LIFE IN AN INDUSTRIAL VILLAGE: THE ARCHAEOLOGY OF CABIN B AT THE COWELL LIME WORKS HISTORIC DISTRICT, SANTA CRUZ, CALIFORNIA

by

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in

Cultural Resources Management

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12 July 2012
Date

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LIFE IN AN INDUSTRIAL VILLAGE: THE ARCHAEOLOGY OF CABIN B AT THE COWELL LIME WORKS HISTORIC DISTRICT, SANTA CRUZ, CALIFORNIA

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ABSTRACT

Purpose of the Study: This thesis is based on the excavations carried out at Cabin B to investigate the foundation for the Friends of the Cowell Lime Works volunteers who are restoring the cabin, to recover a range of artifacts left by the occupants of the cabin, and through the analysis and interpretation of those artifacts, to learn more about the daily lives and domestic behavior of the lime workers who lived there. The primary goal of this thesis is to analyze and interpret the Cabin B archaeological collection and related data to learn more about the workers at this complex. This archaeological assemblage consists of the material remains of the daily lives of the lime workers and can contribute information about rural industrial life in California in the late nineteenth and early twentieth centuries. This thesis attempts to fill a void in the scholarship concerning the ordinary workers in the Santa Cruz lime industry, who are important because of lime's significance to the economic and cultural background of the Santa Cruz area.

Procedure: Except for the minimal information provided by United States Bureau of the Census documents, history has told us little about these workers. However, additional information provided by other types of historic documents contribute to an investigation of daily life at the ranch and of the lives of individual workers. Oral histories with Cowell employees and their descendants are another valuable resource. The information contained in the archival sources is compared and contrasted with information in the archaeological record, analyzed with the Sonoma Historic Artifact Research Database (SHARD), to show how archaeology can enhance our knowledge of history by supplementing this information, and by substantiating or refuting the information in the historic record.

Findings: The findings chapter brings the historical research and archaeological investigation and analysis together in an interpretive framework in order to bring out the meanings and significance of the results of the examination of Cabin B at the Cowell Lime Works National Historic District. I use the results of the Cabin B investigation to compare and contrast this site with other sites at the Cowell Lime Works and with an

additional site, the Alabama Gates Camp on the Los Angeles Aqueduct, and use this information to reveal more about the lives of the ordinary workers in the Santa Cruz lime industry. My work has contributed to the archaeological and historical trend of the investigation of "households that are poorly documented" (California Department of Transportation 2008:179).

Conclusions: I have added substantial personal information about some of the workers that was gathered from historic documents, and used an analysis of the artifact assemblage to view the lives of the residents at Cabin B in more detail. I have uncovered much information about the laborers in the lime industry in Santa Cruz County, the cultures of their homelands, and their daily lives as immigrant laborers in California. Through the comparison of the lives of the Cowell Ranch workers and the Alabama Gates laborers on the Los Angeles Aqueduct, I have exposed similarities and differences between these two groups and the work they did. Although the settings and the nationalities of the men differed, the evidence from the archaeological assemblages shows many similarities among the two groups of workers. The research questions that are the focus of this thesis, when applied to both assemblages, suggest that the daily lives of young, immigrant, single working-class men during the late nineteenth and early twentieth centuries in California, no matter where they were located, were comparable. The similarities and differences in their lives, in many instances, may have been related to the different levels of social control that pertained to the two living situations.

Chair:

Signature

MA Program: Cultural Resources Management
Sonoma State University

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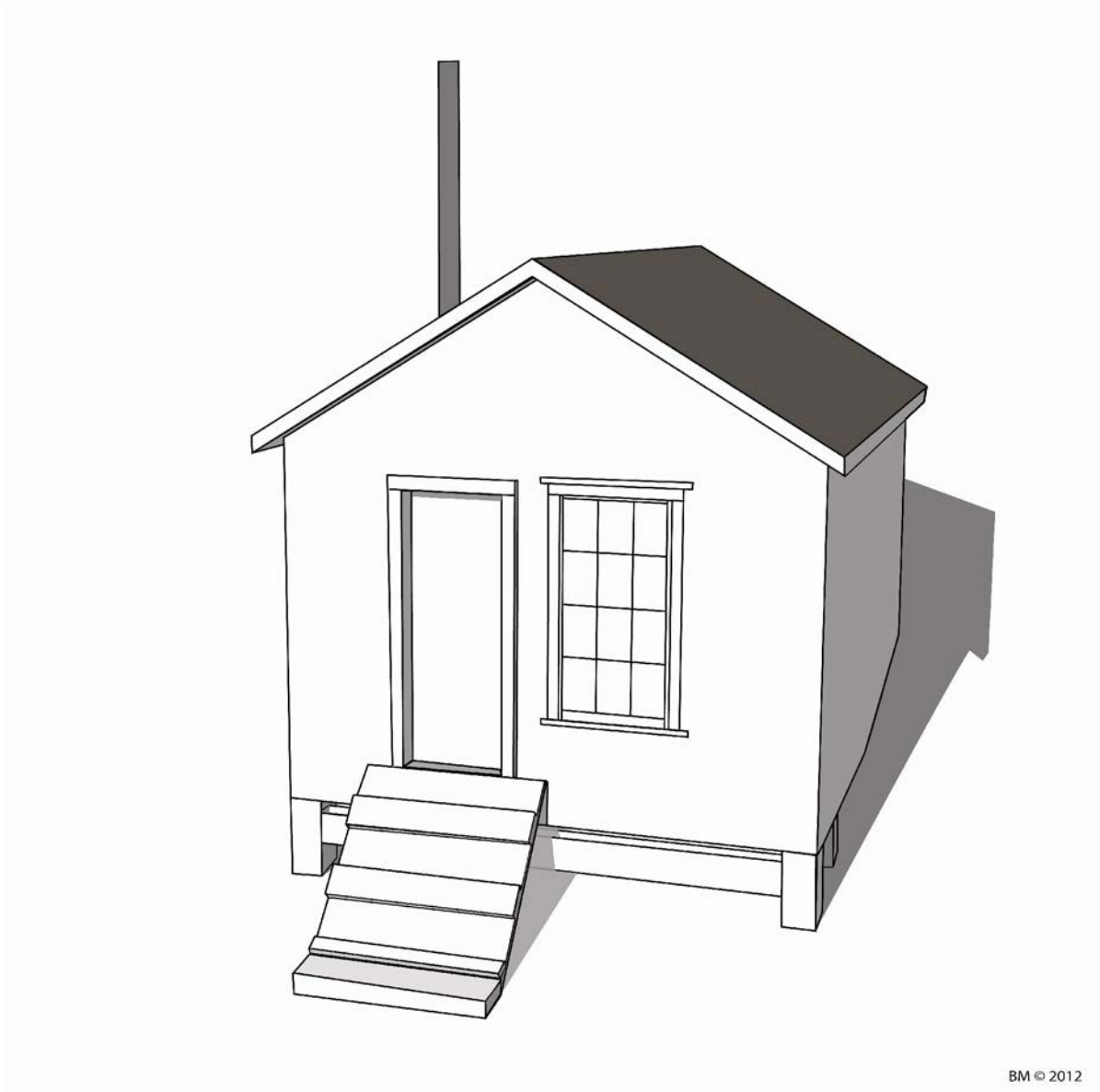


Figure 1. Artist's Interpretation of Cabin B When Occupied. Based on ca. 1910 Panoramic Photograph of the Cowell Ranch Lime Operation (Figure 2).
(Branden Melendez)

CHAPTER I

INTRODUCTION

OVERVIEW

This chapter introduces and summarizes the Thesis Statement, the Thesis Project, and the purpose and goals of the study. A short synopsis of the subsequent chapters in this thesis document follows. I also examine the establishment and listing of the Cowell Lime Works Historic District (Cowell Lime Works) on the National Register of Historic Places in 2007. I conclude with a description of the citizens group, Friends of the Cowell Lime Works Historic District.

THESIS FOCUS

Historic document research and the archaeological excavation and analysis of the resulting artifact assemblage from a small workers' residence (Cabin B) at the Cowell Lime Works have revealed information about the primarily single, immigrant men who lived in this rural industrial complex around the turn of the twentieth century. This complements the small amount of information known about these resident workers from U.S. Census and oral history sources.

In this thesis I study the common laborers at the Cowell Lime Works in Santa Cruz, California through archaeological and archival research and demonstrate the importance of studying these men using historical archaeology. Information is available about many of the owners of the lime companies in this region; however, until my study of the average workers at the Cowell Lime Works, few archaeological or historical investigations have been done with a specific focus on the mostly single, male immigrants who performed the majority of the manual labor that contributed to the production and distribution of Santa Cruz lime and its reputation throughout California and the West as a superior product for construction purposes. The Cabin J data recovery report on cultural resources management company, Pacific Legacy's, archaeological investigation of another workers' cabin at the Cowell Lime Works, touches on some of

these topics, but does not include the detail and range of information contained in this thesis (Reese 2007).

My work is part of a historical and anthropological trend that began in the 1970s with the New Social History, which includes the study of everyday life, ordinary people, and "households that are poorly documented." Through the study of the material culture left behind, historical archaeology can provide much information about an individual or group's history (California Department of Transportation 2008:179). Limited documentation significantly contributes to the difficulties of learning about the Cowell lime workers. My research brings out information not previously investigated by scholars, and synthesizes data from many different areas and sources which helps reveal a more complete picture of the lives of the Santa Cruz lime workers than history or archaeology can communicate alone.

The workers in this industry are important to the history of the Santa Cruz area, especially because the lime industry had significant influence on its residents during the late nineteenth and early twentieth centuries and on the economic background of the city of Santa Cruz. This study attempts to fill a gap in the historical record concerning ordinary workers. The large majority of people throughout history were common laborers, representing most of the ancestors of American citizens today. We know little about these workers' daily lives. It is important to expand this knowledge so that we can understand how our forebears lived during the late nineteenth and early twentieth centuries. By learning from their mistakes, we can create a better future for our children and grandchildren. I chose to investigate the immigrant backgrounds and immigrant experiences of the mostly Azorean/Portuguese and Swiss/Italian workers, their work existences in this rural industry during the peak production years, and their daily lives. All of these topics are important if we are to understand how these workers became part of the American population. How immigrants adapted their native cultures to life in the United States is a prominent topic of research in both history and archaeology.

Historical archaeology can teach us about ourselves by examining the "long-forgotten and often compelling histories of once anonymous folk," some with descendants still living today. Archaeology can discover the details of day-to-day life and common everyday events usually considered too mundane to record and discuss in

history books. In historical archaeology, personal histories and experiences are often as important as conventional narrative history (Orser and Fagan 1995:5–6).

According to Barbara Little, through historical archaeology we have been able to retrieve information about the past that has been obscured, hidden, or ignored (Little 2007; Wood 2008:267). The "mute and dispossessed" of society rarely appear in written records (Murray 2008:234). Reclaiming this lost information gives modern people a more accurate view of history. Society's current topics of concern influence our choices of study and interpretation, and our understanding of the past can influence our current ideas, attitudes and relationships (Wood 2008:267). If we can reveal and understand the past, we can improve the present and the future. Learning about the past through archaeological investigations helps modern people understand how our world and our past developed and evolved and "stimulates creative and alternative visions of the future" (Wood 2008:267). Through community historical archaeology, we can produce information that can challenge the "lies, misperceptions, and partial truths of the past that create modern social injustices," along with prejudices and fear (Little 2007; Beaman 2011:190). We can then use knowledge about history obtained through historical archaeology to inform the public and to "promote reconciliation, equality, and respect" despite problems and conflicts in the past (Silliman 2008:612).

Thesis Statement

Although little information is available in the historic record about the ordinary workers in the Santa Cruz lime industry, through more in-depth archival and document research and through the excavation of a lime workers' cabin, I have learned a great deal about the lives of the laborers and craftsmen who worked at the Cowell Lime Works. These men provided the vital energy needed to produce this important commodity that significantly contributed to the development of the Santa Cruz area, the state of California, and the western region of the United States. The primarily Portuguese and Italian immigrant workers lived in small cabins and a bunkhouse, ate company-provided meals at the nearby cookhouse, but supplemented this food by foraging for local resources like fish, shellfish, and small game animals. Most were literate, they wore American-made work clothing, they drank wine and liquor, they smoked Prince Albert

tobacco, and they were self-medicating with patent and proprietary medicines to treat a variety of maladies and complaints.

THESIS PROJECT

The 30-acre historic Cowell Ranch lime production site consists of the lime production facilities, cow, oxen, and horse barns, and an employee residential complex. The Cowell Lime Works Historic District was listed on the National Register of Historic Places in 2007. The site is significant due to the role the Cowell Lime Works played in the early lime industry and in the economic development of Santa Cruz and California from the 1850s through the 1920s, the period of this thesis project. During this time, the state was undergoing rapid development and lime was a crucial component of construction. The Cowell Lime Works helped to satisfy the demand for lime for mortar, plaster, whitewash, and for a variety of industrial uses (Perry et al. 2007:130).

In 2009, the Friends of the Cowell Lime Works began restoration activities on Workers' Cabin B, one of the last two employee dwellings standing within the Historic District. In conjunction with this restoration project, archaeological investigations were carried out both under the floor and around the perimeter of the cabin. Approximately 17,000 artifacts were recovered, including structural components, food-related artifacts, personal items, and the remains of clothing and footwear.

Purpose of the Investigation

The main purposes of the excavations were to investigate the foundation for the Friends of the Cowell Lime Works volunteers who are restoring the cabin, to recover a range of artifacts left by the occupants of the cabin, and through the analysis and interpretation of those artifacts, to learn more about the daily lives and domestic behavior of the lime workers who lived there.

Goals

The primary goal of this thesis is to analyze and interpret the Cabin B archaeological collection and related data to learn more about the workers at this complex. This archaeological assemblage consists of the material remains of the daily

lives of the lime workers and can contribute information about rural industrial life in California in the late nineteenth and early twentieth centuries. Except for the minimal information provided by United States Bureau of the Census documents, history has told us little about these workers. However, additional information provided by other types of historic documents, for example, ships' passenger lists, California Voter Registers, World War I Draft Registration Cards, and Henry Cowell Lime and Cement Company records, contribute to an investigation of daily life at the ranch and of the lives of individual workers. Oral histories with Cowell employees and their descendants are another valuable resource. The information contained in the archival sources is compared and contrasted with information in the archaeological record, analyzed with the Sonoma Historic Artifact Research Database (SHARD), to show how archaeology can enhance our knowledge of history by supplementing this information, and by substantiating or refuting the information in the historic record.

The information revealed through Cabin B archaeology is considered within the context of other archaeological investigations done at this Historic District, including Cabin J, the cookhouse, and the blacksmith shop (Reese 2007; Baker 2009; Reese 2009). The Cabin B site is also examined in relation to an archaeological investigation at a company work camp in the western United States, the Alabama Gates Construction Camp (Van Bueren et al. 1999). Using the work of archaeologists such as Donald Hardesty, Adrian and Mary Praetzellis, and George Teague, I examine how archaeology assists in the interpretation of the ethnicity, identity, and experiences of immigrant working-class Americans (Hardesty 1988a; Praetzellis 2004; Praetzellis and Praetzellis 2001; Teague 1977).

I have worked alongside other volunteer archaeologists, historians, and interested individuals involved with the project in an effort to find evidence to help date the construction and occupation period for the cabin. A panoramic photo of a portion of the lime complex, dating to around 1910, shows Cabin B in the upper right corner (Figure 2). Therefore, we know for certain that it was built before then. We suspect that the cabin could have been built as early as the beginning of the 1880s because the peak popularity of this type of construction, known as box houses or plank/box style construction, was from ca. 1880-1920 (Jim Derby, personal communication 2011).

Figure 2. **Panoramic Photo of the Cowell Ranch Lime Operation Complex ca. 1910. Cabin B is the Small, White Building on the Far Right.** (UCSC Special Collections)

Research Questions

The foci of my research questions concern the identification of the resident population of the cabin and the daily lives of the average workers. Does the archaeological evidence point to bachelors, married couples, or families living in the cabin? According to the evidence of food preparation/consumption found, what types of cooking and eating activities were taking place at the cabin? In what ways were the workers supplementing the cookhouse diet with other foods, either bought by or gathered themselves? What does the archaeology tell us about how the residents of the cabin spent their leisure time? What do we learn about the workers' manner of dress through the archaeology at the site? What types of artifacts found at the cabin give information about whether the residents could read and write? What does the archaeological assemblage tell us about health issues experienced by the workers? What does the archaeology reveal about the ethnic backgrounds of the inhabitants and the degree that they retained their ethnic identities, or the ways in which they adopted American culture traits?

Analysis and Interpretation

I address the above questions through the archaeological analysis of Cabin B using the Sonoma Historic Artifact Research Database (SHARD) and the subsequent interpretation of the resulting data. Faunal bone, faunal shell, buttons, ceramics, and diagnostic artifacts are analyzed to contribute information addressing the research

questions concerning food procurement, preparation and consumption, ethnicity, women, children, literacy, health, and leisure time activities.

The data gained through this analysis is interpreted in relation to the other archaeological investigations done at the Cowell Lime Works (Reese 2007; Baker 2009; Reese 2009), and is compared and contrasted with information contained in oral histories concerning the Historic District. Elizabeth Spedding Calciano with the Regional History Project at the University of California at Santa Cruz (UCSC), interviewed George Cardiff, the last Cowell Ranch manager; John Dong, a Chinese Cook; and Adalbert Wolff, a ranch time-keeper, during the late 1960s and early 1970s (Cardiff 1965; Dong 1967; Wolff 1972). In addition, I reviewed the Cowell Company records available at the UCSC McHenry Library Special Collections for the purpose of further interpreting the daily lives of the lime workers.

I investigate the lives of individual employees through census, immigration, and naturalization records, voter registers, and other historic documents. I hope to trace the movements of these people from their homelands to the United States and within this country after their arrival. When did they arrive in the Santa Cruz area? Where did they come from? How long did they work for the Cowells? How long did they stay in the Santa Cruz area? Where did they go after they left the area? The answers to these questions contribute to the interpretation of the lifeway trends of the immigrant workers in the Santa Cruz lime industry.

PURPOSE OF THE CABIN B STUDY

Investigate the Foundation

The initial purpose of the Cabin B excavation was to aid the restoration efforts by exposing the foundation members to establish the type of foundation present, and the condition of the supporting beams to determine whether replacement was necessary. The cabin is orientated on a slope. The amount of soil movement down the slope over the past decades hid the rear foundation members under soil and required exposure in order that the foundation could be accurately investigated. Due to the moisture in the soil, the restoration director correctly suspected that the buried timbers would be extremely

deteriorated. In addition, significant portions of the boards making up the rear wall also needed to be replaced.

Recover Artifacts

The interest of the participating archaeologists expanded the primary investigation to include the recovery of artifacts left by the inhabitants to research the daily lives of the workers. Although some of the artifacts recovered from the exterior of the cabin may not be directly related to its residents and may have been deposited by others at the ranch, the items found beneath the floor of the domicile can confidently be associated with the people who lived there.

Synthesis of Historical and Archaeological Data

An additional goal of the investigation, analysis, and interpretation of the artifact assemblage and related research is a synthesis of the historical and archaeological data to formulate a more comprehensive understanding of the daily lives of the lime workers. Of specific interest are the average laborers about which little information is available in the historic record. Many were illiterate immigrants, a group that rarely appears in historic chronicles — "those considered of little importance, not worthy of 'notice,' by the dominant social, political, and economic group" (Scott 1994:3).

THESIS ORGANIZATION

Chapter 1 sets the stage for the rest of this thesis document. The opening section above includes the initial information, consisting of the why this study is important, the thesis statement, and a short description of the project, along with the goals, the research focus, and an explanation of the analysis and interpretation performed. The following section explains the purposes of the Cabin B study.

The formation of the Cowell Lime Works Historic District is detailed. This is followed by information about the founding of UCSC, including a description of the surviving buildings, both those that have undergone adaptive re-use and those that have been victims of the UCSC administration's neglect. The process of the Historic District's application and listing on the National Register of Historic Places is then described. This

portion of the thesis concludes with a short account of the formation of the Friends of the Cowell Lime Works, a citizens' volunteer group.

In Chapter 2, I discuss the development of historical archaeology, and the influence of the "New" Social History, the sub discipline, industrial archaeology, and also, lime archaeology, focusing on the area of Santa Cruz, California. I explain the benefits of the synthesis of this archaeological assemblage with historic documents and how this process reveals a more complete picture of the past. I review multiple sources and their influence and connections to this thesis, especially the sources focused on the Santa Cruz lime industry and specifically the Cowell Lime Works.

In Chapter 3, I explore ethnicity and immigrant identity in relation to Italian and Portuguese (especially Azorean) people's experiences in America and their assimilation into the dominant culture. This will give the reader insight into the lives of the common laborers at the Cowell Lime Works. How does the material culture, as evidenced in the archaeological assemblage, contribute to the expression of identity by immigrant laborers in the western United States? I then discuss the research questions I explored concerning the residents of the cabin, food preparation and consumption at the cabin, leisure time activities, literacy, clothing, health problems, and ethnicity. These questions are the focal points of this research into the lives of Cabin B's inhabitants.

Chapter 4 focuses on the historical context of lime production and the immigrants employed in the Santa Cruz lime industry. This chapter presents a short synopsis of the history of the use of lime, how lime was made, and the raw materials used in processing lime, along with a simple explanation of the technology and chemistry involved in its production. Subsequently, I discuss the historical background of the City and County of Santa Cruz, California. This includes information on the aboriginal inhabitants, the initial colonization by the Spanish, the transition to Mexican and Californio control, and the invasion by the Americans, who caused the collapse of the Californio culture. Following that, I summarize the history of the lime industry in Santa Cruz County, California, with a short biography of Henry Cowell, lime baron. I then describe the Cowell Lime Works operations with details about the lime production facilities, barns, employee residential complex, and other support facilities. Cabin B, the focus of this study, is described in detail, including its setting, its construction, and its layout. I used census and oral history

information to compile an inventory of positions held by men who worked at the ranch, ranging from management to semi-skilled to unskilled work. I explore the characteristics of common types of company towns, villages, and camps, centered around construction, mining, and logging.

Chapter 5, the methods and results chapter details the archaeological excavations at Cabin B, giving information about who performed the excavations, when the excavations took place, and how the excavations were carried out. I describe the manner in which the artifacts were processed and cataloged, including cleaning, sorting, and database entry. I then describe the artifact collection: bone, shell, ceramics, glass, and metal. Items that are datable or that are indicative of a specific place of origin are considered in this study to be diagnostic artifacts, and are treated differently than the other artifacts. Additionally, I introduce one outside comparative site collection from a company work camp in eastern California, the Alabama Gates Construction Camp.

In Chapter 6, I discuss the information revealed through my research on Cabin B using both historical documents available on the internet and the analysis of the archaeological assemblage. I compare the artifact collection recovered from Cabin B with the artifact collections from Cabin J, the blacksmith shop, and the Alabama Gates Camp, focusing on what we learn through this analysis. Artifacts relating to specific research questions are also discussed. I relate information about artifacts used to date the site, along with the dates reflected by the assemblage. I consider lifeway themes expressed by the assemblage and include tables showing information about the recovered artifacts. I conclude with a discussion of how the lives of the laborers at the Cowell Lime Works were similar to the lives of workers at the Alabama Gates Construction Camp.

THE COWELL LIME WORKS HISTORIC DISTRICT

The University of California at Santa Cruz

In 1961, the Regents of the University of California (UC) chose the Cowell Ranch site to build the ninth campus in the UC system and negotiated with the S.H. Cowell Foundation to purchase over 2,000 acres. In 1963, founding Chancellor Dean McHenry established the first administrative offices in the Carriage House. The development of the ranch into a UC campus required changes to the historic area. A new entry road was built,

necessitating removal of almost one half of the cooperage building. The construction of colleges and dormitories began in 1964 to the north of the Historic District and classes began in 1965 (Rodrigues et al. 1992:9). The early industrial lime production facilities and associated buildings remain at what is now the entrance to the campus. Hundreds of people drive through this area daily, but few know its significance (Paramoure 2009:6).

Surviving Buildings

The historic buildings and structures are the first visible architecture upon entering the campus. Figure 18 (Chapter 4) shows the many extant ranch buildings and remnants of the lime operation. The university did an acceptable job of adaptive re-use of many of the historic buildings on campus during the 1960s by converting many of the ranch buildings into offices, shop facilities, and storage, including the old Ranch House, the Carriage House, the Cook House, and some of the barns. The blacksmith shop became an artists' studio, with part of the forge still in place. One barn was turned into a theater, and the granary housed a children's day care center until a couple years ago.

Conversely, the university's attitude toward the non-converted buildings has been benign neglect. Abandoned buildings have been left to the elements, including the hay barn and the cooperage. Still in place are the Powder House and the Stone House, which once held a small store and the paymaster's office. These two buildings are made of limerock. The Stone House was used until the 1989 Loma Prieta Earthquake as offices for City On A Hill Press, the UCSC student newspaper, but has been used only for storage since that time due to its uncertain seismic stability. Only two of the many small workers' cabins that once dotted the hillsides above the industrial complex remain standing today, Cabin A and Cabin B. The kilns are still there, slowly crumbling away due to erosion and root intrusion (Paramoure 2009:6).

State and National Register Listing

In 2004, the UCSC office of Physical Planning and Construction applied for a Campus Heritage Grant from the Getty Foundation, "in support of preserving the unique cultural and historical resources at UC Santa Cruz" (Barnes 2004:1). The funds were intended to support the labor involved in filing an application for nomination for listing

on both the California Register and the National Register of Historic Places for the 30-acre core industrial and ranch complex at the main entrance to the UCSC Campus. One of the stipulations of the Getty Grant was that students be involved. I began work on the project, as a Cabrillo College Archaeology Technology student seeking experience in historical research, after Sally Morgan, the university's Senior Environmental Planner, contacted my Cabrillo College instructor, Rob Edwards, looking for interested interns. In May 2007, the State Historic Preservation Officer approved the district for listing on the California Register, and on 21 November 2007 the Cowell Lime Works Historic District was listed on the National Register of Historic Places.

Consultants, Architectural Resources Group, Inc. of San Francisco, drafted a Historic District Management Plan during 2005-2006. Sally Morgan of UCSC reworded this plan to better describe the district, add archaeological concerns, identify priorities, and correct errors. Important aspects of this plan include reconstruction of historic fences, intrusive vegetation removal, and storm water runoff protection for the historic structures. Morgan used the labor of UCSC undergraduate interns for this work (Architectural Resources Group and Morgan 2006).

Friends of the Cowell Lime Works

Also in 2007, a group of local history enthusiasts formed a support group, Friends of the Cowell Lime Works Historic District (Friends), whose mission is "to aid in the documentation, restoration, preservation and interpretation of the historic lime kilns and related structures and buildings of the Cowell Lime Works Historic District and other historic sites on the campus of UCSC" (Perry 2008:7). In August 2009, the Friends hosted the first-ever conference on "Lime and Lime Kilns in California History." The conference sold out with 80 in attendance, evidence of the interest and importance of lime to local historians and to the Santa Cruz community (Perry 2009/2010:1). Sally Morgan, UCSC planner and staff liaison for this group, developed a strong cooperative relationship that included setting up an internship program for the purpose of giving anthropology and history students valuable hands-on experience in various aspects of archaeology and historic restoration (Morgan 2010).

Following Chapter

The next chapter, Chapter II, begins with a discussion of historical archaeology and explores the development of this interdisciplinary study of historic material culture. I review the subfield of historical archaeology known as industrial archaeology. I consider examples of lime archaeology and examine previous archaeological work at the Cowell Lime Works. I discuss the changes that the "New" social history brought to the field of historical archaeology, and I finish the chapter with an examination of the benefits of the method used in historical archaeology of combining information obtained through archaeology with information in historic documents to obtain a more complete picture of people and cultures in the past.

CHAPTER II

HISTORICAL, INDUSTRIAL, AND LIME ARCHAEOLOGY

INTRODUCTION

This literature review discusses the development of the fields of historical and industrial archaeology, and emphasizes the changes that took place due to the influence of the "New" Social History during the 1960s and 1970s, which changed the trajectory of the scholarship from a focus on important buildings and historical sites to ordinary people and everyday events. Only one source (Perry et al. 2007) examines the lives of ordinary lime industry workers in detail; however, this source is historical and includes no archaeological information on the everyday lives of the primarily single male immigrant laborers and craftsmen who helped produce and distribute lime, an important building material at the time, during late nineteenth and early twentieth century California. Through my research for this thesis, I intend to fill this void in the scholarship using a historical archaeology focus.

HISTORICAL ARCHAEOLOGY

Definition

My study of the Cowell Lime Works falls within the archaeological sub-discipline known as historical archaeology, that emerged in the 1950s, and is defined in the United States as the archaeology of the period from about 1500 to the present (Hicks 2009:1). It is one of the most dynamic and changing sub-disciplines within archaeology today. Beginning around 60 years ago on the East Coast of the United States, it has expanded into a mature discrete subject focusing on the study of the archaeology of many societies and cultures around the world (Gaimster and Majewski 2009:xvii).

Any archaeology of literate societies can be considered to be historical archaeology, including ancient civilizations like Sumer, Greece, and Rome, because these cultures left written records. However, historical archaeology as practiced in the United States is limited to sites dating to after 1492 – the Post-Columbian Era, and involves European Americans or others whose presence is a result of European contact. The effects of this contact on the lifeways of Native Americans as they were forced to interact

with the new arrivals, known as contact-period archaeology, is just one way that scholars use historical archaeology to focus on the lives of people in the past (Deetz 1988:362).

Strengths

In the United States, historical archaeology has been included under the dual disciplines of both history and anthropology, and the greatest challenge to historical archaeologists is to sort through and make sense of the mountains of diverse written documents and material remains relating to historical societies (Gaimster and Majewski 2009:xvii). Through its ability to bridge the gap between anthropology and history, historical archaeology has become a point of intersection between artifacts and documents (Gaimster and Majewski 2009:xviii). Historical archaeology is unusual in that it has survived the many decades since its initial development as a hybrid field with the capacity to mix the material and theoretical perspectives on the past by combining method and interpretation (Hicks 2009:5, 6).

Sources by Deagan (1988) and Hicks (2009), although separated by twenty years, clearly explain the benefits and advantages of historical archaeology for specific types of research into the recent past. Archaeology's strengths lie in its multidisciplinary approach and the use of multiple types of evidence, especially written documents and archaeological artifacts, to interpret specific processes or events within the recent past, and it brings to light the remains of the daily lives of the undocumented people through the investigation of the material traces left behind. Historical archaeology has extended the field of archaeology into modern times, and brings the focus of archaeology into the twentieth century and the contemporary world, touching on material remains from periods remembered by our parents and grandparents. Orser (2001:622, 624) puts it quite succinctly when he explains that, historical archaeologists' multidisciplinary and wide-ranging investigation of the post-Columbian world enables the scholar to reach unique perceptions concerning our lives today by studying the recent not the ancient past. This link between the recent past and the present allows us to understand the past, learn from the past, and see how our world became what it is today. Through this deeper comprehension of the past, we can use this knowledge to make more informed decisions and plans concerning our future.

The Intersection of Archaeology, Historic Documents, and Other Data

Historical archaeology has bridged the gap between archaeology and history (Schuyler 1970; Ascher 1974; Deagan 1982; Schuyler 1988; Little 1994; Mallios 2009). It attempts to engage in complex enquiries of the data, using modern historiographic and archaeological methods (Deetz 1988:363). More than twenty years ago, Schuyler suggested that the future of historical archaeology lies in ethnography, by using both archaeology and written sources to illuminate people's everyday lives (1988:36). Both types of data contain information that can be synthesized into a more complete picture of the past.

In her article, "People with History: An Update on Historical Archaeology in the United States," Barbara Little advocates for historical archaeology to increase its role in assisting in the expansion of historical research and to continue to supplement historic information gleaned from documents, as archaeology has the ability to provide alternatives to the standard questions and interpretations within history. A portion of this historical supplementation includes creating new ways of writing about history that do not solely rely on historical documents for accurate information (Little 1994:7–8). For example, metal detecting and mapping of the historic Little Big Horn Battlefield (Fox 1993), tree-ring dating to investigate drought at Jamestown, Virginia, (Blanton 2000), and the use of oral histories to study Pennsylvania Coal Mining Towns (Metheny 2007) have all shown that much more than just documents can contribute to history.

The mission of historical archaeology is to paint a more complete picture of history by combining and comparing data derived from historical documents, oral histories, archaeology, and other sources, than is possible by considering each type of data individually (Deetz 1993:161. The information contained in one type of data can enhance or refute information contained in other types of data. Additional goals should be set for more interaction and cooperation between historians and historical archaeologists to better utilize the strengths of both disciplines.

Early Work

Historical archaeology in North America began as an approach to uncover the architectural evidence of important buildings at historically meaningful sites. Early studies were associated with the American historic preservation movement of the late nineteenth and early twentieth centuries (Pykles 2008). In 1855, the Canadian government sent Jesuit, Father Martin, to the site of one of Canada's first European settlements, Sainte Marie I on Georgian Bay. Martin drew a map of the famous mission's remains (Kidd 1949). The following year, 1856, Civil Engineer, James Hall carefully excavated the home of his ancestor, Miles Standish, at Plymouth, Massachusetts, and recorded the soil layers, mapped the stone foundation, and plotted the locations of a number of artifacts found during the dig (Deetz 1968). Other early excavations include those at Jamestown, Virginia, the first permanent English settlement in America, begun in 1934 by J.C. Harrington, "the father of American historical archaeology." This early project was one of the first to include the common people, those who built and lived at Jamestown, and it investigated the whole community, not just the famous people who lived there, like John Smith and John Rolfe (Orser and Fagan 1995:25–26). Historical archaeology allows us to focus on the everyday lives of ordinary people (Ascher 1974:11; Casella 2005).

Nevertheless, during the period from the mid-1800s to the 1960s, a number of archaeological investigations focused on famous sites or locations associated with famous people in American History, for example the Springfield, Illinois home of Abraham Lincoln (Hagen 1951) and Fort Necessity, near Farmington, Pennsylvania, built by the Virginia Militia led by 22 year-old George Washington in 1754, during the French and Indian Wars (Harrington 1957). During the early decades of the discipline, architectural remains were emphasized over artifacts, and up until the 1960s, most archaeologists doing this kind of work called it "historic site archaeology," a term coined by Harrington (Pykles 2008:32).

The "New" Social History

During the 1960s and 1970s, the field of historical archaeology, and the social sciences in general, changed. Partly an offshoot and reaction to the civil rights movement,

part of the growing environmental movement, and part of an expanding interest in genealogy and family history, among other influencing factors, the “new” social history moved historical archaeology and the social sciences in general away from a focus on important men, events, and buildings. Instead, these fields moved toward the study of ordinary people and everyday events: “Blacks, immigrants, women, workers, and farmers. Here were studies compelled by a profound personal need to understand ties of family, gender, religion, ethnic group and race, and community” (Chambers 1984:14). Ordinary citizens wanted to connect with their own personal pasts, as a manner of self-identification and through this anchor, move toward more self-determination. It was an avenue to having more control over their own lives (Chambers 1984:14).

One of the strengths of social history comes from its oppositional character. It is concerned with real life rather than abstract ideas, with ordinary people rather than the rich and the privileged, with common things rather than outstanding events. “It was directed against ‘Great Man’ theories of history, championing the peaceful arts against the bellicose preoccupations of ‘drum-and-trumpet’ history.” The “new” social history encouraged and reflected the egalitarian spirit of the 1960s. For example, urban history began as a cottage industry with H.J. Dyos during the 1960s, and labor history was a protest against the routine and narrow views of economic history and was redefined by E.P. Thompson. Social history brings a human face to the past and to the material culture left behind (Samuel 1985:1–2).

The social science interests in ordinary people and everyday events continue today. Even though some universities place history within the school of humanities, in my opinion, all history is social science, and social history especially so. The analysis of groups, classes, communities, institutions and societies, and the explanation of individual human behavior in social contexts, along with the study of gender, race, and ethnicity are common topics in social history and in other social sciences, including historical archaeology. Historians and other social scientists often collaborate on projects by sharing information, concepts, methods, and research models that are useful to multiple disciplines (Klein 2006). Since the lives of ordinary people, in whom social historians are interested, are difficult to recover, they have used sources and techniques from a variety of disciplines, including historical archaeology, to recover more information about

ordinary peoples' lives. These methods have aided this project at the Cowell Lime Works as I have benefited from the input and assistance of a group of local and regional historians who have shard information, sources, and methods.

Recent Trends in Historical Archaeology

Colonialism, capitalism, and western expansion on the frontier were familiar topics within historical archaeology during the 1970s and 1980s (Deagan 1988:9). Several topics have become increasingly popular during the last couple decades. Archaeologists have promoted new techniques and perspectives in battlefield studies (Carman 2005; Powers 2010). Historical archaeologists during the 1990s and 2000s have developed and expanded on an interest in those peoples who have been dominated or intentionally ignored, and have had their histories appropriated by others, like African American slaves in the New World (Samford 1996; Singleton 1996; Orser 2001:626; Delle 2009). The archaeology of the overseas Chinese has become a frequent topic in the western United States (Voss 2005; Costello 2004).

Storytelling as a new form of archaeological analysis has also grown in popularity since it was first introduced as an approach to archaeological investigation and public interpretation by Mary Praetzellis at the 1997 Conference on Historical and Underwater Archaeology. This hybrid of science, humanities, and artistic expression is a wonderful way to engage public audiences (Gibb 2000:1). As some archaeologists continue to focus on and develop public outreach techniques through community archaeology, multivocality, and experimental narratives, this expansion has increased public interest and participation in all types of archaeology (Gilchrist 2005:329). My project is an example of community archaeology as it involved student interns, volunteers from the Central California archaeology community, and other interested individuals. The information gained through my research will contribute to public outreach and site interpretation at the Cowell Lime Works.

The archaeology of gender (Brashler 1991; Seifert 1991; Clements 1993; Scott 1994; Gilfoyle 2005; Spude 2005; Maples 2008), class (Beaudry 1989; Hardesty 1998; Praetzellis and Praetzellis 2001; Van Bueren 2002b; Shackel 2004; Silliman 2006; Walker 2008) and ethnicity (McGuire 1982; Staski 1990; Siân 1997; Costello 1998; Fitts

2002; Bauman 2004; Praetzellis 2004) have also widely expanded during this same period. Other writers have discussed the overlap among these topics and others, especially race, including Bassett (1994), Muller (1994), Spencer-Wood (1994), McGuire and Reckner (2002). McGuire and Paynter (1991) and Leone and Potter (1999) have edited books focusing on inequality and capitalism within the field of archaeology. This thesis touches on all of these themes: gender, class, ethnicity, and race.

Through the continued pursuit of multidisciplinary cooperation in research and analysis, historical archaeology continues to show its substance and vitality as a scientific discipline. Through the collaboration with other disciplines, especially history, archaeology will continue to illuminate the lives of those ignored by history: ordinary people, the powerless, the illiterate, and the poor (Lemisch 1969; Ascher 1974).

INDUSTRIAL ARCHAEOLOGY

Definition

Industrial archaeology is a subfield within historical archaeology. A very simple definition of industrial archaeology was put forth by Hudson in his early book on the subject, *Industrial Archaeology, an Introduction*: "Industrial archaeology is the organized, disciplined study of the remains of yesterday's industries" (Hudson 1966:21). This definition leaves the subject open to exploration and interpretation. In a general way, most archaeology of the literate past is industrial because many artifacts and other types of material culture are tied to manufacturing. The historical approach includes composing records of industrial sites before the sites are lost. However, a list of sites contains no interpretive value. The reconstruction of past technological processes and procedures communicates much about industry and production, but tells nothing about their affects on people and their lives (Teague 1980:18). This type of technological focus can contribute little to a project that centers on the human side of technology, for example, a study of lime industry workers in Santa Cruz, California

Buchanan put forth an excellent comprehensive definition of industrial archaeology as "a field of study concerned with investigating, surveying, recording, and in some cases, with preserving industrial monuments. It aims, moreover, at assessing the significance of these monuments in the context of social and technological history"

(Buchanan 1972:20). This important tie between technology and society begins to explain the bigger picture of how technology influences people; however, industrial monuments are just a small part of the story. Industrial monuments are buildings and structures that are usually large and obvious, made of wood, stone, brick, and metal. But they tell us little about what it all means in a human sense, to people and to society. Industry means different things in different contexts. I am interested in what the lime industry meant to the community, and especially to the ordinary workers and how they were influenced by it. Buchanan's early work, *Industrial Archaeology in Britain*, although filled with information about buildings and structures, says little about the common laborers who toiled in the many industries it discusses: coal mining; the metal, engineering, textile, and chemical industries; and building, agriculture, consumer industries, rural crafts, urban crafts; and even power, transportation, and public services (Buchanan 1972).

The term industrial archaeology was coined in 1955 by Michael Rix, a British historian at the University of Birmingham and one of the founders of the field. His article, "Industrial Archaeology" appeared in *The Amateur Historian* (Rix 1955). Significant interest in industrial archaeology originated after World War II, during the phase of major redevelopment that swept through Europe and the United States. Citizens became concerned with the indiscriminate destruction of historic buildings, structures and objects, particularly canals and railways, especially after "the shock of several spectacular demolitions" (Buchanan 2005:19).

The Preservation Movement

During the 1960s, concerned citizens initiated many preservation projects and formed local preservation societies and action groups. Laws designed to protect ancient monuments and historic buildings were extended to protect industrial monuments. Local governments and planners began to see historical, economical, and educational benefits in the preservation and restoration of industrial sites. Industrial monuments "contribute to the range of experience available both to those who have to plan for the development of post-industrial society, and to the ordinary citizens who stand to benefit from knowledge of previous phases of industrialization" (Buchanan 2005:20). This new interest in conservation was also connected to the changes in the social sciences and the beginnings

of the environmental movement. People began to care more about their histories, their neighborhoods, and their communities, and were bothered by the destruction they saw happening around them. The interest in genealogy and family history expanded to encompass new ideas and topics, influencing and being influenced by the "new" social history (Chambers 1984).

INDUSTRIAL ARCHAEOLOGY IN THE UNITED STATES

In the United States, archaeologists have investigated diverse industrial site types including sugar plantations in east Florida (Wayne 2010), iron works in Alabama (Bennett and Utz 2010), and sawmills, gristmills and cotton mills in the Red Clay Valley in Delaware (Heite 2005). There have also been archaeological studies of other less common industries, for example, cheese making in rural New York (Gibb et al. 1990), bread baking in California (Costello 1998), and charcoal production in Nevada (Zeier 1987).

A survey of the titles of articles in past issues of *The Journal of the Society for Industrial Archaeology* reveals articles from all types of industries and industrial monuments, from beam engines and bridges to sawmills and soap-boilers. The most common topics are the metal industries like steel and iron, and civil engineering construction such as bridges, dams, and tunnels, mills and railroads, and hydroelectric power generators. The journal includes articles from industrial sites all over the world. Industrial archaeology, in its myriad forms, is everywhere.

Trends in articles' foci can be observed over time. Recent popular topics include environmental subjects like toxic substances and industrial waste, green spaces in industrial areas, and studies of whole landscapes. The archaeological study of mining has become very common in the United States during the last twenty years (Society for Industrial Archaeology 2012); however, archeological studies of the lime industry in this country are rare. Of the seven-page list of articles published in the *Journal of the Society for Industrial Archeology* from 1975–2008, only one article is related to lime; an article about steam locomotives at a lime works in southern England (Travis 2004). Lime appears to be underrepresented in the field of industrial archaeology. Only two articles focus on lime's cousin, cement (Howe 2007; Douet 2007). Unfortunately, this journal is

two years behind in its publication due to a lack of submitted articles, having just released Volume 34, dated 2008, in January 2012, (Don Durfee, personal communication 2012). However, the *Industrial Archaeology Review*, the publication of the Association for Industrial Archaeology in England, lists 10 articles on lime and lime kilns published between 1982 and 2003 (http://industrial-archaeology.org/arevind.htm#L).

Archaeology of the Lumber Industry

The lime industry has an extractive component (quarrying), as well as a processing component (lime burning), and a manufacturing component (coopering). All three are important to understanding the archaeology of the Cowell Lime Works. The lumber industry is a good analogy because it includes both an extractive (lumbering) and a processing (sawmilling) component, and there are a number of archaeological and historical studies on this subject. I discuss some of these studies and their relation to my research below.

While an article about logging in West Virginia states that logging was a "single-gender, masculine activity" with "lusty loggers who lived rigorous lives in the woods," this was not always the case (Brashler 1991:54). On some occasions, women and children accompanied their husbands and fathers into the forest, living alongside the men in the hastily-built logging camps. This article's focus is the interconnections within gender, family, economy, and subsistence strategies in a rural West Virginia industrial milieu and uses gender to "understand the organization of the logging industry in a remote portion of Appalachia" (Brashler 1991:54). This article is an informative example of the role of women in logging industry settlements, an industry that was dominated by men, like the lime industry, and where women rarely appear in the related literature and were assumed absent except for the occasional prostitute. Brashler's research has shown that a small number of women, and even children were present in these communities. The Cowell Ranch also housed a small number of women; however, families lived in a separate area away from the central industrial complex with the bunkhouse and bachelor cabins.

Company sawmill towns on California's north coast share similar historical elements with the Cowell Lime Works. Buckley's article focuses on the company town of Scotia, California (formerly Forestville), on the Eel River in Humboldt County. It

describes “barracks and shacks casually arranged around the mill and cookhouse” inhabited by a “floating army of migrant labor” with a “built-in tradition of independence and transience” (Buckley 1997:78). The arduous and dangerous work combined with unattractive working conditions led to a high rate of turnover at the mills. This was a major concern for the lumber mill owners and resulted in a “unique labor radicalism” as the workers reacted to the boom-and-bust cycles that characterized the lumber industry in this area (Buckley 1997:78). (See Figure 3.) The casually arranged barracks and shacks, the mill and the cookhouse could easily describe the Cowell Ranch lime operation if “mill” were replaced with “cooperage and kilns.” The lime industry also employed a significant percentage of migrant laborers, especially during the busy dry season, in hard, dangerous work, with high turnover rates.

Figure 3. Logging Train. Arcata & Mad River Railroad in the Late 1800s, Humboldt County, California. (http://www.american-rails.com/california-logging-railroads.html)

Joseph Conlin’s article on food served by logging camp cookhouses can be viewed in relation to the employee cookhouse fare at the Cowell Ranch. Although logging camps were generally more isolated than the Cowell lime operations, similar staples like beans and bread were common. Logging camps offered little by way of fresh fruits and vegetables or fresh meat other than what was brought back from hunting and

foraging. Supplies were not easily obtainable. The Cowell Ranch cookhouse, on the other hand, provided fresh produce grown on the ranch and fresh beef from their cattle herds, and additional required food supplies were easily acquired in nearby Santa Cruz. Companies that did not feed their men well found it difficult to retain employees. Hard working men needed fuel to work. One man recalled the lumbermen consumed around 9,000 calories daily at a logging camp in Clatsop County, Oregon. The men at the Cowell Ranch worked hard for long hours and likely consumed a comparable amount (Conlin 1979:167).

Praetzellis and Praetzellis published their report on the Cole and Nelson Sawmill in Sierra County, California in 1993. Through the combination of historical research and archaeology, the authors were able to give a more complete discussion of the history and technology of the sawmill and of the lives of the workers at this secluded location. It examines the social and cultural issues of the working class at the mill, comparing their "function, structure, and residential composition to the boardinghouses of the industrial East" (Praetzellis and Praetzellis 1993:17). Lumbering is a rural industry, like the lime operations at the Cowell Ranch, although lumbering sites were generally much more isolated and mills were located in the backwoods, much further from town than the two miles between the Cowell lime operations and the city of Santa Cruz.

During the late 1980s and early 1990s, works within the "contextual" archaeology movement began to explore worker-employer relationships within the industrial sector. In contrast to Beaudry and Mrozowski's work at the Boott textile mills in Lowell, Massachusetts, that concluded that the company attempted to extend the institutionalized environment of the mills into the boardinghouses, Praetzellis and Praetzellis believe the bosses at the Nelson Sawmill were permissive about the workers' behavior as long as production was not affected (Beaudry 1989; Praetzellis and Praetzellis 1993). The oral histories and the archaeological evidence from the Cowell Lime Works lead me to believe that a similar attitude prevailed at this location.

Robert Douglass' thesis, "The Sawmill in Miller Gulch: History and Archaeology on the Redwood Coast," focuses on Salt Point State Park in Sonoma County, California. His extensive research traced the history of the development of this important industry on the Sonoma coast, and includes a biography of William R. Miller, a self-made Scottish

immigrant, and the central figure of the logging industry in this area. Douglass' synopsis of the Alaska Commercial Company and his discussion of the Chinese workers in this industry in this area are important because not much has been written on these subjects. The logging industry was not a common occupation for Chinese immigrants. He reviews the historical archaeology projects done in the park. This includes an evaluation of the archaeology of logging in this area, where the forest quickly reclaims the land after human alterations, and swiftly obliterates almost all visual signs of historic-era activity (Douglass 2002). This is a similar situation to the Fall Creek lime operations near Felton that Cowell bought in 1900. Although the kilns are still obvious, other evidence of the industry has been quickly obscured and overgrown with moss, ferns, and young redwood trees.

Although he discusses the owner of the Miller Gulch Sawmill, William R. Miller, Douglass also includes information about the lives of some of the ordinary workers, like George F. Lowe, a teamster, and the Dibble twins, William and Walter, lumbermen from Maine who became managers of the Salt Point Store. He also relates information about the lives of skilled workers at the sawmill like William J. Graham, a planer, and Orin S. Wakefield, a millwright. Douglass' examination of the Chinese in the lumber industry relates to my investigation of the immigrant Portuguese and Italian workers in the Santa Cruz lime industry and he does an excellent job of integrating historical research with archaeological investigations, exhibiting the benefits of the use of both these types of research in his thesis (Douglass 2002).

Mining Archaeology

Mining, miners, and mining landscapes, are common foci of industrial archaeology projects. Studies have taken place world-wide, although mainly within the United States, Britain, and Australia. Mining frontiers considered by some historians to be comparable to the American West existed in Alaska, New Zealand, South America, Mexico, Russia, South Africa and India (Whittaker 1994). The study of the social world and interactions of miners both in established societies and on the frontier has become increasingly prevalent over time. I focus on mining in this section because it shares significant similarities to the lime industry. Both involve extracting material from the

earth, then processing and transporting it to central shipping locations. Mining and lime production facilities are usually located in rural areas, and their communities consist mostly of men, with few women or children present.

In “Uncertain Migrants: The History and Archaeology of a Victorian Goldfield Community,” Susan Cheney analyzes the daily social interactions of people on the Australian gold mining frontier. Cheney interprets the layout of the community in relation to the natural landscape and to the social exchanges of the inhabitants. “Patterns of conflict and tension in the lives of the inhabitants of Dolly’s Creek are embedded in the material domain of their existence” (Cheney 1992:41). An excavation at a domestic site “provides further insights into the ways in which notions of transience and ambivalence were played out in everyday life” (Cheney 1992:39). The international character of the community is apparent in its network with the outside world, in the social connections established, in the sources of the items acquired, and in the transience of the settlement in general (Cheney 1992:41). Australia’s frontier qualities are similar to those of the American West and mining in Australia and lime manufacturing in Santa Cruz share an international community and network, extensive social connections, extensive trade networks, and the transience of much of the workforce.

An interesting industrial archaeology study during the 1970s in the United States focuses on production and processing at the Harmony Borax Works, a nineteenth century borax mining complex in Death Valley, California. This investigation was performed by George A. Teague and Lynette O. Shenk for the National Park Service, and came about due to needed stabilization and fencing replacement work at the site. Although not focused on a common form of mining, this volume gives much insight into the exploitation of an uncommon geological material, including how it was mined and how it was processed. A description of the climate and ecological surroundings emphasizes the difficulties the workers endured in this isolated location. A large amount of information about life at the Borax Works is communicated by the very detailed description of the remnants of the extant architectural features, the artifacts encountered, and the other human-transported materials found at the site. The site analysis focuses on the use of space, manufacturing techniques and efficiency, the impact of the industry on the environment, the subsistence economy of the miners, communication and transportation

challenges, and sociocultural interactions among the men. Unfortunately, the investigation included limited archaeological work, involving only the excavation of four small test pits (Teague and Shenk 1977). (See Figure 4.)

Figure 4. Twenty Mule Team at Harmony Borax Works Around 1885.
(http://www.nps.gov/museum/exhibits/death_valley/mining_ranching.html)

Sufficient data were gathered during the project for the authors to conclude that buildings at the Borax Works were used to house the Chinese laborers (the Anglos lived off-site), to feed the men, for office use, or for storage. An analysis of the use of American products by the Chinese from the remains found in their quarters concluded that these immigrants had progressed into the "non-Chinese mainstream of nineteenth century California faster than previously suspected" (Teague and Shenk 1977:216). Although they adopted American tools and some clothing, and consumed American cuisine, "food preparation and serving equipment remained traditional" (Teague and Shenk 1977:216). The authors warn the reader that care should be used when reconstructing social interplay by examining specialized areas rather than domestic

facilities. Domestic assemblages are more likely to contain information about cultural behaviors than other types of assemblages (Teague and Shenk 1977:217).

This early industrial archaeology study in the western U.S. investigates the lives of the Chinese workers, as I investigate the lives of the Portuguese and Italian workers. Like the Chinese, the Portuguese and Italian immigrants adopted American clothing and tools, but retained a desire for their ethnic cuisine. Small numbers of wild animal bone attest to little foraging activity at Harmony. The belief that Anglo workers were housed away from the industrial facility and that only the Chinese lived near the Borax works is based on the prevalence of domestic Chinese artifacts present at the site, reinforcing the position that domestic assemblages reflect cultural behaviors more than other types of assemblages, as mentioned above. This hypothesis is reinforced by the information gained through the analysis of the Cabin B assemblage at the Cowell Lime Works (Teague and Shenk 1977).

The archaeology of mining in the eastern United States primarily focuses on the anthracite region in the northeastern corner of Pennsylvania, a belt of “hard” coal that was the first area of the U.S. to endure long-term, large-scale mining (Goin and Raymond 2001:30). The mining industry has transformed the region into an environmental disaster area, disfigured by generations of mining and then discarded and left to financial ruin by the large corporations when mining was not longer profitable (Goin and Raymond 2001:29). The area was commercially mined from the 1820s until 1960. An article by Goin and Raymond focuses on the Susquehanna River’s Wyoming Valley in Pennsylvania, and the legacy of its ravaged mining landscape and remnant population. The article reviews the history of mining in the region and its affects on the area and the people today. “It is a place now wholly shaped by the legacies of that mining, not only physically, but also culturally” (Goin and Raymond 2001:29–30).

