherds was much thinner and appeared heavily worn. A vessel type for these should could not be determined. The presence of the tin-glazed enamelware sherds on the site further reaffirms the chronology established by the other artifact classes and indicates a habitation on the site during the second half of the nineteenth century.

Unknown Earthenware, Refined

The excavations at Highland City recovered three refined earthenware sherds which could not be further identified; all were body sherds. One of the sherds came from STP YY6, excavated in 2014, while the other two fragments came from pedestrian survey efforts in 2014 and 2016 (See Table 7.68). Two of the body sherds came from the westernmost quarter of the site – one from Transect XX and one from Transect YY. The sherd found along Transect XX had a thin, buff-colored body with a brilliant

Table 7.68: Unknown Earthenware, Refined Sherd Totals Organized by Means of Collection

Tin-Glazed Enamelware	**Total**	**Pedestrian Survey**	**STPs**	**TUs**
2013	**0**	0	0	0
2014	**2**	1	1	0
2016	**1**	1	0	0
Total Sherds (n=)	**3**	**2**	**1**	**0**

Emerald green-glazed exterior and a red-brown slipped interior in which several thumbprints were visible. The fragment came from an indeterminate hollowware vessel. The second sherd, found in STP YY6, appears to have come from the same hollowware vessel. It too had a thin buff-colored body with a green exterior and red slipped interior.

The last body sherd came from the second artifact concentration near the middle of the site, having been found along Transect M. It was a refined, white-bodied earthenware that might have been a spalled fragment of whiteware or ironstone. However, without more of the body present – or the presence of any glaze – this determination cannot be definitive. As such, it was classed as an unknown refined earthenware.

China Ware

China Ware, while an attempt to replicate porcelain, is actually a refined earthenware, due largely to its firing process. Porcelain generally is fired twice and becomes vitrified, or glass-like, during this second, hotter firing. China Ware, by contrast, is only fired once, with vitrification happening then; the firing temperature is also generally lower than that used on porcelain, resulting in a slightly different shade of white, which some ceramic experts refer to as a warmer or creamier color. China Ware can have underglaze or overglaze decoration, although the former is more common.

The excavations at Highland City recovered four China Ware sherds, all of which came from pedestrian survey in the westernmost quarter of the site during the 2016 season. The small assemblage consisted of two body sherds, a large sherd with both a rim and a base, and a handle sherd. The rim

Table 7.69: China Ware Sherd Totals, Organized by Means of Collection

China Ware	Total	Pedestrian Survey	STPs	TUs
2013	**0**	0	0	0
2014	**0**	0	0	0
2016	**4**	4	0	0
Total Sherds (n=)	**4**	**4**	**0**	**0**

and basal sherd came from a divided plate – likely a 3-part plate – and is done in a Restaurant Ware style. It has a thick green stripe at the rim with a thinner stripe running at the end of the marly. It was found at point A3. Also found at the same point was a bright white, undecorated body sherd, which may have come from the same plate.

The two remaining pieces both came from point ZZ4, but it is unclear whether or not they are from the same vessel. One fragment, a handle sherd, had a small remnant of a bright bluish green (similar to Crayola's jungle green) glaze on it. The second fragment was a body sherd, broken just after the rim, and embossed with two rows of small, raised dots. A remnant of pinkish-purple glaze was visible on the exterior. This body sherd likely came from a tableware vessel. Overall, the China Ware indicates the presence of at least three vessels – one divided plate, one handled vessel, and one possible hollowware vessel. The pieces found likely date to the early twentieth century.

Rockingham

Rockingham generally refers to a refined earthenware that is yellow or tan in color and glazed a mottled brown with honey-colored streaks, which is usually the vessel's body color showing through the glaze. Rockingham generally refers to a decoration style rather than a true ware-type because Rockingham glaze appears on earthenwares and, on occasion, stonewares. Rockingham appears in the mid-19th century and persists through the early 20th century; these vessels were relatively cheap and mass-produced in both England and in North America. By the 1880s, the United States stopped importing British-made Rockingham; potteries in Vermont, Ohio, Illinois, Kentucky, and New Jersey had been manufacturing Rockingham since at least the 1850s and they eliminated the need to import the ware from Britain (Maryland Archaeological

Conservation Lab, 2015; FLMNH, 1995-2010; Pittman, 2005; DAACS, 2004; Stelle, 2001; Deetz, 1996; Hume, 1970)

Table 7.70: Rockingham Sherd Totals, Organized by Means of Collection

Rockingham	Total	Pedestrian Survey	STPs	TUs
2013	**2**	1	1	0
2014	**9**	5	2	2
2016	**6**	6	0	0
Total Sherds (n=)	**17**	**12**	**3**	**2**

A total of 17 pieces of Rockingham came from the excavations at Highland City, with the majority located during the 2014 season (see Table 7.70). All three excavation methods recovered Rockingham fragments, although pedestrian survey yielded 70.6% of the assemblage found. Almost three-quarters of the assemblage (n = 12) came from the westernmost quarter of the site and the first artifact assemblage. Ten sherds came from between Transects ZZ and C, clustering most along Transect B, and two pieces came from Test Unit 1. Three pieces came from the third quarter of the site, between Transects P and Q and slightly to the east of the second artifact concentration. Four sherds came from Transect Y in the easternmost quarter of the site and the final artifact concentration.

Nearly all of the body sherds found were non-diagnostic body sherds (n = 11), six of the sherds found through pedestrian survey, three through STPs, and two from Test Unit 1 (See Table 7.71). These came from at least one hollowware vessel, with most of the sherds concentrated in the westernmost quarter of the site, as discussed above. Two additional body sherds proved to be semi-diagnostic; both found during pedestrian survey, one came from

Table 7.71: Recovered Rockingham Sherd Types

	Total (n=)	Pedestrian Survey (n=)	STPs (n=)	Test Units (n=)
Non-diagnostic body sherds	**11**	6	3	2
Semi-diagnostic body sherds	**2**	2	0	0
Basal sherds	**1**	1	0	0
Rim sherds	**2**	2	0	0
Handle sherds	**1**	1	0	0
Total Number of Sherds				**17**

Transect C, while the other came from Transect Y and is likely associated with the basal and rim sherds discussed below. The sherd found at point C8 had an acute curvature that resembled a spout, possibly from a teapot, which was a common vessel form for Rockingham. Found along Transect Y were four sherds, all like from the same vessel – and possibly a teapot.

Two rim sherds, forming a contiguous mend, indicate the presence of a rounded holloware vessel, such as a teapot. Found nearby was a basal sherd with an unglazed exterior – and evidence of wheel-throwing – and an interior glazed with a pale yellow glaze with dots of honey-brown. A body sherd was also found in the same area, although most of its glaze had spalled off. The final piece of Rockingham found came from Transect Q and was a handle sherd, with glaze missing from the interior. This handle sherd had the correct curvature to be part of a larger handle for a holloware vessel like a teapot, rather than a mug.

In total, the 17 Rockingham sherds found indicate the presence of at least one holloware vessel, likely a teapot, the pieces of which were scattered across the site.

Agateware & Lusterware

The excavations at Highland City also produced one piece of Agateware and two pieces of Lusterware, both of which are refined earthenwares largely seen in the nineteenth century. Agateware refers to a refined earthenware or stoneware ceramic distinguished by a multi-colored ceramic body created by mixing at several different color clays. The ware type derives its name from the swirled, multi-colored hues of its body – an attempt by potters to mimic the semi-precious mineral agate. Unlike slipwares, the swirling colors of agateware originated in the fabric of the ceramic – not simply its glaze; as such, it retained its multicolored appearance even if its glaze chipped.

Agatewares appear in England as early as the end of the seventeenth century, although they did not entire large-scale production until at least 1725. While fine agateware reached its height of popularity in the mid-eighteenth century (in the form of teawares and table services), the ware type persisted through the nineteenth century, growing heavier and coarser. These thicker ware types appeared in bowls, plates, and dishes used for more utilitarian purposes.

In the seventeenth century – and especially in the eighteenth century – North American potters also produced agatewares. Finally, emerging in the nineteenth century, North American potters began to make mineral knobs, which were agateware doorknobs. The earliest US patent referring to such doorknobs appears in 1843 and archaeological sites up through at least 1900 have yielded mineral knobs, making them a feature of the second half of the nineteenth century (Maryland Archaeological Conservation Lab, 2015; FLMNH, 1995-2010; DAACS, 2004; Stelle, 2001; Deetz, 1996; Hume, 1970). The agateware fragment found at Highland City consisted of roughly half of a mineral knob. This large doorknob fragment came from the domestic assemblage on the site, found along Transect B in 2013 through pedestrian survey.

Lusterware (also known as lustreware), the other ware type mentioned above, refers to ceramics decorated with a glaze that has a metallic film, which is quite thin, adhered to it. The presence of the metals fused to the glaze creates a hard and lustrous appearance, giving the wares their name. In particular, potters chose different metal oxides to create different color lusters; gold oxide produced a gold sheen on white-bodied wares and a coppery sheen on redwares. Copper oxide created a similar coppery sheen on white-bodied wares and platinum oxide produced a silver shimmer. Lusterwares also appeared with colored sheens outside the more typical metallic colors; a pinkish purple sheen appeared if potters added purple of cassis. This particular additive was a solid precipitate created by the precipitation of gold and tin oxides.

Finally, the colors found in each sheen different depending on the number of metallic coats the potters applied – most notably, copper oxide luster only appeared copper colored on white bodied ceramics if two or more layers were used. Otherwise, the luster took on a purple sheen.

Lusterware appears on refined earthenwares, stonewares, and even porcelains. While this technique was well known to Spanish potters, potteries in England, Scotland, and Wales did not create lusterwares until the very end of the eighteenth century; they proved to be incredibly popular not just in Britain, but also in North America and Continental Europe. Lusterwares, as a whole, rose to fashion and fell from it with the course of the nineteenth century; the height of their popularity was around the third quarter of the century (Maryland Archaeological Conservation Lab, 2015; FLMNH, 1995-2010; DAACS, 2004; Stelle, 2001; Deetz, 1996; Hume, 1970).

The two lusterware sherds found at Highland City also came from the westernmost quarter of the site and the domestic assemblage there. Both sherds came from pedestrian survey efforts along Transect ZZ in 2014. The two pieces were rim sherds, likely from the same vessel, and featured an annular band of black with a coppery brown sheen painted just below the rim. They came from a small hollowware vessel, possibly teaware.

Whiteware and Ironstone

Whiteware is a white, refined, hard-bodied earthenware which evolved out of pearlware in the 1810s. Never officially invented, Whiteware likely came about as a response to changing tastes; customers wanted ceramics that were brighter white and also more durable. This demand has not died down, and consumers still purchase whitewares today. Archaeologically, whiteware is truly white when placed next to yellow-tinged Creamwares and blue-tinged Pearlwares. Its diagnostic utility is weaker than that of Creamware and Pearlware because of its continued manufacture. It appears on sites from the first quarter of the 19th century onward; however, decorative features, such as maker's marks and pattern types, aid in tightening Whiteware's diagnostic utility.

Additionally, a subset of Whiteware, referred to as Ironstone, can also help tighten the site chronology. Ironstone first appears around 1840 on archaeological site, although it was most popular between 1855 and 1885. Ironstone, examined below, is thicker, harder, heavier, and often whiter than other varieties of Whiteware. Some of the Whiteware fragments recovered were Ironstone fragments, which supports the assertion that there was occupation on the site at least after 1840.

Non-Ironstone Whiteware

A total of 634 whiteware sherds came from the excavations at Highland City, with sherds found during all three excavation seasons and through all three excavation methods (See Table 7.72). Overall, the whiteware sherds comprise 28.5% of the total ceramic assemblage from the site. The 2016 season yielded the largest number of whiteware sherds (n = 233 or 24.2% of the season's ceramic assemblage), while the 2013 assemblage produced the largest proportion of whiteware sherds (n = 213 or 33.1%). The 2014 season fell in the middle, with 188 sherds, which comprised roughly 30.1% of the total number of ceramics recovered that year.

Table 7.72: Whiteware Sherd Totals Organized by Means of Collection

Whiteware	**Total**	**Pedestrian Survey**	**STPs**	**TUs**
2013	**213**	199	14	0
2014	**188**	173	9	6
2016	**233**	202	0	31
Total Sherds (n=)	**634**	**574**	**23**	**37**

<u>Body Sherds</u>

Overall, 465 body sherds came from the excavations at Highland City, comprising just

Table 7.73: Recovered Whiteware Sherd Types

	Total (n=)	Pedestrian Survey (n=)	STPs (n=)	Test Units (n=)
Non-diagnostic body sherds	**425**	383	10	32
Semi-diagnostic body sherds	**40**	37	2	1
Basal sherds	**64**	60	2	1
Rim sherds	**104**	92	9	3
Handle sherds	**1**	1	0	0
Total Number of Sherds				**634**

under three-quarters of the whiteware assemblage (73.5%). Of these, most were non-diagnostic body sherds (n = 425 or 91.4%). All of the non-diagnostic body sherds were undecorated, with no indication of manufacturer. As Table 7.73 indicates, most of these sherds were recovered through pedestrian survey (n = 383 or 90.1%), with an additional 32 pieces recovered from Test Units (7.5%) and 10 from the STPs (2.4%). The non-diagnostic sherds indicated the presence of at least ten dinner or salad plates, six bowls, one shallow bowl, one teacup, one possible teacup or tea bowl, and two indeterminate hollowware vessels.

The remainder of the body sherds were semi-diagnostic (n = 40 or 8.6%). These sherds provided more information than the non-diagnostic body sherds above, although none of the pieces contained enough information to be classed as diagnostic. The semi-diagnostic sherds either bore a decoration (painted, transferprinted, or molded), or their curvature indicated enough about their vessel form to positively represent the its presence on the site. There were eight sherds in this latter category. Three sherds were fragments of dinner plate marleys, indicating the definitive presence of at least three dinner plates on the site, one on Transect B and two on Transect E. Transect B lies within the first artifact concentration and Transect E lies one transect over, ten meters to the east.

Another two sherds, found along Transect B and Transect ZZ, were pieces of the transition between the bowl, or dish, and the marley on a dinner plate, further confirming the presence of dinner plates at the site and possibly indicating two additional dinner plates. Both of these transects fall within the first artifact concentration. Another sherd bore the faint ring of a plate bowl and also came from Transect ZZ. An additional body sherd, also found along Transect ZZ, forms a contiguous mend with a basal sherd below; when put together, the two indicate the presence of a bowl. Finally, one body sherd indicated the presence of a finely potted undecorated teacup, once again found along Transect B. In total, these eight sherds indicated the presence of one teacup, one bowl and at least three dinner plates at the site – and possibly as many as five.

The remaining 32 semi-diagnostic sherds were decorated with a molded pattern, or one that was either painted or transferprinted, as mentioned above. Six semi-diagnostic sherds bore a molded decoration. Three sherds, found along Transect K in the second artifact concentration, were molded with 3 raised bands, similar to those found on rim sherds discussed below; the pattern indicates that these sherds came either from the same vessel as the rim sherds, or at least from the same service. These three molded sherds indicate the presence of at least one plate. Found along Transect Z, at the eastern edge of the site, were three additional molded sherds, each with a different pattern. One bore a thin stem and leaf pattern, the leaves of which looked like oak, and came from a saucer. The second sherd was molded in a pattern of upward-facing and downward-facing loops, which resembled puzzle pieces. The third sherd was molded with a faint, pattern that had suffered too much weathering to identify. Both of these sherds came from unknown vessels, particularly due to their size.

Five semi-diagnostic body sherds were both molded and painted and all came from the same service or the same vessel. All came from the westernmost edge of the site and the first artifact concentration. Two of the body sherds were found with three rim sherds along Transect YY. The rim sherds are discussed below. The body sherds were molded with a line of embossed dots, beneath which was painted an overglazed annular band of gold paint; swirling, curlicues loops were painted beneath the gold band, also in overglaze gold paint. The three rim sherds and two body sherds found with them indicate the presence of at least one saucer. Two more body sherds with the same pattern came from Transect ZZ and likely were part of the same saucer as those mentioned above. The last body sherd was found with a rim and a body sherd bearing the same molded dot and gold-painted curlicue design. All five body sherds indicate the presence of at least one intricately decorated saucer for a teacup, which broke along Transects YY and ZZ in the westernmost portion of the site.

Fifteen of the semi-diagnostic sherds were painted. Nearly all of these came from the westernmost quarter of the site and the first artifact concentration (n = 12). Two sherds were found through pedestrian survey along Transect YY. One, a teacup fragment, bore an overglaze green vine-like floral decoration. The other was painted with a brown and green underglaze floral pattern that also had ghosting from a now-gone overglaze decoration. The sherd came from an unknown vessel, but it may have been teaware. Six sherds were found ten meters to the west, along Transect ZZ. Two were hand painted, with a barely visible floral pattern, likely from an overglaze pattern; the fragments were too small to determine vessel type. A third body sherd bore a green and pink overglaze floral design and originally came from a teacup saucer. This floral overglaze design may have been what was on the two sherds with the ghosted floral pattern, although this cannot be fully determined. Another body sherd found along Transect ZZ was a teaware vessel decorated with a hand-painted blue and brown floral pattern. Two final sherds came from the same teacup saucer and were painted with an orange, almost floral, sponge-print pattern.

Three painted sherds came from Transect B. One was hand painted with dark pink that, unfortunately, was an indistinct pink smear. Another, from a small plate or saucer, was painted with a blue, floral vine and leaf pattern. The last sherd was painted with an underglaze pink floral design. Another sherd came from Transect C. Painted with green and black, although the pattern was indiscernible, the sherd likely came from a hollowware vessel.

