A Historical Context and Methodology for Evaluating Agricultural Properties in California

Caltrans

Members of the D'Agostini family and friends pose after a day of picking grapes on their family vineyard, Shenandoah Valley, Amador County, ca. 1930s. (Courtesy of Mary Lou and Daniel D'Agostini.)

Accessibility Assistance: Caltrans makes every attempt to ensure our documents are accessible. Due to variations between assistive technologies, there may be portions of this document which are not accessible. Where documents cannot be made accessible, we are committed to providing alternative access to the content. Should you need additional assistance, please contact the Cultural Studies Office at (916) 653-4876 or CSO.Info@dot.ca.gov; Caltrans at (916) 654-2852; or visit htps://dot.ca.gov/request-ada-compliant-documents.

For more information contact:
California Department of Transportation
Division of Environmental Analysis, Cultural Studies Office
1120 N Street MS 27 Sacramento, CA
95814 (916) 653-4876

A HISTORICAL CONTEXT AND METHODOLOGY FOR EVALUATING AGRICULTURAL PROPERTIES IN CALIFORNIA

Prepared for:
Cultural Studies Office
Division of Environmental Analysis
California Department of
Transportation Sacramento

Prepared by:
Agricultural HARD Team and Caltrans Staff

Caltrans®

ACKNOWLEDGEMENTS

This study builds on the contributions of the California Department of Transportation's (Caltrans) 2007 agricultural historic context, the first document in the historical archaeological thematic studies series, which was based in collaboration and intended to be the "product of a group of individuals who share common ideals, but whose diverse backgrounds and professions are instrumental in developing a document that will address important research questions, and ultimately, result in a more efficient and scholarly approach to studying the agricultural history of California" (Caltrans 2007:3). With the inclusion of an architectural focus that compliments the archaeological viewpoint, the authors are hopeful that the current study is a useful improvement upon the original. Primary contributors to the new publication include historical archaeologists, Julia Huddleson and Kimberly Wooten, of the Caltrans' Cultural Studies Office (CSO), and historical archaeologist and architectural historian Mary L. Maniery of PAR Environmental Services, Inc. Retired Caltrans architectural historian, Bob Pavlik contributed to a more robust historical overview. Leslie Hoefert assisted with securing photo permissions, Amber Rankin revised the original graphics and prepared new figures for this updated document, and Julia Prince-Buitenhuys provided assistance with the theoretical overview.

The study was prepared under the overall direction of Jody L. Brown, CSO Office Chief. Far Western Anthropological Research Group coordinated consultants, peer reviewers, and was responsible for technical editing, ADA compliance, and production. Peer review was provided by Alex Bevk Neeb, Jody Brown, Jeff Carr, Dana Cota, Kristina Crawford, Dicken Everson, M. Colleen Hamilton, Caprice "Kip" Harper, Steven Holm, Jill Hupp, Josh Knudson, Elizabeth O'Brien, Julia Prince-Buitenhuys, Thad M. Van Bueren, and Mark Walker. Seetha Reddy, of Reddy Anthropology Consulting, Inc., and Kelly Fong, Continuing Lecturer, UCLA Asian American Studies Department, Chair and Task Force Lead for Asian American Archaeologists, respectively, with the Society for California Archaeology's Coalition for Diversity in California Archaeology (CDCA), provided substantial contributions that made this a better, more equitable document.

Our appreciation is extended to the following repositories and individuals that granted permission for use of photographs: Anaheim Public Library; Bancroft Library, UC Berkeley; Bruce Family Collection, Mariposa County Library; California Museum of Photography, UC Riverside; California State Library; California State University, Sacramento; California State University, Chico; D'Agostini family; Department of Special Collections, UC Davis; Department of Special Collections, Charles E. Young Research Library, UC Los Angeles; Eastern California Museum; Gallues Family Collection; Heritage Center, Fresno County Free Library; Historical Society of the Upper Mojave Desert; Kings County Library; Library of Congress Prints and Photographs Division; Local History Room, Beale Memorial Library; Local History Collection, Orange Public Library; Marysville Chapter Japanese American Citizens League; Mitsuji Furuta family; Museum of Ventura County; National Park Service; PAR Environmental Services; R.C. Baker Memorial Museum; San Joaquin County Historical Museum; and the Tulare County Free Library. To the best of our knowledge, the images labeled as public domain can be used without further permission.

OTHER THEMATIC STUDIES BY CALTRANS

Caltrans Guidelines for Identifying and Evaluating Historic Landscapes (1999)

Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures (2000)

A Historical Context and Archaeological Research Design for Agricultural Properties in California (2007) (superseded)

A Historical Context and Archaeological Research Design for Mining Properties in California (2008)

A Historical Context and Archaeological Research Design for Townsite Properties in California (2010)

Tract Housing in California, 1945−1973: A Context for National Register Evaluation (2011)

A Historical Context and Archaeological Research Design for Work Camp Properties in California (2013)

A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California (2016)

Bedrock Milling Features in California: Archaeological Context and Research Design (2021)

These documents can be found on the Caltrans Other Guidance website.[1]

[1] https://dot.ca.gov/programs/environmental-analysis/standard-environmental-reference-ser/other-guidance#Landscape

MANAGEMENT SUMMARY

The California Department of Transportation (Caltrans) prepared this thematic study to assist cultural resources specialists with the evaluation of historic agricultural properties for their eligibility to the National Register of Historic Places (NRHP). The current study builds on an earlier agricultural context and archaeological research design (Caltrans 2007) by updating those archaeological discussions, addressing architectural resources, and discussing the collaboration between these disciplines when multicomponent sites are present on the landscape. While this document provides a framework for evaluating most types of agricultural properties found within the state's transportation corridors, it is not a comprehensive history of the state, nor does it satisfy the requirements of site-specific research.

This study is intended to serve as both an analytical tool and a methodological framework to record, interpret, and evaluate agricultural resources. An integral part of this study is the development of a research design, which explicitly demonstrates the connection between the information a property contains and important research issues or questions. While a research design is traditionally used to assess archaeological significance, the study will also aid architectural historians. In addition, this document includes an implementation plan that advocates specific methods to follow when assessing the information value of California's agricultural properties. This implementation plan will improve consistency and thereby facilitate better comparisons to similar property types throughout the state and the nation.

The historic context comprises a broad overview that addresses the major themes in California agriculture, covering the period from early statehood through the farm labor movement of the 1970s. Future researchers are encouraged to use this context as a starting point when assessing the National Register values of farms and ranches and their associated features.

Any questions or comments on this study should be directed to the Chief, Cultural Studies Office, Division of Environmental Analysis, MS 27, P.O. Box 942874, Sacramento, CA 94274-0001 or to CSO.Info@dot.ca.gov.

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1. INTRODUCTION

Honor the hands that harvest your crops.
– attributed to Dolores Huerta, American labor leader

California is defined by its diversity—of people, industries, climate, and landscapes—which is reflected in the rich history of its farming and ranching traditions. For cultural resources specialists practicing in the state, capturing this wide-ranging agricultural history for project studies can be challenging. The current study is an updated edition and supersedes the original *Historical Context and Archaeological Research Design for Agricultural Properties in California* (2007). It expands the first study by addressing both the archaeological and architectural aspects of agricultural properties and offers a framework to collaboratively address multicomponent resources. The historic context has been updated to include new industries and important labor movements of the 1960s and 1970s. The discussion of agricultural property types has been revisited, the research design expanded and updated, and best practices in archaeology and architectural history integrated.

The original series of historic context and archaeological research designs, or HARDs, grew out of long-term efforts by Caltrans to improve the process of site-specific research and evaluation. The series also incorporated recommendations by the California State Historic Preservation Officer on how to improve evaluations of architectural and historical archaeological properties in the context of Section 106 of the National Historic Preservation Act. This statute requires that federal agencies take into account the effects of undertakings on properties listed or eligible for listing in the NRHP. The purpose of the series is to provide guidance in identifying and assessing the importance of historic-era resources commonly encountered in the transportation corridors on Caltrans projects. In addition to the current study on California agriculture, other historic-era property types addressed by Caltrans include historic landscapes (1999), water conveyance systems (2000), mining properties (2008), townsite properties (2010), tract housing (2011), work camp properties (2013), and roads and trails (2016).

When Caltrans historians, historical archaeologists, and architectural historians met in 2006 to discuss the need for uniform treatment of the most common archaeological resource types encountered in the transportation right-of-way, agricultural properties were at the top of the list. That has not changed in the decade since the original volume was published, and there is concern regarding the rapid disappearance of agricultural-based resources. As the fifth largest economy in the world, and one of the main agricultural producers in the United States (California Department of Food and Agriculture [CDFA] 2021), it is not possible for historical agricultural landscape in California to remain unchanged. As California's industries and populations adapt and expand, the historic landscape is encompassed in this unceasing change, destruction, and loss. As these cultural resources are subjected to this continuously changing dynamic, it is important to establish an understanding of their importance through both an archaeological and an architectural lens to effectively manage them for the public benefit.

Technological advances in farming methods had profound effects upon farm owners, tenants, and laborers. Historically, California adopted new agricultural technologies at a much quicker pace than the rest of the nation, a trend that continues to hold true today (Olmstead and Rhode 2003). Academic institutions, such as the University of California campuses at Berkeley, Davis, Los Angeles, and Riverside, shaped the state's farm economy by offering degrees in agribusiness and publishing scientific journals related to specific crops and technologies. Crop diversification became the norm for California as specialty crops expanded as the result of an ever-changing marketplace. Starting in 1946, UC Davis began publishing the journal *California Agriculture*, contributing to agricultural research in California (Parker 2009). UC Davis founded the Agricultural History Center in 1964 "to enhance knowledge of agriculture's past through publications, education, and other public services" (Regents of the University of California 2017). From 1965 to 1994, UC Davis published the journal *Agricultural History*, contributing to the active agricultural research in California (Strom 2019).

While the importance of new technologies was critical in the development of the state's agrarian economy, environmental factors also shaped farming and ranching practices in California, including topography, water, soil, and climate. The earliest farms in California used groundwater as the principal means of irrigating fields, vineyards, and orchards; dry farming is a practice that continues today. The introduction of formalized irrigation systems, including early farm colonies, the California State Water Project, and the federal Bureau of Reclamation's Central Valley Project, contributed to profound changes in settlement patterns and natural habitats throughout the state. Canals, ditches, and dams replaced floodplains and valleys with managed agricultural landscapes. Today, the landscape continues to change, shaped by ever increasing demands on the soil and climate change. Increasing groundwater depletion in the San Joaquin Valley, for example, has led to dramatic ground subsidence, loss of topsoil and erosion, and increased soil salinity (Arax 2019). Statewide, extended periods of climate-driven drought, as well as rising sea levels, impact both natural and cultural landscapes. These changes impact the state's infrastructure and crop capacity, while also putting cultural heritage at risk.

A common thread throughout the history of the California agricultural industry was the working conditions laborers faced. California can be credited as having the largest and most ethnically diverse migrant farm labor force in the nation (Flood 2020). Farming continues to be a labor-intensive industry, and without migrant laborers the state's agricultural economy would be in jeopardy. There is also a long tradition of family farms and tenant farmers, whose livelihoods depend upon the success of specific crops and the labor forces planting, tending, and harvesting those crops. Agriculturalists have rallied through innumerable hardships and their struggles and successes are an important part of the history of California. Together, their stories form the living memory of agriculture in California. The disciplines of historical archaeology and architectural history help ensure those stories are captured and preserved for the public.

It is also important to acknowledge some of the broad impacts and social harms that ranching and farming industries had on the Indigenous communities, tribes, and descendant communities throughout the state. These impacts are still felt by communities today, having profoundly changed both the social and physical landscape. Similarly, the disciplines of archaeology and history have pasts based on colonization and racialization. Attempts to mitigate these discipline's past injustices include engagement with tribal and descendant communities when project work impacts a community's cultural heritage, including active consultation, outreach, and project input. For this update, the authors have attempted to employ thoughtful choices in terms, language, and topics reflecting race and ethnicity.

ROAD MAP TO COLLABORATION

Historical archaeologists and architectural historians have long studied the same cultural resources and historical trends through different lenses. Archaeologists focus on features, deposits, and structural remains to understand the dynamics happening at a particular location, while architectural historians focus on standing or collapsed buildings and structures, landscape features, and infrastructure that address other aspects of importance. Both disciplines examine the written record, oral testimonies, and the physical environment in an attempt to create thoughtful, composite views of past events. Properties that include both archaeological and built environment features are referred to as *multicomponent resources* in this study. It is important for architectural historians and archaeologists to collaborate when evaluating such properties in order to gain a holistic understanding of the resource. This study explores the ways these disciplines overlap, complement, and enrich each other, and presents guidelines on how to integrate the disciplinary approaches in the most efficient and effective way possible. It is also helpful to keep in mind that collaboration should also include scholarship outside the traditional bounds of archaeology and architectural history, including ethnic studies, women and gender studies, and other related disciplines, which bring different perspectives to the history and importance of a resource.

PERIOD OF STUDY

The original 2007 publication's period of study began with California's statehood in 1850, covering up until the end of World War II in 1945. For this edition, the period of study has been extended to 1970 in order to include California's farm labor movements. While the aim of this study is to be comprehensive, given the complexity and diversity of California's agricultural economy, it is not possible to cover all topics related to farming and ranching. It must be acknowledged Native Californian agricultural practices, as well as those traditions from the Spanish and Mexican eras, played a critical role in shaping the direction of California's agrarian history prior to the Gold Rush; as important as these resources are, they are rarely encountered in the highway right-of-way. In addition, this history and these property types are significantly different from what developed in California after statehood as to warrant separate studies beyond the scope of this document. Finally, historic-era underwater resources, such as shipwrecks and submerged coastal infrastructure, within the state's coastal, lake, reservoir, and riverine rights-of-way are not addressed in this study.

DEFINITION OF TERMS

For consistency, the terms defined below are used regularly throughout the current study. The terms *Farm* and *Ranch* are often used interchangeably for rural agricultural properties. For this study, farms are generally described as properties where crops and/or orchards are grown, while ranches refer to properties that focused on raising livestock. On the landscape, however, the distinction between farm and ranch is not always clear cut and production practices often overlapped. The United States Census Bureau defines farm as the primary type of agricultural enterprise and ranches get brief attention (U.S. Census 1900). The terms *Building*, *Structure*, *Object*, *Site*, and *District* are NRHP property category descriptions from the National Park Service's (NPS) National Register Bulletin (Bulletin) *How to Apply the National Register Criteria for Evaluation* (NPS 1997a:4–5):

- **Building**: "A building, such as a house, barn, church, hotel, or similar construction, is created principally to shelter any form of human activity. 'Building' may also be used to refer to a historically and functionally related unit, such as a courthouse and jail or a house and barn."
- **Structure**: "The term 'structure' is used to distinguish from buildings those functional constructions made usually for purposes other than creating human shelter." Examples include truss bridges, irrigation, grain elevators, chicken coops, silos and fences.
- **Object**: "The term 'object' is used to distinguish from buildings and structures those constructions that are primarily artistic in nature or are relatively small in scale and simply constructed. Although it may be, by nature or design, movable, an object is associated with a specific setting or environment." Examples include boundary markers, fountains, mileposts, monuments, machinery, and statuary.
- **Site**: "A site is the location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historic, cultural, or archeological value regardless of the value of any existing structure."
- **District**: "A district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development."

Other terms used in this document include:

- **Cultural Resource**: Caltrans uses the term "cultural resources" to mean "any tangible or observable evidence of past human activity, regardless of significance, found in direct association with a geographic location, including tangible properties possessing intangible traditional cultural values, such as sacred or ceremonial sites, traditional plant-gathering areas, artifacts, archaeological sites, buildings, bridges and other structures" (Caltrans 2022, Standard Environmental Reference (SER), Volume 2: Chapter 2:2.2).
- **Historic Property**: "In federal law, a district, site, building, structure, or object significant in American history, architecture, engineering, archaeology, or

culture at the national, state, or local level, that has integrity, and that meets the NRHP criteria" (Caltrans 2022, SER Vol 2: Exhibit 1.3).

- **Historical Resource:** "In state law, any object, building, structure, site, area, place, record, or manuscript found to be historically or archaeologically significant, or significant in other specific aspects of California life, and that meets the California Register criteria" (Caltrans 2022, SER Vol 2: Exhibit 1.3).
- **Multicomponent Resources:** Archaeologists use this term, as well as "dual component site," to refer to an archaeological site that has overlapping Native American and historic-era components. This study uses "multicomponent" to also refer to a resource containing standing structures and buildings with historic-era archaeological features, deposits, and artifacts. Collaboration between historical archaeologists and architectural historians has the potential to inform on the history of multicomponent resources in a way that increases its data potential and significance of a property overall (Caltrans 2022, SER Vol 2: Chapter 5).
- **Property:** For purposes of this study the term "property" has no connotation to eligibility and is used to refer to both single and multicomponent resources.
- **Property Type**: A "property type" consists of "a grouping of individual properties based on a set of shared physical or associative characteristics" (NPS 1997a:53).
- **Ruins vs. Structural Remains**: "If a building has lost any of its basic structural elements, it is usually considered a 'ruin' and is categorized as a site" (NPS 1997a:4). The term *ruins* is often used by architectural historians to describe a dilapidated building or structure, while term *structural remains* is the more common term employed by historical archaeologists for the same resource type. While certain structural remains may not have architectural integrity, they are important features on the archaeological landscape. Caltrans guidance states: "If, after consultation with the historical archaeologist, the architectural historian determines that the building or structure does not retain sufficient structural integrity to be classified as a building or structure, and there is known historical information on the structure, the resource is considered a historical archaeological site and an interdisciplinary approach to evaluation is used" (Caltrans 2022, SER Vol 2: Chapter 6: 6-18).
- **Rural Historic Landscape**: A "rural historic landscape" is a geographical area "that historically has been used by people, or shaped or modified by human activity, occupancy, or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features" (NPS 1999:3).

NATIONAL REGISTER OF HISTORIC PLACES EVALUATION PROCESS

The following section describes the process for evaluating a property for inclusion in the NRHP. First, a property is evaluated in terms of the significance criteria set forth in 36 CFR 60.4:

> The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects [of state and local importance] that possess integrity of location, design setting, materials, workmanship, feeling, and association, and:
>
> A) That are associated with events that have made a significant contribution to the broad pattern of our history; or
>
> B) That are associated with the lives of persons significant in our past; or
>
> C) That embody the distinct characteristics of a type, period, method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> D) That have yielded, or may be likely to yield, information important in prehistory or history.

Properties less than 50 years old, unless of exceptional importance, are not eligible for the NRHP.

Under Criterion A, a property must have documented evidence of a single event or pattern of events significant in local, state, or national history (NPS 1997a). The Bumann Ranch in San Diego County is associated with the exploration and settlement of the Encinitas area by German immigrants through the establishment of the Olivenhain Colony. The property also “embodies the farthest reach of Manifest Destiny, as enacted in the Homestead Act of 1862 and fully realized in the most turbulent, future-shaping decades of American history that followed the Civil War and facilitated western expansion and settlement in the latter-19th century” (Mermilliod 2019).

Under Criterion B property must have documented evidence of affiliation with a person or persons significant in local, state, or national history, although for archaeological sites inferences drawn from data recovered at the site can be used to establish the association between the site and the important person to qualify under Criterion B (NPS 1997a:12,15). The office of George Shima on Bacon Island meets Criterion B as the place where Shima—an important figure in the 1910s and 1920s potato farm industry and a leader in Japanese American farm development—planned and operated his business (Maniery 1993).

Criterion C recognizes a distinctive design, construction, art, or other features associated with the characteristics of a type, period, or method of construction, or that represent the work of a master. Criterion C can include the overall design and layout of an agricultural site, as well as the architectural or engineering components found in individual elements. It may also include physical traits that reflect a cultural heritage preference, such as an outdoor oven built by Italian farmers using designs from the Mediterranean that reflect their heritage. This criterion considers the holistic appearance and features of a farm or ranch, as well as the individual components. The Coach Barn at “Lucky” Baldwin’s estate, now located in the Los Angeles State and County Arboretum in Santa Anna, is an outstanding and well-preserved example of Queen Ann style architecture (Snider 1980). In addition, the interior has alternating slats of Port Orford cedar and redwood paneling. The stall spaces for carriage horses are generously sized, and convenient hay and grain chutes fed directly from the loft above.

Criterion D requires assessment of archaeological data potential of a site in relation to relevant research issues. Barbara Little et al. (2000:29) described five basic steps for evaluating an archaeological property’s eligibility for listing in the NRHP under Criterion D, as summarized here:

1. Determine the property’s structure, content, and classes of data that it may contain.
2. Identify the appropriate historic context by which to evaluate it.
3. Identify important research themes and questions that the data it contains may be able to address.
4. Determine whether the data it contains are of sufficient quality to address these important research issues.
5. Identify the important information that the property is likely to contain.

Located along the San Francisco Bay, the refuse dump associated with the Carnduff Farm (CA-SMA-368/H), was found eligible for the NRHP under Criterion D. The site had an assemblage with a “rich interpretive value, underscoring the need for more deliberate and conscientious assessments of such seemingly unimportant resources” (Van Bueren 2009:163).

On rare occasions, architectural resources could qualify for the NRHP under Criterion D for data value if they may yield information on historic building techniques, such as vernacular architectural traditions, not readily available or documented from other sources. The NRHP nomination, *Agriculture on the Carson River in Douglas and Ormsby Counties in Nevada* (Bertolini 2017), highlighted the potential for Criterion D values at an architectural property. Although this nomination did not identify built resources eligible under Criterion D, it provided for that possibility:

> For example, a barn or shed type that becomes important in dating that property type, construction expertise which affected the evolution of a local building technique, local availability of materials, use or ethnic associations, etc., may be eligible under Criterion D in the area of Agriculture or Architecture, or both. At present, there exist significant research gaps in the understanding of local vernacular architecture related to barn building, and the relationship between ranch owners, barn builders, and ethnic barn building traditions. The ability of a specific barn to address this research gap and provide greater understanding of ethnic building traditions in the study area may allow a built resource to be eligible under Criterion D.

If a property meets one or more of the four criteria, then the physical aspects of integrity are assessed to ascertain if the property has the ability to convey the noted significance. To summarize the Bulletin *How to Apply the National Register Criteria for Evaluation* (NPS 1997a:44–48), the aspects of integrity are defined as:

- ***Location*** is the place where the historic property was constructed or the place where the historic event occurred;
- ***Design*** is the combination of elements that create the form, plan, space, structure, and style of a property;
- ***Setting*** is the physical environment of a historic property; and
- ***Materials*** are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property;
- ***Workmanship*** is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory;
- ***Feeling*** is a property's expression of the aesthetic or historic sense of a particular period of time; and
- ***Association*** is the direct link between an important historic event or person and a historic property.

Integrity is based on significance: who, what, where, when, and why a property is important. Only after significance is fully established is the issue of integrity addressed. Ultimately, the question of integrity is answered by whether the property retains the identity for which it is significant.

Applying the NRHP criteria for evaluation is a complex undertaking and requires that cultural resource specialists follow a set process. The NRHP Bulletin series is an essential reference. Of particular importance in addition to *How to Apply the National Register Criteria for Evaluation* (NPS 1997a), is *Guidelines for Evaluating and Registering Archeological Properties* (Little et al. 2000). Both are available on the NPS website.[2] In addition, *Assessing Site Significance: A Guide for Archaeologists and Historians* (Hardesty and Little 2009) offers practical advice and many informative case studies.

CALIFORNIA REGISTER OF HISTORICAL RESOURCES

The eligibility criteria for the California Register of Historical Resources (CRHR) closely parallel those of the NRHP. In certain cases, a property that is not eligible for listing on the NRHP, may qualify for the CRHR. According to the California Office of Historic Preservation (OHP) Technical Assistance Series #7: "A resource that has lost its historic character or appearance may still have sufficient integrity for the California Register if it maintains the potential to yield

[2] http://www.cr.nps.gov/NR

significant scientific or historical information or specific data" (OHP 2001:11). The Caltrans research design series may be used to help evaluate a property's eligibility to the CRHR for the purposes of complying with the California Environmental Quality Act (CEQA) within the requirements of the CRHR's implementing regulations at California Code of Regulation Section 4850 *et seq.* As with the NRHP, all the California criteria should be considered.

VOLUME CONTENTS

Along with this introduction, this study includes four additional chapters to assist in recording, assessing, and evaluating agricultural resources. These chapters are as follows:

- Chapter 2 is the historic context outlining the significant broad patterns of California's agricultural development. This chapter includes a cross-disciplinary review of current scholarship that informs the research design. It provides a solid basis for the evaluation of archaeological, architectural, and multicomponent resources, a foundation further enhanced by site-specific research. It is presented in two parts. Part One provides a general overview and context of agricultural development. Part Two focuses on individual crops to provide insight into the crop diversification that occurred in California.
- Chapter 3 describes the agricultural property types created by the people, industries, and processes that represent the agricultural history discussed in Chapter 2. These property types are the buildings, structures, objects, sites, and districts that architectural historians and historical archaeologists may encounter in the field.
- Chapter 4 provides a theoretical orientation, previous historic-era archaeological studies from various regions of California, as well as appropriate studies from outside the state. The main section of the chapter is research design, with research themes and questions based on the historic context and the property types, concluding with a data requirements section. While the primary focus of this chapter is on evaluating archaeological resources under Criterion D/4, the process for understanding the built environment is touched on as well, providing a platform for creative collaboration between the disciplines.
- Chapter 5 provides a methodological approach for determining the historic significance of agricultural properties in California. This chapter also includes methods for conducting architectural and archaeological fieldwork, including documentation standards and ways to define the spatial layout and land-use areas of agricultural properties. It explores the issue of integrity and its relationship to significance and includes a discussion of evaluation considerations for each criterion.
- The appendices include supplemental material to assist with research efforts and with evaluations of archaeological sites through excavation. Appendix A

is an annotated list of historical repositories. Appendix B provides detailed methods and approaches for using excavations to evaluate archaeological sites. Appendix C is a glossary of acronyms used in the text. Appendix D provides references for additional readings. Appendix E contains the rules for labor camps written by the California Commission of Immigration and Housing in 1920 that affected agricultural labor camps.

CHAPTER 2. HISTORICAL CONTEXT

California agriculture defies simple, accurate generalizations.
– Warren Johnston (1997:63)

PART I: AGRICULTURAL SETTLEMENT IN CALIFORNIA

Introduction

The history of agriculture is immense in its scope but of critical importance regarding the physical, social, political, economic, and technological development of California. Agricultural properties provide a unique opportunity for understanding the development of the industry over time. Since California currently lacks any comprehensive preservation plan or broad statewide study of its historic agricultural resources, this context will serve as a framework for classifying agricultural sites by geographic region, crops grown, and property types.