A summary of the lives of the workers describes harsh working conditions, frequent and sometimes violent strikes, dangerous underground mines, and the discrimination against the mainly immigrant European workforce. In the earlier years, the workers were mostly Welsh and Irish, and later they were mostly eastern Europeans (known collectively as “Slavs”) in addition to Poles and Italians (Goin and Raymond 2001:36). Other researchers such as Berthoff (1965), Cohen (1989), and Holt (2001) have

also focused on the history of this region, its workers, and their social interactions. Two similarities between the mining industry in the Eastern U.S. and the lime industry in the Western U.S. are apparent from these articles. The work was hard and dangerous and companies employed primarily immigrant laborers. A third similarity, which is only revealed after the demise of an industry is that the area continues to be influenced by the legacies of the industry, as both the Anthracite mining region and the Santa Cruz lime area both show the physical and cultural effects of those industries today.

A useful source on the archaeology and anthropology of mining is "Social Approaches to an Industrial Past" by Knapp et al. (1998). This publication focuses on the "social, spatial, and ideological dimensions of technology and of past or present industrial communities" (Knapp et al. 1998:2). Knapp emphasizes that, despite the importance of the mining of metals over the past six thousand years, and the abundance of printed sources on mining technology, the study of mining history has only received appreciable attention from archaeologists and cultural anthropologists since the 1980s. Knapp focuses on how mining settlements embody the private domains of those who were and are diverse in character and origins, brought together by the need to make a living, and the combined actions and dealings arising from the interactions among people working and living in communities centered in a specific product, industry, or technology (Knapp et al. 1998:6). Knapp's analysis of mining and its social implications tells us that as archaeologists studying mining communities, we need to investigate an array of forces, especially those pertaining to social, cultural, physical, and technical factors. Through the in depth exploration of mining communities, required resources, correspondence networks, and gendered operations, we can examine technology in its social setting, and thereby reveal a more enhanced perspective of the mining landscape (Knapp 1998:19). The above statement could easily apply to lime processing sites, like the Cowell lime operations near Santa Cruz, and this thesis addresses some of these issues.

The western states became the focus of mining in this country beginning in the second half of the nineteenth century, and the dominance of this region in the industry continues to this day. Archaeologists and historians have written repeatedly about mining in this area (Teague 1980; Hovis and Mouat 1996; Malone 1997; Kraft 1998; Smith

1998; St. Clair 1998; Baxter and Allen 2005; Hartill 2006; Redmond 2009; Sampson 2011). (See Figure 5.)

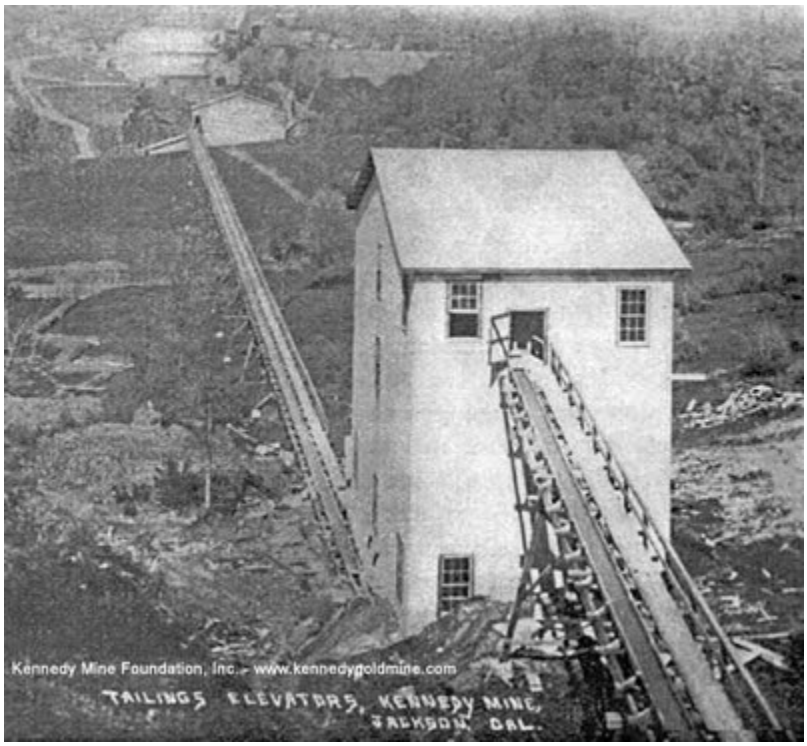


Figure 5. Kennedy Gold Mine Tailings Wheel in Jackson, California, late 1800s. (http://kennedygoldmine.com/)

The Ludlow Massacre

One particular topic that stands out to me as a researcher is the archaeology at the site of the Colorado Coal Field War's Ludlow massacre. This attracted my interest because of the struggle the miners faced for better pay and working conditions, the involvement of women and children in the conflict, the injustice of the treatment of the workers by the Colorado Fuel and Iron Corporation, and the involvement in the project of two of my colleagues, Dana Shew and Nina Rogers. Like my research on the Cowell Lime Works, one focus of the archaeology at the site of the Ludlow Massacre is to investigate the daily lives of the workers (McGuire and Reckner 2002; Walker 2003; McGuire 2004; Walker 2005).

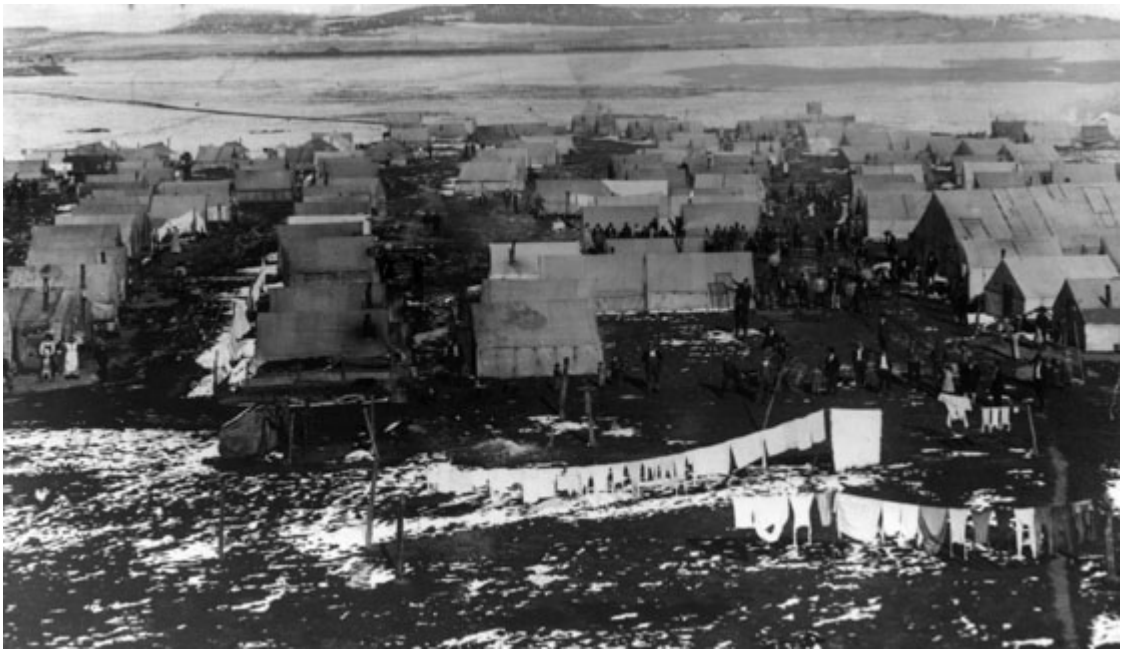


Figure 6. The Ludlow Tent Colony Before the Massacre on April 20th, 1914.
(http://blogs.wvgazette.com/coaltattoo/2009/04/20/the-ludlow-massacre-1914/)

A significant amount of study has been done on the archaeology of the 1913-1914 Colorado Coal Field War, especially at the site of the Ludlow Massacre (also known as the Colorado Coalfield Massacre). This violent tragedy occurred on April 20, 1914, when members of the Colorado National Guard were responsible for the deaths of 20 people, including the men who were shot, and 2 women and 11 children who suffocated when National Guard members set fire to the strikers' tent city. The miners retaliated by burning and looting, destroying several mines and company towns, and killing more than seventy-five people before federal troops restored order, in what became known as the Colorado Coalfield War (McGuire 2004:1-2). (See Figure 6.)

Archaeological work at the site of the Ludlow Massacre began in 1997 under the direction of Dean Saitta of the University of Denver, and Randall McGuire of Binghamton University in New York. The project used remote sensing, photographic, and archaeological survey techniques to find evidence of daily life in the tent colony. Excavations unearthed tent platforms, privies, a discard deposit, and the cellars under the tents that the miners dug to protect themselves and their families from the wind and weather. Archaeologists recovered both the remains of daily life and evidence of the massacre (McGuire 2004:3). Mark Walker wrote a series of articles on this event that

focused on the varied scales of memory of the massacre. Ludlow retains an important existence in provincial collective memory, which is generated and regenerated through numerous colloquial networks (Walker 2005:1). The work at Ludlow demonstrates the political role of history and archaeology. Archaeology at this site has been used for the purpose of veneration, and it contributes to the construction of historical memory, producing views of the past that are created by modern concerns and activities (Walker 2003:76). Although there were no serious labor conflicts at the Cowell Lime Works, the problem of labor conditions was a significant point of contention for the working-classes in the late nineteenth and early twentieth centuries in the United States. Lime is a very caustic substance and safety issues were surely a problem. However, oral histories testify that Cowell treated his workers well (Cardiff 1965; Wolff 1972).

Donald Hardesty's Focus on Mining Archaeology

Few archeologists have specialized in the investigation of mining as much as Donald Hardesty. Focusing on Nevada, Hardesty has written a number of articles and books on the subject of archaeology in the American West, specifically on the archaeology of mining. His article, "Historical Archaeology in the American West" reviews three papers from a plenary session of the 1990 meeting of the Society for Historical Archaeology, and considers pertinent questions to ask when doing archaeology in this region, especially questions concerning "definition, origins, characteristics, distinctiveness, variability, and change in social and cultural patterns during the historical period" (Hardesty 1991a). Some of these topics have been addressed in this thesis.

"The Miner's Domestic Household: Perspectives from the American West" is an example of historical archaeology in a mining context and has much in common with my research into lime worker households. Both include a small number of unrelated adult males living under one roof and sharing household responsibilities and representing a part of the larger industrial working community that is "loose, fragile, and transitory" (Hardesty 1989:180). The author uses the recommended interdisciplinary approach to historical archaeology by using the data and methods of history, archaeology, and ethnography. Through the discussion of household variability in both form and activities Hardesty suggests various causes and explanations of this variability. Environment,

ideology, and chance are all possible reasons for the makeup of lime workers' as well as miners' households, including residences ranging from small cabins to large boarding houses (Hardesty 1989).

Hardesty's article, "Toward an Historical Archaeology of the Intermountain West," notes that historic sites research in this area has increased substantially since the 1970s but it continues to be "site-specific and serendipitous without the benefit of regional research strategies" (Hardesty 1991b:29). He believes that most archaeologists do not know enough about the dominant European-American material culture to enable them to adequately discuss the range and modifications in the material culture of ethnic, class, and gender groups. He also points out the difficulties in chronologically calibrating a material culture that changes quickly and constantly and suggests that one resolution to this problem is "to calibrate time by using the artifact assemblages of short-lived and well-documented mining camps for cross-dating" (Hardesty 1991b:34).

In "Power and the Industrial Mining Community in the American West," Hardesty focuses on archaeological approaches to the power structure of silver-, gold- and copper-mining communities in relation to the social and cultural contexts of industrial capitalism during the nineteenth- and twentieth-centuries. He discusses "the material expression of power in the context of productive relationships mediated by class, gender, and ethnicity, especially patterns and strategies of domination and resistance" (Hardesty 1988b:94). Class, gender, and ethnicity in small isolated communities seriously affect the dynamics within those communities. Although few women lived in mining communities, class and ethnicity created subcultures within the larger population.

In contrasting the layout of company towns with "alternative" towns located outside company control within this context of domination and resistance, Hardesty uses the eastern Nevada copper-mining town, Reiptown, as an example. This community, outside the scope of company domination, offered" alternative" entertainment, including saloons, brothels, and gambling-houses, along with cheap housing and "more individualistic lifestyles" (Hardesty 1988b:81). He characterizes mining communities in the American West as overlaying power interactions consisting of economic, political, military, and ideological associations connecting hierarchical and heterarchical configurations where networks were used to negotiate power, using various methods

including ideology, politics, and violence. Hierarchical power structures have the highest archaeological visibility, with company towns showing landscapes that demonstrate methods of domination and resistance often expressed in cultures of violence. Heterarchical power structures are shown in the material expression of power relations that were very situational and variable. The transience and spontaneity of mining systems were important functions in these structures (Hardesty 1988b:94).

Hardesty's most comprehensive work on mining is, "The Archaeology of Mining and Miners: A View From the Silver State." New exploration and mining in the 1980s in historic mining districts in Nevada has led archaeologists to increasingly study this region. Since many of these areas were on federal property, cultural resources laws had to be applied. The goal of this publication is to provide a "guide for documenting and understanding archaeological sites in historical mining districts." It shows how to use the documentary and archaeological records, and gives recommendations for "preservation planning in mining districts" (Hardesty 1988a:ix). In addition, he includes a framework of questions as a "structure of inquiry for asking research questions about mining sites."

Hardesty approaches mining sites as islands where ore deposits have been found and then colonized by miners with an established social and cultural environment. This view is also applicable to lime deposits, where communities sprang up, sometimes in remote areas, to exploit the resources. Other factors, like transportation and communication networks, along with the availability of other necessary resources, influenced the location of both lime and mining settlements. He explains that "world systems on the mining frontier in Nevada and elsewhere included three kinds of interactions: materials, population, and information" (Hardesty 1988a:1). Although exceedingly heavy on technical information in some areas, this is a valuable resource for any archaeologist needing information on mining, and includes an abundance of illuminating and instructional historical and modern photographs along with examples of useful data. One chapter is dedicated to settlements and includes census information from Shoshone Wells, the Cortez Mining District, and the Garrison District, along with a table of the artifact assemblage from one house site. Hardesty uses available documentary evidence in conjunction with the archaeological investigations to produce a

comprehensive overview of both the layout of the communities and of the populations inhabiting them (Hardesty 1988a).

Much of the work Hardesty has done in the field of mining archaeology could be applied to lime archaeology as many of the same topics and problems concern both. The social interactions within the mining community, the power structure within the work force, the transience of the workers, the variety of the backgrounds of the employees, among others, can all be reflected in the archaeological record. Through the sharing of information and techniques, historical archaeologists have expanded the range of pertinent information that can be retrieved from historical archaeology sites in the American west.

LIME ARCHAEOLOGY

A wide variety of information is available about the archaeology of lime; however, few studies have investigated the everyday lives of the ordinary workers and none have specifically focused on the workers in this industry. Many sources relate to the ancient cultures of Egypt and Mesoamerica, or to the use of lime in the Roman Empire. Archaeological studies of lime processing facilities in England and Australia are fairly common. The remnants of the lime kilns in which limestone was calcined (burned to convert it to lime) are found in many places within the limestone areas in Britain and are worthy of investigation by industrial archaeologists (Buchanan 1972:185).

Britain

Robert White's article on the management of the remains of the limestone industry in one of the lime production areas of Britain reviews the survey, protection, consolidation, and interpretation of the limestone industry in the Yorkshire Dales National Park, especially the results of the Yorkshire Dales Lime Kiln Survey. Recent investigations of clamp or sow kilns have shown that two of these kilns date to the late 17th century" (White 2006:107). Additionally, there is evidence of mortar and lime plaster at Bainbridge fort from the Roman period, and at medieval castles and churches in the area, but no kiln remnants from these earlier periods have been located (White 2006:107). Obviously, limestone exploitation in this region has a very long history.

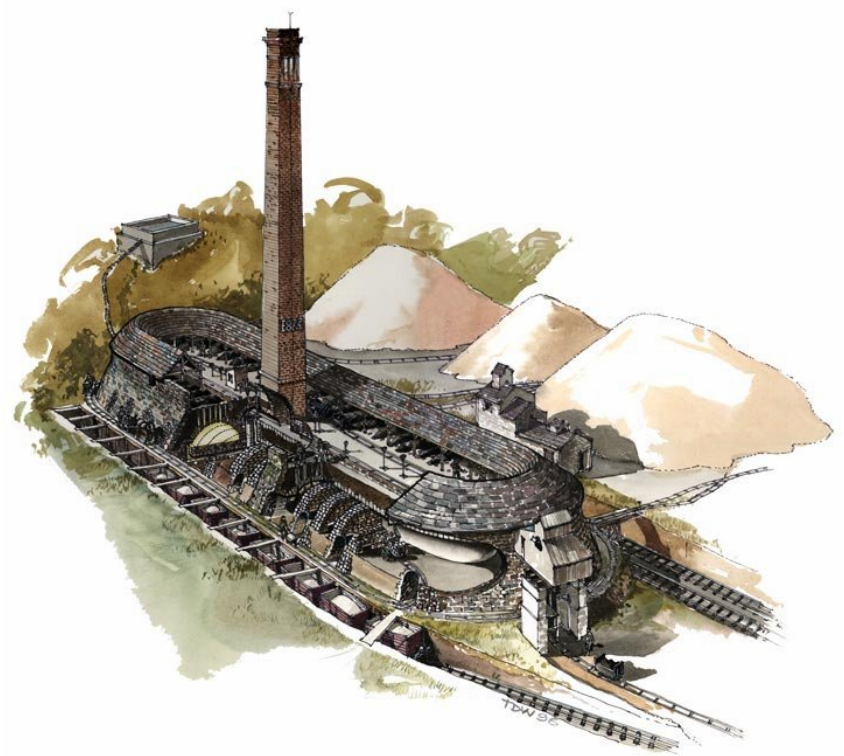


Figure 7. Artist's reconstruction of Hoffman Kiln, Craven Lime Works, Langcliffe, UK. (http://www.outofoblivion.org.uk/record.asp?id=296)

In addition to the Lime Kiln survey mentioned above, White notes investigations by the Ingleborough Archaeology Group using a magnetometer and resulting excavations of a "basin-shaped stone lined pit … constructed of coursed sandstone blocks … [dating to 1650–1695]. The kiln was still charged with partly burnt limestone" (White 2006:109). These earlier lime production facilities were small-scale. However, the expansion of rail transportation in the late 1800s allowed access to larger markets and enabled the commercial development of this industry. The Craven Lime Works was built in 1873 and ceased production shortly before World War II. (See Figure 7.) In the early 1980s, locals began promoting protection, restoration, and conservation. The complex is unusual because it contains the remnants of three different lime-burning technologies, uncommon at one site (White 2006:113). During the last 20 years, investigations have recognized the importance of the industrial history of the Yorkshire Dales, a significant component of the cultural history of the area (White 2006:115). In Britain, as well as in Santa Cruz, we

see the theme that the industrial history of lime production has had a marked affect on the people and the culture of the area where it took place.

Victoria, Australia

The Australian lime industry has many parallels with the lime industry in California because Australia's frontier qualities are similar to those of the American West. Beginning as a cottage industry, lime production began to significantly expand with the building boom following the Australian gold rush of the 1850s (Goetter 2005:8). The Santa Cruz lime industry, like Australia's, included a building boom after a gold rush, an international community, an extensive network with the outside world, and the development of larger, commercial enterprises by entrepreneurs from the big cities.

In her comprehensive volume on the lime burning industry in Victoria, Australia, Jane Harrington reports that there has not been a systematic, state-wide examination of lime industry archaeology. Lime played an important role in the early growth of Victoria. "The colony was literally built on lime" (Harrington 2000:1). Only certain areas have been studied, and most of those are located on government land. The identified sites tend to be more intact and dramatic. This document was the result of a research project "to establish the extent of the physical remains of the lime burning industry in Victoria," in order to develop management and protection approaches. Several field investigations that included site recording and a comprehensive inventory were done between 1994 and 1998 (Harrington 2000:1).

In the section entitled, "Archaeological Model," Harrington explains the basic activities associated with historical lime production: quarrying, fuel gathering, lime burning, and transporting the lime product to market. These same activities make up lime burning in Santa Cruz. In larger, more-permanent burning operations the cost of transportation required that kilns be constructed as close as possible to the stone extraction location (Harrington 2000:13). Additionally, the people who labored in the industry needed residences and a commodities network. All of these actions leave evidence in the archaeological record. Even simple pyre (a pile of mixed shell or limerock mixed with wood for fuel) and pit-burning (a large hole filled with shell or limerock mixed with wood for fuel) usually leave an archaeological signature. Lime

quarries and masonry kilns are usually identifiable, unless destroyed by later enterprises. Kilns were commonly built into hillsides, and some parts of the shaft often survive to some extent, as it was usually safeguarded by the surrounding construction and earth fill (Harrington 2000:15). The manner in which kilns were constructed into slopes usually required stabilization, necessitating a reinforced facing wall and retaining walls. Some kilns, especially larger ones, used wing walls to help stabilize the front of the structure. A flat work area was needed at the front of the draw hole to enable the drawing and bagging of lime at the base of the kiln. At times, this area was surfaced, but was usually uncovered and may retain lime debris and artifacts, as well as kiln rubble, including stone and fire brick (Harrington 2000:17). At the Cowell Lime Works, this work area in front of the kiln was located between the kilns and the cooperage, and was covered with an overhang to help keep the lime dry. The coastal fogs in Santa Cruz likely caused problems with the lime as moisture can cause lime to become volatile.

Transportation elements included internal and external networks used to both move the rock from the quarry to the kilns and to move the lime to a distribution point on the coast or at a railroad stop. Wagon transport left evidence of early routes and some later, larger sites used tramways for this purpose. Ship-board transportation required a loading facility usually evidenced by jetty remains. Shipwrecks along the coast have yielded lime-related artifacts. Other features that may be part of the lime production system include grinding or hoisting machinery, storage outbuildings, worker housing, and animal care facilities (Harrington 2000:17). Most of these elements also existed at the Cowell lime operations near Santa Cruz. However, grinding and hoisting machinery was absent, as the rock was broken up and loaded into the kilns by hand.

Harrington gives a detailed historical overview of the lime burning industry in Victoria. Beginning with the first waves of settlers in the late 1700s, the need to manufacture lime for mortar was the motivation for simple, early lime production by shell burning and pit burning. This parallels the early period of Spanish and Mexican lime production at Santa Cruz. Similar to the situation in Australia, after the Americans took control of California, imported lime was extremely expensive, strongly encouraging the development of local sources. Lime deposits in Victoria were first exploited in 1803. During the mid-1800s, commercial lime production was concentrated on the Mornington

Peninsula and at Geelong. Businessmen and merchants promptly capitalized on the increased demand for lime during the 1850s and 1860s. Many formed partnerships and larger business enterprises. The necessity of locating lime production near the coast to enable shipping was partially eliminated by the expansion of the rail system during this period (Harrington 2000:22).

It appears that the history and development of the lime industry in Victoria, Australia is similar to the lime industry in Santa Cruz County and in California. Early basic operations evolved into larger, more complex and extensive commercial enterprises. The locations of lime production facilities were in primarily rural areas. Early road transportation by wagon to bring the limerock from the quarry to the kiln and the product to the coast for shipping was replaced by tramways within the lime complex and by better roads. Eventually, railroads were used for transporting the product to market. Larger labor crews were employed necessitating larger settlements with more facilities and the availability of a wider range of commodities. The time frame is also quite similar, with large-scale exploitation beginning in the 1850s and 1860s, peaking around the turn of the twentieth century, then diminishing with the advent of Portland Cement in the building industries (Harrington 2000; Perry et al. 2007).

United States

Karin Goetter's master's thesis at Sonoma State University reviews the highlights of the lime industry in the United States. She begins with a passage on how small businesses helped communities evolve and survive the boom-and-bust cycles of the American economy. The author relates that small industries, including the lime industry, contributed to the economic survival of developing areas during fiscal fluctuations over time (Goetter 2005:6).

Goetter discusses various lime production regions in the U.S. and summarizes studies done in these areas, including Rolando's study of the Vermont lime industry. He used technological and stylistic changes along with historical data to develop a chronology for lime kiln complexity and level of operation: farm kilns (ca. 1800s–1860s), early commercial kilns (ca. 1850–

1900s), later commercial kilns (ca. 1870s–1920s), and modern kilns (1900s–1950s) (Rolando 1992:217). However, Goetter argued that Rolando's data are "inadequate for comparison with the various-sized industries that arose during the nineteenth century in the West" because his study centered on lime kilns in an established area where there was a specific evolution in kiln technology (Goetter 2005:7). In contrast, the lime industry in the West developed quickly, with a range of different technologies and expertise imported from around the world, simultaneously. Technologies and kiln designs varied across time, depending on resources, experience, and funding (Goetter 2005:7).

Goetter explains that her research revealed that, more often than not, the physical remains of past lime manufacturing operation are uncovered under the umbrella of cultural resources management, and cites an example of the exposure by floodwaters of the Rudd lime kilns during the 1990s (Goetter 2005:8). These two Livingston County, Kentucky sites consist of mid- to late-nineteenth century lime kilns and associated artifacts. Locals were aware of an old quarry in the vicinity, but were unaware of the existence of the kilns. A member of the local Heritage Council examined the area and recorded the sites. However, as with many investigations of this type, the researcher had difficulty locating archaeological references to lime kilns in the area. Until this time, no kilns had been excavated in the entire state of Kentucky (Hockensmith 1996:117).

In her discussion of the lime industry in Maine, Goetter reflects on the relative influence the lime industry has had in different areas, depending on the volume and scope of the commercial enterprise. Areas that have enjoyed a large successful lime-manufacturing industry will later have a more prominent well-documented history of that industry. These larger operations have left substantial marks on the landscape, and the public recognizes the important role this industry played in the establishment and growth of the community (Goetter 2005:9). This is true of Santa Cruz. Lime production near Santa Cruz was an important industry with many people and locations involved, and it is likely that the majority of Santa Cruz County's residents today are aware of that history. However, many

may not know just how extensively the transport of lime has affected the landscape in certain areas of the city and surrounding communities.

Through the provision of processed lime to the rapidly growing cities of the Atlantic coast, Maine evolved into the principal lime production region in the United States, significantly contributing to the economy of the state (Grindle 1971:6). (See Figure 8.) Goetter finds the lime industry in Maine and its provision of product to Boston and New York similar to the lime industry in the Santa Cruz, California area provisioning lime to San Francisco (Goetter 2005:10).

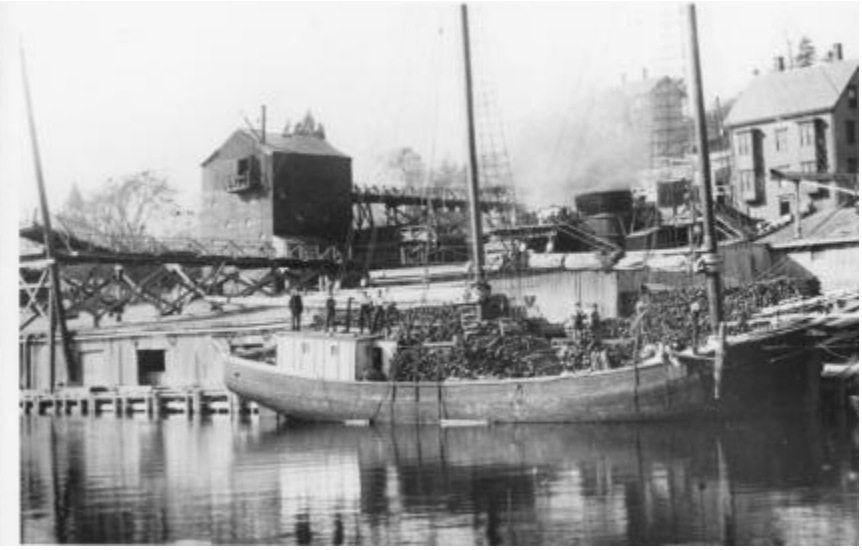


Figure 8. 1895, the *Heather Bell*, Built in 1890 at St. John, New Brunswick to Support the Lime Industry in Rockport, Maine.
(http://www.vintagemaineimages.com/bin/Detail?ln=21405)

The only article found while doing research for this thesis about lime production in the western United States outside of California during the late nineteenth and early twentieth centuries concerns southeastern Arizona, near Tucson (Jones 2005). The author noted that the production of lime was an important cottage industry in Arizona from the Spanish Colonial Period up through the 1920s. The abandoned lime kilns throughout the Southwest are the remnants of a craft whose origins in the Americas can be traced back to the first Spanish settlements (Jones 2005:199). Similarly, the history of lime production in Santa Cruz can be traced back to the early Spanish colonial settlers in Northern

California, but unfortunately, none of the early kilns near Santa Cruz have been identified.

Lime Studies from a California Perspective

An early historical archaeology report on lime kilns in California describes the Olema Lime Kilns near Olema, Marin County. Adan Treganza reviewed the history of the kilns as revealed in the documentary records, and also described the results of an archaeological excavation at the kilns and at a near-by domestic deposit. According to Treganza, the site consists of three pot kilns made primarily according to the same plan, but considerably different in their dimensions, and with minor architectural differences. Unfortunately, due to nature and vandalism, some of the more important features have been destroyed (Treganza 1951:71). According to Bliss Brown, a historic lease dates the construction of the kilns to about 1850 (Brown 1940:320; County of Marin n.d.:13).

Although excavations around the base of the kilns produced no artifacts, the investigation of an artifact deposit associated with the nearby house revealed broken porcelain, glass, iron objects, square nails, and the stem of a clay tobacco pipe. Treganza dated these artifacts to the post-1850s (1951:69). This date agrees with the 1850 lime kiln construction date. Through the analysis of the stratigraphy of lime waste and ash in front of the kilns, the author determined that none of the kilns had been fired more than four times and he proposed there had likely been no more than twelve total firings for the whole kiln complex. Building the lime kilns was an expensive endeavor for such limited return. One kiln was left loaded when abandoned, suggesting its operator(s) may have suddenly given up on the enterprise. The last documentary evidence of use is a lease dated 1852, suggesting the kilns were in use for only a short period (Treganza 1951:69). This short early article on the Olema kilns does not give much information applicable to the Cowell lime operations; however, it does show archaeological interest in California lime going back to the early 1950s. It focuses on the technology, and besides a short list of domestic artifacts found at the habitation site, contains no information about the daily lives of the men who worked the kilns.

An example of an early cultural resources report on lime kilns in Butte County, California was a collaborative effort by an archaeologist, Michael Sampson, and a historian, John McAleer. This study of the Lime Saddle area near Lake Oroville relates the results of a survey, archaeological, and documentary research project to determine the complexity and depth of a prehistoric component, and to describe, record, and interpret the historic features at the site, CA-BUT-392, with an emphasis on the lime kiln (Sampson and McAleer 1977:1,4). The project revealed the existence of two other lime kilns in the area. Historic-era documents revealed that all three kilns had been owned and operated by the same man, William Gywnn. Unfortunately, the construction of the Oroville Dam likely destroyed any historical artifact deposits, so domestic artifacts have not been recovered from this site. However, excavations at the lime kiln were able to contribute information on the construction methods used to build the kiln and the technology used in the lime burning process (Sampson and McAleer 1977:5–8). Again we have information about the technology but nothing about the ordinary workers.

Karin Goetter's M.A. thesis explores the role that the auxiliary industries of gold mining, especially lime production, played in the evolution of communities during the post-gold rush era (Goetter 2005). This thesis describes kilns near Lake Oroville that were owned by William Gwynn, operated for over fifty years, and intermittently produced lime using basic low-level technology and hand labor with minimal maintenance. Through the diversification of his business interests, Gwynn sustained his investments during the boom-and-bust periods of the late nineteenth century. A portion of Goetter's work that is important to this thesis is a short synopsis of the Santa Cruz lime industry focused on the enterprise started by Davis and Jordan and later owned exclusively by Henry Cowell (Goetter 2005:9–14). However, this thesis focuses on the technology and the men who owned the kilns and includes nothing about the daily lives of the ordinary workers. Unfortunately, due to the construction of the Oroville Dam, there was little by way of archaeological deposits left to investigate in order to get a more complete picture of the everyday lives of the workers at this location.

Kenneth Jensen of San Jose State University was the first scholar to do extensive research on the Santa Cruz lime industry for his 1976 master's thesis, "The Lime Industry in Santa Cruz County." Jensen wrote this brief review from a historical perspective, and although it laid the foundation for later research, it contains no archaeological information (Jensen 1976). This manuscript includes historic photographs and maps that help illustrate aspects of lime production and the people involved in the industry, but this is another source that focuses on the technology and the owners of the lime companies but says nothing about the ordinary workers.

The Archaeology of Lime Near Santa Cruz

The Anthropological Studies Center at Sonoma State University performed the first formal archaeological work at a lime related site in the Santa Cruz area at the IXL lime kilns in the Fall Creek section of Henry Cowell Redwoods State Park. This 1996 project for the California Department of Parks and Recreation produced a CRM report that reviews the historic background of the Santa Cruz Lime Industry and of this specific lime operation. The goal of this archaeological investigation was to explore structural details of the kilns, specifically whether they contained brick floors. This technological investigation comprised the excavation of one trench in each of the three kilns present and cleared one of the tunnel entrances to a kiln. This report, like the majority of CRM reports on lime manufacturing facilities in the Santa Cruz area, does not discuss the ordinary workers or everyday life at the kilns (Ziesing 1996), nor does the California Department of Parks and Recreation CRM report, "Limekilns and Ranching Features of Gray Whale Ranch," which focuses on the landscape and architectural features of the lime production complex. Included in this volume are historical photographs of the buildings that once existed on the property, owned by Samuel Adams and Company, until purchased by competitors, Davis and Cowell, in 1869. After the change in ownership, it was then called Cowell's Upper Kilns. After lime production ceased at this location, around 1910, the land was used for cattle ranching, which was the same fate as the lands around the

Cowell Ranch lime complex. Some of the buildings and structures continued to be used by the employees there, as well, as they were at the Cowell Ranch (Wheeler 1998).

During the summers of 2007-2009, instructors and students from the Foothill/West Valley College archaeological field school performed test excavations at the site of the Adams Creek lime kiln complex (CA-SCR-339H). Alfonso Tinoco of San Jose State University analyzed nail and glass artifacts uncovered during these investigations and wrote a short report on the results. He concludes that a distinct spatial layout at the site is evident from the twenty-five units excavated and believes that the site may have been divided between the east side, that focused on the production of lime, and the west side, that focused on farming and meal preparation for the workers (Tinoco 2011:1).

This was not the case at the Cowell Ranch, where rows of cabins were interspersed with other types of buildings and structures. Although this may be a function of the establishment of these complexes by different companies. Tinoco's focus on the chronology of the structures and activity at the site, based on the dating of three types of artifacts (nails, container glass, and window glass), although interesting, says nothing about the people who lived there. His brief history of the Santa Cruz lime industry discusses only the owners of the companies at this location.

In 1989, Laurie MacDougall, an employee of the San Francisco-based S.H. Cowell Foundation, wrote "Henry Cowell and His Family (1819–1955): A Brief History." This is a good example of how bias can affect the content of a source. All sources contain bias, but as an employee of the S.H. Cowell Foundation, she does not mention any of the controversy surrounding the Cowells.

The volume is divided chronologically, with the first section, "The Gold Rush and the Early Years (1850–1865)," beginning with an account of Henry's ancestry and his early years after he immigrated to California from Massachusetts. A section titled, "The Santa Cruz Years (1865–1897)," contains information about the ranch operations, the Cowell family, and the Cowells' business ventures.

Unfortunately, it includes little about the workers at the ranch besides mentioning a long-term manager, Frank George. “The Tragic Year (1903)” recounts the deaths of both Henry, the patriarch, and his middle-aged daughter, Sarah, who was killed in a buggy accident near the upper kilns. Ernest died of meningitis in 1911, leaving Harry to run the family business.

The final section of this brief account, “The S.H. Cowell Years (1911–1955),” describes the personality and interests of Harry Cowell, the activities of the two surviving sisters, the family philanthropy, and the waning years of the businesses they controlled. Included is an account of Harry Cowell’s good treatment of his employees. Although seemingly prejudiced, discussing only favorable information about the family, it is a good basic history of the Cowell saga (MacDougall 1989).

Lime Kiln Legacies, a cooperative effort by Santa Cruz area historians, Frank Perry, Robert Piwarzyk, Michael Luther, Alverda Orlando, Allan Molho, and Sierra Perry, was published in 2007. This volume is the most comprehensive and detailed work to date on the history of lime in Santa Cruz County. It is well-researched and covers all aspects of the lime industry from the geology, to Spanish Colonial lime kilns, to the steps in the lime making process. It reviews information about lime companies operating in the area, the people involved in lime, shipping lime, and a list of place names in and around Santa Cruz that trace their history to lime. Appendices include a lime industry chronology, a list of individuals involved in the lime industry, and census listings for lime workers (Perry et al. 2007). This volume is a must-read for any researcher of the lime industry in the United States.

Although *Lime Kiln Legacies* includes a substantial amount of information about the ordinary workers, I decided I wanted to learn more by focusing on these workers from a historical archaeology perspective, knowing that the archaeology would tell us things not available through written documents. In my own previous work, I looked at the other side of the Cowell story by investigating the personal side of the Cowells (Paramoure 2008). I researched the lives of the family members, focusing on patriarch, Henry Cowell, including his personality,

scandals, feuds, lawsuits, and public opinion about the family, who were considered to be a bit strange and unfriendly. I discuss the Cowell employees, both managers and laborers, and what it was like to live and work on the ranch. This research led to my further involvement at the Historic District, including the excavation of Workers' Cabin B in 2009 and 2010, and ultimately, to the writing of this thesis (Paramoure 2008).

Cultural Resources Reports

The early cultural resources reports on the Cowell Lime Works contain some historical information but little archaeological information, and no archaeological artifact analysis. The later reports, written during the 2000s and described below, cover detailed archaeological information, including artifact analysis but contain limited historical information from a limited number of sources.

Over the years, no fewer than fifteen cultural landscape and cultural resources reports have been written concerning the Cowell Ranch lime complex. California Department of Parks and Recreation (DPR) Site Records have also been filed, and the site has been designated, CA-SCR-198H. Table 1, "Summary of Pertinent CA-SCR-198H Cultural Resource Literature," in Reese's Cabin J report, summarizes the following cultural resources literature (Reese 2007:7-8). "Preliminary Archaeological Reconnaissance of the Lands of the University of California at Santa Cruz" was completed in 1978, the same year that the DPR Site Records were filed (Edwards et al. 1978). In 1991, 1992, and 1996, Edwards and Charlotte Simpson-Smith reported on various aspects of the site, including research evaluation, field reconnaissance, site monitoring, potential impacts, and recommendations (Reese 2007:7-8). None of these early reports mention the ordinary workers at the site.

In 1992, Rodrigues, Sanchez, and Dietz completed the "Historic Cowell Ranch Cultural Landscape Report" for the Office of Campus Facilities. Its purpose was to evaluate the historic-era resources according to the National Park Service National Register Bulletin #30, "Guidelines for Evaluating and

Documenting Rural Historic Landscapes." Dietz performed a record search and a first phase archaeological reconnaissance of the study area to determine if archaeological resources were present within the project area. This report responded to the need for an assessment of significance of the Cowell Ranch area (Rodrigues et al. 1992:1).

This detailed report includes many historic photos, although some of the photos are blurred and very dark. Drawings and maps show excellent detail of the buildings and structures in the Historic District, and a valuable component of this report is individual photos and descriptions of each building and structure. It also includes an assessment of the impacts and the integrity of the historic complex (Rodrigues et al. 1992). The authors conclude that the Cowell Ranch Complex at UCSC is significant as a Historic District and as a rural historic landscape on the state level and hope that designation as a rural historic landscape would strengthen the university's commitment to preservation (Rodrigues et al. 1992:37).

The one and a half pages of information on the workers is limited in scope, with the majority of the information focused on the food, the cook, the managers, and the later ranching activities. The information about the ordinary workers is limited to four short paragraphs and includes no archaeological artifact information, as it is a landscape report (Rodrigues et al. 1992:37). No archaeological excavations or analysis at the Cowell Lime Works had yet taken place at this time.

Archaeology at the Cowell Lime Works

In 2006, construction began on the UCSC Ranch View Terrace (RVT) Housing Development complex, located northwest of the Historic District. Unfortunately, the access road and the utility corridor for this project passed through and adjacent to the historic complex. The widening of the access road for this housing complex threatened the Cabin J site adjacent to the blacksmith shop (Reese 2007). Cabin J had been identified as one of the Cowell Ranch workers' cabins. (See Figure 9.) The university demolished the building in 1981 (Rodrigues et al. 1992:Appendix 3).

The Cabin J foundation was not identified as a cultural resource in the CEQA/NEPA documentation for RVT. Morgan located the foundation while exploring the area before RVT construction began. Mitigation measures are feasible project alternatives that avoid or minimize impacts or potential impacts for a project (State of California 2007:3). Data recovery was not identified in the environmental documents as a mitigation measure because the consultants who did the work failed to find the site. The mitigation, therefore, fell under the accidental discovery clause of the environmental documents.

Figure 9. Cabin J, Demolished by UCSC in 1981. Photo by Ansel Adams.
(UCSC Special Collections)

UCSC Interns did the initial work of clearing the surface during spring 2006 (UCSC Interns 2006). During summer of 2006, the CRM firm, Pacific Legacy, carried out data recovery before RVT construction started because the foundation location would be destroyed during access road widening. Pacific Legacy implemented a data recovery program to investigate the integrity of the footings and houselot, to determine the

functional history of the structure, and to impart information about the Cowell Ranch workers who lived there. The excavation found that, unfortunately, the foundation had been severely disturbed during the demolition process, but artifact analysis revealed information about the inhabitants and an occupational date range (Reese 2007:12).

The UCSC student intern work and Pacific Legacy's data recovery program exposed approximately 38-44% of the Cabin J houselot grid area and recovered a controlled sample of the potential houselot artifact assemblage, both significantly less than with the work carried out at Cabin B (Reese 2007:57). A total of 10,823 artifacts were recovered from 12 excavation units, one mechanical trench, and the exposure of the cabin's north footing. Most of the artifacts were structural debris with significant amounts of domestic, personal and activity-related artifacts. The date range associated with this assemblage, 1870-1920, roughly corresponds to the peak years of lime production at the ranch (Reese 2007: 49-56).

In Reese's report she admits, "there is little record of the lime industry workers and their lives at Cowell Ranch." She attempts to add to this information, as do I. Reese's work was the first archaeological artifact analysis done on material from the Cowell Lime Works site. In addition to the artifact catalog, which is included at the back, the report provides information about the ordinary workers taken from oral history interviews by Elizabeth Spedding Calciano with three prior employees and local nearby residents done during the late 1960s and early 1970s for the UCSC Regional History Project (Cardiff 1965; Majors 1965; Wagner 1966; Blaisdell 1967; Dong 1967; Wolff 1972).

Some of Reese's research questions are similar to my own, but are more limited. She also investigates evidence for food preparation and consumption and diet, resident identity, and clothing. My work, in addition to being focused on a different cabin in a different area of the ranch, focuses on leisure time, literacy, health, and ethnicity, in addition to the topics listed above. This thesis includes much historic research not included in the Cabin J report, especially documentary information on individual workers.

Baker's work at the Cowell Ranch cookhouse resulted from the excavation of utility line trenches and nine auger holes for a retaining wall during 2006 and 2007 that revealed portions of an artifact deposit located next to, and presumably associated with,

the ranch cookhouse. Subsurface archaeological testing of this deposit uncovered four features, including artifacts, ash, and a pig feeder. An analysis of the stratigraphy shows depositional history and disturbances. Archaeologists recovered American, European, Chinese, and Japanese items. The Chinese ceramics and medicine bottles demonstrate the continued use of traditional ethnic foods and medicines by the Chinese workers (Baker 2009:57). Baker's analysis of the ceramics found during this work focuses on the tableware and faunal remains and includes information on makers' marks and decorated wares found at the cookhouse. As expected, this assemblage contains a much wider variety of tableware in much greater abundance than that from Cabin B, as this was where the large majority of food preparation and consumption was taking place. The shell and fish remains, along with fishing associated artifacts were more abundant at Cabin B, further suggesting foraging activities and preparations of this food by the workers themselves (Baker 2009:29-35, 54-56).

During widening of a ranch road for RVT access in 2007, archaeological monitors from Pacific Legacy, Inc. watching earth moving activities near the blacksmith shop discovered a buried historical artifact feature that they recorded and sampled. Before the construction company resumed work, a Pacific Legacy archaeology team completed a data recovery program for this feature (Reese 2009:1). There were few datable artifacts but analysis dated the deposit to the late nineteenth and early twentieth centuries. The majority of the artifact assemblage is comprised of blacksmith stock materials, tool fragments, and blacksmith activity debris. The small number of domestic artifacts suggests that the blacksmiths did not live at the shop. If the artifacts are not connected to the blacksmiths, it is not clear with whom the domestic artifacts are affiliated. They are likely associated with nearby Cabin J. The tools, machinery parts, and other metal debris recovered from the Cabin J area are likely associated with the blacksmith, who may have inhabited this cabin (Reese 2007; Reese 2009:56-57). Unfortunately, Reese's report on the blacksmith shop contains little by way of historical research information besides one of the above mentioned oral histories and has contributed little to this thesis.

CONCLUSION

Through a discussion of the development of historical archaeology and industrial archaeology and their influence from the “New” Social History in the 1960s and 1970s, I demonstrate the trajectory of the scholarship in these fields. By an analysis of the literature on the archaeology and history of the Cowell Lime Works, I show that not much work has been done concerning the ordinary workers in the Santa Cruz lime industry. This thesis attempts to fill this gap in the research using a historical archaeology approach to view the everyday lives of the primarily single male immigrants who lived and worked at the Cowell Lime Works.

CHAPTER III

ETHNICITY AND IMMIGRANT IDENTITY

INTRODUCTION

Although the study of ethnicity and its impacts on human behavior have been important topics in social science for over a century, North American historical archaeologists have only begun to investigate ethnicity as reflected in material culture during the past forty years or so. The development of an ethnic focus within the field of archaeology commenced around the same time as interests in urban archaeology and industrial archaeology. “A growing interest in socioeconomic conditions, status and class, urban development, and the impact of changing technology on social systems” all affected the expansion of the focus on social issues in archaeology and are all part of the expansion of the field of historical archaeology (Staski 1990:121). Census information about the Cowell Ranch workers gives us a more complete picture of the worker population, including data on age, English language ability and literacy.

ETHNICITY AND IDENTITY THEORY

An ethnic group is a type of social unit that serves two related functions. It imparts members with a representative ascriptive and exclusive subculture with which to identify, and it allows members to limit primary relationships to others within the group (Staski 1990:122). A second definition of ethnic group identifies a faction of people who set themselves apart and/or are separated by others, with whom they relate or co-exist, on the basis of their perceptions of cultural differences and/or common origin (Jones 1997:xiii). This definition relates to Jones’ definition of ethnicity as, the social and psychological events associated with a culturally produced group identity. The notion of ethnicity encompasses the ways that social and cultural mechanisms converge in the identification of, and relations among, ethnic groups (Jones 1997:xiii).

As Timothy Bauman writes, ethnicity “has been best defined within cultural anthropology, but it has been a debated topic and there is no single definition or theory of how ethnic groups are formed” (Bauman 2004:12). The use of the word “ethnicity” goes

back to the early 1950s, when it first appeared in the *Oxford English Dictionary*. Its roots go back to the Greek word *ethos* used "in reference to band, tribe, race, a people, or a swarm" (Bauman 2004:12). "Ethnicity" and "race" have very different meanings today, with ethnicity referring to cultural traits defined within the group itself, and race referring to physical and cultural traits defined by outsiders (Bauman 2004:12). However, race is not viewed as a useful concept in anthropology. Instead, the field of anthropology uses the term ethnicity, which is related to culture, not to a person's physical characteristics. Ethnic designation is normally more accurate of a cultural group because it is decided by the members of the group itself (Bauman 2004:12).

Siân Jones tells us that the function of archaeology in the formation and acknowledgement of collective cultural identities has become one of the most important topics in archaeological theory and practice (Jones 1997:1). She encourages a reconsideration of the way in which archaeological inquiry is interwoven with the formation of concomitant identities (Jones 1997:1). Through its contemplation of the essence of ethnicity, its association with material culture, and the soundness of archaeological attempts to identify past ethnic groups, this book explores an area which has been both central to traditional archaeological interpretation, and at the center of recent discussions about the political ramifications of archaeological research (Jones 1997:1–2).

Jones' book demonstrates through the analysis of archaeological sites from the period of "Romanization" in Britain, and the sociological actions which result from the connections between two supposedly separate cultures. Most assume this implies the progressive assimilation into Roman culture by indigenous populations, and the eventual adoption of Roman identity. Cultural habits and representations involved in the indication of the "same" identity may vary qualitatively as well as quantitatively in different social settings characterized by different social conditions (Jones 1997:33,128). Additionally, Jones explains that, "there is rarely a one-to-one relationship between representations of ethnicity and the entire range of cultural practices and social conditions associated with a particular ethnic group" (Jones 1997:128). This theory includes discussions about similarities but more importantly, through examples of explicit social and historical

approaches, it enables the comprehension of distinctions in displays of ethnicity (Jones 1997:129).

The implications for archaeology are significant. Ethnic evidence of various aspects of material culture is not likely to be static. Instead, they will actively develop, and be developed by, the interchanges of group identity by specific cultures in various social contexts (Jones 1997:130). Therefore, Jones argues that the use of relative classification for dating and interpreting site histories misrepresents the type of variation that is important for the analysis of specific ethnic identities and of general past cultural processes (Jones 1997:130). Jones recommends a basic reassessment of the suppositions that underlie the perceptions of classificatory sequences, and further consideration of the cultural systems underlying pattern evolution over time (Jones 1997:131). In closing, the author points out that new expressions of ethnicity must have been created, overshadowing pre-existing displays of culture and identity in some, although possibly not all, social interactions. Variation in material culture is likely connected with such systems (Jones 1997:133). Ultimately, she recommends communication and cooperation among archaeologists, a common theme in today's literature, with the goal of achieving more understanding of how identities are formulated during all time periods (Jones 1997:144).

In "The Study of Ethnicity in Historical Archaeology," Randall McGuire notes that, although there has been expanded interest in the archaeological study of ethnic groups, few historical archaeologists have discussed the extensive question of how such groups form and evolve (McGuire 1982:159). He proposes a theory of "ethnic group formation and change drawn from both anthropological and sociological research… based on the examination of the relationship of three variables: competition, ethnocentrism, and differential power." The diverse distribution of power is given the most significance when determining modifications in ethnic boundary sustention (McGuire 1982:159). McGuire uses an example from the Tucson area of Arizona to demonstrate how social and ethnic boundaries between Hispanics and Anglos changed between 1854 and the early 1900s, depending on who had more social power (McGuire 1982).

Some archaeologists have used ethnicity and identity to explain patterns in material culture. Praetzellis, Praetzellis, and Brown explain that, “ethnic strategies such as boundary maintenance that find behavioral expression in material form can be studied archaeologically” (Praetzellis, Praetzellis, and Brown 1987:39). The authors explain that social anthropologists have largely rejected the idea of acculturation as a direct procedure, instead approving more indirect and elaborate models of social and cultural interaction. They advocate for archaeologists to join in the historical analysis of these systems by analyzing the role of material culture within changing ethnicity as demonstrated by the diverse lives of immigrants inhabiting frontier cities in Western America (Praetzellis, Praetzellis, and Brown 1987:47).

In his article “Using Ethnicity in Urban Archaeology,” Adrian Praetzellis used the example of material culture in Oakland, California to demonstrate how a neighborhood changed between the 1860s to the 1960s. During the first sixty years the population was ethnically variable. Subsequently, a huge population explosion, government sanctioned discrimination, the loss of customary industries and jobs, and claims of urban blight and slums were used to validate the redevelopment of the area (Praetzellis 2004:23). The artifact assemblage recovered from an African American household from the 1880s shows formal dining ceramics, expensive meat cuts, and an abundance of alcohol bottles, along with quality jewelry. Conversely, the artifact assemblage from the 1960s from a vacant lot shows few alcohol bottles but many cleaning containers, and the miscellaneous piles of discarded material disposed of by the chronically poor living in government projects (Praetzellis 2004:24). Using historical documentation as an interpretive backdrop for a comparison, the author concludes that the differences in these artifact collections demonstrate how “optimism has retreated before the hard reality of continued racial injustice. The material plenty of an earlier era was nowhere to be seen” (Praetzellis 2004:24). Praetzellis maintains that archaeological deposits demonstrate transitions in the neighborhoods structure as well as its content (Praetzellis 2004:24). This is just one of many ways that the archaeology of ethnicity can shed light on patterns of human behavior and interaction.

There are many ethnic groups in the United States. However, once transplanted, the necessity to adapt to the new culture transforms these groups. A new group

identification emerges in American society as a result of the perceptions and attitudes shown them by other groups, and a new culture emerges that is a combination of the old and the new (Rollins 1981:7). Various aspects of immigrant culture are retained, depending on the circumstances, with family and religion being the two most important to maintaining ethnic culture and identity (Rollins 1981:24). However, under the influence of the dominant culture, assimilation has meant the sacrifice of the immigrant group's identity and the transformation of their culture into the dominant American pattern (Rollins 1981:16). One of the goals of this thesis is to investigate the types of culture change that the workers at the Cowell Ranch experienced.

ITALIAN AND PORTUGUESE IMMIGRANTS

Immigration History

In the 1870s, many of the laborers in the Santa Cruz lime industry were Swiss-Italians and Portuguese immigrants. (See Figure 10.) By the 1880s, this number was over sixty percent of the laborers, and by the 1900 census almost all the men working in the region's lime industry were from these two areas of Europe. As most were northern Italians and Azoreans, I summarize the immigration history of both of these areas, in order to better understand their experiences. Unfortunately, the censuses many times do not include information on where in Italy or Portugal the men emigrated from. However, the distinction of Azorean is common and many of the northern Italians were recorded as Swiss (Perry et al. 2007:192–205; Baker 2009: 4–11).

The sources I use for the information on the history of Italian and Portuguese immigration to the United States were obtained from the UCSC McHenry Library and were primarily written in the last 30 years by Portuguese and Italian descendants, who appear to have a keen interest in the history of their people. They mainly relate to information about life in the Old Country, immigration experiences, and life in the U.S. The strengths of these sources are that they tend to be well-researched, well-written, and come from the point of view of someone who is familiar with immigrant culture and immigrant family histories. However, they may be somewhat biased in that many of the authors are writing about their own family histories and have likely heard only select information from their parents and grandparents.