The last three painted sherds came from the middle artifact concentration – one sherd from Transect N, and the easternmost concentration, two sherds from Transect Y. The body sherd from Transect N was painted with a small green oval through which a black line ran; the pattern and the vessel were indeterminate. The two sherds from Transect Y were both painted brown. One had a small amount of brown glaze, which appeared too dark to be Rockingham. The second featured a small spot of brown against a white background. Both came from unknown vessels.

The six remaining semi-diagnostic body sherds were all had transferprint designs and came from the westernmost quarter of the site; two sherds were found on Transect ZZ and four on Transect B. The first sherd from Transect ZZ bore a nautical pattern with a rope-like border and a small piece of a possible lighthouse below. This sherd is likely associated with the basal sherd mentioned below and came from either a plate or a saucer. The second sherd found in STP ZZ2 had a very small piece of dark blue or black transferprint, although the rest of the glaze on the sherd had spalled off. As such, the vessel type and the pattern were indeterminate.

Two of the sherds found along Transect B came from the same teaware vessel, likely a saucer. Both were decorated with a pink and light green transferprint floral design. Another sherd had a blue floral transferprint pattern on the interior and an undecorated exterior; it likely came from a plate. The last transferprint decorated sherd from Transect B had a blue wing-shaped design; however, this transferprint pattern was an overglaze design, not an underglaze one. The curvature of the sherd indicates that it originally came from a teacup.

Basal Sherds

A total of 64 basal sherds came from the site, almost all found through pedestrian survey (n = 61). The STPs yielded two basal sherds and one fragment came from the Test Unit 3. The basal sherds indicated the presence of at least 50 vessels. Of these, 31 vessels were plates; one plate was small, and likely a salad plate, while the other 30 were likely dinner plates. Fifteen of the plates had foot rings, while the other 14 did not. Eight of the whiteware vessels indicated by the basal sherds were bowls; four of the bowls were shallow and of these, two had foot rings. Two of the more standard-sized bowls also had foot rings. The next most represented vessel type from the site were saucers; the basal sherds speak to the presence of at least seven different vessels. The basal sherd assemblage also indicated the presence of two teacups with foot rings, one possible teacup, one possible mug, and an unknown vessel with a foot ring (the sherd found consisted mostly of a foot ring).

Nearly all of the basal sherds recovered were undecorated. However, they did indicate the presence of five vessels with some form of decoration. Three of these were saucers, making up almost half of the saucers found, while the other two were a bowl and a plate. One saucer, found through pedestrian survey along Transect YY in 2014 was molded in two embossed rings on the interior. Another, the pieces of which were found at points C3 and D3 through pedestrian survey (2016) had a white body but a cream-colored glaze. The third saucer was associated with a rim sherd and a body sherd, all three of which came from pedestrian survey at point ZZ4. The pattern, described above in the discussion of semi-diagnostic body sherds, consisted of embossed rows of dots, gold-painted annular bands, and gold-painted looping curlicues. The plate fragment also came from point ZZ4. Likely associated with one of the semi-diagnostic body sherds discussed above, the fragment had a brown transferprint image of a rope. The single decorated bowl came from STP Y5 in 2014. It was embossed with a faint, molded floral design. Finally, one basal sherd, found through pedestrian survey along Transect L in 2013, bore a maker's mark, which read: "…WOOD". Not enough remains of the maker's mark to further identify the potter.

Rim Sherds

A total of 104 whiteware rim sherds also came from Highland City; once again, nearly all of the sherds were found through pedestrian survey (n = 92), with nine rim sherds found in the STPs and three in Test Unit 3. The rim sherds indicate a total of at least 35 vessels (although the number may be as high as 70 vessels), many of which were identified as unique vessels due to the patterns decorating them. The decorated rim sherds indicate the presence of at least 22 vessels: four plates, 11 saucers, four teacups, and three teaware vessels, although whether they are teacups or other parts of the tea service is unknown. The undecorated sherds speak to the presence of multiple vessels as well; however, due to the lack of defining characteristics, it is difficult to determine how many undecorated rim sherds came from unique vessels and how many came from the same vessel as another, similar rim sherd.

At a minimum, the undecorated sherds speak to the presence of 13 vessels: five bowls (one wide, one shallow, one thick, one very thin, and one a standard soup bowl), two plates (one of which was very thick), two teacups (one very thin), one saucer, one hollowware teaware vessel, one cup, and one mug. It is of note that the wide bowl mentioned above, which came from Transect L, consisted of one large sherd which ran from the bowl's rim to its base on one side. The number of vessels may be as high as 48 vessels, once the undecorated rim sherds are sorted by vessel type. This figure excludes the sherds that form contiguous mends or those that appear to belong to the same vessel. This larger estimate places at least nine bowls, 19 plates, nine saucers, five teacups, one mug, three cups, and two indeterminate teaware vessels on the site in addition to those identified through the decorated rim sherds.

With regards to the four plates indicated by the decorated rim sherds, one was decorated with two embossed bands below the rim (found at Transect E), another plate – and a matching saucer from the same service – had three embossed bands below the rim and came from Transect K. A third plate, found along Transect B, had a faint, indeterminate molded pattern below the rim. The final plate sherd, found between Transects A and B, had a floral design of hand painted pink petals with red-orange dots at their centers and light green vines.

Only one of the 11 saucers was undecorated below its rim. The only notable feature on this sherd, found along Transect ZZ, was a gently undulating, scalloped rim, likely from a saucer. The assemblage spoke to the presence of two saucers, likely from the same service. One set of three rim sherds was found on Transect YY and the other set of three rim sherds on Transect ZZ; both featured the embossed lines of dots, overglaze gold painted band and curlicues described above; both saucers had scalloped rims. As such, the scalloped rim mentioned above may have been a part of these two saucers; however, with no trace of the gold overglaze paint (including ghosting), the sherd must be considered as something separate at this time.

Another saucer rim sherd came from the western edge of the site, this one from Transect XX. It featured a dark blue annular band embossed with a line of dots. Below this was a wide, light blue annular band, across which ran a basket and sprig design in bright white. Beneath the white lace-like pattern were more embossed white dotes, these following the undulating pattern of the basket and sprig design. The edge of the design – and the white dots that border it – overlapped a second dark blue annular band that completed the decoration.

Found along Transect YY were two saucers, one of which was likely associated with a teacup found nearby. One saucer was molded with a raised band below the rim. The other featured a more complicated design. It was molded with a border of dots and curliques, under which ran an embossed annular band. Beneath the band, was an overglaze floral pattern in coral and light blue. The teacup found nearby had a molded border of dots, under which was a looping, scale-like pattern which may have mimicked the curlicue pattern on the saucer. This pattern too was bordered by an embossed annular band.

Found several transects to the east – although still within the westernmost quarter of the site, were three more saucers. The first, found along Transect B, was a thin saucer painted blue on the interior with a small piece of a light blue and white flower present; just below the rim was a line of embossed white dots. The second, found in STP B5, was decorated with a hand painted dark pink floral design. The third, found on Transect C, featured a molded pattern, which was colored with glaze. The interior of the saucer was dark blue near the rim. Under this was the image of a woman in blue on a white background. The woman was molded onto the saucer as well as painted.

The last two saucers came from the easternmost quarter of the site with one found at Transect V and the other at Transect Z. The former was embossed with an annular band below rim and a floral design beneath the band; the latter was decorated with a hand painted floral design of green kelp-like leaves beneath a dark pink annular band.

One of the four teacups was discussed above, having matched a saucer also found along Transect YY. A second teacup, also found along Transect YY, was molded on the exterior with a pattern of overlapping bands. Ten meters to the west, on Transect ZZ, another teacup rim sherd was decorated with a small portion of a black transferprint decoration; the little pattern that remained showed a piece of a pine tree. Along Transect C, a rim sherd from a teaware vessel, likely a teacup, was decorated with a black annular band below the rim. Another teacup sherd came from Transect G, between the two artifact concentrations. This sherd featured a green annular band along the rim on the interior. The two final teaware fragments, which may have been teacups or other parts of the tea service, were much further distanced. One teaware vessel was found along Transect M and was decorated with a gold-brown annular band jut below the rim. The last sherd, found along Transect V, bore a black annular band below the rim like that found along Transect C, although almost a football field's length separated the sherds.

Handle Sherds

One whiteware handle sherd came from Highland City, located through pedestrian survey at point YY5 in 2016. Possibly associated with the two saucers with gold overglaze paint, which were found along Transects YY and ZZ, this handle sherd also was decorated with an overglaze pattern in gold. Facing away from the cup, just after the apex of the handle arc, was a gold-painted leaf-like shape. The handle sherd itself was molded with two knobs or ridges facing the cup just before the apex of the handle arc. A small portion of the vessel's body still remained, identifying the handle sherd as originally coming from a teacup – further supporting the claim that it may be associated with the gold overglaze saucers found nearby.

Non-Ironstone Whiteware Vessels

In total, the non-ironstone whiteware sherds found speak to the presence of at least 64 vessels (See Table 7.74). Concentrated for the most part in the western portion of the site, the vessels consist of plates, bowls, cups, mugs, and teaware, including teacups and saucers. The presence of non-ironstone whiteware at the site confirms an occupation at the site in the nineteenth and early twentieth century. The presence of brown (1818-1869), black (1785-1864),

Table 7.74: Minimum Number of Non-Ironstone Whiteware Vessels Found

	Total (n=)
Plates	**30**
Saucers	**11**
Bowls	**8**
Teacups	**4**
Teaware (indeterminate)	**4**
Cups	**1**
Mugs	**1**
Hollowware	**3**
Unknown	**2**
Total Vessel Minimum	**64**

and light blue (1818-1867) transferprint patterns, along with orange sponge-print patterns (1820s-1870s) further supports this. Additionally, many of the hand-painted patterns seen on the sherds are chrome colors, seen in the nineteenth century up through the 1860s.

Distribution of Non-Ironstone Whiteware Sherds

The largest portion of whiteware sherds, overall, came from the westernmost quarter of the site, between Transects XX and D A total of 287 sherds came from the seven transects and another six whiteware sherds were found in Test Unit 1. The third quarter of the site contained the second-largest amount of whiteware sherds (n = 139), with an additional 31 sherds found in Test Unit 3. The majority of the sherds found in this quarter (n = 127 or 91.4%) cluster in the second half of the artifact concentration, which lies across the eastern half of the quarter (Transects L through O). The second quarter of the site, where the other half of the second artifact concentration lies, yielded 114 whiteware sherds. Again, most of these (n = 107 or 93.9%) came from the part of the quarter where the artifact concentration lies (Transects I through K). The easternmost quarter of the site – where the third artifact concentration lies – produced the fewest whiteware sherds (n = 57).

This overall pattern is seen in each of the subcategories of sherds within the whiteware assemblage. The westernmost quarter of the site yielded 204 of the 465 body sherds (43.9%), with an additional six body sherds excavated from Test Unit 1. The third quarter of the site was the second-densest with 108 body sherds (23.2%), excluding the 36 sherds produced from Test Unit 3. The second quarter of the site produced 87 whiteware body sherds (18.7%) and -as the larger trend above suggests – the easternmost quarter of the site produced the fewest body sherds (n = 34 or 7.3%).

The 64 basal sherds followed a similar pattern with the majority found in the westernmost quarter of the site (n = 33 or 51.6%) and the fewest number of sherds found across the site in the easternmost quarter (n = 5 or 7.8%). The second and third quarters of the site produced ten (15.6%) and six sherds (9.4%) respectively, with a seventh sherd found in Test Unit 3. The 103 whiteware rim sherds echoed the overall pattern, which was also seen in the body sherds. The largest number of rim sherds came from the westernmost quarter of the (n = 55 or 53.4%), while the third quarter produced the second-highest amount (n = 19 or 18.5%). The second quarter of the site yielded 17 sherds (16.5%) and the easternmost quarter, 12 sherds (11.7%).

Ironstone

A total of 656 ironstone sherds came from the excavations at Highland City. These were found during all three years of excavation and through all three excavation means (See Table 7.75). The ironstone sherds comprise just under 30% (29.5%) of the total ceramic assemblage from Highland City. The largest number of sherds came from 2016 (n = 235 or 24.4% of the season's ceramic assemblage), while the 2014 season yielded the largest proportion of ironstone sherds (n = 217 or 34.7%). The 204 ironstone sherds recovered in 2013 comprised 31.7% of the ceramics recovered during the first season. As with the non-ironstone whiteware sherds, pedestrian survey recovered the largest number

Table 7.75: Ironstone Sherd Totals, Organized by Means of Collection

Ironstone	Total	Pedestrian Survey	STPs	TUs
2013	**204**	194	10	0
2014	**217**	204	8	5
2016	**235**	214	0	21
Total Sherds (n=)	**656**	**612**	**18**	**26**

of ironstone sherds (n = 612), with an additional 18 sherds coming from the STPs and 26 from the Test Units.

<u>Body Sherds</u>

Overall, 418 ironstone body sherds came from the excavations at Highland City, comprising just under two-thirds of the total ironstone assemblage (63.7%). Of these, most were non-diagnostic body sherds (n = 367 or 87.8%). All of the non-diagnostic body sherds were undecorated, with no indication of manufacturer. As Table 7.76 indicates, most of these sherds were recovered through pedestrian survey (n = 340 or 92.6%), with an additional 14 pieces recovered from the STPs (3.8%) and 13 from the Test Units (3.5%). The non-diagnostic sherds indicated the presence of at least ten dinner or salad plates, two of which were very thick and one of which was bright white, three bowls, one teacup, one teaware vessel (possibly a teacup or tea bowl), two hollowware vessels that are either cups or bowls, and one indeterminate hollowware vessel.

Table 7.76: Recovered Ironstone Sherd Types

	Total (n=)	Pedestrian Survey (n=)	STPs (n=)	Test Units (n=)
Non-diagnostic body sherds	**367**	340	14	13
Semi-diagnostic body sherds	**51**	48	2	1
Basal sherds	**103**	96	0	7
Rim sherds	**128**	120	1	7
Handle sherds	**6**	5	1	0
Lid sherds	**1**	1	0	0
Total Number of Sherds				**656**

The remainder of the ironstone body sherds were semi-diagnostic (n = 51 or 12.2%). These sherds provided more information than the non-diagnostic body sherds above, although none of the pieces contained enough information to be classed as diagnostic. The semi-diagnostic sherds either bore a decoration (painted, transferprinted, or molded), or their curvature indicated enough about their vessel form to positively represent the its presence on the site. There were 12 sherds in this latter category, all of which save one came from pedestrian survey; the last remaining sherd was found in Test Unit 3.

Three sherds were fragments of dinner plate marleys, indicating the definitive presence of at least three dinner plates (one of which was very thick) on the site, one on Transect A, one very thick plate marley sherd on Transect B (thick), and one on Transect L. Transects A and B are within the first artifact concentration and Transect L runs through the middle of the second artifact concentration. Another ironstone sherd, found at point ZZ4, was a large piece of the transition between the bowl, or dish of the plate and the rim. This fragment consisted of a plate marley, broken just after the rim, which extended down through the transition until a point just before the base of the plate and the deepest part of the plate's dish or bowl.

Two additional sherds, found ten meters to the west on Transect YY, were fragments of the same plate, which had a raised ring embossed around the edge of the plate's bowl or dish. One last plate sherd, found on Transect Y, featured a similar plate style with several raised rings embossed in a circular pattern, these around the center of the plate's bowl rather than its edge. Transects YY and ZZ are at the western edge of the site, within the first artifact concentration. Transect Y lies in the third artifact concentration at the eastern edge of the site. These four sherds further confirm the presence of dinner plates at the site and possibly speak to the presence of two more plates, these with embossed rings.

Four final sherds in this subcategory indicate the presence of one bowl, one mug, and one burned plate, due to their association with more indicative sherds, such as rim and basal sherds. One ironstone body sherd, also found at point ZZ4, formed a contiguous mend with a rim sherd point at the same point; the two sherds form a larger fragment of a mug, broken just before the vessel's base. Two body sherds were associated with a rim sherd, all three of which came from point V4 at the opposite end of the site; these sherds indicated the presence of an undecorated bowl. Finally, one body sherd came from Test Unit 3, Strat I, and was associated with a rim sherd and basal sherd, all from one burned plate. In total, these 11 semi-diagnosic sherds indicated the presence of one mug, one bowl and at least four dinner plates at the site – and possibly as many as six.

The remaining 40 semi-diagnostic sherds were decorated with a molded pattern, or one that was either painted flow printed or transferprinted. Six semi-diagnostic ironstone sherds had a molded decoration. These indicated the presence of at least five vessels: one plate, one possible bowl, one shaped dish, one possible plate or saucer, and one unknown vessel. The first, found along Transect B, was a small plate fragment, which had been burned. It was molded with a faint pattern that may have been floral, but the damage to the sherd made this difficult to definitively determine. Two thin sherds came from Transect K, in the middle of the site. These sherds were molded with a raised, acute angle pattern, which may have been from a larger floral pattern (and these were the stems) or from a geometric pattern; the vessel is unknown, due to the small size of the sherds.