California's agricultural history is incredibly diverse. In 1939, Carey McWilliams (1939:103–104) stated that "the state produces 214 different agricultural products, including some 35 field crops, 68 fruits, 86 vegetables, and 40 different commercial livestock, poultry, and honeybee products… Approximately 118 different and distinct types of farming can be found in California. In comparison, there are 8 types in Illinois, 12 in Kansas, 20 in Texas, and 25 in Pennsylvania." Claude B. Hutchison reiterated this in his history *California Agriculture*, published in 1946. Agriculture occurs in virtually every corner of the state. Warren Johnston (1997:65) divided the state into eight distinct regions, with Southern California having two sub-regions: the South Coast and the South Desert. A more detailed discussion about the agricultural or geomorphic regions presented in this report is based on Beck and Haase (1974) and Johnston (1997).

If there was one singular event that shaped the course of California's agricultural landscape, it was the discovery of gold at Sutter's Mill in Coloma in 1848 and the ensuing Gold Rush. Not only did the Gold Rush almost instantly create a demand for agricultural foodstuffs, but it also set in motion a wave of settlement aimed at producing commercial food products. Unlike existing well-established agricultural regions of the United States, during the early 1850s there was no singular model for agricultural production in California. Nor was the development of agriculture a monolithic event solely geared towards mass production and marketing. Many would-be farmers in Gold Rush California considered themselves horticulturalists, experimenting with products and introducing new varieties from stock of their own creation. Credit should also be given to the earlier agriculturalists of the Spanish and Mexican periods, who successfully cultivated a wide variety of crops that carried forward after statehood.

Historians, architectural historians, geographers, and archaeologists have investigated agrarian households and their associated farming or ranching ventures in an effort to interpret patterns of change over time and across regions, as well as the adaptability of farmers from different backgrounds to changing environmental, social, and economic conditions (Fite 1966, 1981; Gonzales 1971; Limerick 1987; Orser 1990; Stein 1990; Stoll 1998). Johnston noted that, "the challenge to California's farmers and ranchers has always been to match available, and often limited, physical, human, financial, and managerial resources to produce and market alternative outputs chosen from a long and constantly evolving set of potential agricultural commodities and value-added products" (1997:30). The ever-evolving complex of producers, laborers, and buyers added to the diverse nature of the state's agricultural industry. Ideology, tradition, and culture merged as agricultural communities formed. While some failed, others succeeded and prospered. Today, second, third, and fourth generation farmers continue to seed their lands, ever adapting to the changing political and environmental climate of California.

Patricia Limerick stated that, "Westward expansion was supposed to create a land of independent, agrarian landowners and to prevent the rise of a wage-dependent laboring population" (1987:124). That ideal, however, proved elusive for a wide variety of reasons. Farming has always been a risky business dependent on the vagaries of nature and the marketplace. Western farms, in most cases, proved more challenging to establish and render viable than their eastern and southern counterparts, largely because of the general lack of knowledge regarding the state's natural conditions (Figure 1). The early dominance of large commercial operations and ongoing issues of labor supply also challenged smaller independent agriculturalists.

The cultural history of California agriculture is particularly important but it is often not easily identifiable from historic records alone. California's agricultural provinces did not always have a clear distinction among cultural groups participating in the same industry, nor did most agricultural workers take the time to record their daily activities. At the turn of the century, Mexican laborers found work alongside Japanese, Chinese, and Filipinos, though growers might purposefully segregated worker housing based upon racial or ethnic lines. Small family farms in the 19th and early 20th century were often owned by women, immigrants, Black, or other minority groups, given the democratic nature of the 1862 Homestead Act. Understanding both the physical and cultural characteristics of housing in California's agricultural industry is paramount to addressing questions related to adaptation and innovation, as well as race, gender, and family and community structures.

The technological history of agriculture is as important as its cultural history. California developed into a proving ground for new agricultural inventions, evidenced by the hundreds, if not thousands, of machines and implements advertised in trade journals or exhibited at agricultural fairs. Particularly important are mechanical devices that Californians invented, and in some cases, patented. Understanding technological change as it relates to agricultural properties is essential for establishing historic context and significance. A basic understanding of the variety of implements that California agriculturalists adopted during the 19th through the mid-20th centuries is also important. Accurate identification of farm equipment or machinery will ultimately assist in developing site chronology, historic context, helping researchers understand the economic and environmental determinants in decision making processes.

According to Olmstead and Rhode (1990), several of the most important forces that spurred agricultural development in California include:

Figure 1. A typical modest 1930s homestead. (Keystone-Mast Collection, KU43131, UCR/California Museum of Photography, courtesy of the University of California, Riverside.)

- Passage of laws leading to accessible and free land;
- Available agricultural labor from a succession of countries including China, Japan, the Philippines, India, and Mexico;
- The spread of irrigation;
- Improved transportation including railroads, refrigerated rail cars, trucking and rural roads, and improved handling, storage, and technology;
- The development of marketing cooperatives; and
- Increased mechanization.

The transformation of California's farming economy from expansive grain fields and grazing lands occurred relatively quickly and had profound consequences on the state's agriculture. Factors in this shift in agricultural production included a five-fold increase in the state's population from 1890 to 1930, growing from one million to five million people. That growth, combined with rising incomes from 1910 to 1929, drove consumer demand away from field crops to more specialized crops, spurring the creation of a world class agricultural and research system in the state (Johnston and McCalla 2004).

19th Century Models for Agricultural Settlement

A variety of motivations characterized the development of agriculture in California. The concepts of private or individual ownership and free market economics were of particular importance. Religion and faith also played an important part in both the daily life of farm families and in the broader social and cultural norms that helped define agricultural communities. While the concept of manifest destiny is less tangible, it served the needs of politicians and journalists who took the concept and interpreted and adapted it to shape public opinion.

Agricultural properties reflect the broadest range of cultural traditions of any type of historic resource found across California's vast landscape. Agriculture has its roots in this nation's first settlements and in the philosophy of the country's first leaders and statesmen, such as Thomas Jefferson, "who envisioned the new republic as a nation dependent on citizen farmers for its stability and its freedom" (Auer 1989). Prevailing for the better half of the 19th century, Jeffersonian ideology equated hard work to virtue and sound moral judgment. Jefferson wrote in 1781, "those who labor in the earth are the chosen people of God, if ever he had a chosen people, whose breasts he has made his peculiar deposit for substantial and genuine virtue." A powerful statement such as that of Jefferson's, reflected the values of the time and had a profound influence on the new republic during the late 18th and 19th century.

Intensive settlement in California occurred first in San Francisco and Sacramento during the Gold Rush period and extended into the hinterlands after miners followed the discovery of gold-bearing placer deposits. Whether through pragmatism or ideology, agricultural development occurred in California at a fevered pace during the early 1850s. California's early agriculturalists arriving from the Eastern United States brought with them a long history of family traditions associated with agriculture that influenced their agricultural practices. For California, its diverse natural resources symbolized the opportunities that availed those individuals who chose to toil upon the land.

Ideology is manifested in both settlement patterns and material objects, and also marks California's agricultural history. Although the material culture formed by California's agricultural economy is a main focus of this study, the ideological characters of farm or ranch families is important in the broader interpretation of archaeological remains, standing buildings and structures, and landscape features.

Manifest destiny, a phrase used by leaders and politicians in the mid-19th century to justify continental expansion by the United States, created a sense of "mission" or national destiny for some Americans. Many believed a divine calling obligated them to extend the "boundaries of freedom" to others by imparting their idealism and belief in the institutions of democracy. Nonetheless, this belief often excluded people perceived as being incapable of democratic self-government, such as Native Americans and those of non-European origin. Freedom also meant fee-simple ownership of the land and, at the time of United States Western colonization, the

Mexican government had established claims to vast tracts of land in California. California, unlike the long-established settlements on the East Coast, became a beacon for settlers who believed in the inherent right of individual land ownership and the notion that enormous amounts of free land awaited them.

To what extent each or any one definition of manifest destiny actually motivated one person or groups of people to move to California cannot be known. To be sure, the notion of making better use of the land, agriculturally, parallels the earlier notion of Jeffersonian Democracy and the superiority of the yeoman farmer. Likewise, those bound for California during the 1850s in search of gold were persuaded to make the arduous journey not only to seek financial returns, but also to join a larger movement of colonization and self-fulfillment that swept the nation and much of the world during the mid-19th century (Figure 2). As the 19th century came to a close, the concept of manifest destiny shifted towards industrial resources as capitalists exploited the state's natural resources, particularly its water, fisheries, lumber, and minerals other than gold.

Figure 2. Westward the Course of Empire Takes its Way based on Emanuel Leutze's 1861 mural. In a bid to encourage people westward, advertisements told success stories of those who had trekked across the continent, claimed land, or had become successful. Pictures, such as the one seen here, were painted to exploit the theme of Manifest Destiny. (BANC PIC 1963.002:0743—E, Robert B. Honeyman, Jr. Collection of Early Californian and Western American Pictorial Material, BANC PIC 1963.002:0001-1886, courtesy of The Bancroft Library, University of California, Berkeley.)

Other factors provided impetus for settlement of California during the 19th century, including the periodic high birth rate and increases in population due to immigration, and because agriculture, as the primary economic system in the United States, required large families to work the farms. Expansion into frontier areas created opportunities for new commerce and individual self-advancement. Land ownership often led to the creation of wealth, self-sufficiency, political power, and independent self-rule. Without question, not everyone benefited equally from the fruits of manifest destiny.

The Treaty of Guadalupe Hidalgo in 1848 brought the Mexican American War to an end and guaranteed the land rights of resident *Californios*. However, many eventually lost their lands because of Congress created the Land Law of 1851 to systematically address the problem. The act established a commission charged with reexamining all Spanish and Mexican land titles. This placed the burden of proof on existing landowners—a difficult task for most *Californios*. Many barely understood English and disreputable attorneys often victimized them (Pitt 1966; Rolle 1963). Thus, the Land Law either outright invalidated many rancho claims or forced their Californio owners to sell off all or part of the lands.

Americans began to arrive in California in large numbers with the onset of the Gold Rush in 1848 to 1849. They felt it intolerable that a few hundred Mexicans should control vast tracts of the most fertile and desirable lands. Squatters began to occupy much of the rancho land, sparking lawsuits, distrust, and a great deal of acrimony (Pitt 1966; Rolle 1963). The San Francisco Bay area experienced the most acute squatting, where by 1853, "every rancho within a day's march of San Francisco Bay had its contingent of uninhibited nonpaying guests," according to Pitt (1966:97).

As to what else motivated settlers, farmers, and others to come to California, the answer is as varied as the many meanings of the term manifest destiny. For example, the desire to cultivate, for example, whether by hard work or eased by technological innovation, inspired many to trek to California for economic benefits. Likewise, the Gold Rush itself provided the impetus for large numbers of people to initially settle in the foothills of the Sierra Nevada with dreams of striking it rich, turning to agriculture after failed mining efforts. While no single model explains the full range of settlement patterns that formed California's agricultural landscape, manifest destiny, the idea of natural right, geographical predestination, as well as other concepts played a part in the creation of agricultural properties.

Immigrant farmers brought with them a strong will to succeed, knowledge of crops and soils, and cultural traditions about family, religion, and work. Agriculturalists in California quickly took advantage of the state's relatively gentle climate, fertile soils, and geographic setting with its natural harbors, and its one principal navigable river, the Sacramento.

For many Americans, establishing a homestead epitomized the ideology expressed in Jeffersonian Democracy, although in practice many homesteaders were motivated by market capitalism and the creation of wealth. Even so, homesteading formed the foundation for California's agricultural economy during the 19th century. Under the Preemption Act of 1841 settlers could preempt land in the public domain. By 1850 the United States General Land Office began conducting land surveys, establishing a uniform grid. This pattern was the result of another Jeffersonian principle—the establishment of baselines and meridians in the western territory. This resulted in the formation of townships, ranges, and sections, which is the land division grid still in use today. Each section is one mile square and contains 640 ac. of land.

Preempted lands were often later filed for under the Homestead Act of 1862. A homestead application could include one-quarter of a section, or up to 160 ac. of land. For many, the word "homestead" conjured up a self-fulfilling premonition of entitlement, property rights, individual freedom, and self-sufficiency. Many saw a homestead as an entitlement for every American who desired to succeed, raise a family, and achieve self-independence (NPS n.d.).

While people established homes and fields on land before the official Homestead Act of 1862, the legal mechanism for achieving self-independence and fee-simple ownership of land largely came about after the passage of the Act. The Homestead Act has been called one the most important pieces of legislation in the history of the United States (NPS n.d.). The act turned over vast amounts of the public domain to private citizens. According to one report, "nearly 270 million acres, or 10 percent of the area of the United States was claimed and settled under this act" (NPS n.d.).

In addition, the Act took an unprecedented democratic approach to land ownership. Any citizen (or would-be citizen) could claim land under the act if they were 21 years of age and able to "prove up" the land (i.e., built a house and barn and cultivate 5 to 20 ac. of fenced pasture or fields) within five years (Figure 3). Women, Blacks (after the passage of the 14th Amendment in 1868), and immigrants working through the naturized citizen process were able to acquire and eventually own land for a minimal amount of money (Fairchild 2020).

The dream of individual land ownership prevailed almost universally. Yet, for much of the world, individuals rarely obtained fee-simple land ownership. America, and ultimately California, offered hope and soon became a symbol for this new freedom, although for many immigrants it meant great sacrifice and suffering racial prejudice.

The zeal to acquire land as a basis for an independent and self-sufficient life, as well as the principle of manifest destiny that justified usurping it, provides only part of the picture. In Rodman W. Paul's essay "The Beginning of Agriculture in California: Innovation vs. Continuity," Paul made a convincing argument that in the early years of the development of agriculture in California "the chance to profit by growing food in California was too obvious to be overlooked" (Paul 1973:16). The sudden population influx outstripped the food on hand, driving prices upward.

Transportation remained difficult, and perishable foods simply could not survive long journeys by land or sea. Typically, most of the food products that entered California during the early 1850s were not fresh but instead were cured from salting or other similar means. Thus, many of California's first settlers turned to agriculture, not simply as a way to subsist, but as a way to profit because of the high demand for varietals and fresh foods.

Figure 3. Front and side view of a homestead near Wawona. Notice the recently felled trees in the foreground. Many of the mountain homesteads included an orchard. (The San Joaquin Valley Digitization Project, Bruce Family Collection, mpa0029, courtesy of the Mariposa County Library, San Joaquin Valley & Sierra Foothills Photo Heritage, San Joaquin Valley Library System, Fresno.)

During the latter part of the 19th century, the market-oriented, capitalistic impetus for establishing many of the state's agricultural properties took place under the *laissez faire* economic policies of the period (Peterson 1935). *Laissez faire* policies (i.e., governmental non-interference, lack of regulations and oversight, and free market competition) stemmed, in part, from repugnance for earlier trade interference by the British government, dictated that the federal government should not interfere with economic development. This hands-off approach, coupled with the rapid consolidation of huge agricultural landholdings in California, had a profound effect on the evolution of agriculture in the state. For example, by the 20th century, small operators had to struggle to compete with the domination of the marketplace by huge enterprises that pioneered mass production, use of machinery, pesticides, fertilizers, irrigation, and distribution methods based on industrial or scientific models of production. The loss of small agricultural properties resulted in a gradual concentration of wealth, sometimes through unfair competition and monopoly control (Peterson 1935:7), that set the stage for top-down control of the agricultural industry in California.

The Land of Milk and Honey

Much of the nation viewed California as the land of riches, first through mining gold, and later, by taking advantage of the state's rich soils and mild climate, to harvest crops and raise livestock. California newspapers and periodicals extolled the state's economic opportunities during the 1850s, while at the same time, fledgling farmers experimented with a wide variety of agricultural products. In 1854 *The California Farmer*, the first periodical devoted to agriculture in the state, praised the hard work of local farmers who cultivated a variety of crops, including grapes, apples, strawberries, walnuts, pears, figs, potatoes, eggplant, wheat, buckwheat, barley, squash, chili peppers, turnips, beets, onions, pumpkins, Indian corn, and oats. Experimentation seemed to be the singular most important aspect of agriculture during this period of unprecedented growth, and California farmers adapted quickly, taking advantage of the state's most fertile native soils. California still imported citrus produce, such as oranges, limes, and citrons, mainly from Southern Europe, but that rapidly changed during the 1870s and 1880s.

In California, politicians recognized the importance of agriculture and land settlement and proclaimed its virtues and obstacles before the State Agricultural Society. In the Society's annual address for 1870 to 1871, one of the commissioners commented on the state of agriculture in California:

> As I am not a practical agriculturalist, you will not expect a dissertation on modes of improving stock, or fertilizers, or agricultural chemistry. But a few observations may be acceptable upon the question so interesting to every farmer and to every businessman of the State: Why does not California, with all its attractiveness and productiveness, grow more rapidly in population and development? The first, and to my mind the strongest reason, is the difficulty of acquiring lands cheaply in this State. Years ago, before Americans possessed this El Dorado, the Spaniard obtained grants of all the lands fanned by the sea breezes, where, the lord of vast tracts, he lived lazily, surrounded by herds and dependents. When his possessions were afterwards confirmed to him or to speculators who fleeced him, these great grants remained, and many remain, in very few hands, held at large rates per acre, and forbidding close settlement and improvement. To supplement this system came fraudulent land grants, absorbing whole counties, and often confirmed. California would be millions of dollars richer to-day had not the Mexican system of colonization been practiced in it, provided the valleys and hillsides subjected to Mexican grants had not been open to the second curse of our land system—that of private entry [California State Agricultural Society (CSAS) 1872:82–83].

The comments from the State Agricultural Commission reflected the stereotypes, inherent racism of the era, and the difficulty that many newly arrived agriculturalists, particularly immigrants, faced with surging land prices and the best lands already under patent.

Paradoxically, in late 19th century California, the democratic ideal of owning the family farm came into conflict with the increasing demand by agriculturalists for a transient workforce, as small farms expanded through the acquisition of land or because of improved technology.

The firm of Miller and Lux, owned by two of California's most important land barons, acquired vast tracts of land in San Joaquin Valley, beginning in 1863 (Figure 4). They understood the importance of maintaining a transient workforce together with a more stable one that would keep wages low and at the same time establish a paternalistic relationship with both day laborers and full-time employees (Igler 2001). Miller and Lux also recognized the difficulties in transforming predominantly arid land into productive farmland, and through the use of cheap labor, manipulation of the land laws, and a great deal of capital they were able to irrigate thousands of acres that would otherwise have remained minimally productive. While Miller and Lux were reaping huge benefits from turning arid land into productive farm and grazing lands, other settlers were barely making ends meet (Igler 2001).

Figure 4. The Old San Luis Ranch House of Miller and Lux. (Jesse Brown Cook Scrapbooks Documenting San Francisco History and Law Enforcement, Volume 27, 19a, courtesy of The Bancroft Library, University of California, Berkeley, public domain.)

By the turn of the century, California was experiencing rapid industrialization, urban growth, diversification of agricultural products, and an expanding pool of immigrant laborers. Popular magazines and local newspapers wrote about the virtues of farm life contrasted with the growing health concerns evidenced in the nation's large cities. The back-to-the-land movement—sometimes referred to as the country-life movement, was an outgrowth of these concerns. It marked the beginning of a return to agrarian values, if not practically at least symbolically. In 1880, the honorable Frank M. Pixley of San Francisco addressed the CSAS and proclaimed the benefits of "country life." Pixley asserted that it taught "good industry, economy, and made good citizens… where children honored and obeyed their parents, and parents worshiped God, and where marriage was sacrament and divorce, unknown" (CSAS 1881:230–231).

The country-life movement achieved some national recognition in 1908 when President Theodore Roosevelt created the Country Life Commission to investigate the problems associated with efficiency and production in rural farms (Scheuring 1995:74). The movement focused largely on emotion despite the efforts of the politically appointed commission to instill a sense of urgency and help increase productivity and production. Still, it influenced relatively large numbers of people, “who desired a rural residence in the country, a home with a few acres of ground where they could grow fresh vegetables and perhaps a little grain and hay for the support of chickens and three or four cows” (Layton 1988:9–15; Scheuring 1995: 74–75). The movement may have also spurred interest in scientific farming methods, which were believed to improve the quantity and quality of farm produce, and to maximize efficiency. Large scale commercial farming was the antithesis of this movement.

Other alternatives to large scale farming included the formation of agricultural colonies and the establishment of cooperatives in the early 20th century that sought to pool resources in an effort to establish successful ventures for newly arriving immigrants, compete with industry giants or to test Socialism models. The Llano del Rio Cooperative Colony in California’s Antelope Valley and the Durham State Demonstration Agricultural Colony in the Central Valley are two such examples of socialized farming (Farley and Corley 1996; Greenstein et al. 1992). Neither colony lasted due in large part to overzealous claims, the unpredictability of natural conditions such as climate and crop-damaging diseases, maintaining a consistent supply of water for irrigation and domestic use, as well as the changing social and political climate of California. Other colonies formed by fellow countrymen seeking success in a new land, such as Washington Colony in Fresno County, were more successful. In these examples, a large land purchase was established as a cooperative colony divided into 20 ac. lots and farmed communally by Scandinavians, Germans, or other immigrant groups (Thickens 1946).

The crusade to irrigate much of California played an important role in the expansion of mechanized farming and in the establishment of small farming communities (Figure 5). Irrigation meant a steady supply of water that farmers subsidized in certain cases through the sale of hydroelectric power. As a whole, California did not make a concerted effort to expand its agricultural water supply systems until after the passing of the 1887 Wright Act, which fostered the creation of irrigation districts. Irrigation districts were intended to be fundamentally democratic because the costs and management of the districts were spread throughout the community or region. Individual users would pay a specified fee, which was used to maintain and update the irrigation system. By the early 1900s, irrigation districts had been developed from the south end of the San Joaquin Valley to the north end of the Sacramento Valley and in the Perris and San Jacinto valleys surrounding Riverside and San Bernardino. Thousands of acres were under irrigation by 1910, effectively changing southern California, for example, from cattle ranches to lush, rich agricultural land supporting a variety of fruits and vegetable production. Row crops and orchards were planted where fallow fields once existed (Caltrans 2000; Olmstead and Rhode 2017).

Figure 5. Irrigation on a twenty-acre colony in Fresno County, ca. 1890. (The San Joaquin Valley Digitization Project, San Joaquin Valley & Sierra Foothills Photo Heritage, frb0017, courtesy of the Fresno County Free Library, Heritage Center, San Joaquin Valley Library System, Fresno.)

The Politics of Agriculture from the Grange Movement to the New Deal

As early as the 1880s in California, the family farm began disappearing with the onset of commercial and corporate farms. This dramatic shift had repercussions for communities that relied on a local workforce. Nativistic attitudes manifested in exclusive labor organizations as new immigrants entered the workforce. Farmers confronted the fluctuations in market prices for certain products in a more regional and competitive marketplace. Growers responded by creating farm cooperatives or other forms of communal subsistence and marketing techniques.

As Limerick (1987:130–131) observed, “western farmers in the late 19th century lived with a sense of being squeezed by history, in a vise built by dropping prices on one side and high costs on the other.” The forces arrayed against small family farmers provided the impetus for the formation of cooperatives such as the Grange (The National Grange of the Order of the Patrons of Husbandry) and Farmers’ Alliance, which put small farmers more on a par with big agricultural interests. Farmers’ cooperatives were instrumental in promoting the earliest government regulation of commerce. The advocacy by farmers for government programs acted as “key agents in moving American public opinion toward acceptance of government involvement in economic affairs” in the late 19th century and included passage of the Interstate Commerce Commission Act of 1887 (Licht 1995:189). This advocacy fell short of promoting direct aid to farmers due to the prevailing Jeffersonian sentiment that they should be the most self-reliant citizens. Nonetheless, farmers and ranchers were instrumental in promoting

American expansionism overseas as a way to create broader global markets for the growing agricultural surpluses of the nation.

The politicization of small American farmers and ranchers subsequently waned from the early 1900s through World War I, during a period of welcome prosperity brought about by European crop failures, massive immigration to urban industrial centers, and an increase in money supply due to Alaskan gold discoveries (Licht 1995:188–189). The urban population of the country had outnumbered its rural householders by 1920, and in 1981, only 3 percent of the United States' population still farmed (Limerick 1987:131). Since then that percentage had decreased further as farmland was converted to suburban developments. In 2019, only 1.3 percent of the United States population were farmers and ranchers (http//www.statistica.com).

Notwithstanding the difficulties faced by farmers and ranchers during the 19th century, mechanization and industrialization altered the fabric of American life. The notion of a self-sufficient agricultural state had become outdated. Many farm families remained stuck in a state of economic dependency and were beholden to others for employment as well as essential goods and services. American ideas about democracy and the moral standing of the individual also changed as specialization increased and the country became more industrialized (Deverell and Sitton 1994).

In 1912, a formal Progressive Party formed that included insurgent Republicans under the leadership of former president Theodore Roosevelt and governor of California Hiram Johnson. World War I dramatically changed the political landscape of California, particularly for agriculturists who now depended upon a wartime economy. The 1920s were important years for agriculture because demand increased for a wide variety of products, and technology expanded as the wartime economy shifted to domestic needs. The halcyon years of the 1920s were dimmed following the stock market crash in 1929, when personal income plummeted and many saw agriculture and family farms as a means of survival as jobs in the nation's cities began to vanish. The 1920s also witnessed social unrest and unionization, particularly among farm labor groups who sought better working conditions and higher wages (Alston and Rucker 1986:5–6).

The election of Franklin D. Roosevelt in 1932 created a new wave of optimism in the United States. During the ensuing years, Roosevelt's "New Deal" had major consequences for America's agricultural industry. Roosevelt tied New Deal virtues to democratic values and liberalism served as the core of national and local politics. The New Deal conservation programs were aimed at renewing and rehabilitating the economies of rural areas and assisting farm families to remain on their land through a variety of subsidies and rural development programs. This agrarian ideology of the 1930s inspired major achievements in both infrastructure and economic development and allowed the Democratic Party to build a loyal rural constituency.

The Roosevelt administration and Congress passed a series of acts between 1933 and 1938 that created several new agencies, many of which attempted to help rural farmers. The most important legislation related to agriculture included the National Industrial Recovery Act (NIRA) of 1933 that established the Public Works Administration (PWA) to manage public works projects. During its tenure the PWA spent $7 billion, acted as the catalyst for employing millions of men, and set up the National Recovery Administration (NRA) to establish codes of practices for such things as hours worked, wages, unfair competition, and outlawing child labor. In addition, the New Dealers introduced a minimum wage of $1.25 an hour and helped create a universal eight-hour workday[3] Ultimately, the influence of the New Deal played an important role in post-World War II programs because it appeared to offer a rational solution for rural poverty. The NIRA was abolished in May 1935 when the Supreme Court ruled it unconstitutional (Leuchtenburg 1963). It was replaced by the National Labor Relations Act of 1935 (aka the Wagner Act), which established the right of most works to form or join labor unions and collectively bargain with their employers (although agricultural and domestic workers were excluded by the Wagner Act). No matter how important the NIRA, NRA, and PWA were to working class Americans, for the thousands of farm laborers, with a few exceptions, they did little to improve working conditions (Leuchtenburg 1963).