Figure 10. Kiln Workers at the Cowell Ranch Lime Complex. Kilns are to the Left. Cooperage is to the right. Date Unknown. (UCSC Special Collections)

Italians emigrated for various reasons. Social, economic and political problems prompted many of them to look for something better elsewhere (Rolle 1982:14; Alba 1985:39). Intermittent famines, high local taxes on land, and high unemployment were also common motivators. Italy was united in 1870, but many immigrants came from small remote villages where local dialects and loyalties worked against national identity. Poor soil, low rainfall, persistent erosion, and high population densities in many regions exacerbated food shortages (Rolle 1982:14; Nelli 1983:19–21; Fichera 2011:32–33).

In 1850, the United States contained fewer than 5,000 Italians but by 1860 that number had more than doubled, and by 1880 over 50,000 Italians were in this country. In

1907 (the height of Italian immigration) as many as 15,000 Italians landed at Ellis Island in a one day (Rolle 1982:12; Nelli 1983:19). The average immigrant was male and immigrated alone or with a male family member of working age. They paid for their passage by borrowing money from relatives or from a *padrone* ("labor broker"). The trip was difficult, ranging from two weeks to a month, depending on the type of ship. Conditions were poor. The food was deficient in quality and quantity and many immigrants brought supplemental stores. On-board miseries like lice, scurvy, and seasickness added to the distress of leaving homes and families behind. "Yet friendships grew as deeds of compassion and mutual help drew innocent sufferers together." Some studied English and American guidebooks to help pass the time (Rolle 1982:12; Johnson 1985:29). Upon arrival, they had to pass the immigration station health inspections, and during some periods, there were literacy tests. Some were met by friends or relatives. Others fell prey to swindlers and work contractors who preyed on ignorant, gullible immigrants" (Rolle 1982:13; Fichera 2011:33, 37).

The young men usually immigrated first, primarily due to expectations of economic opportunities. Repatriation rates were high. Those who stayed soon sent for other family members and encourage friends and neighbors to immigrate, helping them to find housing and jobs (di Leonardo 1984:52; Alba 1985:48). Other times heads of households immigrated for job opportunities, found the country to their liking, and sent for the rest of the family. Malio Stagnaro, a member of a well-known Santa Cruz Italian fishing family explained, "their husbands would come first, you see, and then they would send for their families" (Stagnaro:1975:20).

Most immigrants settled in the industrial cities of the East Coast, like New York and Boston. They both contributed to and were victims of the rapid industrialization of that period (Rolle 1982:19; Alba 1985:48). The "Little Italys" in the cities were ethnic ghettos segmented by provincial affiliation, with the Sicilians, Genoese, or Ligurians, etc. living clustered together with others who spoke the same dialect and enjoyed similar foods. Those who desired land to farm went west, where they experienced less alienation, adapted quicker to the new environment, and joined in the rural as well as urban growth of the area (Rolle 1982:19; Alba 1985:48–49). Some worked as miners, lumberjacks, or on the railroad. Most were happy to escape the "sweated labor and industrial slums" of

the eastern cities. California, especially, offered opportunities not available in the East (Rolle 2000:15). The landscape and climate of California are reminiscent of Italy. Even the rainfall patterns are similar, with heavier rains in the north (Rolle 2000:16). California offered immigrants the chance to work as fishermen, orchardists, truck gardeners, and viticulturalists (Fichera 2011:52). The relative absence of large-scale manufacturing industries in the state meant that Italians were not prompted, in the numbers that they were in the East and the Midwest, to form a self-reproducing industrial working-class. This allowed them to fan out into independent business enterprises in numbers above their fellow countrymen who settled elsewhere (di Leonardo 1984:57–58).

Italians from the northern regions were the first to emigrate in numbers. This may be due to chain migration. Later immigrants were lured to areas of the United States previously settled by relatives and friends from their native regions in Italy (di Leonardo 1984:19; Alba 1985:48). Some immigrants came directly to California, while others spent time in the East before migrating. Companies also recruited labor from both Italy and the eastern cities, hoping to maintain a surplus of labor to both keep wages and union memberships down (di Leonardo 1984:61). Many Italian-Swiss settled in the coast ranges of the state and worked in the dairy industry, starting as “milkers,” and often saving enough to buy their own herds and eventually their own land (Raup 2000:134). In Santa Cruz, Cottardo Stagnaro founded a fishing dynasty in 1874, with sixty families coming from Riva-Trigoso, near Genoa, by 1912 (Stagnaro 1975:xiv-xv).

Racism and discrimination, especially against southern Italians due to their darker coloring, was common in the East and Midwest where Italians entered the social and economic spheres at the bottom, largely replacing the Irish (di Leonardo 1984:54). However, in California, the Chinese and Hispanic populations already occupied the lowest level on the social and economic ladder. Racism against the Chinese and Hispanics likely drew some of the negative attitudes experienced by Italians elsewhere in the United States. Italians in California entered a mixed population in which they were not considered to be the lowest status group, and they settled in a region both economically and socially very different from the Midwest and the Eastern Seaboard (di Leonardo 1984:64). Although Malio Stagnaro reported that he did not personally suffer from discrimination, Santa Cruz native, historian, and author, Geoffrey Dunn, himself a

fourth-generation Italian-American, included Italians, and other Southern Europeans, along with California Indians, Mexicans, Californios, African Americans, Chinese, and Irish Catholics on his list of ethnic groups that were “systematically marginalized” in the community (Stagnaro 1975:98; Dunn 2002:96).

In some ways, the Portuguese/Azorean immigration experience was similar to that of Italians, but of course, in some ways it also differed. Additionally, the Azorean immigration experience, in many ways, differed from that of the mainland Portuguese. Since most of the Portuguese in the Santa Cruz area and most of the Portuguese who worked for Cowell were Azorean, I will focus on this sub-population in my discussion of immigration.

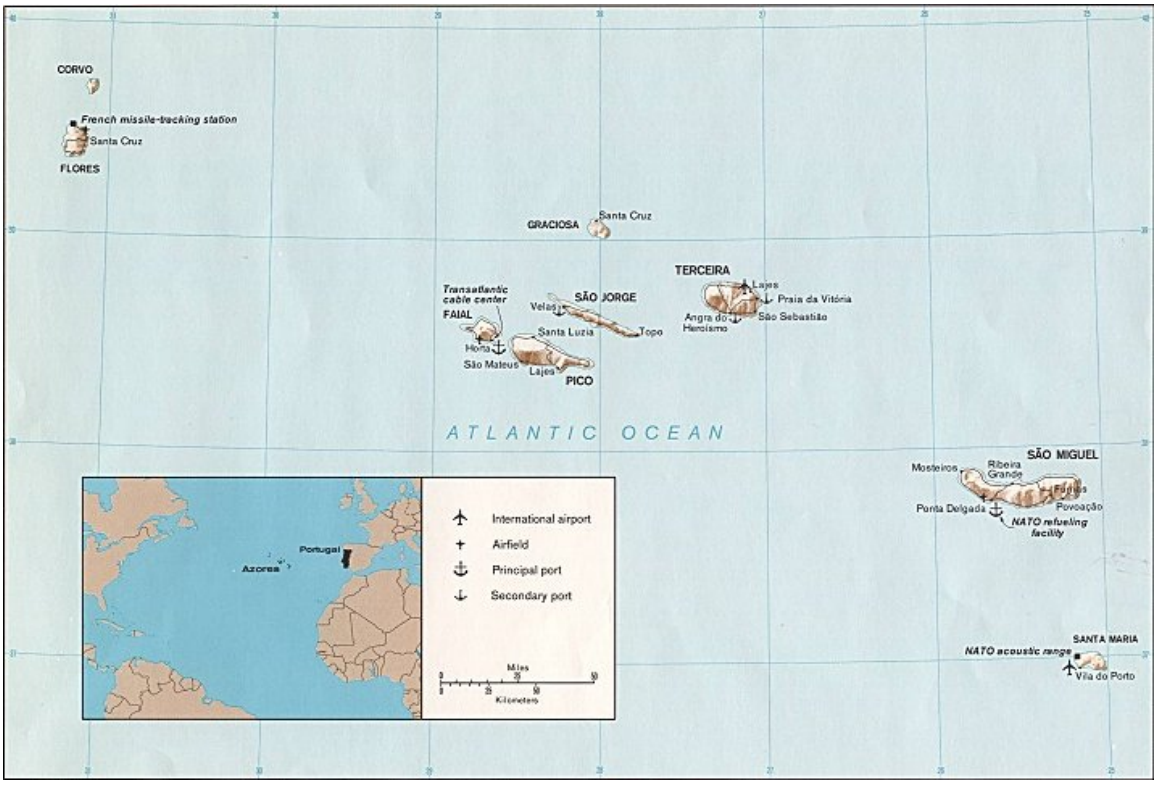


Figure 11. Map of the Azores. (http://mappery.com/map-of/Azores-Islands-Map)

The Azores, nine islands located in the Atlantic Ocean approximately 700 miles off the coast of Portugal and approximately 2,000 miles from the United States, were discovered by Portuguese explorers under Henry the Navigator in 1432 (Santos 1995:6). The archipelago consists of the islands São Miguel, Pico, Terceira, São Jorge, Faial,

Flores, Santa Maria, Graciosa and Corvo (listed by size beginning with the largest). First settled in 1437 by people from a mixture of Portuguese provinces, they were colonized under the Holy Order of Christ to service the mother country with "commodities and tribute," and as a way station for the re-supply and repair of Portuguese ships (Santos 1995:8). Beginning in 1450, Flemish immigrants settled on some of the islands, and made important contributions to Azorean culture (Santos 1995:9). Each island is different in area, terrain, climate and population, and in sociocultural background (Chapin 1989:26). Loyalties lie with the family and the village first, with the Azoreans' next allegiance to the island on which he or she lives. Each island is unique. The industry, topography, and religious celebrations are different, and the dialects are also different (Santos 1995: 27). (See Figure 11.)

Due to their isolation in the mid-Atlantic, the Azorean people have had to be "self-reliant, independent, and harmonious to survive" (Santos 1995:21). Fishing and farming are the primary occupations. However, there are few good harbors and farmland is very limited, demanding very intensive farming practices (Santos 1995:22). Only three islands have protected harbors (Williams 1982:5). The land was poorly divided, with most farmers in an inextricable renting situation, having to pay crop shares to landlords and then trying to feed their large families (Almeida 1978:2).

By the mid-1600s, overpopulation in the Azores was a motivating factor in migration to new Portuguese territories like Brazil and Africa (Avendaño 1982:156). By the early nineteenth century, American whaling ships were regularly stopping in the Azores to obtain provisions and sailors (Chapin 1989:36). It started with a small number of Azoreans shipping as crewmen on the whalers in the 1820s and quickly expanded as the whaling fleet continued to increase in the 1840s and '50s and living conditions in the islands worsened (Williams 1982:4). Emigration motivated by overpopulation and unemployment, along with a lack of opportunity, was added to by the mandatory military conscription of male teens around 1800. Many young men illegally left the islands by stowing away on whaling ships (Santos 1995:33–37). The first Azoreans came to California on these whaling vessels, jumping ship in Monterey or San Francisco (Williams 1982:7).

Whalers brought the news to the Azores of the discovery of gold in California, and its impact on the islands continued for the next twenty years (Williams 1982:7). Azoreans, along with immigrants from all corners of the globe, scrambled to reach the gold fields. Getting rich proved elusive to most, and Azoreans, like many others, decided to stay and farm or fish, the two major occupations of these immigrants in California. Later dairy farming became important (Avendaño 1982:157). A communication network of extended familial ties was established between relatives and friends in America and in the Azores that encouraged migration, assisted new immigrants, provided recent arrivals with temporary housing, and helped them find jobs. The early newcomers established the settlement and social networks that subsequent immigrants relied on (Williams 1982:8). The Azorean emigrants were attracted to the United States by the lure of higher wages and a higher living standard. Their American relatives and friends were well-fed and well-clothed. California was described in glowing colors. Most immigrants planned to settle there, but many did not travel that far west (Avendaño 1982:163).

Most Azoreans settled in New England, the focal point of immigration from the islands, or in California. Some stayed in New England for awhile and then went west (Santos 1995: 58). They came by the thousands, mostly poor and often illiterate. Nevertheless, they possessed a strong will to succeed and better themselves, so that their descendants would not have to suffer as they did in their homeland (Almeida 1978:4). There are many written descriptions of the Azorean's character and work habits. Some are complimentary: "they had a good reputation for aptitude and hard work" (Chapin 1989:38). Whaling captains liked Azorean sailors because they were "hard working, quiet, and cheap" (Santos 1995:54). Like the Italians, most Azorean immigrants were young men. Additionally, like the Italians, Azoreans sent for their families, usually sponsoring one member at a time to immigrate, or they would bring someone back with them when visiting the islands (Santos 1995:36–38). Many returned to the islands after saving enough to buy land. Some returned to retire with the money earned overseas (Santos 1995:39). Those who returned brought gifts for their friends and relatives, and possessions for themselves if they were staying (Santos 1995:40).

Although Roman Catholic, Azoreans tended to be superstitious. Due to their suffering from natural calamities, starvation, isolation, and their lack of education,

Azoreans had strong religious beliefs. However, they might have turned to superstition and even pagan witchcraft in difficult situations. They have a belief in evil spirits, evil eyes, witches, magical potions, and omens (Santos 1995:28-29).

Many Azoreans worked in whaling, fishing, or the textile mills in New England. Some became farmers, as in their homeland. Like the Italians, they joined others from the islands in Azorean neighborhoods in cities, like New Bedford and Fall River, and relied on friends and relatives to help them get settled in their adopted country. Their strong social network played an important role in gaining employment and housing, and was very important in reinforcing local community ties and discouraging integration with non-Portuguese. Azoreans shared the social customs common to their homeland and practiced a high degree of intermarriage. In many ways, they chose to isolate themselves from the dominant population (Williams 1982:24).

Like the Italians, Azoreans suffered some discrimination, especially those with darker coloring. Portuguese-Americans are burdened by the perpetual race consciousness of this country. There is a general anti-Latin attitude and the immigrants along with their descendants are often stressed by a feeling of shame concerning their roots. This can cause the concealment or negation of ethnic origins through Anglicizing names and abandoning their native language (Avendaño 1982:167-168).

Anti-Portuguese discrimination did occur in Santa Cruz. A local historian whose father was Portuguese shared with me a couple of his family's experiences and feelings about discrimination.

> My father was always sensitive about his skin color, at least when he was younger and working more outdoors. His skin was very white, unless he was out in the sun. If he was out in the sun a lot he would turn dark brown. People would mistake him for being Mexican, which he did not like. [Some people did not tell others that they were Portuguese.] I remember my aunt saying that when she got married her husband asked her not to mention to people that he was Portuguese. I remember once in high school PE class overhearing an older boy telling someone that he hated Portuguese. That stung. Needless to say, I did not volunteer the fact that I was half Portuguese [Frank Perry, personal communication 2011].

Some Azoreans even turned to artificial methods to try to keep their skin light so as not to suffer discrimination. Barbara Wagner shared her mother's treatment.

When she was out in the sun a lot and started to get tan, she bleached her daughter's skin with lemon juice so she would not look too dark (Wagner 2011:7).

The immigrant experiences of Italians and Azoreans were quite similar. Likely the biggest differences are the isolation of the Azores in the middle of the Atlantic, that many young Azorean men left their homeland furtively by illegally gaining passage on whaling ships to avoid compulsory military service, and the targeted recruitment of Portuguese men by companies in the United States. Cowell was one of those employers who recruited workers directly from Portugal and the Azores, as well as from the East Coast (Majors 1965: 96). Others heard of Cowell and his willingness to employ Portuguese by word of mouth. He was known as the "Man with Golden Streets" (Cacace 2008:2). (See Figure 12.)

Figure 12. Quarry workers at the Cowell Ranch. Date Unknown. (UCSC Special Collections)

An article pertaining to the domestic archaeological deposits of an Italian immigrant in the United States describes excavations in Jamaica, Queens County, New York that revealed three features associated with an Italian immigrant and his family.

Michael Pette arrived in New York City in 1885 with little money. Initially working in unskilled positions, he eventually became a prosperous real estate developer, newspaper publisher, and a leader of the community. Through archival data, Pette's autobiography, interviews with descendants, and an archaeological excavation, the author interpreted the role of material culture in his attainment of American middle class status (Fitts 2002:1).

People tend to gather with those from similar backgrounds, causing immigrants to live in ethnic communities comprised of natives from the same area or even from the same home village (Alba 1985:48–49). This generally pertains to any group in any industry in any place. Hardesty discusses this phenomenon as it relates to the mining frontier. However, this type of behavior can also cause problems as conflicts from the Old Country made new problems in the adopted country. Even within specific ethnic groups, the immigrants formed cliques. Divisions within communities were common, even within what outsiders often perceived to be a close-knit ethnic populace (Hardesty 1988a:103).

Another potential problem was two or more ethnic groups who occasionally disagreed with each other living and working in the same location. This sometimes amounted to a type of ethnic gang warfare. In 1889 at the IXL lime complex near Felton, "two of the workers, one Irish and one Portuguese, got into a fight while eating dinner, and this developed into a general row, the fellow laborers of each man taking sides according to nationality. Several were very badly beaten. Constable Drew from Felton was called in and eventually several workers on each side were arrested and charged with battery" (Perry et al. 2007:129).

PORTUGUESE AND ITALIANS IN THE SANTA CRUZ COUNTY LIME INDUSTRY

The U.S. Census

United States census information is a common research source in disciplines that study the past. All types of census data are an important aid when doing historical research. It can be used in the study of American communities and to identify individuals and households along with their activities at historic sites (Fliess 2000:65). There has been much debate over the decades of the accuracy of the modern censuses, especially in

this country (Steckel 1991:579–580). The scope, complexity and purposes of the federal censuses expanded significantly during the 1800s. An increased interest in the "study of life-course and intergenerational behavior" was partially motivated by a drop in the costs of "linking households over time" (Steckel 1991:581).

Beginning with the 1850 Federal census, the method and scope of the enumeration were substantially changed, and this census, along with the two subsequent enumerations (1860 and 1870), included much more than the standard name, age, sex, color, nativity, occupation, education, and physical and mental condition questions in the population schedules. Almost 100 new inquiries, including information about agriculture, industry, mortality, schools, libraries, churches, newspapers, and periodicals, and the value and taxes paid on property were included (Hunt 1899:466). These non-population schedules greatly expanded the amount of time and labor needed for this decennial government project.

During the period from 1860 to 1910, the questions on the population schedules consistently expanded from 12 questions to 29 questions, before decreasing to 24 questions in 1920 and to 16 questions in 1930. Expanded census forms included questions about marriage status and date, school attendance, literacy, disabilities (deaf and dumb, blind, insane, idiotic), economic status, whether a convict, home ownership, immigration year, naturalization status, birthplace of parents, language spoken, language spoken by parents, employment status, type of employment, number of weeks employed during previous year, and whether a Civil War veteran (United States Census Population Schedules 1860, 1870, 1880, 1900, 1910, 1920, 1930).

Biases within the recording of census material come from many sources. For example, the census workers must be competent and adequately trained and supervised in order to produce accurate information (Hunt 1899:479). Individual and environmental factors associated with high poverty rates contribute to omission rates. Demographers have linked geographic concentrations of racial and/or ethnic groups in both urban and rural settings to problems with the quality of census data. Poverty also contributes to behavior that has been linked to undercounting by the census enumerators. This situation is complicated by the overlap of these two factors (Fein 1990:285; Bell 1999:103). Living arrangements, including large household size, extended family households, close kinship

ties across households, individual and household mobility during the census period, and limitations to a respondent's ability to follow census form instructions (e.g. low education and poor English language skills) all affect the quality of the census data (Fein 1990:286).

The use of census data for historic research is fraught with problems. Three types of enumeration error commonly affect the quality of census data. Underenumeration occurs when a record or element of the census is missing. Overenumeration is the error of including a person or unit more than once. Misreporting is when the census attributes are recorded with mistakes (Steckel 1991:579). All of these inaccuracies create problems for researchers.

When viewing the population schedules, I found legibility to be mediocre at best. Contributing to archaic writing styles and blotched ink is the sometimes blurry condition of the photographs of the original large census sheets. Combine that with outdated microfilm viewers and worn out microfilm rolls, and the result can be a literal headache while attempting to decipher these images. However, the limitations are outweighed by the benefits of access to a trove of historic information, especially the details about the individuals' and family's lives that they contain.

Santa Cruz County Lime Workers in the U.S. Census Population Schedules

Using the list of lime workers from the U.S. Census Population Schedules for Santa Cruz County located in Appendix C in Lime Kiln Legacies, I tallied the numbers of individuals listed from Switzerland or Italy versus those listed from the Azores or Portugal for each census year (Frank Perry et al. 2007:192–205). I then tallied the total numbers of workers listed for each census year, eliminating owners, managers, supervisors, foremen, and white-collar workers, like book keepers. However, I did not eliminate skilled workers like coopers, blacksmiths, and cooks. I converted these numbers into percentages. With this information, I calculated the percentage of the workers from each of these areas. I also added the numbers of both ethnic groups together and calculated the percentages for both ethnic groups combined. (See Figure 13.)

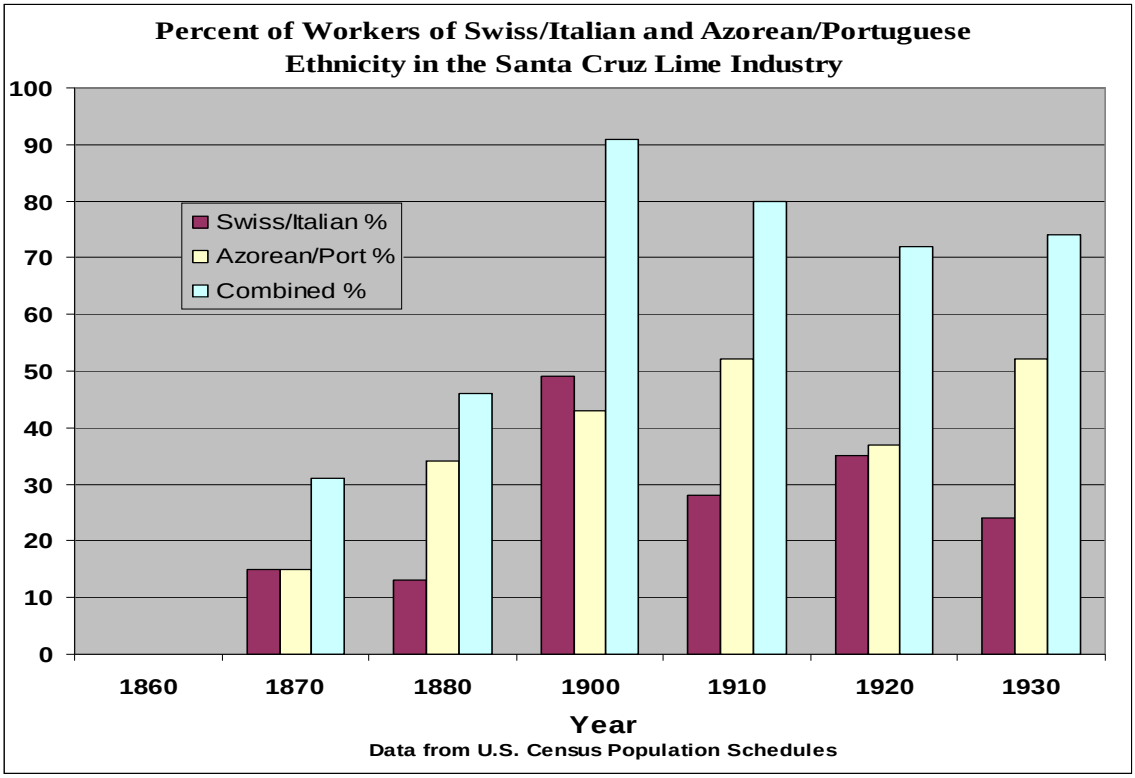


Figure 13. Percentages of Swiss/Italian and Azorean Portuguese Employed in the Santa Cruz Lime Industry, 1860-1930. (Michael Boyd)

Some trends emerged. In 1860 there were no Swiss/Italians or Azorean/ Portuguese employed in the Santa Cruz lime industry. Immigrants at this time were English, Irish, Scottish, and Canadian, all represented by very small numbers of men. By 1870, each ethnic category represented fifteen percent of the employees, totaling thirty percent of the lime workers for both ethnic groups. By 1900, ninety-one percent of the lime workers were members of one of these two ethnic groups, the peak of their dominance in the employee numbers. In 1910, the year with the highest total number of workers in the lime industry in Santa Cruz County, with ninety-six men working in the industry, the percentage of employees who were Swiss/Italian or Azorean/Portuguese dropped to eighty percent. By this time, Cowell had bought and reopened the IXL lime kilns near Felton, had built the new complex at Rincon, located along the Southern Pacific Railroad between Santa Cruz and Felton, and had converted one of the Bay Street kilns, now on the campus of UCSC, to run on oil.

The census information for 1920 and 1930, the waning years of the lime industry, shows the combined numbers of the Swiss/Italians and Azorean/Portuguese employees to be just over seventy percent (United States Census Population Schedules 1860, 1870, 1880, 1900, 1910, 1920, 1930). However, beginning in 1910, Swiss/Italian and Azorean/Portuguese men are increasingly represented in the ranks of foremen in the Cowell operations, being listed as both quarry and lime kiln foremen, although Portuguese far outnumber Italians in these positions. Managers, supervisors, and white-collar workers continue to be Anglo (Frank Perry et al. 2007:199–205). This suggests that these ethnic groups were slowly climbing the social ladder, a sign of assimilation and success in the United States.

Age, Literacy, Language

I also used the data contained in the U.S. Census Population Schedules to look at age, literacy, and language within the Cowell Ranch workforce. During the 1870s and 1880s, the ages of the large majority of the workers were between the mid-teens and mid-thirties. However, during the 1920s and 1930s, the majority of the workers were in their mid-thirties or older. This shows the trend of an aging work force toward the later years of the lime industry, when lime manufacture was waning at the ranch and the company was not hiring new employees, but continued to retain their aging work force.

During the 1870s and 1880s, the large majority of the lime workers at the Cowell Ranch were literate. In 1880, the literacy rate was 100 percent. Information on English speaking ability is not available for these census years. In 1900, the numbers of English-speaking and non-English-speaking workers is almost equal, calculated at 55.6 percent versus 44.4 percent. During the 1910s through 1930s, English-speaking ability among the workers fluctuates between around 40 percent to almost 70 percent. However, illiteracy remains over 50 percent during these years. In 1920, for example, the illiteracy rate of the Cowell Lime Works employees was over 75 percent. (See Figure 14.)

Cowell Lime Works
Age, Literacy, Language

From U.S. Census Population Schedules

	n =	Age 14-25	%	Age 26-35	%	Age 36-45	%	Age 46 UP	%
1870	43	19	44.2	17	39.5	4	9.3	3	7
1880	38	4	10.5	23	60.5	11	28.9	0	0
1900	18	6	33.3	7	38.9	3	16.7	2	11.1
1910	37	10	27	10	27	9	24.3	8	21.6
1920	19	0	0	4	21.1	3	15.8	12	63.2
1930	11	1	9.1	4	36.4	1	9.1	5	45.5
	166	40	24.1	65	39.2	31	18.7	30	18.1

Totals									
	n =	**English**	**%**	**No Eng**	**%**	**Literate**	**%**	**Illiterate**	**%**
1870	43	N/A		N/A		42	97.7	1	0.3
1880	38	N/A		N/A		38	100	0	0
1900	18	10	55.6	8	44.4	12	66.7	6	33.3
1910	37	15	40.5	22	59.5	9	24.3	28	75.7
1920	19	13	68.4	6	31.6	7	36.8	12	63.2
1930	11	6	54.5	5	45.5	5	45.5	6	54.5
Totals	166	44	51.8	41	48.2	113	68.1	53	31.9

(Patricia Paramoure)

Figure 14. Age, Literacy, Language of the Lime Workers at the Cowell Ranch.

HISTORICAL RESEARCH

Internet

Ann Ramage, a retired Bureau of Land Management archaeologist with an interest in genealogy and historic research, assisted me with research on the internet about the lives of individual lime industry workers. We primarily used the commercial version of Ancestry.com for this investigation. U.S. census records with links to ship passenger lists, State of California Death Indexes, and State of California Voter Registers are available at Ancestry.com. We investigated other websites, including Norcal Genealogy, SFgenealogy, US Gen Web, Genealogy Trails, and Family Search. We found Ancestry.com to be the most useful for our research and used it extensively to access the above documents.

Company Records

An archive of company records from the Henry Cowell Company (established 1889) and the Henry Cowell Lime and Cement Company (established 1899) is available at UCSC Special Collections. Due to the renovation of the UCSC McHenry Library, Special Collections was moved to a storage facility and was closed to the public for an extended period of time. Conveniently, Special Collections reopened in early January, 2012, in time to complete this research. Unfortunately, relatively few records survive, and none of the documents include interpretive material. The ranch ledgers, for example, contain a motley list of entries on various ranch, lime, and other company activities with some of the information not understandable because it is too vague or uses unknown abbreviations.

Individual Workers

Archival research into the lives of individual workers yielded mixed results. I was not able to investigate a large number of individuals within the scope of this thesis. Using oral histories, census information, and Cowell Company documents, I randomly selected the names of individual lime workers to do research on their lives (Conde and Lorenzana 2011; Wagner 2011; United States Census Population Schedules 1860, 1870, 1880, 1900, 1910, 1920, 1930; Henry Cowell Lime and Cement Company 1910). One individual stands out in this search because of the uncharacteristic abundance of archival information available about his life. According to the 1900 U.S. Census, Joseph S. Quadros was born in Portugal in June 1861 (United States Census Population Schedules). He immigrated to the U.S. from Fayal, Azores, in 1882, arriving on the *Paladin* in Boston, Massachusetts, on May 21 (Boston Passenger and Crew Lists 1943). He lived in the San Lorenzo area of Santa Cruz County, and his spouse was named Mary C. Quadros. They were married in 1888, they had three children, and he worked at the lime kilns (United States Census Population Schedules 1900). By the time the 1910 U.S. Census Population Schedules were recorded, he was a foreman at the kilns (United States Census Population Schedules 1910). According to the California Voter Register, Jose Da Sonza Quadros (alternative spelling) came to Santa Cruz, obtained citizenship, and registered to vote in 1894. Interestingly, the voter registration gives a physical description: six feet tall,

dark complexion, brown eyes, black hair (California Voter Register 1866-1898). Jose S. Quandros (alternative spelling) passed away in 1945 (California Death Index 1940-1997). This is the most definitive data I have on a specific individual.

I have experienced some of the problems discussed above using the United States Census Population Schedules while doing research on individual lime workers. People changed their names. I found that anglicization of immigrants' names was a common practice, especially by men. They also went by nicknames. Another issue is differing dates of birth. Four documents I inspected concerning one individual gave four different dates of birth, all around 1862. Census information is notoriously unreliable and incomplete. People were missed. People were listed more than once in the same census year. I found it very difficult to trace individual laborers listed in the U.S. Census. There are many Portuguese surnames that are common. Repatriation among these ethnic groups was also common. It appears that few men remained working in the same location for the same company for a long enough period that they would be recorded in the same place on two different censuses. Moreover, the missing 1890 U.S. Census Population Schedules also creates problems for any researcher of this time period.

Men moved around, especially single laborers with no community ties and no dependents to encourage steady employment. In his paper, "The Floating Army: Transient Labor in Early 20th Century California," Mark Walker discusses this phenomenon. The landscape throughout much of rural California is the creation of migrant and transient seasonal workers. Undocumented, nomadic, with few personal possessions, these workers manifest problems for both historians and archaeologists (Walker 2008:Abstract). Walker explains that, "the problem was identifying the so-called bindlestiffs," those men who wandered from place to place and from job to job (Walker 2008:2). In California, especially, all of the major industries were seasonal (agriculture, lumbering, railroad construction, fishing, mining) (Walker 2008:2). Work availability concentrated in the summer and fall months. The artifacts associated with these drifters "are buried in the mixed deposits of hotels and boarding houses, in 'the landscape of lodging'" (Walker 2008:2). And except for U.S. Census information, they rarely appear in the historical record.

Lime was also a seasonal industry. The explosive reaction of lime when contacted with water, along with the impossibility of navigating unpaved mountain roads with heavy wagons during the wet winter months necessitated a significant cutback in employees during the rainy season. Some workers were retained, especially those with skills that could be utilized year-round, like coopers and blacksmiths. For them, winter and spring was a time to catch up on inside work. However, the large numbers of laborers lime companies employed during peak dry-season production were not needed during the off-season. Undoubtedly, few of the laid off men would have the means to survive without work until consistently good weather appeared, necessitating a search for another position, many times likely leading them somewhere else.

Ethnic Artifacts

Immigrant workers retain aspects of their native cultures, and this behavior may show as evidence in the archaeological record. Evidence for ethnicity may include certain types of cuts of meat, shellfish species preferred by ethnic groups, or imported food packaging relating to specific ethnic groups. Malio Stagnaro describes how the Italians in Santa Cruz ordered goods from the wholesale Italian grocers (Stagnaro 1975:39). Ethnicity as reflected in clothing remains may include fasteners not common on American-made clothing, but that may have originated on clothing brought from immigrants' home countries. Any artifacts with foreign marks are a clue to the possible activities of immigrant individuals. These items may have been brought from their homeland or may have been purchased here from importers (Paramoure 2009:17).

Conversely, the evidence of American artifacts in a known ethnic site or feature shows assimilation and the adoption of American material culture. In his discussion of the Chinese at the Harmony Borax Works, Teague says that "acculturation had, at least in the Harmony operations of the mid-1880s, advanced to the extent that Chinese laborers were adopting American tools, and some articles of clothing and food. Food preparation and serving equipment; however, remained traditional" (Teague 1977:211).

Early attempts to study race and class in archaeology in objective ways searched for ethnic markers and patterns in the archaeological assemblage. The investigations tended to focus on the individual artifacts themselves, and to focus narrowly on race and

class as the important analytical factor. Recently, the trend has been toward looking at a bigger picture, with artifacts being just part of that picture. New ideas relating to new ways of interpreting archaeological sites, increased public outreach and community participation, and a "more complex, symbolic version of artifact analysis" are all important developments. However, focus on specific types of artifacts can narrow the interpretive potential to the detriment of a beneficial holistic view of the assemblage (Brandon 2009:12).

Praetzellis et al. tell us that foodways are very traditional cultural elements and are frequently maintained long after other ethnic characteristics have been disregarded. The use of traditional ceramic types is an especially important part of ethnic foodways, having pronounced cultural significance to the people who use them (Praetzellis, Praetzellis, and Brown 1987:39). Staski states that researchers have given much attention to the procurement and use of consumer goods and the features of foodways in archaeological sites. However, the frequency of food-related artifact categories has most often been used as a measure of status, and not ethnicity, but some evidence suggests that foodway-related artifacts are more representative indicators of ethnicity than of status (Staski 1990:128). Clothing and food related artifacts recovered at Cabin B at the Cowell Lime Works may communicate information that pertains to the ethnicity of the structure's inhabitants. Many of the workers were immigrants, but people born in the United States can still retain ethnic traditions which have been passed on by recent ancestral immigrants, also. Ethnic traits do not equal nativity.

CONCLUSION

In this chapter I have explored immigrant ethnicity and identity, focusing on the Italians and Portuguese, especially Azoreans. I have reviewed ethnicity and identity in archaeology along with the immigration experiences of both ethnic groups. The ethnicity of the employees in the Santa Cruz lime industry changed over time, with Italians and Portuguese becoming dominant. I used U.S. Census Population Schedule information to calculate the percentages of workers from these ethnic groups both separately and together, using a bar graph to visually express this information. Specific types of artifacts are more likely than others to express ethnic affiliation, but ethnicity is notoriously

difficult to determine from artifacts (Van Bueren 1999:179–180). Specifically, artifacts relating to foodways are discussed in the archaeological literature as indicating the ethnic traditions of immigrants and those with recent immigrant ancestry.

Following Chapter

The focus of the following chapter is the lime industry in Santa Cruz County. This includes discussions about how lime was made and used historically, as well as today. In order to give a basic background on the city and community of Santa Cruz, I then explain the historical background of the area. The lime industry in Santa Cruz, lime manufacturing operations at Cowell Ranch, and the life of "Lime Baron" Henry Cowell, are discussed. I review company towns and the Cowell company village. I describe Cabin B in detail. I examine lime industry occupations and work conditions. Oral histories that give information about life on the ranch will also be discussed.

CHAPTER IV

THE LIME INDUSTRY

INTRODUCTION

In this chapter, I present information about the geology of limestone, how lime is made, and the history of its use. I then give a short overview of the historical background of Santa Cruz, California. I discuss the lime industry in Santa Cruz County, and present short biography of Henry Cowell, "Lime Baron". I discuss company towns, especially those involved in other extractive industries such as mining and logging. A summary of the Cowell Ranch company village assists in the portrayal of the everyday lives of the lime workers. A description of Cabin B, its location within the village, and its setting facilitates a better understanding of the layout of the operations and how the workers' cabins fit into the larger industrial system.

WHAT IS LIME?

The word, "lime," is used to describe the substance produced by heating (calcining) limestone, usually using a kiln. The production of lime begins with the extraction of limestone from the earth, a quarry, or a mine. However, in some locations marine shell was burned to make lime (National Lime Association 2010:1).

The Lime-Making Process

Lime is the product of calcining, meaning heating, a rock rich in calcium carbonate, such as limestone. This usually takes place in a kiln. Heating limestone releases carbon dioxide gas, leaving behind calcium oxide, called quicklime (Rolando 1992:208). The amount of heat that is required for complete calcination depends on the composition of the stone, the type of fuel, the amount of draft, and the direction and force of the winds (Rolando 1992:208). A minimum temperature of 1,648˚F is needed to convert pure calcium carbonate into quicklime at sea level. To expedite the process, workers usually heated the lime kilns to between 1,900˚F and 2,450˚F (Boynton 1980: 160,168). Quicklime is very volatile and must be handled very carefully (Wingate

1985:5). When water is added to quicklime (called hydrating or slaking), a chemical reaction takes place. The volume increases by over three times and a large amount of heat is released. Limerock that has been baked in a kiln retains its basic shape but its molecular weight has been reduced by about half and the rock had shrunk by about a fifth (State of California 1888: 555; Wingate 1985:5-6, 9).

During the late 1800s, using wood for fuel, it took 4 ½ to 5 days to burn a charge (or load) of limerock in a lime kiln in Santa Cruz. Later, during the 1920s, using oil for fuel, it took 4 to 4 ½ days. Tending the kilns around the clock was necessary to maintain a relatively consistent temperature. The men who tended the kilns were called firemen. Large kilns had four fire chambers. The workers controlled the draft by opening and closing the large metal doors to the fire chamber (Perry et al. 2007:51).

After firing, it was necessary to allow the kiln to cool after which it took two to three days to unload the kiln, a few lumps at a time (Calciano 1971:3). Some of the lime would be under- or overcooked and would be discarded. Waste lime can be seen at many lime manufacturing locations, strewn about or in piles (Perry et al. 2007:52). At the Cowell Lime Works, waste lime was used for retaining walls, foundations, and fill. During the late nineteenth and early twentieth centuries, the cooked lime was placed in barrels while it was still warm but not hot enough to burn the wood. Many locations, including the Cowell Ranch, made their own barrels. Coopers made the staves out of redwood and the hoops out of hazelnut. Later, the hoops were made from metal. The lime was shipped in barrels by wagon, ship, or train primarily along the West Coast. The lime companies encouraged their customers to recycle the barrels by offering 20 to 30 cents apiece for each one returned (Perry et al. 2007:52-53). The size and weight of the barrels varied. In 1916, the Standard Lime-Barrel Act designated two sizes for lime barrels. Large barrels weighed 280 pounds, net weight, and small barrels weighed 180 pounds, net weight (United States Department of Commerce 1927:12).

HISTORY OF THE USE OF LIME

Limestone is a naturally occurring rock that consists primarily of calcium carbonate and is mostly composed of the mineral calcite. It is found in many forms and its classification is based on its origin, chemical composition, structure, and geologic

formation. Deposits of this stone are widely distributed throughout the world. Lime is a requisite material for many industries and is one of the most heavily used chemicals in the world (Oates 1998:1). The rock is primarily composed of calcium carbonate fossils of small marine organisms and was formed under ancient oceans (Boynton 1980:2).

The use of lime and limestone for various purposes was developed independently in multiple places. Evidence of the use of lime goes back more than 10,000 years and archaeological indications of its use by early sedentary societies in the Near East have been dated to approximately 12,000 years B.P. Both Natufian and Pre-Pottery Neolithic B cultures used lime, likely for its durable properties, in their permanent buildings. Remains of architectural uses of lime in plasters and surface washes have been recovered. Many residential and ceremonial structures had floors coated with lime-plaster and walls coated with lime wash (Schreiner 2002:18). No early regional lime-making methods remain in use. They were likely replaced by the Roman-era development of more-efficient contained kilns (Schreiner 2004:1). A second early use of processed lime dates to the same time period. Lime was used as a cement to fix stone tools to shafts at the Lagrima North VIII site on the Siani Peninsula in Egypt (Schreiner 2002:16). Evidence of a Terrazzo floor laid with lime mortar made from lime, sand, clay, and water, at Cajenu in Eastern Turkey dates back to approximately 10,000 B.P., and evidence of the use of lime in a floor dating back about 8,000 years ago has been uncovered at Lepenski Vir, a Mesolithic site on the banks of the Danube in eastern Serbia (Oates 1998:3).

The Egyptian pyramids are the first recorded use of limestone in construction, when limestone blocks were cemented together with lime mortar between 6,000 and 4,000 B.P. The use of marble (metamorphosed limestone) for statues and wall construction in luxury buildings began soon after (Boynton 1980:3). Besides using lime for construction, the Greeks and Romans employed it as a chemical agent, for example, for bleaching linen, and in medicine, made into limewater, to treat burns and to be taken internally as an antacid (Boynton 1980:3). The Assyrians described lime's importance in their glass recipe and it was also a component of pottery glazes (Oates 1998:4).

Little is known about the medieval lime industry but its use is mentioned in texts from that time, and also in church and municipal records (Oates 1998:4). The use of lime in an early form of chemical warfare was reported when the English threw lime in the

faces of the French during a battle in 1217 A.D. during the First Barons' War. Shakespeare and other early English writers mentioned lime. Alchemists in the Middle Ages used lime and wood ashes to make a crude lye for soap making (Boynton 1980:3). Lime was such a familiar material during this period that it was not often recorded. During the 1400s, its use in construction spread throughout Europe. In the 1700s, Joseph Black gave the first technical explanation of the calcination of limestone, and in 1766 De Ramecourt detailed the art of lime burning and described the design, operation, and economic characteristics of quarrying and burning limestone (Oates 1998:4).

Lime was also used in Asia. In Tibet, lime stabilization of clay was employed in the construction of the pyramids of Shersi over 5,000 years ago (Oates 1998:3). Lime made from shell and used in plaster and mortar was recorded in China during the Hsia dynasty (2205–1766 B.C.) (Hommel 1969). Beginning with the Ming dynasty in China (1368 –1644 A.D.), a concentrated effort was made to strengthen defenses, and the Great Wall was extensively rebuilt and reinforced with brick and stone using lime-based mortar (Waldron 1990:140–141).

The aboriginal use of lime for mortar, plaster, and whitewash seems to be limited in the New World to Mesoamerica, and likely was significant in the development of architectural forms within this region. It was used both functionally and ornamentally. Residential and ceremonial structures were built with lime-plaster floors and walls, and whitewash was used. Lime was also essential in the treatment of dried corn for human consumption (Schreiner 2004:1–2).

The Spanish manufactured lime in Florida, at St. Augustine, during early colonization efforts. Lime made by burning *coquina* (an abundant thin shell found in coastal waters) was used for mortar and plaster for construction of early buildings. At Jamestown, Virginia, during the 1600s, the English made lime by burning oyster shell, obtained by hand-dredging near the mouth of the James River, in a kiln built near the settlement. Shell was used because no limestone was found in these coastal areas. Rhode Island appears to be the first colonial location where limestone was burned, followed by Quakers near Philadelphia and the Dutch in the Hudson River Valley (Boynton 1980: 3–4).

Early Lime Use in California

The first use of lime in California was by the Spanish during the Mission period. Lime was used for stone and brick mortar, for wall plaster, and for whitewash. The Spanish also used lime to remove hair from cow hides during the tanning process, to process dried corn (learned from the Mesoamericans), and to make cement used for building aqueducts and other structures. All the missions in California had a source of lime (Costello 1977:22). Most of this lime was made from rock burned in early kilns; however, at some missions, like Carmel, the Spanish burned shell from Native American shell mounds (The Masterkey 1945:70). Unfortunately, there is little historic documentation of this early California lime manufacturing. Historians and archaeologists have investigated kilns associated with Missions San Antonio, San Diego, and San Luis Rey. Lime was also used at Mission Santa Cruz and historic documents from the mission refer to lime and lime kilns. Unfortunately, the documents do not say where the kilns were located or where the limestone was quarried. During the Mexican period, lime continued to be used in construction in the Santa Cruz area. One source also mentions its use as a disinfectant, and today we know that lime is toxic to some bacteria (Perry et al. 2007:15–18).

Uses of Lime During the Late Nineteenth and Early Twentieth Centuries

Lime is a very versatile material. Its uses fall within three main categories: agriculture, construction, and the chemical industries. Lime has a multitude of miscellaneous, important industrial and every-day uses. Limestone likely affects human lives in more ways “than any other mineral except water and common salt” (Logan 1947:180). Approximately fifteen percent of the contiguous United States is underlain by limestone, but little is mined because it can be inexpensively obtained through surface quarrying (Logan 1947:180). I will touch on some of the most common uses, especially those during the late-nineteenth and early twentieth centuries when the Cowell Ranch was producing lime in Santa Cruz.

Although California is a leading agricultural state, lime has not been used on the land to the extent it is elsewhere. Moderate rainfall levels, poor drainage in many areas, and the short time span that agriculture has been done in the state mean that the soils

continue to retain calcium, and the need to add lime to the soils does not exist here as it does in many other places. Another important reason for the use of lime as a soil additive was to help neutralize acid soils ("sour" soils), and to help break up heavy clay or adobe soils. Some agricultural crops, like alfalfa require that extra lime be added to the soil. Other agricultural uses include its utility as an additive to processed poultry and stock feed, as a filler in commercial fertilizers, and in sugar manufacturing using sugar beets (Bradley 1906:62; Stone 1913:313; Logan 1947:181 –183; Bowen 1957:304).

In construction, crushed limestone was commonly used as aggregate in concrete, and a small amount of lime hydrate added to concrete made it easier to work with and limited its water absorption rate. Quicklime and hydrated lime (quicklime with water added) were well-known for their use in mortar, plaster, whitewash, and stucco. Builders prefered high-calcium lime because it slaked quicker and made a greater quantity than other limes. Beginning in the 1930s, lime putty became widely available. Lime was also used in making sand-lime and silica bricks, types of firebrick used as refractory linings for furnaces (Bradley 1906:61; Stone 1913:313; Logan 1947:187–189; Bowen 1957:304).

The chemical industries employed lime as a source of calcium and carbon dioxide for manufacturing other chemicals, like caustics and alkalis. Lime was used as a vehicle for manufacturing products such as magnesium salts, to neutralize acids, and as a catalytic agent in many chemical processes. It was used as a dehydrating agent, a precipitating agent, and a coagulating agent. Lime's usefulness as a hydrolyzing agent in glue, rubber and paper manufacturing was also noted. Other applications include, to saponify fats and oils in soap manufacturing, to absorb gases, and as a solvent (Bradley 1906:61; Stone 1913:313; Logan 1947:187–189; Bowen 1957:293).

The tanning industry used lime to remove hair from animal skins (Logan 1947:185–186). Lime was important in the glass-making industry, in the manufacture of paints and varnishes, and for the treatment of water, sewage and industrial waste for purification purposes, and it was known as a general disinfectant. Lime was also used as a filler in many substances, like asphalt, fertilizer, paint, paper, oilcloth, linoleum, cosmetics, tooth paste, and tooth powder (Logan 1947:192–197).

Many of lime's uses in the past continue today. The lime industry during the late nineteenth and early twentieth centuries played an important role in the development of

many of these uses. The lime produced in Santa Cruz made up a significant proportion of both the state's and the West Coast's lime output and, therefore, made an important contribution to the development of many other industries in these regions.

Lime Burning Technology

The simplest lime manufacturing techniques are known as pyre or pit burning. These techniques were used when manufacturers lacked the knowledge, skill, or time to use more effective technology, or when the minimal amounts of lime needed did not justify the expenditure of labor to construct a kiln. This method requires only a source of limerock or shell and fuel (usually wood). The lime and fuel were mixed together in a pit or a pile and the fuel set on fire. Sometimes clay, mud, or sod was used to insulate the lime (Harrington 2000:14). Pit burning was more efficient, helping to keep the heat concentrated; however, the lime would be contaminated with ash and the rock might not burn (Perry et al. 2007:18). The pit and pyre burning methods "were used in isolated rural areas or when the lime was being produced for small-scale construction purposes" (Harrington 2000:14). This approach is still used in many rural areas of Mesoamerica (Tom Schreiner, personal communication 2008).

The simplest type of lime kiln is the pot kiln, so-called because they were originally round and shaped like a big pot. Early pot kilns were inverted cone-or barrel-shaped, but square and rectangular pot kilns soon developed. Common procedure was to build the kiln into a hillside to facilitate stability and to assist in loading. Mixed feed kilns alternated layers of fuel and limestone, and separate feed kilns kept the limestone charge and fuel apart. Burners commonly used wood, coal, or coke for fuel. Lime burners built a "fire chamber," created by constructing an arch or dome of limestone charge just inside the draw hole opening. The kiln was then filled with limerock (an industrial term for stone that is calcined to produce lime) and the fire chamber was then filled with fuel (Rolando 1992:207).

Most of the lime kilns in Santa Cruz County were constructed with limerock and lime mortar. The size of the stones varied from one to five feet in diameter. Some kilns were built with rough rock and others show shaping. The front wall was built especially thick, as that wall was the weakest portion of the kiln. Kilns were usually built into

hillsides and the front of the kiln did not have the structural support of the earth reinforcement utilized by the other walls of the kiln. However, the thicker the wall, the harder it was to insert the fuel and remove the lime. Another method used to reinforce the front wall was buttressing. The buttresses were usually made of stone. Sometimes wood braces were used. Although kiln builders used buttresses and braces for reinforcement, the front walls of some of the country's kilns are bowed outward, especially towards the top. In three cases, the front walls of three kilns in the area have collapsed. In some locations, steel was used as a reinforcing agent (Piwarzyk 1996; Perry et al. 2007:25–26).

While some pot kilns were not lined, most were lined with schist or firebrick. Schist is a metamorphic rock that is found in the Santa Cruz area. It did not have to be imported, like firebrick, and has been demonstrated to be "more resistant to vitrification than certain types of firebrick" (United States Department of Commerce 1927:32). Firebricks are a special kind of brick used in lining furnaces, kilns, fireboxes, and fireplaces. They are usually yellow or tan in color and are made from a refractory ceramic material designed primarily to withstand high temperature, but will also usually have a low thermal conductivity for greater energy efficiency. During the late nineteenth and early twentieth century, most of the firebrick used in California was imported from England, Scotland, or Belgium. The name of the manufacturer was commonly stamped or molded into the bricks. Over thirty companies are represented in Santa Cruz County lime kilns (Perry et al. 2007:28).

Pot kilns are the simplest variety of intermittent or batch kiln. A second type of kiln used in Santa Cruz County was the continuous kiln, of which there were at least ten built in the area. They were made of stone, steel, or a combination of the two substances. All were lined with firebrick. Two still exist but both are incomplete (Perry et al. 2007:33). Continuous kilns, as the name suggests, burned unceasingly, whereas batch kilns required a cooling period before the burned lime was removed. This type of kiln did not work well in this region because of the consistency of the limerock in the area. The stone is "coarse grained and very pure." It makes very high quality lime but tends to break apart and cause jams inside continuous kilns (State of California 1921:238). The solution to this problem was for the quarrymen to selectively mine the finer-grained limerock. Since both types of rock occur together, some companies operated both types

of kilns simultaneously. Another issue was that the denser limerock needed more heat to calcine properly, requiring more fuel. Therefore, the money saved using a more efficient kiln was offset with an increase in fuel costs (Perry et al. 2007:33).

As this section demonstrates, lime burning technology has changed dramatically over time from the earliest pit and pyre burning to the more sophisticated rock and steel kilns used in the late nineteenth and early twentieth centuries. Many more dramatic technological changes have occurred since that time; however, as the new industrial technology does not pertain to the focus of this thesis, I do not discuss it here.

HISTORIC BACKGROUND OF SANTA CRUZ

Prehistory

At the time of European contact, the Santa Cruz area was within the traditional territory of the native Costanoan peoples. The term Costanoan is derived from the Spanish word for the local inhabitants, *Costeños*, meaning people of the coast. The aboriginal peoples collectively labeled Costanoan by ethnographers were actually several distinct sociopolitical groups who spoke between eight and twelve separate languages belonging to the Utian family of the Penutian language stock (Levy 1978:485–486; Margolin 1978:1). The Coastanoan peoples occupied the region surrounding the San Francisco Bay, with the southern coastal extent of their territory including the Monterey Bay region south to the area around Point Sur (Kroeber 1925:462). Since the 1970s, some descendant groups in these areas have preferred to use the term Ohlone to refer to themselves (Levy 1978:487; Margolin 1978:1).

The Cowell Lime Works is located within the traditional territory of an Ohlone subgroup known today as the *Uypi*. This area included the lands surrounding the modern city of Santa Cruz and continued west along the coast toward Davenport, to the north up the valley of the San Lorenzo River, and east along the coast to Aptos (Milliken 1985:45–46). Mission Santa Cruz records document that the *Awaswas* language was spoken in the area that is today the city of Santa Cruz (Levy 1978:486).

The primary sociopolitical unit was the tribelet. Each tribelet was made up of one or more permanent villages with multiple seasonal villages and camps within their territory, defined by physiographic landscape features. Chiefs served primarily in an

advisory capacity and the office was passed on patrilineally, with a daughter succeeding if there was no male heir (Levy 1978:485–487; Milliken 1995:1).

The Native Americans of the Santa Cruz area employed a subsistence strategy that exploited both land and ocean resources through hunting, fishing, and gathering. They managed their landscapes through controlled burning to promote the growth of seed-producing annual plants. Acorns were likely the most important dietary plant. Additional vegetative foods included seeds, shoots, bulbs, and tubers. Meat protein came from large and small terrestrial and sea mammals, along with birds, fish, reptiles, insects and shellfish. Their technology included tule balsa rafts, bows and arrows, flaked stone tools, pigments, cordage, woven skins and pelts, mortars and pestles, and basketry. Warfare between tribelets and with outside groups was common, with trespassing being a prevalent cause of conflict (Levy 1978:487–493; Margolin 1978:13–16).