Another sherd came from Transect X and was molded with a raised leaf decoration on the interior; this sherd came from a hollowware vessel, likely a bowl. From Transect Z, at the far eastern edge of the site, came another molded sherd, this one with a floral, plant-like pattern. The body sherd was associated with a rim sherd, discussed below, and may also be from the same vessel as a basal sherd, found nearby. The pattern depicted is likely the Lily Shape pattern produced by Edward Corn (predecessor of W. & E. Corn, Ltd) in Burlsem, England; the Lily Shape dates to between the 1830s and the 1850s. A basal sherd, discussed below, indicates the presence of at least one Lily Shape vessel. The final molded sherd came from the 2013 season's spoils and, as such has no provenience other than having been found through pedestrian survey. This sherd is molded with a faint floral pattern that features a small stem and a bud. However, the sherd is too small to determine any further information about the pattern or the vessel.

Two semi-diagnostic ironstone sherds had patterns that were both molded and painted. Found along Transect B and associated with three rim sherds, discussed below, these two body sherds were painted dark blue and a line of embossed dots which ran just below the rim of the vessel, which was a saucer. Beneath the line of dots was a hand painted light blue and white floral pattern. A line of gold overglaze paint ran between the rim and the line of embossed dots. Another nine sherds were both printed and painted. Five sherds came from the same saucer, these sherds came from Transect YY and were decorated with a flow blue pattern painted over an embossed sprig pattern. The sherds were associated with three rim sherds with the same pattern; these are discussed below. Found along Transect ZZ, ten meters to the east, were four body sherds printed with an elaborate flow blue design on the interior. The four sherds were found with a rim sherd from the same vessel; this sherd is discussed below. The flow blue pattern ran from the vessel's rim to the edge of the marley. A tracery of gold overglaze curlicues was visible just below the rim with another stripe of gold paint at the edge of the rim. The body sherds featured a purple overglaze pattern, which appeared possibly floral. The vessel was either a bowl or a vase, based on its curvature.

Another six decorated semi-diagnostic sherds featured flow-printed patterns. These sherds indicate the presence of at least two saucers, one plate, and one hollowware vessel (possibly a teacup). Two sherds found along Transect YY both were decorated with a flow blue pattern and may have come from the same saucer, although they were found in two different excavation seasons. One transect to the east, along Transect ZZ, was a third sherd printed with a flow blue pattern. Its curvature suggested that it came from a hollowware vessel – possibly a teacup to match the saucer found along Transect YY. Two additional flow blue sherds came from Transect ZZ. Both associated with a basal sherd, discussed below, they were printed with a flow blue floral pattern; one of the two sherds was the wider marley, indicating that the vessel was a plate, rather than a saucer. The last flow-printed sherd was found on Transect M, in the second artifact concentration. This sherd came from a second flow blue saucer.

Four of the semi-diagnostic body sherds had painted patterns and spoke to the presence of a thick plate and a plate or saucer. Two sherds came from Transect ZZ. One had a small dab of brown paint on it, although the sherd – and the amount of decoration – was so small that no information as to vessel could be gained. The other was painted with a small amount of blue paint, which transitioned to white, appearing to fade as it neared the center of the plate or saucer from whence it came. Two sherds, found on Transect B, came from a thick plate; one piece was a part of the marley and the other a part of the transition between the marley and the dish of the plate. The plate was decorated with a dark blue floral pattern of vines, which were likely hand painted.

The last 13 semi-diagnostic body sherds all had transferprinted designs and indicate the presence of three teacups, one saucer, and three plates or saucers. All of the transferprinted sherds came from the westernmost quarter of the site. Two sherds came from Transect ZZ; one was decorated with an indistinct brown transferprint pattern. The sherd was too small to identify the image on the fragment. The second sherd was a teacup fragment with a black floral transferprint design. A third sherd from Transect ZZ was decorated with a light blue floral transferprinted pattern; it was associated with two teacup rim sherds, discussed below. Seven sherds, all from the same saucer, were decorated with a blue vine-like floral pattern and came from Transect B. Another sherd, also found on Transect B, was decorated with a floral pattern in light and dark blue; it came from a plate or a saucer. Transect B also yielded a plate or saucer body sherd with a dark blue floral transferprint pattern. The last transferprinted sherd came from a teacup, found in Additional STP #1, dug on Transect C. It was decorated with a light pink floral transferprint design.

<u>Basal Sherds</u>

A total of 103 ironstone basal sherds came from the site, almost all found through pedestrian survey (n = 96). The Test Units yielded seven basal sherds, while no ironstone basal sherds came from the STPs. The undecorated basal sherd assemblage indicated the presence of at least 39 vessels. Of these, 19 vessels were plates; ten of the plates had foot rings, while the other nine did not. Further, three of the plates were smaller – perhaps salad plates – five were very thick, and one was thin, bright white, and finely potted. Thirteen of the ironstone vessels indicated by the basal sherds were bowls; five of the bowls were shallow and of these, two had foot rings. Five of the more standard-sized bowls also had foot rings, all of which were very protruding and pronounced Additionally, one bowl was finely potted and bright white, perhaps from the same service as the plate mentioned above.

The undecorated basal sherds also indicated the presence of one teacup, one saucer, a small bowl or cup, one bright white teaware vessel (similar to the bowl and plate mentioned above), one large hollowware vessel, such as a pot or serving dish, one smaller hollowware vessel, and one unknown vessel with a pronounced foot ring. While nearly all of the basal sherds recovered were undecorated. However, they did indicate the presence of 16 additional vessels, each with some form of decoration or identifying mark.

Twenty-four basal sherds had back stamps indicating the potters that manufactured them. These proved to be immensely helpful, especially in tightening the site chronology. They also indicated the presence of one large plate or serving dish with a foot ring, one shaped dish, and eight plates. Seven sherds, found on Transect V, came from a large plate or serving dish. Five of the sherds formed a contiguous mend and a nearly complete back stamp (marred only by the cracks separating the sherds), which was impressed on the underside of the vessel. It read: "T. & R. BO… / CHINESE SH…" and was bordered by an incised circle. The back stamp indicates the presence of one Chinese Shape vessel manufactured by T & R Boote Ltd, in Burslem, Stoke-on-Trent, England. Chinese Shape vessels were round or oval bodied with molded botanical and floral motifs used on whole dinner services. The design was first registered on December 8, 1858 and used through the nineteenth-century, although it is a more obscure design pattern by T & R Boote, Ltd. These seven sherds represent the only ironstone maker's mark found in the easternmost quarter of the site. The remainder of the back stamps came from either the westernmost quarter of the site (n = 15) – and the first artifact concentration – or the third quarter of the site and the second artifact concentration (n = 2).

Thirteen separate back stamps came from the first quarter of the site and the domestic assemblage there. Four of these were from vessels manufactured by J & G Meakin (Ltd) in Hanley, Stoke-on-Trent, England. A basal sherd from a plate, found on Transect YY, depicted a partial back stamp of 3 curving sun rays in dark blue. The rays were part of a larger "Sol" hallmark used by J & G Meakin from around 1912 until 1939. Also found along Transect YY was another back stamp featuring a "modern Royal Arms" design; the large basal sherd read: "IRONS… / [Royal Arms image] / J. & G. ME…". The plate with this maker's mark dates to after 1890. Found three transects to the east was another J & G Meakin mark, also featuring a

“Royal Arms” seal, although this one dated to between 1851 and 1890; and directly preceded the mark found on the plate mentioned above. Further, this particular mark came from the Eagle and Eastwood Potteries in Hanley. The back stamp read: “[Royal Arms image] / IRONST… / “J & G…”. This sherd also originally came from a plate. Two plate sherds found on Transect C formed a fourth J & G Meakin back stamp. Forming a contiguous mend, when put together, the two sherds read: “MEAKIN / HANLEY / ENGLAND”. The font and the word order indicate that this mark once featured a “modern Royal Arms” image and dates to after 1890.

Seven different maker’s marks came from Transect ZZ on the western edge of the site, representing at least six plates. One mark featured a small piece of a crown in dark blue. This was part of the larger hall mark for John Maddock & Sons, Burslem, Stoke-on-Trent, England; the particular crown used, with an edge comprised of a row of small, tight circles, dates to between 1896 and 1906. A small fragment of a second maker’s mark, this one a fragment of a black crown, may be another John Maddock & Sons back mark, but this is not definitive. Another third maker’s mark on Transect ZZ came from a plate manufactured by W. H. Grindley, Tunstall, Stoke-on-Trent, England. Advertised as “semi-porcelain” the partial back stamp read: “…LAIN [in a banner] / [bow-half of a ship] / [globe with grid of latitude and longitude lines and a white strip across the equator] MARK / ENGLAND [in a banner]”. The complete back stamp would have featured the words “SEMI-PORCELAIN” in a banner above a masted ship. Below this, the mark would have a globe (described as above) and at the bottom, a curved banner which would read: “W. H. GRINDLEY & CO ENGLAND”. The mark found dates the plate sherd to after 1891.

A fifth basal sherd from a shaped dish also came from Transect ZZ and featured another maker’s mark (one of the seven mentioned above). The basal sherd was impressed with:

"…SHAP…/…CORN / BU…SLEM". The back stamp is encircled by lozenge in a rectangular shape instead of a circular one. This likely came from a "Lily Shape" vessel, as this is one of the very few styles that featured the back stamp in a rectangular lozenge. As discussed above, the manufacturer was Edward Corn, or E. Corn, Burslem, Stoke-on-Trent, England – the predecessor to W. & E. Corn.

The sixth basal sherd found on Transect ZZ read: "…RONSTONE / CHINA / …WELL & BISHOP" and was the back stamp for Powell & Bishop, from Hanley, Stoke-on-Trent, England. The mark dates the plate fragment to between 1867 and 1878. One of the back stamps found on Transect ZZ was American rather than English. The basal sherd from a plate had a back stamp, which read: "EXTRA". The font indicates that this mark, which originally would have read "EXTRA QUALITY" came either from the American China Co. in Toronto, Ohio (1897-1904), or the Akron China Co., from Akron, Ohio (1898-1905). The last maker's mark from the transect featured a small leaf-like shape in black along with a portion of a word, which read: "…LET…"; the maker's mark is unknown.

One final back stamp came from the westernmost quarter of the site. Found on Transect D, the basal sherd indicated another American potter. The mark read: "…ENTON. N. J" and was likely manufactured by The Trenton China Co., based in Trenton, New Jersey. The plate sherd dates to between 1859 and 1891.

The last two ironstone back stamps both came from Transect L, one from pedestrian survey and one from Test Unit 3. The first was another Maddock mark, which read: "JOHN MAD… / BURSLEM STO…". The plate sherd was manufactured by John Maddock & Sons (Ltd), but without the rest of the mark, and specifically the specific crown design, information can only come from the font, which dates the plate to after 1880. The last ironstone mark also came from Burslem and was found in Test Unit 3, Strat II. The potters mark, stamped deeply into the basal sherd, read: “JAS. EDWARDS & … / DALEHAL…”. The manufacturer was James Edwards & Sons, who ran the Dalehall Pottery in Burslem. The specific maker’s mark indicates that the plate was made after James’s son became a full member of the Dalehall pottery; this mark was used on their brand of “Ironstone China” between 1851 and 1882.

The last seven basal sherds indicated the presence of another six vessels: two plates, one of which was quite thick, and four saucers, one of which had a pronounced foot ring. All of these sherds were decorated either with a molded, painted, or printed pattern. The assemblage contained one molded basal sherd, which came from a Hotel-style plate with an embossed sprig pattern; it was found on Transect B. The only painted ironstone basal sherd also came from Transect B. A particularly thick plate, the basal sherd featured one dot of dark blue on the interior, although the larger pattern is unknown.

The five remaining basal sherds also bore transferprinted patterns and all came from the westernmost portion of the site, with three sherds found on Transect ZZ, one on Transect A, and one on Transect B. Three saucers came from Transect ZZ. The plate fragment was decorated with a light blue, vine-like floral transferprint pattern and another had a faint green floral transferprint design that may have been applied overglaze. The last basal sherd found on Transect ZZ was decorated with two faint, raised concentric circles, which marked the center of the underside of saucer. Another saucer rim fragment came from Transect B and was likely associated with one of the sherds found on Transect ZZ. It too was embossed with concentric circles, which were surrounded by the saucer’s footring. The obverse side was decorated with a blue, dot-like transferprint floral pattern. It was slightly raised as if it too may have been applied overglaze. The last basal sherd, a saucer fragment found on Transect A, featured a green, floral transferprint pattern.

Rim Sherds

A total of 128 ironstone rim sherds came from the excavations at Highland City; of these, 120 came from pedestrian survey, one from the STPs, and seven from the Test Units. As with the basal sherds, the majority of the rim sherds were undecorated (n = 95). These indicate the presence of 47 vessels: at least 21 plates, including five thick plates, one with a shallow rim, six large plates, two very thin plates, and two smaller, salad plates; at least 11 bowls, including two shallow bowls, two small ones, one wide-mouthed bowl, one very large bowl, and one thick bowl; additionally, there indicated the presence of at least three plates or saucers, five saucers, including one thin saucer; three mugs, one teacup, two cups, and one thin hollowware vessel.

The remaining 33 sherds were all decorated with a molded, painted, or printed pattern and indicated the presence of another 14 vessels: six plates, one of which had a very thin rim, three saucers, two teacups, two teaware vessels, and a large bowl or vase. Four rim sherds had molded patterns, indicating the presence of two plates and a shaped dish. One plate fragment, found on Transect B, had a row of molded oval lozenges decorating the rim. Two sherds from a second plate, found on Transect D, were molded with two raised bands on either side of the marley; within the marley was a wide arch-like pattern with a floral decoration between each arch. The final molded fragment, found on Transect Z, was associated with a body and basal sherd already discussed. This rim sherd indicated the presence of a Lily Shape dish manufactured by Edward Corn. The vessel was molded with a raised floral pattern on the exterior.

Another two sherds, both found in the westernmost quarter of the site, had painted decorations. One, found on Transect ZZ, was a small teaware fragment with a remnant of a small black line painted on it; there was not enough of a decoration to determine a pattern. The second sherd, found on Transect A, was a saucer fragment, painted with pink flowers and green leaves. Four rim sherds were both painted and flow printed and were associated with sherds discussed above. One rim sherd, associated with four semi-diagnostic body sherds all found at point ZZ4, came from a large bowl or vase. It was decorated on the interior with a flow blue design from the rim to the edge of the marley, as well as a few centimeters down from the rim the exterior. Gold overglaze paint decorated this portion of the exterior in an undulating pattern, which was echoed by a purple overglaze paint below. On the interior, a faint curlicue pattern of gold overglaze paint ran over the flow blue pattern. Gold overglaze paint also ran along the top edge of the rim sherd. Three sherds, found on Transect B and associated with two body sherds, came from a painted and printed saucer. The flow printed interior was embossed with a line of molded dots that ran just below the rim; between this line and the rim ran a line of gold overglaze paint. Beneath the flow blue pattern was a white and light blue floral pattern.

Two additional rim sherds were decorated with a flow blue pattern, representing one saucer and one plate. The saucer, found on Transect YY, featured a flow blue pattern, which washed over a raised sprig pattern; this particular rim sherd was associated with five body sherds, discussed above. The second, larger sherd, a plate rim found on Transect ZZ, was also decorated with a flow blue pattern. One large sherd consisting of a rim, body, and base came from a plate with a shallow rim. The sherd, found on Transect C, had lettering printed on the interior, which read: “.LS”.

The last seven sherds were all decorated with transferprint patterns, representing two plates, two teacups, and a teaware vessel. One rim sherd came from Transect YY and the other six came from Transect ZZ. One large plate sherd consisting of a rim, body, base, and pronounced foot ring was decorated with a brown, vine-like floral transferprint pattern, which extended from the markedly to the edge of the rim. A rim sherd found on Transect ZZ was decorated with a similar brown vine-like floral pattern and likely came from the same vessel. A second rim sherd, from a teacup, also had a brown transferprint pattern; this ne had a bar-like border by the rim and a faint vine-like pattern beneath it. Although the vine pattern was fainter on the teacup, this vessel may have been from the same service as the plate above. One large plate sherd, consisting of a rim, body, and basal fragment, including a portion of a foot ring, was decorated with a black floral transferprint pattern on the interior. Two rim sherds, from a teacup and associated with a body sherd mentioned above, were decorated with a light blue transferprint floral pattern. The last decorated rim sherd was small and came from an indeterminate teaware vessel, decorated with a blue floral transferprint design on the interior

<u>Lid and Handle Sherds</u>

One ironstone lid sherd and six handle sherds came from the excavations at Highland City. The lid sherd was found during pedestrian survey on Transect Z in 2014. Undecorated, the shirt consisted of the outer edge, or lip, of the lid along with the footring-like inner ring, which helped to secure the lid in the vessel. The lid came either from a hollowware vessel, likely a teapot or a covered serving dish.

The six ironstone handle sherds came from all three years of excavation and nearly all (n = 5) came from pedestrian survey; one fragment came from STP ZZ2. Three handle sherds in total came from Transect ZZ; all three were undecorated and at least two came from a mug. The one handle sherd from STP ZZ2 was thinner and may have come from a teacup. A fourth handle sherd came from Transect K. It too was undecorated and was very small and thin. It may have also come from a teacup. The last two sherds were found on Transect V and were undecorated.

One sherd likely spalled off of the other, although they did not form a complete contiguous mend. The two sherds indicated the presence of a large, wide handle which may have come from a mug or from a large dish – perhaps a serving dish.