Another New Deal act the Agricultural Adjustment Act of 1933 (AAA) that attempted to stabilize prices and increase earnings. The act paid farmers to limit the number of crops they grew or simply to plow under crops already grown and included a provision for crop insurance. The federal government bought farm animals and then slaughtered them to raise the price of farm products. As a result, farm prices doubled between 1933 and 1937, but in 1936, the Supreme Court declared key provisions of the AAA to be unconstitutional. A new AAA enacted in 1938 allowed the federal government to subsidize the price of a wide variety of farm products to gradually increase the subsidy until farm prices reached their pre-1914 numbers to give all farmers guaranteed minimum income (Alston and Rucker 1986:5–6).

The Soil Conservation Act, passed in 1936, provided the federal government the means to pay subsidies to farmers who agreed to leave land fallow or to plant crops that put nitrogen back into the soil. The federal government also financed research on soil conservation and alkalinity.

The creation of the Civilian Conservation Corps (CCC) in 1933 and the Works Project Administration (WPA) in 1935 affected agriculture as well. The CCC employed jobless single men between the ages of eighteen and twenty-five. They worked for six months in mountains and forests learning forestry, flood control, and fire prevention. Nearly three million men took part in the CCC program from 1933 to 1941. The WPA coordinated all public works projects, spending over $10.5 billion of federal money and employing approximately 3.8 million men from 1935 to 1941 (Alston and Rucker 1986). In California's Central Valley, the WPA and the CCC were involved with irrigation projects that directly benefited farmers and rural communities (Figure 6). The CCC and WPA also assisted with rural power development, electrification, and the irrigation of rural farms and communities in California (Alston and Rucker 1986:5–6; Civilian Conservation Corps Legacy 2018; Cohen 1980).

[3] California had introduced an eight-hour workday in 1908; however equal application of the provision to all industries across the sate did not occur uniformly, particularly in farming. In addition, railroad and factory workers nationwide had been awarded an eight-hour workday in 1916.

Figure 6. Civilian Conservation Corps (CCC) camp in the 1930s, Yucca, Tulare County. The CCC provided labor for construction and maintenance for many irrigation projects throughout California. (The San Joaquin Valley Digitization Project, San Joaquin Valley & Sierra Foothills Photo Heritage, tca0026, courtesy of the Tulare County Free Library, Annie R. Mitchell History Room, San Joaquin Valley Library System, Fresno.)

Finally, the Farm Credit Administration (FCA), created in the 1930s, provided federal money to pay off farm creditors and save farmers from bankruptcy. The FCA targeted farmers in the Midwest who persevered through the Dust Bowl years (Alston and Rucker 1986:5–6).

The 1930s were difficult years for California's agricultural industry, as farm failures were at an all-time high. Government, private industry, and popular culture combined to portray an indelible image of the California farmer during the Great Depression. For example, the 1939 John Steinbeck novel "The Grapes of Wrath," later adapted as a motion picture, exposed the graft, corruption, and exploitation associated with migrant laborers coming into California and challenged the image of a benevolent social service system that acted in the best interest of farm laborers. Most importantly, the 1930s introduced a sustained period of government intervention that succeeded in saving thousands of family farms throughout the nation and introduced a farm subsidy program that remains in place today. Although government programs achieved some level of success at stabilizing prices for certain products and, abating farm foreclosures, these programs brought little relief to the thousands of seasonal farm laborers who had become the backbone of the agricultural industry in California by the 1920s (Figure 7). Their story would unfold during the first two decades following World War II, as farm labor organizations, such as the American Federation of Labor and the Congress of Industrial Organizations (AFL-CIO) and United Farm Workers Union, garnered political victories through boycotts and strikes, which ultimately improved both living standards and wages for seasonal workers.

Figure 7. Migrant children near Linnell Camp in Tulare County, ca. 1935. Note the simple board and batten wood frame temporary housing in the background. (The San Joaquin Valley Digitization Project, San Joaquin Valley & Sierra Foothills Photo Heritage, tca0150, courtesy of the Tulare County Free Library, Annie R. Mitchell History Room, San Joaquin Valley Library System, Fresno.)

In summary, the ideals fostered by an agrarian society were the cornerstone of American democracy. From the Jeffersonian views of democracy and the virtues of "laboring on the earth" came even more radical ideas expressed by organized labor, as well as a progression towards large-scale commercialized farms that relied on a more transient or seasonal labor force. For California, the few decades of cheap, abundant land gave way to greed, corruption, and monopolization of the state's most fertile and productive public lands. The physical residue of ideological or political dogma clearly is not as apparent as are aspects of material culture found in historical archaeological sites.

Nonetheless, understanding the acquisition and expansion of farms or ranches, technological adaptation, patterns of consumption, and ethnicity and gender issues in farm practices can provide important data that reveal attitudes, beliefs, and a broader understanding of agrarian life in California from 1850 to 1970. That understanding will be derived from the documentary record. Particularly, properties dating to the mid-20th century and beyond, oral histories may be the only way to further identify and evaluate relevant and important historical resources, especially when it comes to issues of race, gender, ethnicity, and labor, as well as perspectives, attitudes, and experiences that are not always found in historical documents.

The Role of Soils, Climate, and Geomorphology in Agricultural Land Settlement in California

California's climate and geology played a significant role in the failure and success of California farmers. Both climate and geology also influenced agricultural production and output. For the purposes of this study, geomorphology refers to the variety of landforms that comprise a particular region or province, such as the San Joaquin and Sacramento valleys. Geomorphic provinces have unique, but oftentimes overlapping, features due to hydrologic systems that cross regional boundaries and mountain ranges that span large sections of the state. Geomorphology influences both climate and soils, which are particularly important for the sustainability of agriculture, and geomorphology defines the types of agriculture carried out within a particular area, since certain soils are more conducive to growing particular crops. Still, human-made systems, or altered natural features such as irrigation networks and railroads, also played an important role in defining agricultural enterprises and their sustainability and profitability.

Hundreds of books and articles, published from the 1860s through the 1880s, chronicle California's agricultural resources by region and county. John S. Hittell's *Resources of California*, published first in 1863, and reprinted in 1866, 1869, 1874, and 1879, is one of the earliest and most popular books of the mid-19th century highlighting California variability. Hittell (1863) provides detailed descriptions of the region's resources and their potential wealth. In addition, Henry De Groot (1884) published an "informational, general, and statistical" guide to California in 1884. By the late 1870s and 1880s hundreds of publications promoted California's climate, soils, and unlimited agricultural possibilities, although many of the 19th century publications often embellished or romanticized the facts. During the 20th century, periodicals and books generally took a more scientific view of the state's geomorphology and climate. Notwithstanding the numerous publications by state and federal agencies concerned with agricultural production, Claude Hutchison (1946), among others, provided an excellent survey of how the state's agricultural history relates to regional landform.

Geomorphic Regions

This study divides California into eight broadly defined geomorphic provinces following well-accepted boundaries with an emphasis on the state's diverse agricultural characteristics. (Figure 8) These boundaries draw upon those established by the California Division of Mines and Geology and as described by Allen Schoenherr (1992) and the work of agricultural historian Warren Johnston (1997:63–100). Map 1 depicts those provinces in relationship to modern county boundaries. Those regions are as follows:

- Northern Province (encompassing the Klamath and Cascade Mountains);
- Sierra Nevada;
- Coast Ranges (North and Central);
- Sacramento Valley;
- San Joaquin Valley (includes the Delta Region);
- South Coast (encompassing the Transverse and Peninsular Ranges);
- South Desert (encompassing the Mojave and Colorado Desert); and
- Great Basin Desert (encompassing the Modoc Plateau and Basin-Range province).

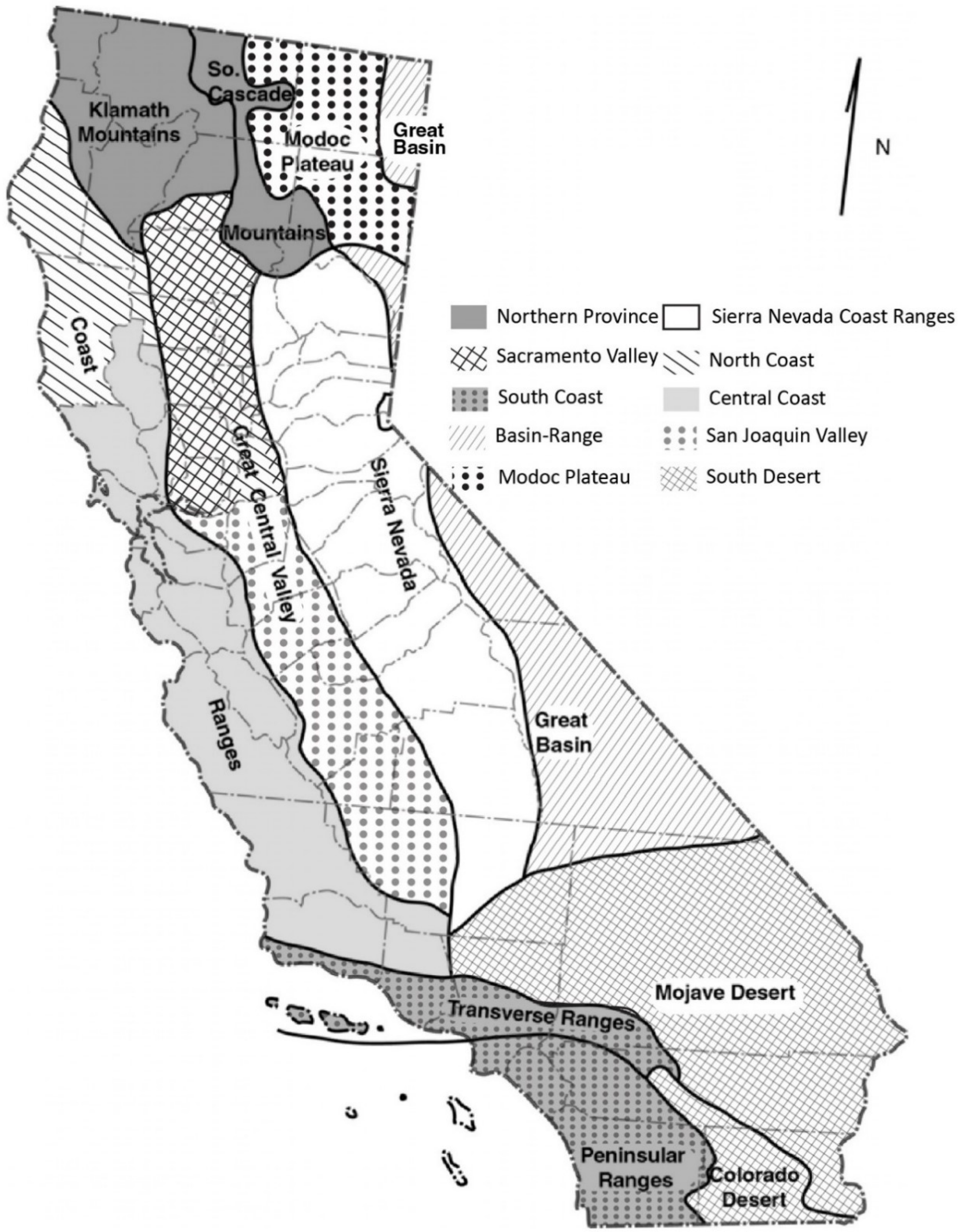

Figure 8. Geomorphic Regions of California and Agricultural Provinces. (Compiled by Caltrans from Beck and Haase 1974, Schoenherr 1992, and Johnston 1997.)

A Mediterranean climate with wet winters and long dry summers generally characterizes California. The various mountain ranges influence weather patterns with as much as 80 inches of precipitation falling on the western slope and considerably less on the eastern slope. This creates a "rain shadow" that affects the entire eastern slope and contributes to the conditions that created the Great Basin. Much of California is arid and meets the technical definition of desert, receiving less than 10 inches of rain per year (Schoenherr 1992:11). Those portions of the state lying east of the Cascades, Sierra Nevada, Transverse, and Peninsular ranges, as well as the southern end of the San Joaquin Valley, meet this definition.

Northern Province

The Northern Province includes the Klamath and Cascade Mountains, while the Modoc Plateau is part of the Great Basin Desert. Approximately half of the land is in public ownership and 17 percent is in farms, with 20 percent of that as cropland (Johnston 1997:68). As compared to other regions within the state, this area had limited agricultural development, most of which occurred only after suitable irrigation systems were put in place.

The Klamath Mountains in the northwest corner of the state have peaks ranging from 5,000 to 7,000 feet in elevation, cut by the Smith, Klamath, and Trinity rivers. Rainfall averages 140 inches per year along the coast, contributing to the large, and scenic, river systems. Dense stands of Douglas fir, as well as a wide variety of other economically valuable tree species, dominate the landscape. Logging removed many of these stands and individual farmsteads were often established on logged-over lands. The Cascades lie farther to the east and form the southernmost extension of the range running from Washington though Oregon. Active volcanoes Shasta and Lassen are prominent peaks in this mountain chain. Precipitation averages around 80 inches per year on the western side of the Cascade Mountains along the California-Oregon border, with the eastern side suffering the same rain shadow effects as the Sierra Nevada. Precipitation in the Modoc Plateau region averages around 12 to 20 inches annually (Beck and Haase 1974:5). The Pit River drains the Modoc Plateau region and feeds into Shasta Reservoir (Schoenherr 1992:5–6).

Ranching is the most widespread agricultural industry in this area and has been an important part of the regional economy for more than 130 years. Cattle and sheep graze on a combination of private and leased public land. Dairying was common along the coast. Large-scale agriculture is limited to areas under irrigation where feed crops such as hay, barley, and alfalfa are grown. Historically, small apple orchards grew in sheltered valleys (Johnston 1997:68).

Sierra Nevada

Schoenherr described the Sierra Nevada as "the most conspicuous geographic feature of the state of California" (Schoenherr 1992:1). This north-south trending mountain range consists of granite blocks that have been uplifted by tectonic activity. The western side of the Sierra forms a gradually uplifting slope cut by many rivers while a steep vertical drop of nearly two miles into the Owens Valley characterizes the eastern side. The range includes thirteen peaks that are higher than 14,000 feet, as well as the Mother Lode region known for its gold mining. The mountain range contributes to the "rain shadow" effect that influences the entire state.

Precipitation averages between 20 to 70 inches in the western Sierra foothills, while the eastern slopes average between 12 to 40 inches. Rainfall varies from north to south as well, with the northern Sierras receiving between 40 to80 inches of rain annually and the southern Sierras receiving between 20 and 40 inches of rain annually (Beck and Haase 1974:5).

As with the North, ranching-related activities on public and private lands dominate the Sierra Nevada region. The higher elevations support dense coniferous forests and alpine meadows that are used for seasonal grazing and pasturage, although less so in recent years. Most of the agricultural activity in this region occurs on the western slope with small-scale domestic agriculture, such as orchards, vineyards, and row crops, widely practiced in the foothills. The east side of the Sierra with the help of irrigation, developed both small and large farms devoted to the production of feed crops, such as hay and barley. A similar pattern followed in the Mother Lode region along the west side of the Sierra. Farming accounts for less than 10 percent of the area (Johnston 1997:71). The abundant precipitation feeds rivers that drain into the Central and Owens valleys and provide water to the rest of the state.

Coast Ranges

The Coast Ranges consist of a series of northwest-to-southeast-trending ridges and broad valleys that define the western edge of the Great Central Valley. Mountain elevations in this region reach as high as 6,000 feet and snow is common on higher elevations. Precipitation varies from 40 inches of rain annually near the San Francisco Bay Area to 80 inches of rain annually near the California-Oregon border (Beck and Haase 1974:5). Many rivers carve through the valleys, creating broad alluvial fans and rich bottomlands that support diverse crops. Chaparral dominates south-facing slopes while evergreen oak woodland occupies cooler north-facing slopes (a vegetation pattern termed “slope effect”). On the coast side, stepped terraces indicate the uplift that has resulted from geological activity. Native oak woodlands and grasslands were converted to pastures or agricultural use along the central coast and interior valleys. The North Coast region encompasses part of Humboldt and all of Mendocino counties. The Central Coast region includes the counties of Lake, Sonoma, Napa, Marin, San Francisco, Alameda, San Mateo, Contra Costa, Santa Clara, Monterey, Santa Cruz, San Benito, San Luis Obispo, and most of Santa Barbara County.

The Central Coast has long been important to the agricultural economy of the state. This region possesses a mild climate and fertile soils conducive to growing a wide variety of agricultural products. Coastal terraces and inland valleys provide fertile lands for various row crops, orchards, and vineyards. The Salinas Valley, which drains into Monterey, has been an important agricultural area for its row crops, such as lettuce and beets, as well as orchard crops, such as apples. Napa and Sonoma are world famous for the output of vineyards, some in existence since the 1850s. Livestock historically grazed the hills and valleys of this region and today interior valleys still support many cattle ranches and dairies.

Sacramento Valley

The Sacramento Valley is part of the Great Central Valley, which is approximately 500 miles long and forty miles wide and lies between the Coast Ranges and the Sierra Nevada. The Central

Valley "is generally regarded as the richest agricultural valley in the world" (Johnston 1997:72) The principal counties in the Sacramento Valley include Glenn, portions of Shasta, Tehama, Butte, Colusa, Yolo, Solano, Yuba, Sutter, and Sacramento. The valley currently has the highest proportion of land in private ownership (Johnston 1997:72). Cooler winters, higher rainfall, and less productive soils characterize the Sacramento Valley in comparison to the San Joaquin Valley, which lies immediately to the south beginning in San Joaquin County. Precipitation in the Sacramento Valley varies from north to south, with the northern Sacramento Valley near Redding receiving an average of 40 inches of rain annually and the southern Sacramento Valley near Sacramento receiving 20 inches of rain annually, on average (Beck and Haase 1974:5).

The Sacramento Valley, characterized by broad, open expanses of flat terrain, historically, served as the center of wheat production in the state. The region, if one were to include the San Joaquin Valley, accounted for three million bushels in 1860, and by 1870, that figure rose to over eleven million bushels, a feat accomplished without use of the combine until after 1870 (Adams 1946:35). California ranked second in the nation in wheat production by 1889. However, barley and alfalfa, much of it grown in the Sacramento Valley, surpassed wheat by 1900 (Tufts 1946:114). Today approximately 82 percent of all the cropland in the valley is under irrigation, in part a result of the Central Valley Project (CVP) which conveyed water from rivers from northern California and those in the Sierra Nevada Range through a network of dams, reservoirs, and canals, and the State Water Project (SWP) (Johnston 1997:73). Reclamation activities along the Sacramento River resulted in the construction of huge levees to create rich, productive cropland. Wheat, corn, alfalfa, dry beans, sunflowers, safflower, rice, almonds, peaches, pears, prunes, and walnuts are important crops grown in the valley (Figure 9). Rice, a major export crop, first grew in the Sacramento Valley in 1906, and local varieties were soon developed (Tufts 1946:117).

San Joaquin Valley

The San Joaquin Valley forms the southernmost part of the Great Central Valley. The region includes all or portions of the counties of San Joaquin, Contra Costa, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern. Approximately one third of the state's farmland lies in the San Joaquin Valley, and nearly 90 percent of the valley is currently under irrigation (Johnston 1997:73). No single river runs through the entire valley, although the San Joaquin River drains the northern portion of the valley and forms the core of the state's Delta region. Lake basins, once fed by runoff from the Sierra Nevada, formed the southern end of the valley. Early farming depended upon natural aquifers for irrigation, and on the reclamation of the Tulare and Buena Vista Lake Basins. The 1940s and 1950s saw increased irrigation water into the southern end of the valley through projects such as the CVP. Annual rainfall is highest at the northern end of the San Joaquin Valley near Sacramento, which averages around 20 inches a year, and lowest at the southern end of the valley near Bakersfield, which receives approximately 12 inches a year (Beck and Haase 1974:5).

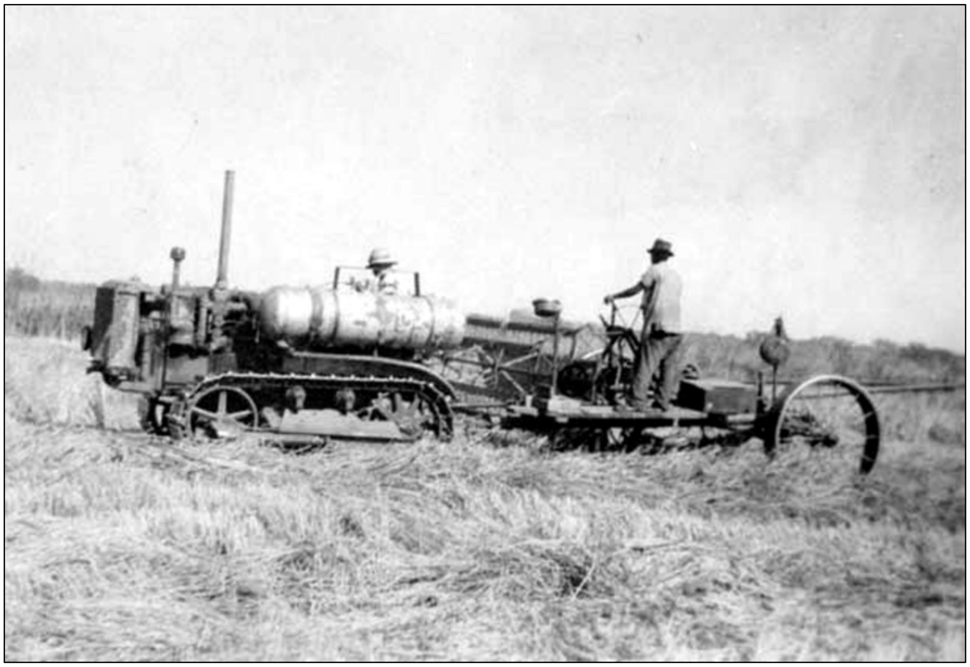

Figure 9. Japanese rice harvesting in Nelson, Butte County, ca. 1930s. (Courtesy of the Marysville Chapter Japanese American Citizens League.)

The San Joaquin Valley is home to a wide variety of farming enterprises, ranging from smaller, intensively cultivated farms to large, extensive, industrial enterprises. Fruit and nuts are important crops, as are many other field crops (e.g., barley, beans, corn, hay, potatoes, sugar beets, and wheat). Vineyards are gaining importance in the region. Cotton has been among the most important field crops in the valley since its introduction in 1871 (Johnston 1997:73). Livestock is widely distributed throughout the valley floor, including the former home to the famous Miller and Lux cattle enterprise. Dairies, poultry, and swine farms produce other products including milk, chickens, turkeys, eggs, pork, and apiary products. Grain sorghum became important in the area after 1870 as a summer grain crop (Tufts 1946:118).

South Coast

The South Coast region consists of the Peninsular and Transverse ranges and includes all or portions of the counties of Ventura, Los Angeles, Orange, Riverside, and San Diego, and the southern portion of Santa Barbara County. The Transverse Range runs east to west, continues into the ocean, and encompasses the Channel Islands. The range, which forms the northern border of the Los Angeles basin, consists of several distinct mountains with peaks over 10,000 feet, including the Santa Monica, San Gabriel, and San Bernardino mountains. The Peninsular Ranges form the northern end of the Baja peninsula and lie west of the San Andreas Fault. The ranges, as well as Santa Catalina and San Clemente islands, have been uplifted along the numerous fault lines that cross the region.

The Los Angeles basin is part of the Peninsular Ranges, although the basin itself is merely lowland filled with sediments from runoff of the Transverse and Peninsular ranges. Marshy grassland characterized the basin before the channelization of the rivers. Precipitation for the entire region is considerably lower than in Northern California, with south-facing slopes averaging 30 to 40 inches of rain and north facing slopes averaging 15 to 20 inches per year. Despite this difference, north-facing slopes are actually moister, because they do not suffer the evaporative effects of the long hot summer. This slope effect causes chaparral to cover south-facing slopes, while north-facing slopes have coniferous forests that extend nearly to the desert floor.

The South Coast, historically, was an important agricultural region. “Los Angeles County was once the most important agricultural county in the United States, measured by the value of its agricultural production” into the 1950s (Johnston 1997:74). The region is known for its high-value nursery products, fruits, and vegetables, including flowers, avocados, strawberries, wine grapes, dates, broccoli, celery, lettuce, and bell peppers. Citrus trees got their start in the southland with over 45,000 trees planted by 1870 (Adams 1946:40). Livestock has always been economically significant, with dairying important throughout the region’s history.

Between the early 1900s and 1930, poultry farms dramatically increased in the south region. Several ostrich farms began in the region in the 1880s to take advantage of the fashionable uses for their feathers (Figure 10). The southland also led the state in turkey farms during the 1890s (Hart 1946:104).

South Desert

The South Desert region lies east of Los Angeles and includes most of San Bernardino, Riverside, and Imperial counties. Sub-regions include the Antelope, Coachella, Palo Verde, and Imperial valleys. This region includes the Mojave Desert that extends eastward to Nevada and Arizona and the Colorado Desert, extending into Mexico. The San Bernardino Mountains and the San Andreas Fault form its southern border. The Mojave is the “high desert” in Southern California, with an average elevation of 3,500 feet. Precipitation falls mostly in the winter, with snowfall at higher elevations, and averages between two to four inches annually (Beck and Haase 1974:5). Native vegetation includes pinyon pines, Joshua trees, and creosote bush. Much of the land is currently under government management either as military bases (Edwards Air Force Base, Fort Irwin, China Lake Air Weapons Station, upgraded to Mohave National Preserve) or as parklands (Joshua Tree National Park, East Mojave National Scenic Area).

Irrigation provides water for the majority of cropland today, as well as historically, mainly from canal systems conveying water from the Colorado River, such as the All-American Canal. While the Colorado River Aqueduct largely provides drinking water to urban cities in Southern California, it is also a source of water for the citrus industry. San Bernardino and Riverside counties gained recognition for their citrus crops and dairying, industries that continue today. Field production includes alfalfa, cotton, sugar beets, and wheat. During the early 1900s, vegetable production in this region rapidly developed as the demand increased, particularly in eastern markets. By 1929, Imperial County led the state in acres of vegetables. After 1900, the cantaloupe industry in California began in Imperial and Coachella valleys. Flax, first planted in the 1930s, quickly expanded in production, as did cotton (Tufts 1946:128, 149).