Effects of European Contact on Native Americans

After European contact, missionization, disease, and displacement due to population collapse caused the breakdown of social organization that severely disrupted the lifeways of the Ohlone peoples. Mission-based interaction with other groups from disparate geographical, linguistic, and cultural backgrounds also contributed to significant culture changes. When the newly independent Mexican government secularized the missions during the 1830s, the natives experienced further critical changes to their way of life. Many natives voluntarily left or were evicted from Mission holdings and became laborers at Californio-owned *ranchos* (ranches) or in the developing *pueblos* (towns). Multicultural Native American hamlets formed from these displaced populations were established within and just outside many new towns and ranches. The appropriation of California by Anglo-Americans further worsened the plight of the natives, as they became third class citizens in their own homeland (Levy 1978:487; Bean 1994:xxii).

Santa Cruz During the Spanish Colonial Period

Although Spanish explorer, Sebestián Vizcaíno sighted and named Monterey Bay from the deck of his flagship, the *San Diego*, in 1602, the area was not explored for

another 160 years. The first European expedition to traverse Santa Cruz County was in 1769 when Don Gaspar de Portolá and Father Juan Crespi, representatives of the Spanish government, came searching for Monterey Bay. Due to the fog and the poor geographic description provided by Vizcaíno, they missed Monterey Bay, continued up the coast and discovered San Francisco Bay, before turning back and successfully reaching and identifying their original destination (Dillon 1992:52). Father Crespi's diary described the area between the San Lorenzo River and Wilder Creek, now part of Santa Cruz County. They named the river for Saint Lawrence (Clark 2008:295).

As part of Spain's colonization plan to secure Alta California, the Spanish government emplaced a series of religious missions, military presidios, and secular pueblos along the coast of California from San Diego to Sonoma. The mission system was founded by Majorcan Franciscan Friar Junípero Serra. When Serra died in 1784, Friar Fermín Lasuén took over leadership (Lydon 2008:39). Friar Palóu chose the site for La Misión La Exaltación de la Santa Cruz (Mission Exultation of the Holy Cross) in 1774, but the mission, number twelve of the twenty-one Alta California Missions, was not officially established by Lasuen until 28 August 1791 (Rowland 1980:5). Originally located on the floodplain near the San Lorenzo River, it was later moved to the top of Mission Hill, to the west of and overlooking the San Lorenzo River (Rowland 1980:13).

Pueblo de Branciforte, the third and last pueblo established in Alta California, was founded in 1797 on the eastern side of the San Lorenzo River, and was settled primarily by convicted criminals and retired soldiers. Branciforte was unsuccessful as a settlement and failed to prosper. Supplies promised by the government never materialized. Many of the settlers survived by stealing from the mission rather than farming or raising livestock themselves. The inhabitants encroached on mission lands, tormented the natives, and in general, caused much trouble in the area. As it grew, Branciforte became a center for smuggling and illegal trading. Native Americans fled the mission to escape the settlers' predatory behavior (Dillon 1992:57–58).

The lands that became the Cowell Lime Works, located one mile west of the mission, were likely used as grazing areas for mission livestock. The Spanish brought the knowledge of making lime for construction purposes to California. There were lime kilns associated with various missions and lime mortar was used in mission construction

(Rodrigues et al. 1992:7). “To the early Spanish settlers, lime was essential. They used it to make mortar for stone and brick work, plaster for coating walls and surfacing tile floors, and whitewash for sealing walls” (Costello 1977:22). Lime helped protect adobe bricks from moisture damage and was used for processing cow hides and dried corn, and to make cement for aqueduct construction .

Santa Cruz During the Mexican Era

In April 1822, word reached California that Mexico had achieved independence from Spain after twelve years of fighting. The last Spanish Governor, Pablo Vicente de Sola, requested that members of his government take an oath of allegiance to the new Mexican Republic (Dillon 1992:59). The capital of California remained at Monterey. Secularization of the mission system commenced. The result was to free up the innumerable acres of church-owned land for private ownership. Church possessions were given away, sold, or appropriated by unscrupulous administrators appointed by the Mexican Government. The intent was to give the assets to the Indians, but the valuable property soon ended up under the ownership of prominent Mexican families with government connections, through lavish land grants (Rodrigues et al. 1992:7). No private Spanish land grants were made in Santa Cruz County, “but under Mexican rule a quarter of a million acres or more were given” (Rowland 1980:39). No fewer than nineteen separate Mexican land grants were made in what is today Santa Cruz County, ranging in size from seventeen acres to the huge *Shoquel Aumentación* grant comprising approximately 32,702 acres (Dillon 1992:62). Members of two families, the Castros and the Rodriguezes, the offspring of two army veterans who settled at Branciforte, received most of Santa Cruz County (Lydon 2008:55).

Portions of today’s UCSC campus were first granted in 1843 to Pierre (Pedro) Sainsevain, a French lumberman and millwright. Called *Rancho la Cañada del Rincón en el Rio San Lorenzo de Santa Cruz*, he later traded the land to Isaac Davis and Albion Jordan for the steamer, the *Santa Cruz*. Davis and Jordan established the lime operation on the lower campus that is today the Cowell Lime Works Historic District (Rodrigues et al. 1992:7).

The Coming of the Yankees

The first permanent American inhabitant in the Santa Cruz area was Isaac Graham, a Virginian, who settled on Rancho Zayante in 1841. He proceeded to "engage in lumbering, operating grist and sawmills, distilling, cattle ranching and tanning leather" (Clark 2008:130). Graham established the first power sawmill in California on Zayante Creek in 1841. Some immigrant Americans, mainly trappers and adventurers, arrived by way of the Santa Fe or the Oregon Trail. Others were sailors who jumped ship while in port along the California coast (Rowland 1980:55). In addition to sawmills, the immigrant Americans built a tannery, a flour mill, a foundry, and two lime kilns (location unknown) to exploit the natural resources of the Santa Cruz area. They also helped establish and develop the new agricultural industry (Rodrigues et al. 1992:7–8).

John Charles Fremont, leading a United States Army detachment on a "peaceful" exploration and mapping expedition, entered California in 1844, then went to Oregon, and returned in 1845. He traveled to Monterey to meet with U.S. Consul Thomas O. Larkin, to inquire about the political environment regarding California becoming part of the United States. *Commandante General* (General Commander – an administrator of a military-political district), José Castro, granted Fremont permission to continue exploring provided the party did not approach the coast. Breaking this agreement, in early 1846 he set up camp, along with an American flag, in the mountains south of San Juan Bautista and commenced to build fortifications (Rowland 1980:115–116). "This deliberate affront to the Mexican authorities, a mere 25 miles away in the capital at Monterey, so alarmed Consul Larkin that he persuaded Fremont to evacuate his fort and move towards the Oregon country" (Dillon 1992:64).

The Mexican War seemed inevitable. The U.S. had annexed Texas in 1845. The Bear Flag Revolt in June 1846 by Anglo-American immigrants was a repeat of the Texas rebellion ten years earlier (Dillon 1992:64). The American immigrants captured Sonoma and imprisoned prominent Californio leaders at Sacramento (Rosenthus 1995:105–119). American military commanders in the area promptly invaded to protect American interests without a declaration of war. Commodore Sloat and his forces took Monterey on 7 July 1846, hoisting the American flag at the customs house, and they were joined by Fremont and a complement of Californian volunteers (Rosenthus 1995:157; Osio

1996:231). Men from the Santa Cruz area fought on both sides during the war (Rowland 1980:117). The Battle of Natividad was fought south of Monterey on 16 November 1846, the only military engagement in northern California that resulted in U.S. casualties (Osio 1996:313). The Treaty of Guadalupe Hidalgo, which formally ended the war, was signed in Los Angeles on 2 February 1848, and California officially became part of the United States. The discovery of gold at Sutter's Mill in the Sierra Nevada foothills preceded the signing of the treaty by just one week (Dillon 1992:65–66).

The Gold Rush and Statehood

A flood of immigrants, primarily of European descent, invaded California. The Gold Rush drained the population of Santa Cruz as most of the able-bodied men left for the gold fields. Santa Cruz and Branciforte became minor way stations for men on their way to the gold fields (Reader 1998:13). The California Gold Rush "pushed Monterey and the region off center-stage of California's history, and the region began developing its natural resources, particularly on the north side" (Lydon 2008:69). There commenced in California a "fearsome struggle for political, economic and cultural turf as the Yankees affirmed their authority through legal and physical violence" (Lydon 2008:69). The discovery of gold expedited the economic development of the Monterey Bay area. While Monterey retained its Californio flavor and pastoral economy, Santa Cruz became an American town with increased industrial development and American architecture (Lydon 2008:69).

In four years, the population of California increased phenomenally, growing from 15,000 in 1848 to 224,000 in 1852. During the next generation, the ragtag assortment of retired miners who came to Santa Cruz contributed to its society and its economy by founding businesses and social institutions and organizations, such as churches, schools, and fraternal societies (Reader 1998:13). That California became a state so quickly, in 1850, was directly related to the significance of the state's mineral wealth and the size of its growing population. Branciforte County was one of the state's original 27 counties formed on 15 February 1850. A month later, due to a petition signed by most of the registered voters in the area, it was re-named Santa Cruz. (Dillon 1992:66). Interestingly, some of the men who "signed" this petition were illiterate, and others were "away at the

mines" during this period. The Anglo-Americans purportedly did not like the name, Branciforte, because that was where the Hispanics lived and the name was associated with the Mexican portion of the population (Lydon 2008:73–74).

The First Building Boom

The San Francisco area became the entry port for the gold seekers and it quickly grew into a city as a concentration of people, goods, and services was needed to support the sudden growth in regional population. Prices for commodities and real estate skyrocketed. A building boom commenced. Lime was an important ingredient in cement, plaster, whitewash, and stucco needed for the building trades (Baker 2009:3). Initially, this material had to be shipped from the East Coast. Entrepreneurs first exploited limerock deposits just north of the city of Santa Cruz in the early 1850s and the lime industry quickly developed into one of the most important industries in the Santa Cruz area (Perry et al. 2007:63; Lydon 2008:71).

THE LIME INDUSTRY IN SANTA CRUZ COUNTY

The city of Santa Cruz, California is located in the middle part of the state, about 70 miles southeast of the city of San Francisco, on the north side of Monterey Bay. Its south-facing, protected coastal location contributed to its early success as a major shipping point, especially for resources needed in the growing metropolis of San Francisco. (See Figure 15.)

"Lime had a major influence on the geographic, economic, and social development of Santa Cruz County" (Perry et al. 2007: 1). The crumbling remnants of lime kilns and quarries dot the hills and canyons of the western and southern slopes of the Santa Cruz Mountains. They nestle among the ferns and redwood forests, silent testaments to the building frenzy that took place in northern California during the latter half of the nineteenth century. Santa Cruz lime was famous for its high quality and was primarily marketed in San Francisco, where it contributed to the mortar, plaster, and whitewash of innumerable buildings (Baker 2009:3). Cowell lime was also shipped to Petaluma, Ukiah, Tacoma, Alaska, and many other places along the western seaboard,

and even as far east as Denver, Colorado (Henry Cowell Lime and Cement Company 1910).

Figure 15. Map of a Portion of Northern California Coast Region. (David Pierce)

Lime is important to many people living in the Santa Cruz area today because they have ancestors who worked in the lime industry. Some came to Santa Cruz specifically for that purpose from as far away as Europe. Lime's importance to local history is also reflected in its contribution to the development of transportation in the area. Many early roads were built to transport lime to the coastal wharves for shipping.

One local railroad was also built partly to facilitate lime transportation through the San Lorenzo River Valley just north of the city.

The Santa Cruz Lime Industry

Little is recorded about early commercial lime manufacturing in Santa Cruz during the late 1840s and early 1850s, and unfortunately the location of many of these early kilns is a mystery (Perry et al. 2007:59). However, Santa Cruz companies burned over 50,000 barrels of lime in 1854, a substantial amount at this early date (*Monterey Sentinel* 1855:2). Major lime production began at what later became known as the Cowell Ranch in approximately 1853, when Isaac Davis and Albion P. Jordan, two transplanted New Englanders, leased land around what is now the intersection of Bay and High Streets at the main entrance to UCSC. They later bought this land along with large tracts of adjoining acreage containing additional limestone outcrops as well as vast redwood forest for fuel (Supreme Court of the United States 1893:230). Davis and Jordan were the first to manufacture lime in the Santa Cruz area on a large scale (Jensen 1976:10). This location was once the largest lime manufacturing plant in the state, with an annual output of tens of thousands of barrels of lime, and the Santa Cruz area was the center of the largest lime manufacturing area in California (University of California at Santa Cruz 2009).

Fire was a significant problem on the California frontier. Many towns and cities were devastated by the raging infernos that periodically whipped through communities. Firefighting equipment was primitive and whole towns were leveled. San Francisco suffered seven large fires between the end of 1849 and mid-1851. Almost all buildings were wood and inside walls were covered with cloth or paper instead of plaster. "Masonry buildings, although they were more expensive to construct, were much more resistant to fire." Mortar for brick buildings was in high demand (Perry et al. 2007:57).

The market for lime during the second half of the nineteenth century varied according to the old adage of supply and demand, and the price of lime varied accordingly. Lime, like many other industries in the west during the late eighteenth and early nineteenth century, went through the economic boom and bust cycles of the times. The early 1850s, late 1850s, 1860s, and 1880s were boom periods in California, but

depressions and panics swept the state in 1857, 1873, 1893, 1907, and 1929 (Perry 2009:6).

Lime Companies and Operations

"Of the more than twenty Santa Cruz County lime companies in business during the late 1800s, only two survived California's economic roller coaster over the long haul": The Henry Cowell Lime and Cement Company (started by Davis and Jordan) and the H.T. Holmes Lime Company near Felton (Perry et al. 2007:57). Cowell liked to buy out the competition. In 1869, he bought out Samuel Adams' lime operation on Adams Creek, west of the main ranch. This area became known as Cowell's upper kilns. In 1900, Cowell bought the former IXL lime operations near Felton, retaining the IXL name. The H.T. Holmes Lime Company continued some type of lime production into the mid-1930s and the Henry Cowell Lime and Cement Company lasted until 1946 (Perry, et al. 2007:57; Frank Perry, personal communication 2012). The last surviving Cowell family member, Harry, died in 1955 at the age of 93 (*Santa Cruz Sentinel* 1955:1).

HENRY COWELL, LIME BARON

Biographical Sketch

For almost 100 years, the property that became the UCSC campus was known as the Cowell Ranch, after its owner, Henry Cowell (1819–1903) and his family. Cowell came to California from Wrentham, Massachusetts, just after the Gold Rush. (See Figure 16.) Henry went into business in San Francisco with his brother John. They were merchants who imported goods from the East and resold them at inflated West Coast prices. They also owned a drayage business, shipping goods within San Francisco and later to Stockton, Sacramento, and the gold fields. Henry returned to Massachusetts in 1854 and married Harriett Carpenter (1822–1900) of Rehoboth. Henry and Harriet had six children in the years from 1857 to 1865: Roland (1857–1858); Isabella Marion (1858–1950); Ernest Victor (1858–1911); Samuel Henry (1861–1955); Sarah Elizabeth (1863–1903); and Helen Edith (1865–1932). By 1858, Henry had bought out his bother's share of the business and John returned to the East. A disagreement developed between the two brothers because John felt that Henry had paid him only a fraction of the value of

his share of the business and they remained estranged for the rest of their lives (Barnes 1972:6–8; MacDougall 1989:2–3).

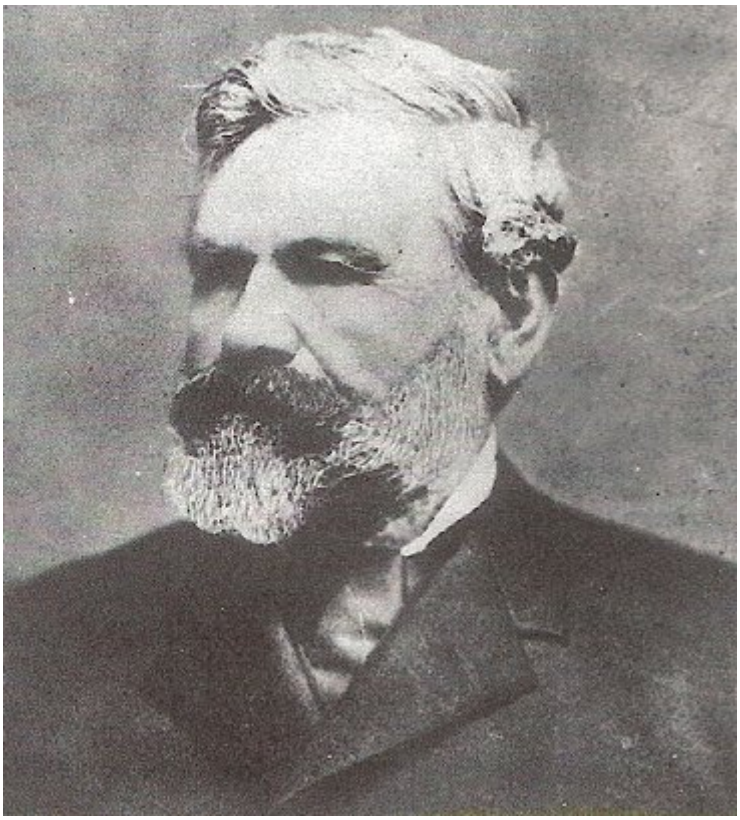


Figure 16. Henry Cowell, "Lime Baron" of Santa Cruz County (1819–1903). (Santa Cruz Museum of Art and History)

In 1865, Henry Cowell bought Albion P. Jordan's half-interest in the firm, "Davis and Jordan," and the name was changed to "Davis and Cowell." Jordan was very sick with tuberculosis and died the following year. Henry Cowell moved his wife and young family to Santa Cruz from San Rafael, to begin his job as on-site manager of the lime production operations. After adding on to accommodate their large family, the Cowells moved into the Jordan house, built in 1864. The Cowell family lived in Santa Cruz for fourteen years, from 1865 to 1879, before moving to San Francisco (MacDougall 1989:6–8; Perry et al. 2007:68). Henry Cowell's partner, Isaac Davis, died in 1888. Cowell bought the remainder of the company from Davis' heirs in 1889 and it became the "Henry Cowell Company." Upon incorporation in 1899, it was renamed the "Henry

Cowell Lime and Cement Company" (Jarrell 1982:21). By 1900, Cowell had gained control over most of the limestone resources in the Santa Cruz area (Perry et al. 2007:74).

When Henry died in 1903, he was one of the richest men in the state, with land holdings in twenty-three California counties and real estate stretching from San Luis Obispo County in central California to Texada Island in British Columbia, Canada. Upon his death, his company and his extensive properties passed on to his four surviving children. His son, Ernest, ran the company until his death in 1911, when the youngest Cowell son, Samuel Henry (known as S.H. or Harry), took over (MacDougall 1987:10–14). None of Henry's children had any surviving children, so when Harry died in 1955 the majority of the family's fortune and real estate was left to a charitable organization, the S.H. Cowell Foundation, established in 1956 upon the distribution of his estate (*Santa Cruz Sentinel* 1955:1; Perry et al. 2007:81).

Henry Cowell was, "The Lime Baron of Santa Cruz County" (Paramoure 2008). Today it is his name more than any other that is associated with the Santa Cruz lime industry. More than fifty regional place names are connected to lime, its manufacture, and people involved in lime production. Cowell's name shows up in sixteen local place names, including Cowell Beach, Cowell's Cove, Cowell College, and Henry Cowell Redwoods State Park (Perry, et al. 2007:67). The State Park is likely the most widely-recognized use of his name.

Business Ventures

Although focusing on lime, Henry Cowell diversified his business interests. He invested heavily in real estate. He loaned money, foreclosing when the people or companies could not pay back the loans. He also rented out some of his properties. He owned a dairy, selling milk and butter to locals, and he raised cattle. He sold ranch products, like animals, vegetables, and hay. The ranch did various work for local farmers, like branding and castrating animals. He opened a bituminous rock quarry and sold the material for roads. He also controlled general importing and wholesaling interests (Henry Cowell Lime and Cement Company 1910; Perry et al. 2007:72).

Court Cases

Henry had litigious tendencies. He always seemed to be fighting with someone over land or money. An early dispute concerned the rerouting of a road used by the Cowell lime wagons to reach the coast. Henry also had many legal battles with local railroads. A local historian called him “a real pain in the tracks” (Sandy Lydon, personal communication 2008). It is believed that Cowell was against local railroad projects because it would have enabled his competitors to ship their lime more economically. A long-running border dispute with the California Powder Works went all the way to the U.S. Supreme Court, where Cowell eventually prevailed in 1893 (Supreme Court of the United States 1893:Record Case No. 14,346). The case that gave Cowell the largest amount of bad press was the highly publicized dispute over the Santa Cruz tidelands, when he tried to claim ownership of the whole Santa Cruz waterfront in 1872. The prevailing local sentiment was that the tidelands should be secured for the benefit and use of the city, and that Cowell’s application for the lands contained false and fraudulent information. The case was finally decided in the city’s favor in the California Supreme Court in 1880 (Supreme Court of California 1880:Record Case No. 6,941). Finally, a long-running border dispute in Merced County let to Cowell being shot in 1903. This injury possibly contributed to his death a few months later (*San Jose Mercury News* 1903; *Santa Cruz Sentinel* 1903:3).

It is likely that these court cases led, at least in part, to poor Santa Cruz public opinion about Henry Cowell. He was not highly thought of in the city (Blaisdell 1967: 64; Paramoure 2008:11). It is possible that enough local men would not work for Cowell, either because of his reputation or because of the working conditions, and this may have led to the employment of immigrants. John Dong said that he didn’t pay very well (Dong 1967:11). It is possible that this alleged low pay rate also contributed to the high numbers of immigrant employees working for Henry Cowell.

COMPANY TOWNS AND WORK CAMPS

The Cowell Ranch lime complex constitutes a type of company town. I call it a company village, primarily because of its small size. There were originally at least 10 and likely as many as 16 or more worker cabins located on the lime production ranch. The

Historic Cowell Ranch Cultural Landscape Report designated the surviving cabins and the visible remnants of the collapsed cabins present, located along both sides of Jordan Gulch, as Cabins A through J (Rodrigues et al. 1992). Evidence of the married worker cabins is no longer visible. Some of the area where these dwellings were located has been built up with modern residential housing.

In this section, I discuss company towns and work camps, focusing on those located in the western United States. This material provides more information about the lives of the lime workers, explaining what life in these company-owned communities was like, and the range of types of company towns that existed.

Company Towns

Allen defined the term "company town" as "any community which has been built wholly to support the operations of a single company, in which all homes, buildings, and other real-estate property are owned by that company, having been acquired or erected specifically for the benefit of its employees, and in which the company provides most public services" (Allen 1966:4). However, company towns vary in many ways that make a simple definition difficult, if not impossible. Allen revised the above definition to, "any community which is owned and controlled by a particular company" (Allen 1966:5). The most prevalent type of company town was in the mining industry and was an artifact of the remote location of many mining operations; however, many types of companies constructed employee communities for their workers. Factors governing the decision whether to build a company town included the local availability of labor, the accessibility of the market and available transportation, and the location of the raw material. However, in few industries other than mining was the placement of company towns likely to be so distant from the closest forms of civilization and in areas so unpopulated (Allen 1965:5).

The term, company town, "evokes powerful, uncompromising images of worker exploitation and owner domination" (Metheny 2007:xv). Although many company towns were "single-enterprise towns," completely under the control of the company or corporation, this was only a general rule (Garner 1992:3). Private businesses existed in some company towns, but only with permission, and the business owners rented from the company. In some corporate towns, homes were privately owned while in others they

were leased. Some company towns were large enough or remote enough to have their own city or town government and municipal services. The many feudalistic qualities of a company town meant that employment and living arrangements were dictated by any regulations the owner enforced (Metheny 2007:xv).

Company towns were created to support a variety of business types. There were lumber towns in the Northwest and coal- and copper-mining towns in the Rocky Mountain and Great Basin regions. Company towns were established in various parts of the American West to support "oil companies, cement manufacturers, potash and chemical manufacturers, and even cotton producers" (Allen 1966:4). These communities were fairly small in size, rarely exceeding a few thousand inhabitants and normally housing only a couple hundred workers and their families. Their location was, until the twentieth century, determined by geological, environmental, and geographic variables. . Natural resources, a source of power, and transportation availability dictated their placement (Metheny 2007:2–4). Hundreds of small company towns and villages existed at one time or another in the West; however, few remain. Depleted natural resources, improved transportation, and the economic burden company towns place on their owners have severely depleted their numbers. Except for a very few instances, the company town is slowly becoming extinct within the Western American landscape (Allen 1966:8). The steady departure of the company town from the American landscape is just one of the many commercial changes that have taken place in this country during the modern era. Just as business motives led to the establishment of company towns, modern economic environments contributed to the ingestion of these towns into conventional American society (Allen 1966:8).

Company towns frequently attracted satellite communities that were "havens for prostitutes, gamblers, bootleggers, and social misfits," and were "special case manifestations of 'wrong side of the tracks' neighborhoods, which plagued most towns throughout America" (Goddard 2002:85). However, "these communities defied all attempts to prevent them. The ability of these marginal neighborhoods to persist suggests that they were necessary components of the towns where they occurred" (Goddard 2002:85). These towns not only consisted of those who wished or were forced to live outside conventional society, but by people who actively opposed company paternalism

and felt that corporate-controlled life had a perverse influence on humanity. These individuals communicated their attitudes by their choices to not live in the company town and by the ways they lived their lives in the alternative communities (Goddard 2002:92).

Metheny's interdisciplinary approach to the archaeology of Helvetia, Pennsylvania, "From the Miners' Doublehouse," discusses recent trends in the study of company towns in the United States. Whereas some scholars have portrayed the residents of company towns as helpless victims under the control of oppressive company paternalism, Metheny supports a view of the workers as active participants in the community, making decisions, and using "landscape, material culture, and social discourse" to create and maintain their identities and environment. The focus on landscape in archaeology has been used to explore company towns within the concept of industrialism and community. Recent studies of the workers themselves relates to trends of race, class and gender investigation within the social sciences. The examination of agency and material culture as a form of social discourse in company towns relate to the author's views of the workers as active participants in choices that affect their lives. Additionally, she discusses the methods and importance of reconstructing the context, environment, and landscape of Helvetia (Metheny 2007:xvi–xxix).

Work Camps

A more ephemeral and male-dominated type of company town was the Western work camp. These camps were temporary and were usually set up to accommodate workers on construction projects, such as the Los Angeles Aqueduct (Van Bueren et al. 1999; Van Bueren 2002a), the Butt Valley Dam (Maniery 2002), and various railroads (Wegars 1991). They were also set up to accommodate workers in extractive industries, like mining (Gillespie and Farrell 2002), logging (Pappas 2004), and oil (Baxter 2002). Occasionally, these camps led to more permanent settlements.

During the years of the eighteenth to twentieth centuries, many types of work communities established in the West reflected the expansion of the growing global-wide economy. Controlled by large wealthy corporations, usually from the Eastern cities, the purpose of these locales was to serve the parent company by provisioning their workers with the basic needs for survival in the sometimes harsh isolated locations of western

work camps. In return, the workers extracted raw materials or built infrastructure that helped transport products to urban areas (Van Bueren 2002a:1).

Van Bueren suggests that all types of "specialized work communities that served as outliers of the world economic system" be referred to as "peripheral work settlements" (Van Bueren 2002a:2). This would include company towns, work camps, and villages formed by business men, and also the unsanctioned settlements of hangers-on and strikers that established themselves nearby. The qualities that defined these places include a narrow economic focus, comparative geographic isolation, transience, and reliance on the global economy for their sustenance and existence (Van Bueren 2002a:2).

The temporary existence of these camps contributed to their distorted population, with few women and children in residence. The men who worked in these environments were mostly itinerant laborers living a transient existence, working for limited time periods and then moving on to the next job, existing on the periphery of society and the global economy. Some were sojourners who came to the U.S. to work for a period of time and eventually returned to their native countries. They were primarily unmarried, with few responsibilities and were willing to endure poor food and living conditions for a short or moderate period of time before moving on due to their inclinations or the completion of their engagement (Van Bueren 1999:178). Although men working in extractive industries often existed along the peripheries of society, they developed a set of values pertaining to the use of space both within and outside the work place and used the landscape to express these values (Baxter 2002:18).

Cowell, California

Ernest Cowell adapted to the changing market and consumers' preference for using Portland cement over natural cement for building purposes. In 1906, work began on a huge cement plant complex near Mt. Diablo, and a company town named Cowell, in Contra Costa County (today part of the city of Concord). This plant was one of the largest employers in the area in the early 1900s (Lyon 1997:1). The Cowell Portland Cement Company opened in February 1908 on a 2,000 acre site (Perry et al. 2007:74). This extensive operation included quarries, steam shovels, a crusher, bunkers, cement kilns, and a finishing mill. The plant even had its own locomotives and railroad, the "Cowell

Portland Cement Company Railroad." The plant ran twenty-four hours a day and peak output was in 1917 when 5,000 barrels a day were produced by 217 employees (Larkins 1984:1). The product was called "Mt. Diablo Cement" (Perry et al. 2007:74).

The plant shut down every year from November through April, with many workers being laid off for the rainy months. Cement dust from the plant led to a lawsuit by local fruit and vegetable growers and after a prolonged legal battle a judge ordered Cowell to build dust arrestors. In May, 1936, the plant first used a new smokestack, 235 feet high, built to withstand 25 mile an hour winds and an "earthquake intensity of 10." It became a local landmark (Larkins 1984:2).

The town of Cowell, California, likely completed in 1907, consisted of fifty-four family dwellings, two boarding houses, a town hall, a hospital, a fire house, and a company office. Innumerable trees were planted, and the houses lots included front lawns and gardens. Strict company policy insisted on the upkeep of the property. Company rules even attempted to control the behavior of the workers' children. Problems with their home or their children could result in the worker being fired and evicted (Larkins 1984:2). Harry Cowell purportedly strongly resisted a movement at the plant by unsatisfied workers to unionize (Rego 1996:1).

Company paternalism was strong in this industry town. Many of the workers lived in company houses, ate at the company boarding house, and shopped at the company store. Company "parties" afforded entertainment. Extensive company rules stretched to controlling workers' behavior in their own homes. Bedtimes were set by the company with a rule that no lights were allowed after 10:30 p.m., and the company also attempted to control the intake of alcoholic beverages in the employee domiciles. The company even controlled how much sugar went into the workers' coffee (Rego 1996:1).

The plant produced cement for 38 years, until, according to one author, the limerock deposits ran out (Perry et al. 2007:74). However, William Larkins cited multiple grounds for the end of the operation after Harry Cowell announced the impending plant closure in 1946. The reasons included the lack of sufficient limestone in the quarry, government purchase of the direct rail line used for shipping, wage increases, and competition from the Kaiser Permanente Cement Plant in Sunnyvale. A three-day auction of equipment and machinery was held in 1952, and the land was sold to the Newhall

Land and Farming Company in 1959. In 1969, Newhall sold the town and plant to the Larwin Company and in May of that year, the company began to demolish the plant. The town was torn down that summer (Larkins 1984:2–3).

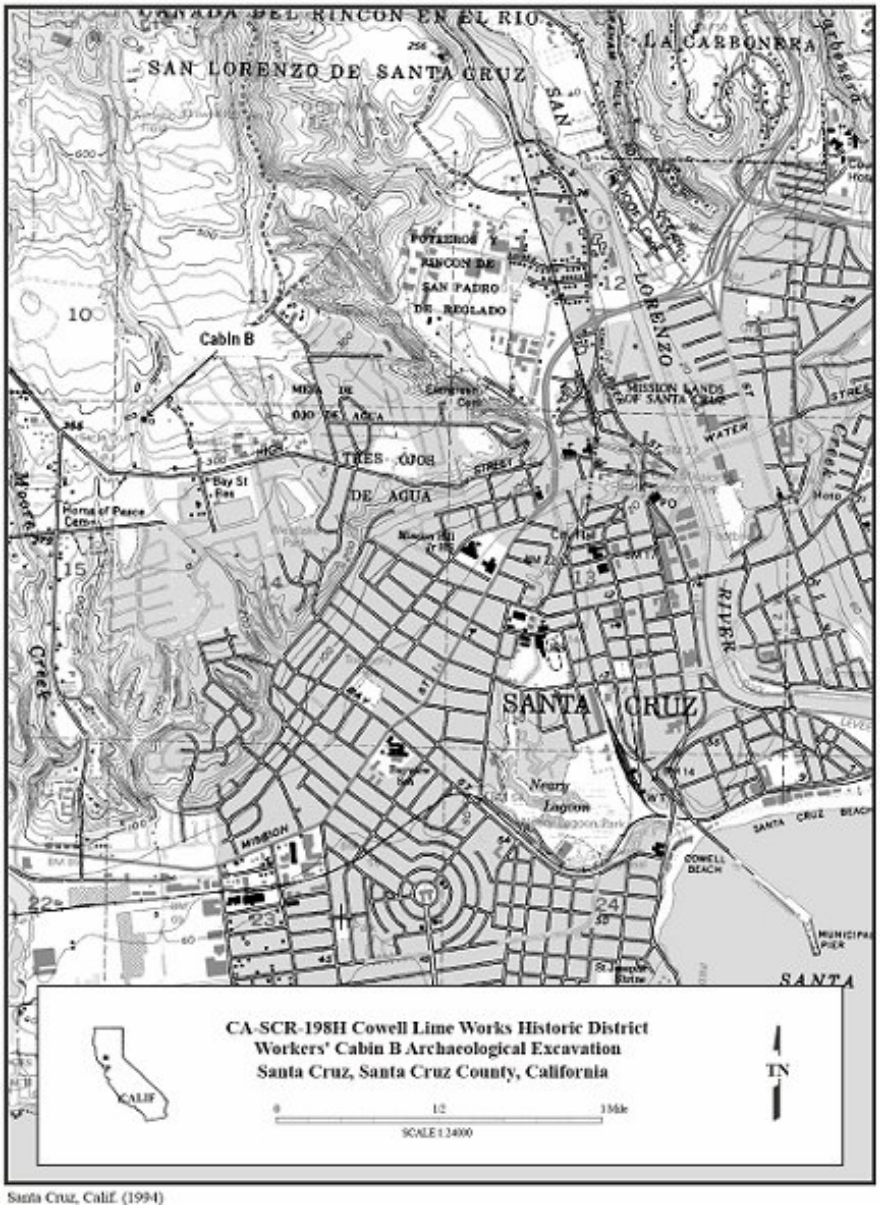
Although Cowell, California was a full company town, the industrial hamlet built around the Cowell Ranch lime works was not. I call this community an "industrial village", not only because of its small size, but also due to its being neither big enough nor remote enough to require the building of the public facilities present in many company towns, such as schools, churches, and entertainment facilities. Although it once had a small company store, downtown Santa Cruz was only a little over a mile away, and it was relatively easy for employees to walk to town for supplies. The few employees' children who lived near the lime works attended the local Santa Cruz community schools, as did the owner's children. The majority of the Azorean and Italian workers attended Holy Cross Church in town and those that died were buried in city cemeteries. Henry Cowell and his family attended the First Congregational Church. The only company organized activity seemed to be the baseball team, The Lime Burners (Perry et al. 2007).

The men in the Cowell family reportedly treated their workers well. "They had reputations as excellent employers" (Cardiff:1965:15). Other sources substantiate that concern for employee welfare was a widely recognized trait of the Cowells. Cowell treated them well and fairly, and they were fed and housed at the ranch. Adalbert Wolff mentioned that he never heard of any discontentment and that there was not much turnover among employees (Wolff 1972:25–28). In the waning days of the Santa Cruz lime industry, he kept the men employed so as to give them a place to live.

"As each one quit or died his crew kept getting down, so finally …he brought the rest of the men over here to Santa Cruz and worked them here on the ranch. He never let a man go. He lost money the last few years (which didn't mean anything to him), but as he said, those old men had been at that all their life and knew nothing else, and if he didn't keep that [the ranch] running, where would they go?" (Cardiff 1965:122). It is likely that the men in the Cowell family gained experience being good employers at the Santa Cruz ranch industrial village and that this served them well while running the full-fledged company town of Cowell. However, apparently company paternalism was stronger in Cowell, California, than at the Cowell Ranch, as the archaeological

assemblage from Cabin B includes the abundant remains of alcoholic beverage containers.

THE COWELL INDUSTRIAL VILLAGE AT SANTA CRUZ



Santa Cruz, Calif. (1994)

Figure 17. Location Map of Cowell Lime Works Historic District, Cabin B. (Virginia Hagensieker)

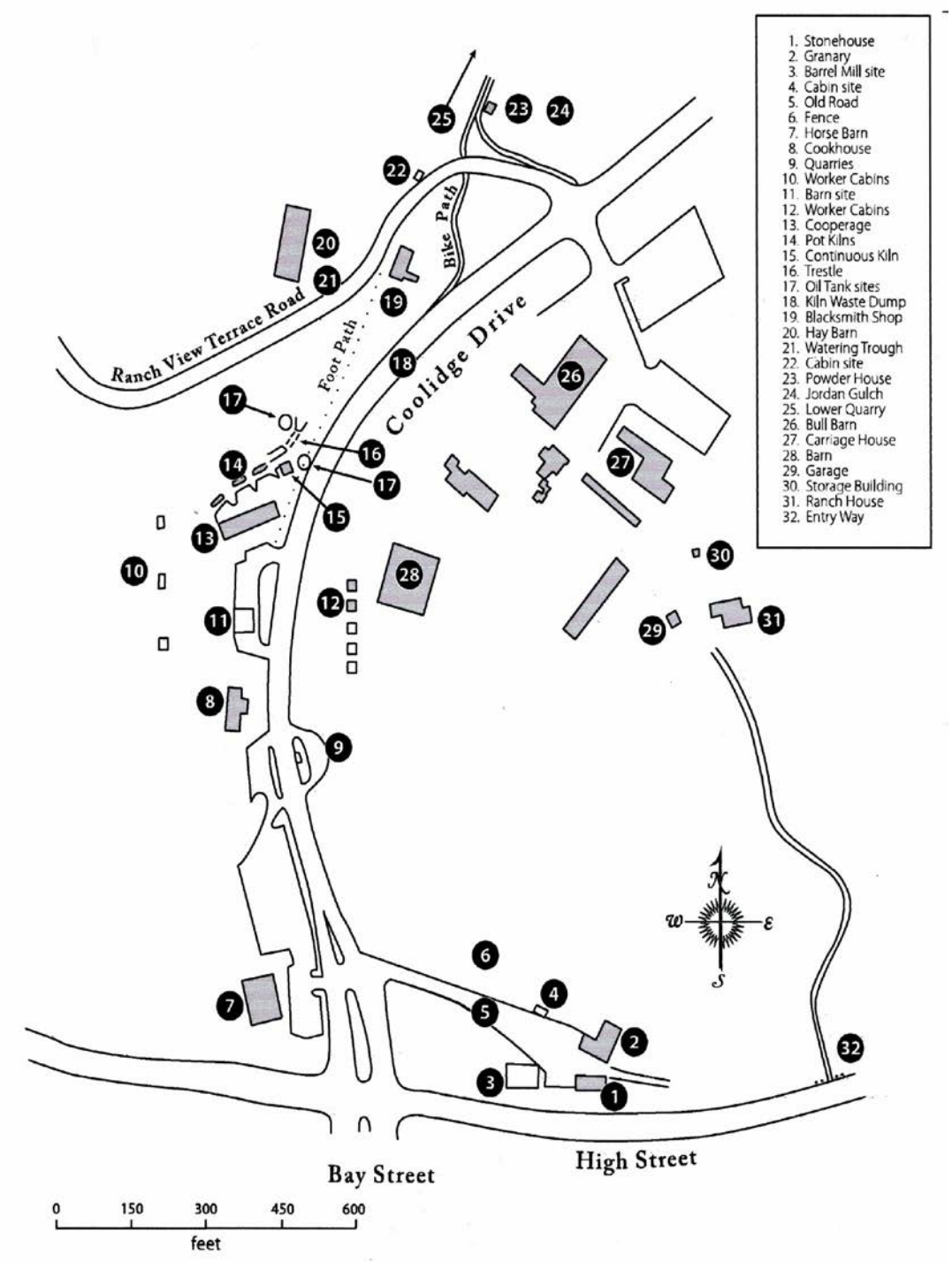


Figure 18. Map of the Cowell Lime Works Historic District.
(Friends of the Cowell Lime Works)

The 30-acre Cowell Ranch lime production site consisted of the lime production facilities, animal barns, and an employee residential complex. The main industrial facilities, including the kilns and cooperage, were grouped in the low-lying area of Jordan

Gulch, running north and south. Nearby were the bunkhouse, cookhouse, and associated structures including the meat locker, woodshed, and animal pens. The bunkhouse likely sheltered the single laborers (Baker 2009:9–10). The slaughterhouse was located further up the gulch to the north, possibly to keep the smell away from the work and living areas. Along the slopes and the top of Jordan Gulch were small workers' cabins, likely home to bachelor foremen and supervisors (Rodrigues et al. 1992:Appendix 2; Perry et al. 2007:172–179; Conde 2011:54–57). However, according to census information, some of the ordinary workers also lived in these small cabins (United States Bureau of the Census 1870, 1880, 1900, 1910, 1920, 1930).

To the west, clustered around the intersection of the ranch access road and the two roads into town, was the married worker housing, the granary, the barrel head and stave mill, and the wagon scale. The stock and feed barns were located around the periphery of these buildings, most being located to the east of the gulch (Rodrigues et al. 1992:Appendix 2; Perry et al. 2007:172–179; Conde 2011:54–57). The kilns were, of course, made of stone while the rest of the buildings and structures were of wood, usually board and batten. An investigation of one of the barns by JRP Historical Consulting, revealed that it was constructed with mortise and tenon joinery (McMorris and Miller 2011). Only the exteriors of the ranch house, the carriage house, and the cookhouse were painted. All of the other wood buildings and structures were whitewashed. The worker cabins were whitewashed both inside and out. Remnants of the whitewash can still be seen today under the eaves of the buildings (Perry et al. 2007:133). (See Figure 18.)

Other stone structures included a paymaster's house/company store and a powder house. The walls of the cookhouse basement were also made of stone. The stone used in construction was, as expected, limerock (Rodrigues et al. 1992:Appendix 2; Perry et al. 2007:172–179; Conde 2011:54–57). The paymaster's house/company store was built of stone and had bars on the windows for security, because at one point, in the early years, Henry Cowell paid his men only once a year, common at the time. He would bring in around $100,000 in gold from San Francisco for that purpose (Cardiff 1965:167). I conjecture that the powder house was constructed of stone for both security and safety reasons, in case of an explosion. The lower floor of the cookhouse may have been constructed of stone to help keep food they stored in the basement cool. The cookhouse

was built into the hillside but the worker cabins were perched on the hillside on their support posts. The owner's house (which later became the superintendent's house) and a large carriage house were also to the east of the gulch, on the other side of the barns from the main industrial complex and worker housing (Rodrigues et al. 1992:Appendix 2; Perry et al. 2007:172–179; Conde 2011:54–57).

Setting

The Cowell Lime Works is located just over a mile northwest of downtown Santa Cruz, on the southern slope of the Santa Cruz Mountains, on a hill overlooking Monterey Bay. Access to the district is through the main entrance of UCSC, known as the East Gate. (See Figure 17.)

The Cowell Ranch industrial complex was situated within the interface between the Coastal Rangeland and the Redwood Forest vegetation zones. The workers' cabins were set within gently rolling, open grasslands sloping south toward Monterey Bay. These were cultivated and grazed during the period when the ranch was in operation. The vegetation is characterized by Küchler (1977) as a Coastal prairie-scrub mosaic (*Baccharis-Danthonia-Festuca*) composed of grasslands interspersed with small stands of hardwoods such as live oak (*Quercus agrfolia*) and bay-laurel (*Umbellularia californica*). Soils, when intact, consist of a light to medium brown sandy or silty loam overlying a mudstone, schist, and marble geological complex with marine terrace deposits present (Edwards, et al. 1978:5).

Cabin B stands on a narrow bench on a steep slope, on the east side of the former Jordan Gulch (today the route of Coolidge Drive, the main access road to the campus). The eastern side of the gulch, in this area, is characterized by massive limestone outcrops, overlain and interspersed with pockets and sheets of clayey soil. The larger outcrops were quarried for limestone in the past, such that there is a series of "pocket quarries" along the east side of the gulch, from the campus entrance to near the cabins. The limestone in the site region consists of bedrock that is highly fractured, so that its surface is highly irregular, with many surficial outcrops. A casual pedestrian trail extends down the slope between the corporation yard above the cabins, and Coolidge Drive, at the base of the

slope. This trail meanders among limestone boulders, and the highly-fractured bedrock is exposed in several places.

Cabin B in the Present Day

Figure 19. Workers' Cabin B Before Restoration. (Michael Kenner)

Workers' Cabin B is an excellent example of early Californian/American vernacular architecture. Built in a box construction manner with board and batten walls, it is composed completely of old growth redwood. A box house is built of boards (planks) standing upright and it is not framed. Also known as a board building, board-wall, or plank-wall construction, this type of dwelling was often used for worker housing, especially in resource extraction industries. Board and batten is described as a type of board-wall construction, commonly with one 1 or 1 ¼ inch boards, called battens, that are attached to the exterior, and sometimes also attached to the interior to cover the cracks between the boards and to keep the weather out. Battens may also be affixed to the

interior of the building (Jan Dekema, personal communication 2009; Jim Derby, personal communication 2011). The wood-shingled gable roof is oriented east/west. The cabin measures approximately 12 feet, 3 inches north/south by 14 feet, 4 inches east/west and is set on a slope of approximately twenty-five degrees, with one door and one window facing west (down slope). A board floor and board ceiling complete the cabin interior (Rodrigues et al. 1992:Appendix 2). (See Figure 19.) A photo of the inside of the cabin taken in January 2005 by Frank Perry prior to the beginning of restoration work shows a wooden, single bed, a small shelf unit, a built-in "desk" sagging from the wall in the northeast corner, and strips of tarpaper and newspaper used for insulation hanging from the walls (Cacace 2008:7) (See Figure 20).

Figure 20. Cabin B Interior, January 2005. (Frank Perry)

Directly downhill in front of the cabin is a generally level dooryard area approximately twenty feet wide, separated from a relatively steep drop-off above the main portion of the historic industrial complex and the campus access road, by a split

redwood picket fence. Directly behind the cabin is another steep hillside, with a slope measuring approximately 35 degrees, and another split redwood picket fence, separating the Workers' Cabin area from the modern UCSC maintenance yard, barns, and parking lot located at the top of the slope. There were originally five cabins in this area. These were arbitrarily designated A-E in order of north to south (Rodrigues et al. 1992:Buildings and Features). Cabins A and B are the only cabins still standing on this hillside. Cabin C remained relatively intact until 2005 when a truck rolled down the hill, crashed through Cabin C, and came to rest in the drainage ditch alongside Coolidge Drive, the main entrance road to campus. Cabins D and E were still standing in the 1960s, but collapsed after university development in the adjacent corporation yard began, probably due to erosion by storm water run-off from the yard above. The corporation yard consists of an extensive paved surface around numerous industrial-type facilities, including several large barns that date to the Cowell era. Barn H stands at the top of the slope immediately overlooking the back of the cabin complex, and associated paving extends almost to the slope edge at the top of the slope above the cabins (Sally Morgan, personal communication 2009).

Working and Living at the Ranch

Depending on an individual's occupation, work at the ranch was not steady. Quicklime must be kept dry until ready to use, so production slowed during the winter rainy season. Some jobs, especially wood chopping, were done by contractors. The ranch bosses would move the men to where they were needed, so it helped to be knowledgeable about different tasks (Cacace 2008:12). Some men started as laborers and worked their way up to foreman or supervisor (United States Census Population Schedules 1860, 1870, 1880, 1900, 1910, 1920, 1930). Carlos Silva worked as a cooper and blacksmith, sometimes at Cowell's Felton lime kilns, and other times at the ranch near Bay Street. Al Vasconcellos "first worked in the quarry in Felton and later, when Cowell found out that he was good with animals, he assigned him to work with the ranch stock and draft animals" (Cacace 2008:3–5).

John Dong, or Dong Hong Goon as he is known in Chinese, was born in 1909 in Canton, China. His father, who was born in San Francisco, brought him to the United

States when he was in grade school. The elder Dong was the cook at the Cowell Ranch and put his son to work as his assistant. Many years later, John Dong himself became cook. In 1967, Elizabeth Spedding Calciano interviewed Mr. Dong for the UCSC Regional History Project many years after he no longer worked at the ranch. The majority of the interview covers his daily schedule, how he got his supplies, and the foods he most often prepared. He also discusses the equipment and the floor plan of the cookhouse (Dong 1967).

The single men lived two to four in a cabin or in the dormitories until they married. Not all of the men lived on site. Some commuted to work, but poor roads could make this difficult in inclement weather. The bachelors ate their meals at the cookhouse, usually prepared by a Chinese cook, who lived in a small room attached to the kitchen and put in fourteen hour days, seven days a week. There was not a lot of variety in the menu. A steer was killed each week in the ranch slaughterhouse. This was when there were only fifteen workers, so presumably, many more animals were butchered during the peak of industrial and ranch operations. It was usually an old, tough, stringy bovine and it was pretty hard to chew (Dong 1967).

Sometimes on holidays they killed a pig, and the Portuguese and Italian Catholics ate fish on Fridays, but that was the only alternative to the monotonous main course of beef. The pigpen and pig feeder were located near the cookhouse so that the pigs could easily consume the food waste left by the men. The men also ate a lot of beans, potatoes, and bread. The ranch raised pigs and sheep, but those were for sale. Chickens produced eggs for sale, but occasionally the cook might prepare chicken or turkey. Eggs were served only on Sundays. Despite the dairy herd, they did not have cheese or real butter because those were also sold. The cook made bread from grain grown on the ranch. They grew lots of fresh vegetables up on the hill behind the cookhouse, including beans, peas, carrots, cabbage, corn, etc. They also had fruit from the ranch orchards in season. Every meal they had some kind of pudding or pie. Prune pie was a favorite (Dong 1967). Good food was very important to the men. Men in company towns and work camps “would put up with bad weather, lice, filthy living conditions, and even substandard wages as long as the food was good” (Conlin 1979:171).

Although he primarily lived in San Francisco, when he was in town, Harry Cowell would sometimes eat at the cookhouse. He moved back to the ranch for a while, before he died, and ate breakfast in the cookhouse every morning in a small separate room. He would sometimes eat with another of the management staff, but he never ate with the rest of the workers. He would eat special foods that the regular employees didn't get, like bacon with his eggs (Dong 1967:12–13).

The family cabins had cooking stoves and the families ate at home. They were allowed to keep chickens and pigs, some of which were bought from the Cowell Ranch (Henry Cowell Lime and Cement Company 1910: Ranch Diary). The Silva family had a dog that helped keep the rats and weasels away from the garden and the chickens. They grew fava beans, kale, anise, turnips, potatoes, onions, and garlic, to name a few. They made jellies from grapes, figs, and quince. Whiskey and wine were made at home, too. Soups were popular because they helped the meat go further. Special sweets like candy and puddings were saved for the holidays (Cacace 2008:3). One researcher describes the Cowell ranch as a "self contained world that provided all needs for the family and the firm's employees" (MacDougall 1989:11).

In the 1920s, the men worked ten hour days and sometimes they worked on Saturday. I compiled a list of worker occupations in the lime industry from the U.S. Census Population Schedules for the Santa Cruz area. I do not include foremen, supervisors, or white-collar workers such as clerks on this list. The list comprises both skilled and unskilled laborers: cooper, blacksmith, lime burner, archer, brick mason, wheelwright, carpenter, quarryman, teamster, cook, wood chopper, and laborer. Pay at one time was seventy-five cents a day (Cardiff 1965:169). Wood cutters reportedly received "a dollar and a half a cord… if they did a cord in two days they did pretty good" (Cardiff 1965:169). According to both the 1860 and 1870 U.S. Non-population Schedules, the average income for workers at the ranch was $42.86 per month. The 1880 Census reports that Cowell paid an average of $1.50 a day for a skilled laborer and $1.00 a day for an ordinary laborer (United States Census 1860, 1870, 1880). The men did not need much money to live on. Most were fed and housed at the ranch. It is likely that clothing and other personal items were about the only expenses a worker had (Cardiff 1965:168). Many may have sent money home to help support family members still in

Europe. Others saved their money. One older man who worked for the Cowells for over fifty years left an estate of around $80,000. “He had the first dollar he ever made. He put it in the bank, and he never spent a dollar hardly” (Cardiff 1965:124).

The immigrant workers generally had little education and most could not speak English. “Portuguese and Italians, that came out to this country, and there wasn’t half of them … that could even speak English” (Cardiff 1965:121). “I don’t suppose there were fifty percent of them that could write their own name” (Cardiff 1965:123). Cowell supposedly hired primarily immigrants, because most Americans were not willing to do the work. “Working in that lime was awful hard work. Very few people would work in it” (Cardiff 1965:121). A few men started as laborers and worked their way up to foreman or supervisor. However, most of the workers appear to have been transient laborers, as few of them are found in consecutive U.S. censuses. They were likely part of “the floating army” of the transient working-class, “the majority of workers who were unskilled and moved from job to job, having little more to sell than their strength” (Walker 2008:1).

Working in the lime industry was dangerous, especially for those who worked in the quarries or worked directly with the lime. With this type of heavy work involving high heat, accidents did happen. Explosions in the quarry, falling rock, and extremely high kiln temperatures all contributed to the causes of accidents (Perry et al. 2007:127–129). George Cardiff played it down a bit saying there were very few accidents and the minor ones were not paid much attention. The men just bound their wounds and went on with their work (Cardiff 1965:130).

Reports of accidents appeared in the local newspapers from time to time. In the quarries, falling rock and premature explosions caused injuries and deaths. “Sometimes the explosion would go off when they were not expecting it… Quite often an explosion would be premature… That’s where all those people were killed in those blasts, because they were premature blasts” (Cardiff 1965:129). In 1877, a newspaper article recommended an investigation into a quarry death at Cowell Ranch. Within the previous couple years, there had been multiple accidents at Davis and Cowell’s lime quarries. Two men had been killed and a number of work men had been seriously injured. The most recent fatality involved a man who was crushed beneath tons of falling rock, “disfigured beyond recognition,” and killed instantly. The death was ruled accidental (*Santa Cruz*

Weekly Courier 1877:3). Men working at the kilns were also involved in accidents. In 1861, a kiln wall collapsed, spilling heated rocks onto a worker (*Santa Cruz Sentinel*, 1861:2), and in 1876, a Swiss-Italian man working inside a Santa Cruz area kiln was killed when an ore car fell on top of him (*Santa Cruz Sentinel* 1876:3).