Ironstone Vessels

A total of at least 80 ironstone vessels came from the excavations at Highland City (See Table 7.75). The majority of these were plates (n = 30), including three salad plates, five large, thick plates, and one bright white, finely potted plate. Additionally, one plate, although burned, was molded with a faint floral pattern, another featured a sprig pattern, a third was molded with a floral pattern and raised bands, and a fourth was molded with oval lozenges along the rim. A total of 13 bowls also came from the site, including five shallow bowls, one wide-mouthed bowl, one thick bowl, two small bowls, one bowl molded with raised leaves, and one bright white, finely potted bowl. Eleven ironstone saucers were also recovered, along with four plates or saucers (their size was difficult to determine), one of which was molded with a raised, floral stem and bud pattern.

Table 7.75: Minimum Number of Ironstone Whiteware Vessels Found

	Total (n=)
Plates	**30**
Plates or Saucers	**4**
Saucers	**11**
Bowls	**13**
Teacups	**6**
Teaware (indeterminate)	**3**
Mugs	**3**
Cups	**2**
Vase or Large Bowl	**1**
Large Dish / Server	**2**
Shaped Dish	**1**
Hollowware	**4**
Total Vessel Minimum	**80**

Teaware was also present on the site, with three indeterminate teaware vessels found, including one that was bright white and finely potted (and likely in the same service as the bowl and the plate above). Additionally, fragments of at least six teacups were recovered from Highland City as well, most of which were decorated with painted or printed designs. The assemblage also indicated the presence of at least three mugs (determined through rim, body, and handle sherds) and two indeterminate cups (possibly smaller mugs). The excavations also yielded evidence of one large hollowware serving dish and four additional hollowware vessels, one thin vessel and one molded with an indeterminate pattern that was either the raised stems of a floral motif or raised lines of a geometric pattern.

The ironstone vessels provided much in the way of diagnostic utility, which helped to reaffirm the site chronology of Highland City. Of the minimum of 30 plates at the site, 11 had known manufacturers. J & G Meakin, from Hanley, Stoke-on-Trent, England, manufactured four of the plates present; the earliest of these dated to between 1851 and 1890. Two plates dated to after 1890 and one dated to between 1912 and 1939, further confirming the argument that habitation at Highland City lasted longer than previously thought. John Maddock & Sons, from Burlsem, Stoke-on-Trent, England, manufactured another two plates, one dating to after 1880 and the other to between 1897 and 1904. Other English made plates include one made Bishop & Powell, from Hanley, Stoke-on-Trent (1867-1878), one by JAS. (James) Edwards & Sons, out of Dalehall Pottery in Burlsem, Stoke-on Trent (1851-1882), and one made by by W. H. Grindley, from Trunstall, Stoke-on-Trent (1891+). Additionally, two plates manufactured by American potters also came from the site. One of these was made by The Trenton China Co., Trenton, New Jersey (1859-1891) and the other was made by either the American China Co., Toronto, Ohio (1897-1904) or the Akron China Co. (1898-1905). These plates indicate an occupation at the site from the third quarter of the nineteenth century through the first quarter of the twentieth century.

Two other vessels had known potters. One, a shaped dish, was made by Edward Corn – the predecessor to W. & E. Corn, from Burslem, Stoke-on-Trent, England. His floral Lily Shape service of dishes was most popular between the 1830s and the 1850s. As such, this dish may have traveled with to Highland City with one of the town’s new residents. The Lily Shape pattern was indicated by a back stamp and by a floral design on rim and body sherds. The second vessel was a large dish or serer made by T & R Boote, Ltd, also out of Burlsem. This particular dish, as indicated by the maker's mark, was a Chinese Shape vessel. This tableware service featured round and oval dishes, servers, and hollowware inspired by traditional Chinese vessel forms and decorated with all decorated with molded botanical reliefs, especially on the handles and the tops of lids – which resembled branches or leaves. If the vessels featured finials, these frequently resembled flowers, fruits, or even nuts (White Ironstone China Association Inc, 2005). Chinese Shape vessels dated to between 1858 and roughly 1900.

Aside from known potters, the designs on the ironstone vessels also aided in tightening the chronology of the site. Thirteen vessels had transferprint decorations. One plate and one teacup bore a brown vine-like floral transferprint pattern (1818-1869). Another plate and teacup both featured black floral transferprint patterns against what was likely once a more ivory than stark white background (1879-1890). Several vessels also had floral transferprint patterns in a variety of shades of blue. One teacup was decorated with a light blue floral transferprint and one plate or saucer featured a light and dark blue floral transferprint design (both 1818-1867). A blue vine-like transferprint pattern decorated a saucer and blue flowers decorated one indeterminate teaware vessel (1784-1859). Additionally, one plate or saucer featured a dark blue floral transferprint pattern and was likely one of the oldest sherds found (1802-1846). One saucer recovered featured a dot-like blue floral transferprint (1816-1841). Two saucers were decorated with green. One bore a green floral transferprint pattern, while the other was decorated with a light green, overglaze transferprint pattern (both approximately 1818-1859). The last transferprinted vessel was a teacup with a light pink floral transferprint design (1818-1880).

A total of eight vessels decorated with flow blue printed designs also came from the site, including one plate, two saucers, and a teacup, all of which likely dated to between 1862 and 1929. The other four vessels featured more complicated flow blue patterns. One saucer was decorated with a flow blue pattern over an embossed molded sprig motif and another was decorated with a flow blue at the rim, accented with gold overglaze paint and molded white dots. Beneath this was a light blue and white floral pattern. Finally, a bowl or vase, described in detail above, was decorated on the interior with a flow blue design, as well as a few centimeters down from the rim on the exterior. Over this, were painted intricate overglaze gold curlicue-like patterns and undulating overglaze purple designs.

Finally, two vessels featured painted motifs that were likely done in chrome colors (1829-1860s); one was a plate with a blue floral design and the other a saucer with pink flowers and green leaves. The decorated ceramics, like those identified by maker's marks and back stamps, indicate an occupation at Highland City from at least the third quarter of the nineteenth century through the early twentieth century. Several of the wares even predate the 1866 founding of the site, indicating that perhaps these vessels traveled with the miners and other soon-to-be residents of the town.

Distribution of Ironstone Sherds

The distribution of the ironstone sherds was similar to the of the non-ironstone whiteware sherds, clustering most along the westernmost quarter of the site and the first artifact concentration there. Of the 418 body sherds recovered, 225 (53.8%) came from the first quarter of the site, with another three sherds recovered from Test Unit 1. The second quarter yielded 82 sherds (19.6%), all but one found in the western half of the second artifact concentration. The third quarter of the site yielded 15 (3.6%) sherds and an additional 11 came from Test Unit 3; not factoring in the Test Unit, 12 of the 15 sherds recovered came from the eastern half of the second artifact concentration, bringing the ironstone body sherd total for the second concentration to 93 sherds (22.2%). The easternmost quarter of the site yielded 69 body sherds (16.5%).

The basal and rim sherds followed a similar pattern. Like the body sherds, most of the more diagnostic sherds clustered in the westernmost quarter. A total of 64 of the 103 basal sherds and 91 of the 128 rim sherds came from the first quarter of the site (62.1% and 71%, respectively). One basal sherd and one rim sherd also came from Test Unit 1. Another 15 basal sherds (14.6%) and five rim sherds (3.9%) came from the second quarter of the site. Unlike the body and basal sherds, for the rim sherds, the second quarter of the site was not the second-most productive. In fact, the second quarter of the site yielded the fewest number of rim sherds. The third quarter of the site yielded four basal sherds (3.9%) and seven rim sherds (5.5%). Test Unit 3 produced another four basal sherds and six rim sherds. The second artifact concentration, spread across the second and third quarters, yielded a total of 15 basal sherds and 12 rim sherds (14.6% and 9.4% respectively). The easternmost quarter of the site – and the third artifact concentration – produced 14 basal sherds (13.6%) and 18 rim sherds (14.1%).

Finally, half of the six handle sherds came from Transect ZZ in the first quarter of the site. One handle sherd came from Transect K, in the second quarter and two handle sherds came from Transect V in the easternmost quarter of the site. The only ironstone lid sherd recovered from the excavations also came from the easternmost quarter of the site, having been found along Transect Z.

Stonewares

Stonewares, the next ceramic class in this chapter, are fired at temperatures ranging from 1200 – 1390º C (2192 – 2534º F); these are much higher temperatures than those used to fire earthenwares. This increased heat creates a non-porous, partially vitrified body. This results in a ‘stone’-like fabric that is both hard and durable, as well as impermeable to water, which removes the need for a waterproofing glaze. In general, stoneware fabrics range from gray to buff and yellow to brown and red.

As with earthenwares, historical archaeology focuses most on stonewares produced in Europe from the middle ages onward, although stonewares were very common in Japan and China, emerging in the latter as early as the Shang Dynasty (1600-1046 BC). This long history of Chinese and Japanese stoneware is especially important when considering nineteenth-century assemblages, as some of them contain high proportions of Asian – and especially Chinese – stonewares. With regards to European stonewares, most of them were produced in Germany, specifically in the Rhineland, until the late seventeenth century, when they began to be produced in England. By the beginning of the eighteenth century, stoneware production was underway in North America, although mostly in the east. During the nineteenth century, American stoneware (also known as American Gray) was one of the most ubiquitous housewares in North America. Stonewares still appear today, especially as tablewares and kitchenwares, and retain popularity due to their durability and relatively low cost. Due to the fact that stoneware types from the eighteenth through the twentieth century were produced over long periods of time, they do not provide the same diagnostic utility that earthenwares do; this pertains especially to those stonewares produced in North America.

Stonewares served a variety of functions. Thicker stonewares fulfilled utilitarian functions as pitchers, jugs, crocks, chamber pots, and even oil lamps, and inkwells. Thinner stonewares were used for mugs, jars, bottles, and tankards. Most archaeologists distinguish stonewares by the variations in their surface treatments, the majority of which fall into the following categories: unglazed (also known as plain), salt-glazed, Albany slip, and Bristol glazed. Other stoneware types, such as Frechen, Westerwald, Fulham, and English White Salt-Glazed, and Scratch Blue are also common on archaeological sites dating from the eighteenth century, such as the Isles of Shoals.

Overall, stonewares comprise roughly 10.7% of the total ceramic assemblage, with a total of 239 sherds; further, 49 of the site's 252 vessels recovered are made of stoneware. This section discusses each of the six stoneware types: Bristol Glaze, Chinese Brown-Glazed Stoneware (CBGS), Chinese Dry-Bodied Stoneware, Unknown Chinese Stoneware, Unknown Gray Stoneware, and Unknown White Stoneware

Bristol Glaze

Bristol Glaze refers to a thick, shiny, light-colored feldspathic slip glaze with zinc oxide in it. It generally is grayish white or yellowish white in appearance. The glaze gets its name from the fact that potters invented it in Bristol, England, in 1835; soon afterwards, American potters picked up the technique for use on their vessels; it soon replaced older forms of stoneware decoration because of its durability and the fact that it only required a single firing. This glaze appears most on bottles, as well as utilitarian vessels such as crocks and jars. Bristol Glaze usually does not appear archaeologically after 1900.

A total of 47 stoneware sherds with Bristol Glaze were found at Highland City (See Table 7.78). Nearly all of the sherds came from pedestrian survey efforts during all three years of excavation (n = 46 or 956.8%).

Table 7.78: Bristol Glaze Sherd Totals Organized by Means of Collection

Bristol Glaze	Total	Pedestrian Survey	STPs	TUs
2013	**7**	6	1	0
2014	**12**	11	0	1
2016	**28**	28	0	0
Total Sherds (n=)	**47**	**45**	**1**	**1**

<u>Body Sherds</u>

A total of 24 Bristol Glaze body sherds came from the excavations at Highland City. The majority of these were non-diagnostic body sherds (n = 15), largely collected through pedestrian survey (See Table 7.79). Of the nine remaining semi-diagnostic sherds, one sherd, likely from a jug (perhaps a beehive jug), had a small handle fragment attached and another sherd, a bottle fragment, had evidence on the unglazed interior of having been wheel-thrown. Two sherds from a crock are semi-diagnostic due to their associated with a rim and a basal sherd from the same vessel. Two other body sherds are from a large pot and are associated with two basal sherds; one body sherd even forms a contiguous mend with the basal sherd. Another body sherd, from a pot, is associated with a basal sherd. Finally, the last two sherds are semi-diagnostic because they are decorated with an Albany slip on the interior; one body sherd came from Transect A and the other from Transect, although they are likely from the same vessel.

Albany slip refers to a dark, chocolate brown slip glaze used throughout the nineteenth century. A slip glaze is one that is made from a slurry of clay and water; Albany Slip gets its particular color from its high iron content in the glacial clay first sourced for it near Albany, New York. This particular decorative technique emerged in the early 1800s in Albany, but quickly spread to Midwest potters in Pennsylvania and Ohio. Albany Slip was used on the interior and exterior of stonewares and became popular due to its color, durability, and texture, which fired to a glassy smoothness. As the United States expanded west, Albany Slip's popularity did too,

Table 7.79: Recovered Ironstone Sherd Types

	Total (n=)	Pedestrian Survey (n=)	STPs (n=)	Test Units (n=)
Non-diagnostic body sherds	**15**	15	0	0
Semi-diagnostic body sherds	**9**	8	1	0
Basal sherds	**16**	15	0	1
Rim sherds	**2**	2	0	0
Neck sherds	**2**	2	0	0
Shoulder sherds	**1**	1	0	0
Total Number of Sherds				**47**

traveling in shipments on the expanding railroads. The slip fell out of favor by the 1910s and it is generally not found on archaeological sites after 1940. Overall, the 27 body sherds indicated the presence of at least one ginger bottles, two crocks – one decorated with Albany slip – two pots, one (possible beehive) jug, and two hollowware vessels.

Basal Sherds

A total of 15 basal sherds with Bristol Glaze came from Highland City. One fragment came from Test Unit 1 and the rest came from pedestrian survey. Basal sherds came from all three years of excavation. They indicated the presence of at least 10 vessels: one wheel-thrown mug, one pot, one wide-mouthed pot, one crock with Bristol Glaze only on the interior, one large crock with an unglazed base, one large jug (or possibly a large crock), one ginger bottle, and three hollowware vessels; one decorated with Albany slip, one wheel-thrown and glazed on the interior with Albany slip, and one wheel-thrown w/ an unglazed exterior and base.

Rim Sherds

Two rim sherds came from the excavations, both found through pedestrian survey on the western edge of the site, one from Transect XX in 2014 and one from Transect ZZ in 2016. One sherd, glazed on both the interior and exterior, came from either a crock or a pot. The other came from a large hollowware vessel with an angled mouth and an inward sloping neck, likely a pitcher. The top surface of the rim was very worn and was either unglazed or the glaze had worn away.

Neck and Shoulder Sherds

Four neck sherds and one shoulder sherd came from the excavations at Highland City, all found through pedestrian survey. The neck sherds indicate the presence of at least two ginger bottles. One sherd, from Transect C, came from a bottle with a Bristol Glaze exterior, gray fabric, and a peach / beige slipped interior. Two sherds, found on Transect N, came from a wheel-thrown bottle with a white fabric and interior, which had a clear glaze. The exterior had a Bristol Glaze. The last fragment, found on Transect K, may have come from the same bottle. The shoulder sherd came from Transect K and came from a ginger bottle with a Bristol Glaze and a gray fabric.

Bristol Glaze Vessels

The Bristol Glaze assemblage indicates the presence of at least 12 vessels (See Table 7.80). In total, there was a minimum of one wheel-thrown mug, two pots, one of which was wide-mouthed, two crocks, one with an unglazed exterior and one with an unglazed base, one large jug (or possibly a large crock), two ginger bottles (one with a gray fabric and a peach / beige-slipped interior and one with a white fabric and interior, which had a clear glaze, and a Bristol Glazed exterior), a pitcher, and three hollowware vessels. Two of the vessels had interiors decorated with an Albany slip, one of which was wheel-thrown. The third hollowware vessel was wheel-thrown, had a Bristol Glaze interior and an unglazed exterior.

Table 7.80: Minimum Number of Bristol Glaze Vessels Found

	Total (n=)
Pots	**2**
Crocks	**2**
Ginger Bottles	**2**
Jugs	**1**
Mugs	**1**
Pitchers	**1**
Holloware	**3**
Total Vessel Minimum	**12**

Bristol Glaze Sherd Distribution

The Bristol Glaze sherds clustered, for the most part, in the westernmost quarter of the site. Of the 25 body sherds recovered, 21 of them came from the first quarter of the site, while the remaining four came from the second artifact assemblage; two sherds were found on Transect K in the second quarter and two sherds were found in the third quarter, from Transects L and N, respectively. No body sherds came from the easternmost quarter of the site.

Nearly all of the basal sherds also came from the westernmost quarter of the site. Of the 16 basal sherds, nearly all were found through pedestrian survey between Transects XX and D (n = 13); another sherd came from Test Unit 1, also in the first quarter of the site. Both rim sherds found also came from the first quarter of the site, as did one of the four neck sherds. Two additional body sherds came from Transect K in the second quarter and second artifact concentration, along with one neck sherd and the only shoulder sherd. Two neck sherds also came from Transect N, in the second artifact concentration, but the third quarter of the site. Finally, one basal sherd was found on Transect Y in the easternmost quarter of the site.