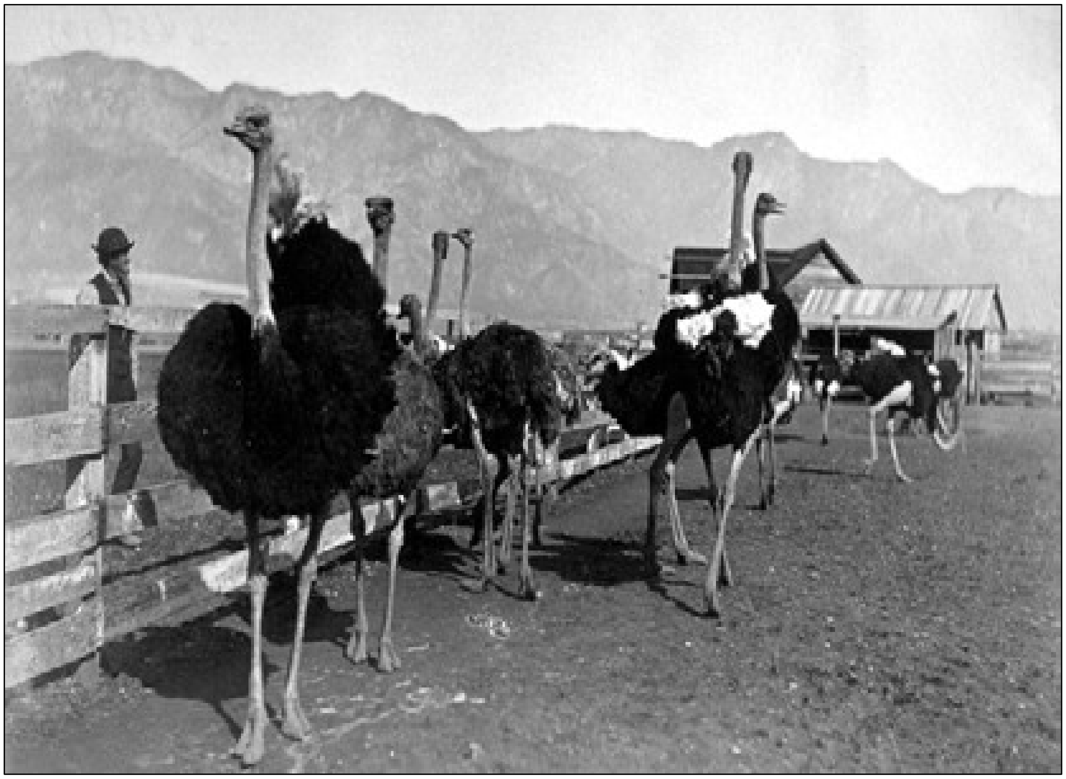

Figure 10. Ostrich farm near Pasadena, San Gabriel Valley. Ostriches were generally farmed for their feathers or plumes, which were the rage during the late 19th and early 20th century for women's clothing. (BANC PIC 1905.06485:017—PIC, Views from a Trip to California, ca. 1887-1889, BANC PIC 1905.06484-.06485--PIC, courtesy of The Bancroft Library, University of California, Berkeley, public domain.)

Great Basin Desert

The Great Basin is the largest desert in North America and extends a short way into eastern California. Portions in California include two geomorphic provinces: the Modoc Plateau and the Basin-Range province. The Modoc Plateau, averaging 4,000 to 5,000 feet in elevation, is an undulating flatland east of the Cascades drained by the Pit River. Precipitation varies based on elevation, with lower elevations receiving around 12 to 20 inches of rain annually and higher elevations receiving approximately 20 to 30 inches annually (Beck and Haase 1974:5). The Basin-Range province lies south and east of the Modoc Plateau, along the eastern edge of the Sierra Nevada and includes portions of Plumas, Sierra, Mono, Inyo, and San Bernardino counties, as well as Owens and Death valleys, separated by the Inyo-White Mountains, with many smaller mountain ranges and valleys in between. Ecologically, sagebrush dominates the landscape, with pine trees at higher elevations and saltbush at lower elevations. Most precipitation falls as snow that percolate into the soil as it melts, resulting in lush spring growth. Precipitation averages between five to 20 inches annually (Beck and Haase 1974:5). The Los Angeles Aqueduct conveys much of the region's water to Southern California.

The Modoc Plateau encompasses Modoc and Lassen counties and supported by intensive irrigation, supplies alfalfa and other field crops, together with its numerous cattle and sheep ranches. The Owens Valley produced a wide variety of commercially viable crops before Los Angeles Department of Water and Power took much of the viable agricultural land out of production and conveyed the region's water to Southern California. Today, livestock graze on public and private lands, and feed crops, particularly hay and alfalfa, are grown.

Geomorphological Factors that Influenced Settlement

Agriculturalists, particularly homesteaders, were sensitive to the location and quality of the land, and therefore, attempted to select the most fertile areas where they could easily divert water to their fields. Soils, climate, and geomorphology influenced not only where settlement would occur, but also the type of settlement, the success of the settlement, and ultimately, the productivity and value of the land (Figure 11). Landforms, particularly river or stream courses, were the first visual features that lured settlers to particular locations that were suitable for agricultural use.

Figure 11. Aerial view of Tulare County agricultural land, ca. 1940. Note the uniform grid or patchwork patterns of various fields broken only by rows of trees, curvilinear canals, and roads. (The San Joaquin Valley Digitization Project, Annie R. Mitchell History Room, George Serpa Collection, San Joaquin Valley & Sierra Foothills Photo Heritage, tps0135, courtesy of the Tulare County Free Library, San Joaquin Valley Library System, Fresno.)

A great variety of geomorphologic conditions characterize California. Geographer Allen R. Eigenheer theorizes that settlers used the following criteria to judge the agricultural worth of a particular area:

- Physical features of the landscape, such as vegetation and soil color and texture (a common criterion for virtually all homesteaders or settlers);
- The adaptability of crops to an unfamiliar climate (factored by the experience level of the homesteaders or settlers and their personal experience with certain crops);The availability of free or cheap land, including the uncertainty of land titles resulting from existing land grants (constantly in flux as lands became settled or reclamation projects opened up new agricultural areas);
- Accessibility of the area to potential markets for commerce and trade (important for long-term sustainability, particularly so for expanding agricultural-based farms or homesteads); and
- Availability of a reliable supply of water (critical factor in determining the location of a homestead or settlement. If the water had to be purchased then this cost would have to be weighed before acquiring the land. The longevity of water sources was also a factor in the boom-and-bust cycles of homesteads) (Eigenheer 1976).

Geomorphology played a role in influencing each of the above-mentioned criteria, although geomorphologic conditions alone did not serve as a basis for all of them.

Soils and Landforms

Soil and landform are key components towards interpreting the agricultural landscape. The level of knowledge that early-day agriculturalists had regarding soils, climate, and hydrology were particularly important. Agriculturalists with pre-existing knowledge, or those who chose to study scientific data as it became available, generally fared better than their counterparts who relied solely upon traditional methods of farming.

Soils and landforms were important factors in deciding where to settle, not only because of their physical composition and structure, but also because of their visual attributes. The perceived visual similarity of certain provinces in California to their homeland was a powerful attraction for many immigrants who chose to settle in a specific region. For example, the northern Coast Range in Sonoma County shared many characteristics with northern Italy, and hence Italians from the provinces of Genoa and Tuscany settled in Sonoma County. Similarly, Azoreans settled in large numbers along the Central Coast, particularly in the Monterey region, and Armenians settled in the Fresno area (Santos 1995).

Crop rotation was an important part of California agriculture. Crop rotation is a centuries-old system, in which farmers continue to grow a series of crops in sequence on the same piece of ground. Farmers generally group crops into three broad categories when they plan rotations: cultivated row crops (including fallow land), hay or sod crops, and close-sown small-grain crops (Figure 12).

Figure 12. Cultivation and grading at the vast Rivergarden Farms, Sacramento County. (BANC PIC 1977.019:69—ALB, Rivergarden Farms, BANC PIC 1977.019--ALB, courtesy of The Bancroft Library, University of California, Berkeley.)

Row crops include corn, cotton, fodder roots, potatoes, sugar beets, soybeans, and vegetables (Figure 13). They can be cultivated through the loosening or breaking up of the soil in order to kill weeds before the seeds have time to germinate. Row crops generally facilitate erosion, particularly on sloping land, and require fertilization. Hay or grain crops, however, hold soils and generally reduce soil erosion, and consequently grains played an important part in California agricultural economy during the 19th century.

Soil also determined settlement patterns and sustainability. Deep alluvial floodplain soils formed within portions of the Sacramento and San Joaquin valleys. These soils are low in organic material and calcareous at the southern end of the San Joaquin Valley. South of Fresno and Turlock are a series of sandy, wind-modified soils, which are light brown, neutral in reaction, and possess poor water-holding capacity. Organic soils, formed by the decomposition of tules and reeds, characterize the Delta region. The peat soils are dark colored and acidic in reaction.

Terraced lands having red-iron hardpan soils characterize the eastern side of the Central Valley. These soils have dense clay subsoil resting on a silica-iron hardpan impermeable to roots and water. USDA soil surveys initiated around the turn of the century provide important data towards understanding what the soil constituents are in a particular area. These data gathered by the state’s early soil scientists assisted agriculturalists in deciding what species of crops to plant, and today the old soils publications can provide archaeologists and historians with a reliable predictive model for the type and degree of agriculture present on any particular site.

Figure 13. Japanese potato diggers in the rich alluvial soils of the Sacramento Delta, ca. 1905.
(Photographs of Agricultural Laborers in California, BANC PIC 1905.02678-PIC, courtesy of The Bancroft Library, University of California, Berkeley, public domain.)

Overflow lands, which occurred all along the Sacramento and San Joaquin rivers, were detrimental to certain types of cultivation, although settlers took advantage of these seasonally flooded lands for cultivating feed crops, such as barley, oats, wheat, alfalfa, and row crops, such as beans, and for grazing livestock.

Climate, Droughts, and Flooding

Agriculture is dependent upon the availability of water, whether through rainfall, internal sources within the property such as natural aquifers, wells, or holding tanks, or through external means such as water conveyance systems. In order to provide a consistent supply of water, reservoirs costing immense sums of money were required for most arable lands. The opposite is true for tule lands that required draining to cultivate the soils. Levees were constructed to keep water out of farmlands until released via ditches, canals, or weirs.

While the state's natural environment offered unlimited potential for the development of agriculture, the actual labor required to sustain certain crops under variable and harsh environmental conditions was an arduous task. Allen Eigenheer (1976:187) notes that during the early 1850s portions of the Sacramento and San Joaquin valleys had an image as being unhealthy, a perception based upon the large areas of marshland generally infested with swarms of malaria-bearing mosquitoes during the summer months. In addition to disease, a result of bad water and/or insects, floods and droughts played havoc with both miners and farmers, who had little or no foreknowledge of the state's precarious climate.

Before the development of irrigation systems, agriculturalists relied upon seasonal rainfall to replenish the soils, sustain groundwater tables, and germinate seeds for harvest later. Dry-land farmers were particularly vulnerable to droughts because they relied upon the seasonal rains for germination.

California's geomorphology plays a central role in determining the amount of precipitation and where it would fall. California's agriculturalists could not reliably predict the timing and amounts of rainfall that would fall within any given year and were forced to endure cycles of droughts and heavy rainfall (Figure 14).

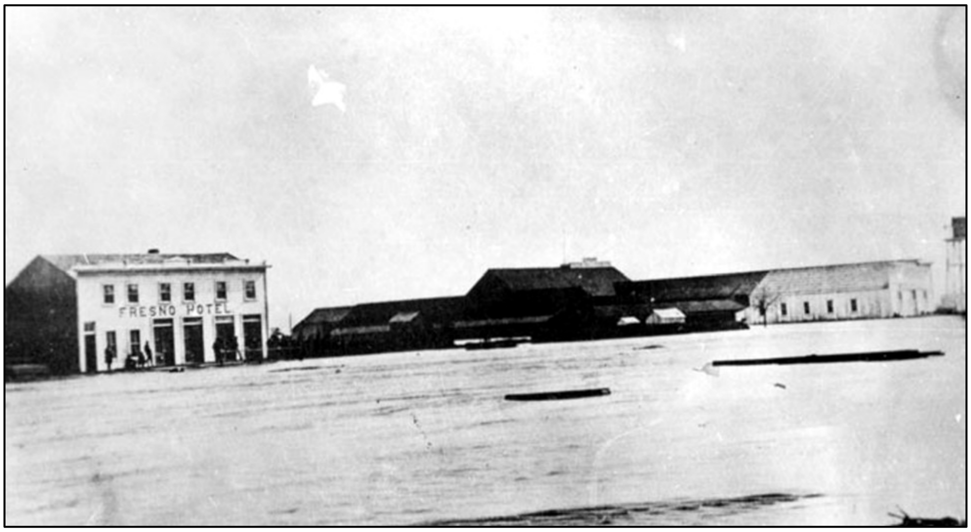

Figure 14. Fresno Flood of 1884. Note the Hotel Fresno in the background with water lapping at the front door. View of H and Tulare Streets from Southern Pacific Railroad Depot. (The San Joaquin Valley Digitization Project, San Joaquin Valley & Sierra Foothills Photo Heritage, frp0143, courtesy of the Fresno County Free Library, Heritage Center, San Joaquin Valley Library System, Fresno, California.)

Records indicate that California witnessed periodic droughts followed by above-average precipitation. For example, the floods of 1861 to 1862, one of the wettest years on record, preceded the great drought of 1863 to 1864 (Hundley 2001). William H. Brewer, who crisscrossed the state from Los Angeles to the east side of the Sierra, took meticulous notes on its natural landforms and peoples, and observed the flood during the winter of 1861 to 1862. Brewer provided the following description:

> Nearly every house and farm over this immense region [Sacramento Valley through the northern San Joaquin Valley in the foothills of the Sierra] is gone. Such a body of water 250 to 300 miles long and 20 to 60 miles wide had winds that made high waves that beat the farm homes in pieces. America has never before seen such desolation by flood. But the spirits of the people are rising, and it will make them more careful in the future [McClurg 2000:41].

During the 19th century, lacking any major water impoundments, virtually all of the state's runoff ultimately went out into the Pacific Ocean. During the 20th century, however, the construction of reservoirs and dams impounded water and helped prevent annual flooding. The drought of 1863 to 1864 proved particularly devastating to wheat farmers and ranchers, since the floods of previous years prevented germination of the next year's crops. The State Agricultural Society filed a report that commented on the drought in 1872 and noted the great scarcity of grazing and hay for stock and the drought's widespread effect on the entire state (CSAS 1872, 1873). The drought led to a pattern of transhumance characterized by moving livestock, particularly sheep, to the foothills and the Sierra Nevada during the late spring and summer months. The development of many of the state's first irrigation systems also resulted from the 1863 to 1864 drought. Ultimately, the floods of 1861 to 1862 and the drought of 1863 to 1864 had significant consequences for the development of California agriculture. While the floods spurred improvements to areas subject to seasonal flooding, together with improved transportation systems following the destruction of hundreds of miles of wagon roads and bridges, the drought established a pattern of transhumance (established base camps in the valley floors and summer camps in the higher elevations) that continued unabated in California until the second half of the 20th century.

By the late 1860s, California's homesteaders had already preempted and improved much of the state's most fertile lands, characterized by high ground outside the flood plain, rich alluvial soils, and mature overstory vegetation, such as sycamores and oaks. The settlement of marginal lands, either within the flood plain or in areas lacking fertile soils or permanent water, generally occurred later. California's Central Valley, one of the most fertile agricultural regions in the United States, still reflects the model presented above, particularly the settlement patterns that followed riparian corridors.

The purveyors of gravity-fed irrigation systems took advantage of the state's natural topography. Of particular importance are the Sierra Nevada and Coast Range that form a ring around the Great Central Valley. Snow accumulates in the mountains drains into a series of rivers and their tributaries and works its way into the valley, ultimately flowing out to the Pacific Ocean.

Mining companies in the early 1850s, and later agriculturalists in the 1880s, faced the challenge of harnessing this great source of power. Clearly, for California's agriculturalists, water was akin to liquid gold, sought so desperately by miners. In California the evolution of water development can be separated into three major topical areas—water for industry, agriculture, and domestic use.

One of the most important court decisions involving water rights in California was instigated in 1879 when Henry Miller and his partner, Charles Lux, filed for an injunction against irrigation developer James Ben Ali Haggin. At issue was water from the Kern River in the southern San Joaquin Valley. Miller believed that he held a riparian right to the river, rooted in English Common Law and the California Constitution, which prevented others from taking water, which he needed to grow grass along the river to feed his livestock. Haggin, on the other hand, believed that appropriating the water into a canal, which ran some distance from the river improved the land through irrigation (Igler 2001:101–111; Water Resources Collections and Archives [WRCA]1997).

What became known as the "Riparian Doctrine," evolved from English Common Law and held that the owner of the bank of a river owns the right to water flowing past or through the property.

It does not allow water rights attached to the property to be separated. The principle of "Appropriation," however, provides that the first person to divert water from a stream has the right to continue diverting as much water as needed, even if the water is transported to a location far from the stream. The appropriator has the first right to the water itself, separate from any rights to the land adjacent to the stream from which the water was taken. The conflict that arose between these two principles ultimately resulted in the "California Doctrine" of dual water rights, established by the State Supreme Court in the case of Lux v. Haggin in 1886 (Igler 2001:101–111; WRCA 1997).

Following the State Supreme Court's Lux v. Haggin ruling, advocates of irrigation projects in the Legislature argued for laws to limit riparian rights. In a special session in 1887, lawmakers debated issues of appropriation, riparian rights, and the role of state government. The most significant legislation to come out of the special session was sponsored by Assemblyman C.C. Wright of Modesto. This law provided for the establishment of irrigation districts under local public control. It did not, however, abolish the "California Doctrine" of dual water rights, which would continue to be defined in later years by the courts. Few of the initial districts formed under the Wright Act, however, were successful, but by the beginning of the 20th century much of the Central Valley was under cultivation assisted by irrigation districts and private water companies (WRCA 1997; Figure 15).

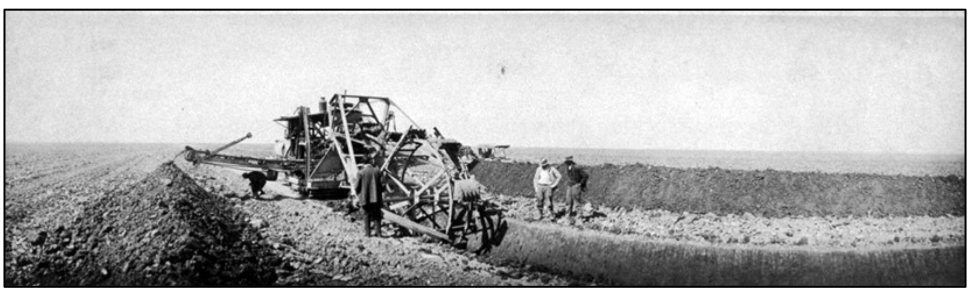

Figure 15. Austen Ditcher bought about 1910 by Solano Irrigation Farms, sold to River Farms in 1916. Pictured here is a ditch being dug in Yolo County. (Courtesy of The Bancroft Library, University of California, Berkeley, public domain.)

Following passage of the Wright Act in 1887, Turlock Irrigation District (TID) became the first irrigation district formed in California, with the first water becoming available in 1901, when 3,757 ac. were under irrigation. The history of the Modesto Irrigation District (MID) parallels that of TID, with water becoming available in 1904, distributed to over 7,000 ac. Today, the two districts combined irrigate over 200,000 ac. of agricultural lands in the lower San Joaquin Valley. To the south other irrigation districts formed around Fresno, and in the 1920s the Department of Public Works' Engineering and Irrigation Division developed the State Water Plan, which called for dams on the Sacramento River above Redding and pumping stations to deliver the water into the San Joaquin Valley (WRCA 1997). The State Water Plan evolved into the CVP, which resulted in the construction of the Shasta Dam and a series of canals that distribute water from Northern to Southern California.

While the historic development of water storage and conveyance systems is integral to our understanding of agricultural economics and consequently the level of production, water development in California has been treated in a similar thematic study prepared in December 2000, by JRP Historical Consulting Services (JRP) under contract with Caltrans, entitled “Water Conveyance Systems in California: Historic Context Development and Evaluation Procedures.” Caltrans completed and published the final report (Caltrans 2000).

The study serves as a useful model for interpreting the evolution of canals, reservoirs, and other water conveyance systems in California, many of which were designed for agricultural use (Figure 16). Other important works that provide a broad context for irrigation and water resources include scholarship by Donald J. Pisani (1984), Norris Hundley (2001), Jr., and Donald Worster (1985).

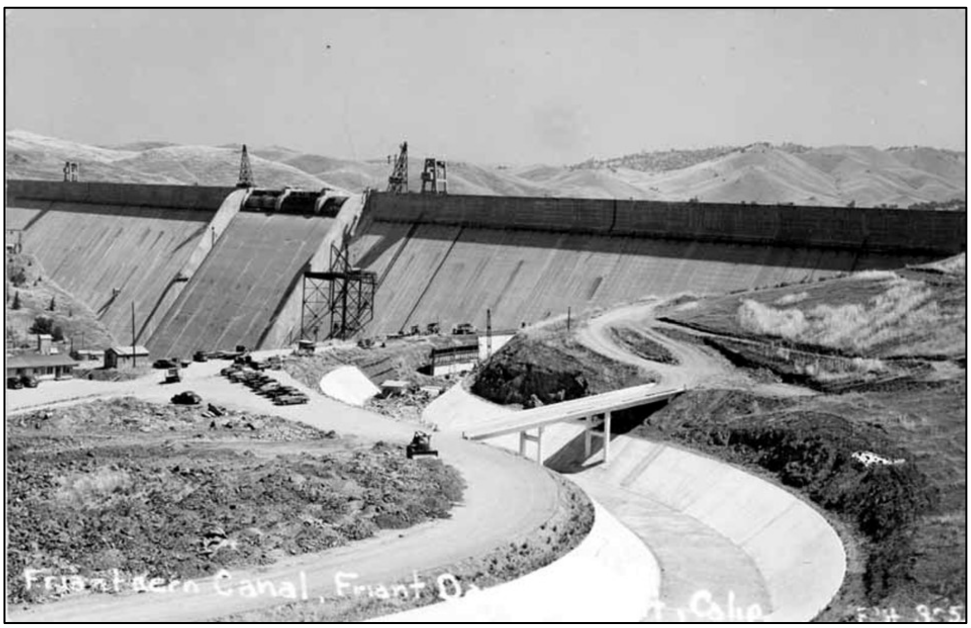

Figure 16. Friant Kern Canal, Friant Dam, Friant, ca. 1945. (The San Joaquin Valley Digitization Project, San Joaquin Valley & Sierra Foothills Photo Heritage, frp0159, courtesy of the Fresno County Free Library, Heritage Center, San Joaquin Valley Library System, Fresno.)

In summary, California’s diverse geomorphology lent itself to the development of a wide range of agricultural properties. Climate, soils, and hydrologic systems together played a part in determining which crops were planted where, at what time of year, and under what conditions. Ironically, the state’s natural resources that once appeared to be unlimited, under certain conditions had real limitations. Droughts, floods, changing groundwater tables, human intervention such as the construction of dams, canals, and reservoirs; and in more recent times the use of pesticides and chemicals, all affected the scale and productivity of farmland and had deleterious effects to the environment.

Laws and Regulations Governing the Acquisition of Public Lands

California's agricultural landscape is as much a product of natural forces as it is of politics, laws, regulations, land acquisition, and cultural influences. The acquisition of California's public domain proved difficult. The settling of California lands, though often exceedingly slow, resulted from complications from Spanish, and later Mexican land laws and conflicting federal regulations. Beck and Hasse (1974) illustrate the relationship of Mexican land grants to regions later subject to intensive agricultural use.

Colonization of California came quickly following the discovery of gold in 1848, notwithstanding the tragic consequences to native peoples. For many settlers, it took years to gain clear title to the lands they squatted or preempted. Some were never successful and lost their claims due to unscrupulous attorneys or because they failed to file the proper papers with the local land office in time.

Nonetheless, by the late 19th century, most of California's most fertile and accessible lands were under private ownership. Four types of land grants ratified by the federal government characterized land disposal by the state between 1841 and 1861. These land grants included lands for internal improvements, for swamp or overflow lands, for public schools, and for agricultural or mechanical colleges, such as the University of California, Berkeley (Liebman 1983:20–21).

Between the 1850s and 1860s, capitalized land brokers, such as John Parrott, preempted the tasks usually assigned to the U.S. Land Office. Besides his other business ventures, Parrott specialized in the acquisition and exchange of California lands. Ironically, his iron-front commercial building in San Francisco also housed the officers of the U.S. Board of Land Claims Commissioners (Igler 2001:41). Parrot also surrounded himself with attorneys, politicians, and influential businessmen, such as Miller and Lux. Parrott's success at helping clients acquire vast tracts of land in California during the early 1850s and 1860s partly resulted from the restructuring of private property rights. The 1851 Land Law, which harmed Mexican land claimants, compelled rancheros to prove their land grant title before the Land Claims Commission in San Francisco or Los Angeles, most often unsuccessfully (Igler 2001:45).

Until 1858, California had no state-administered land sales because local governments generally handled land transactions. Conflicts often arose when the state granted applicants lands through warrants on lands not surveyed. This policy, declared illegal in 1863, along with an 1866 federal law, averted the problem that confirmed titles granted by the state in cases of dual grants. The most corrupt sales were associated with swamp and school lieu lands, which the office of the State Surveyor General poorly administered. In many cases, unscrupulous attorneys, such as the San Francisco firm of Mullen and Hyde, used dummy buyers to help them acquire large tracts of land. The fact that 516 individuals, including companies and corporations, had holdings over 5,000 ac. in size, which covered roughly 8.7 million ac. by the

1870s, attests to the dramatic land monopolization that occurred during the mid-19th century in California (Liebman 1983:21–22).

California had eight primary methods of federal land disposal during the latter part of the 19th and first half of the 20th century: cash land sales, homesteads, Desert Land Act entries, Timber and Stone Act entries, scrip or lieu, mineral entries, Timber Culture Act entries, and railroad grants. Script and lieu included military bounty warrants, such as those issued after the Civil War, agricultural college scrip, Valentine scrip, and Sioux Indian scrip. Through military bounty bills, assignable warrants could be provided to any soldier, or his heirs, who had served a minimum of nine days in any war after 1790 or in the Revolutionary War.

Speculators later purchased many of the warrants and used them to acquire land in the West. Exploiting various types of land scrip to acquire land in California also occurred, while the Forest Lieu Land Act of 1897 assisted in the acquisition of the state's valuable timberland. The federal government enacted a number of laws granting lands to aid railroad construction between 1850 and 1871. The allocated sections were alternating, odd-numbered, and within twenty miles of the side of a road. In addition, the grant generally exempted all previously disposed-of land. Selling excess land occurred within three years after the construction of the Transcontinental Railroad. By 1958, California had disposed of 38,784,000 ac. of federal land (Liebman 1983).