Lime is a very caustic material, and working directly with the substance could be very dangerous. Multiple sources mention the physical effects lime had on some men. After the lime was burned and left to cool in the kiln, the workmen would draw (remove) the lime from the kiln and pack it in barrels. This was done when the lime was just cool enough that it would not burn the wooden barrels. Performing this task caused some men to bleed from the nose (Wagner 1966:335). In Arizona, Manuel Escalante's loaded lime wagon got stuck while crossing a wash. The man began to unload the wagon, inadvertently inhaled some lime dust, and died immediately (Jones 2005:194). In Victoria, Australia, Albert Facey described the deleterious effects lime had on him, personally, while working in the industry. The lime was ninety-eight percent pure and when it got on his skin it would burn and large blisters would come up. The dust was very damaging to his hair and after a few weeks on the job, he became completely bald and also lost all the hair on his body. After persevering in the position for five months, he became very ill and was put in the hospital (Pearson 1990:33). Perhaps these types of health issues contributed to the turn-over of employees at the Cowell Ranch.

Even shipping lime could be hazardous. Lime has a volatile chemical nature. When water is added, the slaking process begins, causing a reaction that starts slowly but can eventually generate enough heat to set wood on fire. This was especially dangerous on wooden ships. In Footscray, Victoria, Australia, the *Victoria*, a "lime boat," completely burned and sank while moored at Napier Wharf due to a fire in the lime cargo (Harrington 1996:21). If lime got wet, it could catch the wooden barrels containing it on fire and then it could spread to the wooden ship carrying the cargo. There were occasional fires on ships carrying Santa Cruz lime to San Francisco (Perry et al. 2007:150).

Other occupations within the lime industry were also dangerous. Teamsters drove massive wagons pulled by ten, twelve, or more draft animals on primitive roads. Lumbermen felled and wrestled with huge trees weighing thousands of pounds. However,

many occupations in the late nineteenth century were hazardous. Industries were beginning to use steam power, but in the days before the internal combustion engine, most heavy labor was done by man and beast. As the technology changed, the world became a safer place for the working man. Machines put men out of work, but they also saved many lives and made work on the frontier, in extractive industries, less risky.

I have revealed a substantial amount of information about the lime workers in Santa Cruz through the research I have discussed thus far. In the following chapter, I will review the results of the archaeological investigation at Cabin B. The material culture of the lime workers at the Cowell Ranch contributes additional information about the lives of these men, through the artifacts they left behind. Through the analysis of these artifacts using the Sonoma Historic Artifact Research Database, I will interpret the data concerning the artifact assemblage to address my specific research questions.

Following Chapter

Chapter 5 reviews the methods used and results of this thesis project, including the historical document research, the archaeological excavation, and the analysis of the resulting artifact assemblage. I discuss the historic documents researched and the resulting information revealed through the study of these documents. I recap the details of the archaeological investigation by describing who excavated, when the excavations took place, and how the excavations were carried out. I review the cataloging process and then describe the collection unearthed during excavation. Finally, I introduce the comparative collections I will use in the interpretation chapter, Chapter VI, “Findings.”

CHAPTER V

METHODS AND RESULTS

Figure 21. Cabin B on the First Day of Excavation, 21 January 2009. (Michael Kenner)

INTRODUCTION

This chapter details the archaeological investigations at Workers' Cabin B and the laboratory analysis of the resulting artifact assemblage. Included are descriptions of the archaeological workers, the timeline of work, and the specific methods used during the excavation, cleaning, sorting, and cataloging of the resulting artifact collection. The archaeological assemblage is described by material type, with sections on faunal bone, shell, other organic items, ceramics, glass, and metal. I will briefly describe the excavations at Cabin J, the cookhouse, and the blacksmith shop at the Cowell Lime Works, as well as the excavation of the company village at the Alabama Gates

Construction Camp in the Owens Valley (Van Bueren, et al. 1999) and compare the artifact assemblages from these projects.

ARCHAEOLOGICAL EXCAVATION

Excavation Personnel

During 2008, Friends began planning the first major restoration project: Workers' Cabin B, one of the two extant employee residences in the Cowell Lime Works. This project commenced in December 2008 under the direction of Jan Dekema, a local expert on the repair and restoration of old and historic-era architectural woodwork. In conjunction with the restoration, volunteers from the Santa Cruz Archaeological Society and archaeology students from Cabrillo College and UCSC excavated underneath the cabin and around the outside perimeter of the building.

Sally Morgan, a UCSC planner with 25 years of experience as an archaeologist and archaeological project manager, approached me to recruit volunteers from Cabrillo College and the Santa Cruz Archaeological Society, and initiated an internship program for UCSC students. Morgan directed the archaeology work at Cabin B. Excavation commenced in January 2009.

Site Formation

The soils at the Cabin B site include large cobbles of limestone, as well as abundant limestone grit in a matrix of fine clay. Throughout the Historic District, dry summer soils are rock hard, while in the winter, the same soils are highly erosive and susceptible to slope wash. Around the cabin, the effects of slope wash are evident in the erosion channeling of the adjacent pedestrian path, the wide-spread, sparse distribution of historic artifacts over the slope below the cabins, and the build-up of soil at the back (upslope) wall of the cabin and under the cabin floor.

Slope wash and soil movement at the cabin site almost certainly has increased as a result of campus development. Prior to storm water diversion work during the last decade, storm runoff from the corporation yard ran through the cabin complex creating a channel under Cabin E that caused its collapse, and fostering the growth of a large willow tree that caused Cabin D to collapse. Further, as is evident from the debris in and on the

slope behind the cabins, soil and artifacts from the Barn H perimeter likely were pushed over the slope when the areas north and south of the barn were graded and paved. Debris on the slope includes asphalt chunks, limestone rocks, and modern artifacts (Sally Morgan, personal communication 2012).

Within the cabin complex, the area between the rear of the cabins and the back fence of the complex is steep, and there has been substantial build up of clayey soil and rubble to the extent that soil covered the back wall boards up to more than a foot deep, and had filled in approximately 75 percent of the space under the cabin floor. In the unimpeded spaces between the cabin locations, slope wash has carried clay soil down slope. Soil buildup has not occurred to nearly the same extent in these areas as it has under the cabin; however, the floor level at the front is still well above the ground surface, as it was historically.

Excavation Goals and Methods

The primary goal of this excavation was to explore the foundation for the restoration crew. Therefore, the first units we excavated, during winter 2009, were around the outside cabin perimeter, focusing on the corners of the cabin to expose the foundation of the building. The second goal was to reveal information about the Cowell Ranch workers who lived in the cabin through the recovery of a sample of the houselot assemblage. The third goal was to recover chronologically sensitive artifacts to determine the occupation date range and the construction date of the cabin. The second and third goals led to the decision to excavate a series of units around the exterior of the cabin, and to excavate within and underneath the floor of the cabin. An additional goal of this work was to provide excavation experience for the volunteers and university interns.

The excavation efforts were primarily focused on facilitating the exposure of the cabin's foundation posts and wall bases for restoration purposes. To this end, excavation units were set out all the way around the perimeter of the cabin with one wall of each unit against the cabin wall.

The purpose of stratigraphic excavation is to investigate the depositional history of an archaeology site through the law of superposition, that says that the upper strata are newer than the lower strata (Harris 1975:109). Stratigraphic excavation has the potential

to provide data that can support the analysis of change over time in material culture and cultural practices, and a fine-grained site chronology that might delineate successive occupational episodes. Stratigraphic excavation was not pursued at the Cabin B site for several reasons.

First, based on an exploration foundation exposure made by the cabin restoration team, it was evident that soils around the exterior of the cabin were compact, highly uniform in color and texture, and low in organic material. Furthermore, cultural material was evident in the exploration to a depth of only about 12 inches, below which the clay became increasingly compact. Neither natural nor cultural strata that might guide the excavation were evident in soil texture, color, or gross content. Second the site deposit is quite shallow and small in area and steeply sloping. Slope wash has continually moved surface material down slope, both during the occupation of the site and likely during modern episodes of rapid slope runoff. The deposit also has been subject to extensive disturbance through ground squirrel and gopher burrowing, and water pipe installation. For these reasons, particularly in the steeply-sloped units along the north and south walls, substantial stratigraphic disturbance was anticipated. Third, excavation was to be undertaken by crews with varied experience. Most were student interns with very little. Also, the excavations would be intermittent. Excavations ultimately took place every other Saturday over a period of 15 months. For these reasons, Morgan decided that maintaining consistent stratigraphic controls would not be feasible. Therefore, the vertical excavation units comprised the units of excavation, each excavated as a single level (Sally Morgan, personal communication 2012).

We suspect that UCSC, during the process of converting the ranch barns into facilities management offices, shops and storage space, and the barnyards into parking lots, bulldozed the surface soil from the barnyards, along with any artifacts they contained, over the edge of the slope. Artifacts contained within these surface soils joined the artifacts already deposited behind the cabin by the workers and by ranch activities.

In spring 2009, volunteers from Friends emptied the cabin interior of the few remaining artifacts, shored up the cabin to prevent collapse during excavation, and removed the floor boards to facilitate access to the soils under the floor. Excavations continued, usually on alternate Saturdays, through 2009 and into the spring of 2010,

under Morgan's leadership. I acted as schedule coordinator and assistant manager, leading and directing activities when Sally Morgan was not available. Excavations concluded in spring 2010. (See Figure 21.)

Excavation Tools

The archaeology crew used hand tools for excavation: pick axes, shovels and trowels. The same methodology was used for all units, but varied with season. During summer the compact soil required a pickax. Units along the back wall contained a lot of rock, which was removed by hand and not collected. All features and structural elements were mapped by Morgan with the assistance of student interns and volunteers.

The archaeology crew screened all excavated soils through ¼ inch wire mesh standing box screens. The archaeologists bagged the artifacts in the field and labeled the bags with the site trinomial, "Cabin B," the unit number, and the excavation date. Fragile materials were bagged individually. Extremely fragile items were wrapped in tissue before bagging. New bags were used for each unit and each date.

Cabin Foundation

The cabin does not possess a continuous perimeter foundation. It is supported by a redwood and brick "post and pier" foundation (Rodrigues et al. 1992:Buildings and Features). Upright redwood posts measuring five inches by seven inches, buried to approximately two feet, support the two downhill front corners of the cabin, the northwest and southwest corners. Each post is set on a pier consisting of two fire bricks. Pairs of fire bricks are also set midway along the north and south walls and at the two back corners, lifting the wall foundation beams off the ground surface (Morgan 2010:4). One fire or red brick supports the middle of the east wall and several were placed beneath the support beam under the middle of the cabin (Perry, personal communication 2012).

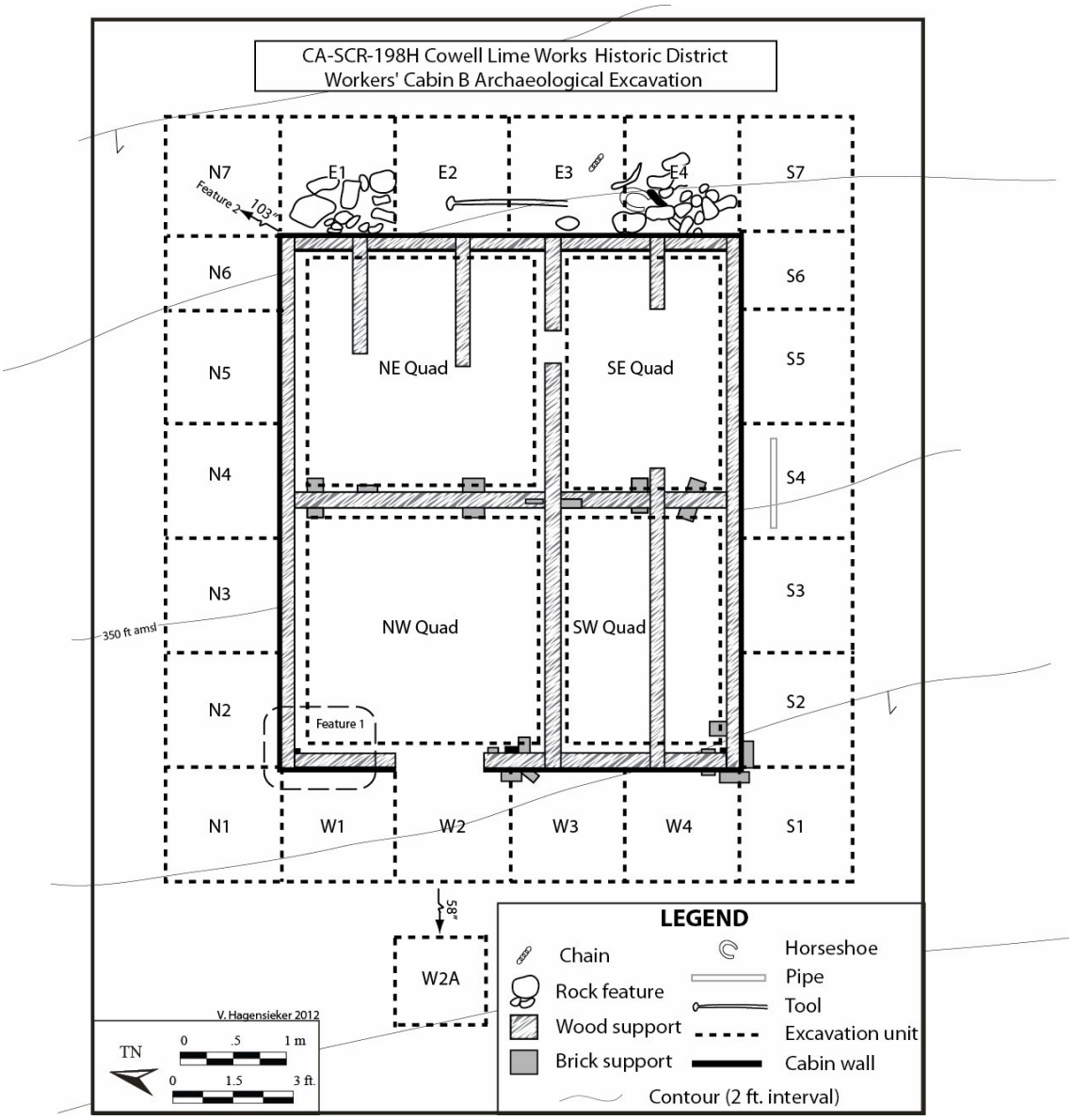


Figure 22. Excavation Map. (Sally Morgan and Virginia Hagensieker)

Unit Layout

The goals were to expose the foundation components for accurate replication, to clear soil from below the floor boards to stop rot, and to recover a sample of artifacts from the historic period at the ranch. Units were placed to accomplish these goals. Excavation removed all soil to below the base of the walls, exposed all foundation members and exposed the floor joists. Each unit was excavated as a single level, generally starting with one quadrant excavated to below wall base and then working across units. Some units were excavated by quadrants in small vertical increments with

subsequent vertical increments removed as needed to reach the base of the cultural deposit. No natural or visually-distinguishable cultural levels were observed in most units. At each foundation post, the post and pier elements were exposed to the base of all of the pier elements (bricks) so that all elements could be drawn. Excavations terminated when all of the key foundation members were exposed and when the under-floor area was completely cleared to culturally sterile soil.

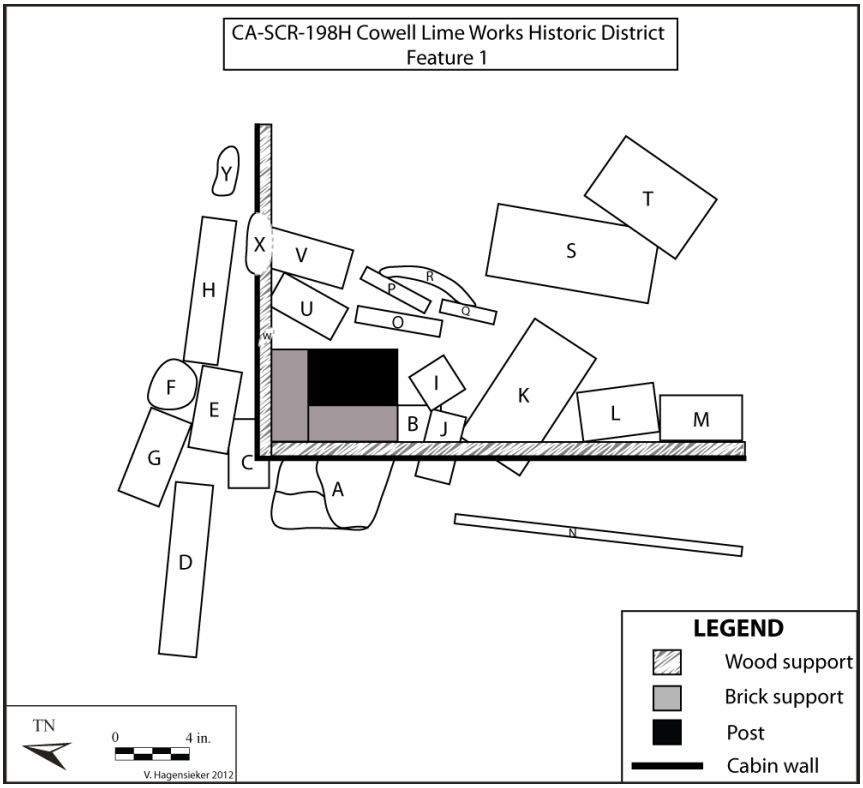


Figure 23. Feature 1 Map. (Sally Morgan and Virginia Hagensieker)

Morgan facilitated the layout of the units on the exterior and within the interior of the cabin. The north and south sides of the cabin each contained six 3 x 3 ft. units, designated N1-N5, and N7, and S1-S5 and S7, respectively. Units N6 and S6 were designed as 2 x 3 ft. units due to the dimensions of those exterior walls. The numbering regiment began with the western, downhill corners of the north and south walls. The exterior perimeter of the east and west sides of the cabin also contained 3 x 3 ft. units, designated E1-E4 and W1-W4, respectively. The numbering on these two exterior walls began with the north corners of the cabin. The interior of the cabin was divided into four sections, separated by surviving floor joists, and designated the northeast, the southeast,

the northwest and the southwest quadrants. The northeast and northwest quadrants are larger and measured approximately 7 ft. by 7 ft., while the southeast and southwest quadrants measured approximately 7 ft. east/west by 5 ft. north/south. A final unit, designated W2A, was laid out approximately 4 ft. directly in front of the cabin doorway in an attempt to recover remnants of the access stairs and door. This unit measured three feet by three feet. (See figure 22).

The excavation crew also explored two features. Feature 1, called the Can Feature, was discovered during restoration work by Frank Perry under the northwest corner of the cabin. Feature 1 consists of a group of complete and fragmented red and fire bricks, limerock fragments, and lumber fragments. Interspersed within these items were artifacts, including a ring, a colorless glass “Vaseline” jar, and multiple “Prince Albert” tobacco cans. The artifacts were located within a small shallow pit, likely dug by one of the inhabitants as a hiding place for important items. Feature 1 was located adjacent to the northwest post and pier, therefore, the feature and the foundation members were excavated together. (See Figures 23 and 24.)

Cowell Lime Works Historic District
Workers' Cabin B

Feature 1 Map Key

A. Fire brick	N. Lumber (on edge)
B. Red brick	O. Tobacco can (on edge)
C. Red brick	P. Tobacco can (on edge)
D. Metal strap	Q. Tobacco can (on edge)
E. Red brick	R. Tobacco can fragment (on edge)
F. Red brick	S. Red brick
G. Limerock	T. Fire brick
H. Red brick	U. Tobacco can
I. Colorless glass jar	V. Tobacco can
J. Tobacco can	W. Amorphous metal
K. Fire brick	X. Limerock
L. Tobacco can	Y. Limerock
M. Fire brick	Z. Red brick fragment

Figure 24. Feature 1 Map Key. (Sally Morgan)

Feature 2, the Post Hole Feature, was exposed by UCSC interns digging a posthole to repair a collapsed fence line located approximately twenty feet uphill and to the east of the cabin. Feature 2 consists of various artifacts that are likely part of a larger deposit covering a portion of the hillside. Excavators recovered a range of artifacts from this feature, including shell, plastic, and metal buttons, ceramic fragments, colorless, green, olive, and brown container glass, window and mirror glass, an eating utensil handle, hardware, tool fragments, can fragments, shell fragments, and trouser and animal tack buckles.

ARTIFACT PROCESSING AND CATALOGING

Cleaning and Sorting

During the summer of 2009, work began on the cleaning, sorting, and initial identification of the artifacts based on material type. Due to the lack of appropriate laboratory facilities, this work was done one morning a week in my home. I supervised this activity, providing equipment, contacting personnel, and coordinating schedules. Volunteers and UCSC interns supervised by Drs. Diane Gifford-Gonzalez and J. Cameron Monroe, helped with this work. Later, when working on the data entry of the artifacts, we increased the work level to two or three days a week, depending on the availability of the volunteers, the interns, and myself. Interns participated solely while UCSC classes were in session. The cleaning and initial sorting was completed at the end of the summer of 2010.

Artifacts were cleaned using methods appropriate to the type of material and the condition of the item. For example, brick, glass and ceramics were washed with brushes and water. Metal and leather artifacts were cleaned with a dry brush to remove any soil remaining. Paper, bone, and shell were gently dry brushed. All artifacts from each unit were sorted as a group. Each unit assemblage was sorted by function and material types, then counted and bagged. Diagnostic artifacts were first separated from non-diagnostic material. The lab workers sorted ceramics by ware type and then by glaze color. The glass was sorted according to function and color. We sorted metal into identifiable versus unidentifiable artifacts. Faunal bone was analyzed by Michael Stoyka and the shell was analyzed by Frank Perry.

Cowell Lime Works Historic Distric Workers' Cabin B					
Context Numbers and Corresponding Unit Location					
	North Wall		Interior Subfloor		
	South Wall		Interior Above floor		
	East Wall		Features		
	West Wall		Miscellaneous		
	Provenience	**Assigned Context #**			
Exterior	**North Wall**	**Unit 1**	**1**		
		Unit 2	**2**		
		Unit 3	**3**		
		Unit 4	**4**		
		Unit 5	**5**		
		Unit 6	**6**		
		Unit 7	**7**		
		General	**8**		
	South Wall	**Unit 1**	**9**		
		Unit 2	**10**		
		Unit 3	**11**		
		Unit 4	**12**		
		Unit 5	**13**		
		Unit 6	**14**		
		Unit 7	**15**		
		General	**16**		
	East Wall	**Unit 1**	**17**		
		Unit 2	**18**		
		Unit 3	**19**		
		Unit 4	**20**		
		General	**21**		
	West Wall	**Unit 1**	**22**		
		Unit 2	**23**		
		Unit 3	**24**		
		Unit 4	**25**		
		Unit W2A	**26**		
		General	**27**		
Interior	**Subfloor**	**NE Quad**	**28**		
		NW Quad	**29**		
		SE Quad	**30**		
		SW Quad	**31**		
		General	**32**		
	Above Floor	**General**	**33**		
Features	**Can Feature**	**Feature 1**	**34**		
	Post Hole Feature	**Feature 2**	**35**		
Miscellaneous		**Misc**	**36**		

Figure 25. Unit Location and Corresponding Context Numbers. (Patricia Paramoure)

Context Designations

I assigned context numbers to each provenience unit, beginning with the north wall exterior provenience, with each unit receiving an individual number. Due to the inconsistent labeling of some bags, we were not able to assign a number of artifacts to a

specific unit, but only to a general location. These artifacts were assigned to a general location provenience, e.g. North Wall General. The north wall exterior units received context numbers 1 through 8, corresponding to units N1 through N7, with Context 8 referring to a general North Wall exterior location. The south wall exterior units received context numbers 9 through 16, corresponding to units S1 through S7, with Context 16 referring to a general south wall exterior location. This system was also applied to the east and west wall exterior units, with the east wall receiving numbers 17 through 21 and the west wall receiving numbers 22 through 27. Unit W2A, located in the area of the entrance stairs, was included in this group and received context number, 26. The cabin interior excavation areas received context numbers 28 through 32, corresponding to the northeast, northwest, southeast and southwest and general interior cabin designations, respectively.

The restoration crew removed a number of artifacts from the cabin interior before sub-floor excavation began, and the interior above-floor artifacts were assigned context number, 33. Features one and two were assigned context numbers 34 and 35, respectively. A number of artifacts were located by a university employee volunteer using a metal detector. These artifacts, along with some miscellaneous surface finds and a couple of artifacts for which the provenience information was lost, were all consolidated into one context, labeled miscellaneous, and given context number, 36. Volunteers and interns were given free choice as to where they wanted to excavate and two units were not excavated. Consequently, north wall unit two (N2) and west wall unit one (W1), which correspond to Contexts 2 and 22, respectively, did not yield any artifacts. (See Figure 25.)

The artifacts were grouped and bagged by lot. A lot is a group of like artifacts within a context. The lots were assigned three-part catalog numbers consisting of the accession number (115 for all artifacts in the Cabin B assemblage) context Number (1–36 depending on provenience) and lot number. We then entered the artifact information into SHARD, a database discussed below.

Sonoma Historic Artifact Research Database

Artifact data entry into SHARD (Sonoma Historic Artifact Research Database, developed at Sonoma State University) began in September 2010. This database is modeled on Stanley South's functional classification system for historical artifacts, initially developed in 1977 and modified and expanded for use with archaeological sites dating from the mid-nineteenth to early-twentieth century located in the western United States. "Artifacts are separated into broad Group divisions, and then further split by Type, Category, and Description" (Gibson and Praetzellis 2008:2). Artifacts were classified and identified according to a functional category system that assists in determining the original function, time period, origin, and economic context for the artifacts. The functional category concept for historic-era artifact analysis was developed by South (1977), Tordoff and Seldner (1987), and Praetzellis (1990).

Data Entry

Using the historic catalog form view in SHARD, we input the data for the artifacts one lot at a time and one context at a time. Within each context number, we attempted to enter artifacts by material type in consistent order, commencing with the organic and brick material, then proceeding to enter the ceramic, glass, and metal. We completed artifact data entry during early fall 2011.

Labeling

We began labeling diagnostic artifacts in fall 2011, using the three-part catalog labeling system also used in cataloging, made up of the accession number, the context number and the lot number. For example, the first artifact number in the database is a fragment of a stoneware jug, labeled 115-1-1. All the labeling was done with the help of three UCSC undergraduate interns, Marina Nelson, Bianca Estrada, and Joshua Bowman, three evenings per week. When possible, white and black permanent markers were used for labeling. For the glass artifacts, we used white or black India ink and a quill-tip pen, then coated it with a layer of clear acrylic after the ink dried, to fix the label. (Since glass is non-porous, the marker never sets, and blurs or wipes off when touched if the label is not fixed in place.) We used black ink for the light-colored material and white ink for the

dark-colored material, and labeled all the ceramic fragments, the diagnostic glass, and many of the diagnostic metal artifacts. Some of the diagnostic metal was too encrusted with rust and was impossible to write on. During the same time period, volunteer, Christina Powell, and I met twice a week to correct the many mistakes and inconsistencies that were made during the initial data entry.

Minimum Number of Items (MNIs)

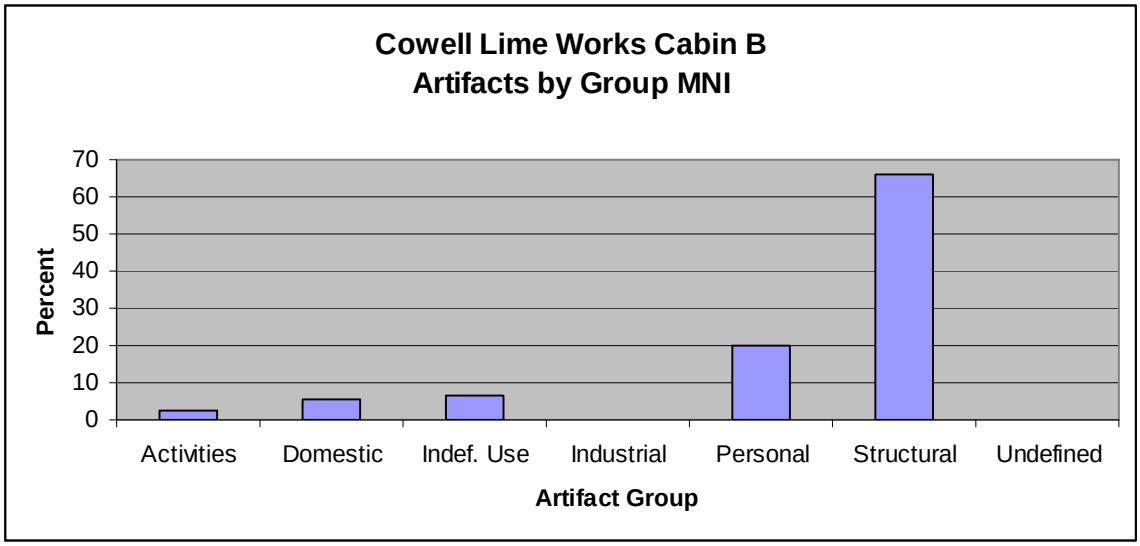
The next task was to determine the minimum number of individual items, or MNIs, represented by each artifact type. “By quantifying artifacts in a standard analytical manner, they can be used for intra-site and inter-site comparison and analysis. MNIs are the minimum number of individual items (not the number of fragments) represented in an artifact collection” (Gibson 2002:18-19). We determined the MNIs of the ceramic artifacts in this assemblage based on provenience, ware type, form, diagnostic fragments, and cross-mending. Container glass MNIs were primarily based on provenience, color, form, diagnostic fragments, and cross-mending. With other items such as boot fragments, clock parts, and stove parts, we gave an MNI to the largest most representative portion, especially if parts were scattered among multiple provenience locations. MNIs were assigned to shoe and boot fragments only when a majority of the sole was present and if we were able to discern if it was a left or a right. If both left and right sides were present within a given provenience, we gave only the left shoe or boot an MNI. Clothing buttons and rivets were also given MNIs; however, we do not know how many of these items each piece of clothing contained.

Dating Methods

We studied each artifact to determine if it was temporally diagnostic. We researched molded decorative shards to determine if the patterns were identifiable and datable. Glass artifacts containing embossing were researched “to determine place or origin, contents, and production date ranges” (Gibson 2002:18-10). Manufacturing techniques were also used for dating container glass. We dated other artifacts based on printed or embossed manufacturer and/or patent information. For example, bottles made with cup-bottom molds were dated using Munsey (1970:39-40) to ca. 1870s to 1920s and

Prosser molded buttons were dated using Sprague to1840 until 1950s. All marks and dates were entered into the artifact database, with additional missing mark information extrapolated if possible.

DESCRIPTION OF THE COLLECTION



Activities	Domestic	Indef. Use	Industrial	Personal	Structural	Undefined
2.4 %	5.4 %	6.5 %	0.03 %	19.8 %	65.77 %	0.11 %

Figure 26. Cabin B Artifacts by Group. (Patricia Paramoure)

Summary

Excavation recovered a total of 14,945 artifacts from approximately 80% of the interior and exterior cabin area. These are cataloged into 1,915 lots. Approximately 2,000 whole artifacts and 13,000 fragments are included within the assemblage, representing 3,523 items. Materials include bone, ceramic, glass, leather, lime, metal, organics, paper, plastic, rubber, shell and textile. We cataloged artifacts by group, category, type, and description and entered the information into SHARD. Artifact groups within the assemblage include activities, domestic, personal, structural, and indefinite use. A large proportion of artifacts were structural debris, and indefinite use. Within the activity category are commerce, firearms, fishing, painting, religious, tools, transportation and writing artifacts. The domestic group includes artifact categories, clothing maintenance, food, food preparation/consumption, food/food storage, furnishings, heating and lighting,

miscellaneous closures, and miscellaneous containers. The personal group includes artifact categories, accoutrements, clothing, footwear, grooming/health, social drugs–alcohol and social drugs–tobacco. Within this assemblage, identifiable artifacts include significant proportions within the domestic and personal artifact groups. (See Figure 26) There are no complete ceramic vessels and few complete glass containers in the collection. Unfortunately, the collection contains only one ceramic makers' mark.

Faunal Remains

Cowell Lime Works Historic District
ANIMALS REPRESENTED BY NISP

Common Name	Scientific Name	NISP	MNI
MAMMALS			
Major Meat Mammals			
Cow	*Bos taurus*	48	2
Pig	*Sus scrofa*	3	2
Minor Meat Mammals			
Cottontail Rabbit	*sylvilagus sp.*	6	2
Incidental Mammals			
Coyote	*Canis latrans*	1	1
Domestic cat	*Felis catus*	1	1
California ground squirrel	*Spermophilus beecheyi*	6	2
Botta's pocket gopher	*Thomomys bottae*	5	2
Dusky-footed woodrat	*Neotoma fuscipes*	1	1
Black rat	*Rattus rattus*	4	1
California vole	*Microtus californicus*	1	1
Indeterminate rodent	rodentia	6	
Indeterminate Mammals			
Large mammal		187	
Medium-Large mammal		3	
Medium mammal		5	
Small-Medium		3	
Small mammal		12	
mammal		21	
TOTAL MAMMALS		313	15
BIRDS			
Domestic Poultry			
Indeterminate Bird		3	
TOTAL BIRDS		3	
FISH			
Rock fish	sebastes	1	1
Indeterminate fish		4	1
TOTAL FISH		5	2
Indeterminate fragments		17	
GRAND TOTAL		338	17

Figure 27. Cabin B Faunal Bone by NISP. (Michael Stoyka)

The archaeofaunal identifications were made by Michael Stoyka, Faunal Specialist at the Anthropological Studies Center (ASC) at Sonoma State University in Rohnert Park, California, using the comparative reference collection at the ASC, along with pertinent mammalian and avian osteology manuals. Mr. Stoyka has seventeen years of experience with faunal identification. Most of the bone is fragmented, especially the larger specimens. Stoyka divided the bone into identifiable and unidentifiable categories and examined the bones for evidence of burning, rodent or carnivore gnawing, butchering, and natural modification. The specimens were identified as to species if sufficiently complete, but to more generalized taxonomic categories when necessary (Reese 2007:19). Provenience, taxon, element, portion, side, epiphyseal-fusion status, butchering cuts, tool marks, taphonomic factors, and heat alteration were recorded for each specimen using a computerized data-entry system (Stoyka, personal communication 2011). Most of the food bone recovered is beef (*Bos taurus*) with small amounts of pig (*Sus scrofa*), rabbit (*Sylvilagus*), bird (Aves), and fish (Osteichthyes) bone. Some of the bone appears recent and is likely not the result of human consumption behavior, and are incidental. These include coyote, vole and gopher. Ground squirrel bone in the assemblage could be either from human processing or from accidental deposit (Stoyka, personal communication 2011). (See Figure 27.)

Shell

The excavation retrieved 1,528 shell fragments representing a minimum of 118 individual shells. The shell identifications were made by Frank Perry, Research Associate, at the Santa Cruz Museum of Natural History in Santa Cruz, California, using his personal comparative reference collection along with pertinent shell identification manuals. Mr. Perry has forty years experience in shell identification. The shell material from Cabin B is primarily from marine mollusks and includes the following identified taxa: California Mussel (*Mytilus californianus)*, Pismo Clam (*Tivella stultorum*), Owl Limpet (*Lottia gigantea*), Green False-Jingle (*Pododesmus macrochisma*), Asian Clam (*Corbicula fluminea*), Barnacle (*Balanus)*, and unidentified calcareous material. All but the barnacle and the unidentified calcareous material belong to the phylum Mollusca and

to the class Bivalvia. Nearly all of the specimens are fragments. Only a few whole shells were found, including five whole specimens of *Lottia gigantea*, a complete valve of *Mytilus californianus*, and a complete valve of *Corbicula fluminea*. Almost two-thirds of the shell by MNI are *Mytilus californianus.* (See Figure 28.)

> The breaks are mostly angular with sharp edges. This is not surprising since it is presumed that the mollusks were gathered for food. The shells may have been broken during the process of prying them off rocks or opening them. Many of the shells have a chalky appearance and feel. This is typical of shell that has been buried in soil for a number of years and has started to dissolve [Perry 2010:1-2].

Cowell Lime Works Historic District

Workers' Cabin B Marine Shell

Descript.	Remarks	MNI	% MNI
Clam	Asian clam valve. *Corbicula fluminea*.	1	0.84
Barnacle	Barnacle. *Balanus*. Large. Species unknown.	1	0.84
Mussel	California Mussel. *Mytilus californianus*.	76	64.4
Limpet	Owl limpet. *Lottia gigantea*.	18	15.3
Jingle	Jingle. *Pododesmus macrochisma*.	2	1.7
Clam	Pismo clam. *Tilvela stultorum*.	16	13.6
Mollusc	Unidentified mollusc shell.	1	0.84
	Indefinite	3	2.5
Total		118	100

Figure 28. Cabin B Marine Shell. (Michael Boyd)

Ceramics

The ceramics recovered during the Cabin B archaeological excavations range in type from rough to refined, but are limited in form. The excavation retrieved 133 fragments representing 42 ceramic vessels. Forms are restricted to plates, bowls, cups, mugs, a jug, two jars, and a crock. Common pottery, earthenware, opaque porcelain, porcelain, stoneware, white improved earthen ware, and yellow ware fragments are present within the assemblage. Ceramic fragments were found in all areas of the excavation. Below is a brief synopsis of the ceramic type descriptions used for identification.

Common pottery is often made of local clay in which the temper is frequently visible. Usually colored red, brown, or yellow, the wares are soft, light and porous.

Earthenware is a white to cream colored pottery and its soft body can be easily chipped or etched with a thumbnail or a dental pick. A cross section of an earthenware piece shows a dry, chalky and rough paste. Its clear glaze is often highly crazed. “Crazing is a network of lines or cracks in the fired glazed surface [of a ceramic object]. It happens when a glaze is under tension. A craze pattern can develop immediately after removal from the kiln or years later” (Zamek, Jeff and Lakeside Pottery 1995:1). Opaque porcelain “resembles white improved earthenware but has some characteristics of porcelain” (Gibson 2003:1) (See white improved earthenware, below.) The magnified fabric appears granular and shiny. The glaze is clear and uncrazed. Porcelain is usually white and often translucent. It is hard, dense, and highly vitrified with a granular fabric. Stoneware is non-porous and is very hard and dense, with a heavy body. It is cold to the touch. The fabric is primarily shiny and granular and may have conchoidal fractures. It is non-porous. White improved earthenware is a white ceramic type with a chalky appearance and no inclusions. The body is harder than earthenware and the paste cannot be scratched with a dental pick. The glaze is typically clear and is usually crazed (Gibson 2003:1-2).

Cowell Lime Works Historic District
Workers' Cabin B **Ceramics**

Material	MNI	% MNI
Chinese Brown Glazed Stoneware	1	2.3
Common-pottery	2	4.7
Opaque Porcelain	5	11.6
Porcelain	1	2.3
Stoneware	3	7
White Improved Earthenware	29	67.4
Yellowware	2	4.7
Total	43	100

Figure 29. Cabin B Ceramics. (Michael Boyd)

One fragment of Chinese pottery is present within the collection. It is a straight-sided jar body fragment of a type known as Chinese brown-glazed stoneware. Chinese utility vessels were not made for commercial export and did not have the same decorations or vessel forms as earlier Chinese export porcelains marketed to Anglo-Americans. Chinese utility vessels like this were imported containing food materials like ginger or dried vegetables and are usually made of coarse, gritty buff or gray-brown paste

and a thick *jian-you* or Tiger glaze of a chocolate brown, gray or black-brown color (Adkison 2002:3.9). (See Figure 29.)

Glass

Cowell Lime Works Historic District
Workers' Cabin B Glass

Material	MNI	% MNI
Amber Glass	3	1.8
Amethyst Glass	4	1.7
Aqua Glass	31	13.7
Brown Glass	18	8
Chimney/Shade Glass	16	7.1
Colorless Glass	113	50.2
Dark-olive Glass	8	3.5
Green Glass	4	1.8
Mirror Glass	4	1.8
Olive Glass	12	5.3
Opaque-white Glass	6	2.6
Red Glass	1	0.4
Smoky Glass	4	1.7
Teal Glass	1	0.4
Window Glass	0	0
Total	225	100

Figure 30. Cabin B Glass. (Michael Boyd)

The assemblage contains 5,445 glass fragments, representing 221 glass items. The very fragmented condition of the assemblage is apparent, as there are only seven complete glass containers in the collection. The majority of these are from glass containers, specifically jars and bottles. We inspected the bases and tops of bottles and jars, along with embossed body fragments, for identification and dating. I was surprised at how many canning jar ground lip fragments are in the collection. Notable bottles and jars include Vaseline jars, medicine jars and bottles, ink bottles, a possible perfume bottle, and alcoholic beverage containers like wine and whiskey bottles. The most common glass color is colorless (clear). Other common glass colors present in the assemblage are green, olive, dark-olive, amber, brown, and aqua. The small number of red glass, cobalt blue glass, and teal glass fragments are more rare. Amethyst (solarized colorless) glass fragments are also included. In addition, fragments of opaque-white glass are included in the assemblage. We also identified colorless pane glass window

fragments, very thin colorless lamp chimney fragments, and colorless mirror fragments. Some of the mirror fragments retain their metallic backing. (See Figure 30.)

Metal

The assemblage contains a large number of metal artifacts, most of which are of indefinite use or unidentifiable. Over 87% of the identifiable metal items are ferrous. Nails were sorted by cut versus wire and by whole versus fragment. Cut nails are square or rectangular-shaped and are made by cutting the shaft from a sheet of metal and forging a square head onto this shaft. Wire nails are round and are made by cutting an individual shaft from a long piece of metal wire and then affixing a round head and shaping a point (Nelson 1968). The metal artifacts are primarily made of ferrous and copper alloys, with some cast-iron, aluminum, and lead. Some diagnostic artifacts, like work clothing fasteners like stud-type buttons and jeans rivets, are embossed or engraved with manufacturer information and occasionally with dates. Tobacco cans and food cans, some in very poor condition, are present. Identifiable tools and farming implements are present, although usually very rusted and sometimes fragmented. Lamp or lantern parts and cast-iron stove parts are also included. Bullets and bullet casings of different calibers sometimes have diagnostic attributes, like manufacturers' information contained on the base of some casings. We also found clock parts and watch parts at the cabin. Gears, a winding key and the backs of both a clock and a watch were recovered. (See Figure 31.)

Cowell Lime Works Historic District
Workers' Cabin B Metal

Material	MNI	% MNI
Aluminum	8	0.3
Cast-iron	1	0.04
Copper-alloy	323	10.7
Copper-alloy and Ferrous	22	0.7
Copper-alloy and Textile	1	0.04
Ferrous	2622	87.2
Lead	10	0.3
Metal	3	0.1
Metal with Other Material	14	0.5
Stainless Steel	1	0.04
Steel	2	0.08
Total	3007	100

Figure 31. Cabin B Metal. (Michael Boyd)

Other Items

Miscellaneous other items found at the cabin include different types of paper, most of which seem to have been used as insulation on the interior of the cabin. In addition to the faunal bone and the shell, other organics within the assemblage consist of peach, cherry, plum and olive pits, likely the remnants of food consumption. We discovered many boot parts, including preserved leather uppers and soles, eyelet lace guides, lace hooks, boot nails, and boot screws. Complete boots were also found. When identifiable, boot components all seem to be from left boots. (See Figure 32.)

Cowell Lime Works Historic District
Workers' Cabin B Other Materials

Material	MNI	% MNI
Canvas	1	0.7
Chalk and Linseed Oil	1	0.7
Composite	2	1.5
Cotton	1	0.7
Fabric	1	0.7
Felt	1	0.7
Hard-rubber	5	3.7
Leather	2	1.5
Leather and Metal	12	8.8
Lime	6	4.4
Paper	3	2.2
Plastic and Metal	1	0.7
Porcelain	34	25
Putty	1	0.7
Rubber	4	2.9
Vegetal	56	41.4
Wood	5	3.7
Total	136	100

Figure 32. Cabin B Other Materials. (Michael Boyd)

Clothing Fasteners

By far the most numerous identifiable items in the assemblage are clothing fasteners. Buttons and jeans rivets are plentiful; suspender, overall, belt buckles and hose support buckles are also abundant. Most of the buttons are of the sew-through style rather than the shank style, with shell buttons and metal stud-type work-clothing buttons being the most numerous. Many Prosser buttons are also present. Prosser buttons are glass-like ceramic buttons made through a press molding manufacturing process. They are most

commonly white in color, have a smooth obverse and an “orange peel”-like surface on the reverse (Sprague 2002:111). Unfortunately, most of the clothing fasteners have a large date range. (See Figure 33 and Figure 34.)

Cowell Lime Works Historic District
Workers' Cabin B Clothing Fasteners

Material	MNI	% MNI
Bone Button	18	3.1
Copper-alloy Brace/Hose Support Buckle	2	0.3
Copper-alloy Button	57	9.7
Copper-alloy Cuff Link	1	0.2
Copper-alloy Hook	4	0.7
Copper-alloy Rivet	218	37.1
Copper-alloy Snap	1	0.2
Copper-alloy Suspender Buckle	1	0.2
Copper-alloy Suspender Loop	2	0.3
Copper-alloy and Ferrous Button	21	3.6
Copper-alloy and Textile Hose Support Buckle	1	0.2
Copper-alloy Suspender Adjuster	1	0.2
Ferrous Belt Buckle	1	0.2
Ferrous Brace/Hose Support Buckle	9	1.5
Ferrous Buckle	11	1.9
Ferrous Button	116	19.8
Ferrous Clasp	1	0.2
Ferrous Rivet	2	0.3
Ferrous Suspender Clip	1	0.2
Ferrous Trouser Buckle	3	0.5
Hard-rubber Button	2	0.3
Metal Button	1	0.2
Plastic Button	6	1.0
Porcelain Button	24	4.1
Shell Button	77	13.1
Stainless Steel Hook	1	0.2
Wood Button	4	0.7
Total	586	100

Figure 33. Cabin B Clothing Fasteners. (Michael Boyd)

Cowell Lime Works Historic District
Workers' Cabin B Buttons

Material	MNI	% MNI
Bone	18	5.3
Copper-alloy	57	16.9
Copper-alloy and Ferrous	21	6.2
Ferrous	116	34.4
Hard-rubber	2	0.6
Metal	1	0.3
Plastic	7	2.1
Porcelain	34	10.1
Shell	77	22.8
Wood	4	1.2
Total	337	99.9

Figure 34. Cabin B Buttons by Material.
(Michael Boyd)

CURATION

The collection will be curated at the UCSC Monterey Bay Archaeology Archives, under the direction of Diane Gifford-Gonzales. At some point, the collection should be reviewed and some artifacts discarded. This is necessary because of the limited space at the facility. It is not practical to save all artifacts, and certain items that do not contain long-term research value, are excessive in quantity, are in poor condition, or contain health or safety risks need not be curated. These include window glass, undiagnostic glass, nails, leather items without interpretive value, scrap metal, sheet metal, or wire, corroded or amorphous undiagnostic metal, and very large items, when size presents a curation problem. After analysis, cataloging, counting and weighing, these items should be discarded (Praetzellis and Costello 2002). Copies of this thesis will be on file at UCSC Special Collections for the use of students and researchers, and at the UCSC Department of Physical Planning and Construction for those who care to research this data.

Comparative Collections

In Chapter VI, I compare the Cabin B artifact assemblage to the collections from three other sites: Cabin J, the blacksmith shop, and the Alabama Gates Construction Camp. Data recovery at the Alabama Gates Construction Camp took place in 1997. The camp was occupied by approximately 150 men and their families from April 1912, until February 1913. The camp's remains lie four miles north of Lone Pine, in the Owen's Valley in eastern California. It was one of many camps used to house workers during

construction of the 215-mile-long Los Angeles Aqueduct. The history of this aqueduct is well known and well documented. However, until this project was carried out, little was known about the lives of the "thousands of men who built the elaborate system in the years before the outbreak of the First World War. Contending with extreme desert conditions and grueling dangerous work, an army of rugged men (and in some cases their families) occupied 57 camps along the aqueduct route between 1908 and 1913" (Van Bueren 1999).

The remains of the camp include a residential area, an industrial area, and a livestock management area. Most of the structure locations excavated were dwellings and these were separated into discrete neighborhoods. Archaeologists recovered structural materials from the camp buildings, domestic remains like food, kitchen, and tableware remains, and personal artifacts like clothing fasteners, health-related items, and social drug consumption evidence, as well as tools, hardware, and other construction activity and support items (Van Bueren et al. 1999:1–4).

The volume which describes this project, *Building the Los Angeles Aqueduct: Archaeological Data Recovery at the Alabama Gates Construction Camp*, discusses many aspects of camp life. Insights are offered about the use of space in the camp, including the camp's organization, sanitation, amenities, and how these aspects of the camp affected labor relations between the workers and the City of Los Angeles. The authors discuss the archaeological evidence concerning the ethnically diverse population of primarily single immigrant men who lived in the camp and what their daily lives were like. A discussion of class and struggle, and the "manipulation of class-specific ideologies" is interpreted to be a vital component of class conflict at the Alabama Gates camp. Due to its brief period of occupation, the Alabama Gates Camp archaeological assemblage represents an easily datable slice in time and place (Van Bueren 1999:174–192).

SUMMARY

In this chapter I have described the methods and results of the archaeological excavations at Cabin B at the Cowell Lime Works Historic District. This project has been ongoing for almost three years. Restoration continues on Cabin B and plans are in the

works to excavate the site of Cabin C. I also discussed the sites I will use for a comparative analysis of the archaeological assemblage from Cabin B, along with a brief description of the Alabama Gates Camp, a municipality-owned work camp in the Owens Valley of eastern California.

Following Chapter

In the next chapter I discuss the findings of the archaeological excavation and analyze the data and artifacts from Cabin B, using SHARD and historic documents. I interpret the artifacts and discuss what they tell us about the lives of the cabin's inhabitants, and by association, about the lives of the workers at the Cowell Ranch. I compare the data from Cabin B to the data from Cabin J, the blacksmith shop and the Alabama Gates Camp assemblage, to reveal similarities and differences among these collections, and to use this information to investigate how the workers used these locations in similar and in different ways. I also analyze and interpret differences in the data concerning these locations and how these differences relate to the research questions which are the focus of this thesis. In conclusion, I compare the lives of the workers at the Cowell Ranch lime complex to those at the Alabama Gates Construction Camp.

CHAPTER VI

FINDINGS

INTRODUCTION

This thesis chapter brings the historic research and archaeological investigation and analysis together in an interpretive framework in order to bring out the meanings and significance of the results of the examination of Cabin B at the Cowell Lime Works Historic District. I use the results of the Cabin B investigation to compare and contrast this site with other sites at the Cowell Lime Works and with an additional site, the Alabama Gates Camp on the Los Angeles Aqueduct, introduced in the preceding chapter, and use this information to reveal more about the lives of the ordinary workers in the Santa Cruz lime industry through an analysis of the similarities and differences of these two sites.

Viewing the lives and behavior of the lime workers through the analysis of a residential archaeological assemblage contributes information about their lives because residential sites contain a wide range of conceivable archaeological research, exploration, and analysis possibilities. Examination of residence patterns and domicile remains in the communities of the U.S. inevitably touches on the topics of race, gender, ethnicity, class, social status, economics, domestic unit, and other important matters pertaining to our culture and society (California Department of Transportation 2008:179). This thesis meets all of these topics.

My work is part of a recent archaeological and historical trend of the investigation of "households that are poorly documented" (California Department of Transportation 2008:179). I examine some of the topics listed in the paragraph above in relation to the inhabitants of Cabin B at the Cowell Lime Works, for example, ethnicity, gender, and family status. Archaeology of such households is important because of the lack of historic documentary evidence. Unfortunately, written history, before approximately 30–40 years ago, primarily focused on "Big Men" and "Big Events," giving people a skewed view of the past. Through the change in focus to ordinary people and everyday events brought about by the "New" Social History, through the cooperation of multiple disciplines, and

through the study of multiple types of sources, we get a much more realistic, reasonable, detailed, and complete view of history. Historical archaeology, with its combined use of diverse sources, including archaeological evidence, historic documents, and oral histories is a discipline that is well suited for illuminating hidden aspects of history to assist in painting a more vivid and varied picture of our culture and our society.

This thesis attempts to fill a void in the scholarship concerning the ordinary workers in the Santa Cruz lime industry, who are important because of lime's significance to the economic and cultural background of the Santa Cruz area. This is evident in the influence lime had on the developing transportation infrastructure in Santa Cruz County and in the large number of Santa Cruz County place names relating to lime. Many of today's inhabitants of Santa Cruz have ancestors who worked in the lime industry, and common laborers represent the majority of the ancestors of modern Americans.

Historical archaeology has the "ability to augment, correct, and corroborate the historic record, particularly in areas where historic documents are often silent such as the reconstruction of the daily lives of the working people who built the west" (Van Bueren et al. 1999:36). Historical archaeology can teach us about our own times through the investigation of how our ancestors lived. We can learn from their mistakes and use this knowledge to create a better world for our descendants. Historical archaeology can help clear up misconceptions about the past to create a more accurate picture of history. My historical archaeology study reveals information previously uninvestigated through the synthesis of data from many different areas and sources and exposes a more complete picture of the ordinary workers in the Santa Cruz lime industry than history or archaeology can impart individually. Historical archaeology helps reveal ordinary people and everyday life through routine experiences usually not considered important, but yet are vital to understanding the culture of America as they reveal aspects of our commonplace history. By using historical archaeology, we can uncover new information that refutes misconceptions about the past to reveal a more complete, truthful picture of history.

Like Hardesty, I advocate for an interdisciplinary approach that combines historic documents, oral histories, and archaeological data to attempt to obtain a more complete

picture of the lives of these men than each source would offer individually. Like mining households, an industrial lime household is likely a short-lived arrangement of men living in the same domicile for mutual benefit, support, and assistance, in a non-kin situation, and through cooperation, accomplishing necessary basic household tasks (Hardesty 1992:181). Following Johnson's lead, this thesis focuses on the non-working lives of these men, because "like domestic and personal service work, leisure was one of the key locations in which gendered and racialized meanings got made, unmade, and remade" (Johnson 2000:144).

DATING THE ARCHAEOLOGICAL ASSEMBLAGE

Based on the Cabin B datable artifacts, the assemblage was deposited between the mid-nineteenth and mid-twentieth centuries, between 1843 and 1941. (See Appendix C.) An 1843 date comes from the end mint date of a Portuguese coin manufactured during the reign of Maria de Gloria also known as Maria II (1819–1853), Queen regnant of Portugal and Algarves, who ruled from 1834 to 1853. The coin was minted between 1835 and 1843 (Bruce et al. 2006:961). This coin may have originally contained a mint date; however, due to the extremely worn condition of both surfaces, the embossed printing is very difficult to read. It is made of a copper-alloy material and originally contained the Latin inscription: *PORTVGALIAE ET ALGARBIORUM REGINA* (Queen of Portugal and Algarves) on the obverse side and *MARIA II DEI GRATIA* (Maria II Grace of God) on the reverse (Bruce et al. 2006:961). I believe that this coin was a keepsake, someone's memento from the Old World, that they carried in their pocket and "worried" down almost smooth. The coin is very thin and heavily worn, and the final minting date is ten years before Davis and Jordan began manufacturing lime at this location (Perry et al. 2007:63). There is no historical or archaeological evidence of occupation at this site as early as 1843. However, this item was likely curated by one of the workers, and it is unknown for how many years the coin was carried before it was lost.