Chinese Brown-Glazed Stoneware (CBGS)

Fairly ubiquitous on sites, Chinese Brown-Glazed Stoneware (CBGS) – referred to in China as Black Glaze – first appeared in the early fifteenth century, during the Ming Dynasty (1368 – 1644) and continued through the Qing Dynasty (1644 – 1911). A few kilns in China still produce CBGS, but on a much smaller scale. Nearly always hollowware vessels, these common storage vessels generally were either jars or bottles. These utilitarian stonewares served a variety of functions from holding water, sugar, wine, condiments – including soy sauce and fermented soy bean paste or curd – oil and even preserved vegetables. Different Chinese guilds produced different Chinese Brown Glazed Stoneware vessel types, each responsible for a certain product; as such, the Shui Tow and Shui Tour Guilds produced sauce containers, the Gong Tarp Guild produced water jugs, and the Hak You Guild produced wine bottles (Choy, 2014; SODA, 2017).

Table 7.81: CBGS Totals, Organized by Means of Collection

CBGS	**Total**	**Pedestrian Survey**	**STPs**	**TUs**
2013	**1**	1	0	0
2014	**68**	61	7	0
2016	**25**	25	0	0
Total Sherds (n=)	**94**	**87**	**7**	**0**

A total of 94 sherds of Chinese Brown-Glazed Stoneware came from Highland City (See Table

7.81). As with most of the ceramic types, the majority of the sherds were recovered through pedestrian survey (n = 87 or 92.6%), while the STPs provided the remaining seven sherds. No sherds were found in the four Test Units.

Body Sherds

A total of 74 body sherds came from Highland City, comprising 78.7% of the CBGS assemblage. The body sherds fell into five main decorative styles: black-glazed exterior & interior; black-glazed exterior & brown-glazed interior; black-glazed exterior & unglazed interior; speckled dark brown-glazed, exterior and brown interior; and speckled black-glazed exterior and brown interior (See Table 7.82).

Twenty-seven body sherds were black-glazed on the exterior and the interior, including all but one of the sherds recovered in STP YY6 (n = 6). The sherds in this category indicate the presence of at least four vessels: three jars and one wide-shouldered jar. Four body sherds, found on Transect XX, came from a jar and were associated with basal and rim sherds discussed below. Another two sherds were found on Transect YY. They represent at least one additional jar, with a black interior that has slight spots in the glaze. Fourteen sherds from Transect ZZ

Table 7.82: Recovered CBGS Sherd Types

	Total (n=)	Pedestrian Survey (n=)	STPs (n=)	Test Units (n=)
Black exterior / interior body sherds	**27**	21	6	0
Black exterior / brown interior body sherds	**26**	26	0	0
Black exterior / unglazed interior body sherds	**6**	6	0	0
Speckled dark brown exterior / brown interior body sherds	**14**	14	0	0
Speckled black exterior / brown interior body sherds	**1**	1	0	0
Basal sherds	**8**	8	0	0
Rim sherds	**8**	8	0	0
Lid sherds	**2**	2	0	0
Shoulder sherds	**2**	2	0	0
Total Number of Sherds				**93**

were associated with a rim and shoulder sherd mentioned below. Further, two pieces form a contiguous mend and have an incised line that runs across them. These came from a wide-shouldered jar. The last six sherds were excavated from STP YY6. They indicate the presence of at least one additional jar.

The next decorative style, a black exterior and a brown interior, was found on 26 sherds. These indicate the presence of at least five vessels. Seven sherds, found on Transect XX, were associated with a basal sherd and a rim sherd and likely came from a jar. Another five sherds, found on Transect ZZ, were also associated with more indicative sherd, rim, shoulder, and basal sherds, and likely came from a spouted jar or a bottle. Four sherds came from Transect YY and represent the presence of a hollowware vessel, likely a jar. Three from Transect ZZ also indicate a small hollowware vessel, which may also be a jar. Two sherds found at point A3 and four sherds found at point A4 during pedestrian survey likely all come from the same small jar. Finally, an outlier, one fragment of a hollowware vessel was found at the far eastern edge of the site, on Transect Z.

Six sherds with a black exterior and an unglazed interior came from the excavations and indicate the presence of at least one jar. One sherd found at point YY4 indicates the presence of at least one jar. The unglazed sherd found in STP YY6 may be from this same vessel. Four additional sherds came from point ZZ4 ten meters to the east and likely are also part of this same jar.

Fourteen sherds were decorated with a speckled dark brown exterior and a brown interior and indicated the presence of at least three vessels on the site. Three sherds found on Transect ZZ were associated with a basal sherd and came from a jar. Another body sherd, found at point ZZ5 is associated with a rim sherd found ten meters to the south, at ZZ4 and represents a second jar. Two body sherds from Transect YY and two from Transect ZZ likely came from one of the two vessels mentioned. Five sherds came from Transect A and likely came from the same holloware vessel. The sherds of this possible vessel were found between points A4 and A5. The last sherd came from Transect N, and was the only fragment found during the initial season in 2013. The vessel, also brown on the interior (with glaze and possible slip), came from a wheel-thrown holloware vessel, likely a jar. Finally, one body sherd had a speckled black exterior and a brown interior; it was associated with a lid fragment found nearby on Transect ZZ. This body sherd likely came from a lidded jar; the lid is discussed below.

Basal Sherds

A total of eight basal sherds came from the excavations, all through pedestrian survey between Transects XX and ZZ; they indicate the presence of three vessels. Two basal sherds from Transect XX indicate the presence of at least one jar with a black-glazed exterior and interior. The base of the jar was left unglazed, although several streaks of black glaze appear to have dripped downward onto it. Five basal sherds came from a shouldered jar with a back exterior and brown interior. They were found on Transect ZZ along with rim and shoulder sherds. Finally, one basal sherd, associated with four body sherds, represent the presence of a jar with a dark brown speckled exterior and a brown glazed interior.

Rim Sherds

Eight CBGS rim sherds were also found at Highland City, representing at least six vessels. Two rim sherds, found on Transect XX, came from a vessel with a black glazed exterior and interior. This vessel had a rolled rim connected to a neck that flared into a wider-shouldered squat jar. Two additional rim sherds came from Transect XX. One, with a black exterior and brown interior, also had a rolled rim and was found with a basal and a body sherd. This likely came from a wide-shouldered jar as well. The last sherd came from a wide-mouthed jar with a dark brown, speckled glaze, which covered the rolled rim and continued just inside the vessel; the rest of the interior was glazed with a slip-like red-brown glaze.

The four remaining rim sherds were all found on Transect ZZ. One sherd, black on the exterior and interior, had a rolled rim and was associated with a shoulder sherd and body sherds. This likely came from a wide-shouldered jar. Another sherd came from a black-glazed jar with a brown-glazed interior. The sherd had a rolled rim and was associated with a basal sherd and body sherds. The last two sherds represent at least one additional jar. This one was decorated with a speckled, dark brown glaze on the exterior and a red-brown interior. One horizontal stripe of the dark exterior glaze was present on the interior below the rim. The vessel had a thick, protruding rim

Lid and Shoulder Sherds

Two shoulder sherds and two lid sherds were found through pedestrian survey at Highland City, all during the 2014 season. Both shoulder sherds were found on Transect ZZ. One came from a wide-shouldered jar with a black exterior and interior. The second sherd came from a wide-shouldered jar with a black-glazed exterior and brown interior, although the interior appeared slipped in more places than glazed. The very bottom of the shoulder sherd was unglazed, as if the interior was hastily slipped and then glazed, with some part of the vessel skipped over accidentally.

The two lid sherds recovered also came from Transect ZZ. One lid sherd had a black speckled exterior and a brown interior; it was found with a body sherd from the same vessel. The glaze was thinner on the lid sherd than on the body sherd and appeared almost slip-like. The interior of the lid was molded with two raised lines running horizontally, likely to secure the lid within the rim of the jar. The second lid sherd was the only vessel fragment that was a light, speckled brown on the exterior and a dark brown on the interior. Like the other lid fragment, this sherd also had two raised lines running horizontally in the center of the sherd to secure it to a vessel. The two lids represent the presence of two lidded jars.

Chinese Brown-Glazed Stoneware Vessels

All 15 of the CBGS vessels found at Highland City were jars of one form or another. No apparent bottle sherds appeared in the assemblage (See Table 7.83). The assemblage indicates that at least six jars, two wide-shouldered jars, a spouted jar, two lidded jars, and three holloware vessels came from the site. Three jars and one wide-shouldered jar were decorated with a black exterior and interior. A jar, a wide-shouldered jar, a spouted jar, and two holloware vessels were decorated with a brown interior. One additional jar had a black-glazed exterior and an unglazed interior. Finally, one jar, one wide-mouthed jar and a holloware vessel had a dark brown speckled exterior and brown interior, one lidded jar had a black speckled exterior and brown interior and a second lidded jar had a light brown speckled exterior and brown interior.

Table 7.83: Minimum Number of CBGS Vessels Found

	Total (n=)
Jar	**6**
Wide-shouldered Jar	**2**
Wide-mouthed Jar	**1**
Spouted Jar	**1**
Lidded Jar	**2**
Holloware	**3**
Total Vessel Minimum	**15**

Most CBGS jars served multiple purposes during their use life. Generally, once emptied of their original contents, they were reused both by stores and in homes; this trend occurred in China and in North America. These jars have been known to contain everything from preserved vegetables and sugar to tea, rice, and even functioned as apothecary jars. The wide-mouthed and wide-shouldered jars found generally held saucers, including soybean paste, fermented soybean curd, and soy sauce. The one possible spouted jar could have contained soy sauce, oil, vinegar, or even liquor.

<u>Chinese Brown-Glazed Stoneware Distribution</u>

With two exceptions, all of the Chinese Brown-Glazed Stoneware sherds clustered on the far western edge of the site, between Transects XX and A. One body sherd was found at the easternmost edge of the site, on Transect Z and one was found on Transect N; their presence at these two spots seems surprising, but several Chinese ceramics appear along Transects Y and Z, as is further demonstrated below. These may be the beginning of a second Chinese assemblage.

Of the 17 sherds found on Transect XX, 11 were body sherds, two basal sherds and four were rim sherds. All of the sherds found on Transect YY, including within STP YY6, were body sherds (n = 17). Transect ZZ yielded the largest number of CBGS sherds with 47 fragments (50.5% of the assemblage). Of these, 33 sherds were body sherds, six were basal sherds, four were rims, two were lids, and two were shoulder sherds. Finally, 11 sherds came from Transect A, all of which were body sherds. The presence of Chinese Brown-Glazed Stoneware on the site confirms that Highland City had Chinese inhabitants. The fact that they all came from the westernmost portion of the site – with one exception – where the domestic assemblage clusters (and the extant cabins stand now) also serves to indicate the location of a possible Chinese section of the town.

Chinese Dry-Bodied Stonewares

The ceramics in this section are all dry-bodied stonewares, which are Chinese in origin and fragments of opium pipe bowls (also known as dampers). A total of seven sherds call into this category, all found through pedestrian survey on Transects YY and ZZ. Five sherds came from a dark gray dry-bodied pipe bowl, which was burnished on the exterior. One of the fragments had two parallel sets of two horizontal lines (four lines in total) incised on the exterior. These grooves likely would have aided in attaching the bowl to the saddle, which is metal component (usually brass) that secures the bowl to the pipe (University of Montana, 2017).

Figure 7.22: Red Stoneware Opium Pipe Bowl, Recovered from Highland City

The two remaining sherds are from a red dry-bodied pipe bowl, this one incised with several Chinese characters (See Figure 7.22). The incised sherd came from Transect YY and the other from Transect ZZ. Not all of the characters are legible, due to wear on the vessel; however, those that are clear enough read “香” or “fragrant” and “吮” or “suck”.

These ceramics – and the fact that they came from the same area as the Chinese Brown-Glazed Stoneware – further confirm the presence of a Chinese population on western edge of the site, particularly along Transects YY and ZZ.

Unknown Chinese Stoneware

In total, there were three sherds classed as Unknown Chinese Stoneware; specifically this group consists of sherds that were neither CBGS nor dry-bodied stonewares from opium pipes. All located through pedestrian survey in 2016, two of the sherds were found on Transect ZZ and one on Transect Y. The two sherds from point ZZ4 on Transect ZZ consisted on a basal sherd and a rim sherd, possibly from the same vessel. The basal sherd came from a vessel with a round base, a coarse buff body and a red-brown slipped interior. The rim sherd also had a coarse body, although it had a grayer tint. The sherd was a weather-worn turquoise or blue-green on the exterior and on the interior just below the thick protruding rim (which was left bisque). The remainder of the visible interior was decorated with a red-brown slip. These two sherds likely came from a Chinese ginger jar, which were frequently made of coarse earthenware or stoneware with a circular base and broad shoulders. A green or blue-green glaze often decorated these utilitarian vessels. The ginger jar name is a deceptive, as it is a term used by Western collectors. The jars initially held all manner of herbs – not ginger alone.

The last sherd, found on the opposite end of the site at point Y7, was rough-textured and almost appeared gravel-tempered. The sherd, from a hollowware vessel, had a gray-brown slipped interior and a gray and tan exterior. This may be another ginger jar fragment, but it this is not definitive. As such, these sherds indicate the presence of at least one ginger jar – found in the same area as the rest of the Chinese assemblage – and one unknown hollowware. Notably, the one outlying fragment of CBGS came from Transect Z, ten meters to the east of this unknown hollowware fragment.

Unknown Gray Stoneware

A total of 12 unknown gray stoneware sherds came from the excavations at Highland City. Found only during pedestrian survey, unknown gray stoneware sherds appeared during all three excavation seasons (See Table 7.84). Just over half of the sherds recovered were body sherds (n = 7) and they represent the presence of at least four vessels. Two sherds found on Transect ZZ came from the same large, hollowware vessel, likely a crock. The sherds were made from a thick, heavy, light gray stoneware with a thick gray glaze on the exterior. While likely a crock, the ware type is unknown. The vessel does not exhibit the typical salt-

Table 7.84: Unknown Gray Stoneware Totals, Organized by Means of Collection

Unknown Gray	**Total**	**Pedestrian Survey**	**STPs**	**TUs**
2013	**4**	4	0	0
2014	**4**	4	0	0
2016	**4**	4	0	0
Total Sherds (n=)	**12**	**12**	**0**	**0**

glazed exterior or the dark body seen in American Gray Stoneware. As such, it is classified as unknown.

Two light gray sherds, also found on Transect ZZ, were very thin and glazed on the exterior and interior with a lighter gray glaze or slip; they were associated with two rim sherds, found nearby and likely from same vessel. These fragments all suggest the presence of a finely-potted stoneware tea vessel, although whether it is a teacup or a tea bowl is unknown. A final sherd from Transect ZZ was decorated with a clear, lead-glazed exterior and evidence of wheel-throwing on its bisque interior. The sherd came from a hollowware vessel, perhaps a small jar.

The last two body sherds came from elsewhere on the site. One hollowware fragment was found on Transect L, in the second artifact concentration. The sherd had a gray exterior w/ brown kiln marks and a red-gray interior, likely from a slip. The vessel was wheel-thrown and small in size, perhaps originally a mug or a jar. The second sherd came from Transect X, in the easternmost quarter of the site. It too came from a wheel-thrown hollowware vessel with a gray exterior and red-gray slipped interior. The two sherds may possibly have come from the same vessel, despite the distance of roughly 120 meters between them.

Two basal sherds from vessel also fall into this artifact category. Found on Transect K, the thick, wheel-thrown sherds have a gray body, a dark brown glazed exterior – possibly Albany slip – and a red-slipped interior. The sherds were originally part of a large hollowware vessel. The last three sherds classed as unknown gray stoneware are rim sherds. One rim sherd, found on Transect ZZ, is made of a thick gray stoneware with an Akaline-glazed rim. The other two rim sherds came from the same vessel and, along with two body sherds mentioned above, likely come from a finely potted, light gray teaware vessel.

In total, the unknown gray stoneware sherds indicate the presence of at least six vessels: two crocks – one light gray and one dark gray with an Albany-slipped exterior and red-brown slipped interior – one thin, light gray, finely potted teaware vessel, one small wheel-thrown, lead-glazed holloware vessel (possibly a jar), a small, coarse gray hollowware vessel with kiln marks (possibly a mug), and a thick gray stoneware hollowware vessel with an Akaline-glazed rim (possibly a pot).

Unknown White Stoneware

The last category in this section includes white stoneware sherds found, which do not correlate to any known ceramic type. In total, 81 unknown white stoneware sherds were recovered. These fell into three main subcategories: tile (n = 1), heavy white stoneware (n = 4), and refined white stoneware (n = 76).

One tile, found through pedestrian survey on Transect N in 2013, came from the excavations. It had a bright white body with an equally bright white glaze on the obverse. The bisque reverse, or underside, of the tile had three scored lines on it. Originally, the ceramic tile was attached to the adhesive backing discussed in the Other section above.

Four heavy white stoneware sherds also came from the excavations, all found during pedestrian survey in 2013 and 2014. Two body sherds and a basal sherd were found in 2013. One large body sherd, which was thick and heavy with a white glazed exterior, was found on Transect ZZ. The other, found on Transect D, was also thick, heavy, and white-glazed; it had glitter-like interior, perhaps from remnants of foil or devitrified glass. The basal sherd, found on Transect ZZ, was also thick and white and had a small fragment of a body sherd still attached. The three sherds came from hollowware and may have even come from the same medium to large vessel. The last sherd was a rim sherd, found on Transect Z, at the opposite end of the site, in 2014. This sherd also had a thick, heavy body and a white glaze and it too was from a hollowware vessel. It may have been from the same vessel, but if so, the fragments were very far apart (roughly 220 to 260 meters away, depending on whether the distance is measured between the body and rim sherds or between the basal and rim sherds). The heavy white stoneware sherds indicate the presence of at least one hollowware vessel, perhaps two.