The Preemption Act of 1841, enacted for the settlement of western lands, allowed for cash sales and became the primary method of land acquisition during the 19th century. Under the Preemption Act, bona fide settlers could settle upon and purchase at $1.25 per acre up to 160 ac. of surveyed, non-mineral, unoccupied, and unreserved public land. The act extended to California in 1853 and cash sales began in California in that year.

The terms of the Preemption Act extended to lands not yet surveyed in 1862. This meant that squatters anywhere on the public domain, on land that did not turn out to be mineral or reserved when surveyed, had the first option to buy that land. In California, preemption was the major source of cash land sales. Fraud ran rampant and dummy entrymen often put in hastily built improvements, did not cultivate the land, and still filed for entry. Repeal of preemptions and cash sales occurred in 1891.

The Swampland Act of 1850 allowed for the segregation and donation of lands designated as "swamp or overflow" to the state, with the proceeds from the sale used for their reclamation. In California, with outright purchasing of federal land prohibited prior to the early 1850s, speculators used this land measure to acquire extensive acreages, particularly in the San Joaquin and Sacramento valleys. The acts described above set the stage for the Homestead Act, an act that changed California's land divisions.

Homesteading the Frontier

The Homestead Act in 1862 is perhaps the most sweeping piece of federal legislation passed during the late 19th century. William W. Robinson examined the effects of federal homesteading laws and their influence on the broad patterns of rural agrarian life in the West (Robinson 1979). The Act established a pattern of small family farms, each no more than 160 ac., within the public domain. Individuals who desired additional land could file under both the Preemption and the Homestead Act for land totaling 320 ac. A homesteader had only to be the head of a household and at least 21 years of age to claim a 160-ac. parcel of land. Settlers from all walks of life including newly arrived immigrants on a path to naturalized citizenship, farmers from the east, single women, and former slaves came to meet the challenge of "proving up" (establishing a house, barn, fenced fields) and keeping this "free land." Each homesteader had to live on the land, build a home, make improvements, and farm for five years before they were eligible for a patent and permanent ownership. A total filing fee of $18 was the only money required. The first parcel or filing had to be carried to patent before entry on the second parcel. As the Homestead Act was based on the division of land into Townships, Ranges, and Sections, many agricultural fields, farm roads and irrigation ditches, and electric and telephone line corridors today are defined by the survey lines established in the 1860s. These once-hypothetical lines have had an enormous impact on the shaping of the land—especially in flat agricultural areas of the state.

Preemptors, between 1862 and 1880, had an advantage over homesteaders as the right of preemption attached from the date of actual settlement, while the right of homestead dated from the entry at the local land office. Preemptions became commutable to homesteads (land not surveyed could be homesteaded) in 1878 and the right to a homestead pushed back to the date of settlement in 1880. Straw entries also abused this law. Entrymen often sold off the land to engrossers after waiting the necessary six months. The Act was amended in 1912, changing the requirements to a three-year residency (with at least seven months a year spent on site), a 10 ft. square house instead of 10 ft. by 12 ft., and only 20 ac. cultivated. After World War I the Act was again amended to encourage veterans to farm. This amendment reduced occupancy to only one year (Bradsher 2012; Marchell 2018).

The Timber Culture Act of 1873 entitled an applicant to 160 ac. of land naturally devoid of timber if, on the day of the final proof eight years after entry, at least 675 trees were in living and thriving condition on 10 ac. of the land. Settlement was not a requirement. The purpose of the act was to increase tree cover in sub-humid environments and provide a much- needed supply of lumber and fuel. The Timber Culture Act was repealed in 1891 (associated with establishment of Forest Reserves renamed national forests in 1907).

The Desert Land Act was passed in 1877. This act was designed to promote settlement in arid regions of the country, particularly the Far West. The act had no residency requirement. Each applicant was entitled to 640 ac. of land. Twenty-five cents per acre was paid upon filing a desert land claim, and the balance of one dollar per acre was to be paid within three years when proof of reclamation by artificial irrigation was made. Reputedly, this act was designed for speculators or monopolists to acquire vast tracts of land. Stockmen and speculators were able to control thousands of acres for a nominal amount, barring entry and use by others. An amendment passed in 1890 reduced claim size to 320 ac. but required only 80 ac. irrigated. Thirty-four percent of all Desert Land entries nationwide were carried to patent (JRP 1997:39).

The Enlarged Homestead Act of 1909 (also known as the Dry Farming Homestead Act) extended the 160 ac. of the original Homestead Act to 320 ac., with five years occupation and cultivation.

Generally, lands that fell under this act were considered marginal for sustained agriculture. California was included in the Act in 1910 and it became applicable here after 1912. It was used in the Mojave Desert (Robinson 1948:169). The Enlarged Homestead Act of 1909 was probably the least important rural Homestead Act for California.

In 1916, the Stock Raising Homestead Act was passed. This act provided for a maximum of 640 ac. on grazing land. Residency was required and improvements were valued at $1.25 per acre. The bill was associated with the “Progressive Movement” in the U.S. and the philosophical argument that the Act would result in an economic boom to the West. Californians used this act more frequently than other states during the 1920s, although lands taken under it were generally marginal for long-term settlement.

In 1976 the Federal Land Policy and Management Act was passed by Congress. This act repealed the original Homestead Act of 1862 in the 48 contiguous states. The purpose of the Act was to establish public land policy, established guidelines for administration of public lands, and to provide for the management, protection, development, and enhancement of public lands. This Act, and its amendments, is the Bureau of Land Management’s “organic act” that establishes the agency’s multiple-use and sustained yield mandate to serve present and future generations of Americans (Potter and Schamel 1997; USDI, BLM 2016).

Table 1 shows the number of the various types of homestead claims granted in California. The proportion of claims and claimed acreage to all California agricultural properties differs markedly from other Western and Midwestern states. By 1900, homestead entries stabilized at just under half of all farm and ranch properties. The low proportion of entries reflects substantial consolidations of agricultural land because of prior Mexican and Spanish land grants, fraudulent federal and state land claims, and sections of land deeded to railroads as enticements to develop transportation systems to serve the state.

The data in Table 1 also illustrates that the acreage claimed by homesteaders continued to rise until it made up about a third of all agricultural land by 1940. That ratio is deceptive, however, because residual federal lands poorly suited for agriculture characterized most 20th-century claims. In addition, uncertainty exists about whether or not the data used to create the table includes the abandoned and rejected claims that rose greatly after the turn of the century. For example, many Desert Land Entries were never “proven up” due to inadequate water and harsh conditions.

The transfer of public lands to late-19th-century settlers is as much of an example of an experiment in socialized agriculture as an ongoing effort by the federal government to encourage settlement west of the Mississippi River. It operated on the theory that “both labor and rewards were distributed evenly through the population; permanent, responsible settlement resulted; families anchored people in space and through time; farm products provided an essential self-sufficiency; and an unlimited cycle of planting and harvesting ran no risk of depletion” (Limerick 1987:124). Homesteading laws deceived many “into thinking that securing a piece of land was all that was necessary to make a competence for the owner” (Fite 1966:17). In actual practice, much work, investment, and luck proved necessary before even the relatively cheap federal or state lands yielded their first proceeds. Until that time, many homesteaders had to take out loans and live frugally in the hope that this American dream would eventually pay off.

Table 1. Federal Land Records, California by County: 1862 to 1976.

County	Number of Entries	County	Number of Entries
Alameda	2,085	Orange	1,467
Alpine	702	Placer	3,917
Amador	3,109	Plumas	5,654
Butte	5,322	Riverside	12,655
Calaveras	6,045	Sacramento	2,461
Colusa	3,780	San Benito	4,444
Contra Costa	1,920	San Bernardino	34,030
Del Norte	2,228	San Diego	13,289
El Dorado	6,317	San Francisco	86
Fresno	11,823	San Joaquin	3,694
Glenn	3,613	San Luis Obispo	10,031
Humboldt	18,946	San Mateo	1,299
Imperial	9,047	Santa Barbara	5,412
Inyo	3,877	Santa Clara	3,925
Kern	18,780	Santa Cruz	1,551
Kings	2,491	Shasta	9,994
Lake	4,050	Sierra	1,799
Lassen	10,958	Siskiyou	10,714
Los Angeles	10,490	Solano	2,180
Madera	6,758	Sonoma	6,795
Marin	1,124	Stanislaus	4,897
Mariposa	4,317	Sutter	1,961
Mendocino	20,286	Tehama	6,453
Merced	6,142	Trinity	4,379
Modoc	8,959	Tulare	8,991
Mono	2,169	Tuolumne	4,864
Monterey	10,097	Ventura	3,083
Napa	3,148	Yolo	3,140
Nevada	3,615	Yuba	2,067

The unpredictability of nature with its droughts and other risks, combined with the inexperience and poor farming practices of some settlers, led to hardships and the abandonment of many farms across the West and Midwest. The Depression Era Dust Bowl is the most widely known disaster as it ruined many Plains farms and led to a mass migration to California. As Limerick observes, “in their haste to produce marketable crops, farmers did not necessarily work with long-term stability in mind; getting crops in and out could become something close to an extractive industry - another way of mining the soil” (Limerick 1987:124–125).

The methods put into practice by western farmers varied widely, reflecting differences in background, experience, intention, and attitudes toward the environment. Some of the most successful farmers were immigrants who gravitated toward areas and types of agriculture compatible with their traditional homelands. Others came with no experience and disparate motivations.

Bowen recognized at least four distinct motivations for establishing homesteads in Nevada, which seem to mirror homesteads in California (Bowen 1988:198–211). Claimants included those wishing to establish farms, settlers who wanted to enlarge their existing holdings, those who simply wanted a country estate, and land speculators. These differences clearly influenced land use, residency, and the types of development strategies employed. Fabricated claims, however, were most likely among speculators and claimants adding acreage to an existing holding, not those with a bona fide interest in establishing a homestead.

The hard realities of the arid West, shortages of labor, costs of transporting crops to market, and depressed wholesale prices forced many aspiring western farmers to abandon their dreams. Frank Norris' classic 1901 novel, *The Octopus: A Story of California,* considers how small farmers were often subjected to predatory freight rates that made it difficult for them to compete with larger, capitalized farms. Increasing mechanization also required investments daunting to most small farmers. Lands available for homesteading also became increasingly marginal over time, requiring ever-larger tracts to achieve success. As Gilbert Fite observes, "for most farm operations the needed efficiency required larger units" (Fite 1966: 238). In California, large estates from the Mexican and Spanish eras and enormous holdings controlled by railroad barons led to a pattern of large-scale factory type farming that came to dominate the regional marketplace.

In summary, the long-term effect of land disposal in California proved advantageous to some and harmful to others. Large landowners, such as Miller and Lux, acquired hundreds of thousands of acres of land through purchase and land grants (Igler 2001). Nonetheless, settlers frequently used the federal land acts to acquire property through the legal mandates governing land disposal, such as the Homestead and Desert Land Act. To distinguish which lands were actually held under legal title proved difficult, if not impossible for many, because vast tracts of land, as in the case of the Central Valley, were never developed but rather used as open range for grazing livestock.

The Diversification of California Agriculture

The rapid infusion of settlers into California during the Gold Rush, along with unprecedented technological innovation, wheat farming, and eventually railroad development resulted in the diversification of agriculture and agricultural products in the state. That diversification led to the establishment of many different types of agricultural properties, while the demand for fresh foods and the high cost of imported food products created an impetus for local agricultural ventures.

Farmers and ranchers initially sought to satisfy local demand by growing a diverse range of products desired by the burgeoning and ethnically diverse population. Markets with a wide range of agricultural products familiar to the newly arrived immigrants emerged because culturally derived food preferences are among the most conservative cultural practices (Olmstead and Rhode 1997).

The state's diverse geomorphic conditions presented opportunities to grow and experiment with a wide variety of agricultural products. Many purchased seeds and seedlings from nursery catalogs or propagated them from stock available at missions and other early settlements.

Commercial nurseries appeared in California during the early 1850s. Ranchers recognized the opportunities available to them in vast open rangelands that under certain conditions could produce abundant feed for their sheep and cattle. Before irrigation, natural groundwater, precipitation, and runoff from winter snows provided agriculturalists with the means to cultivate their crops. As diverse as California's soils and climate were, however, droughts, floods, insects, alkaline soils, and changing market conditions still hampered agriculturalists.

California growers experimented to find the most appropriate plant stocks, including the introduction of exotic species and the creation of new varieties. Plums and prune trees were imported from France and Japan; grape vines from France, Italy, Spain, and Germany; and figs from Greece and Turkey. Horticulturists such as Luther Burbank, who settled in California in 1875, developed hundreds of new varieties of plums and other fruits (Olmstead and Rhode 1997:7). Olives, grapes, and other fruits were also propagated using the stock established at California's missions.

Regional and international market conditions influenced production and development of new products. During the 1860s, California served as the principal source of agricultural products for the Comstock boom in Nevada. Until the 1870s, virtually all the fresh products available in the Comstock came from California. Local agriculturalists benefited from improved transportation, starting with the growing role of steam-powered shipping together with the enormous boost that occurred with the completion of the Transcontinental Railroad in 1869.

The federal government's *laissez faire* economic policies gradually faded in the early 20th century due to growing international trade imbalances, volatility in gold prices, and political pressure from farmers and American manufacturers. Many key trade partners gradually adopted the gold standard as a way to adjust exchange rates. Tariffs imposed on an expanding array of foreign goods directly stimulated increasing diversification of the products grown in California.

Continuing experimentation, coupled with new immigrants with different food preferences, fostered ongoing diversification of the crops grown in California in the early 20th century. During the Great Depression of the 1930s, direct government subsidies and price controls affected agricultural production.

Table 2 summarizes the production patterns for the state during the late 19th century, and Table 3 summarizes the same for the early 20th century, using data compiled by the U.S. Census Bureau. The compilation of data appears separately because the census changed its methods of accounting from amounts to dollar values. Those patterns reveal only the highlights of statewide production while more detailed summaries of major plant and animal products appear below. The summaries consider changing trends in production through time and devote special attention to the varying material evidence of these different agricultural pursuits. The products grown on farms and ranches also influenced labor patterns.

Table 2. California's Late 19th Century Agricultural Production.

	Description	1850	1860	1870	1880	1890	1900
Animal-based Production	All Cattle	262,659	1,180,142	631,398	815,044	1,608,418	1,115,194
	Dairy Cows	4,280	205,407	164,093	210,078	317,201	307,245
	Equines	23,385	164,291	209,806	266,053	453,700	480,209
	Swine	2,776	456,396	444,617	868,419	594,009	598,336
	Sheep	17,574	1,088,002	2,768,187	4,152,349	2,475,140	2,563,353
	Poultry	ND	ND	ND	1,610,167	3,987,223	4,196,268
	Milk (gallons)	ND	ND	3,693,021	12,353,178	111,191,186	153,684,741
	Butter (pounds)	705	3,095,035	7,969,744	14,084,405	26,776,704	20,853,360
	Cheese (pounds)	150	1,343,689	3,395,074	2,566,618	3,871,575	4,249,588
	Eggs (dozens)	ND	ND	ND	5,771,323	13,679,423	24,443,540
	Honey (pounds)	ND	12,276	294,326	574,029	3,929,889	3,667,738
Plant-based Production	Barley (bushels)	9,712	4,415,426	8,783,490	12,463,561	17,548,386	ND
	Buckwheat (bushels)	ND	76,887	21,928	22,307	10,388	ND
	Corn (bushels)	12,236	510,708	1,221,222	1,993,325	2,381,270	ND
	Oats (bushels)	ND	1,043,006	1,757,507	1,341,271	1,463,068	ND
	Rye (bushels)	ND	52,140	26,275	181,681	243,871	ND
	Wheat (bushels)	17,328	5,928,470	16,676,702	29,017,707	40,869,337	ND
	Flax Seed (bushels)	ND	ND	13,294	45,770	4,130	ND
	Molasses (gallons)	ND	552	333	2,459	1,670	ND
	Tobacco (pounds)	1,000	3,150	63,809	73,317	12,907	ND
	Hops (pounds)	ND	80	625,064	1,444,077	6,547,338	ND
	Potatoes (bushels)	10,292	2,003,770	2,251,262	4,636,849	3,785,772	ND
	Peas/beans (bushels)	2,292	165,574	380,010	419,777	745,844	ND
	Hay (tons)	2,038	305,655	551,773	1,045,119	2,218,285	ND

Note: From U.S. Census Bureau compilations at the time of the census. ND – No data compilation available.

Table 3. Value of California's Agricultural Production, 1910 to 1950.

Description	1910	1920	1930	1940	1950
All Products	284,553,259	784,629,039	583,026,459	361,479,929	1,741,961,237
Livestock	144,179,180	221,141,462	146,569,400	112,254,656	ND
Market Gardens	12,121,958	47,377,921	1,533,041	ND	180,862,162
Orchards/Vineyards	50,706,869	273,068,064	296,241,840	157,928,799	350,327,175
Cereals	28,039,826	108,570,469	43,040,180	31,212,341	ND
Other Grains & Seeds	7,318,211	38,349,277	28,779,437	17,906,182	ND
Forage	42,187,215	96,121,846	66,862,561	42,177,951	ND

Note: From U.S. Census Bureau compilations at the time of the census. ND=no data compilation available.

The diversification and capitalization of California agriculture had much broader consequences for the international marketplace, as traditional exporters of many crops, particularly those from the Europe and South America, were driven from the lucrative U.S. market and faced stiff competition from California growers who had introduced similar products on their respective farms.

According to Olmstead and Rhode (1997:6), the transformation of California agriculture resulted in part because of the following factors:

- Increases in demand for fruit products in eastern urban markets.
- Improvements in transportation, especially the completion of the Transcontinental Railroad in 1869.
- Reductions in the profitability of wheat due to slumping world grain prices and falling local yields.
- The spread of irrigation and accompanying breakup of large land holdings.
- The increased availability of "cheap" labor.
- The accumulation of knowledge about California's environment and suitable agricultural practices.

Other factors that fostered diversification in California agriculture include capital investment, availability of cheap land, the introduction of fertilizers, and more drought and insect resistant plants or seeds. Technological advances in refrigeration, first within the brewing and meat packing industry and later within the perishable vegetable and fruit industry, influenced the market and made shipping products regionally more feasible. Refrigerated rail cars appeared sporadically in the eastern United States to transport milk and dairy products by the 1840s. The refrigerated rail car, which included insulated cars and ice bunkers, did not make climate-controlled transport relatively safe, efficient, and more feasible until the late 1860s. Even then, long-distance transport during the hot summer months was risky, particularly if a car derailed and delayed the journey (Krasner-Khait 2005). During the early 20th century ice plants were developed in the Sierra, and ice houses were used in concert with refrigerated marketing facilities along California's railways (Sackman 1995:87).

The face of California agriculture changed in the mid-20th century, due to a combination of environmental conditions, water issues, and population growth. In 1929 there were 136,000 farms in California. While this number decreased during the 1930s Depression years when crop prices dropped and some farmers were forced to foreclose or sell, by 1949 there were 137,000 farms in the state. A series of events led to the decline in the numbers of farms statewide, beginning in 1950.

During World War I and again in World War II America's farm labor force was reduced as men left for military service or were attracted to better paying industrial jobs. Before 1914, an estimated 85 percent of the nation's population was engaged in agriculture, producing food for themselves and for the other 15 percent of Americans. The war years forced farmers to adapt and function with less labor and widespread mechanization occurred. The use of diesel engines instead of horses and mules to power farm tractors, increased access to electricity, use of airplanes to seed, fertilize, and spray crops, and advances in equipment for planting and harvesting are just some of the technological developments that led to efficient farming with fewer employees. By 1950 the pre-World War II numbers had reversed; 15 percent of the population produced food for themselves and the remaining 85 percent of the nation's population. Farmers t unable to adapt to the lack of workers or afford new equipment often gave up their farms (*California Agriculture* 2020)

While increased mechanization led to advances in farm equipment, the number of vehicles on local roads and highways after 1930 began to take its toll on crops, particularly in the heavily populated Los Angeles area. In November of 1950 *California Agriculture* focused on the effects of pollution on crops. Leaf damage due to smog had been noticed as early as 1944, and University of California scientists in Riverside and Los Angeles began to study pollution effects. These researchers found that table beets, Romaine lettuce, Swiss chard, and spinach were particularly affected by smog and published results of their study, along with photographs of affected leaves and healthy leaves. They noted that the total cost of smog damage to Los Angeles crops in 1949 exceeded $480,000 (*California Agriculture* 2020; Reith 1951).

In addition to the effects of pollution and mechanization, California's population exploded after World War II. Men who participated in the Pacific Theater during the war often spent time at California's military facilities prior to deployment, particularly in San Diego and the San Francisco Bay area. Some of these sailors, marines, airmen, and soldiers relocated to California after the war, drawn by the opportunities, climate, and booming industries. With population growth came the urgent need for housing and commercial enterprises to serve the thousands of people relocating to the state. At the same time, farmers reached retirement age and sometimes were left with difficult choices, as children or relatives often had little interest in pursuing an agricultural lifestyle. In the 1950s and 1960s many urban centers such as the San Francisco Bay area, San Diego, Sacramento, Los Angeles, and Riverside, and began expanding and growing in a way referred to as "urban sprawl" (Caltrans 2011).

As stated by Gebhard in 1976 for the San Francisco Bay area:

> While urban sprawl was already gobbling up pear orchards before World War II, the fifteen years after 1945 witnessed an urbanization of the Peninsula and East Bay on a scale never before experienced. Urbanization or devastation? Thousands of acres of the most productive agricultural land in the nation were platted with tract housing. Acres of the Bay were filled in for domestic and commercial projects. Major freeways were built, and as they were projected further and further down the Bay and eastward beyond the Coastal Range, they drew new developments and new commercial centers like magnets [Gebhard 1976:22–23].

While some farmers in urbanized locations were selling out and moving away, major water projects in the 1950s, including the CVP and California Aqueduct, brought water to the dry Central Valley farmland, leading to the formation of new irrigation districts and expansion in agricultural properties from Stockton to Bakersfield. Other Southern California areas, however, struggled to claim water for crops as competition from new developments and urbanization increased (*California Agriculture* 2020).

Growing conflicts between urban and rural residents for natural resources, increased concerns regarding pollution from pesticides into groundwater, and advances in science resulting in hybrid crops and efficient farming took its toll on farmers. The combined effects of mechanization, pollution, water issues, and urban sprawl led to a sharp decline in the number of California farms and to the rise of large corporation “agribusiness” companies. As noted above, there were 137,000 farms in California in 1949. This number decreased to 99,000 in 1959. (United State Department of Agriculture 2020). By 1960 farm residents accounted for only two percent of California’s 15.7 million residents (*California Agriculture* 2020). The number of farms continued to decline, with to 78,000 in 1969 and 73,000 in 1978. As of 2019 there were a reported 69,900 farms in California (United States Department of Agriculture 2020).

Part II of this chapter provides summaries of specific agricultural industries in California that had a marked change upon the state’s physical and cultural landscape. California diversified agricultural products in many ways insulated the state’s economy from cyclical shifts in individual crops or products. Diversification also created demands for new and improved technology. For example, the shift towards cotton, which began in the 1920s, had broader implications, including the more intensive use of power. In California, farms were twenty times more likely to have a tractor than similar farms in Mississippi. Tractors reduced the need for more labor and led to further modernization. Physical indicators of this transformation are visible on post-1920s farms in California in the form of abandoned machinery and other farm equipment, and perhaps also found in capital investment records that reflect new purchases and obsolete equipment.

Application of irrigation water to row crops occurred in a variety of ways. A ditch or canal system, while expensive to build and maintain, was the most efficient. Water was pumped into a raised bed or distributed by gravity into a sunken bed. Along California’s coast, field irrigation happened by use of a windmill extracting groundwater through a pump to the high point where gravity fed it through various furrows, side ditches, or flumes to water the crops. Sprinklers were introduced in the early 1900s, however, water-loss was great, and maintenance costs were higher than a simple gravity watering system. Cultivation strategies of early farmers included ridging by a plow or other mechanical device, raised beds, particularly for winter crops, tillage to release excessive moisture, thinning, and transplanting to secure proper spacing (Wickson 1923:73–74).

Fertilization practice also took place during the 19th and early 20th century because some crops depleted nutrients from the soil. The use of horse, cow, sheep, hog, and hen manure in varying amounts to fertilize sterile soils helped to raise nitrogen, potash, and phosphoric acid levels.

In summary, California’s climate, geomorphology, *laissez faire* economic system, and large immigrant labor force led to the creation of a diversity of agricultural industries and products throughout the state during the 19th and early 20th century.

Transportation, Mechanization, and the Infrastructure of the Agricultural Industry in California

Transportation

With the development of an industrialized society, the efficient movement of goods and services from the grower or producer to the market is essential. In the case of California, largely because of the Gold Rush, the state had already developed a complex network of roads. While maintenance of the state's transportation system was a recurring issue throughout the 19th century, this network of roads linked most of the state's major commercial centers to each other, and to smaller communities, many of which were located in prime agricultural areas. Designed mainly for horse-drawn wagons and stages, California's early transportation system provided farmers an opportunity to market their products regionally, although not necessarily efficiently.

Of particular importance to California's agricultural industry was the discovery of gold and silver in the Comstock Lode in 1859 in present day Nevada, and the subsequent rush to Washoe. Between 1860 and 1866, a network of new roads opened up between San Francisco, Sacramento, and Virginia City, and thousands of tons of merchandise and foodstuffs were shipped out over the Sierra Nevada to the fledgling mining camps on the Comstock Lode. This commerce included a wide variety of agricultural products that were in high demand in Nevada, particularly products that could not be grown in the harsh environment of the Great Basin. California farmers also had the ability to charge exorbitant prices for certain perishable products, such as milk, butter, cheese, fresh vegetables, and fresh fruit. Many sections of these earlier routes later morphed into the main Trans-Sierran routes of the Pioneer section of the Lincoln Highway and the modern Highways 50 and 80. Remnants of unused sections can still be viewed from the modern roadway.

California's navigable waterways served as important natural features and quickly became main transportation and commercial corridors (Figure 17). By the mid-1850s, a regular trade developed along the Sacramento and San Joaquin rivers. Most homes and farms along the river had docks extending into the water to facilitate bringing crops to market and welcoming the occasional visitor. In the central and northern portions of the Central Valley, the river courses served as the primary routes for transporting the bulk of products in this section of the state, particularly wheat and feed crops. In the 1910s and 1920s, barges regularly docked at various islands in the Delta. George Shima, for example, owned a fleet of barges that were continually in use shipping potatoes from the Delta to San Francisco and beyond (Figure 18). From the 1850s through the 1930s, paddle wheelers powered by steam as well as barges plied the waters of the San Joaquin and Sacramento rivers. The completion of the Port of Stockton in 1930, the first inland port that could accommodate ocean liners and freighters, led to increases in exports of California fruits, vegetables, grains, and other products to a large international market.

Figure 17. Steamboats on the Sacramento River hauling grains and produce. (Rivergarden Farms, 17, courtesy of the California History Room, California State Library, Sacramento, California.)