The artifact assemblage was analyzed to determine an occupational date range for Cabin B, including a *terminus post quem* (TPQ) date. *Terminus post quem* is Latin for the date after which and refers to the date after which an archaeological stratum, feature, or artifact must have been deposited. This dating tool is quite useful in combination with "a

detailed knowledge of the history of the invention and development of the artifacts in question" (Deetz 1996:24). An example of its use is the contents of an archaeological feature were deposited after the manufacture date of the "most recent artifact contained in it" (Praetzellis 2003:226). The term is used in relative dating or to provide dates for fixed points in a site's stratigraphy (Kipfer 2012). The TPQ date of the Cabin B assemblage is 1941, based on an Owens Illinois Glass Company glass vessel manufactured in 1941. However, because the deposit has been disturbed and because it is contained within just one stratigraphic layer, this concept is not useful in this case. Additionally we know from the ca. 1910 photograph that the Cabin existed decades before this date.

A number of artifacts may have been produced during the 1820s to 1850s. Numerous Prosser molded ceramic buttons were recovered that have a beginning manufacture date of 1840, and continued to be made up until the 1950s. A child's toy rubber balloon recovered from the exterior of the cabin along the east wall has a possible manufacture date as early as 1824. Six safety pins, invented in 1849, are contained within the assemblage, five being found beneath the floor of the cabin, likely lost between the floorboards. (See Appendix C.) Two other artifacts give a beginning date of 1851 and 1856. A hard rubber comb fragment is embossed 1851 and a second hard rubber comb fragment of a different style has a beginning date of 1856 (Woshner 1999:281). Therefore, I believe the assemblage dates to between the mid-1850s and the early 1940s.

Some artifacts, although not specifically datable, have cultural connections that we can date approximately and that also give insights into the lives of the workers. Oil lamp and lantern parts testify to lighting technology used in the days before electricity. An oral history says that Harry Cowell installed gas lights in the cabins some time during the 1920s. He installed them in the family cabins first so that "the children could see at night to read and do their homework," indicating that S.H. Cowell valued education (Cacace 2008:3). However, no evidence of gas pipes has been found at Cabin B.

Parts from at least two alarm clocks have also been recovered at Cabin B, testament to the importance of being on time in an industrial working environment. While the limerock was burning, the kilns had to be watched around the clock (Perry et al. 2007:51). The men may have needed an artificial awakening in the middle of the night to take over a shift at the kiln. Stoking the fires to maintain the required temperature for

calcining was required twenty-four hours a day (Perry et al. 2007:51). Men who worked for themselves, especially farmers and craftsmen, did not have to follow anyone's schedule but their own, or the schedule of nature. However, men working in industry had to work the schedule the boss ordered them to work.

According to the date range of the artifacts in the assemblage, I believe that Cabin B was occupied from around 1870 to around 1940, with datable artifacts clustered between 1870 and 1911, likely during more intense occupation during the peak production years at the lime complex. However, time lag could affect those dates. A more expert opinion could substantiate or refute my dates.

Due to disturbance at the site, especially through soil creep, there is not a lot of site integrity and not much patterning of deposits. For example, fragments from a stoneware jug were found in 23 different contexts. However, certain trends seemed evident. Buttons and other clothing fasteners were abundant within the sub-floor contexts, where they likely fell through the cracks. Bone, large metal items, and limerock were concentrated behind the cabin, possibly having been deposited there after the bulldozing for the parking lot above and the collapse of a limerock retaining wall behind the cabin visible in the historic panoramic photograph of a portion of the industrial complex included in Chapter 1 (See Figure 2).

ADDRESSING THE RESEARCH QUESTIONS

The focus of these questions is learning about the daily lives of the workers. Who were the residents of the cabin? Where were they from? How did they adapt their traditional cultures to life in industrial America? Were they literate? How did they dress? What were their health issues? How did they spend their leisure time? I chose these research questions because I feel that answering them would provide pertinent information about the daily lives of the ordinary workers. We already know much about the industrial side of the lime industry, and hence know much about their working hours. This thesis is designed to uncover more information about the time they spent while not working. This gives us a much more complete picture of their lives. Through the use of both the artifact assemblage, archival sources, and oral histories, I have uncovered a

significant amount of information on all of these topics, which demonstrates the utility of using a historical archaeology approach to investigate the past.

Archival and archaeological research produce different types of information, but by combining the information, we can obtain a more complete picture of the lives of the lime workers at the Cowell Ranch. Archival research on the lime workers tends to give us important information, such as dates and events, for example: names, births, deaths, marriages, immigration, naturalization, etc. Oral histories give us more information, provided by the memories of locals and former Cowell Ranch employees. Archaeological research on Cabin B gives us artifacts: things left behind by the workers. Through the study of these items, we can infer information about who they belonged to and their ordinary lives, but the artifacts do not give us information about life events or specific dates. However, by dating artifacts we can obtain information about when the items may have been used.

Archival Information

The two main documentary sources about the workers at the Cowell Ranch are U.S. Census Population Schedules and Cowell Company records. I have previously reviewed the types of information available through the U.S. Censuses. The Cowell Company documents reviewed during this research do not reveal much about the lives of the workers, and I was unable to trace most of the workers who were mentioned in these documents through the U.S. Census records.

I have also used documents available through the ancestry.com website to research the lime workers in Santa Cruz. Documents available through Ancestry.com (Ships' Passenger and Crew Lists, U.S. Census Population Schedules, U.S. Naturalization Service Petitions and Records, U.S. Passport Applications, U.S. World War I Draft Registration Cards, U.S. City Directories, California Voter Registers, and California Death Records), and through the Santa Cruz Public Library (Santa Cruz city directories, church records, and newspaper obituaries), revealed a trove of information about the Italian and Portuguese workers in the lime industry.

The Archaeological Assemblage

During cataloging, we paid close attention to artifacts relating to the cabin's inhabitants, such as evidence of food preparation and consumption, evidence that could suggest the ethnicity of the occupants, artifacts relating to literacy, and evidence of leisure time activities. These artifacts relate to my research questions and are the main focus of the artifact analysis for this thesis. They are included in the activities, domestic, and personal artifact groups. Structural artifacts make up over 60 percent of the artifacts by MNI. Of the remaining 34.23 percent of the artifact assemblage, personal artifacts make up almost 20 percent, domestic artifacts make up over 5 percent, and activities make up 2.4 percent of the artifact assemblage, by MNI. (See Figure 35.)

Cowell Lime Works Historic District
Workers' Cabin B Artifacts by Category

Group	Category	MNI	% MNI
Activities	Animal Husbandry	5	6
	Collecting	1	1.2
	Commerce	3	3.6
	Firearms	13	15.7
	Fishing	7	8.4
	Painting	3	3.6
	Religion	1	1.2
	Tools	22	26.6
	Transportation	24	28.9
	Writing	4	4.8
	Total	**83**	**100**
Domestic	Clothing Maintenance	6	3.2
	Food	56	29.4
	Food Prep/Consumption	54	28.4
	Food/Food Storage	45	23.7
	Furnishings	7	3.7
	Heating/Lighting	22	11.6
	Total	**190**	**100**
Personal	Accoutrements	3	0.4
	Clothing	599	85.7
	Footwear	12	1.7
	Grooming/Health	32	4.6
	Social Drugs - Alcohol	34	4.9
	Social Drugs - Tobacco	18	2.6
	Toys	1	0.1
	Total	**699**	**100**

Figure 35. Cabin B Artifacts by Category. (Patricia Paramoure)

Cabin Households

The small cabins in the area of Cabin B likely housed bachelors and the households likely had little influence from women. Although family cabins did exist, they were in another area of the ranch complex, located approximately a quarter mile away (Conde 2011:54). A few local women worked at the ranch as laundresses and at the Cowell family ranch house as housekeepers (Perry, personal communication 2012). One oral history confirms that single men lived in these cabins (Cacace 2008:6). According to the population censuses, most of the cabins in the main industrial area usually housed one or two men (United States Bureau of the Census 1870, 1880, 1900, 1910, 1920, 1930). They may have occasionally housed up to four men, but it is unlikely the cabins housed more, due to their small size. The interior of Cabin B measures 14 feet by 12 feet, providing 168 square feet of space minus the stove with a buffer area around it to help prevent fires. The men spent little time in the cabins, except for sleeping (Cacace 2008:6).

Cabin B contains an attic but the space was not used. It was inaccessible and the ceiling and ceiling joists are very flimsy. It does not support the weight of an adult. It is possible that bunk beds were used, but the two beds that have been recorded as part of the workers' cabin complex were single beds. One located within the remains of Cabin E measured 74 x 30 x 15.5 inches high (Perry, personal communication 2012). The censuses also show that some of the small cabins housed foremen or supervisors, but some also housed general laborers at various points in time (United States Bureau of the Census 1870, 1880, 1900, 1910, 1920, 1930). "There was sort of a residential pecking order. The cabins were preferable to the dorms" (Cacace 2008:6). It would be interesting to know what criteria allowed an individual to move from the seemingly crowded, noisy bunkhouse to a more private, but still very crowded, small cabin, and who authorized that change of domicile and the accompanying rise in status.

In recent years, local historian, Frank Perry, has interviewed later Cowell Ranch employees and their descendants. Most of these interviews cover the time period after Cowell ceased manufacturing lime at the Cowell Lime Works (during the 1920s) and hence, post-dates the period of focus of this thesis. During later years, the ranch was a cattle and hay operation, with few remaining employees living there (Conde and

Lorenzana 2011; Patten 2011; Strong 2011; Wagner 2011). In another interview, Jo Ann Cacace recalls family stories of when her grandfather, Carlos Silva, worked for Cowell, and her grandparents, mother, and aunt lived at the ranch. This account contains abundant information about Portuguese immigrants living and working at the Cowell Ranch. It is unusual in that it recalls the experiences of a family on the ranch, where most of the workers were single men (Cacace 2008). However, the Silva family did not live in the area of Cabin B, but in the "family neighborhood," near today's intersection of Bay Street and High Street (Conde and Lorenzana 2011). (See Figure 36.)

Figure 36. Lurina (left) and Marie Silva Beside Their Family's Home at the Cowell Ranch in 1923. (Jo Ann Cacace)

It appears that the employees had the benefit of using the ranch facilities in the procurement of produce resources, like milk, hay, and potatoes, and of ranch animals like pigs, chickens, cows, and sheep (Henry Cowell Lime and Cement Company 1910). This

substantiates one oral history source that mentioned that the workers were allowed to keep pigs and chickens (Cacace 2008:3). However, the limited amount of space around the small bachelor cabins would have made it difficult for the men to keep many animals. These perks likely pertained to the family men and to those who lived off-site, did not eat all of their meals at the cookhouse, and had more space to keep a small number of livestock for personal use.

Women and Children

Were any women and children living in the cabin or were the residents single men? According to the census information, women and children did not live in the cabins that were located around the main industrial area. The archaeology appears to substantiate this information. Through the identification of gender-related artifacts, I have concluded that women did not live in this cabin, although some women very likely spent some time there. “The most obvious link to gender is in the frequency of female-specific items” (Spude 2005:94). Female-specific items include women’s clothing remains like fancy buttons, corset hardware, and garter snaps and clips; accoutrement like decorative combs, jewelry, hair pins and hat pins; cosmetic containers; sewing implements (except in tailoring contexts) like needles, pins, and thimbles, and items relating to food storage and serving. However, men were known to sew, and to store and serve food. Male-specific items include pocket knives and razors; suspender and trouser buttons, buckles, and other clothing fasteners; pocket watches, watch fobs and chains; jeans rivets; collar stays and cuff links; men’s toiletry items like shaving cream and hair gel containers; and obvious male clothing remains like large sized boots and large belt buckles (Spude 2005:94). Most of these items have been found at Cabin B. However, women were also known to use pocket knives and pocket watches.

Although some items found at the cabin regularly or occasionally crossed the gender gap, the overwhelming majority of male-related artifacts and the extremely limited number of female-related artifacts show that it is likely that only men inhabited this cabin. Only three artifacts in the assemblage testify to the likely presence of women at the cabin. One is a small, colorless, decorative bottle, oval shaped and approximately three inches tall. This perfume bottle was uncovered outside the south wall of the cabin.

The second artifact is a women's abalone shell hair stick, measuring approximately four inches long, one tenth of an inch thick, and is slightly triangular in shape, tapered from about one half inch wide to a rounded point about one tenth of an inch wide. The third is a garter buckle unit consisting of a metal clip, a fastener, and a slide. Red and pink striped fabric is still attached. These last two artifacts were found under the cabin floor. Although it is possible that these female-related artifacts were at Cabin B for some reason other than the presence of women at the cabin, for example they were possibly gifts for a woman who had never been to Cabin B, I think that the isolated garter clip especially shows that women were there. It likely separated from the rest of the garment and was lost between the floorboards.

Due to the lack of domestic artifacts relating to women and the minimal number of personal artifacts relating to women found at the cabin, I do not believe women lived in Cabin B. However, the perfume bottle and abalone hair ornament are evidence that women at least spent some time there. The fancy, decorative appearance of these artifacts may indicate the presence of prostitutes. A local newspaper referred to lime workers sending a wagon into town on Saturday nights to pick up women (Phil Reader, personal communication 2008). There are many articles about the archaeology of brothels in the literature (Seifert 1991; Gilfoyle 2005; Meyer et al. 2005; Spude 2005). The Alabama Gates Construction Camp report mentions a similar situation, where archaeologists found feminine clothing items in an area where only men were living. According to the authors, these artifacts were likely left by visiting women, possibly prostitutes. U.S. census documentation of prostitutes at other Los Angeles Aqueduct construction camps during 1910 exists (U.S. Census Population Schedules 1910; Van Bueren 1999:182). However, no prostitution-related tools (e.g., douches or flushing solutions) have been recovered.

"Artifacts attributable solely to children are rare, if not absent, from most archaeological assemblages" (Baxter 2006:3). I define evidence of children by the presence of child-specific artifacts like toys and children's clothing fasteners. Two artifacts recovered from Cabin B relate to children. A rubber toy balloon was found on the exterior east side of the cabin, near the northeast corner. The balloon could have been carried to that area by the wind. The second artifact is a very small, white, four-hole, sew-through Prosser button found beneath the floor of the cabin that could be from a piece of

children's clothing or from an adult's underwear garment. Due to the lack of other evidence of children in the assemblage, I believe that this was likely an underwear button. In conclusion, although the evidence is slightly ambiguous, I do not believe children lived in Cabin B.

Age, English Language, and Literacy

The men who worked and lived at the Cowell Ranch were generally between the ages of mid-teens to mid-30s, especially between the years of 1870 and 1900. As operations slowed down on the ranch and fewer men were employed, the census numbers reflect the aging of the work force. In 1920, for example, 63% of the work force was over age 45. This substantiates the information in Cardiff (1964) that says that long-term employees were retained and employed as they got older, an example of Harry Cowell's loyalty to his long-term employees (See Figure 14.)

The information in the oral history with George Cardiff that the Italian and Portuguese workers, "there wasn't half of them, a very small percentage of them, that could even speak English" does not appear to be accurate. Although information is not available for 1870 and 1880, from 1900 to 1930, just over half of the lime workers could speak English; however, it is likely that the amount was higher in the earlier decades of the lime operations when a smaller percentage of the workers were immigrants (Cardiff 1964:119). (See Figure 14.)

The literacy rate of the workers at the Cowell Ranch changed significantly over time. In the earlier years of the lime operations, in the 1870 and 1880 censuses, almost all of the workers could read and write, 97.7% and 100% respectively. However, during the later decades, 1900-1930, the percentage of illiterate workers at the ranch steadily decreased from 75.7% in 1910 until in 1930, just over half (55%) of the workers were illiterate.(See Figure 14.)

Although census information shows that many of the immigrant workers in the lime industry were illiterate, the presence of three ink bottles at Cabin B suggests that at least some of its inhabitants could read and write. One complete ink bottle and fragments of two other ink bottles were found at the cabin. The complete bottle is colorless glass, cylindrical in shape, has a cork top, and the bottom is embossed with CARTERS /

MADE IN U.S.A. (See Figure 37). We have dated this bottle to between 1895 and the 1920s (Digger Odell Publications 1999:1). The other two ink bottles are cylindrical shaped colorless glass, and cone shaped aqua glass, and were all found outside the cabin. Reading letters from and writing letters to friends and family back home is another way the immigrant occupants of the cabin likely spent some of their leisure time. These artifacts are evidence that some of the residents of Cabin B were literate, and that some of the laborers had at least a rudimentary level of education. However, there are other uses for ink besides writing letters. The ink could have been used for drawing or for keeping ranch records.

Figure 37. Carters Ink Bottle Dated to Between 1895 and the 1920s. (Frank Perry)

Socioeconomic Status

The hundreds of buttons, rivets, and other work clothing fasteners found at the cabin provide evidence of socio-economic status. We also found parts of heavy work

boots, further evidence of the laborer status of the cabin's inhabitants. A man's gold-plated ring with a clear glass stone shows that some workers likely had enough disposable income for fancier things (Kurt Haveman, personal communication 2011). It is also possible that it was an heirloom brought with them from home. The ring was found within Feature 1, in a slight depression in the soil with a group of Prince Albert tobacco cans, bricks, limerock, and an early Vaseline jar buried under the northwest corner of the cabin.

Work Clothing

There is a large number of buttons, other clothing fasteners, and boot parts within the cabin assemblage. Cacace said that her grandfather always wore overalls, and that he had two pairs: a pair for work and a good pair for church and for special occasions (Cacace 2008:6). A number of overall buttons, clips, and sliders were found. Other types of fasteners are from suspenders and from work clothing, like blue jeans. Embossed and engraved Levi Strauss, Carhartt's, Boss of the Road, and other work clothing company's buttons and rivets are represented in the collection, as are trouser buckles, hose support buckles, and belt buckles. One copper-alloy cuff link with the decorative disc absent was also recovered. (See Figure 38.)

Figure 38. Work Clothing Fasteners Recovered at Cabin B. Rivets (left) and a Button Cover (right). (Patricia Paramoure)

A small Prosser button, possibly from underwear or children's clothing was mentioned previously. Many Prosser buttons were recovered at Cabin B and are likely shirt buttons, as are the abundant fragile shell buttons found at the site. Two larger hard

rubber buttons, possibly from a coat, were also retrieved. Clothing fasteners were found in all contexts, but the sub-floor contexts contained the most. The boot remains are from heavy work books that came up to just above the ankle. Some of these boot fragments contain large rivets placed at the stress points, possibly a demonstration of repair work. The majority of the boot remains were found behind the cabin, along the east wall.

The workers at the Cowell ranch wore typical work clothing for the time, consisting of overalls and other types of work pants with button-down shirts and heavy work boots. The shirts were fastened with Prosser or shell buttons. The overalls and blue jeans were fastened with metal buttons and rivets, and the work boots were fastened with laces run through eyelets and hooks. The large number of clothing fasteners in the collection may be a reflection of the short use life of the workers' clothing. Lime is a very caustic material and it is likely that this contributed to the workers' clothes wearing out even faster than workers in other industries during this time period.

Ethnicity

As I discussed in Chapter III, the Cowell Ranch employed a large number of Portuguese/Azorean and Swiss/Italian immigrants. Most came to the U.S. as young single men. Nearly all came to this country through East Coast ports, especially Boston and New York. Many did not settle permanently in the Santa Cruz area and many eventually returned to their home countries. A few married here but others returned to their native countries to marry and then brought spouses and sometimes children back to the United States. Some stayed in Santa Cruz County for the remainder of their lives and their obituaries are found in local newspapers, but that number was minimal. Many could not read or write. Some lived in boarding houses, but some rented houses while still others bought property. (See Appendix A).

It appears that many of these immigrants were temporary residents: people who came for a limited stay and lived in the area for a brief period before moving somewhere else in California, to another state, or back to their home countries. The main reason for immigration was likely to work and save money to bring home and to increase their economic status in their country of origin. Others decided to stay in the United States, settling down with wives and families, and adopting the U.S. as their homeland. Many

Italians returned to their native land, but many Portuguese settled in Santa Cruz, married, and had families. However, few of the men were naturalized, and few registered to vote. Of the minimal number of men who continued working in the lime industry for extended periods of time, many switched employers, and some moved up in the employee ranks from laborer to skilled worker or to foreman or supervisor (United States Bureau of the Census 1870, 1880, 1900, 1910, 1920, 1930). (See Appendix A.)

Clues to the ethnicity of the inhabitants of Cabin B are seen in three different artifacts. The presence of mussel, and especially limpet shells are possibly related to the ethnic cuisine of Azorean or Italian workers. As I mentioned above, in the section on the shell recovered from Cabin B, mussels and limpets were commonly eaten in the Azores; however, they are not standard American cuisine (Reese 2007:55). A second artifact relating to ethnicity is the Portuguese coin discussed in Chapter V. The third is the religious medallion discussed below. This medallion is embossed in Portuguese and came from the island of Terciera, in the Azores. It was likely either brought from the Azores by one of the workers or was sent from there by a friend or relative. Although the evidence for the ethnicity of Cabin B's inhabitants is not conclusive, I believe the artifacts show that Azorean(s) lived in the cabin at some point when it was inhabited.

Evidence of fishing was also found at Cabin B. Azorean cuisine commonly utilizes fish and shellfish. "For tiny islands, the archipelago's foods are remarkably regionalized… nowhere is Azorean individuality seen more than in *sopa de couves*" (Leite1999:3). Azorean cooks from different islands do not agree on all of the ingredients, but *bacalhau* (salt cod) and *porco* (pork) are essential components (Leite 1999:3). Another traditional Portuguese dish that utilizes fish and shellfish is *caldeirada*, a seafood stew that incorporates prodigious varieties of fish and shellfish with tomato, onion, and potatoes. Types of fish that range in both taste and texture are used. Oily fish like mackerel, sardine, or tuna along with firm fish like halibut or white fish like flounder or cod, are common constituents, along with shrimp, mussels and clams. This hearty stew is traditionally served over a crusty slice of bread quickly fried in oil (Gourmet Heartbeat 2011:1). *Cataplana*, popular along Portugal's Algarve coast is a stew made with clams, pork, vegetables and spices steamed in a special handmade, airtight copper pot. It is also possible that the cabin's residents ate the shellfish prepared in other ways (Lewis 1984:1).

Italy also has a tradition of seafood cuisine. Surrounded by the Mediterranean Sea, fish and shellfish are common in Italian households. Swordfish, cod, tuna, and sea bass are popular. Shrimp and scallops are especially favored (Speciale 2009:1). Cioppino is actually not a traditional Italian dish. It was first made in San Francisco by Italian immigrant fishermen and became popular in the 1930s. "The origin of the word 'cioppino' is something of a mystery, and many historians believe that it is Italian-American for 'chip in'. It is also believed that the name comes from a Genoese fish stew called cioppin" (Stradley 2004:1). The shellfish are the only food-based clues to the ethnicity of Cabin B residents. Nevertheless, the shellfish show that the residents of Cabin B were foraging for local resources to supplement and/or vary their diet.

Figure 39. Religious Medallion.
(Branden Melendez)

One religious artifact with an Azorean connection was recovered from Cabin B: a small religious medallion approximately one inch long by seven-tenths of an inch wide. Made of a silver-colored metal, possibly tin, it is embossed with Mary holding baby Jesus and a bouquet of flowers – possibly roses – on the obverse and the Portuguese inscription *Nossa Senhora, Dos Milagres*, *Serreta-Terceira* on the reverse. Serreta is a village on the west coast of the island of Terceira in the Azores. *Nossa Senhora dos Milagres* (Our Lady of the Miracles) has been celebrated in Serreta since the end of the seventeenth century when a small chapel was erected. The Church of *Nossa Senhora dos Milagres*

was consecrated in 1907 and is the center of activity for followers to this day (Gayton 1948:251). This medallion was either brought from the Azores by one of the workers or was a gift from home. It was recovered from the exterior of the cabin on the south side. (See Figure 39.) Religion as a leisure time activity is briefly discussed below.

Religion

As previously discussed in Chapter III, the Italian and Portuguese immigrants were primarily Catholic and the religious medallion described above is dedicated to an Azorean Catholic icon. The discovery of this medallion at Cabin B suggests that someone who lived in Cabin B was an Azorean Catholic. Obituaries and Santa Cruz church records also show that the Azorean and Italian immigrants who worked in the lime industry were mostly practicing Catholics, were members of local Catholic churches, and were buried in local Catholic cemeteries.

Food Related Artifacts

Was food preparation and consumption taking place at Cabin B? Although the lime complex residents ate their meals at the cookhouse, evidence uncovered at the cabin suggests that some food consumption and storage took place there. An early photo dated to ca. 1910 shows a stove pipe on the roof of Cabin B, and parts of a stove were recovered from the exterior of the cabin. (See Figure 2, Chapter I.) A scorched area on the inside of the cabin's north wall testifies to where the stove was located (Perry, personal communication 2012). Since the men ate company-provide meals at the cookhouse, some researchers believe the stove was primarily for heating the cabin, not for cooking.

The possible remains of eating between meals, or of individuals, or small groups eating specialty foods acquired by the workers themselves is suggested by some of the food-related artifacts. Excavations uncovered 60 tableware fragments representing 43 items, such as ceramic plate and cup fragments; and evidence of eight metal eating utensils, all likely related to food consumption at the residence. This is a substantial amount of food consumption related artifacts considering the primary food consumption location was the cookhouse. Abundant food canning jars and fragments of three

stoneware ceramic storage containers suggests that some of the inhabitants were storing food there as well. The majority of the tableware was white improved earthenware, often called “hotel ware” that were inexpensive and mass produced. These items were commonly used during the late nineteenth and early twentieth centuries in restaurants, hotels, and company-owned kitchen and dining establishments (Praetzellis and Praetzellis 1980; Maniery 2002:78). The limited range and the similarity of ceramic types in the assemblage show that it is unlikely that the men kept their own dishes, as occurred in some settings. Hotel ware was not likely purchased by individuals.

A large number of marine shell fragments and a few whole shells were found at the cabin. The shells in the artifact collection were analyzed by Frank Perry (2010). His report lists shells belonging to six different genera, almost all within the phylum, mollusca consisting of California Mussel, Pismo Clam, Asian Clam, Owl Limpet, Green False-Jingle, and Barnacle. Joann Cacace mentioned that the men often harvested shellfish (2008:7). “Three of these species appear to have been harvested by people who lived in and about Cabin B: the California Mussel, Pismo Clam, and Owl Limpet” (Perry 2010:4). All three are edible and are native to the Santa Cruz area. Limpets were commonly eaten in the Azores, but they are not common in American cooking (Reese 2007:55). They were likely collected from nearby rocky shores and were eaten at the cabin by the residents (Perry 2010:7). The presence of limpets in the assemblage suggests that the culinary tastes of the immigrant workers had not completely shifted to American foods (Reese 2007:55).

They also made lime from shells at the ranch and subsequently added powdered shell lime to the whitewash which was used to paint many of the buildings at the ranch (Cacace 2008:7). It is likely that more shellfish were consumed, but that the empty shells were burned to make lime (Perry 2010:4).

Five fish bones representing two species were also recovered at Cabin B, as were six fish hooks. It is likely more small fish bones would have been retrieved if we had used 1/8 inch screen instead of ¼ inch screen while processing the soil.

The food bone found at the cabin was primarily beef, with 48 NISP (Number of Individual Specimens) recovered. The faunal assemblage also contains three pig bones, six rabbit bones, and three bird bones. The rabbit may have been incidental, as the bones

did not exhibit any signs of butchering (Stoyka 2012:1). According to Stoyka's analysis, a minimum of two each of cow, pig, and rabbit are represented in the faunal collection. Considering the size of the individual animal, a significantly larger proportion of beef was being consumed at the cabin than other types of animal protein. Butchering style seems to be in "the standard Euro-American model common in Northern California during the first part of the twentieth century. Sides or quarters of butchered animals were reduced to standard steaks and roasts, or soup bones whenever appropriate" (Stoyka 2012:2). There is some evidence of in-house butchering and meat use. The collection contains several cut refits, one of a split soup bone from a cow long bone and two steaks from a beef femur. The assemblage does not include any non-standard cuts (Stoyka 2012:2). This indicates that the meat was likely being processed at the slaughter house by a professional butcher, and not being processed on site.

Most of the meat consumed at the site was beef, with small amounts of pork also being eaten. Rabbit, fish, shellfish, and bird were also consumed occasionally, and were likely locally obtained by the men themselves. California quail are very common in the area today, and it is possible that the bird bone represents this species. The majority of the meat from beef and pork were cuts likely used for soups and stews, notably the feet, hind shank, neck, head, cross rib, and round. The second most common types of meat cuts were beef steaks. The remains of porterhouse, round, sirloin, and chuck steaks (in descending order) were all recovered at the cabin. One beef roast was also represented. The domination of the faunal bone assemblage by cuts appropriate for soups and stews places this collection's overall meat by quality in the medium to lower range (Stoyka 2012:2).

Beef was obviously the preferred meat and it was prepared in a way to feed groups and make the meat stretch further. However, "the recovery of three bird bones, a rabbit bone, and the fish bones suggest that the residents may have been supplementing their diet by foraging for food in the area" (Stoyka 2012:2). Evidence of this diet supplementing through foraging is also suggested by the presence of bullets and bullet casings in the artifact assemblage, likely evidence of hunting, and also by the four fish hooks.

Supplemental food procurement is also a leisure time activity. As we have seen in the shell and food bone discussion above, hunting, fishing, and gathering shellfish were other activities likely done by the inhabitants of Cabin B. The presence of bullets and bullet casings at Cabin B suggest that some hunting was done in the area. Blaisdell (1967:67-68) mentioned quail and rabbit were the main prey hunted on the Cowell Ranch ca. 1904-1907. Ammunition found at Cabin B included shotgun shell remnants. Shotgun shells are used in quail and rabbit hunting. Rifle bullet casings were also found, which are primarily used for deer (Reese 2007:45–47). Although the main complex at the Cowell Ranch was industrial, the ranch included acres of agricultural fields, forests, and meadows. In some areas, game was abundant. Although outsiders were prohibited from hunting on the ranch (Cardiff 1965; Blaisdell 1967), it is likely that the Cowell men allowed their employees to hunt on the ranch, especially in areas where wild game like deer and rabbits caused damage to crops, flowerbeds, and landscaping. It is also possible that some of the bullets or bullet casings were left by trespassers and vandals who plagued the ranch in later years (Cardiff 1965).

The butchering patterns substantiate in-house meat sources and the generally low cost cuts of meat. “A single beef podial bone with an arthritic pathology also suggests the overall quality of meat may have been fairly low” (Stoyka 2012:2). This information corresponds with the John Dong interview in which he said the man who butchered the cow would “always pick the old ones. It was kind of tough. You could hardly chew it.” They would just hang the meat in the meat house next to the cookhouse after it was butchered and then cut off what they needed (Dong 1967:20,28).

Stoyka’s report also mentions the likelihood of cats and dogs being kept in the area due to the existence of canine and feline remains in the bone assemblage, and the evidence of gnawing on some of the dietary bone. He also notes the variety of rodent remains in the assemblage and the lack of signs of rodent gnawing on the bones in the skeletal collection (Stoyka 2012:2). We know that Harry Cowell “loved animals and as an adult, he had a regular menagerie hanging around the ranch” (Paramoure 2008:14). Cacace’s oral interview also mentions that they had a dog (Cacace 2008:3).

One other group of dietary material was recovered at the cabin. Fruit pits at the cabin are another possible clue to food consumption at the cabin. The ranch had its own

orchards and many different kinds of fruit were available in season. Peach pits, plum pits, cherry pits, and an olive pit are all included within the artifact assemblage. A 1981 photo shows a tree growing behind Cabin B that no longer exists. From the scores of peach pits found at the cabin, we suspect that this tree may have been a peach tree. This shows additional evidence of foraging behavior and diet supplementation.

Leisure Time

As wage labor and associated time discipline replaced older work systems, the separation between work and leisure became more distinct. Leisure is loosely defined to encompass "both diversion and sacred practices" (Johnson 2000:143). This includes both amusement as well as religious activities, along with a number of other activities that do not neatly fit into either of these categories but reflect the ways that people choose to spend their free time. Only one religious artifact was found at Cabin B, the medallion discussed above in the section on religion.

During leisure time, people have the freedom to relax and be themselves, and therefore, "people tend to express their cultural, class-based, gender-based identity during their free time, especially when living in a prejudicial social and economic context" (Dixon 2006:581). Domestic deposits are more likely to accurately reflect a person's ethnic identity than other types of archaeological deposits. As I discussed in Chapter III, prejudice against Portuguese and Italians existed in Santa Cruz and, as mostly laborers on the lower end of the socio-economic scale, the workers at the ranch may have experienced prejudice based on their laborer status.

In her oral interview, Cacace says that the cabins were primarily used for sleeping, and that if the weather was good they "held other social activities such as making music or playing cards outdoors" (Cacace 2008:6). There was no evidence of either of these activities at Cabin B, although other leisure time activities at the cabin are represented in the artifact collection.

Judging from the amount of related artifacts, drinking and smoking seem to have been popular pastimes at Cabin B. Wine and whiskey bottles are present in the assemblage, and these drinks seem to have been the alcohols of choice at the ranch. The men made both wine and whiskey themselves. A variety of alcoholic beverages were

made from grapes and a type of whiskey was made from the figs (Cacace 2008). Apparently, some of the lime workers occasionally went to Santa Cruz saloons. A newspaper story describes how when heavy rains forced the men to stop working at the kilns, they went into town and became "slightly confused with stimulants" (*Santa Cruz Sentinel* 1879:2). One whiskey bottle fragment is embossed with "Andy Balich," the owner of a saloon on Pacific Avenue in Santa Cruz. (See Figure 40.)

Cowell Lime Works Historic District
Workers' Cabin B Social Drugs

Social Drug	Description	MNI	% MNI
Alcohol	Absinthe Bottle	1	1.9
	Alcoholic-beverage Bottle	2	3.9
	Alcoholic-beverage Can	1	1.9
	Beer Bottle	2	3.8
	Whiskey Bottle	12	23.2
	Wine Bottle	14	26.9
	Wine/Champagne Bottle	2	3.8
Subtotal		34	65.4
Tobacco	Can	16	30.8
	Can Lid	1	1.9
	Pipe	1	1.9
Subtotal		18	34.6
TOTAL		52	100

Figure 40. Cabin B Social Drug Artifacts. (Erica Gibson)

The tobacco of choice at Cabin B was Prince Albert in an upright pocket-style tobacco tin. Many of these tins were found at the cabin, including a group of them that appear to have been stashed under the southwest corner in a shallow, man-made depression (Feature 1). Unfortunately, only one contains intact legible painted writing in red, yellow, and black. One plastic or hard rubber pipe mouthpiece was also recovered. (See Figures 40 and 41.)

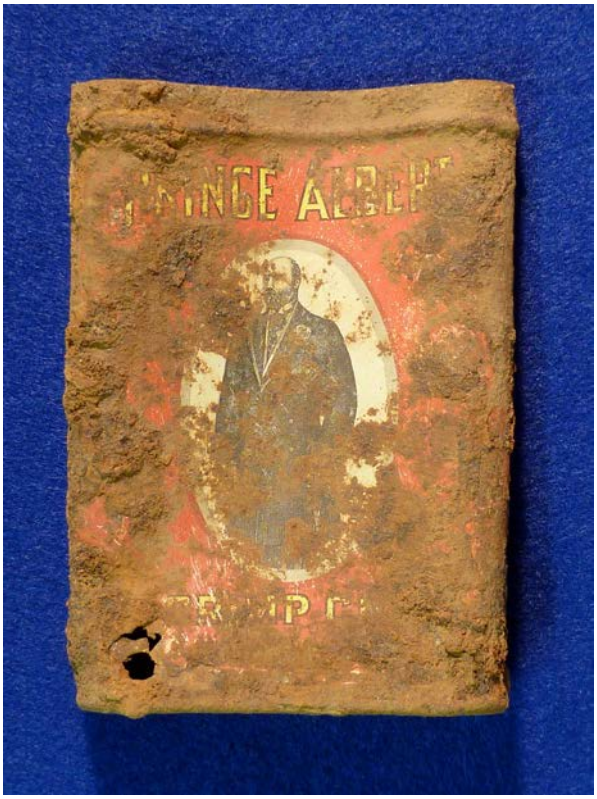


Figure 41. Prince Albert Upright Pocket-Style Tobacco Tin. (Frank Perry)

Health

Artifacts uncovered at Cabin B give information about the health of the lime workers. As I mentioned in Chapter 4, lime can be extremely dangerous, or even deadly if the dust is breathed into the lungs. Fragments of a "cough cure" bottle and a Dr. Kings New Discovery For Consumption bottle testify to residents' lung problems. Fragments of four vaseline jars at Cabin B suggests "treatment of minor wounds and bruises" that could have included a variety of scrapes, cuts, burns, and other topical skin maladies (Fike 1987:56). Fragments of mentholatum jars were found. This product was popular during this time period for the treatment of colds and muscle aches (Maniery 2002:75). Fragments of a Hood's Sarsaparilla Bottle do not suggest a specific type of ailment, as it claimed to be a general cure-all: "Blood purifier, Cures Scrofula, Dyspepsia, Rheumatism, Catarrh, That Tired Feeling, Loss of Appetite, etc." (Rance 2009:1). A fragment of an Ayer's medicine bottle is present, but it is unknown which of Dr. Ayer's many proprietary medicines it contained. (See Figure 42.)

Fragments of three Palmer Drug Company bottles were found at Cabin B. As these bottles were generic, ordered by the pharmacist and then filled on-site, it is not possible to know what they contained. The Palmer Drug Company was owned by Sylvester A. Palmer and was located at 40 Pacific Avenue in Santa Cruz. His advertisements first appeared in the *Santa Cruz Sentinel* in 1888 and he continued in business for many years, until he passed away 31 December 1919 (*Santa Cruz Sentinel* 1888:Palmer Drug Advertisement; *Santa Cruz Sentinel* 1920: S.A. Palmer Obituary).

Cowell Lime Works Historic District

Workers' Cabin B Grooming and Health

Type	Material	Description	MNI	Percent
Container	Brown Glass	Bottle	1	3.1
	Ferrous	Box	1	3.1
	Opaque-white Glass	Jar	3	9.4
	Colorless Glass	Magnesia Bottle	1	3.1
	Aqua Glass	Medicine Bottle	5	15.6
	Colorless Glass	Medicine Bottle	3	9.4
	Opaque-white Glass	Mentholatum Jar	1	3.1
	Colorless Glass	Perfume Bottle	1	3.1
	White Improved Earthenware	Pot	1	3.1
	Aqua Glass	Sarsaparilla Bottle	2	6.3
	Lead	Tube	1	3.1
	Colorless Glass	Vaseline Jar	4	12.6
	Colorless Glass	Vial	3	9.4
Subtotal			27	84.4
Toiletry	Hard-rubber	Comb	1	3.1
	Hard-rubber	Double-sided Comb	1	3.1
	Shell	Hair Stick	1	3.1
	Colorless Glass	Mirror	2	6.3
Subtotal			5	15.6
Total			32	100%

Figure 42. Cabin B Grooming and Health Artifacts. (Erica Gibson)

The remains of the patent and proprietary medicine bottles found at Cabin B give clues to health conditions suffered by the lime workers. These container fragments are also evidence of the participation of the workers in a country-wide economic system. These bottles come from Massachusetts, New York, and Illinois, as well as from the local area, in Santa Cruz. Another medicine bottle fragment might be embossed with "Watsonville," located approximately fifteen miles south of Santa Cruz.

A large percentage (84.4) of the grooming/health category of artifacts are health-related, represented by a minimum of 27 items, composed of bottles, jars, tubes, pots, and vials. It appears that the residents of Cabin B were primarily self-medicating and self-treating injuries and ailments. It is likely that they could not afford to pay a professional physician or pay for prescription medications, and hence made due with "patent" and other over-the-counter medicines available at local pharmacies at that time. It is possible that, as immigrants from primarily rural areas, they had little experience with professional medical practicioners, were accustomed to home remedies and self-treatment, and some may not have trusted professional doctors. If sick or injured, the workers did not get paid, so they tended to use whatever was easily available to get them back to work (Cardiff 1965:130).

COMPARISON TO OTHER ASSEMBLAGES FROM THE COWELL LIME WORKS

By comparing the archaeological assemblage from Cabin B with other assemblages from the Cowell Lime Works, it is possible to use the similarities and differences to learn more about the workers and the different buildings at the ranch. Obviously, the cookhouse was where the food was prepared and served to the employees. By comparing the Cabin B assemblage with the cookhouse assemblage, we can get a more complete picture of the workers' diet and we can see what types of food were being consumed at the cabin but not at the cookhouse. This would likely give information concerning worker foraging activities. For example little marine shell was found at the cookhouse.

However, Cabin J was also an employee domicile. By comparing the two cabin assemblages, we can interpret similarities and differences about the men who lived in each cabin. A detailed comparison of these two assemblages is not possible within the scope of this thesis. The Cabin J deposit is similar to the Cabin B deposit and contains abundant structural debris, container glass, a limited number of table ceramics and other food preparation/consumption artifacts, tobacco and alcohol consumption evidence, and a large number of buttons, rivets, and other clothing- and footwear-related artifacts. One significant difference between Cabins B and J is the amount of artifacts found at Cabin J

that seem to be associated with blacksmithing. The blacksmith may have lived in this cabin, which was located close to the blacksmith shop. Evidence of food foraging activity has also been found at Cabin J. The faunal bone assemblage includes rabbit and California quail, and both bullets and bullet casings were found, showing hunting and foraging behavior, making use of local resources to supplement the food provided at the cookhouse. Mussel shell has also been identified within the assemblage, further evidence of foraging behavior. Unfortunately, almost 50 percent of the Cabin J assemblage was classified as indefinite use, a substantial portion that, if more analysis had been done, might have told us more about the workers' lives (Reese 2007). (See Figure 43.)

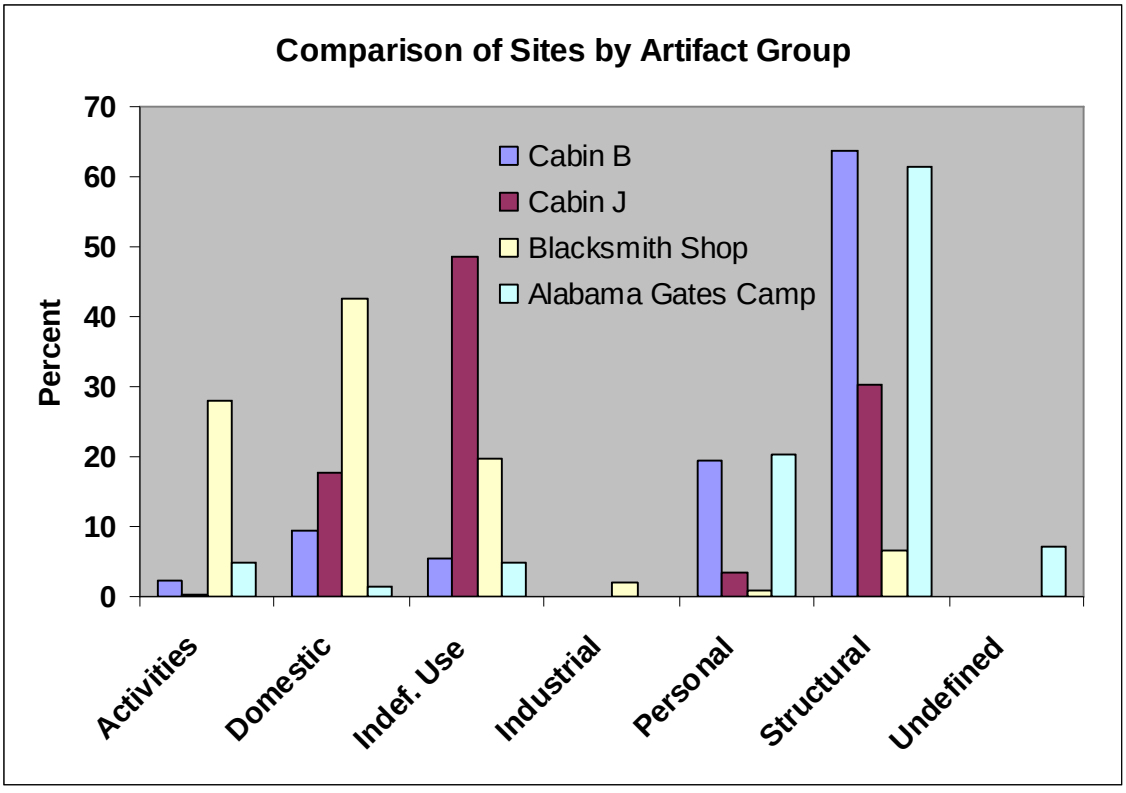


Figure 43. Comparison of Sites by Artifact Group. (Patricia Paramoure)

The cookhouse collection contains much less structural debris than Cabin B. Only 139 complete wire nails and 49 complete cut nails were recovered. The cookhouse was converted into offices in the early days of UCSC and is still standing. The cookhouse assemblage contains large amounts of ceramic tableware, container glass, and faunal bone. Significant numbers of Asian ceramics, both Chinese and Japanese, support oral

history information that the Cowell Ranch employed primarily Chinese cooks who likely bought these items and used both the ceramics and the imported foods contained in the Chinese Brown Glazed Stoneware (Cardiff, 1965:158; Baker 2009:35). Moreover, this suggests that the Chinese were processing foods according to their own traditions, and were not only eating American foods (Baker 2009). (See Figure 43.)

There are few personal artifacts within the cookhouse assemblage. Four buttons, a ring, and Chinese medicine bottle fragments comprise the personal artifact category. This suggests that the cookhouse was primarily a utilitarian, not domestic building, (although the cooks lived there) and that the men were not spending a lot of time there. However, a possible toothbrush handle fragment may attest to oral hygiene. Clam, mussel, abalone, and crab shell, in addition to fish bone found at the cookhouse may indicate that the bosses consented to the purchase of locally-gathered food material for consumption by the men, or that the cook was willing to prepare these items when gathered by the workers. A bullet shell is possible evidence of hunting (Baker 2009). Unfortunately, the cookhouse assemblage was not cataloged in a manner that allowed it to be statistically compared with the other assemblages (Cabin J, blacksmith shop, and Alabama Gates Camp), and therefore, it is not included in the Comparison of Sites by Artifact Group Table. (See Figure 43.)

The domestic material at the blacksmith shop consisted of a spoon along with can, ceramic tableware, and bottle fragments. All of the animal bone was from *Bos taurus* (beef) or incidental (Reese 2008:40). No evidence of local food procurement was present within this assemblage. Only four personal artifacts were found, including three shoe or boot fragments and one wine bottle fragment (Reese 2008:47). This is in sharp contrast to the Cabin B assemblage, which contains over seven hundred personal artifacts (MNI). The blacksmith shop was not likely a place where any of the workers lived. The abundance of metal artifacts, broken tools, etc. found there attests to the large amount of work done at this site in the days when most large ranches employed their own blacksmiths.

COMPARISON OF CABIN B WITH THE ALABAMA GATES CONSTRUCTION CAMP ON THE LOS ANGELES AQUEDUCT

Introduction

In Chapter 5, I introduced the Alabama Gates Camp as a comparison site for Cabin B. Although they have very different contexts, I chose to compare Cabin B at the Cowell Lime Works near Santa Cruz, California, with the Alabama Gates Construction Camp near Lone Pine, California, for multiple reasons. Both locations housed industrial workers. The main difference between a work camp and a work village is the time scale. The period of time the Alabama Gates Camp was occupied (1912–1913) was much shorter and is included within the focal time period of my Cowell Lime Works investigation (1870–1930). Documentary evidence concerning both locations is available today, although no census was taken while the Alabama Gates Camp was occupied. The two sites are similar in that both reflect socioeconomic conditions in the rural industrial west. However, the work was different, the layout of the camp/village was different, and the setting is different. This comparison is valuable because it helps us to understand Cabin B from the viewpoint of a different type of work camp. The lives of young, immigrant, single working-class men during the late nineteenth and early twentieth centuries in California, no matter where they were located, were in some ways very similar, but in other ways very different. The similarities and differences in their lives may have related to the different levels of social control that pertained to the two living situations.

Finally, the purpose of the Alabama Gates study was basically the same as the purpose of my study of Cabin B: “to document and preserve the story of the site and its occupants for future generations” by reconstructing “the daily lives of the working people who built the west” (Van Bueren et al. 1999:1, 36). Ultimately, “the archaeological remains of work camps [and company towns and villages] are a potentially rich source of information about the technological and socio-economic dimensions of the industrialization of the west” and through their study, we can learn more about the everyday lives of the ordinary workers whose descendants populate our country today (Van Bueren et al. 1999:34).

Archaeological Assemblages

Through the analysis of the similarities and differences between the archaeological assemblages from these two sites, we can infer information about the everyday lives of the ordinary workers at these locations. Following advice from Gibson that the category field is most meaningful for inter/intra site comparison, this analysis focuses on this artifact cataloging division (Gibson, personal communication 2012). As my research questions are reflected in the activities, domestic and personal artifact groups, my analysis focuses on these groups and their category divisions.

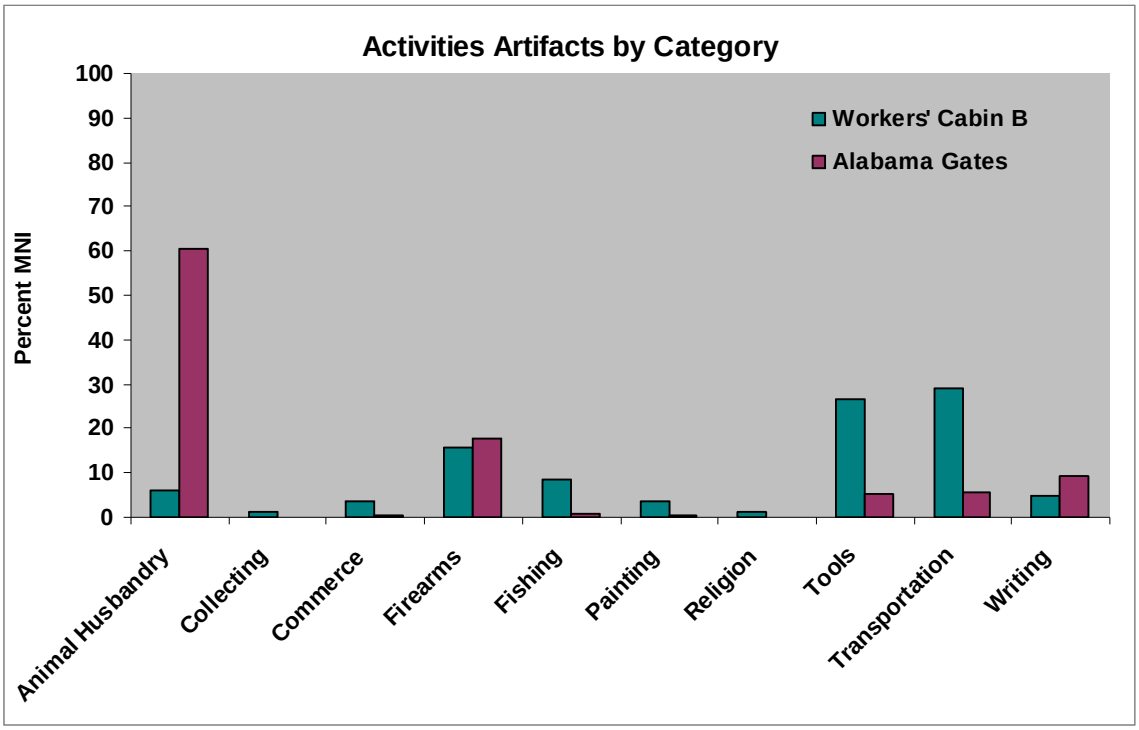


Figure 44. Workers' Cabin B vs. Alabama Gates. Activities Artifacts by Category. (Michael Boyd)

My archaeological investigation of the similarities and differences between the Alabama Gates Camp and Cabin B at the Cowell Lime Works relate primarily to domestic and personal objects. Additionally, similarities and differences among the activities artifacts also give us information. I believe that the significant differences between the Animal Husbandry and Transportation artifact categories may reflect differences in cataloging. However, it is possible that the high percentage of Animal

Husbandry artifacts at the Alabama Gates Camp could result from the large number of animals used on the project (Van Bueren et al. 1999:24). However, the differences in the fishing category artifacts and faunal remains from these two sites are likely a reflection of Cabin B's location close to the ocean in contrast to the Alabama Gates Camp being located in the desert. Although fishing artifacts and faunal remains found at Alabama Gates show that some fishing was taking place near this site, finding a location to fish in the desert would have been more difficult.

Along with food preparation/consumption items, like food cans and tableware, personal items like grooming and health-related items, tobacco and alcohol consumption artifacts were present at both sites. A multitude of work clothing fasteners, like stud-type buttons, overall buckles, and trouser buckles were recovered at both locations, as were footwear fragments. Figures (See Figures 44, 45, 46.)