A total of 71 thin, refined white stoneware sherds were recovered from Highland City, all through pedestrian survey (See Table 7.85). Roughly equivalent numbers of unknown, refined white stoneware sherds came from each of the excavations, with the 2013 season yielding the largest number (n = 27). In total, the refined white stoneware sherds indicate the presence of at least 12 vessels. None of the sherds had paint or colored glaze and only two vessels had faint molded decorations.

Table 7.85: Unknown Refined White Stoneware Totals, Organized by Means of Collection

Unknown Refined White	Total	Pedestrian Survey	STPs	TUs
2013	**27**	27	0	0
2014	**22**	22	0	0
2016	**22**	22	0	0
Total Sherds (n=)	**71**	**71**	**0**	**0**

A total of 48 refined white stoneware body sherds came from the excavations. Of these, 17 were non-diagnostic and 31 were semi-diagnostic (See Table 7.86). The non-diagnostic sherds were found between Transects K and Y and spoke to the presence of at least one bowl and one hollowware vessel. Most the semi-diagnostic sherds (n = 18) came from Transect ZZ. Five sherds, associated with a rim sherd, had a thin white glaze on the interior and exterior. The sherds all came from one vessel, a bowl. Six other sherds from the same

Table 7.86: Unknown Refined White Stoneware Sherd Types (All Found Through Pedestrian Survey)

	Total (n=)
Non-diagnostic body sherds	**17**
Semi-diagnostic body sherds	**31**
Basal sherds	**5**
Rim sherds	**17**
Total Number of Sherds	**71**

transect were associated with three rim sherds and a basal sherd with a shallow foot ring. These all came from another bowl, this one with a slightly gray tint.

Another set of six sherds from Transect ZZ came from a thin-bodied hollowware vessel and were associated with a rim sherd found on the same Transect. The interior and exterior are glazed with a very thin white (or clear) glaze. The last sherd from Transect ZZ is a body sherd that forms a contiguous mend with a rim sherd. Both sherds are thicker, but still thinner than the heavy stonewares mentioned above. The interior and exterior are glazed white and likely came from a mug.

Two sherds, found on Transect C, came from a bowl and are associated with a basal sherd found nearby. A set of nine sherds were found on Transect K, along with a rim sherd. These vessels were thinly potted with a thin white glaze on the exterior and interior. However, these particular sherds showed evidence of spalling, with missing glaze on the interior – along with small pieces of the original fabric, which likely spalled off with the glaze. As such, unlike earthenwares that craze and lose their glazes, these stonewares were much more pitted. The sherds came from an unknown hollowware vessel. Finally, two body sherds were found on Transect Y and were associated with rim and basal sherd found on the same transect. The sherds were also weathered, although missing no glaze on the interior or exterior. The sherds originally came from a bowl. The semi-diagnostic body sherds indicate the presence of at least seven vessels: four bowls, one mug, and two hollowware vessels, one of which was quite thin.

Five refined white stoneware basal sherds were also recovered. One thin, finely-potted stoneware sherd was found on Transect XX and came from a saucer with a white glaze on the exterior and interior. One thin, white, and finely potted basal sherd came from Transect YY and was also glazed on the interior and exterior with a thin white glaze. It came from a teacup with a pronounced foot ring. As mentioned above, a basal sherd was found on Transect ZZ along with three rim sherds and six body sherds. These all came from a bowl, slightly thicker than the vessels above, that was decorated on the interior and exterior with a gray-white glaze. Another basal sherd, found on Transect C, came from a bowl with a bright white glaze; it was likely associated with the body sherd mentioned above. Finally, a basal sherd from a bowl with a pronounced foot ring was found on Transect Y. Associated with a rim and a body sherd, all three fragments had a white glaze on the interior and exterior and a thin white body. The basal sherds speak to the presence of five vessels: a saucer, a teacup, and three bowls.

The remaining 17 sherds were rim sherds; of these, 12 sherds came from Transect ZZ. Two sherds likely came from a saucer, and may have come from the same vessel; both had white glaze on the interior and exterior. A third rim sherd was associated with a set of five body sherds and originally were part of a thin white bowl. A set of four rim sherds, which were associated with a body sherd, also came Transect ZZ and came from a teacup. The teacup had a scalloped rim and was molded with a faint dot and curlicue-like pattern just below the rim (on all four rim sherds). A set of three rim sherds, found with six body sherds and a basal sherd, all came from a thin, gray-white bowl with a shallow foot ring. Another rim sherd, associated with six body sherds, came from a thin white holloware vessel. The last rim sherd found on Transect ZZ formed a contiguous mend with a body sherd and came from a thicker holloware than many of the other vessels; the sherds were likely mug fragments.

One mug or cup sherd came from Transect A and another, with a faint scalloping pattern on the exterior below the rim, came from Transect D. One rim sherd came from Transect K and was likely associated with the weathered and spalled holloware body sherds mentioned above.

Another sherd, from Transect L, also came from a thin hollowware vessel, although it is uncertain whether it came from the same vessel as the sherds on Transect K. Finally, one rim sherd was found on Transect Y and was associated with a basal sherd from a bowl. The rim sherds speak to the presence of at least 10 vessels: three bowls, two cups, two hollowware vessels, one saucer, one teacup, and one mug.

The refined white stoneware sherds indicate the presence of at least 12 vessels: four bowls (one with a gray-white glaze), two indeterminate cups, one mug, two teacups, one with a smooth rim and a faint molded scallop and dot pattern and the other with a scalloped rim and a faint, raised curlicue pattern, one saucer, two hollowware vessels, one of which was very thin and finely-potted. Overall, the unknown white stoneware sherds spoke to the presence of one stoneware tile, one thick, heavy hollowware vessel, and the twelve refined white stoneware vessels, mentioned above.

<u>Porcelains</u>

Porcelains, the final ceramic class in this chapter, are fired at the highest temperatures of any ceramic type: 1250 – 1400º C (2282 – 2552º F). At this temperature, porcelain is highly vitrified, or glass-like, with a glaze that usually fuses to the fabric (showing no difference between the two in cross-section). The resulting vessel is hard, impermeable to water (without the need for a glaze), white, and usually translucent.

Porcelain gets its name from the Italian word "porcellana," which means cowrie shell; this is a reference to the smoothness and translucence of the ware, which resembled that of the shell. The Chinese first created porcelain roughly 2,000 years ago from a combination of white kaolin clay and feldspathic clays. While Chinese porcelain is traditionally hand painted, Europeans soon found ways to fire porcelain at lower temperatures and, as a result, use underglaze decorations. Most often, the potters added ground glass to the clay mixture to achieve such vitrification in lower-fired kilns. The term porcelain is difficult to define, as there were many attempts to copy the original Chinese ware, each of which has received its own name as the product of identification efforts by ceramic experts, archaeologists, and collectors.

By 1800, for example, English potters introduced a new type of porcelain, referred to as Soft Paste Porcelain or English Soft Paste Porcelain, which was whiter than the blue-tinged Chinese original. When this new porcelain type contained high proportions of bone ash, used for the calcium phosphate, it was referred to as Bone China and generally had a grayish tinge to it. The term China itself can be a misnomer as well. The first English advertisements for Chinese porcelain sometimes referred to the ware as China or Fine China. The term China later covered a wide range of ceramics from soft-paste porcelains to the earthenware China Ware mentioned above. The wide range of porcelain types and attempts to copy Chinese porcelain have resulted in the use of terms such as “porcellaneous” and “near-porcelain;” these wares generally resemble porcelain more than stoneware or earthenware, but they are often not truly white or translucent.

Porcelain has always been an expensive ware type, which is – in part – the reason for the many attempts to copy it and reproduce it. Manufacturers wanted part of the porcelain market’s profits and buyers wanted cheaper options. While porcelain speaks to vessel cost and household consumer power, it does not always provide a strong diagnostic utility after 1850, due to the wide variety of English (and eventually American) porcelains. Porcelains, despite their place of manufacture, appear as tablewares, teawares, and figurines. By the nineteenth century, porcelains also serve industrial and technological functions, including use in electrical components.

Porcelains are the least represented group in the assemblage from 24SB67, which is typical for archaeological sites, due to the generally higher cost associated with the ware. A total of 117 porcelains came from Highland City, comprising 5.3% of the total ceramic assemblage. Additionally, the porcelain assemblage represents the presence of at least 36 vessels at the site. This section discusses five main porcelain types: Bone China, Celadon, Chinese Porcelain, Japanese Porcelain, and Other Porcelain.

Bone China

Made in England to imitate Chinese (hard paste) porcelains, Bone China gets its name from the face that it contains calcined bone ash. As described at the beginning of this section, Bone China has a slightly grayish tinge to it when compared to Chinese porcelains and generally is fired at a lower temperature. Bone China emerged in England in the 1790s although it did not receive its name until the beginning of the nineteenth century. The potter Josiah Spode first created Bone China and others quickly followed him, including Davenport and Wedgwood. In 1821, a new variety of Bone China, called Felspar Porcelain, emerged – also created by Spode; the manufacturers used the word “felspar” instead of “feldspar,” although this term is now archaic. After this, all subsequent Bone China was Felspar Porcelain. Bone China is difficult to identify, as it is still produced today; maker’s marks and specific patterns generally provide the necessary diagnostic criteria.

A total of 18 sherds of Bone China came from the excavations at Highland City and fragments came from all three years of excavation; however, all of the sherds recovered came from pedestrian survey alone (See Table 7.87).

Table 7.87: Bone China Sherd Totals, Organized by Means of Collection

Bone China	**Total**	**Pedestrian Survey**	**STPs**	**TUs**
2013	**3**	3	0	0
2014	**7**	7	0	0
2016	**8**	8	0	0
Total Sherds (n=)	**18**	**18**	**0**	**0**

Over half of the sherds recovered (n = 10) were body sherds (See Table 7.88). Two sherds were found on Transect YY. One, from a teaware vessel (likely a teacup), was decorated with a light blue diagonal band and a large dot with a curling line extending out from it. The interior was decorated with two annular bands. The other teaware vessel was undecorated and darker, likely representing a second vessel.

Table 7.88: Bone China Sherd Types (All Found Through Pedestrian Survey)

	Total (n=)
Body sherds	**10**
Basal sherds	**3**
Rim sherds	**5**
Total Number of Sherds	**18**

Five body sherds came from Transect ZZ. Two sherds, likely from the same teacup, were both undecorated except for fain gray speckles. The two remaining sherds were found with three rim sherds and likely represent one teacup. One body sherd was decorated with an overglaze design of pink flowers with light and dark green leaves on the exterior; the other sherd had the same pattern on the interior. The last sherd from Transect ZZ had a faint gray tint with small speckles. It was decorated on the exterior with a small overglaze orange and green flower.

One sherd came from Transect A, still within the first artifact concentration. The undecorated sherd had a faint gray tint with small speckles and likely came from a teaware vessel. The last two body sherds came from Transect Z and likely came from the same teacup. Both were decorated with an indistinct blue pattern on the exterior.

Three Bone China basal sherds also came from the excavations, all found in the westernmost quarter of the site. One sherd, found on Transect ZZ, had a foot ring and was decorated with a green, leaf-life floral design, although a fair amount of it was missing. The fragment was large and thicker than many of the other fragments; it likely came from a plate. A second sherd from Transect ZZ was equally thick and also had a foot ring; its curvature suggests, however, that it was likely a piece of a bowl. Additionally, the sherd was undecorated. The last basal sherd came from Transect A. While also thick and undecorated, this particular fragment had no foot ring; the fragment likely indicates a hollowware vessel.

The remaining five Bone China sherds found were rim sherds. Four sherds came from Transect ZZ and one from Transect B. Three rim sherds from Transect ZZ all came from the same teacup and were associated with two body sherds mentioned above. One of the rim sherds was decorated on the interior with a somewhat messy overglaze pink and red flowers along with light and dark green leaves; a light brown (almost yellow) strip ran along the top edge of the rim. Another sherd in the set had a small amount of a green leaf on the interior and the same light brown strip on the top edge. The third rim sherd was decorated with pink flowers and light and dark green leaves on the exterior; it too had the same light brown strip on the top edge of the rim.

One additional sherd was found on Transect ZZ. This rim sherd was decorated with an overglaze dark green circular shape with light green and pink paint on either side. The edges of each of the shapes appear incised. The pattern is indeterminate. The final Bone China rim sherd found came from Transect B. It was molded into a ribbed or scallop-like pattern with a strip of overglaze red paint on the exterior, just below the rim. A small part of an overglaze pink flower was also visible on the exterior.

Table 7.89: Minimum Number of Bone China Vessels Found

	Total (n=)
Plates	**1**
Bowls	**1**
Teacups	**6**
Teaware	**2**
Hollowware	**1**
Total Vessel Minimum	**10**

Overall, the Bone China assemblage indicates the presence of at least 11 vessels: six teacups, two teaware vessels, one plate, one bowl, and one indeterminate hollowware vessel (see Table 7.89). Additionally, 15 of the 17 sherds (88.2%) came from the westernmost quarter of the site, specifically between Transects YY and B. The two remaining sherds were found on Transect Z, at the far eastern edge of the site.

Celadon

Celadon ceramics refer to green Chinese porcelains found on North American archaeological sites. However, while archaeologists refer to the ware as Celadon, the Chinese inhabitants of Highland City would have called the porcelain Winter Green vessels; this is largely because technically, the term Celadon refers to a specific green porcelain produced in Chekiang Province during the Sung Dynasty, which lasted from 960 to 1280 AD. As such, it is unlikely that true Celadon pieces would have been in western mining towns. In order to keep with the archaeological literature on the wares, these vessels here are referred to as "celadon," without the capitalization, to distinguish them from the much older ceramics (Choy, 2014, University of Montana, 2017). Light green in color, celadon wares came in a variety of vessel forms including cups, bowls, and plates.

Table 7.90: Celadon Sherd Totals, Organized by Means of Collection

Celadon	Total	Pedestrian Survey	STPs	TUs
2013	**7**	7	0	0
2014	**10**	9	1	0
2016	**12**	12	0	0
Total Sherds (n=)	**29**	**28**	**1**	**0**

A total of 29 celadon sherds came from the excavations at Highland City and were found during all three years of excavation. All but one of the sherds came from pedestrian survey; the last fragment was found in STP YY6 (See Table 7.90). Roughly half of the sherds found were body sherds (n = 14). Ten of the body sherds came from Transect ZZ. Two sherds, associated with a rim sherd from the same vessel, was decorated with a Winter Green exterior and a white interior. As is discussed below, a red-brown strip of color ran along the rim. The sherds came from a bowl. The remaining eight body sherds from Transect

ZZ likely all came from the same vessel, which was another bowl. This one was decorated with a Winter Green exterior and a soft, baby-blue interior.

Table 7.91: Recovered Celadon Sherd Types

	Total (n=)	Pedestrian Survey (n=)	STPs (n=)	Test Units (n=)
Body sherds	**14**	14	0	0
Basal sherds	**6**	6	0	0
Rim sherds	**9**	8	1	0
Total Number of Sherds				**29**

One sherd from Transect A and two from Transect D likely came from the same vessel and may be associated with one of the bowls identified on Transect ZZ. All three sherds had Winter Green exteriors and white interiors. Similarly, a third sherd found on Transect D likely corresponds to the other bowl identified on Transect ZZ; Winter Green on the exterior, the body sherd is a soft baby-blue on the interior.

Six celadon basal sherds also came from the excavations at Highland City (See Table 7.91). All of the sherds came from the westernmost quarter of the site, specifically between Transects ZZ and C. Four basal sherds came from Transect ZZ, all of which were Winter Green on the exterior and soft baby-blue on the interior; they represented at least three bowls, one of which was thicker than the other two. Two of the bowls had pronounced foot rings and one sherd had half of a Chinese seal mark (an abstracted kiln mark similar to a reign mark) in the center on the bottom of the vessel. One basal sherd bound on Transect B had a white interior and was likely associated with the similarly decorated body sherds mentioned above. The last basal sherds came from Transect C and came from a bowl with a Winter Green exterior and soft baby-blue interior.

The remaining nine sherds were rim sherds, nine of which came from pedestrian survey and one from STP YY6. One rim sherd was found on Transect YY during pedestrian survey. It had a red-brown strip of color along the top edge of the rim and a white interior. The rim sherd

Figure 7.23: Celadon Rim Sherd with Chinese Characters, Recovered from Highland City

found in STP YY6 is likely from the same vessel; it too had a white interior and a red-brown strip of color along the edge of the rim. Both sherds likely come from a bowl. Four rim sherds came from Transect ZZ. One, which was mentioned above, was associated with two body sherds; all three sherds were Winter Green on the exterior and white on the interior with a red-brown strip of color along the top edge of the rim. Two additional rim sherds with the same color pattern also came from Transect ZZ and may all be part of one bowl. One of these rim sherds was painted with four different Chinese characters on the exterior (See Figure 7.23). The last rim sherd from Transect ZZ had a Winter Green exterior and a soft baby-blue interior, along with a red-brown strip of color along the edge of the rim.

A rim sherd came from Transect A and another from Transect D, both still in the first quarter of the site. Both sherds had white interiors and Winter Green exteriors. The sherd from Transect A may be part of one of the bowls discussed above. The rim sherd from Transect D was smaller and likely came from a cup. The last celadon rim sherd also had a white interior and likely came from a bowl. It also came from Transect Z at the far eastern edge of the site, far from the rest of the assemblage.