During the 19th and early 20th centuries, agricultural products shipped out via ocean-going schooners or steamships to various ports in the Northwest, Hawaii, Mexico, South America, and East Asia. Partly due to improved transportation systems, particularly the completion of the Transcontinental Railroad and improved overseas shipping, diverse agricultural products were being shipped from California by the 1870s, including many exotic varieties. In an address before the California Agricultural Society in 1880, members lauded the significance of the Southern Pacific Railroad (formerly the Central Pacific) for its ability to solve the issue of affordable and efficient transportation of agricultural products (CSAS 1881:182–183).

During the 1880s, techniques were invented to improve the long-term preservation of agricultural products, particularly canned fruits and vegetables. By 1889, 39,313,740 canned goods shipped out from California via the Southern Pacific Company's railroad. In addition, 33,132,050 pounds of dried fruits also shipped out via the railroad (CSAS 1890:196–197). The demand for canned and dried fruit products led to increased industrialization of the agricultural industry in California and a demand for cheap labor. Jose Morilla Critz, Allen L. Olmstead, and Paul W. Rhode (1999) provide an in-depth analysis of the dried fruit industry, particularly as it relates to international competition and its development from 1880 to 1930.

Figure 18. George Shima's barge, Kongo, loaded with potatoes for market, 1914. (2000.164.044, Delta Water Path exterior exhibition panel, courtesy of San Joaquin County Historical Society and Museum, Lodi.)

The merchandizing or sale of agricultural products to regional markets was speculative. During the late 1880s shipments of citrus and vegetables to eastern markets were auctioned off to the highest bidder. Prices varied widely, however, depending upon supply and demand at the time of arrival. This unpredictability continued through much of the early 20th century until New Deal legislation created subsidies and price controls to protect farmers from rapidly declining prices or market competition.

In California, a network of railroads linked the state, beginning in 1854 with the Sacramento Valley Railroad. The most significant was the Central Pacific Railroad (CPRR) in 1869, which provided transcontinental commerce and trade. The 1870s witnessed the construction of thousands of miles of railroad grades in California, including those through the Central Valley, along the Coast, and in Southern California (Figure 19).

Completion of the first Transcontinental Railroad in 1868 was integral to the expansion of California's agricultural industry that was, in part, fostered by the burgeoning Sierran ice industry. One of the principal ice harvesting centers was in Truckee, although it would extend farther down the Truckee River. The Truckee River and its tributaries were dotted with ice ponds and warehouses all along the river to meet the incredible demand for ice necessary for railroad shipping. A synchronous relationship developed between the CPRR and the ice companies located along its route. Ice enabled the CPRR to refrigerate its cars, thereby

Figure 19. Santa Fe Depot with railroad cars bearing a tractor shipment for M. Eltiste Company, Orange 1922. (Local History Collection, courtesy of the Orange Public Library & History Center, Orange.)

expanding the distance Californian farmers could transport their goods and allowing farmers to reach more distance markets (Lindström et al. 2007). The invention of refrigerated railcars led to an explosion in production, as for the first-time farmers and ranchers could ship their products and livestock across the nation in cool cars, significantly reducing spoilage.

Further expansion occurred during the 1880s with the Southern Pacific Railroad extending branch lines into the Sierra Nevada and through the Coast Range and into Northern and Southern California. Numerous short-line railroads were constructed between 1880 and 1920 as a way to link agricultural production areas with mainline railroads. Sidings to accommodate packing houses were common (Figure 20). Ventilated boxcars allowed produce to ship farther with less spoilage. By 1886, express train deliveries of fruit from Sacramento and Los Angeles to the East Coast were common (Sacramento History 2020). In the 1890s, California asparagus, for example, became a popular item served in high-end hotels in New York City, primarily because

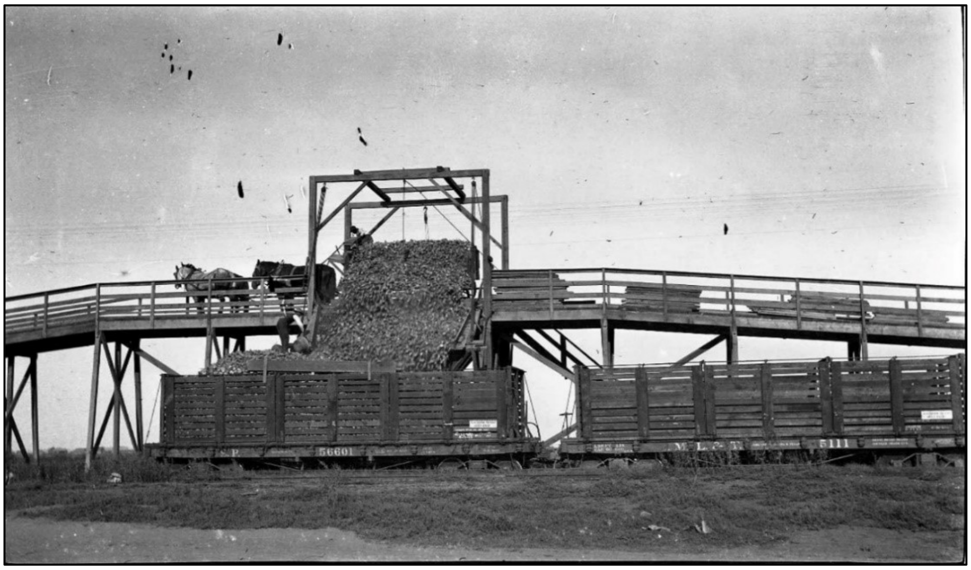

Figure 20. Charles Mitsuji Furuta unloading a wagonload of sugar beets at the Southern Pacific Railroad siding near Wintersburg Village, now present-day Huntington Beach, ca. 1914 to 1915.
(Photograph courtesy of Historic Wintersburg, Furuta Family Collection.)

it arrived fresh, something that was not possible when shipping by ocean freighters. By the mid-1910s, Riverside's citrus industry was in full-force, shipping oranges in refrigerated cars across the nation (George and Hintzman 2020).

In 1906 the Southern Pacific Railroad and Union Pacific Railroad created a partnership --Pacific Fruit Express (PFE) —to supply refrigerated cars to farmers. In 1907 PFE started business with 6,600 cars cooled with ice produced in the company ice plant. PFE cooled the cars, loaded them with ice, then the SPRR and UPRR transported the empty cars to stops throughout California. Fruits and vegetables, beer, wine, and stock were loaded into the cars and shipped across the nation. At its peak in the 1950s, the company produced over 300 tons of ice per day and maintained nearly 40,000 steel refrigerated cars (Thompson et al. 1992). Technological changes led to innovation in cooling cars, and the use of ice became obsolete in the 1970s, leading to the closure of PFE. Although the railroad offered new opportunities for those who had access to a rail line, high costs and overcharging reduced the profitability for agriculturalists. The increased rail construction throughout California was significant and went hand in hand with an improved highway transportation system in the state. By the early 1900s, spurred by the "Good Roads Movement," both in California and the nation, private investors together with various states were helping to build new transportation systems, such as the Lincoln Highway and later the Victory Highway (Figure 21). The Lincoln Highway, created in 1912, purported to be the first transcontinental highway in the nation, was actually a network of loosely knitted automobile, wagon, and farm roads that began in New York and terminated in San Francisco. The boosterism associated with the highway generated a great deal of interest leading to local or state initiatives at road improvements. Even though the Lincoln Highway received much attention in the 1910s, railroads were still the primary mode of transportation for agricultural products.

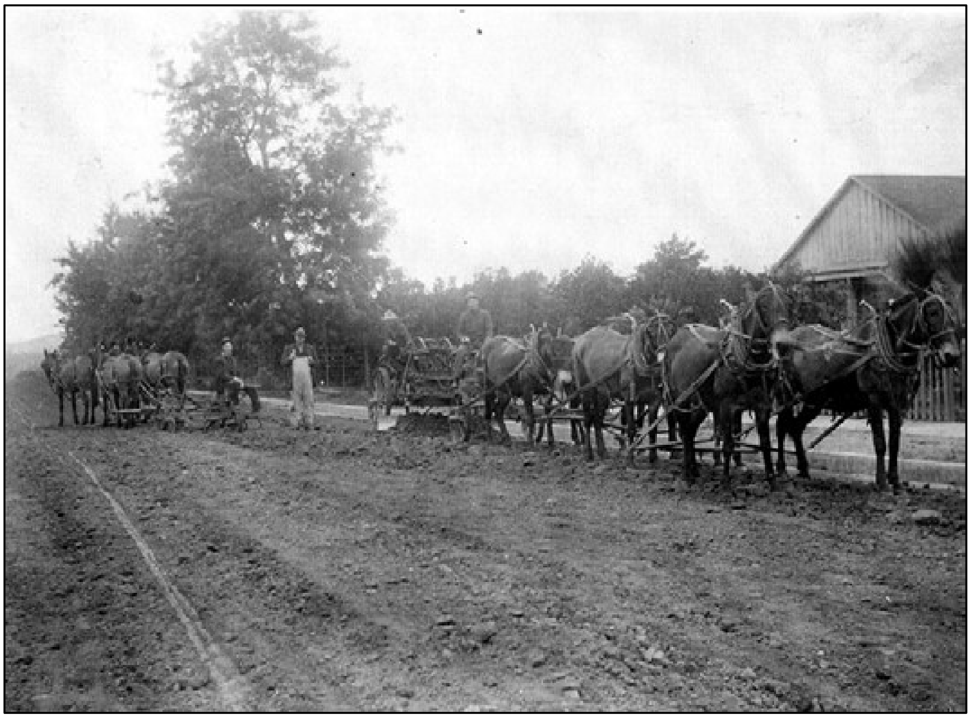

Figure 21. Road building with Fresno Scrapers in Kings County, ca. 1915. (San Joaquin Valley & Sierra Foothills Photo Heritage, kia0116, Courtesy of the Kings County Library, Hanford.)

During the 1920s, as both automobiles and trucks became an integral part of the state's modes of transportation, new highways were being built to form large swaths across California's farmland. Highways influenced the transport of farm products in a variety of ways. Combined with improved trucks for transport, California's highways connected distribution points across the state providing outlets for a much broader range of agricultural products. Highways also improved efficiency and generally lowered the cost of transportation (Caltrans 2016).

California's modern highway system, which began in 1909, ultimately became the principal mode of transportation for agricultural products in the state. The highway system, coupled with improvements in diesel trucks, opened new markets and made transport of agricultural products much more efficient. Individual farmers could now take their produce directly to the marketplace.

Mechanization of Agriculture

During the 1850s much of what Californians consumed came from the East Coast and from a wide range of countries. Importation also meant relatively high prices for agricultural implements such as shovels, plows, spades, axes, threshing machines, straw cutters, rakes, pitchforks, hoes, butter churns, and flour mills, to name a few. Products that reached San Francisco were then shipped out via the Sacramento or San Joaquin rivers to various distribution points such as Red Bluff, Marysville, Sacramento, and Stockton. From these commercial hubs, jobbers would resell the merchandise at much higher prices. In some cases, products were shipped out once again via wagons to rural outlets where local merchants would sell them at even higher prices. Because of the cost of transportation and strong demand, prices remained high for most agricultural products in California through the 1850s and 1860s.

During most of the 19th century the primary asset of most California farms were the horse and mule. According to Olmstead and Rhode (1997:15–16), “in 1870 the average number of horses and mules on California farms was almost three times the national average and the number of horses and mules per male worker was more than twice the national average.” Equines provided power to till the soil and transport crops to market.

By the 1860s, California had become the proving ground for new technology. According to agricultural historian Lawrence J. Jelinek (1982:41), “The H.C. Shaw Plow Works manufactured 20,000 gang plows between 1852 and 1886, which helped transform Stockton into a major agricultural implement center.” Combine harvesters had replaced outdated horse-drawn equipment in California’s wheat fields long before midwestern farmers adopted them. “In 1887, George Berry constructed one of the first straw burning, steam powered combine harvesters on his Tulare farm, and one year earlier the first steam powered tractor made its appearance in the San Joaquin Valley” (Jelinek 1982:41). Through the 1880s into the early 1900s, technological advances abounded in agriculture, including steam-powered water pumps that allowed for easier access to year-round water supplies. An examination of several mid- to late-19th-century agricultural periodicals seems to bear out Olmstead and Rhode’s (1997) assertion regarding the rapid adaptation by California farmers of new technologies (Figure 22).

Figure 22. Heading grain in the Anaheim Hills, ca. 1880s. (Anaheim Public Library Photograph Collection on Anaheim Local History, P27, Courtesy of the Anaheim Public Library, Anaheim.)

The California Farmer (later the *Pacific Coast Rural Press*) provided numerous descriptions of the newest and most efficient agricultural implements available for sale in San Francisco. The newspaper also noted what might have been one of California's first agricultural fairs in 1854 with the exhibition of the newest farm equipment, such as the "Clipper or Prairie Plow," which could "cut furrows 16" deep" (California Farmer 1854). This early mechanization seems to have set the stage for later developments that Olmstead and Rhode outline.

Whether or not this rapid mechanization held true for farmers who operated on marginal lands or owned farms located in some of the state's less accessible areas, such as the Sierra Nevada region, the Siskiyou Mountains of northern California, and the Great Basin, remains unclear. Archaeological evidence along with documentary evidence found in journals, such as the *California Farmer*, may ultimately be a good indicator of adaptation and the degree of mechanization of many of California's farms.

By the turn of the century, California's farms had undergone a major transformation. The transport of agricultural products and the mechanization of California farms and ranches went hand in hand with diversification and intensification (Figures 23 and 24). According to Olmstead and Rhode (1997:14), "a hallmark of California agriculture since the wheat era has been its highly mechanized farms." Industrialization and mechanization created multiple spheres of production, often many miles away from the actual farm where the products grew. The interconnection of these spheres or feature systems is critical towards interpreting the scale of agricultural development and production and the mechanics of the system as a whole.

During the 20th century, California farmers led the nation in the adoption of gasoline tractors, mechanical cotton pickers, sugar beet harvesters, tomato harvesters, electric pumps, and irrigation systems (Figure 25). Farm mechanization went hand-in-hand with the inventive efforts of local farmers and merchants as specialized crops and growing conditions created demands for new and more efficient types of machinery and equipment. As Olmstead and Rhode (1990:1–2) point out, "the conversion from draft power to the internal combustion engine was one of the most far-reaching technological changes ever to occur in the United States." Of particular significance was the localized development of specific farm machinery adopted primarily for California farming conditions and specialized crops, including track laying tractors, giant land planes, tomato pickers, and sugar beet harvesters, along with the Caterpillar tractor, made famous in the Stockton area for its use in the Delta (Figure 26).

J. Brownlee Davidson's *Farm Machinery and Farm Motors* presents a particularly good overview, including numerous illustrations of the range of farm equipment available at the turn of the century (Davidson 1908). Farm catalogs, United States Department of Agriculture publications, patent records and their production dates, and California State Parks publications also discuss equipment and machinery (California State Parks 1982).

Several factors led to the mechanization of California agriculture. According to Olmstead and Rhode, California farmers were generally more educated and more prosperous than farmers in many areas of the United States (Olmstead and Rhode 1997:15).

Figure 23. Mule team and grain combine harvesting, San Joaquin Valley, ca. 1930s. Note the newly constructed electrical towers in the background. Even with mechanized equipment being available, animal power was still a part of many operations prior to World War II. (The San Joaquin Valley Digitization Project, San Joaquin Valley & Sierra Foothills Photo Heritage, tca0012, courtesy of the Tulare County Free Library, Annie R. Mitchell History Room, San Joaquin Valley Library System, Fresno.)

Figure 24. Abandoned animal-drawn farm equipment, ca. 1930s. (Anaheim Public Library Photograph Collection on Anaheim Local History, P3911, courtesy of the Anaheim Public Library, Anaheim.)

Figure 25. Early diesel-powered traction engine in California's Central Valley, ca. 1920. (BANC PIC 1977.019:02—ALB, Rivergarden Farms, BANC PIC 1977.019--ALB, courtesy of The Bancroft Library, University of California, Berkeley.)

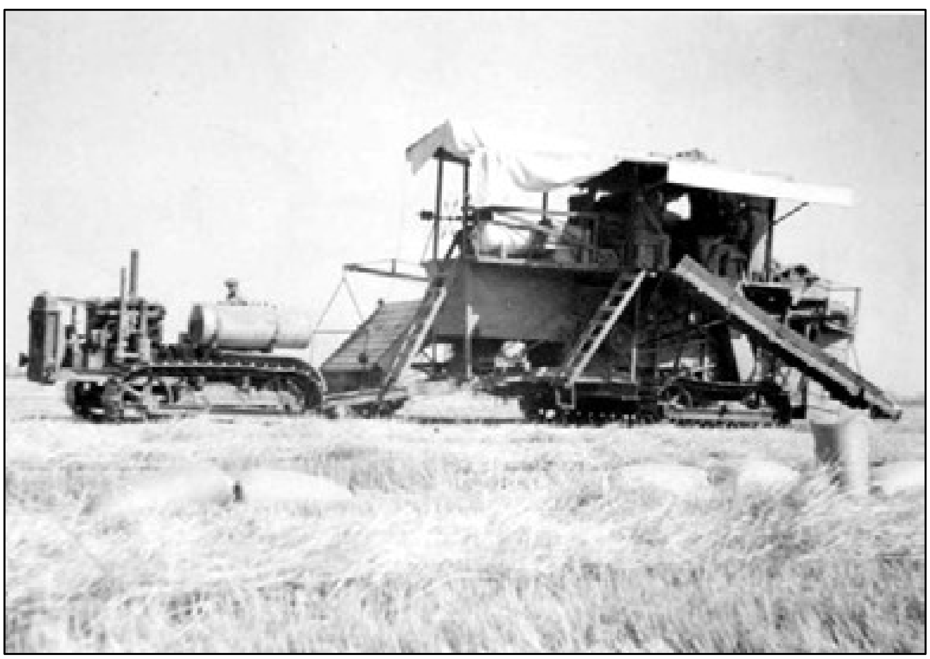

Figure 26. A 60-horsepower Caterpillar Tractor and butane tank pulling harvester drops rice automatically as it is bagged in a Butte County farm, ca. 1930s. (Courtesy of the Marysville Chapter Japanese American Citizens League.)

In addition, California had many large-scale farms where the fixed cost of expensive equipment was not as much of a burden as it was on small farms (Figure 27). This in turn put pressure on smaller operators to adopt newer technologies and methods in order to compete with the market dominance and efficiencies achieved by the larger growers.

Figure 27. Stacking sacks of barley near Huron, San Joaquin County, 1935. (Reproduced by permission of the R. C. Baker Memorial Museum, Coalinga, California.)

Lastly, the scarcity of labor meant relatively high wages and periods of uncertain labor supply. Nonetheless, California's climate and soils were favorable to mechanized farming and could bear the additional costs that technology brought (Olmstead and Rhode 1997:15). Experimentation and the scientific approach contributed significantly to transformation of the dairy industry. California was the leader in the early adoption of mechanical tractors. For the moist soils of the San Joaquin Delta region, Benjamin Holt built the first commercially significant steam powered "caterpillar track" tractor in 1904. He designed a tractor powered by a gasoline engine two years later (Jelinek 1982:41). "By 1920, over 10 percent of California farms had tractors compared with 3.6 percent for the nation as a whole" (Olmstead and Rhode 1997:16). Tractors developed on the West Coast were generally larger than those found elsewhere. California's farmers were also leaders in the use of electric power. The expansion of electric power was also a factor in the stimulation of innovation in diversifying farm equipment and practices.

Reportedly, the first use of electricity in the world for irrigation pumping occurred in the Central Valley just before the turn of the century. "Between 1910 and 1940, California accounted for roughly 70 percent of all of the nation's agricultural pumps" (Olmstead and Rhode 1997:16). Both groundwater and surface water were pumped from one location to another, often with deleterious effects to natural aquifers, especially in the Palm Desert and Inyokern areas.

One mid-20th century invention, the center pivot irrigation machine, was an important post World War II addition to California's agricultural landscape. This machine was invented in 1948 by a Colorado farmer looking for a way to improve water distribution over large agricultural fields. The central pivot is overhead sprinklers that consist of several segments of pipe jointed together, supported by trusses and mounted on wheeled towers. The machine can be up to a quarter mile in length and moves in a circular pattern. Water is fed through a central pivot point, reducing the amount of water needed by up to 50 percent, lessening soil erosion and flooding from system failures. By 1960 this machine was used to irrigate field crops such as cotton, corn, sugar beets, potatoes, alfalfa, and sunflowers, particularly in Hinkley and Barstow and high Sierra pastures in Lassen and Modoc counties (Smallwood 2014).

The Science of Agriculture

Soon after the first settlers arrived in California, "scientific" observations regarding the region's variable climate emerged. This information was published in a variety of ways, to attract settlement in certain areas by embellished stories of the area's natural resources, and for practical reasons so that settlers could make better decisions regarding planting times, fertility of soils, and sources of permanent water and seasonal management of this precious resource. Similarly, through trial and error, California's first horticulturalists learned what crops would be successful under certain conditions. They were flexible as weather patterns shifted and new techniques were required.

Agricultural fairs and exhibitions, which came to California during the early 1850s, provided useful scientific information to would-be farmers, including the latest and most efficient farm implements and machinery. The *California Farmer* served as one medium to advertise agricultural fairs and exhibitions in California.

In 1854, the state legislature created the California Agricultural Society and authorized it to hold an exhibition of livestock, manufacturers, and crop production. In 1863, a Board of Agriculture began in the state, and in 1880, the Board became a formally declared state institution. In Southern California, an annual fair was held in Riverside from the late 1870s, which helped popularize the new Bahia variety of orange. In Sacramento, the California State Fair was largely an agricultural fair, which included exhibits, scientific information, and displayed a wide variety of agricultural and machinery products as well as livestock. In 1929, the Department of Finance took over the Board's duties, and in 1963 the Board, including the State Fair, transferred to General Services (Anonymous n.d.).

Throughout the 19th century, California agriculturalists took advantage of the newest technology and applied scientific methods of farming to increase productivity. Although we may never know exactly what influenced agriculturalists in their decision-making, science most likely played an important role, leading to greater efficiency and productivity, particularly in California. The downside was that scientific knowledge regarding agriculture at the turn of the century was still fraught with inaccurate data and unsubstantiated, wildly optimistic claims.

The California State Board of Horticulture was created in 1881, providing an active forum through publications and annual conventions and exhibits. The Agricultural College of the University of California intensified its research efforts on horticulture and viticulture after the mid-1880s. By the early 1900s, the USDA, the state agricultural research system, and local cooperatives worked together to acquire and spread knowledge regarding the quality of fruit and the economic aspects of packing, shipping, and marketing agricultural products (Olmstead and Rhode 1997:8).

Scheuring (1995) provides an excellent chronological history of the land-grant university system and agriculture in California. The need for better science was one of the hallmarks of early college education in California. The Land-Grant College Act of 1862, commonly known as the Morrill Act, gave each state 30,000 ac. of public land for each of its senators and representatives in Congress.

The money from the sales of those lands would be used to support at least one college, whose main function would be to teach agriculture and the mechanical arts (Scheuring 1995:xii). A bill drafted in 1867 called for the creation of the University of California, which included a school of mines and agriculture to meet the stipulations of the Morrill Act. The bill passed the legislature in 1868, and the University of California was officially established, with its first campus at Berkeley (Scheuring 1995:10–11).

In 1874, Eugene Woldemar Hilgard became professor of agriculture and director of the University Agricultural Experiment Station. He served from 1875 to 1905 and was instrumental in the initial inventorying of the state's soils. In 1880, he published a major report regarding the alkali soils of the San Joaquin Valley, discussing the implications of irrigation and suitable crops (Scheuring 1995:32). Recognizing the potential for disastrous consequences to California's burgeoning agricultural industry, Hilgard and others conducted research and published monographs regarding the state's agricultural pests, such as phylloxera, the peach worm, and root gall (Scheuring 1995:38–39). In 1887, the Hatch Act passed and expanded the creation of new state agricultural experiment stations by contributing federal funds to their development and use (Scheuring 1995:xii).

The turn of the 20th century brought many changes to the science of agriculture, including the establishment of the Forest Reserves, and in 1905, the United States Forest Service. By then, the wheat boom had faded and new varieties of crops emerged. Participants in California's booming agricultural economy took advantage of the waves of new immigrants entering the country and often embellished the agricultural potential of a region.

A detriment to innovation and change in agriculture was a resistance among adults in farming community to accept new discoveries made on college campuses. These innovations ranged from using hybrid seed corn, milk sanitations, improved home canning methods, and experiments with crop rotation. Researchers at experimental stations and colleges found that adults in farming communities were not willing to try new methods. As a way to counteract the resistances, the USDA and local public universities reached out to youths. The 4-H Club began in the early 20th century through the premise of providing practical and hands-on learning to rural youth, using new experimental ideas as a way to affect future change. As the children experimented with new ideas and products, they shared their experiences and successes with the adults, often leading to change (University of California 2021).

These youth agricultural clubs started in Ohio and Illinois and were specific to a crop. Children could join the "Tomato Club," "Corn Club," "Canning Club," or "Pig Club," for example. In 1910, the 4-H clover pin emblem with an H on each leaf was developed, along with the motto Head, Heart, Hands, Health. By 1912, the 4-H Club was officially organized. In 1914 Congress passed the Smith-Lever Act, creating the Cooperative Extension System (CES) of the USDA. Under the CES umbrella were various agricultural rural youth clubs. This Act effectively nationalized the 4-H organization, a club instrumental in affecting innovative change and advances in agriculture (University of California 2021).

California's agricultural colleges continued to conduct research and publish sound scientific information for California's diverse agricultural industry. In 1905, the California legislature appropriated funds to purchase the Jerome Davis Ranch, which was to be renamed the "University Farm," to teach scientific and practical agriculture and to provide an appropriate location for research on California agriculture. In 1909, the Davis campus was acquired and formal instruction began. A few years earlier, in 1906, a citrus experiment station, along with a pathology laboratory, opened below Mt. Roubidoux at the University of California in Riverside (Scheuring 1995:66–68, 72).

In 1912, universities were collaborating with school districts to organize boys' and girls' agricultural clubs. By the time the CES was created in 1914 California already had 84 high school agricultural clubs, with an annual summer 4-H conference held at UC Davis (University of California 2021). By the 1920s, colleges such as the University of California, Davis and Riverside, as well as the USDA, Pacific Southwest Range and Experiment Station in Albany, produced hundreds of brochures and circulars designed to assist rural agricultural development in California. Topics included crop rotation, irrigation, technological improvements, costs of shipping goods, reclamation of swamplands, and flood control. Soil surveys, which began around the turn of the century, delineated soils by type, characteristics, quality, and region. Research efforts by leading colleges and private institutions also included agro-chemicals, biological learning regarding crops and cultural practices, as well as land clearing and preparation techniques. Research involving irrigation, flood control, and soils were particularly important to virtually all farmers in California.