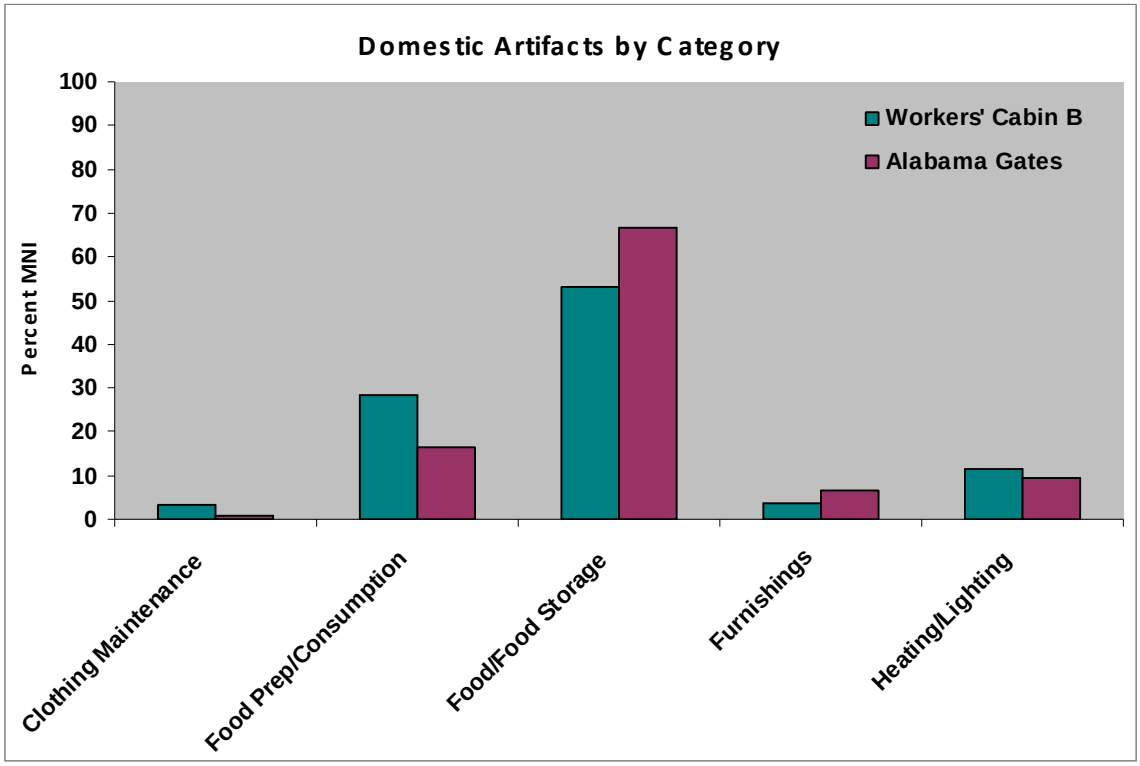


Figure 45. Workers' Cabin B vs. Alabama Gates. Domestic Artifacts by Category.
(Michael Boyd)

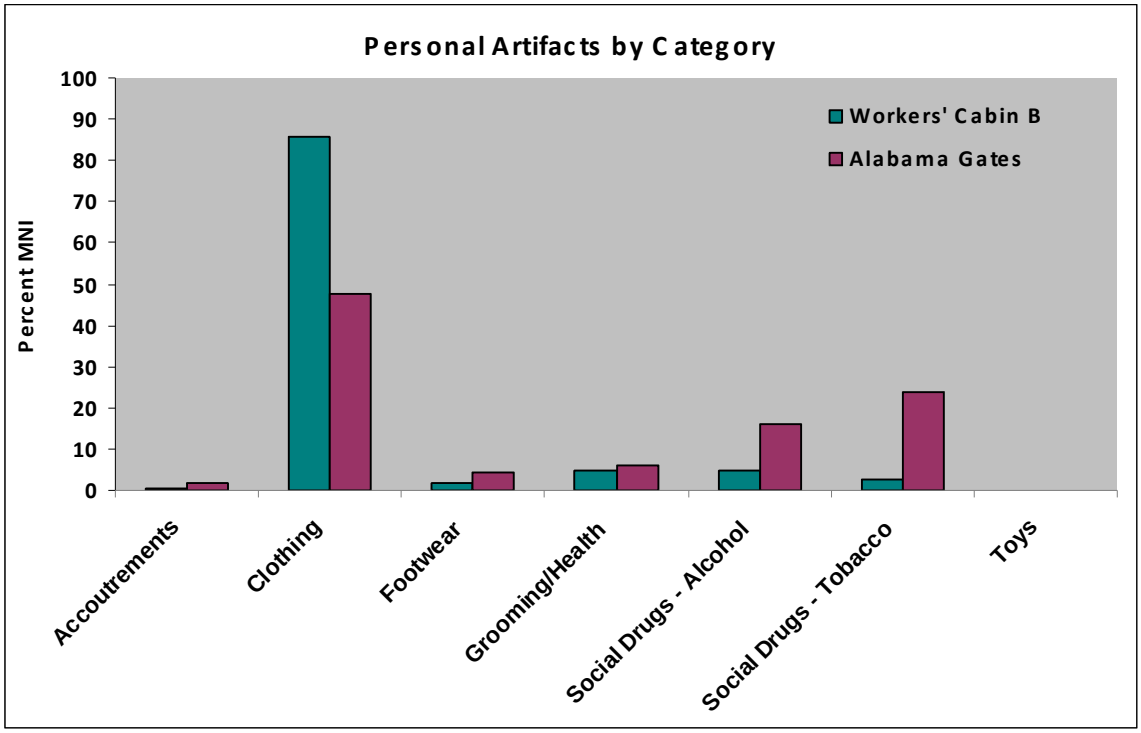


Figure 46. Workers' Cabin B vs. Alabama Gates. Personal Artifacts by Category. (Michael Boyd)

Setting

The contrasts in the environment between the Alabama Gates Camp and the Cowell Lime Works are striking. Located in the Owens Valley of eastern California, in Inyo County, the site of the Alabama Gates Camp sits in an arid high desert landscape surrounded by mountains and comprised of two ecological zones: riparian areas along the Owens River and smaller drainages containing water-dependent vegetation, and a desert scrub zone with various small bushes, cacti, and grasses. The camp remains are located on a wide, slightly sloping scarp at the base of the Alabama Hills with a view of the lower Owens Valley.

On the southern flanks of the Santa Cruz Mountains, the Cowell Ranch complex overlooks Monterey Bay and the city of Santa Cruz on the Central California Coast. The Pacific Ocean and the steep rugged mountains squeeze between them a semi-level area of inhabitable territory. The village is situated within the interface between the coastal rangeland and the redwood forest vegetation zones. The workers' cabins are set within gently rolling, open grasslands sloping south toward the bay. Cabin B stands on a narrow bench on a steep slope, on the east side of the former Jordan Gulch surrounded by various

sized outcrops of limestone and the pocket quarries where the outcrops were exploited in the past.

The weather at Alabama Gates, being in the desert, is more extreme than in Santa Cruz. Precipitation averages only 5 to 7 inches. Mean temperature extremes range from 4 degrees to 107 degrees Fahrenheit. Additionally, the elevation at Alabama Gates is approximately 4,000 feet above mean sea level (AMSL). Conversely, the Cowell Lime Works is located at approximately 360 feet AMSL, precipitation averages 30 inches a year, and the temperature ranges between approximately 40 and 80 degrees Fahrenheit. Summer fogs help keep Santa Cruz cool but the extreme heat of the inland California high desert likely made summers at Alabama Gates almost unbearable. Retaining a full work force during the extreme heat was a challenge for labor recruiters.

The Alabama Gates Camp is located in a much more isolated, remote rural area. While it is only a little over a mile from the Cowell Ranch to Santa Cruz, and only about 70 miles to San Francisco, Alabama Gates was 4 miles from the Owens Valley community of Lone Pine and approximately 180 miles from Los Angeles. Accessible rail transport linked both smaller communities to the larger distant cities, but while San Jose was only 30 miles through the mountains by rail, it was 114 miles on the train from Lone Pine to Mojave, the closest town of any size. While Santa Cruz was a busy seaport with farms and ranches reaching up into the hills and bordering the Cowell Ranch, Lone Pine was isolated at the end of the railroad line that was built primarily to move men, materials, and supplies to the construction sites. While Alabama Gates was secluded out in the desert scrub, disconnected and detached, the Cowell Ranch was part of the adjoining larger community.

Structure

Both the Alabama Gates Construction Camp and the Cowell Lime Works were company settlements, built to house and feed workers. However, the differences between the two sites were many. The Alabama Gates Camp was significantly larger than the Cowell Ranch industrial village, housing as many as 150 men (Van Bueren 1999:1). At its maximum, in 1880, at the peak of lime production at this location, the Cowell Ranch

lime village likely housed no more than 70 to 75 people, or about half as many as were living at the Alabama Gates Camp (Van Bueren et al. 1999:181).

From its conception, it was known that Alabama Gates would be a temporary camp. Once the construction in the area was finished, it was dismantled and abandoned. The camp was inhabited for only 11 months, from April 1912 to February 1913. The Cowell Lime Works, on the other hand, was inhabited for approximately 110 years. The Alabama Gates Camp was dismantled after construction was completed in the area and surviving materials consisted of only relict features and artifact deposits. The Cowell Lime Works was generally abandoned in place, becoming almost a mini ghost town until the university "saved" some of the buildings through remodeling, but left others to deteriorate with neglect and time.

Both sites were centered around a residential and industrial hub. The organizational layout at Alabama Gates, built decades later, was apparently more formal than the Cowell Ranch complex, with tents and wood frame housing arranged in neat orderly rows with the mess hall and kitchen near the center. However, the Cowell Ranch contained a bunkhouse and small groups of cabins variously placed on the slope or the top of Jordan Gulch, built in a box construction manner with board and batten walls, and composed completely of old growth redwood. However, the central location of the cookhouse corresponds to the location of the cookhouse at the aqueduct camp (Van Bueren et al. 1999:4–6).

The work and living areas at Alabama Gates were separate with the livestock management area and the blacksmith shop located away from the main dwelling and cooking areas. This reflects a historical trend in improved living conditions at work camps, especially with relations to sanitation. However, the tent dwellings were still overcrowded, with an average of four occupants each. At the Cowell Ranch, there was no separation of eating areas from livestock and industrial areas, and some living locations were also situated close to the livestock areas, and the cabins and bunkhouse were both likely quite crowded. Privy sites have not been found at either location, so it is unknown how this sanitation issue was addressed. The Alabama Gates Camp included a bath house but it is not known how personal hygiene was addressed at the Cowell Lime Works

during this period (Van Bueren et al. 1999:4–6). One oral history reports that a shower had been installed at the cookhouse at the Cowell Ranch by the 1940s

The Alabama Gates Camp was formally arranged with the dwellings organized into four distinct neighborhoods while the Cowell Ranch complex was less formal but still contained a separate area where the married men lived. At Alabama Gates, one neighborhood housed privileged workers in cabins rather than tents, including two married men and their families, but most of the households consisted of unrelated men. "Differences in the behavior and ideology of such householders may be reflected in the organization and segregation of the camp" (Van Bueren et al. 1999:37). This reflects a trend toward more structured organization in work camps over time that was part of an "outgrowth of late nineteenth century social and capitalist reform agendas associated with increasing mechanization, standardization, and domination of wage laborers" (Van Bueren et al. 1999:177). Both locations were built by the management and were likely designed and operated to meet management's needs and goals with little regard for the feelings of the workers as a group or individually.

The Workers

Few historical sources exist concerning the workers at the Alabama Gates Camp. Although there is no census information because it did not exist during a census year, newspapers, and anecdotal sources give some clues, and one photograph exists of five employees and part of the camp. The work force was likely similar to other Los Angeles Aqueduct construction camps enumerated during the 1910 population schedules that consisted of an ethnically varied work force. This data recorded an unskilled workforce averaging 137 men of primarily single, foreign-born nationals, many of whom were Mexicans. Almost all of the foreign born workers were recent immigrants (Van Bueren et al. 1999:38). This is in contrast to the Cowell Ranch employees, who were primarily Portuguese and Italians, as discussed above. The Alabama Gates camp is similar to the Cowell Ranch in that many workers were transient, and the work force was ethnically stratified with immigrants from southern and eastern Europe and Mexico in the lower level positions and native born whites and northern European immigrants occupying the higher level skilled worker and supervisory jobs.

Only three ethnicity-related artifacts were found at Alabama Gates: a kosher wine bottle base, a Japanese porcelain bowl, and a Chinese celadon bowl. The Asian ceramics have been interpreted to be curios owned by white families. The presence of kosher wine is an unlikely indicator of the presence of a Jewish person in this type of setting. Any Jew who followed Kosher food practices strictly enough to select Kosher wine would not have been able to eat any of the foods at the camp, as none of it was kosher. This is an example of how the existence of a seemingly "ethnic" artifact is likely unrelated to the ethnicity of its user (Adrian Praetzellis, personal communication 2012).

Van Bueren points out that "attempts to identify archaeological signatures of ethnicity" in archaeological sites from the early twentieth century in the United States have generally attained little success because of "the proliferation of increasingly standardized mass produced goods associated with the industrial revolution" (Van Bueren 1999:179–180). As discussed previously, evidence of ethnicity at Cabin B is limited, consisting of a Portuguese coin and religious medallion and abundant remains from shellfish like mussels and limpets, among others. However, this evidence seems stronger than at Alabama Gates. Ethnic-related artifacts, on the other hand, are not required to be associated with foreign cultures and groups. As to be expected, the very large majority of artifacts found in American archaeological sites are related to the American culture and ethnic group that is primarily derived from the English and other northern European peoples and lifeways.

Beef was the most common meat served in both locations, and pork was the next most common type of meat consumed. However, both groups were supplementing the diet with local resources. Duck, quail, fish (carp), and mussel shell were all found at Alabama Gates, suggesting that these men were also varying their diet through the exploitation of locally-available foods gathered or hunted themselves. Bullets and bullet casings, along with fish hooks and a fishing weight attest to these foraging activities as contributions to the diet and to "break up the monotony of the usual fare," which was of poor quality (Van Bueren 1999:163).

Like the men of Cabin B at the Cowell Lime Works, apparently the workers at Alabama Gates were doing some food preparation and consumption at their residences, as food remains were found within the housing neighborhoods (Van Bueren 1999:158).

The higher percentages of Food Preparation/Consumption and Food/Food Storage artifacts found at Cabin B may reflect the more structured lifeways at the Alabama Gates Camp, where community activities were likely more formal and more strictly regimented due to tighter company control. It is possible that eating in the workers' personal domiciles was strongly discouraged due to the threat of pests attracted by food and food remains. Although trash disposal away from living and cooking areas did not seem to be practiced at either site, evidence of regular refuse burning is evident at the Alabama Gates Camp but absent at Cabin B. Company policy at the aqueduct camp clearly called for this practice. The higher percentage of Food/Food Storage artifacts at the Alabama Gates Camp may reflect the camp's isolation and may be evidence of the necessity of importing all food to the work site, whereas at the Cowell Ranch, much of the food the men enjoyed was fresh, grown on site by the company.

Similar clothing was worn by men at both sites. Work clothing fasteners and boot parts were abundant in the assemblages. Jeans and work boots with linen shirts were the uniform of the laborers of the day. Overalls, suspenders, trousers, and belts were also present. Some clothing maintenance took place at Alabama Gates, with evidence consisting of a scissors blade, a thimble, a straight pin, a clothes pin, and safety pins found at the camp. However, it is not known if the men did their own clothing maintenance or they hired local women to do it. Safety pins were the only evidence of clothing maintenance found at Cabin B. The significantly larger percentage of clothing remains found at Cabin B is likely a reflection of the long period of occupancy at this site. The men who worked there had much more time to lose clothing fasteners and to wear out their clothes, but the short period of time men lived at the Alabama Gates Camp did not likely result in nearly the number of lost buttons, rivets, and worn out garments.

Only a few women and children lived in the camps, most being family members of the skilled workers and supervisors, a situation that is also similar to that at the ranch. Two prostitutes and a laundress were also recorded as living in the camps (Van Bueren et al. 1999:17–21). Archaeologists uncovered artifacts relating to women at both sites, but none relating to children at Alabama Gates. It is believed that at least a couple men had their families living with them. Two women probably lived at the camp and it is likely that others visited. Evidence of women at the Alabama Gates camp includes pieces of

matching ceramic tableware, examples of domestic artifacts that have generally been attributed to women residing at a site. No similar evidence was found of women living at Cabin B. However, evidence suggests that women visited both places (Van Bueren 1999:181). I believe the women's artifacts found at Cabin B may show evidence of visits by prostitutes.

The work at both locations could be dangerous, with big equipment, heavy loads, and explosive materials on site. The work was hard and hours were long. Each crew was divided into at least two work details. Men using dynamite and steam shovels dug the aqueduct and another group prepared and poured the concrete that lined the canal. The temporary nature of the camp was dictated by the work. When building was complete along a specific stretch of the canal, the camp was dismantled and the equipment and men were moved somewhere else to construct another segment (Van Bueren et al. 1999:12–13). At the Cowell lime operations blasting powder and later, dynamite was used in the quarries, and the caustic lime caused health problems. The heat of the kilns was extreme. However, the complex was permanent, and the ordinary workers lived in buildings not flimsy tents.

The grooming- and health-related artifacts at both locations are similar, consisting of combs, mirrors, pharmacy bottles, patent medicine bottles, tubes and vials. Although a doctor and standard health care was available to the aqueduct construction workers, many men administered to their own health at Alabama Gates, as they did at Cabin B. Dr. Taylor, hired by the City of Los Angeles to minister health care to the workers on the aqueduct reported that "many of the workers took poor care of themselves and would fail to report lacerations and other minor injuries" (Van Bueren 1999:49). Tooth brush remains were found at Alabama Gates but are absent at Cabin B. However, with no running water inside cabin B, its inhabitants were likely bathing and brushing their teeth at a different location. The Alabama Gates Camp contained a bath house. The Cowell Ranch lime complex did not.

The Alabama Gates assemblage, like that from Cabin B, contains evidence of literacy. Writing equipment found at the site consists of at least 37 artifacts, including ferrous pen nibs, ink bottles, pencils, and a pen clip. At least some of the men working at both locations could read and write. The larger percentage of writing artifacts at the

Alabama Gates camp may be a result of the later date of the site. This may reflect the general increase in literacy rates in Europe during this time. The literacy information about the Cowell Ranch in the U.S. Census Population Schedules also shows an increase in literacy rates beginning around the time the Alabama Gates Camp was occupied.

The men working at both these sites enjoyed drinking and smoking (or chewing) tobacco. At Alabama Gates, most of the identifiable glass containers once held alcohol (83%), with demijohns, beer bottles, and liquor bottles predominating. Tobacco-related artifacts found at Alabama Gates include tobacco tins, lids, tags, and seals, cigarette and cigarette packaging remains, a cigarette holder, a lighter, and smoking pipes (Van Bueren 1999:91). These leisure time activities were popular among working-class men in general (Van Bueren 1999:186). With the higher level of structure and formality at the Alabama Gates Camp, it is surprising that the percentages of Social Drug categories are higher at this site.

CONCLUSION

This study demonstrates how historical archaeology can create a more complete picture of history than either documents or artifacts alone. With this thesis I have contributed a significant amount of information about the workers at the Cowell Lime Works Historic District, more information than has ever been gathered in the past, through the contribution of material on cabin residents, ethnicity, independent food procurement, preparation and consumption, clothing, leisure time, literacy, and health problems. My work has contributed to the archaeological and historical trend of the investigation of “households that are poorly documented” (California Department of Transportation 2008:179). I have added substantial personal information about some of the workers that we gathered from historic documents, and used an analysis of the artifact assemblage to view the lives of the residents at Cabin B in more detail. I have uncovered much information about the laborers in the lime industry in Santa Cruz County, the cultures of their homelands, and their daily lives as immigrant laborers in California.

Through the comparison of the lives of the Cowell Ranch workers and the Alabama Gates laborers, I have exposed similarities and differences between these two groups. The lives of young, immigrant, single working-class men during the late

nineteenth and early twentieth centuries in California, no matter where they were located, were in some ways very similar. Dominated by long days, the work was usually hard and sometimes dangerous. The food was usually mediocre to poor. The bosses were sometimes very controlling and were known to occasionally take advantage of new immigrants. Many men were transient and turn-over was high. However, life and living conditions at the Alabama Gates Camp were more structured and controlled

The work was obviously different: construction versus extraction and industrial production. The jobs at the aqueduct were temporary in nature, but some men continued to work at the Cowell Ranch for decades. The accommodations at the Cowell Ranch were permanent but most of the workers at the Alabama Gates Camp lived in tents. The lime company was a small firm, owned by two men or a family, as opposed to working for a large construction outfit, as at Alabama Gates.

The setting was very different at these sites. Santa Cruz has a temperate climate with significant winter precipitation. The Owens Valley is desert, with large seasonal temperature fluctuations and little rain. Work was slower during the winter at the lime complex. At the aqueduct, they worked year-round. The Cowell Ranch was part of the Santa Cruz community while the remote isolated Alabama Gates Camp was situated out in the desert removed from the closest town by four miles of desolate scrub. The aqueduct camp was much larger than the Cowell Ranch village, with a more-structured layout and more amenities.

The workers at the Cowell Ranch were primarily from two ethnic groups: Portuguese and Italian. At the aqueduct camp, the ethnic composition was likely much more varied. There are a few reports of labor unrest concerning unionizing at the Cowell lime complex, but the company purportedly treated their employees well (*Santa Cruz Surf* 1904a; *Santa Cruz Surf* 1904b:2). A strike over the quality of the food occurred at the Elizabeth Tunnel Camp on the aqueduct project in 1910 (Van Bueren 1999:22).

Although the settings and the nationalities of the men differed, the evidence from the archaeological assemblages shows many similarities between the two groups of workers. The research questions that are the focus of this thesis, when applied to both assemblages, suggest that the daily lives of both groups of laborers were quite similar in many ways.

Figure 47. Artist's Interpretation of the Cowell Ranch Lime Complex When in Production. (Branden Melendez)

Figure 48. Artist's Interpretation of Cowell Ranch Cabins A through E When Inhabited. (The woman in front of Cabin A is uncharacteristic, since likely only bachelors lived in these cabins.) (Anne Kefarle)

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APPENDICES

APPENDIX A

DOCUMENTARY RESEARCH

This appendix presents the data extracted from historic sources available at the Santa Cruz, California Public Library, Main Branch, and on the internet website, Ancestry.com. I use a source key of abbreviations for the purpose of keeping this document brief. Please see REFERENCES CITED section on page 166 for complete citations.

Ann Ramage did the majority of the research that comprises this appendix under my direction. She used her knowledge of Ancestry.com to assist me and train me so that I could do the research myself. I transcribed the computer printouts into a text document, organizing the data alphabetically by the name of the worker and chronologically within each worker's life.

We chose names from three primary sources: U.S. census population schedules, Cowell Company documents, and oral histories. I include individuals for which no information was found. When information does not correspond to other sources beyond the reasonable amount of error of about one year, I have inserted brackets containing a question mark [?].

Key

Bost Pass – Boston Passenger and Crew Lists 1820–1943
Cal DI – California Death Index 1940–1997
Cal Vote – California Voter Registers 1866–1898
Nat Service – Naturalization Service Petition and Record 1909–1927
NY Pass – New York Passenger Lists
SC City Polks Directory – Polk's Santa Cruz City Directory 1958
SCE News [YEAR] – *Santa Cruz Evening News*[paper]
SC Sent [DATE] – *Santa Cruz Sentinel* [Newspaper]
US Census [YEAR] – United States Federal Census
US Passport – United States Passport Applications
WWI Draft – War I Draft Registration Cards

Antonelli, Joseph (aka Joe Antonelli)
US Census 1910
Born in 1868 in Italy.
Immigrated in 1897.
Naturalized.
Lives in Felton, [Santa Cruz County] California.
Laborer at Lime Kilns.
Speaks English.
Can read but not write.
Married to Esther.

Wife and 2 oldest daughters immigrated in 1906.
Daughter, Ida age 16.
Daughter, Halia, age 14.
Daughter, Julie age 3.
US Census 1920
Born about 1868 in Italy.
Immigrated in 1897.
Naturalized 1905.
Lives in Felton, [Santa Cruz County] California.
Laborer, odd jobs.
Speaks English.
Literate.
Married to Esther.
Daughter, Julia age 13.
Daughter, Isabelle age 5.
U.S. Census 1930
Born about 1868 in Italy.
Immigrated in 1897.
Literate.
Married to Esther.
Daughter, Isabelle age 16.
Has a radio.

Barratto, Stim (aka Stern Barratto).
US Census 1900
Born June 1859 in Italy.
Immigrated in 1864.
Lives in Santa Cruz, California.
Naturalization papers have been filed.
Speaks English.
Literate.

Bettencourt, Eugenio Nunes
Bost Pass
Born on Graciosa, Azores.
Arrived 23 September 1912 in Boston, Massachusetts, on the *Canopic*.
Portuguese.
U.S. Census 1920
Born about 1893 in the Azores.
Lives in Santa Cruz, California.
Immigrated in 1911.
Boarder in household of 5 adults and 2 children, all with Bettencourt surname.
Illiterate.
U.S. Census 1920
Born about 1892 in Azores.
Lives in Santa Cruz, California.

Lives with 2 adults with Bettencourt surname.
SC Sent 27 June 1982 – Obituary
Born in Azore[s].
Resident of Santa Cruz, California, for more than 60 years.
Employed at Johnson Quarry.
Member of Holy Cross Church.
Son, Richard Bettencourt of Watsonville, [Santa Cruz County] California.
Son, David Bettencourt of Santa Cruz, California.
3 grandchildren.
2 great-grandchildren.
Died 27 June 1982 in convalescent hospital.
Entombment in Holy Cross Mausoleum, Santa Cruz, California.
Cal DI
Born 8 November 1892.
Died 25 June 1982.

Bettencourt, Joseph Correia
Nat Service
Born 16 May 1885 in Sinhora da Luz, Graciosa, Azores.
Emigrated about 2 August 1902 from Praia, Graciosa, Azores.
Arrived 10 August 1902 at Port of New York on the *Dona Maria.*
Resident of California since 11 April 1903.
Resides at 218 Ocean Street, Santa Cruz, California.
Works as boarding house proprietor.
Dark complexion, 5 ft. 4 in. tall, 160 lbs, brown hair, grey eyes.
Date of Declaration of Intention: 11 September 1908.
Date of Petition for Naturalization: 18 March 1913.
Date of admission as a citizen: 21 July 1914.
Married to Isabell Reis Bettencourt, born in Santa Cruz, California.
Children: Evelyn Frances, born 25 December 1909 in Santa Cruz, California.
Marie Bettencourt, born 11 December 1910 in Santa Cruz, California.
Walter Reis Bettencourt, born 6 January 1913 in Santa Cruz, California.

Cabral, Antone
US Census 1900
Born about 1862 in Azores.
Lime Burner for Cowell Company.
SC Sent 27 January 1933 – Obituary
Born about 1862 in Azores.
Lived at 444 Bay Street, Santa Cruz, California.
Daughter, Mrs. Mary Meyers, 91 Hunt Street, Santa Cruz, California.
Died 26 January 1933 at home.
Buried at Holy Cross Cemetery.

Cabral, Manuel S.
SC City Polks Directory
Living with wife Anna at 615 Seabright Ave.
Santa Cruz Sent 24 February 1960 – Obituary
Native of St. George, Azores.
Died 23 February 1960 in Santa Cruz.
Survived by Anna S. Cabral.
Member of Star of the Sea Catholic Church.
Internment at Winton cemetery, Atwater, California.
Cal DI
Born 11 December 1878.
Lived in Capitola.
Died 23 February 1960.

Ceciliani, Petro (aka Petro Ceciliam)
US Census 1900
Born August 1876 in Italy.
Immigrated in 1900, has been in the country 2 months.
Lives in Santa Cruz, California.
Lime burner.
Married.
Does not speak English.
Literate.

Comschi, Louie (aka Louie Comaschi)
US Census 1910
Born 1850 in Italy
Immigrated in 1882.
Lives in Felton, California [Santa Cruz County].
Laborer at IXL Lime Kilns.
Does not speak English.
Illiterate.

Franciscona, Lorenzo
US Census 1900
Born September 1880 in Italy.
Immigrated in 1900, has been in the country 2 months.
Lives in Santa Cruz, California.
Day laborer for Cowell Company.
Does not speak English.
Literate.

Godani, John (aka John Godaire)
1900 Census
Born April 1875 in Italy.
Immigrated in 1900, has been in country 2 months.

Lives in Santa Cruz, California.
Lime burner for Cowell Company.
Does not speak English.
Literate.

Jaggi, A. – Possibly worked for Cowell Company. No further information.

Lazarotti, Peter (aka Peter Lazzaretto, Pietro Lazarotti, Peter Lazzarotte, Peter Lozzarette, Peter Lazorrotti)
NY Pass
Born about 1870.
Arrived 2 June 1900 in New York on the *Saint Paul* from Southampton, England.
US Census 1900
Born January 1869 in Italy
Lives in Santa Cruz, California.
Lime Burner.
Married in 1894.
US Census 1920
Lives in Felton, California [Santa Cruz County]..
Blaster at lime kiln.
US Census 1930
Born about 1869.
Married to Orelia Lazzaretto.
SC Sent 28 January 1951 – Obituary
Born about 1870 in Italy.
Married to Eulalia.
Daughter, Grace Saunders of Felton, California [Santa Cruz County]..
Quarry worker.
Lived in Santa Cruz, California for 50 years.
Buried at Felton Cemetery, California [Santa Cruz County]..

Manerhan, H. – Possibly worked for Cowell Company. No further information.

Masconi, M. – Possibly worked for Cowell Company. No further information.

Mello, John Correia
WWI Draft
Born Graciosa, Azores.
Living in New Bedford, Massachusetts.
Brown eyes, medium height, slender build.
Naturalized.
Single.
Poor.
Unemployed cotton weaver.

US Passport 1920
Father: Mathias C. Mello.
Sailed from Graciosa, Azores.
Immigrated about 1 April 1907, age 13 to New Bedford, Massachusetts.
Lived in Massachusetts 1907 – 1920, Somerville for 8 years, New Bedford for 5 years.
Naturalized in Boston, Massachusetts, 27 December 1915.
First Passport issued 1916.
Trained as a weaver.
Married to Angelina B. Mello.
Daughter, Emma age 8.
US Census 1930
Born in Azores in 1894.
Immigrated in 1907.
Married in 1918.
Not living with wife.
Literate.
Renter.
Naturalized.
Laborer at lime kilns in Felton, California [Santa Cruz County]..
Wage worker.
Cal DI
Born 9 April 1894.
Died 19 October 1981.

Negri, Clement
US Census 1930
Born in Italy.
Lives in Santa Cruz.
Listed twice in this census, in Santa Cruz City and in the Felton Precinct.
SC Sent 12 February 1945 – Obituary
Native of Italy.
Married to Maria.
Daughter, Eleanor.
Son, Alfred.
Son, Alec.
Cal DI
Born 21 March 1883.
Died 11 February 1945 in Santa Cruz.

Napolino, Peter
US Census 1900
Born November 1870 in Italy.
Immigrated in 1896.
Lives in Santa Cruz, California.
Lime burner.

Speaks English.
Literate.

Joe Netto (aka Joe S. Netto, Joe Souza Netto)
SC City Polk's Directory
Married to Virginia.
Laborer.
Lives at 311 Otis Street.
SC Sent 5 April 1970 – Obituary
Born in Azores.
Came to Santa Cruz 1919.
Worked for Johnson quarry.
Lived at 311 Otis Street.
Married to Virginia.
Son, Manuel Netto
Daughter, Genieve.
2 grandchildren.
1 great-grandson.
Died in the hospital.
Member of Holy Cross Church.
Cal DI.
Born 22 February 1885.
Died 3 April 1970 in Santa Cruz.

Peno, Joe (aka Joe Peni)
1910 US Census
Born 1891 in Italy
Immigrated in 1907.
Lives in Felton, California [Santa Cruz County].
Laborer at IXL Lime Kilns.
Speaks English.
Literate.

Pesi, Petro (aka Petro Pen)
US Cenus 1910
Born June 1871 in Italy.
Immigrated in 1894.
Lives in Santa Cruz, California.
Lime burner for Cowell Company.
Naturalization papers have been filed.
Does not speak English.
Literate.

Quadros, Jose De Souza (aka Joseph S. Quadros, Jose S. Quadros, Jose Da Sonza Quadros)

Bost Pass
Born about 1863.
Arrived 21 May 1883 from Fayal, Azores, Portugal, on the *Paladin* in Boston, Massachusetts.

Cal Vote
Born about 1862.
Naturalized 13 February 1894 in Santa Cruz Superior Court, Santa Cruz, California.
Registered to vote in Santa Cruz, California, on 28 August 1894.
6 foot tall, dark complexion, brown eyes, black hair.
Lives in Felton, California [Santa Cruz County].

US Census 1900
Born June 1861 in Portugal.
Lives in San Lorenzo, California [Santa Cruz County].
Immigrated in 1882.
Married to Mary C. Quadros in 1888.
Children at home: Alfred (11), Lenora (10), Manuel (8).
Works at Lime Kilns.

US Census 1910
Born June 1848 [?] in Portugal.
Lives in Felton, California [Santa Cruz County].
Immigrated in 1870 [?].
Naturalized.
Foreman at lime kilns.
Married to Mary C. Quadros.
Children at home: Alfred (21), Lemora (20).

SC Sent 17 August 1945 – Obituary
Lived in Santa Cruz, California, for more than 50 years.
Born in Azores.
Came directly to Santa Cruz County, California in 1886[?].
Naturalized soon after arrival.
Worked at Holmes Lime Company, Felton, [Santa Cruz County] California.
Moved to Santa Cruz, California in 1914.
Member of Holy Cross Church.
Died in Santa Cruz.
Survived by wife, Mary.
Son, Alfred.
Daughter, Leonora Avila [dec].
Entombment at family vault at Holy Cross cemetery.

Cal DI
Born 15 June 1862.
Naturalized.
Died 16 August 1945 in Santa Cruz.

Quadros, Manuel (aka Manuel Quadres, Manuel Quadras, Manuel Inadros)
US Census 1900
Born August 1881 in Azores.
Lives in Pajaro, California [Santa Cruz County].
Works as servant.
US Census 1920
Born about 1881 in Portugal.
Lives in Santa Cruz, California.
Married to Annie Inadros. Children at home: Emma (9).
Renter.
Illiterate.
US Census 1930
Born about 1883 (?) in Portugal.
Married to Anna Quadros. Children at home: Emma (19).
SC Sent 28 January 1962 – Obituary
Native of the Azores.
Resident of Santa Cruz since 1900.
Employed in the sawmills.
Employed by Cowell Company.
Employed at Kalkar Products quarry.
Lived in Santa Cruz.
Wife, Anna, died in 1953.
Survived by daughter.
2 grand-daughters.
7 great-grandchildren.
Member of Holy Cross Church.
Interned at Holy Cross cemetery.
Died in local nursing home.
Cal DI
Born 1 September 1880.
Died 27 January 1962 in Santa Cruz, California.

Silva, Evo (aka Evo Souza Silva)
WWI Draft Registration
Born on 7 April 1881 in Portugal.
Lives in Felton, California [Santa Cruz County]..
Not Naturalized.
Works at Holmes Lime and Cement Company.
Married to Marie Souza Silva.
Tall, medium build, dark brown eyes, black hair.
US Census 1920
Immigrated in 1906.
Renter.
Literate.
Married to Maria Evo.
Immigrated 1913 with 2 oldest children: Lucy and Manuel.

Lucy is maid at hotel.
2 children born in US: Tony and Genevieve.
Not Naturalized.
US Census 1930
Have a radio.
Married at age 20, wife at age 19.
Illiterate.
Immigrated 1906.
Not Naturalized.
Employed as teamster at lime kilns.
Cal DI
Born 7 April 1881.
Lived in Capitola, California.
Died 18 October 1960.

Silva, John
SCE News 26 August 1941 – Obituary
Died in Santa Cruz August 24.
Son, John Silva, Jr.
Native of Portugal.
Member of Holy Cross Church.
Internment in Holy Cross cemetery.
SCE News 27 August 1941 – Obituary
Son, John Silva, Jr.
Owned Grocery Store on Ocean Street.
Member of Holy Cross Church.
Cal DI
Born 7 May 1868.
Died 24 August 1941.

Sousa, Menuel A. (aka Manuel A Sonan, Manuel A. Sousa)
US Census 1910
Born about 1850 in Portugal.
Lives in Watsonville, [Santa Cruz County] California.
Immigrated in 1887.
Not naturalized.
Married to Maria Sousa.
8 children living, 2 minor children at home:
Francisco Sousa (15).
Joseph Sousa (12).

Speroni, Joe
US Census 1910
Born in 1881 in Italy.
Immigrated in 1900.
Lives in Felton, [Santa Cruz County] California.

Laborer at IXL Lime Kilns.
Speaks English.
Literate.

Sylva, D. – Possibly worked for Cowell Company. No further information.

Verdino, Andrew
1910 US Census
Born in 1870 in Italy.
Immigrated in 1903.
Married.
Lives in Felton, [Santa Cruz County] California.
Laborer at IXL Lime Kilns.
Does not speak English.
Literate.

APPENDIX B

ARTIFACT DESCRIPTIONS BY GROUP AND CATEGORY

Group and Category	Description	Count	MNI
Activities			
Animal Husbandry			
- Ferrous Horseshoe		3	3
- Ferrous Mule Shoe		2	2
Subtotal Animal Husbandry		5	5
Collecting			
- Stone Rock		1	1
Subtotal Collecting		1	1
Commerce			
- Copper-alloy Coin		1	1
- Copper-alloy Nickel		1	1
- Copper-alloy Penny		1	1
Subtotal Commerce		3	3
Firearms			
Ammunition	Copper-alloy Shell Casing	6	6
Ammunition	Copper-alloy Shotgun Shell	1	1
Ammunition	Lead Bullet	6	6
Subtotal Firearms		13	13
Fishing			
- Ferrous Fish Hook		7	6
- Lead Sinker		1	1
Subtotal Fishing		8	7
Painting			
- Composite Paint Brush		1	1
Container	Aluminum Paint Tube	2	2
Subtotal Painting		3	3
Religion			
- Metal Medallion		1	1
Subtotal Religion		1	1
Tools			
- Aqua Glass Knife, Homemade		1	1
- Copper-alloy Knife Handle		2	1
- Copper-alloy Saw Blade		1	1
- Ferrous Axe Head		1	1
- Ferrous Ferrule		1	1
- Ferrous File		3	3
- Ferrous Handle		2	2
- Ferrous Harrow Tine		1	1
- Ferrous Hay Fork Tine		1	1
- Ferrous Plane Blade		1	1
- Ferrous Ratchet		1	1
- Ferrous Saw Blade		2	2
- Ferrous Snap Ring		1	1
- Ferrous Stake		1	1
- Rubber Hose		28	2
- Wood Handle		2	0

Fastener	Ferrous Clamp	1	1
Fastener	Ferrous Collar	1	1
Subtotal Tools		51	22
Transportation			
Carriage	Ferrous Seat Spring	1	1
Tack	Ferrous Buckle	14	13
Tack	Ferrous Ring	8	8
Tack	Leather Strap	1	1
Tack	White Metal Horse Collar Pad Holder	1	1
Subtotal Transportation		25	24
Writing			
Container	Aqua Glass Ink Bottle	2	1
Container	Colorless Glass Ink Bottle	3	3
Subtotal Writing		5	4
Domestic			
Clothing Maintenance			
Sewing	Copper-alloy Safety Pin	5	5
Sewing	Ferrous Safety Pin	1	1
Subtotal Clothing Maintenance		6	6
Food			
Fruit	Vegetal Cherry Pit	3	3
Fruit	Vegetal Olive Pit	1	1
Fruit	Vegetal Peach Pit	81	48
Fruit	Vegetal Plum Pit	4	4
Subtotal Food		89	56
Food Prep/Consumption			
Drinking Vessel	Colorless Glass Tumbler	8	5
Drinking Vessel	Opaque Porcelain Cup	2	1
Drinking Vessel	White Improved Earthenware Cup	3	2
Drinking Vessel	White Improved Earthenware Mug	6	5
Drinking Vessel	Yellowware Cup	5	1
Kitchen	Ferrous Church Key Opener	1	1
Kitchen	Ferrous Grater	5	1
Kitchen	Ferrous Pan	1	1
Kitchen	Yellowware Bowl	1	1
Serving	Opaque Porcelain Plate	1	1
Tableware	Ferrous Eating Utensil Handle	4	4
Tableware	Ferrous Fork	2	1
Tableware	Ferrous Knife	1	1
Tableware	Ferrous Spoon	2	2
Tableware	Opaque Porcelain Bowl	2	1
Tableware	Opaque Porcelain Plate	5	3
Tableware	Porcelain Bowl	1	1
Tableware	White Improved Earthenware Bowl	7	5
Tableware	White Improved Earthenware Hollow	1	1
Tableware	White Improved Earthenware Jar	1	1
Tableware	White Improved Earthenware Plate	19	10
Tableware	White Improved Earthenware Saucer	7	5
Subtotal Food Prep/Consumption		85	54
Food/Food Storage			
Closure	Copper-alloy Canning Jar Lid	9	1
Closure	Opaque-white Glass Canning Jar Lid Liner	4	1

Container	Aqua Glass Bottle	4	3
Container	Aqua Glass Canning Jar	3	2
Container	Chinese Brown Glazed Stoneware Jar	1	1
Container	Colorless Glass Canning Jar	55	22
Container	Colorless Glass Jar	9	8
Container	Colorless Glass Wide-mouth Jar	2	1
Container	Ferrous Can	39	4
Container	Stoneware Crock	4	1
Container	Stoneware Jar	39	1
Subtotal Food/Food Storage		169	45
Furnishings			
- Colorless Glass Mirror		13	2
- Common-pottery Flowerpot		2	2
- Copper-alloy Clock Back		1	1
- Copper-alloy Clock Gear		3	0
- Copper-alloy Clock Hook		1	0
- Copper-alloy Clock Key		1	1
- Copper-alloy and Ferrous Clock Gear		1	0
- Ferrous Foot		1	1
Subtotal Furnishings		23	7
Heating/Lighting			
- Cast-iron Stove		48	0
- Cast-iron Stove Bolt		1	0
- Cast-iron Stove Door		2	0
- Cast-iron Stove Flue		1	0
- Cast-iron Stove Handle		1	0
- Cast-iron Stove Leg		1	1
- Cast-iron Stove Lid		4	0
- Cast-iron Stove Rivet		1	0
- Cast-iron Stove Washer		1	0
- Ferrous Lantern		5	2
Lamp	Colorless Glass Chimney	278	10
Lamp	Colorless Glass Shade	1	1
Lamp	Copper-alloy Burner	3	3
Lamp	Ferrous Collar	1	0
Lamp	Frosted Colorless Glass Shade	4	4
Lamp	Opaque-white Glass Diffuser	8	1
Lantern	Ferrous Handle	1	0
Subtotal Heating/Lighting		361	22
Indefinite Use			
Electric			
- Plastic and Metal Plug		1	1
Subtotal Electric		1	1
Hardware			
- Copper-alloy Washer		1	1
- Ferrous Washer		6	6
Subtotal Hardware		7	7
Indefinite			
- Bone Indefinite		1	0
- Canvas Indefinite		4	1
- Colorless Glass Indefinite		1	1
- Fabric Indefinite		1	1
- Felt Indefinite		1	1

- Leather Indefinite	1	0
- Paper Indefinite	22	1
- Plastic Indefinite	5	2
- Putty Indefinite	1	0
Subtotal Indefinite	37	7
Misc. Closures		
- Aluminum Cap	1	0
- Colorless Glass Stopper	2	1
- Copper-alloy Cap	1	0
- Ferrous Can Key	1	0
- Ferrous Can Lid	7	2
- Ferrous Cap	1	0
- Ferrous Lid	4	0
- Lead Cap	1	0
- Plastic Cap	1	0
- Rubber Seal	1	0
Subtotal Misc. Closures	20	3
Misc. Containers		
- Amber Glass Bottle	13	3
- Amethyst Glass Bottle	5	1
- Amethyst Glass Bottle/Jar	6	1
- Aqua Glass Bottle	653	14
- Aqua Glass Jug	40	3
- Blue Glass Bottle	1	1
- Blue Glass Bottle/Jar	1	1
- Brown Glass Bottle	351	12
- Brown Glass Jar	1	1
- Colorless Glass Bottle	332	36
- Colorless Glass Bottle/Jar	2046	7
- Colorless Glass Jar	9	5
- Colorless Glass Jug	15	2
- Ferrous Can	566	10
- Green Glass Bottle	90	4
- Olive Glass Bottle	59	3
- Opaque-white Glass Jar	6	1
- Red Glass Bottle	2	1
- Smoky Glass Bottle	21	4
- Stoneware Jug	28	1
- Teal Glass Bottle	3	1
Subtotal Misc. Containers	4248	112
Misc. Fasteners		
- Aluminum Collar	1	1
- Aluminum Strap	3	1
- Copper-alloy Bracket	1	1
- Copper-alloy Chain	1	1
- Copper-alloy Grommet	3	0
- Copper-alloy Indefinite	1	0
- Copper-alloy Strap	3	2
- Copper-alloy and Ferrous Rivet	1	1
- Ferrous Bolt	6	6
- Ferrous Bracket	6	6
- Ferrous Chain	13	3
- Ferrous Chain Link	4	0

- Ferrous Clasp	1	1
- Ferrous D-Ring	1	1
- Ferrous Fastener	1	1
- Ferrous Hook	2	2
- Ferrous Indefinite	1	0
- Ferrous Loop	1	1
- Ferrous Nut	6	2
- Ferrous Nut and Bolt	3	3
- Ferrous O-Ring	1	1
- Ferrous Staple	2	2
- Ferrous Strap	20	1
- Ferrous Strap, Washer and Peg	1	1
- Ferrous Tack	30	29
- Ferrous Thumb Screw	1	1
- Ferrous Wire	1446	1
- Ferrous Wire Coupling	1	1
- Ferrous Wire Loop	7	0
- Ferrous Wire Twists	50	0
- Leather Strap	3	1
- Metal with Leather Clip	1	1
- Rubber Strap	3	1
Subtotal Misc. Fasteners	1625	73
Misc. Materials		
- Neoprene Indefinite	1	1
Subtotal Misc. Materials	1	1
Misc. Metal Items		
- Aluminum Corrugated Sheet Metal	1	1
- Aluminum Flange	2	1
- Aluminum Indefinite	1	1
- Aluminum Sheet Metal	1	1
- Copper-alloy Electrical Plate	5	1
- Copper-alloy Indefinite	1	0
- Copper-alloy Sheet Metal	1	1
- Copper-alloy Spindle	1	0
- Copper-alloy Spring	1	1
- Copper-alloy Trim	1	0
- Ferrous Ball	2	0
- Ferrous Bar	1	1
- Ferrous Decorative Star	1	0
- Ferrous Disc	3	3
- Ferrous Handle	9	0
- Ferrous Indefinite	18	0
- Ferrous Key	2	1
- Ferrous Knob	2	0
- Ferrous Ring	1	1
- Ferrous Rod	2	2
- Ferrous Sheet Metal	1144	1
- Ferrous Spring	5	4
- Ferrous Strap with Nail	1	1
- Ferrous Strap with Peg	2	1
- Ferrous Strap with Rivet	2	1
- Ferrous Strap with Rivets	1	1

- Lead Indefinite		3	1
- Metal Indefinite		1	0
Subtotal Misc. Metal Items		1215	25
Industrial			
Materials			
- Lime Rock		1	1
Subtotal Materials		1	1
Personal			
Accoutrements			
- Copper-alloy Watch		1	1
Jewelry	Alloy and Glass Ring	1	1
Jewelry	Shell and Composite Fill Pendant	2	1
Subtotal Accoutrements		4	3
Clothing			
Fastener	Bone Button	20	18
Fastener	Copper-alloy Belt Keeper	1	0
Fastener	Copper-alloy Brace/Hose Support Buckle	2	2
Fastener	Copper-alloy Button	65	57
Fastener	Copper-alloy Cuff Link	1	1
Fastener	Copper-alloy Hook	5	5
Fastener	Copper-alloy Rivet	220	218
Fastener	Copper-alloy Snap	1	1
Fastener	Copper-alloy Suspender Adjuster	1	1
Fastener	Copper-alloy Suspender Buckle	1	1
Fastener	Copper-alloy Suspender Clip	1	0
Fastener	Copper-alloy Suspender Loop	2	0
Fastener	Copper-alloy and Ferrous Button	21	21
Fastener	Copper-alloy and Textile Hose Support Buckle	4	1
Fastener	Ferrous Brace/Hose Support Buckle	12	9
Fastener	Ferrous Buckle	15	13
Fastener	Ferrous Button	143	116
Fastener	Ferrous Clasp	1	1
Fastener	Ferrous Overall Buckle	4	2
Fastener	Ferrous Rivet	2	2
Fastener	Ferrous Suspender Clip	1	1
Fastener	Ferrous Trouser Buckle	3	3
Fastener	Hard-rubber Button	2	2
Fastener	Metal Button	1	1
Fastener	Plastic Button	7	7
Fastener	Porcelain Button	34	34
Fastener	Shell Button	85	77
Fastener	Stainless Steel Hook	2	1
Fastener	Wood Button	5	4
Subtotal Clothing		662	599
Footwear			
- Leather Shoe/Boot		4	0
- Leather and Metal Boot		89	8
- Leather and Metal Shoe/Boot		87	3
Fastener	Copper-alloy Boot Rivet	33	0
Fastener	Copper-alloy Shoe Button	1	1
Fastener	Copper-alloy Shoe/Boot Eyelet	25	0
Fastener	Copper-alloy Shoe/Boot Nail	9	0
Fastener	Copper-alloy Shoe/Boot Screw	4	0

Fastener	Ferrous Boot Hook	3	0
Fastener	Ferrous Boot Rivet	2	0
Fastener	Ferrous Boot Tack	31	0
Fastener	Ferrous Shoe/Boot Nail	5	0
Fastener	Metal with Leather Boot Rivet	49	0
Fastener	Metal with Leather Shoe/Boot Eyelet	16	0
Fastener	Metal with Leather Shoe/Boot Screw	6	0
Subtotal Footwear		364	12
Grooming/Health			
Container	Aqua Glass Medicine Bottle	5	5
Container	Aqua Glass Sarsaparilla Bottle	5	2
Container	Brown Glass Medicine Bottle	1	1
Container	Colorless Glass Bottle	1	0
Container	Colorless Glass Magnesia Bottle	1	1
Container	Colorless Glass Medicine Bottle	17	3
Container	Colorless Glass Perfume Bottle	1	1
Container	Colorless Glass Vaseline Jar	5	4
Container	Colorless Glass Vial	3	3
Container	Ferrous Box	2	1
Container	Lead Tube	8	1
Container	Opaque-white Glass Jar	16	3
Container	Opaque-white Glass Mentholatum Jar	5	1
Container	White Improved Earthenware Pot	4	1
Toiletry	Colorless Glass Mirror	61	2
Toiletry	Hard-rubber Comb	1	1
Toiletry	Hard-rubber Double-sided Comb	1	1
Toiletry	Shell Hair Stick	1	1
Subtotal Grooming/Health		138	32
Social Drugs - Alcohol			
Container	Amethyst Glass Whiskey Bottle	2	2
Container	Brown Glass Alcoholic-beverage Bottle	2	2
Container	Brown Glass Beer Bottle	2	2
Container	Colorless Glass Whiskey Bottle	12	10
Container	Dark-olive Glass Wine Bottle	81	8
Container	Ferrous Alcoholic-beverage Can	1	1
Container	Olive Glass Absinthe Bottle	1	1
Container	Olive Glass Wine Bottle	78	6
Container	Olive Glass Wine/Champagne Bottle	3	2
Subtotal Social Drugs - Alcohol		182	34
Social Drugs - Tobacco			
- Hard-rubber Pipe Mouthpiece		1	1
Closure	Ferrous Can Lid	5	1
Container	Ferrous Can	38	16
Subtotal Social Drugs - Tobacco		44	18
Toys			
- Rubber Balloon		1	1
Subtotal Toys		1	1
Structural			
Electrical			
- Metal and Concrete Insulator		1	1
Subtotal Electrical		1	1

Hardware			
- Ferrous Barbed Wire		5	2
- Ferrous Hinge		1	1
- Ferrous Latch Plate		1	1
Fastener	Copper-alloy U Staple	2	2
Fastener	Copper-alloy Wire Nail	1	1
Fastener	Ferrous Cut Nail	1954	1255
Fastener	Ferrous Screw	10	9
Fastener	Ferrous Spike	2	2
Fastener	Ferrous U Staple	19	19
Fastener	Ferrous Wire Nail	1277	1000
Fastener	Steel U Staple	2	2
Plumbing	Copper-alloy Pipe Connector	1	1
Plumbing	Ferrous Collar	2	2
Plumbing	Ferrous Fitting	1	1
Window	Ferrous Screen Mesh	4	1
Subtotal Hardware		3282	2299
Materials			
- Chalk and Linseed Oil Window Putty		6	1
- Clay Brick		75	5
- Clay Fire Brick		3	1
- Ferrous Drain Pipe		1	1
- Glass Window		1099	1
- Lime Mortar		24	4
- Lime Whitewash		100	1
Insulation	Cotton Fabric	1	1
Insulation	Paper Newspaper	3	1
Insulation	Paper Oil Paper	80	1
Subtotal Materials		1392	17
Undefined Use			
Fuel			
- Stone Coal		2	1
Subtotal Fuel		2	1
Indefinite			
- Ferrous Amorphous		849	0
- Incidental Rubber, Modern Undefined		1	0
- Lead Amorphous		1	0
Subtotal Indefinite		851	0
Waste			
- Ferrous Slag		1	1
- Indefinite Slag		2	0
- Lead Slag		1	1
- Wood Charcoal		15	1
Subtotal Waste		19	3
TOTAL		14945	3523

APPENDIX C

DATE AND ORIGIN OF MARKED/DATABLE ITEMS

Catalog #		Material	Description	MNI	Mark	Maker	Origin	Date Range	Reference
Marked Ceramic Items									
18	4	Opaque Porcelain	Plate	1	CHIN[A]			-	
18	5	White Improved Earthenware	Plate	1	GOODWIN'S/ HOTEL CHINA	Goodwind Bros., Goodwin Pottery Co.	East Liverpool, OH	1893-1906	Praetzellis, et al. 1983:40, Mark 126; Kovel 1953:53.
Marked Glass Items									
13		Colorless Glass	Vaseline Jar	1	[TRADE]MARK /[VASE]LINE/ [CHESEBOROU]GH[, NEW YORK].	Chesebrough Mfg. Co.	Brooklyn, NY	1906 - 1955	Fike 1987:56; http://www.vaseline.co.uk/Carousel.aspx?Path=Consumer/AboutUs/History.
47		Colorless Glass	Bottle/Jar	1	[SANT]A [CRU]Z, [CAL]		Santa Cruz, CA	-	
49		Aqua Glass	Bottle	1	..RFU..			-	
410		Aqua Glass	Medicine Bottle	1	..NE M../COUGH			-	
53		Colorless Glass	Medicine Bottle	1	..STORE /.. ILLE, CAL			-	
64		Opaque-white Glass	Mentholatum Jar	1	///(Upper arch) MENTHOLATUM / REG /TRADE/ (lower arch) MARK	Mentholatum Co.	Orchard Park, NY	1889 - 1952	http://www.mentholatum-ap.com/history.html http://www.mentholatum.ca/history.html, Adkinson 2002:1.15.
67		Brown Glass	Bottle	1	..A../CO possibly for SAN FRANCISCO			-	
68		Colorless Glass	Bottle	1	CR..			-	
69		Colorless Glass	Bottle	1	..HICA.. Possibly for Chicago.			-	
78		Colorless Glass	Canning Jar	0	..H..			-	
79		Colorless Glass	Jar	1	[DUR]AGLASS (script).	Owens Illinois Glass Co.		1940 - mid-1950s	Toulouse 1971:403.
711		Colorless Glass	Bottle	0	S.. (in embossed circle or oval).			-	
815		Brown Glass	Bottle	1	/// (inside four squares clockwise from top) 9/ 47/ 2/ MG			1870s - 1920s ca.	
824		Opaque-white Glass	Canning Jar Lid Liner	0	C..			1869 -	Toulouse 1969:430
827		Colorless Glass	Jar	1	S G & / SYRAC[USE]		Syracuse, NY	-	
828		Colorless Glass	Whiskey Bottle	1	[T]EN / OUN[CES]			-	
829		Colorless Glass	Bottle	0	B2			-	
830		Colorless Glass	Bottle	0	OER / IST (Pharmacist?)			-	
11	14	Aqua Glass	Medicine Bottle	1	[DR.] KING ['S]/ [NEW DIS]COV[ERY]/ [FOR COUG]HS AN[D COLDS]			-	
11	15	Colorless Glass	Medicine Bottle	1	[D]RUG CO. (on side panel)			-	
12	1	Colorless Glass	Perfume Bottle	1	///W			-	
12	5	Colorless Glass	Bottle	1	PCGW	Pacific Coast Glass Works	San Francisco,	1902 - 1924	Toulouse 1971:415-417