Table 7.92: Minimum Number of Celadon Vessels Found

	Total (n=)
Bowls	**2**
Cups	**1**
Total Vessel Minimum	**3**

The celadon sherds indicate the presence of at least two bowls, one a soft, baby-blue interior and one with a white interior, along with one cup, also with a white interior (See Table 7.92). All of the sherds, save one, came from the westernmost quarter of the site, specifically between Transects YY and D; in particular, they clustered around Transect ZZ. This pattern echoes that seen in in the Chinese stonewares. The one outlier came from Transect Z. This too echoes the few Chinese stoneware sherds found at the eastern edge of the site, along Transects Y and Z.

Chinese Porcelain

As explained above, Chinese porcelain is generally blue in tint and hand-painted, following a tradition that stretches back roughly 2,000 years. A total of 11 sherds from Highland City were classed as Chinese porcelain, separate from celadon above. All of these sherds came from pedestrian survey efforts in 2014 and 2016 (See Table 7.93).

Table 7.93: Chinese Porcelain Sherd Totals, Organized by Means of Collection

Chinese Porcelain	Total	Pedestrian Survey	STPs	TUs
2013	**0**	0	0	0
2014	**10**	10	0	0
2016	**1**	1	0	0
Total Sherds (n=)	**11**	**11**	**0**	**0**

Eight of the Chinese porcelain sherds recovered were body sherds; of these, six came from Transect ZZ. A set of five body sherds, associated with two rim sherds found nearby, came from a teaware vessel. Although faintly blue in tint, as is characteristic, the vessel was undecorated; one body sherd did have iron staining, however. Another body sherd, from a teacup, was decorated on the interior with an overglaze green and pink floral pattern.

The last two body sherds came from the eastern edge of the site. One sherd, from Transect Y, was decorated on the exterior with a gray-blue and green strip and dot pattern that is like the Bamboo pattern. The sherd came from a teacup. The second sherd was found on Transect Z. It was decorated around the exterior with a light blue annular band. On top of the band was a geometric border pattern of lines, which may be part of the Double Happiness pattern, although the sherd is too small to make a definitive identification. The vessel came from a small, thin hollowware vessel, likely teaware.

The last three sherds were rim sherds, all from Transect ZZ. Two rim sherds came from the same undecorated teaware vessel as the set of five body sherds mentioned above. The last sherd, from a teacup, was decorated with an overglaze floral decoration in green, pink, and yellow. Gold paint served as the stem for a pink flower on the sherd, while ghosting of a vine-like pattern and second flower was visible. This sherd was finely potted and translucent when held to light.

Table 7.94: Minimum Number of Chinese Porcelain Vessels Found

	Total (n=)
Teacups	**3**
Teaware	**2**
Total Vessel Minimum	**5**

Overall, the Chinese porcelain fragments speak to the presence of at least five vessels on the site: three teacups and two teaware vessels (See Table 7.94). Additionally, as with other Chinese ceramics, the majority of the ceramics clustered in the westernmost quarter of the site – in particular along Transect ZZ; however, as before, a small number of sherds also came from the far eastern edge of the site, along Transects Y and Z, further indicating a possible Chinese assemblage there as well.

Japanese Porcelain

Japanese porcelain first emerged at the beginning of the seventeenth century and was traded to Europe through the Dutch and Portuguese. Japanese porcelains lost popularity by the middle of the eighteenth century. By the 1820s and 30s, Japanese potters were producing porcelain for social classes beyond the elite, making the wares cheaper and more widely available. In the 1850s, Japan produced wares for foreign trade once more, focusing especially on tableware for European and North American consumers.

Table 7.95: Japanese Porcelain Sherd Totals, Organized by Means of Collection

Japanese Porcelain	Total	Pedestrian Survey	STPs	TUs
2013	**5**	5	0	0
2014	**4**	4	0	0
2016	**3**	3	0	0
Total Sherds (n=)	**12**	**12**	**0**	**0**

A total of 12 Japanese porcelain sherds came from the excavations at Highland City. While sherds came from all three years, they were only recovered through pedestrian survey (See Table 7.95). Eight of the sherds recovered were body sherds, nearly all recovered from between Transects XX and B. One sherd came from Transect XX. A teaware fragment, the sherd was decorated with an overglaze black decoration; ghosting from other decorations was visible. However, due to wear, the pattern was indeterminate.

Two sherds from Transect YY and two from Transect ZZ came from the same teacup. The sherds were bright white and molded into large, raised ribs. These were decorated with overglaze green leaves, pink flowers, and red, spikey, plant-like designs. Two undecorated body sherds also came from Transect ZZ and may have been from the same vessel as above, as the sherds were the same color in fabric.

The last body sherd was found on Transect G, in between the first and second artifact concentrations. Associated with three basal sherds, the body sherd was a small marley from a teacup saucer. The three basal sherds provided further diagnostic information. One sherd had a foot ring, another had an overglaze maker's mark, which read: "MADE I… / …APA…". Before it wore away, the mark likely read "MADE IN JAPAN". The third basal sherd bore a seal or maker's mark, also overglaze; the image looked like a stylized character. The last Japanese porcelain sherd was a rim sherd found on Transect B. It had a blue background similar to Winter Green, although slightly bluer. It was decorated with a small blue dot and a faint red diamond pattern on the interior. The pattern may possibly be the Japanese Imari pattern, but this is not definite.

In total, the Japanese porcelain sherds indicate the presence of at least four vessels (See Table 7.96). Recovered between Transects XX and G were two teaware vessels, a teacup, and a saucer. Nearly all of the sherds came from the first quarter of the site (n = 8), with four sherds found on Transect G, in the second quarter between the first and second artifact concentrations.

Table 7.96: Minimum Number of Japanese Porcelain Vessels Found

	Total (n=)
Teacups	**1**
Teaware	**2**
Saucer	**1**
Total Vessel Minimum	**4**

Other Porcelain

The last porcelain category encompasses all of the porcelain fragments that either do not fit into the categories above or – for the most part – are unidentified. A total of 47 sherds fell into this last group, recovered from all three years of excavation (See Table 7.94). Nearly all of the sherds were recovered through pedestrian survey efforts, although one sherd did come from Additional STP #1 on Transect C.

Most of the sherds recovered were body sherds (n = 28). Two sherds came from Transect YY. One, undecorated and bright white, likely came from a teaware vessel. The other was a teacup sherd, decorated with an overglaze green, pink, and black floral design. Eight sherds were found on Transect ZZ. Three sherds were likely from the same set, although they represented two different vessels. All three sherds were

Table 7.97: Other Porcelain Sherd Totals Organized by Means of Collection

Japanese Porcelain	**Total**	**Pedestrian Survey**	**STPs**	**TUs**
2013	**15**	14	1	0
2014	**14**	14	0	0
2016	**18**	18	0	0
Total Sherds (n=)	**47**	**46**	**1**	**0**

bright white and finely potted; they represented one teacup and one possible teapot or creamer fragment, as one of the body sherds was curved and spout-like. A set of four body sherds from Transect ZZ likely came from the same teaware vessel, likely a saucer. Three sherds were decorated with light green overglaze leaves and stems, outlined in dark gray (or faded black). A fourth sherd was decorated with a red-orange flower the the beginning of another stem with leaves. These four sherds likely came from the same vessel as a rim sherd with a similar design, found on Transect A.

Another set of five body sherds found on the transect came from the same tube-like vessel; two of the sherds were stained faintly pink on the obverse, as if a pink or red coating had faded. The interior of all of the sherds was white and appeared to have a matte finish. One fragment was faintly molded on the inside as well. The sherds all came from a narrow, cylindrical, hollow shape. Two rim sherds found on the same transect may be part of the same vessel or object. The sherds may be made of semi-porcelain. Semi-porcelain refers to ceramics that resemble porcelain but lack porcelain's translucency. Semi-porcelains often are high-fired earthenwares (especially ironstones) which have become vitrified enough that they resemble something in between earthenware and true porcelain and generally are considered to be nineteenth-century century ceramics. The final sherd from Transect ZZ was undecorated and too small to identify any vessel form.

Two body sherds came from Transect A. One was part of the pink-washed cylindrical object mentioned above. The other was a body sherd broken just before the base. It was decorated with a brown overglaze decoration on the exterior; underneath, the color of the body transitioned from white to yellow. The fragment likely came from a bowl. Three sherds were found on Transect B. One was a possible Haviland teaware fragment, decorated on the exterior with pink and red-brown overglaze flowers and green leaves. A second sherd had a faint ghosting of an overglaze design, which could not be further distinguished. The third sherd from Transect B was undecorated. The final sherd from the first quarter of the site was a body sherd excavated from Additional STP #1 on Transect C. A teacup fragment, it was decorated with an overglaze pattern of orange and purple flowers with green leaves. The last body sherd came from Transect W in the easternmost quarter of the site. Undecorated, this body sherd was likely associated with three lid sherds found also found on Transect W and from a small bowl lid.

Table 7.98: Recovered Other Porcelain Sherd Types

	Total (n=)	Pedestrian Survey (n=)	STPs (n=)	Test Units (n=)
Body sherds	**28**	27	1	0
Basal sherds	**2**	2	0	0
Rim sherds	**11**	11	0	0
Lid sherds	**3**	3	0	0
Handle sherds	**1**	3	0	0
Total Number of Sherds				**47**

Two basal sherds also came from the site, both from pedestrian survey on Transect ZZ (See Table 7.98). One basal sherd came from a saucer with a foot ring. It was decorated with dark and light green overglaze floral pattern. The second basal sherd came from a small pitcher or creamer and was associated with two rim sherds and a handle sherd. The basal sherd was decorated with two parallel horizontal lines of overglaze gold paint.

A total of 11 rim sherds came from the site, all found between Transects XX and D. One rim sherd, found on Transect XX, was from a thin teacup with a small light brown stripe on the top edge of the rim. Two sherds from Transect YY also came from a teacup; this one was decorated with a line of gold overglaze paint on the top edge of the rim. Six of the rim sherds came from Transect ZZ. One sherd likely came from the same thin teacup found on Transect XX; it too was decorated with a light brown stripe along the top edge of the rim. A set of two rim sherds were from the small pitcher or creamer mentioned above. The small vessel was decorated with a scalloped rim with large dots of overglaze gold paint on the exterior and a wide shoulder beneath the rim. Two other rim sherds on Transect ZZ were likely associated with the cylindrical, pink-washed object or vessel mentioned above. The last rim sherd on Transect ZZ was decorated with an overglaze pink flower and green leaves, all of which was outlined in black.

Two rim sherds came from Transect A. One was decorated with green leaves and a small piece of a pink or orange flower; it also had a light brown stripe on the edge of the rim. The sherd is likely from the same saucer as the four body sherds described above with a similar overglaze floral pattern. The other rim sherd was a part of a small bowl and included a portion of the vessel's base as well. The only decoration on the vessel was a small blue dot on the rim. The last rim sherd came from Transect D as well. It was decorated with a small dark green leaf and had a small stripe of brown on the top edge of the rim.

The last four sherds consist of three lid sherds and a handle sherd. The three rim sherds came from Transect W and were associate with the body sherd found there. The sherds appear to the be from the lid of a bowl. The handle sherd was associated with the pitcher or creamer mentioned above was made of rounded bars that formed a nearly rectangular shape; it was decorated with a thick stripe of gold overglaze paint on the exterior.

Table 7.99: Minimum Number of Other Porcelain Vessels Found

	Total (n=)
Teacups	**6**
Creamers	**2**
Teaware	**1**
Saucer	**1**
Bowls	**2**
Bowl Lids	**1**
Unknown Cylindrical Vessel	**1**
Total Vessel Minimum	**14**

The other porcelain assemblage speaks to the presence of at least 14 vessels on the site, including six teacups, two creamers – one with gold overglaze paint – one teaware vessel, one saucer, two bowls, one bowl lid, and one cylindrical, tube-like vessel with a narrow, rolled lip (See Table 7.99). Nearly all of the sherds recovered (n = 38) came from the westernmost quarter of the site, between Transects XX and D and clustering on Transect ZZ in particular. Nine sherds, however, came from Transect W, in the easternmost quarter of the site.

Chapter VIII. Conclusion

Introduction

In this final chapter, I place Smuttynose Island, Maine and Highland City, Montana side-by-side through a comparison of their ceramic assemblages, as well as the wider trends in the sites' respective artifact assemblages as a whole. The comparison, described in detail below, illustrates the similarities at the two resource extraction communities, despite their geographical and temporal distance from one another. As discussed in Chapters Four and Five, both Smuttynose Island and Highland City were seemingly isolated resource-extraction communities. However, the two settlements represented key nodes in a large web of global, domestic, and local interactions of trade and exchange. Within the tangle of this web were both legal activities, such as contracts for barrels of fish or ounces of gold, and extralegal activities, like harboring pirates and turning a blind eye to road agents.

The ceramic assemblages indicate the interconnectedness of both sites with the larger world around them, as indicated by large numbers of non-local wares. As is discussed below, these two locations truly represent frontier locations, as the material culture with which they are associated provides physical evidence of the interactions of varied cultures – and their material culture – at the site. From a demonstration of a preference for objects from back home, in the form of North Devon tall pots and Winter Green bowls, to the use of local resources, such as seagull and bison, Smuttynose Island and Highland City represent settlements that witnessed the collision and collusion of cultures and ideas so typical of frontier zones. However, as resource extraction communities, these borderland towns were far more than frontier outposts. Both seemingly remote locations regularly received expensive, high prestige imports; customized white Westerwald stoneware from the Rhine River valley in Germany and Chinese porcelain graced the tables at the Smuttynose Island Saloon, while French Champagne from Reims, Chinese opium, English ironstone, and ocean-living clams and oysters found their way to the saloons of Highland City.

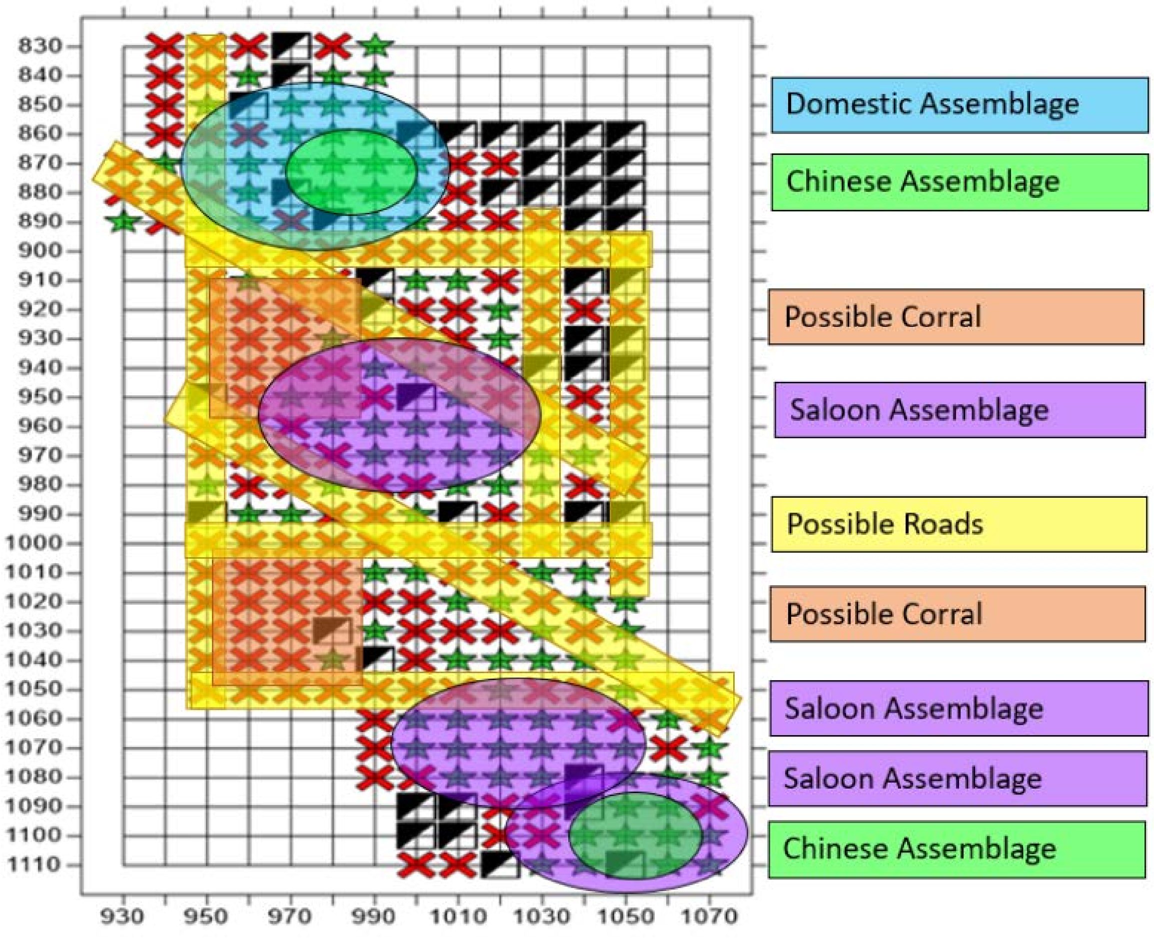
This final chapter first examines the activity areas mentioned in Chapter seven before turning to a brief description of the ceramics from Smuttynose Island – analyzed in detail in my Master's Thesis (Victor, 2011). This data are then compared with that of Highland City and a discussion of the patterns elucidated follows. This chapter finishes with a focus on the potential for future research at the site.