The College of Agriculture at the University of California, Davis, officially began on 1 July 1952 as a part of the reorganization plan of the University system, which the Regents approved on 30 March 1951. The reorganization provided for coordination of the teaching and research on the four major campuses, that had agricultural programs, including Berkeley, Los Angeles, Riverside, and Davis. Since the 1950s, major advancements in the science of agriculture have abounded, particularly those related to biogenetic research, plant propagation, disease resistant plants, and advanced water delivery systems.

Mechanizing Food Preservation

The process of canning foods was developed in France in the early 19th century. Soon after, the industrial revolution led to the mechanization of canning. The Civil War provided the impetus for widespread expansion of the canning industry in the United States.

The first cannery in the west opened near San Francisco in 1856, canning fruits such as peaches and apricots. By 1862, about 100,000 cans of preserved fruits were produced here. While canned goods had a local market, it wasn't until the completion of the Transcontinental

Railroad in 1869 that a reliable transportation network allowed for shipment of California's canned fruits and vegetables across the country. By 1900, canneries were in operation throughout the fruit and vegetable belts, spurred on by can manufacturing machines, and the merging of 11 San Francisco/San Jose/Oakland canneries into the California Fruit Canners Association (Historical Marker Database 2021). The 1901 California Horticultural Report included an article from a San Francisco area cannery owner, J. S. Nelson who noted that over 100 million pounds of fruit were canned in his 28 factories that year, primarily apricots, peaches, cherries, plums, and pears. His factories produced over 60 million cans of preserved fruit and provided jobs for 9,500 men, women, and girls, with a total of $750,000 paid out in wages (Nelson 1901).

United States Department of Commerce records show the increased use of canned goods in the United States from 1904 to 1923 (Table 4). Canneries were being built at record speeds, and crops were planted in record numbers to keep up with the demand. For some regions, such as the Sacramento/San Joaquin Delta region, a cannery was operating every few miles or so.

Table 4. Canned Good Statistics, 1904 to 1923.

Year	Cases Packed Vegetables	Cases Packed Fruit	Total Cases Packed	Total Cans Filled (millions)
1904	29,719,879	4,628,241	34,348,120	824.4
1909	34,656,179	5,528,878	40,185,057	964.4
1914	50,258,674	9,449,182	59,707,856	1,433
1919	58,108,311	21,432,393	79,540,704	1,909
1921	38,186,041	12,516,014	50,708,055	1,217
1923	75,751,122	20,328,957	96,080,079	2,306

Source: United States Department of Commerce, Bureau of the Census 1904 to 1914.

The opening of the Panama Canal in 1914 dramatically increased the availability of California canned goods and spurred further development of the industry, as shipping paths opened up the way for international sales. Until World War I the primary buyer of canned goods in America was the military As excess goods became available, canning companies began advertising, marketing to American families. Companies often bought up the surplus to feed workers (logging industry, work camps, scientific expeditions, etc.), introducing the concept of canned food to the larger population (Can Manufactures Institute 2021).

Increased irrigation and planting of deciduous fruit orchards around Hemet and the San Jacinto Valley led to new canneries in operation by 1916. The Hemet canneries hired over 400 workers that year to process the apricot and peach harvests (Beedle with Earle 2005). With canneries came thousands of jobs, often filled by women, Chinese and Japanese laborers, Black, Hispanics, Portuguese, Filipinos and others, reflecting a diverse pool of workers. Since much of the work was crop-dependent and seasonal, housewives, college students, children, and others could earn extra money during peak seasons, without committing to a full-time job (Brown and Philips 1985).

The opening of military surplus stores when World War I ended often provided the first introduction to canned goods to American households. By the early 1920s, canned goods were commonly shelved in grocery stores throughout the world. The canning industry exploded as preserved foods became accepted as part of the national diet. In 1929, the Western Canner and Packer magazine published an image of people bowing to a large can and captioned the cartoon as follows: "When future archaeologists study 20th century civilization they will learn that canned foods were the dominant influence of the era" (Western Canner and Packer 1929).

The opening of the Port of Stockton in 1933 allowed for the shipping of goods from the Central Valley region and a continued increase in canneries and exported canned goods.

Canning companies maintained their own research laboratories and produced volumes of scientific data outlining the nutritional aspects of canned goods and their benefits. As stated by the American Canning Company (Canco) in 1937 (preface):

> It would be difficult to imagine our present 20th century without canned foods. Canned foods have helped man push civilization through the tropics and to the far north. They have rendered service beyond measure in times of flood and when other food supplies may be subjected to contamination. … But perhaps even more important in our present, every-day living is the fact that canned foods stretch summer through all twelve months of the year.

A publication issued in 1943 (a time when rationing of canned foods began as a response to tin shortages due to World War II), noted that the American Can Company processed more than 60 types of fruit; 38 types of vegetables; 37 types of fish and shellfish; 36 types of meat; 19 juices; 13 ready-made meals; over 40 "specialty items" like catsup, honey, or a lima bean loaf; and 22 soups (American Can Company 1943; Figure 28).

Throughout the 1950s and into the early 1960s canneries continued to play a major role in California's agricultural industry, although the numbers of canneries began to decline. In the 1940s there were 72 plants operating in the East Bay, centered around San Jose, Oakland, and San Francisco (Cohn 2000). In the 1950s Santa Clara Valley was the largest fruit production and packing region in the world, with 39 canneries in operation, led by Del Monte Corporation (Historical Marker Database 2021). By 1953 there were 13 canneries operating in Stockton, processing 12 million cans of food. In the 1950s the Port of Stockton built four 160,000 square foot warehouses just to store the canned goods that were shipped from the Port to places around the world (Sprague 1953). Virtually every type of vegetable and fruits was preserved or processed in the many canneries around California. Del Monte; Libby, McNeil and Libby; the California Can Association; and others dominated the industry and their huge factories often sprawled across tens of acres.

The post-World War II population boom, resulting in urban sprawl and a loss of agricultural fields, contributed to a decline in the canning industry. In the 1970s, California's canning industry began to further wane, as many American households turned to frozen or fresh produce for their tables and agricultural acres and farmers were reduced in numbers. While canneries continued to operate, consolidation occurred, and small canneries went out of

Figure 28. Norman Rockwell advertisement in Saturday Evening Post, 1943. (Depicting "Uncle Sam" bringing California canned goods back to Washington, Stoltz and Stoltz 1985).

business or were absorbed. By the late 1970s, the decline in the demand for canned goods resulted in the closure of many canneries. Major canneries, like Del Monte factories in the South and East Bay Area and Libby, McNeil and Libby in Sacramento, both operating for nearly 100 years, began closing in the early 1980s and continued downsizing and closuring into the early 2000s (Astone 1981; Historical Marker Database 2021). In 2002, California had 146 fruit and vegetable canneries in operation, with a total of 58,980 employees (United States Bureau of the Census 2002). As of 2020, these numbers decreased to 142 factories operating with 11,710 employees. Primary canned goods today include juices, jams and jellies, and tomato-based products (sauce, paste, diced and whole tomatoes) (California, State of 2020).

Agricultural Management and the Diverse Workforce

Given the vast scale of California's agriculture, virtually every ethnic group present in the state found employment in farming and ranching in one capacity or another. Even indigenous populations played an important role until their numbers were significantly depleted by the 1860s. Thus, agricultural properties provide opportunities to understand not only the evolution of agriculture as a business, but also the differing experiences, adaptations, adjustments, and struggles of the diverse people who worked and lived at those properties.

Knowing who was present on California's agricultural properties is a prerequisite for meaningful interpretation and evaluation. The internal and external relations of agricultural properties are crucial, not just for understanding agricultural practices, but also for interpreting domestic life. A primary objective of social science is to understand how factors such as ethnicity, class, religious affiliation, household composition, gender, and age have influenced behavior and adjustments to life in America's multi-cultural society. Some of the richest and most complex features and deposits at agricultural properties are also typically associated with the places that workers, tenants, managers, and owners lived. These areas and their requisite buildings, structures, objects, and archaeological deposits and sites may enable insights well beyond the household sphere. For example, studying buildings, structures, objects and sites associated with residential areas may help address questions such as the relationship between workers and owners, the effects of industrialization on the work force, labor organizing and resistance, the retention of cultural or traditional values, and lifestyles and living conditions.

Discerning who lived and worked at agricultural properties is not always a straightforward matter. The seasonal nature of agricultural work, as well as the transience of workers and tenants, makes interpreting the history of a large segment of the work force challenging at best. Documentary evidence may reveal that owners managed agricultural properties themselves, leased them out for cash or a share of the crops, or hired managers. At the bottom of the economic ladder were agricultural workers who often left little or no documentary evidence. They typically moved from job to job, received low pay for grueling work, and made the best of poor living conditions.

General Employment Trends

The following discussion first considers the broad patterns of agricultural employment in California between 1850 and 1950. Compilations published by the U.S. Census Bureau, narrative histories, and other sources provide insight into employment patterns (Cornford 1995; Jelinek 1999:233; Street 2004a). Particular attention is devoted to the roles of ethnic groups and the changing gender and age composition of the workforce. Brief sketches are provided for key ethnic groups. Attention then turns to the differing interests and approaches adopted by major economic stakeholders (owners, middlemen, and laborers) and how labor relations evolved over time. Woven into that discussion is a consideration of how industrialization affected all of those employed in agriculture.

Agricultural properties are particularly important in addressing a wide range of questions associated with labor and ethnicity through a combination of architectural history, archaeological data, historic records, and oral history. Between 1850 and 1950, California witnessed radical changes in the relationship between farm ownership, management, and the workforce. California, perhaps more than any other state in the nation, historically required both skilled and unskilled laborers. This requirement could only have been possible through a largely transient labor force, composed mainly of immigrants.

Throughout much of this nation's history farmers remained a dominant constituency in local, regional, and national politics. Often referred to as the "Farmer Movement," this phenomenon was defined by rural farm families engaged in populist struggles, albeit at first mainly out of self-interest. Most farmers, however, were inherently distrustful of the government. Their entry into politics, particularly as participants in the state's Populist Movement, provided some assurance that the government offered opportunities for purchasing land, obtaining low interest loans, and increasing productivity.

As the immigrant labor force increased throughout California, the disparities between fee simple land ownership and tenant farming became quickly evident, as the state's best agricultural lands were subsumed into large land holdings. Societal prejudices, government regulations, fluctuations in the supply of labor, and many other factors contributed to the opportunities and constraints faced by particular groups as they sought to own, rent, or simply find work on California's farms and ranches.

The general patterns summarized here provide a way to interpret the degree of innovation and creativity required by an individual or a cultural group to adapt to California's agricultural workforce. The U.S. Census Bureau did not summarize the ethnic, gender, and age composition of the agricultural work force during the initial decades after statehood.

Archaeological research and detailed site-specific historical studies may help interpret employment trends during that period. Employment trends in subsequent decades are more apparent because census compilations focused greater attention on those issues.

For this reason, reliance on anecdotal evidence provides the major characterization of agricultural employment patterns during the initial decades of statehood. According to the U.S. Census, between 1850 and 1940, the number of those employed in agriculture rose from 2,059 to nearly 232,000, a more than one-hundred-fold increase (Table 5). That figure includes all people employed in agriculture from owners to tenants and laborers. The number of agricultural laborers in the first two decades after statehood, however, is clearly underreported because labor, coerced or otherwise, provided by indigenous people was not systematically documented. With most people working in more profitable or less physically taxing types of employment, farmers and ranchers in the 1850s and 1860s took advantage of Native American and later Chinese workers to establish and expand production. Census figures for labor in those early decades probably exclude most indigenous labor. Not until the 1870 census did census compilations for agricultural labor become more reliable. By that time, the indigenous population had plummeted, their importance in the agricultural work force steadily declined, and census enumerators began to count indigenous workers as part of the general work force.

By the mid-1860s, California was 12th in the United States in total farm production, and agriculture was challenging mining as the primary industry in the state (Street 2004a:145). That exponential growth occurred despite a chronic shortage of labor and significant fluctuations in the market conditions. The families of farm owners carried out much of the early development out with limited help from temporary farm workers and an uncertain amount of indigenous labor.

Table 5. Agricultural Employment from Census Compilations.

Agricultural Employment		1850	1860	1870	1880	1890	1900	1910	1930	1940
Owners/Foremen	Farmers	1,486	20,836	24,090	43,489	61,808	64,171	61,554	ND	ND
	Fruit, Nursery, & Florist	111	1,862	2,670	ND	ND	5,096	15,752	ND	ND
	Dairy Farmers	ND	ND	1,010	ND	ND	3,102	4,720	ND	ND
	Stock Raisers	6	108	1,860	2,483*	2,934*	2,264	3,935	ND	ND
	Apiarists	ND	59	4	0	249	256	496	ND	ND
	Total	1,603	22,865	29,634	45,972	64,991	74,889	86,457	135,676	96,487
	Percent Female	ND	ND	ND	ND	4.0%	5.8%	4.8%	ND	ND
Laborers	General	ND	ND	16,231	23,856	51,799	63,266	85,199	ND	ND
	Dairy	ND	ND	ND	ND	4,253	2,345	5,830	ND	ND
	Fruit/Nursery	ND	ND	ND	ND	5,298	4,227	12,103	ND	ND
	Ranch & Poultry	ND	722	1,998	2,483*	2,934*	1,838	7,415	ND	135,213
	Total	456	10,421	18,229	26,339	64,284	71,676	110547	ND	ND
	Percent Female	ND	ND	ND	ND	0.5%	0.7%	2.6%	ND	ND
	Age 15 & Under	ND	ND	ND	1,158	ND	ND	2,459	ND	ND
All Agricultural Workers		2,059	33,286	47,863	73,311	129,275	146,565	197,004	ND	231,700
Percent Of Agricultural Workers Reflecting Owner's Families		78%	69%	61%	64%	50%	51%	44%	ND	42%
Percent Of All Workers		2.6%	15.2%	20.1%	19.2%	23.8%	22.9%	17.8%	ND	ND

Note: * Stock raisers and ranch hands were not separated in 1880 and 1890. In keeping with the general pattern in earlier and later decades, 50 percent were arbitrarily allocated to each group. ND means the census bureau compiled no data.

Nevertheless, judging by the ratio of owners and their families to wage laborers, reliance on outside help steadily increased over time (see Table 4 above). That steady rise in the proportion of wage laborers underscores the market orientation of most California agricultural ventures and how they diverged from small family-operated farms.

Although early employment compilations were skewed, employment in agriculture occupied a growing proportion of the state's work force during the late 19th century. It rose from less than three percent of the non-indigenous work force in 1850 to nearly a quarter of all employed workers by 1890. In later years, agricultural employment declined in relation to other types of employment due to mechanization and ongoing expansion of other industries.

The problem of inadequate labor supplies changed after the completion of the Transcontinental Railroad in 1869. As anticipated, the railroad provided new markets for California agricultural products. At the same time, it spawned a regional economic recession because local products now had to compete against cheap imports. In certain regions of the state unemployment increased. Compounding the loss of jobs in some California industries was a flood of newly unemployed railroad construction workers, largely Chinese immigrants, and large numbers of new job seekers arriving from the east by train. Those factors contributed to an unemployment rate that exceeded 20 percent in California in 1870 (Fuller 1991:9–10). Starting in the 1870s, the

U.S. Census Bureau began compiling more detailed employment statistics by race, ethnicity, gender, and age (Table 6). Whites owned the vast majority of farms and ranches—a pattern that changed little over time. California's agricultural properties were owned or operated by native-born individuals twice as often as by immigrants.

Table 6. California Agricultural Workers, 1870 to 1940.

	Ethnicity	1870	1880	1890	1900	1910	1920	1930	1940
Agricultural Owners/Operators	*All Owners/Operators*	29,634	79,396	66,384	74,889	84,582	117,670	135,676	132,658
	All Whites	ND	ND	65,306	ND	81,504	111,184	130,204	125,928
	Native-born Whites	ND	ND	45,195	ND	55,162	ND	ND	ND
	Foreign-born Whites	ND	ND	20,111	ND	26,342	ND	ND	ND
	Irish	ND	5,220	3,246	ND	ND	ND	ND	ND
	German	ND	4,231	4,076	ND	ND	ND	ND	ND
	British	ND	5,756	5,098	ND	ND	ND	ND	ND
	Scandinavian	ND	738	1,571	ND	ND	ND	ND	ND
	All Non-Whites	ND	ND	1,078	ND	3,078	6,486	5,472	6,730
	Black	ND	ND	ND	ND	159	290	424	327
	Native American	ND	ND	ND	ND	591	578	758	864
	Japanese	ND	ND	ND	ND	1,816	5,152	3,956	5,135
	Chinese	ND	ND	ND	ND	512	466	292	236
	Other Non-White	ND	ND	ND	ND	ND	ND	42	168
Agricultural Laborers	*All Farm Laborers*	18,229	23,856	78,684	71,676	135,353	ND	ND	135,213
	All Whites	ND	ND	58,076	ND	87,923	ND	ND	ND
	Native-born Whites	ND	ND	32,158	ND	56,882	ND	ND	ND
	Foreign-born Whites	ND	ND	25,918	ND	31,041	ND	ND	ND
	Irish	ND	1,210	2,124	ND	ND	ND	ND	ND
	German	ND	890	2,892	ND	ND	ND	ND	ND
	British	ND	1,269	3,090	ND	ND	ND	ND	ND
	Scandinavian	ND	233	1,995	ND	ND	ND	ND	ND
	All Non-Whites	ND	ND	10,507	ND	25,704	ND	ND	ND
	Black	ND	ND	ND	ND	450	ND	ND	ND
	Other Non-Whites	ND	ND	ND	ND	22,252	ND	ND	ND
Total Employed	Native-born Whites	30,629	ND	99,039	ND	140,826	ND	ND	ND
	Foreign-born Whites	17,234	ND	46,029	ND	57,383	ND	ND	ND
	All Whites	ND	ND	123,382	ND	169,427	ND	ND	ND
	All Non-Whites	ND	ND	21,686	ND	28,782	ND	ND	ND
	Irish	3,803	6,430	5,370	ND	ND	ND	ND	ND
	German	2,756	5,121	6,968	ND	ND	ND	ND	ND
	British	2,472	7,025	8,188	ND	ND	ND	ND	ND
	Scandinavian	588	971	3,566	ND	ND	ND	ND	ND
	Chinese & Japanese	2,694	ND	ND	ND	ND	ND	ND	ND
	Grand Total	47,863	103,252	145,068	146,565	198,209	ND	ND	267,871

Note: Owner/operators include family members engaged in agriculture. ND = no data compilations available.

Most foreign-born owners were from northern European countries, although other nationalities such as Mexican, Italian, and Portuguese did establish farms and ranches in limited numbers. Ownership by persons of color, taken in the census to encompass Asian, Pakistani, Black, and Native American individuals, composed a small proportion of all farm owners in the state during the century embraced by this context. This proportion steadily rose, however, from just 1.6 percent of all farms to over 5 percent from 1890 in the early 20th century.

Tenancy provided limited opportunities for economic advancement and stable employment for those who could not buy land, whether because of lack of funds or because of discrimination. The proportion of “colored” tenants, as enumerated in the census, rose dramatically from about 13 percent of all tenants in 1910 to 31 percent by 1940 (Table 7), aided by influx of Japanese immigrants into agriculture. Tenants rented land for cash or a share of the crops they grew. The dramatic increase in colored tenants is significant because tenancy rates remained at a consistent level for cash and sharecroppers from 1910 through 1940, the only years the Census Bureau consistently compiled this data. By that period, only the most marginal lands remained available for homesteading, since the best arable lands already had owners or occupants.

Farms owned or operated by immigrants of diverse cultures and backgrounds have research value not only because they are rarely mentioned in documents, but also because they have the potential to reveal the adaptations, the accommodations, and sometimes the resiliency of minority populations. Researchers are interested in understanding how and why different ethnic groups maintained, altered, or abandoned traditional approaches to agriculture. Farms and ranches owned or operated (leased) by women constitute another relatively scarce type of agricultural property that have the potential to address questions concerning gender strategies, adaptations, and economic opportunity.

The period between 1900 and 1920 was a time of robust agricultural production brought about by spirited economic growth in the United States as a result of European crop failures, massive immigration to urban industrial centers, and an increase in money supply due to Alaskan gold discoveries (Licht 1995:188–189).

The agricultural work force nearly doubled between 1900 and 1910, and the value of agricultural production increased nearly six-fold to $785 million by 1920. As the demand for agricultural laborers rose following the turn of the century, their ranks swelled with an increasing proportion of native-born white and non-white workers, while the number of foreign-born white workers remained relatively constant. Of the native-born white workers Street (2004a:529) notes:

> Like their predecessors… these men had, for a variety of reasons, abandoned societal mores and taken to a life on the road as a means of survival. Filling the void created as the Japanese moved up and out of farm labor, and the Chinese and native Indian populations [that had] died out, bindlemen became so essential to the prosperity and growth of California agriculture that they should have earned the respect and admiration of their fellow citizens as well as the

Table 7. California Farm Tenants by County, 1910 to 1950.

County	1910			1920			1930	1940			1950	
	Cash	Share	Colored	Cash	Share	Colored	Cash	Cash	Share	Colored	Cash	Share
Alameda	386	183	9.3%	458	271	21.1%	284	318	112	32.8%	147	79
Alpine	7	0	0.0%	3	0	0.0%	2	0	0	0.0%	0	0
Amador	73	9	2.4%	68	18	1.2%	53	55	1	0.0%	18	1
Butte	86	89	9.1%	131	132	9.5%	157	164	132	9.1%	58	92
Calaveras	26	11	8.1%	36	13	0.0%	42	50	4	1.9%	21	0
Colusa	54	92	4.1%	88	129	9.7%	85	46	101	5.4%	26	81
Contra Costa	313	153	5.6%	312	203	15.5%	196	190	71	28.7%	93	42
Del Norte	17	1	16.7%	31	2	12.1%	37	36	9	82.2%	17	9
El Dorado	40	9	8.2%	70	22	4.3%	42	56	8	7.8%	24	11
Fresno	254	403	17.2%	333	996	32.9%	468	532	738	39.2%	298	524
Glenn	44	81	0.8%	89	102	3.1%	113	137	84	1.4%	61	61
Humboldt	436	15	0.9%	550	22	0.5%	544	271	70	44.3%	140	178
Imperial	242	145	13.2%	928	403	23.9%	893	623	276	46.4%	289	105
Inyo	33	18	5.9%	43	20	6.3%	118	72	2	117.6%	70	1
Kern	137	52	21.2%	208	153	10.2%	258	395	168	7.8%	254	219
Kings	188	185	9.4%	306	218	14.9%	267	298	130	11.0%	161	107
Klamath	0	0	0.0%	0	0	0.0%	0	0	0	0.0%	0	0
Lake	82	17	1.0%	62	40	0.0%	68	68	27	10.5%	27	16
Lassen	36	26	0.0%	41	38	0.0%	63	48	16	17.2%	13	8
Los Angeles	1,297	413	34.5%	2,547	533	48.1%	1,848	2,555	216	57.5%	1,180	98
Madera	17	101	7.6%	105	117	4.1%	108	123	141	22.0%	85	102
Marin	274	7	0.0%	300	9	0.6%	289	194	5	3.5%	138	3
Mariposa	24	5	3.4%	24	14	2.6%	34	56	4	10.0%	6	2
Mendocino	174	33	1.4%	214	72	0.7%	156	170	70	20.8%	61	24
Merced	156	199	1.4%	398	255	2.6%	525	555	317	15.4%	393	169
Modoc	43	67	0.0%	51	57	0.0%	47	53	35	8.0%	81	19
Mono	8	5	0.0%	4	0	0.0%	1	14	1	40.0%	7	0

Table 7. California Farm Tenants by County, 1910 to 1950 *continued*.

County	1910			1920			1930	1940			1950	
	Cash	Share	Colored	Cash	Share	Colored	Cash	Cash	Share	Colored	Cash	Share
Monterey	251	249	9.4%	294	254	15.9%	347	433	228	20.6%	206	125
Napa	204	68	1.5%	131	76	1.0%	133	143	89	2.6%	45	15
Nevada	48	5	9.4%	53	6	1.7%	59	45	2	0.0%	17	4
Orange	200	271	16.6%	192	245	35.7%	210	380	161	47.3%	165	79
Placer	211	59	61.1%	179	227	55.2%	127	116	73	87.8%	42	42
Plumas	19	2	0.0%	27	4	6.5%	26	16	0	12.5%	10	0
Riverside	95	134	7.4%	212	318	6.6%	194	286	200	40.3%	126	93
Sacramento	295	195	42.2%	612	418	48.9%	355	368	193	81.3%	184	104
San Benito	84	104	8.5%	91	84	14.3%	86	106	81	21.9%	56	50
San Bernardino	67	91	3.2%	162	130	4.1%	248	274	103	11.7%	120	29
San Diego	180	115	7.1%	367	248	22.9%	263	495	79	56.6%	169	27
San Francisco	38	0	21.1%	27	1	7.1%	41	24	0	0.0%	5	0
San Joaquin	296	411	15.8%	512	522	27.3%	587	605	456	24.8%	300	278
San Luis Obispo	374	195	3.0%	290	270	8.6%	384	440	161	15.1%	188	77
San Mateo	243	26	4.1%	340	54	12.2%	289	330	38	29.3%	149	14
Santa Barbara	293	159	4.6%	233	298	11.1%	192	228	163	16.4%	124	84
Santa Clara	467	341	16.5%	374	258	24.7%	388	518	287	51.6%	255	207
Santa Cruz	229	81	7.4%	278	106	21.4%	243	258	72	33.0%	101	27
Shasta	107	21	5.5%	98	29	1.6%	121	147	28	19.4%	36	7
Sierra	10	1	0.0%	8	0	0.0%	9	8	0	0.0%	3	0
Siskiyou	54	39	1.1%	69	58	0.0%	118	165	50	15.8%	53	28
Solano	197	104	20.3%	240	169	29.1%	160	161	104	34.0%	69	79
Sonoma	461	150	2.8%	603	233	3.8%	726	642	178	6.2%	329	95
Stanislaus	147	239	0.8%	495	487	6.2%	561	551	345	4.5%	500	274
Sutter	88	64	11.8%	77	167	17.6%	56	58	115	14.5%	23	107
Tehama	103	35	5.8%	107	57	9.8%	168	215	52	3.4%	65	26
Trinity	16	3	21.1%	24	4	3.6%	30	19	4	13.0%	11	1
Tulare	233	212	3.8%	373	537	11.0%	737	566	283	21.7%	328	258

Table 7. California Farm Tenants by County, 1910 to 1950 *continued*.