							CA				
13	6	Brown Glass	Bottle	1	/// O (in center)				-		
14	10	Colorless Glass	Bottle	0	, CAL (in embossed oval)		CA		-		
14	11	Colorless Glass	Bottle	0	[C] ALI [FORNIA] ?		CA		-		
14	13	Colorless Glass	Vaseline Jar	1	TRAD[E MARK] (upper arch 1)/ VASE[LINE] (upper arch 2)/ [C]HESE[BROUGH] (across center)/ NEW YORK (lower arch); (threaded finish).	Chesebrough Mfg. Co.	Brooklyn, NY	1906	- 1955		Fike 1987:56; http://www.vaseline.co.uk/Carousel.aspx?Path=Consumer/AboutUs/History.
14	14	Colorless Glass	Bottle	1	(Owen's scar).			1905	- 1980s		Miller and McNichol 2002 in Kimball 2010:2; U.S. Department of the Interior Bureau of Land Management 2009:28-29; http://www.sha.org/bottle/ossary.htm.
15	5	Colorless Glass	Bottle	0	..ND..				-		
16	10	Aqua Glass	Medicine Bottle	1	[DR. KING'S/ NEW DISCO]VE[RY/ FOR CONS]UMPT[ION]// [H.E. BUCKLEN & CO.](side panel)// [CHICAGO, ILL.] (side panel)	H.E. Bucklen & Co.	Chicago, Illinois.	1878	-		Wilson and Wilson 1971:124.
16	11	Colorless Glass	Ink Bottle	1				1870s	- 1920s ca.		Toulouse 1969:583.
16	19	Colorless Glass	Bottle	1				1870s	- 1920s ca.		Toulouse 1969:583.
16	24	Colorless Glass	Magnesia Bottle	1	..NESIA (lower arch). (Likely Citrate of Magnesia).			1804	- Present		Fike 2006:140-141.
17	11	Aqua Glass	Bottle	1	(crown finish).			1892	- Present		Adkinson 2002:1.7.
17 14.	12	Amethyst Glass	Whiskey Bottle	1	/// 4883H			1880	- 1920		Jones and Sullivan 1989:13-
18	28	Amber Glass	Bottle	1	SAN				-		
18	29	Brown Glass	Bottle	1	ARMOUR/ [LABO]RATORI[ES]/ CHICAGO (in embossed oval)	Armour & Company	Chicago, ILL		-		Fike 1987:51.
18	30	Colorless Glass	Medicine Bottle	0	DRUGGI[ST]/ SANT[A CRUZ]/ 3 (sideways).		Santa Cruz, CA		-		
18	31	Colorless Glass	Bottle	1	/// M (in circle).				-		
18	32	Colorless Glass	Bottle	1	BON..				-		
18	34	Colorless Glass	Bottle	1	NEW				-		
18	53	Colorless Glass	Bottle/Jar	0	.. &CO				-		
18	54	Amethyst Glass	Bottle/Jar	0	..AST			1870s	- 1930s		Lockhart 2006:54; Adkinson 2002:1.22.
18	55	Colorless Glass	Bottle/Jar	0	L..				-		
18	57	Colorless Glass	Bottle/Jar	0	I				-		
19	1	Colorless Glass	Ink Bottle	1	/// MADE IN U.S.A.(upper arch)/ CARTERS (lower arch).	Carter's Inks	Boston, MA	1895	- 1920s ca.		http://www.bottlebooks.com/carter/carters_inks.htm.
19	12	Aqua Glass	Canning Jar	1	[Ba]ll.	Ball Co.	Muncie, Indiana	1886	-		http://www.fohbc.com/FOHBC_References3.html
19	13	Aqua Glass	Bottle	1	SAN (lower arch in oval or circle).		San Francisco/San Jose?		-		

19	14	Amethyst Glass	Bottle	1	..A../ ..S C../ ..Y.. (written around)/ (compass-like symbol).				-		
19	15	Red Glass	Bottle	1	NOB (possible small 2 above it).				-		
20	16	Brown Glass	Beer Bottle	1	/// L.G.Co.				-		
20	17	Aqua Glass	Bottle	1				1905	-	1980s	U.S. Department of the Interior Bureau of Land Management 2009:28-29; Miller and McNichol 2002; http://www.sha.org/bottle/glossary.htm.
20	19	Opaque-white Glass	Canning Jar Lid Liner	1	JAR (on border).			1869	-		Toulouse 1969:430
20	23	Aqua Glass	Sarsaparilla Bottle	1	[HOOD'S] (upper arch, in recessed panel)/ [SARS] (across center, in recessed panel) / PARILLA (lower arch)(in recessed panel) // C.I. HOO[D & Co] // [LOWELL, MASS] /// [28] (in recessed circle).			1878	-	1922	Fike 1987:217; http://choyt48.home.comcast.net/~choyt48/cihood_run.htm.
20	27	Colorless Glass	Whiskey Bottle	1	/// 213 (in center).				-		
20	33	Colorless Glass	Bottle	1	[SAN FRANCIS]CO/ CAL. (inside embossed square) //..T . CO.		San Francisco, CA		-		
20	35	Teal Glass	Bottle	1	..A../ ..EAT S..				-		
20	36	Brown Glass	Bottle	1	..S../ ..HILD..				-		
20	37	Brown Glass	Bottle	0	M..				-		
20	38	Colorless Glass	Medicine Bottle	0	..ALM../ [S]ANTA. (see photo).	Palmer, Sylvester A.	Santa Cruz, CA	1888	-	died 1919	Santa Cruz Sentinel October 14, 1888; Cynthia Matthews, personal communication:photos.
20	39	Colorless Glass	Whiskey Bottle	1	WHISKE[Y].				-		
20	40	Colorless Glass	Bottle	0	J..				-		
20	41	Colorless Glass	Bottle	0	..A../ 17[0]				-		
20	42	Colorless Glass	Bottle	0	[L.]?G. CO (in embossed box with rounded corners).				-		
20	45	Dark-olive Glass	Wine Bottle	2				1840s	-	1880s	Kimball 2010:3.
20	50	Colorless Glass	Bottle	0	PAL[O ALTO] (in slightly sunken rounded rectangle). Or possibly Palmer Drug.		Palo Alto, CA		-		
21	12	Colorless Glass	Bottle	0	A C				-		
21	16	Aqua Glass	Canning Jar	1	B[all] (script).	Ball Co.	Muncie, Indiana	1889-1970			www.balljars.net/ball_corporation_history.htm.
23	5	Colorless Glass	Medicine Bottle	1	…DER/ [CH]EMIST/.., CAL/// W.T.Co./ A/ U.S.A. (possiby John H. Horsnyder, Santa Cruz, California- 1898 to present).	Whitall Tatum Co.	Millville, NJ	1901	-	1924	Lockhart et al. 2006:59; Lindsey and Schulz; Santa Cruz Sentinel, 20 January 1898. Bill Lindsey and Pete Schulz

23	7	Olive Glass	Absinthe Bottle	1	*/ PERNOD/ FILS/ * (dotted circle surrounding words).			1855	- 1915	http://www.feeverte.net/pernod/page2.html; http://www.oxygenee.com/absinthe-buy/vintage2.html
23	9	Colorless Glass	Bottle	1	…T CO./…E/ [U.]S.A.				-	
24	2	Colorless Glass	Bottle	0	..TS				-	
26	10	Colorless Glass	Bottle	0	..H../ ST..				-	
26	11	Colorless Glass	Jar	1	D.. (cursive). IS THIS DURAGLASS????				-	
27	8	Brown Glass	Beer Bottle	1	NO [DEPOSIT]?				-	
27	9	Aqua Glass	Bottle	0	8				-	
27	10	Colorless Glass	Bottle	0	.., CA[L]		CA		-	
27	47	Colorless Glass	Bottle	0	..ST &/ CR[UZ]				-	
28	60	Colorless Glass	Ink Bottle	1	Label: ..oggin (one side of bottle)/ [F]ountain Pen (drawing)// Before..ink to..out..Ious../Thereafter..about/ KEEP ONE STEIGER/// 35.	STEIGER			-	
28	61	Opaque-white Glass	Canning Jar Lid Liner	0	[GE]NUINE ..			1869	-	Toulouse 1969:430
28	62	Colorless Glass	Bottle	0	..HL../ LA				-	
28	63	Colorless Glass	Bottle	0	NE..				-	
28	68	Colorless Glass	Bottle	0	17				-	
28	69	Colorless Glass	Bottle	0	..UAL				-	
28	74	Colorless Glass	Bottle	0	[A]MERIC[A]				-	
28	75	Colorless Glass	Bottle	0	R (in embossed rectangle).				-	
28	76	Colorless Glass	Bottle	0	0				-	
28	77	Colorless Glass	Bottle	0	..PHENSON (lower arch).				-	
28	78	Colorless Glass	Bottle	0	Y				-	
28	79	Colorless Glass	Bottle	0	D				-	
28	80	Colorless Glass	Bottle	0	D				-	
28	81	Colorless Glass	Bottle	0	E				-	
28	86	Brown Glass	Bottle	1				1870s	- 1920s ca.	Toulouse 1969:583.
28	102	Aqua Glass	Medicine Bottle	1	[ONE M]INUTE/ [COUGH] CURE	Elden C.DeWitt	Chicago, Illinois	1895	-	Wilson and Wilson 1971:65, 129. Fike 1987:51, 103.
28	103	Colorless Glass	Medicine Bottle	0	..ON/ [PHAR]MACIES (lower arch)/ ..S - S.F.		San Francisco, CA		-	
28	104	Colorless Glass	Vaseline Jar	1	[TRADE MARK] (upper arch 1)/ [VA]SE[LINE] (upper arch 2)/ [CHE]SEBROU[GH (across center)/ NEW YORK] (lower arch).	Chesebrough Mfg. Co.	Brooklyn, NY	1906	- 1955	Fike 1987:56; http://www.vaseline.co.uk/Carousel.aspx?Path=Consumer/AboutUs/History.
28	105	Colorless Glass	Bottle	1	W. (upper arch)/ B.. (across center)/ U.S.A. (lower arch).				-	
28	106	Colorless Glass	Medicine Bottle	0	[D]RUG[GIST]/ [SANTA] CRUZ, CA		Santa Cruz, CA		-	

28	107	Colorless Glass	Bottle	0	[SANTA] CRU[Z] (in recessed panel).		Santa Cruz, CA		-		
28	108	Colorless Glass	Bottle	0	[SA]NTA CR[UZ]		Santa Cruz, CA		-		
28	109	Colorless Glass	Bottle	0	..U or ..O				-		
28	110	Colorless Glass	Bottle	0	MAR.. (with a line through them).				-		
28	111	Colorless Glass	Bottle	0	H				-		
28	112	Colorless Glass	Bottle	0	CA				-		
28	113	Colorless Glass	Bottle	0	..ER (in recessed panel).				-		
28	114	Colorless Glass	Bottle	0	H				-		
28	115	Colorless Glass	Bottle	0	F				-		
28	116	Colorless Glass	Bottle	0	..M or ..K				-		
29	40	Brown Glass	Bottle	0	..N..				-		
29	42	Aqua Glass	Sarsaparilla Bottle	1	[HOOD'S] (upper arch, in recessed panel)/ [SARSA] (across center, in recessed panel)/ PARILLA (lower arch, in recessed panel) // [C.I. HOOD & Co] // [LOWELL, MASS] /// [28] (in recessed circle).			1878	- 1922		http://choyt48.home.comcast.net/~choyt48/cihood_run.htm. Fike 1987:217.
29	50	Colorless Glass	Bottle	1	/// W.T.CO. (upper arch)/ B (across center)/ U.S.A. (lower arch).				-		
29	51	Colorless Glass	Bottle	1	/// 16 (in sunken panel).			1905	- 1980s		U.S. Department of the Interior Bureau of Land Management 2009:28-29; Miller and McNichol 2002; http://www.sha.org/bottle/glossary.htm.
29	54	Colorless Glass	Bottle	0	SAN (in embossed oval).				-		
29	55	Colorless Glass	Bottle	0	..OZ.				-		
29	57	Colorless Glass	Bottle	0	IG.. (in rectangle).				-		
29	58	Colorless Glass	Bottle	0	..A				-		
30	20	Aqua Glass	Medicine Bottle	1	LOW[ELL]	Ayer's	Lowell, Massachusetts	1847	- 1938		Fike 1987:94.
30	21	Colorless Glass	Whiskey Bottle	1	/// 3/4 (in center)				-		
30	23	Colorless Glass	Bottle	0	BALL.. (in embossed oval).				-		
30	24	Colorless Glass	Bottle	0	[D]RUG[GIST]				-		
30	25	Colorless Glass	Bottle	0	[SANT]A /[C]RUZ		Santa Cruz, CA		-		
30	26	Colorless Glass	Bottle	0	HE../ [N]EW-				-		
30	27	Colorless Glass	Bottle	0	P../ PH../ R				-		
30	38	Opaque-white Glass	Canning Jar Lid Liner	0	P..			1869	-		Toulouse 1969:430
31	13	Colorless Glass	Vaseline Jar	0	VAS[ELINE]/ [CH]ESE[BROUGH].	Chesebrough Mfg. Co.	Brooklyn, NY	1906	- 1955		Fike 1987:56; http://www.vaseline.co.uk/Carousel.aspx?Path=Consumer/AboutUs/History.
31	14	Colorless Glass	Bottle	0	..RLE..				-		

31	15	Colorless Glass	Bottle	0	..Y				-			
31	21	Brown Glass	Bottle	0	..LA (in embossed oval).				-			
32	36	Colorless Glass	Bottle	0	[SANTA CRU]Z CAL	Palmer, Sylvester A.	Santa Cruz, CA	1888	-	died bfore 1926	Santa Cruz Sentinel October 14, 1888 Cynthia Matthews, personal communication:photos.
32	37	Colorless Glass	Bottle	0	MOD..				-			
32	38	Colorless Glass	Bottle	0	SPRIN[G]				-			
32	39	Colorless Glass	Medicine Bottle	0	[PALME]R [DRUG CO.]/ SANTA [CRUZ, CAL].	Palmer, Sylvester A.	Santa Cruz, CA	1888	-	died bfore 1926	Santa Cruz Sentinel October 14, 1888 Cynthia Matthews, personal communication:photos.
32	40	Colorless Glass	Bottle	0	..R				-			
32	41	Colorless Glass	Bottle	0	[SA]NTA..				-			
32	43	Colorless Glass	Bottle	0	..T CO				-			
32	44	Colorless Glass	Bottle	0	[SANTA CRU]Z, C[AL]		Santa Cruz, CA		-			
32	45	Colorless Glass	Bottle	0	[P]AUL				-			
32	46	Colorless Glass	Bottle	0	PAC..				-			
32	47	Colorless Glass	Bottle	0	[SA]N FR[ANCISCO]		San Francisco, CA		-			
32	48	Colorless Glass	Bottle	1	///IGCo (in diamond).	Illinois Glass Co.		1897	-	1911	Lockhart 2005:60; Toulouse 1971:264.	
32	49	Colorless Glass	Bottle	0	..[Y]S (in embossed circle or oval).				-			
32	50	Colorless Glass	Bottle	0	(illegible)				-			
32	52	Colorless Glass	Medicine Bottle	0	[PA]LMER D[RUG]	Palmer, Sylvester A.	Santa Cruz, CA	1888	-	died bfore 1926	Santa Cruz Sentinel October 14, 1888 Cynthia Matthews, personal communication:photos.	
32	59	Colorless Glass	Canning Jar	0	CO..				-			
34	3	Colorless Glass	Vaseline Jar	1	TRADE MARK (upper arch1)/ VASELINE (upper arch2)/ CHESEBROUGH (across center)/ NEW YORK (lower arch).	Chesebrough Mfg. Co.	Brooklyn, NY	1906	-	1955	Fike 1987:56; http://www.vaseline.co.uk/Carousel.aspx?Path=Consumer/AboutUs/History.	
34	9	Colorless Glass	Whiskey Bottle	0	[A]NDY BALICH (upper arch)/ [170] PACIFIC AVE. (across middle)/ [SANTA CRUZ] CAL (lower arch) (in embossed circle).	Andy Balich	Pacific Ave, Santa Cruz, CA	1910	-	1920	http://www.santacruzmah.org/2011/cordano-family-collection/.	
34	10	Amber Glass	Bottle	1	..II..				-			
34	11	Colorless Glass	Medicine Bottle	0	[PAL]ME[R]/ [SA]NTA [CRUZ]	Possibly Palmer Drug	Santa Cruz, CA		-			
35	8	Colorless Glass	Jug	1	(Owens-Illinois diamond). (Illegible numerals).	Owens Illinois Glass Co.		1930	-	1958	Lockhart 2004:24-27	
35	9	Colorless Glass	Bottle	1	/// I. G. Co.	Ihmsen Glass Co.	Pittsburgh, PA	1870	-	1895	Toulouse 1971:261.	
35	10	Colorless Glass	Bottle	1	8 c O (in embossed square). (Owen's suction scar).				-			
35	12	Colorless Glass	Bottle	0	..A..				-			

35	14	Colorless Glass	Bottle	0	..UR (script).				-	
35	15	Colorless Glass	Jug	1	[Q]UART/// 101/ I (in embossed oval and diamond)/ 41	Owens Illinois Glass Co.		1941	- 1941	Lockhart 2004:24-27
Marked GlassGlass Items										
18	33	Colorless Glass	Whiskey Bottle	1	[3 or 8] 75.				-	
Marked Other Items										
4	18	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
4	19	Copper-alloy	Rivet	1	B N & L	Brownstein, Newmark and Louis Co.	Los Angeles, CA	1895	- 1911	Van Bueren, Building the LA Aqueduct, pg. 103.
4	24	Copper-alloy and Ferrous	Button	1	LEVI STRAUSS & CO (upper arch)/ S.F. CAL. (lower arch)	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Building the Los Angeles Aqueduct
4	25	Copper-alloy	Rivet	1	L.S. & CO (upper arch)/ -S.F.- (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. Building the Los Angeles Aqueduct
4	26	Copper-alloy	Rivet	1	L.S. & CO (upper arch)/ -S.F.- (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. Building the Los Angeles Aqueduct
4	27	Copper-alloy	Rivet	1	(upper arch) L.S. & CO/ (lower arch) -S.F.-	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. Building the Los Angeles Aqueduct
4	28	Copper-alloy	Rivet	1	B N & L	Brownstein, Newmark and Louis Co.	Los Angeles, CA	1895	- 1911	Van Bueren, et al. Building the Los Angeles Aqueduct
4	38	Copper-alloy	Button	1	BOSS OF THE ROAD (in circle)	Heynemann & Co. / Eloesser-Heynemann Co.	San Francisco, CA	1878 ca.	- 1950s	Van Bueren et al. Pg. 102 Appendix C pg 37
6	21	Lead	Bullet	1	/// REM-UMC (upper arch) /32 S&W (lower arch)/ U (in center).	Remington	Madison, NC	1911	- 1960	http://mysite.verizon.net/time-saver/Firearms/Cartridge%20Collection.htm. according to http://www.munician.org/32swl/32swl.htm --Intro 1903 - still being made
6	24	Copper-alloy	Rivet	3	PAT MAY 1873 (upper arch)/ LS & CO S.F. (lower arch)// PAT MAY 1873 (upper arch)/ LS & CO S.F. (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873-	1996	Van Bueren Building the Los Angeles Aqueduct, P. 106-107
6	25	Copper-alloy	Rivet	2	L S & CO (upper arch)/ -S.F.- (lower arch)// L S & CO (upper arch)/ -S.F.- (lower arch)	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren Building the Los Angeles Aqueduct, P 106-107
6	26	Copper-alloy and Ferrous	Button	1	LEVI STRAUSS & CO. * (in circle)	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren Building the Los Angeles Aqueduct, P 106-107
7	2	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
7	21	Copper-alloy	Button	1	BOSS OF THE ROAD.	Heynemann & Co. / Eloesser-Heynemann Co.	San Francisco, CA	1878	- 1950s	Van Bueren et al.1999:102.
7	22	Copper-alloy	Button	1	TOWERS (upper arch)/ WIRE FASTENED (lower				-	

					arch)						
7	23	Copper-alloy	Button	1	LEVI STRAUSS & CO. (upper arch)/ S.F. CAL (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al.1999:106-107.
7	24	Copper-alloy	Button	1	LE[VI STRAUS]S&CO*.	Levi Strauss & Co.	San Francisco	1873	- 1996	Van Bueren, et al.1999:106-107.
7	25	Copper-alloy	Rivet	5	L.S. & CO -S.F.-.	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107.
7	26	Copper-alloy	Rivet	2	PAT MAY 1873 (upper arch)/ LS&CO SF (lower arch)// PAT MAY 1873 (upper arch)/ LS&CO SF (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107.
7	27	Copper-alloy	Rivet	1	B OF R	Heynemann & Co. / Eloesser-Heynemann Co.	San Francisco, CA	1878	- 1950s	Van Bueren, et al. 1999:102.
8	31	Ferrous	Can	2	(pocket tobacco tin)			1907, 1913	-	Rock 1987: .
8	37	Ferrous	Button	1	CARHARTTS (upper arch)/O'ALLS & GLOVES (lower arch)(engraved railroad car over a heart in center)	Hamilton Carhartt Co.	Detroit, MI	1905	- 1964	Van Buren, 1999. Pg. 105, data sheet 117
8	38	Copper-alloy	Rivet	1	PAT MAY 1873 (upper arch)/ LS & Co SF (lower arch)	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Buren, page 106-107, data sheet page 50
8	39	Copper-alloy	Rivet	2	LS & CO (upper arch)/ -SF- (lower arch)// LS & CO (upper arch)/ -SF- (lower arch)	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Buren, page 106-107, data sheet page 50
8	40	Copper-alloy	Rivet	1	B OF R - (written around)	Heynemann & Co. / Eloesser-Heynemann Co.	San Francisco, CA	1878 ca.	- 1950s	Van Buren, page 102, data sheet page 18
8	42	Ferrous	Button	1	BOSS OF THE ROAD (upper arch) (embossed bull dog).	Heynemann & Co. / Eloesser-Heynemann Co.	San Francisco, CA	1878 ca.	- 1950s	Van Buren, page 102, data sheet page 18
8	43	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
10	18	Copper-alloy	Button	1	CARHARTTS (upper arch)/ OVERALLS & GLOVES (lower arch) (engraved in center: railroad car with heart behind it).	Hamilton Carhartt Co.	Detroit, MI	1905	- 1964	Van Bueren et. al. p. 104-105, Apendix B p. 117
10	19	Copper-alloy and Ferrous	Button	1	CARHARTTS (upper arch)/ O'ALLS & GLOVES (lower arch). (engraved in center: railroad car with heart behind it)	Hamilton Carhartt Co.	Detroit, MI	1905	- 1964	Van Bueren et. al. p. 104-105, Apendix B p. 117
10	22	Copper-alloy	Rivet	1	LS& CO (upper arch)/ S.F. (lower arch)	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren et. al. 1996 p. 106-107, Appendix B p. 117
10	23	Copper-alloy	Rivet	1	LS& CO (upper arch)/ S.F. (lower arch)	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren et. al. 1996 p. 106-107, Appendix B p. 117
11	1	Copper-alloy	Nickel	1	UNITED STATES OF AMERICA (upper arch around perimeter)/ CENTS (lower arch)/ 5 (circled by 13 stars)(in center)// Reverse: IN GOD WE TRUST (upper arch)/ 1883 (lower arch)/ (shield in center)	U.S. Mint	Philadelphia, PA	1883	- 1883	www.collectorscorner.org/mark.html

11	29	Copper-alloy	Rivet	3	LS&Co (upper arch)/ -SF- (lower arch)// L.S.&Co (upper arch) -S.F.- (lower arch)	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, Thad, et al. 1999. Building the Los Angeles Aqueduct: pg. 106-107, Appendix C, pg. 6 of 173.
11	35	Copper-alloy	Safety Pin	1	(safety pin)	Invented by Walter Hunt		1849	-	inventors.about.com/od/hstartinventors/a/safety_pin.htm.
11	37	Ferrous	Can Key	0				1895	-	Van Bueren, Thad, et al. 1999. Building the Los Angeles Aqueduct: pg. 148.
12	14	Copper-alloy	Button	1	LEVI STRAUSS & CO (upper arch)/ S.F.CAL. (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren et al. 1999:106-107, Appendix C:6.
12	16	Ferrous	Button	1	LEVI STRAUSS & CO* (in circle).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren et al. 1999:106-107, Appendix C:6.
12	17	Copper-alloy	Rivet	1	LS & CO (upper arch)/ S.F. (lower arch) // LS & CO (upper arch)/ S.F. (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren et al. 1999:106-107, Appendix C:6.
12	18	Copper-alloy	Rivet	1	PAT MAY 1873 (upper arch)/ LS&CO SF (lower arch)// PAT MAY 1873 (upper arch)/ [L]S&CO SF (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren et al. 1999:106-107, Appendix C:6.
13	2	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
13	12	Copper-alloy	Rivet	1	LS&Co (upper arch)/ S.F. (lower arch)// [LS&Co (upper arch)]/ S.F. (lower arch)	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107, Appendix C, 6.
14	1	Metal	Religious Medallion	1	(Mary holding baby Jesus and a bouquet of flowers - possibly roses)// *Nossa Senhora* (upper arch)/ Dos Milagres (across center)/ Serreta-Terceira (lower arch).				-	
14	30	Copper-alloy	Button	1	CARHARTTS (upper arch)/ (engraved heart on top of trolley car).	Hamilton Carhartt Co.	Detroit, MI	1905	- 1964	Van Bueren, et al.1999:104-105, Appendix C:2.
14	32	Copper-alloy	Rivet	1	LS&Co (upper arch)/ S.F. (lower arch)// LS&Co (upper arch)/ S.F. (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al.1999:106-107, Appendix C:6.
14	33	Copper-alloy	Rivet	1	LS&Co (upper arch)/ S.F. (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al.1999:106-107, Appendix C:6.
15	3	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
15	20	Ferrous	Button	1	BOSS OF THE ROAD (written around).	Heynemann & Co./ Eloesser-Heynemann Co.	San Francisco, CA	1878 ca.	- 1950s	Van Bueren et al. 1999:102, Appendix C:19.
15	21	Copper-alloy and Ferrous	Button	1	LE[VI] STR[AUSS] (upper arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren et al. 1999:106, Appendix C:50.
15	26	Copper-alloy	Button	1	LE[VI STRAUSS &] Co * (written in circle).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106, Appendix C:50.
15	27	Copper-alloy	Rivet	2	PAT MAY 1873 (upper arch)/ LS&CO SF (lower arch)// PAT MAY 1873 (upper arch)/ LS&CO SF (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106, Appendix C:50.

16	9	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
16	37	Copper-alloy	Button	1	LEVI STRAUSS & CO (upper arch)/ *S.F.CAL* (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren et al. 106-107, Appendix C:6.
16	38	Copper-alloy	Rivet	2	L.S. & CO. (upper arch)/ -S.F.- (lower arch) // L.S. & CO. (upper arch)/ -S.F.- (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren et al. 106-107, Appendix C:6.
16	39	Copper-alloy	Rivet	1	PAT.MAY1873 (upper arch) / L.S.&CO SF (lower arch) // PAT.MAY1873 (upper arch) / L.S.&CO SF (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren et al. 106-107, Appendix C:6.
16	40	Copper-alloy	Button	1	CARHARTTS (upper arch) (embossed heart and trolley car).	Hamilton Carhartt Co.	Detroit, MI	1905	- 1964	Van Bueren et al. 104-105, Appendix C:117.
16	43	Copper-alloy	Suspender buckle	1	CARHARTTS	Hamilton Carhartt Co.	Detroit, MI	1905	- 1964	Van Bueren, et al. 1999:104-105,111, Appendix C:117.
17	3	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
17	7	Rubber	Balloon	1				1824	-	
17	8	Rubber	Hose	0				1871	-	http://www.nndb.com/people/368/000164873/.
17	23	Copper-alloy	Shell Casing	1	W.R.A. Co. (upper arch)/ 44 W.C.F. (lower arch)	Union Metallic Cartridge Co	Bridgeport, CT	1886	- 1937	http://www.leverguns.com/articles/44wcf.htm. Barnes 2000 as cited in Kimball 2010:17 - end date.
17	26	Copper-alloy	Rivet	2	L.S.&Co (upper arch)/ -SF- (lower arch)// L.S.&Co (upper arch)/ -SF- (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Buren, et al. 1999 p. 106-107, appredix C page 50
17	29	Copper-alloy	Button	1	LEVI STRAUSS&CO (upper arch)/ S.F.CAL. (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Buren et al. p. 106-107, appredix C page 50
17	32	Copper-alloy	Button	1	HEAD (upper arch)/ LIGHT (lower arch).	Head Light/Crown Head Light Company. Bought by Hamilton Carhartt Co. 1960	Cincinnati, OH	1905	- 1960s	Van Bueren, et al. 1999:105, Appendix C:58.
17	33	Copper-alloy	Button	1	HEAD (upper arch)/ LIGHT (lower arch).	Head Light/Crown Head Light Company. Bought by Hamilton Carhartt Co. 1960	Cincinnati, OH	1905	- 1960s	Van Bueren, et al. 1999:105, Appendix C:58.
17	42	Copper-alloy	Watch	1	R.H.INGERSOLL & BRO. (upper arch 1)/ NEW YORK (upper arch 2)/ PATENTED (upper arch 3)/ DEC.23.90 JAN.13.91.(lower arch 1)/ APR.23.01 AUG.9.04 (lower arch 2)/ MADE IN U.S.A. (lower arch 3).	Ingersoll Watch Company (R.H. Ingersoll & Bro.)		New York, NY		1907 - 1960 Van Buren, et al. pg. 128, Appendix C pg. 51
17	48	Ferrous	Can	1	(pocket tobacco can)			1908	-	Rock 1987:62.
18	17	Plastic and Metal	Plug	1	A-H&H/ U.S.A./ T-1328/ -2				-	

18	18	Hard-rubber	Double-sided Comb	1	I.R.COM[B ..]	India Rubber Comb Co.	New Brunswick, NJ	1856	- 1898	Woshner 1999:281
18	22	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
18	23	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
18	24	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
18	25	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
18	26	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
18	67	Copper-alloy	Button	1	HEAD (upper arch)/ LIGHT (lower arch).	Crown Headlight Co.	Cincinnati, OH	1920	- 1960	Van Bueren, et al. 1999:105.
18	68	Copper-alloy	Button	1	CARHARTTS (upper arch)/ OVERALLS AND GLOVES (lower arch)/ (trolley car inside heart).	Hamilton Carhartt Co.	Detroit, MI	1884	- 1960	Van Bueren, et al. 1999:105, Appendix C:122.
18	69	Copper-alloy	Button	1	CARHARTTS (upper arch)/ O'ALLS AND GLOVES (lower arch)/ (trolley car inside heart).	Hamilton Carhartt Co.	Detroit, MI	1884	- 1960	Van Bueren, et al. 1999:104-105, Appendix C:122.
18	70	Copper-alloy	Coin	1	In Portuguese around margin: PORTVGALIAE ET ALGARBIORUM REGINA// MARIA II DEI GRATIA (Mary the Greatful).	Portuguese Government	Portugal	1834	- 1853	www.pedroamaral.com/coin511; http://www.treasurerealm.com/coinpapers/Portugal/Kingom-Decimal/20-Reis.html.
18	71	Copper-alloy	Rivet	8	L.S.&Co (upper arch)/ -SF- (lower arch)// L.S.&CO (upper arch)/ S.F. (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:121.
18	72	Copper-alloy	Rivet	1	PAT.MAY1873 (upper arch)/ L.S.& CO (lower arch)// PAT.MAY1873 (upper arch)/ L.S.& CO. SF (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:121.
18	73	Copper-alloy	Rivet	2	B OF R (upper arch)/ lower arch (illegible).	Heynemann & Co. / Eloesser-Heynemann Co.	San Francisco, CA	1878 ca.	- 1950s	Van Bueren, et al. 1999:106-107, Appendix C:19.
18	80	Copper-alloy	Snap	1	SCOVILL MFG. CO (written around).		Waterbury, CT	ca. 1850	- 1970s	http://relicman.com/buttons/zBackmarkScovillMfg.htm.
18	81	Ferrous	Rivet	1	SHIRLEY.				-	
18	89	Copper-alloy	Boot	0	(leaf).				-	
19	32	Copper-alloy	Button	1	CARHARTTS (upper arch)/ OVERALLS & GLOVES (lower arch) (heart and trolley car).	Hamilton Carhartt Co.	Detroit, MI	1905	- 1964	Van Bueren, et al. 1999:104-105, Appendix C:117.
19	33	Copper-alloy	Button	1	CARHARTTS (upper arch)/ (heart and trolley car).	Hamilton Carhartt Co.	Detroit, MI	1905	- 1964	Van Bueren, et al. 1999 Page 104-105, Appendix C, page 117
19	39	Copper-alloy	Rivet	6	-LS&Co- (upper arch)/ SF(lower arch)// -L.S.&C0- (upper arch)/ S.F. (lower arch)	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999. Pg. 106-107, Appendix C pg. 50

19	48	Copper-alloy	Boot	0	(crown)				-	
20	12	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
20	13	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
20	14	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
20	58	Copper-alloy	Button	1	BOSS OF THE ROAD * (written around).	Heynemann & Co. / Eloesser-Heynemann Co.	San Francisco, CA	1878 ca.	- 1950s	Van Bueren, et al. 1999:102, Appendix C:19.
20	59	Copper-alloy and Ferrous	Button	1	BOSS OF THE ROAD (written around).	Heynemann & Co. / Eloesser-Heynemann Co.	San Francisco, CA	1878 ca.	- 1950s	Van Bueren, et al. 1999:102, Appendix C:19.
20	60	Copper-alloy	Button	1	BOSS OF THE ROAD (upper arch) / (bull dog in center).	Heynemann & Co. / Eloesser-Heynemann Co.	San Francisco, CA	1878 ca.	- 1950s	Van Bueren, et al. 1999:102, Appendix C:19.
20	61	Copper-alloy	Button	1	BOSS OF THE ROAD (written around).	Heynemann & Co. / Eloesser-Heynemann Co.	San Francisco, CA	1878 ca.	- 1950s	Van Bueren, et al. 1999:102, Appendix C:19.
20	62	Copper-alloy and Ferrous	Button	1	*LEVI STRAUSS & CO*S.F. CAL (written around).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:50.
20	63	Copper-alloy and Ferrous	Button	1	*LEVI STRAUSS & CO*S.F. CAL (written around).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:50.
20	69	Copper-alloy plated with silver	Suspender Adjuster	1	CROWN MAKE (scipt)/ PAT. JUNE 7, 1880	Crown Suspender Co.	New York, NY		-	The Clothier and Furnisher, Volume 23, July, 1894.
20	70	Copper-alloy	Rivet	1	PAT. MAY 1873 (upper arch)/ L.S.&Co SF (lower arch)// PAT. MAY 1873 (upper arch)/ L.S.&Co SF (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:176.
20	71	Copper-alloy	Rivet	1	LS&Co (upper arch)/ S.F. (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:176.
20	72	Copper-alloy	Rivet	1	B OF R (upper arch).	Heynemann & Co. / Eloesser-Heynemann Co.	San Francisco, CA	1878 ca.	- 1950s	Van Bueren, et al. 1999:106-107, Appendix C:176.
20	73	Copper-alloy	Rivet	1	LS&Co (upper arch)/ -SF- (lower arch)// LS&Co (upper arch)/ -SF- (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:176.
20	74	Copper-alloy	Rivet	1	PAT MAY 1873 (uppr arch)/ LS&CoSF (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:176.
20	88	Copper-alloy	Shotgun Shell	1	WESTERN MADE IN USA (upper arch)/ SUPER-X (lower arch)/ No. 12 (center).	Winchester	New Haven, CT		-	http://www.rbs0.com/shotshell.htm
20	95	White Metal	Horse Collar Pad Holder	1	MNED BY/ DEXTER CURTIS/ MADISON, WIS/ STAR COLLAR PAD/ No 7	Dexter Curtis Co.	Madison, WI	1870	-	http://wc.rootsweb.ancestry.com/cgi-bin/igm.cgi?op=GET&db=shaon-curtis&id=I582, http://www.newspaperabstracts.com/print.php?id=59601.
20	96	Copper-alloy	Clock	1	ALARM/ FAST/ SLOW/ TIME/ HANDS				-	

20	131	Neoprene	Indefinite	1	(neoprene)	DuPont		1931	-	
21	25	Copper-alloy	Rivet	1	B N & L// B N & L	Brownstein, Newmark and Louis Co.	Los Anglese, CA	1911	- 1942 ca.	Van Bueren, et al. 1999:103, Appendix C pg. 13
21	37	Cast-iron	Stove	0	20 (on inside curve above rectangular panel which may have had embossing in it).				-	
21	40	Ferrous	Box	1	[FIRS]T AID				-	
23	3	Hard-rubber	Comb	1	GOODYEAR 1851// HERCULES/ WARRANTED/ UNBREAKABLE (leaf design)	Goodyear		1851	- ca. 1917	http://www.vintagebuttons.net/rubber.html.
25	14	Copper-alloy	Button	1	LEVI STRAUSS & CO (upper arch)/ *S.F.CAL* (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:117.
25	16	Copper-alloy	Rivet	1	PAT MAY 1873 (upper arch)/ LS&C0. (lower arch)// PAT MAY 1873 (upper arch)/ LS&C0. (lower arch)	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:117.
25	17	Copper-alloy	Rivet	1	(illegible)// -L.S.&CO- (upper arch)/ SF (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:117.
26	2	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
26	3	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
26	22	Copper-alloy	Shell Casing	1	/// W.R.A.Co. (upper arch)/ 30 W.C.F. (lower arch).	Winchester Repeating Arms Co.	New Haven, CT	1895	- 1920?	http://www.leverguns.com/articles/3030history.htm.
26	23	Copper-alloy	Shell Casing	1	/// U				-	
26	26	Copper-alloy	Rivet	1	L S & Co. (upper arch)/ -SF- (lower arch)// L.S.&CO (upper arch)/ -S.F.- (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:117.
27	21	Copper-alloy	Button	1	LEVI STRAUSS & CO (upper arch)/ S.F. CAL (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, el al. 1999:106-107, Appendix C:117.
27	22	Copper-alloy	Rivet	2	LS&Co (upper arch)/ -SF- (lower arch)// LS&Co (upper arch)/ -SF- (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, el al. 1999:106-107, Appendix C:117.
27	23	Copper-alloy	Rivet	1	LS&CO (upper arch)/ -SF- (lower arch)// LS&Co (upper arch)/ -SF- (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, el al. 1999:106-107, Appendix C:117.
27	24	Copper-alloy	Rivet	1	B.N.&L.- (written around)// B.N.&L.- (written around).	Brownstein, Newmark and Louis Co.	Los Angeles, CA	1895	- 1911	Van Bueren, el al. 1999:103, Appendix C:124.
27	25	Copper-alloy	Rivet	1	B OF R - (written around)	Heynemann & Co. / Eloesser-Heynemann Co.	San Francisco, CA	1878 ca.	- 1950s	Van Bueren, el al. 1999:102, Appendix C:124.
28	2	Copper-alloy and Ferrous	Button	1	LEVI STRAUSS & CO. (upper arch)/ S.F. CAL (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, el al. 1999:106-107, Appendix C pg 6.
28	3	Ferrous	Button	1	(trolley car)	Hamilton Carhartt Co.	Detroit, MI	1905	- 1964	Van Bueren, Thad, et al. 1999. Building the Los Angeles Aqueduct: pg. 104-105, Appendix C, pg. 2 of 173.
28	5	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal

											communication.
28	9	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
28	10	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
28	11	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
28	12	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
28	13	Porcelain	Button	2	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
28	14	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
28	15	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
28	52	Paper	Indefinite	0	8				-	
28	57	Copper-alloy	Grommet	0	S				-	
28	129	Copper-alloy	Button	1	CARHARTTS (upper arch)/ (Trolly car on a heart).	Hamilton Carhartt Co.	Detroit, MI	1905	- 1964	Van Bueren, et al. 1999:104-105, Appendix C:117.
28	130	Copper-alloy	Button	1	CARHARTTS (upper arch)/ (Trolly car on a heart).	Hamilton Carhartt Co.	Detroit, MI	1905	- 1964	Van Bueren, et al. 1999:104-105, Appendix C:117.
28	131	Copper-alloy	Button	1	LEVI STRAUSS & CO (upper arch)/ S.F. CAL. (lower arch).	Levi Strauss & Co.	San Francisco, CA	1872	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:50.
28	132	Copper-alloy	Button	1	LEVI STRAUSS & CO (upper arch)/ S.F. CAL. (lower arch).	Levi Strauss & Co.	San Francisco, CA	1872	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:50.
28	133	Copper-alloy	Button	1	LEVI STRAUSS & CO* (in circle).	Levi Strauss & Co.	San Francisco, CA	1872	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:50.
28	134	Copper-alloy	Button	1	BOSS OF THE ROAD (engraved around).	Heynemann & Co. / Eloesser-Heynemann Co.	San Francisco, CA	1878 ca.	- 1950s	Van Bueren, et al. 1999:102, Appendix C:19.
28	135	Copper-alloy	Button	1	SWEET ORR & CO (written around).	Sweet Orr and Co.	Wappingers Falls / Newburgh, NY		1880-1996	Van Bueren, et al. 1999:108-109, Appendix C:123.
28	145	Copper-alloy	Rivet	2	B of R (upper arch).	Heynemann & Co. / Eloesser-Heynemann Co.	San Francisco, CA	1878 ca.	- 1950s	Van Bueren, et al.1999:102-103, Appendix. C:18.
28	146	Copper-alloy	Rivet	3	B N & L (upper arch)// B N & L (upper arch).	Brownstein, Newmark and Louis Co.	Los Angeles, CA	1895	- 1911	Van Bueren, et al.1999:103, Appendix. C:24.
28	147	Copper-alloy	Rivet	2	L.S. & CO (upper arch)/ S.F. (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al.1999:106-107, Appendix. C:6.

28	148	Copper-alloy	Rivet	37	L.S. & Co (upper arch)/ SF (lower arch)// L.S. & CO (upper arch)/ S.F. (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al.1999:106-107, Appendix. C:6.
28	149	Copper-alloy	Rivet	7	PAT MAY 1873 (upper arch)/ LS&Co S.F. (lower arch)// PAT MAY 1873 (upper arch)/ LS&Co S.F. (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al.1999:106-107, Appendix. C:6.
28	173	Copper-alloy	Shell Casing	1	H (in circle).				-	
28	180	Ferrous	Safety Pin	1	(safety pin)	Invented by Walter Hunt		1849	-	http://inventors.about.com/od/sstartinventions/a/Inventions_S.htm.
28	183	Ferrous	Suspender Clip	1	PATENT (on back).				-	Van Bueren, et al. 1999:111.
28	215	Ferrous	Button	1	BOSS OF THE ROAD*	Heynemann & Co./ Eloesser-Heynemann Co.	San Francisco, CA	1878 ca.	- 1950s	Van Bueren et al. 1999:102-103, Appendix C:2.
29	10	Lead	Tube	1	..LMIT/ MANUFACTURED/ GANE & INGRAM, INC/ New York		New York, NY		-	
29	19	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
29	71	Copper-alloy	Safety Pin	1	(safety pin)	invented by Walter Hunt		1849	-	inventors.about.com/od/hstartinventors/a/safety_pin.htm.
29	78	Copper-alloy	Button	1	(heart and trolley car).	Hamilton Carhartt Co.	Detroit, MI	1905	- 1964	Van Bueren, et al. 1999:104-105, Appendix C:122.
29	79	Copper-alloy	Button	2	LEVI STRAUSS & CO. (upper arch)/ S.F. CAL. (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:6.
29	87	Copper-alloy	Rivet	2	LS&CO- (upper arch)/ S.F. (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren et al. Pg. 106-107, Appendix C pg. 50
29	88	Copper-alloy	Rivet	2	PAT MAY 1873 (upper arch)/ LS&CO S.F. (lower arch)// PAT MAY 1873 (upper arch)/ LS&CO S.F. (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren et al. Pg. 106-107, Appendix C pg. 50
29	89	Copper-alloy	Rivet	12	LS&Co (upper arch)/ -S.F.- (lower arch)// LS&CO (upper arch)/ -S.F.- (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren et al. Pg. 106-107, Appendix C pg. 50
30	15	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
30	16	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
30	17	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
30	18	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
30	19	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.

30	54	Copper-alloy	Button	1	CARHARTTS (lower arch)/ OVERALLS & GLOVES (heart with trolley car).	Hamilton Carhartt Co.	Detroit, MI	1905	- 1964	Van Bueren et al. 1999:104-105, Appendix C:2.
30	55	Copper-alloy	Button	1	LEVI STRAUSS & CO (upper arch)/ *S.F. CAL* (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren et al. 1999:106-107, Appendix C:50.
30	56	Copper-alloy	Button	1	LEVI STRAUSS & CO (upper arch)/ *S.F. CAL* (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren et al. 1999:106-107, Appendix C:50.
30	72	Copper-alloy	Safety Pin	3	(safety pin)	Invented by Walter Hunt		1849	-	inventors.about.com/od/hstartinventors/a/safety_pin.htm.
30	79	Copper-alloy	Rivet	1	B N & L -	Brownstein, Newmark and Louis Co.	Los Angeles, CA	1911	- 1942 ca.	Van Bueren, et al. 1999:103, Appendix C:58.
30	80	Copper-alloy	Rivet	1	B OF R.	Heynemann & Co. / Eloesser-Heynemann Co.	Los Angeles, CA	1878 ca.	- 1950s	Van Bueren, et al. 1999:102, Appendix C:2.
30	81	Copper-alloy	Rivet	8	LS & Co. (upper arch)/ -S.F.- (lower arch)// LS & CO (upper arch)/ -S.F.- (lower arch)	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:50.
30	88	Copper-alloy	Clock Key	1	On handle: ALARM				-	
30	89	Copper-alloy	Hook	1	CATCH ON (script)				-	
30	111	Copper-alloy	Button	1	SWEET (upper arch)/ ORR (lower arch).	Sweet Orr and Co.	Wappingers Falls / Newburgh, New York		1871-1996	Van Bueren, et al. 1999:109-110, Appendix C:123.
31	2	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
31	36	Copper-alloy	Indefinite	0	J				-	
31	37	Copper-alloy	Button	1	CARHARTTS (upper arch)/ OVERALLS & GLOVES (lower arch) (heart and trolley car).	Hamilton Carhartt Co.	Detroit, MI	1905	- 1964	Van Bueren, et al. 1999:104-105, Appendix C:2.
31	38	Copper-alloy	Button	1	LEVI STRAUSS & CO *.	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:6.
31	44	Copper-alloy	Button	1	CARHARTTS (upper arch)/ O'ALLS & GLOVES (lower arch) (heart and trolley car).	Hamilton Carhartt Co.	Detroit, MI	1905	- 1964	Van Bueren, et al. 1999:104-105, Appendix C:2.
31	61	Copper-alloy	Rivet	3	LS&Co (upper arch)/ - S.F.- (lower arch)// LS&Co	Levi Strauss & Co.	San Francisco, CA	1973	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:6.
31	62	Copper-alloy	Rivet	1	PAT MAY 1873 (upper arch)/ LS&CO SF (lower arch)// PAT.MAY (upper arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:6.
31	64	Copper-alloy	Rivet	1	LS&CO.	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:6.
32	1	Copper-alloy	Penny	1	In God We Trust/ Liberty/ 1935 s// One Cent/ United States of America/ E Pluribus Unum.	U.S. Mint	San Francisco, CA	1935	- 1935	
32	17	Porcelain	Button	1	(Prosser molded button).			1840	- 1950s	Sprague 2002:111; Gibson 2011:personal communication.
32	68	Copper-alloy	Rivet	4	PAT MAY 1873 (upper arch)/ LS&CO SF (lower arch)// PAT MAY 1873 (upper arch)/ LS&CO SF (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:6.

32	69	Copper-alloy	Rivet	16	LS&Co (upper arch)/ -S.F.- (lower arch)// LS&CO (upper arch)/ -S.F.- (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:6.
32	70	Copper-alloy	Rivet	2	L.S.&CO (upper arch)/ -S.F.- (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:6.
32	71	Copper-alloy	Rivet	1	B.N.&L.-	Brownstein, Newmark and Louis Co.	Los Angeles, CA	1895	- 1911	Van Bueren, et al. 1999:105, Appendix C:24.
32	73	Copper-alloy	Rivet	1	(daisy motif with 8 petals).				-	
32	77	Copper-alloy and Ferrous	Button	1	LEVI STRAUSS & CO (upper arch)/ *S.F. CAL* (ower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:6.
32	78	Ferrous	Button	1	LEVI STRAUSS & CO *	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:6.
32	79	Copper-alloy	Button	1	BOSS OF THE ROAD (bulldog).	Heynemann & Co. / Eloesser-Heynemann Co.	San Francisco, CA	1878 ca.	- 1950s	Van Bueren, et al. 1999:102, Appendix C:2.
32	80	Copper-alloy and Ferrous	Button	1	CARHARTTS (upper arch)/ O'ALLS AND GLOVES (lower arch) (heart and trolley car).	Hamilton Carhartt Co.	Detroit, MI	1905	- 1964	Van Bueren, et al. 1999:104-105, Appendix C:2.
32	81	Copper-alloy and Ferrous	Button	1	LEVI STRAUSS & CO (upper arch)/ S.F. CAL. (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:104-105, Appendix C:2.
32	82	Copper-alloy and Ferrous	Button	1	LEVI STRAUSS & CO.*.	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:104-105, Appendix C:6.
32	83	Copper-alloy and Ferrous	Button	1	CARHARTTS.	Hamilton Carhartt Co.	Detroit, MI	1905	- 1964	Van Bueren, et al. 1999:104-105, Appendix C:2.
32	84	Copper-alloy and Ferrous	Button	1	TOWERS (upper arch)/ WIRE FASTENED (lower arch).				-	
33	1	Ferrous	Church Key Opener	1	FOR BEER IN CANS MARKED/ CANCO (in oval) KEGLINED/ Patent/ 96550 TRADEMARK AMCANCO	Canco		1935	- 1979	
33	8	Ferrous	Can	1	R/ FACTORY NO. 74. FIRST DISTRICT STATE OF MISSOURI/ NOTICE: THE MANUFACTURER OF THIS TOBACCO HAS/ COMPLIED WITH ALL REQUIREMENTS OF LAW. EVERY/ PERSON IS CAUTIONED UNDER THE PENALTIES OF LAW NOT TO USE THIS PACKAGE FOR TOBACCO AGAIN./ REG US PA[T]/				-	
33	12	Ferrous	Can Lid	1	BETHLEHEM STEEL COMPANY (upper arch)/ SPARROWS POINT MD PLANT (lower arch)/ In shield in center: BETHLEHEM/ STEEL	Bethlehem Steel Company	Sparrows Point MD	1904	- 2001	http://store.stocklobster.com/1575.html.
33	14	Composite	Paint Brush	1	PURE BRISTLES (upper arch)/ VULCANIZED/ IN RUBBER/ 3 IN.				-	
33	18	Aluminum	Paint Tube	2	1) permanent pigments (in script)/CINCINNATI, OHIO/ ARTISTS/ WATER COLOR/ HOOKER'S/ GREEN. 2) permanent pigments (in script)/CINCINNATI,	Permanent Pigments	Cincinnati, OH		-	

					OHIO/ ARTISTS/ WATER COLOR/ CERULEAN/ BLUE.						
33	19	Paper	Newspaper	0				1925	- 1929	Friends of the Cowell Lime Works Newsletter, Fall/Winter 2010/2011. Perry, Frank. "Writings on the Walls".
34	1	Alloy and Glass	Ring	1	14KA				-	
34	2	Ferrous	Can	2	Painted red label w/ yellow text. PRINCE ALBERT/ CRIMP CUT/ LONG BURNING PIPE AND CIGARETTE TOBACCO// FOR PIPE AND CIGARETTE SMOKERS// PRINCE ALBERT/ PROCESS PATENTED/ JULY 30TH, 1907/ R.J.REYNOLDS TOBACCO COMPANY/ WINSTON SALEM, N.C.U.S.A	R.J. Reynolds Tobacco Company	Winston-Salem, NC	1907, 1913	-	A Brief Commentary on Cans by Jim Rock 1987, Scientific Excavations at Palomar Mountain's Nate Harrison Site: The Historical Archaeology of a Legendary African-American Pioneer by Seth Mallios.
34	32	Copper-alloy and Ferrous	Button	1	BOSS OF THE ROAD	Heynemann & Co. / Eloesser-Heynemann Co.	San Francisco, CA	1878	- 1950s	Van Bueren, et al. 1999:102, Appendix C:2.
34	37	Copper-alloy	Rivet	1	LS&Co (upper arch)/ -S.F.- (lower arch)// LS&CO (upper arch)/ S.F. (lower arch).	Levi Strauss & Co.	San Francisco, CA	1873	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:6.
35	24	Copper-alloy	Button	1	SWEET (upper arch)/ ORR (lower arch).	Sweet Orr and Co.	Wappingers Falls / Newburgh, NY	1871-1996		Van Bueren, et al. 1999:109 110, Appendix C:123.
35	26	Copper-alloy	Rivet	2	LS&Co (upper arch)/ -S.F.- (lower arch)// LS&Co (upper arch)/ -S.F.- (lower arch).	Levi Strauss & Co.	San Francisco, CA	1871	- 1996	Van Bueren, et al. 1999:106-107, Appendix C:6.