Highland City Activity Areas

Three main activity areas appeared at Highland City (See Figure 8.1). At the far western end of the site, covering an area of roughly 50 to 60 meters, is a domestic activity area filled with trendy patent medicine bottles, gold-painted porcelain, and High Victorian molded shaving cups (one with the devil Mephistopheles embossed on it). The area also yielded Chinese celadon or Winter Green porcelain, Chinese Brown-Glazed Stoneware (CBGS) that once held preserved vegetables, oils, and saucers, such as soy sauce. The area also yielded an imported English tin of Colman's Mustard, and even evidence of smithing. Surprisingly, for landlocked Montana, this assemblage also yielded an oyster shell fragment and 26 clam shell fragments.

In the middle of the site, especially in an area about 40 to 50 meters wide, a second artifact assemblage speaks to the presence of a large saloon, which may have also had a dance hall and a hardware store attached. The largest amount of bone – and cut bone – on the site, along with painted ceramics, tumbler and mirror fragments, bitters bottle and beer bottle glass fill the area. Uniquely this second assemblage also yielded evidence of at least 12 French Champagne bottles – one of which had foil that read 'Reims". A commercial-sized opium tin

Figure 8.1: Highland City Activity Areas (in Blue, Green, and Purple), Corrals (in Orange) and Roads (in Yellow)



also came from excavations here, indicating that this was a place where opium was not only used, but sold.

The third artifact assemblage found clusters along the eastern edge of the site grid, although this does not mark the eastern edge of the town itself – which may extend as much as 100 meters further to the east. Glass from patent medicine, beer and liquor bottles, along with mirror glass came from this concentration, along with the beginning of a possible second Chinese assemblage, seen in the form of Winter green and Chinese porcelains, as well as CBGS and Chinese stoneware ginger jar fragments.

The excavations also indicate the presence of at least eight possible roads and two large, rectangular areas that may have been corrals. Both the road and corral areas demonstrated a paucity of artifacts and, in particular with the roads, particularly packed soil, as if beaten down by hooves, wheels, and foot traffic. The roads found create a grid-like pattern, with horizontal, diagonal, and vertical areas of negative artifact space, found especially in the STPs. One of the roads, which runs along Transect O (1000 E), yielded only negative STPs and few artifacts through pedestrian survey. As mentioned in Chapter 6, a 1 x 1-meter test unit, Test Unit 2, further proved the dearth of artifacts and the hard-packed, worn nature of the silty clay stratigraphy.

The Smuttynose Island Ceramics

The ceramics at Smuttynose Island clustered in two of the site's three main activity areas, the fish processing area producing little in the way of ceramics. As discussed in Chapter 6 and in Victor, 2011, a distinct domestic assemblage and tavern assemblage emerged through ceramic analysis. This next section briefly discusses both the tavern and the domestic assemblages at Smuttynose Island.

Tavern Ceramics

The largest category of ceramics found in the tavern assemblage was that of earthenwares. Of these earthenwares, most of them were coarse, lead-glazed earthenware, numbering 2,413 sherds, with at least 100 different vessels found. Most of these pertain to storage, tableware, and drinking. Specifically, at least four tall pots were found, which often help provisions such as salted meat and were then kept as storage vessels for beers and ales because of the fairly watertight glazing on the tall pot's interior (Clausnitzer, 2011). Several rim sherds off of drinking mugs were found as well. These redwares are likely either locally made on the

American mainland or are imported from England. Coarse earthenware ceramics from North Devon were also found in fairly high proportion, with at least 46 vessels, which includes at least nine tall pots. Most of the North Devon ware is smooth (n=954 sherds) although there are gravel-tempered wares in the assemblage (n=125 sherds). Additionally, several North Devon sgraffito pieces were found (n=33), which can be grouped into at least eight vessels. These appear to take the form of tableware.

The next largest group represented in the assemblage is that of tin-glazed enamelware, comprising 534 sherds and at least 34 vessels. The place of manufacture for these wares varies widely, with ceramics from Portugal, Spain, the Netherlands, and England. Much of the tin-glazed enamelware vessels are in the form of tableware. Border Ware ceramics, including storage and tableware vessels were also found in the assemblage (n=24 with at least three vessels), as were Iberian storage and small olive jars (n=4 with at least three vessels), New England slip-trailed redwares (n=31 with at least two vessels), and a very small amount of North Italian sgraffito and marbled slipware (n=7 with at least one vessel), as well as European polychrome slipware (n=2).

Several Staffordshire slipware earthenwares were found in the assemblage, much of which was comb-dragged (n=60). At least five vessels were found that were made of this fine ware. Additionally, Jackfield (n=2 with at least one vessel), Jackfield type (n= 38 with at least four vessels), Whieldon Ware (n=9 with at least 2 vessels) and Rockingham (n=4) were found. Whitewares also appeared in the assemblage, including creamware (n=304 with 18 vessels), plain pearlware (n=509 with at least 23 vessels) and painted pearlware (n=160 with at least 22 vessels), hard whitewares and ironstones (n=34 with two vessels) and transferwares (n=12).

These whitewares are comprised of teaware and tableware vessels, but do not feature other common vessel form types for this ware, such as chamber pots.

Stonewares make up roughly four percent of the assemblage, and include Rhenish Bellarmine/Bartman and Westerwald vessels, English Staffordshire white salt-glazed and scratch blue stonewares well as English Brown, Nottingham brown refined stoneware and Bristol Glazed vessels. At least 64 stoneware vessels were found in total, with the vast proportion of them pertaining to drinking mugs, jugs, and other storage vessels, likely used for alcohol storage.

The assemblage contained sixteen porcelain sherds and they appear to be both Chinese and English in manufacture. All four of the vessels found were teaware.

Town Ceramics

The trends mentioned above differ from those found in the domestic spaces on Smuttynose Island. Redwares still comprised the largest number of ceramic sherds with 1,601 sherds in total and at least 41 vessels. However, none of the more expensive wares such as tin-glazed enamelwares (n=63), fine stonewares (n=182), or refined earthenwares such as Staffordshire (n=37) were represented in the same proportions. Additionally, only four pieces of porcelain were found. Most of the ceramics recovered from this area, aside from the redwares mentioned above, were refined whitewares, namely creamwares (n=912), plain (n=1,265) and painted pearlwares (n=503), whitewares (n=229), and transferwares (n=198). This seems to indicate that the ceramic assemblage increased in size later in the settlement's history, once these whiteware ceramics, which were mass-produced, were available at a more middling class price.

Placing the Smuttynose Island Tavern's Assemblage on a Continuum

The ceramic assemblage has been crucial in establishing the specific nature of the tavern on Smuttynose Island and in total, I conducted analysis on 11,004 ceramic sherds the site. In my

2011 Master's Thesis, I placed Smuttynose Island on a continuum through the use of comparative data from published excavation reports on Pemaquid, Maine and Port Royal, Jamaica; this continuum placed the urban port city of Port Royal at one end and the fishing plantation of Pemaquid at the other. The excavations at Smuttynose Island revealed that the settlement had neither a collection of urban buildings, large houses and taverns like Port Royal nor was it a fishing plantation owned by a wealthy planter like Pemaquid (Victor, 2011).

The ceramic assemblage from Smuttynose Island's tavern, when compared to the two other sites, revealed a pattern similar to the larger but less wealthy Pemaquid, but with wider variety of ware types and more expensive wares, similar to that found at an urban port, like Port Royal; in fact, Smuttynose Island had a wider variety of wares than Port Royal, even taking into account the wares which came after the 1692 earthquake that destroyed the Jamaican city. This variety speaks to the multitude of routes and contracts associated with the independent fishing masters at the Isles of Shoals and highlights an intriguing distance from the typical 'triangle trade' model for the fishing, discussed in depth in Victor, 2011. Smuttynose Island at occupied a critical place on the landscape of Atlantic World trade – due to its role as a wealthy resource-extraction community – and offered it amenities beyond that of a standard fishing plantation and even on par with some port-city taverns. Smuttynose Island's tavern had the potential to compete with both larger fishing stations and port-city taverns for the time and money of merchants, sailors, the settlement's own fishermen and, as evidence suggests, even a crew of pirates (Victor, 2011).

The Highland City Ceramics

A total of 2,2224 ceramics came from the three years of excavations at Highland City, which represents just over 7% (7.5%) of the site's complete assemblage of 29,629 artifacts. As with Smuttynose Island, earthenwares comprised the largest proportion of the ceramics assemblage (n = 1,326 or 59.6%) and indicated the presence of at least 157 of the 252 ceramic vessels identified at the site. For the purposes of comparison, the 11 sherds of tin-glazed enamelware (comprising at least one vessel) from Highland were separated from the total number of earthenwares found, just as they were with the Smuttynose Island assemblage. Additionally, the ten ceramic pipe fragments found at Highland City, and indicating the presence of nine different pipes, are not part of the earthenware analysis, as those recovered at Smuttynose Island (n = 4,897) represent a separate class of the Shoals data. The final category removed from this analysis are clay pigeon fragments (n = 522).

A total of 709 earthenware ceramics came from the domestic assemblage, found in the six westernmost transects on the site. The second artifact concentration, likely a saloon, general store, and brothel together, yielded 377 earthenware sherds and the final artifact assemblage, a second saloon, yielded 176 earthenware fragments. As with Smuttynose Island, the domestic assemblage at Highland City had the largest number of earthenware sherds, consisting – for the most part – of utilitarian whitewares (including ironstone). Tin-glazed enamelware still continued to be expensive in the nineteenth century, although – as noted in Chapter 7 – it was far less common. Nine sherds of Victorian majolica, as it was called, came from the domestic assemblage and another two sherds came from the saloon assemblage on the eastern edge of the site.

As was shown in Chapter 7, 238 stoneware sherds came from the excavations at Highland City. Of these, 194 clustered in the domestic assemblage, 32 clustered at the site of the first saloon, near the middle of the site, and 13 clustered at the second saloon sight on the eastern edge of the site. The stoneware sherds were the second-highest represented group at both

Highland City and at Smuttynose Island. However, at Smuttynose, while stoneware appeared at both the domestic and the tavern activity area, there were far more present at the tavern. At Highland City, the majority of the stoneware sherds (n = 194) came from the domestic area, with the saloons yielding 45 sherds; however, rather than reflecting a wealthier domestic assemblage that that of Smuttynose Island, this speaks to the change in material culture in the nineteenth century. The stoneware recovered from the domestic assemblage were all utilitarian wares, many of which replaced redwares that dominated seventeenth- and eighteenth-century assemblages for storage and cooking. Stonewares comprised roughly 4% of the tavern assemblage on Smuttynose Island, while they comprised 7.4% of the saloon assemblages at Highland City, which further indicates that these stoneware vessels were more prevalent across activity areas in the nineteenth century and no longer represented prestige ceramics. Additionally, 101 of the 194 stoneware sherds found in the domestic activity area were Chinese ceramics, including dry-bodied stoneware opium pipe bowl fragments and Chinese Brown-Glazed Stoneware (CBGS), a ware type distinguished by its ubiquity and utilitarian function in Chinese domestic assemblages. The fact that the domestic assemblage is also largely a Chinese assemblage explains the presence of these ceramics.

Porcelains comprised 5.3% of the ceramics found, with 117 sherds recovered from the site. As with the stonewares, many of these porcelains also began to lose their prestige as trade routes further opened and wares – especially from Japan and China – became easier to access. A total of 99 porcelain sherds came from the domestic area at Highland City, while 18 sherds came from the saloon assemblage at the eastern edge of the site. No porcelains were found in the saloon assemblage in the middle of the site. As with the stonewares, several artifact types indicated the presence of a Chinese settlement rather than an expensive Chinese import. Winter

Green porcelains, also known by archaeologists as celadon, dominate the porcelain assemblage and comprise roughly a quarter of all of the porcelain fragments recovered (n = 29 or 24.7%). Winter Green porcelains frequently appear on Chinese sites, however, and were designed to be utilitarian while imitating ceramics designed for the Imperial Court. As such, as with the stonewares, the large number of porcelains in the domestic area more to do with the presence of a Chinese community there than a lack of prestige items in the saloons. Interestingly, the porcelains found at Smuttynose Island's tavern comprised 4% of the total ceramics found there, while they comprised 3% of the total ceramics found at the saloons of Highland City.

Conclusions and Opportunity for Further Research

The ceramic comparison – out of context – seems to indicate that Highland City's assemblage is a reversal of the pattern seen at Smuttynose Island. However, the comparison highlights the change in material culture from the seventeenth through the nineteenth century rather than a change in prestige items in drinking spaces. Stonewares dramatically increase in number and variety in the nineteenth century, as do porcelains. As such, they lose much of their prestige status. To see large numbers of the nineteenth century's equivalent of coarse earthenwares and redwares in the domestic assemblage is no surprise, as this trend did in fact appear in the domestic area of Smuttynose Island.

The wide array of international imports that so characterized the tavern at Smuttynose Island appear within the saloons at Highland City as well; however, they appear in the glass assemblage, rather than the ceramic assemblage, which trends toward the utilitarian. The glass assemblage indicated the presence of imported French liqueur bottles as well as champagne bottles from Reims. They also speak to the presence of Sazerac bitters (manufactured by PHD & CO), Old Cabin and Kelly's Log Cabin bitters, Ayer's Sarsaparilla, Brown's Jamaica Ginger

Essence, delicate pressed-glass vessels, including an aqua Union Clasped Hands flask, and graphite electrode-powered electric arc lamps. The saloons also yielded up the site's only imported opium tin. As noted in Chapter 7, the opium tin was what Americans referred to as "half-pound" tins, carrying 6.5 ounces (or 5 Chinese *liang*). These tins contained far more opium than an individual could use As such, they generally appeared at stores, where the drug was sold by the ounce, or at smoking parlors, where smokers could purchase the chance to smoke the house blend, drawn from a mixture of various grades of opium, each originally in a half-pound brass tins.

Like Smuttynose Island, Highland City was a node in a larger network of trade that extends far wider than its remote location would indicate. Just as there was a demand for fish in the seventeenth and eighteenth century, there was a demand for gold – as well as silver, copper, and garnet – in the nineteenth century. As a result, there was an impetus to export and ship to Highland City. The miners there had gold, both as a product and as capital, and they used this to bring in English mustard, French champagne and liqueur, patent medicines and bitters from across the United States, and even clams and oysters into the seemingly inaccessible mountain town. As Chapter 5 observed, the town even had a stop on the US Postal Route, which meant that the town was important enough to trek up to in order to deliver mail and news; many smaller towns would have had to come to a place like Highland City to receive their own packages.

The presence of imported French champagne, Chinese opium and ceramics, and English Mustard, along with clams, and oysters, speaks to the purchasing power of the miners at Highland City – in spite of their remote location. However, just as the inhabitants of the Isles of Shoals threw seagull stew into expensive bowls, the patrons of Highland City's saloons dined not only on cattle, but on large local game such as bison, elk, and moose – and possibly even hawk.

Frontier spaces represent places where new patterns of behavior emerge and leave their imprint on the material record as much as on the historical imagination. The combination of wild, local, and sometimes unexpected, food choices with expensive, imported goods personifies the frontier experience, proving Madelon Powers right: drinking spaces are indeed a "cross-section" of the larger population of a town, especially one on the frontier.

In that vein, there is much for future research at the site of Highland City. As mentioned above and elsewhere in this research, the site grid of 29 transect lines and 199 grid points stands at roughly 316 meters, or just around two football fields in length. However, this likely represents roughly half of the site of Highland City, perhaps even only a third. The westernmost and central activity areas noted above have edges where, after a certain point, no further artifacts associated with the activity area were found. The easternmost activity area, however, has a clear western and southern edge. The northern and eastern edges, on the other hand, are indeterminate and Transect Z, the easternmost transect on the site, was also one of the most productive. The evidence indicates that the site continues to the east and northeast after Transect Z. During the end of the 2016 season, I observed several scant house foundations roughly 100 meters to the east of Transect Z, beyond a ridge. Locals, including descendants of the original miners of Highland City, also pointed out these foundations at the end of the excavation season.

No extant map exists for Highland City; as such, Figure 8.1 is the closest approximation to a town layout at present. Further excavations to the east have the potential to substantially contribute to the understanding of Highland City, its city grid and layout, its activity areas, and its inhabitants. The presence of a second Chinese assemblage at the eastern edge of the site also stands to provide information about the Chinese inhabitants on the site, by doubling the number of known areas of settlement. Questions concerning day-to-day activities of the Chinese inhabitants at these two locations has the potential to reveal the professions of these immigrants, who perhaps were not all miners, as well as the gender and age makeup of the population.

Questions of gender across the site overall also still pose much for exploration. The presence of a heel from a woman's dancing shoe, along with delicate floral teaware sets, indicates the presence of women at Highland City. Whether these women were family members of the miners or camp followers who worked in the saloons and dance halls bears examination, especially as to the ways that such an exploration could challenge or support conceptions about women in the Wild West of nineteenth century Montana. Similarly, no information pertaining to children has appeared in the archaeological record thus far. Excavating to the east may reveal marbles, toys, or even evidence of children's shoes; if the area continued to lack a children's assemblage, the paucity itself would speak to the conditions and the population of the town.

Finally, documentary records indicate the presence of ten saloons and five saloons. At present, two to three of the saloons and possibly one of the dance halls have been located; as such, the archaeology has not even identified half of the original drinking spaces at Highland City. With more of the site examined, the excavations could locate the additional saloons and dance halls – or prove them an exaggeration codified in the historical record. The rest of Highland City and the story of its inhabitants awaits just beyond the ridge east of the site grid.

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