County	1910			1920			1930	1940			1950	
	Cash	Share	Colored	Cash	Share	Colored	Cash	Cash	Share	Colored	Cash	Share
Tuolumne	18	2	0.0%	24	9	0.0%	12	47	2	22.4%	20	2
Ventura	60	253	6.4%	59	281	7.1%	62	80	120	13.0%	56	70
Yolo	137	167	18.4%	229	210	30.8%	184	150	139	34.6%	64	107
Yuba	65	20	8.2%	50	44	11.7%	66	60	33	22.6%	24	22
TOTALS	9737	6135	13.1%	14230	9643	21.30%	13880	15013	6577	31.20%	7511	4282
Percent of All Farms	11.0%	7.0%	2.4%	12.1%	8.2%	4.3%	10.2%	11.3%	5.0%	5.1%	5.5%	3.1%

> gratitude of farmers and rural communities. But this was not the case. Despite their central role, they remained social outcasts. Among farmworkers, no group—with the possible exception of the Indians—was more ill-treated, no group was more misunderstood or taken for granted by the agricultural industry, and none led a more perilous or mobile existence.

While new waves of immigrants and native-born people of color continued to comprise the largest part of the agricultural labor pool, native-born white men resorted to that hard and relatively low-paying employment in significant numbers between the 1870s and the First World War. In the years 1890 and 1910, according to the U.S. Census Bureau, more than 40 percent of California's agricultural work force consisted of native-born white men.

Waves of new immigrants made up the rest of the agricultural work force. One-third of the foreign-born agricultural work force was still composed of northern Europeans in 1890, but their numbers were eclipsed after the turn of the century by immigrants from southern and eastern Europe, Japan, Mexico, and India (Figure 29). Anecdotal evidence suggests the pool of foreign-born agricultural workers came largely from recent immigrants, although census compilations for the period do not list the respective contributions of particular ethnic groups to the agricultural labor pool.

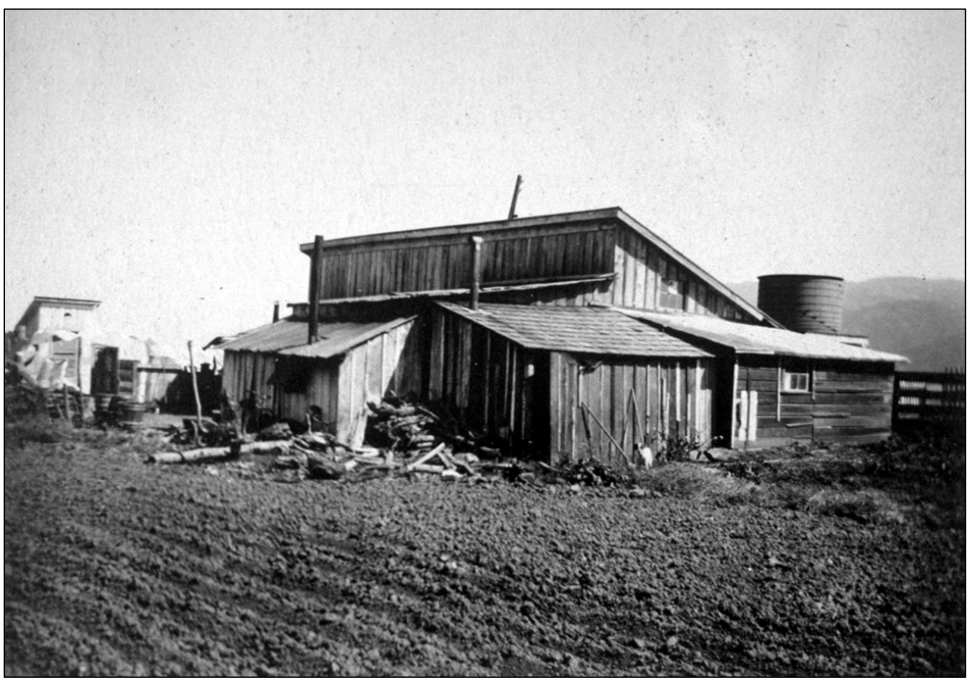

Figure 29. Japanese farm laborer's shack, 1905. Segregated and poor housing for Japanese farm laborers, such as the one seen here, was common. (Photographs of Agricultural Laborers in California, BANC PIC 1905.02645- PIC, courtesy of The Bancroft Library, University of California, Berkeley, public domain.)

Recent immigrants often had to resort to the lowest paying, unskilled jobs, which included agricultural work. Because recent foreign arrivals and native-born persons of color from other states often entered the California work force at the bottom of the wage scale, many likely resorted to unskilled, low- paying agricultural work at least some of the time.

Some groups came to be closely associated with certain regions and agricultural products. For example, Basques from northern Spain and southern France came to dominate the sheep industry in eastern California, while Italians and Italian Swiss were heavily involved in the dairy and wine industry.

By the end of the 19th century, the changing character of the agricultural work force may have coincided with the placement of greater physical and social distance between some farm families and their temporary farm workers, as one study suggests (Van Bueren 2005). That separation was likely an outgrowth of a shift from the old paternalistic patterns rooted in the peonage of the Mexican and early American periods to a system that increasingly emphasized a strict wage labor relationship. This separation was attributable to a general upsurge of racism in American society, particularly in California, directed against Asians and Hispanics. As agricultural producers emphasized industrial approaches to production, employment became increasingly transient, as work became more seasonal. Wider separation of dwellings used by workers and owners also may have stemmed from the belief that transient workers were morally suspect.

Another facet of agricultural labor involves the contributions of women and children. Very little systematically collected information exists about either segment of the work force. In many cases, women and children who were part of a farm or ranch family may have worked part or even full time, while the census lists them as “keeping house” or “at school.” This seems to be confirmed by the fact that, in California, women are listed as working in agriculture nine times more frequently as owners or operators than as wage laborers in the years 1890 and 1900 (see Table 5 above). The proportion of women wage laborers, however, rose from less than 1 percent to 2.6 percent of the agricultural work force by 1910. Since that time their contributions to the labor pool have steadily increased.

Women in agricultural camps were bound not only by the rules of the camp, but also by traditional expectations related to gender, marital status, and motherhood. Women often were expected to keep a home, raise children, assist with cooking (or prepare all meals), and work in the fields. One woman, recalling her experiences in the San Joaquin River Delta in the 1930s, reminisced (McBane and Winegarden 1979:179):

> I am an agricultural working woman. I came to this camp with my husband and baby. I have to get up before the men get up. I feed my baby and then I am supposed to help in the kitchen. If I don’t help in the kitchen, people will say “what kind of woman is she?” Although there is a paid cook I am supposed to help. I have to go out to work with the men at the same time, taking my baby with me. When we finish work at suppertime, I have to do the cooking and wash the dishes. At night when the baby cries, I have to be extremely careful because

> we live in a rooming house, and the partition has thin walls. Sometimes I have to take the baby outside in order to quiet it. I am suffering doubly.

While the average job tenure in California in 1900 was a remarkable 13 years and less than 7 percent of the work force held jobs lasting under three years, wage employment at many farms was by its very nature short term (Carter and Savoca 1991:323–343). Transience favored single men, although families did work together, particularly in some agricultural industries.

In 1939, the Works Progress Administration prepared guides to various states, including California. The California Guide discussed the changes in agriculture. It noted that the traditional family farm, operated by a farmer, his family, and perhaps a few temporary farm workers, was on the decline in numbers and importance (WPA 1939:68–69). The WPA reported:

> Those that remain are increasingly operated, not as self-sufficing family units, but as commercial enterprises, imitating on a miniature scale the big 'outdoor factories.' Many are direct adjuncts of fruit and vegetable packing corporations, for which they produce selected crops according to company specifications under supervision of the company's field men and, in many cases, with funds advanced by the company.
>
> Among the small submarginal farm units are the tens of thousands of little farms, often worked on a part-time basis, which are as characteristic a feature of the California scene as the great thousand-acre ranches, especially in the south around Los Angeles. Many of these are run by retired business and professional men, or midwestern farmers attracted to California from more austere territory.
>
> The bulk of farm work in California today is performed, not by the independent farmer, but by a vast army of some 200,000 wage earners, most of them migrant laborers. The big landowners, following the railroads in scouring the world for sources of cheap labor, imported in succession Chinese, Japanese, Hindus, Mexicans and Filipinos to do field work. Today the ranks of migratory workers also include refugees from Dust Bowl areas.
>
> This great mass of landless field and shed workers constitutes a major social problem in the State. Migrants stream up and down the valleys, covering hundreds of miles from Imperial Valley to the coast valleys, to San Joaquin Valley and the Sacramento-San Joaquin Delta, and back to Imperial Valley—homeless, cut off from stable rural communities, existing continuously near the hunger line.
>
> An effective approach to the migrant problem is now being made, for the first time in California history, by the Federal Government. Its Farm Security Administration is aiding the Dust Bowl exiles through the series of camps extending from Brawley, in the Imperial Valley, to Marysville, in the Sacramento Valley, through food grants made to workers in danger of starvation between crops; and through the recently organized Agricultural Workers Health and

> Medical Association, which utilizes existing medical apparatus in agricultural counties [Works Progress Administration 1939:69].

The steady increase of families in the agricultural wage labor pool resulted in other changes, such as the need for segregated housing by race, temporary housing for families, and more educational services. Information regarding children working in agriculture is scarce (Figure 30).

Figure 30. Johnny Lubken assisting with round-up, Lubken Ranch, Owens Valley, ca. 1930s.
(Courtesy of the Eastern California Museum, Independence.)

According to some estimates, up to one-quarter of all farms and ranches may have relied on such workers (Street 2004a:149). In California, a total of 1158 children aged 15 and under were listed as agricultural laborers in 1880, constituting 4.4 percent of all workers in that industry at the time. That figure likely reflects only those children actually engaged in agricultural work at the time census enumerators visited farms and ranches. Many were likely engaged in part-time work or even missed school during harvest season, and thus, census officials never counted them. By 1910, 2,459 children under 16 years of age worked as agricultural laborers, just 2.2 percent of the agricultural work force (Figure 31). The reduction in child labor after the turn of the century reflects in part the efforts of progressives to curtail some of the abuses of industrial capitalists.

Yet, agriculture was different in many respects from other types of industries. For example, when farm labor organizing efforts met with some solid victories starting in 1903, farmers sought to promote the idea of using juvenile delinquents from cities to harvest crops, based on the idea that it would provide a healthful atmosphere in which to reform them (Street 2004a:472–473). Farmers placed advertisements in San Francisco and other urban area newspapers looking for these potential workers. Public support for that program evaporated quickly, however, after the well-publicized trial of a 14-year-old boy named Claude F. Hankins.

Figure 31. Members of the D'Agostini family and friends pose after a day of picking grapes on their family vineyard, Shenandoah Valley, Amador County, ca. 1930s. (Courtesy of Mary Lou and Daniel D'Agostini.)

In July 1904 Hankins was working at a ranch near Marysville when he shot a foreman who he said had whipped him and committed sexual assault. During the trial, another boy named Charles Dray testified that, "we were slaves on that ranch" (Street 2004a:474). Child labor diminished as it fell under greater governmental control in the 20th century.

The Diverse Work Force

As noted above, California's agricultural work force came from around the world, drawn by opportunity and available jobs (Figure 32). The following discussion outlines major waves of immigration and highlights some of the groups who were influential in the success of California agricultural development.

Figure 32. Migrant family of Mexicans on the road, 1936. (1942.008 Folder 101 #2464E, California Cornerstones: Selected Images from The Bancroft Library Pictorial Collection, courtesy of The Bancroft Library, University of California, Berkeley.)

Native Americans

Evidence supports the premise that Native Americans were crucial to the success of California agriculture during the Spanish and Mexican eras (Costello and Maniery 1988; Silliman 2004). That they were also an important source of agricultural labor during the initial period of statehood requires additional research. While the U.S. Congress debated whether to admit California as a free or slave state, in April 1850 the new state legislature passed it's very first law entitled "An Act for the Government and Protection of Indians." Nicknamed the Indian Indenture Act, it allowed farmers to obtain Indian labor under a variety of pretexts including "vagrancy" (Street 2004a:120).

Under the Act, any farmer could have an unemployed or otherwise "vagrant" Indian arrested. Once tried, convicted, and fined for his "crime," an Indian could be bailed out and set to work for a proscribed period of time, or until he had repaid the amount of the fine and cost of bail. In effect, this made any Indian available for farm labor. While the Act stated that field hands were to be treated humanely and properly fed and clothed, it did not contain any language for enforcing those provisions. Since no white farmer could be convicted of mistreatment on the testimony of an Indian, field hands obtained in this way became, in effect, enslaved people (Street 2004a:120–121).

The Act also allowed the adoption of Indian children as apprentices. Under this provision, whites could appear before a justice of the peace with “parents or friends” of an Indian child and obtain charge of that minor simply by demonstrating no coercion was involved. The new law also stripped Indians of rights to access traditional food sources, forbade the use of methods such as setting fires for game drives and the promotion of favored plants, and gave Indians no rights to bring lawsuits, vote, or otherwise fairly redress grievances. Hence, it essentially legalized the system of peonage first implemented under Mexican rule, forcing many indigenous people into farm work and other manual labor at a time when few people wanted such jobs. In many cases Indians received little more than food, consent to pursue traditional subsistence on lands usurped by white settlers, and limited protection from white aggression in exchange for labor. In a manner that differed from slavery only by nuance, Indians who tried to escape this coerced farm labor system were often hunted down and severely punished or killed (Silliman 2004).

Street (2004a) notes “many natives would continue working on farms - even dominating crops and harvest in some areas - until well into the second decade of the next century.” Yet their numbers declined precipitously from about 100,000 in 1850 to an estimated 16,500 by 1880 due to violence, disease, and other causes (Merriam 1905).

One local study found that 22 percent of the Native Americans listing an occupation in Amador County in 1880 worked on farms, while another 51 percent were laborers that may have worked partly or entirely as farm workers (Van Bueren 2005). The indigenous population of Amador County, however, composed only 2.2 percent of the total population by that time, and agriculture had become the primary source of income due to dramatic shift away from gold mining.

Italian/Italian Americans and Italian Swiss/Italian Swiss Americans

While Italian immigration to the United States was less than 10 percent of all immigrants from Europe, between 1890 to 1930, Italians comprised almost one-quarter of all immigrants arriving in America (Palmer 1965:11). Many of the early Italian or Italian Swiss immigrants to California had experience in agriculture or the trades. After trying their hand at mining, they often turned back to the trades or agriculture for their livelihood. Sierra Valley in Plumas and Sierra counties, for example, had dairies and cattle ranches owned by Italian and Italian Swiss immigrants by the 1860s. Most of these immigrants arrived from Tocino in southern Switzerland. Some family names included Guidici, Laffranchini, Ramelli, Scolari, and Dotta. These immigrants sold butter, beef cattle, vegetables, and animal feed to the miners working in the surrounding gold fields (King et al. 2004). Many of these families still operate ranches in the valley. Other Italian Swiss made their way south, establishing communities around Hemet and Winchester (M. Colleen Hamilton 2022, pers. comm.).

By far the highest percentage of Italian/Italian American immigrants in California settled in the San Francisco Bay Area, although during the 1860s and 1870s a large number migrated north to

Sonoma and Napa counties and to the Mother Lode Region to establish farms (Palmer 1965:124). Northern Italian immigrants, primarily from the Genoa area, established themselves in the Mother Lode region in ranching, lumbering, construction, stone masonry, and farming. By 1870 an estimated 25 percent of all Italian immigrants living in California chose Amador, Calaveras, and Tuolumne counties as their new home. As they established ranches, olive orchards and truck gardens, they brought in more immigrants from their home country as workers, increasing the Italian presence in the Mother Lode. Today, many of these families, such as Fregulia, Sanguinetti, Costa, and Gardella, continue to thrive in the region, operating ranches and farms (Italian Cultural Society of Sacramento 2022).

By the 1870s Italians and Italian Swiss could be found working in a wide variety of industries in California, including logging, stone masonry and construction, cattle, wheat, truck farms, and factories. In the 1870s Alberto Trescony is credited with establishing a major sheep operation in Monterey County and hiring Chinese, local vaqueros, and some of the first Basque shepherds. At one time Trescony controlled as many as 44,000 ac. of land in Monterey County. The sheep were sold for meat, wool, and hides (Palmer 1965:203).

Italians and Italian Swiss immigrants became involved in the wine business soon after the gold rush as well. The Italian Swiss Colony winery, for example, began in 1881 as an experimental venture in cooperative grape production. The company was headquartered in Asti in Sonoma County and had marketing cellars in San Francisco. According to Palmer, “the entry of the Italian Swiss venture marked not only the beginning of large-scale Italian participation in the state’s wine industry but also the beginning of the first phase of the wine industry’s modern history” (Palmer 1965:251). In 1892, wine merchants formed the California Wine Association, many of whom were of Italian descent. Some families, like Gallo, ultimately became household names among the leaders in state’s wine industry.

Scandinavian/Scandinavian Americans

Scandinavian immigrants arrived in California during the Gold Rush, although small in numbers. They included Finns, Danes, Swedes, Norwegians, and Icelanders. All five cultural groups made important contributions to California’s economy and social history.

Finnish enclaves were established in Eureka, the Mendocino Coast, San Francisco County, portions of the East Bay, Rocklin in Placer County, and Reedley in the Central Valley. Census figures for 1860, 1870, and 1880 suggest that the majority of California Finns were enumerated as “seamen,” presumably working in the fishing industry. In Humboldt and Mendocino counties Finns and Finnish Americans were generally employed in the lumber industry (Schofer 1975:35–41).

A large enclave of Danish immigrants settled in the Santa Ynez Valley. In 1910 three Danish visionaries contracted to purchase nearly 10,000 ac. of land in the valley. The land had been part of the Mexican land grant, Rancho San Carlos de Jonata, and had a mild climate, adequate water supply and fertile soil. Stock in the new Danish American Company was issued on 19 October 1910, building began, and businesses opened in the fledgling town that became known as Solvang. Solvang has retained much of its rich cultural heritage and has a yearly celebration to honor their Danish heritage (Sudderth 2001:37–44).

Swedish immigrants began arriving in California in the 1860s, settling in colonies in Fresno and Tulare counties. Like many groups, crop failures in Sweden between 1868 and 1869 and overpopulation put pressure on a Swedish society that was primarily agricultural in nature. California offered economic opportunity that was familiar to families who grew up farming. In 1861 there were 18,000 Swedish-born people in the United States. Within 10 years that number grew to nearly 100,000 and by 1910 the United States census enumerated 665,000 Swedish immigrants and Swedish Americans, primarily living in Iowa, Illinois, southern Minnesota, western Wisconsin, central Texas, and California's Central Valley. According to … These immigrants brought cultural and religious traditions to *Svenskamerika* (Swedish America) and many traditions were preserved or evolved as the population grew. Today, descendants of the initial wave of Swedish immigrants still practice traditions, language, and religion brought from the homeland over 100 years ago (Blanck 2009).

Chinese/Chinese American

The Chinese were the first cultural group to participate as workers in virtually every agricultural industry. Chinese were already working in the Delta region of the San Joaquin Valley in the 1850s, helping construct levees and dikes, although many of these levees failed in the 1862 floods. Successful reclamation began in the late 1860s, when Chinese immigrants laid off from railroad construction projects found work in the Delta. In many cases, entire crews, with their foreman, shifted from railroad construction to reclamation work. As islands were reclaimed, these same crews became the agricultural work force for the region. Their presence as part of the growing state's agriculture is evidenced in sites within the Santa Clara, Sacramento, and San Joaquin valleys. (Chu 1970; Thompson 1957). In Southern California, Chinese/Chinese Americans were working as farm laborers in Santa Barbara area by the 1860s, provided all the vegetables for the growing community of Redlands and the surrounding area in the 1880s, and continued working on farms in Riverside and San Bernadino counties into the 20th century (McDannold 2000).

The 1870 Federal census noted that Chinese/Chinese American workers comprised about 10 percent of California's agricultural work force, although historians and anthropologists suggest that this number was likely much higher, reaching up to 75 percent of total farm laborers in the 1880s (Hamilton et al. 2011; McWilliams 1969). A small number of Chinese/Chinese Americans rented plots of lands as tenant farmers, selling their goods locally, but most were itinerate laborers, moving from crop to crop.

As early as the 1860s there was sporadic agitation against Chinese. The overall population of California more than doubled from 1870 to 1890 and completion for jobs became intense. As jobs became scarce, anti-Chinese sentiment grew, galvanized by the Workingmen's Party of California. Established in 1877, the party's platform called for 8-hour workdays, compulsory education, improved monetary system, equitable taxation, and abolition of prison and other contract labor. At the height of its power (1878 to 1879), this group managed to secure a change to California's State Constitution, Article 9, that severely restricted work opportunities for Chinese/Chinese Americans, denied them the right to own or inherit land, and prohibited many corporations and government entities from hiring Chinese (Hamilton et al. 2011). Although these provisions were found unconstitutional shortly afterwards, the seeds for anti-Chinese sentiments were planted and continued for several decades.

During the 1870s, Chinese immigrants increasingly took employment in agriculture because they were forced out of other occupations (Chan 1986). In 1870, the greatest percent of Chinese/Chinese American farm laborers were concentrated in San Mateo County, followed by Alameda, then San Joaquin, and finally Santa Clara County. In the 1880s many Chinese labors were constructing canals around Riverside and other nearby towns, working on irrigation systems. By 1900, that ratio had shifted, with Kern, San Joaquin, and Monterey counties having the highest percentage of Chinese farm laborers (Chan 1986:319). The shift reflects the state's evolving agricultural lands and the demand for affordable labor in the Central Valley and portions of Monterey County.

By the first decade of the 20th century, while Chinese/Chinese Americans could be found in agriculture throughout the state, their numbers had dwindled and other ethnic groups had begun to replace them. The Chinese immigrant work force had a brief resurgence in the 1920s, as new immigrants navigated around the immigration process by claiming they were sons of Chinese immigrants already established in California. These "paper sons" often joined their "fathers" in the fields and orchards (Chu 1970).

Japanese/Japanese Americans

There are a number of published works that serve as models for interpreting the Japanese experience in California, particularly as it relates to agriculture. Kathy Nichols and James Borg explore Japanese culture and adaptation within Monterey County, and in the spring of 1994 the journal *California History* published by the California Historical Society, devoted its entire magazine to Japanese Americans in California (Nichols and Borg 1992).

Japanese workers began arriving in California by the late 1890s and replaced diminishing numbers of Chinese workers following the passage of the Exclusion Act in 1882. As Nichols explains, "unlike many Chinese, early Japanese immigrants had a high degree of literacy, the vision to become landowners with the ambition to work toward this goal and a high value placed on mutual aid, all of which led to their future success" (Nichols and Borg 1992). The Japanese/Japanese Americans played a significant role in the development and specialization of agriculture in California.

As the number of Chinese/Chinese American agricultural workers declined, the number of Japanese immigrants steadily increased, particularly those who were engaged in California's sugar beet industry in Yuba County; cut flowers in Southern California, San Francisco Bay area, and San Diego; strawberry industry along the Central Coast; the citrus industry in Southern California; vegetable farms in Santa Clara; and potato industry in the San Joaquin Delta. The organization of Japanese/Japanese American labor was similar to that of the Chinese labor system with a "labor boss" acting on behalf of group of workers, who received an annual fee, and from whom the contractor, generally white, secured the requisite labor necessary to complete a particular job. The labor boss also served as a mediator between the employer and the workers. Japanese/Japanese Americans remained a dominant part of the agriculture work force through the early 1900s, although passage of Alien Land Laws in 1913 and 1920 and other anti-Japanese legislation affected this work group.

The cut flower industry was dominated by Japanese Issei (Japanese born immigrants) and Nissei (children of Japanese immigrants born in America) operating out of Los Angeles, San Francisco Bay area, and San Diego. For example, Oakland had five Japanese American nurseries by 1900; that number grew to 80 independent Japanese American nurseries by 1930. By 1917 the strawberry farms ere dominated by Issei and their families, with successful ventures found along the central California Coastal zone in Watsonville, Salinas, Santa Clara and Pajaro valleys, and Monterey and at Florin in the Sacramento Valley. In Southern California, Japanese American strawberry farmers concentrated in Gardena Valley and Ventura County, growing an estimated 80 percent of the berries produced in the region by 1910 (Parsons 1997; Takeshita 2007). Strawberries and Japanese Americans were so closely linked that in 1917, when the Central California Berry Association was formed, a requirement in the bylaws was that 50 percent of the board be of Japanese descent.

In 1907 nationwide agitation against Japanese immigrants escalated, primarily through lobbying efforts by white supremacist groups, labor organizations, and some politicians, led to limitation on the number of immigrant workers arriving from Japan (although wives and children were allowed entry). This led to the organization of the Japanese Association of America, with George Shima, a Stockton potato farmer, elected as the first president of this national association. Some of the tasks undertaken by the association was to register all Japanese living in America and record the value of property, acreage of farms (owned or leased), and other demographic data (Walker 1992:135).

Shima's success of reclaiming Delta islands and planting them in potatoes worked by his countrymen and women was used by anti-Asian groups as proof that Asians were "taking away" jobs and land from hard-working non-Asians. In 1913 California passed the Alien Land Act, stating that persons ineligible for citizenship were also ineligible to own land. The Act also limited leasing property to three-year intervals (Bunje 1957:10–13; Pajus 1937:49). As a way around this Act, Japanese immigrants (known as Issei) often filed for land leases and property in the name of American born children (Nisei). Japanese American families during this time often had 10 or more American-born children as a means to gain needed land for farming.

The anti-Asian movement escalated after the end of World War I in 1918, as soldiers returned home and began looking for work. This anti-Asian sentiment resulted in the Initiative Land Law of 1920 which prohibited Issei (Japanese born immigrants) from acting as guardians for minor children, leasing land, or owning stock in corporations that purchased agricultural land. This act, directed primarily at the farming industry, essentially forced hard working Japanese to remain as employees, circumventing them from managing their own farms, even on a crop sharing or tenant agreement (California State Board of Control 1920). The passing of the California Land Act in 1923, outlawing sharecropping, and the 1924 National Immigration Act, which prohibited immigrants ineligible for citizenship from entering the United States, resulted in sharp declines in tenant farmers and workers in the Delta potato fields (Hata and Hata 1986). The enforced incarceration of Japanese Americans during World War II led to further declines in this labor force.

East Indian/East Indian Americans

East Indians began arriving in 1910, finding work in agriculture, lumber and railroad industries. This initial wave of migrants came primarily from Punjab and were often enumerated or listed as Punjabs or Shiks. Farms along the coast and in the Sacramento-San Joaquin Delta region hired East Indians to work the fields and supplement the aging Chinese immigrant workers. The East Indians/East Indian Americans remained a strong labor force until the 1920s. As with the Japanese/Japanese Americans, the East Indians/East Indian Americans were also targeted in the Alien Land Acts of 1917 and others in 1921 and 1924. These acts forced many of the East Indian labor force to leave California and limited new immigration from India. By the late 1920s a large influx of both Filipino and Mexican laborers appeared, filling the demand for pickers, and the East Indian labor pool diminished (Gonzalez 1994:6). The Luce-Celler Act of 1946 further reduced influx of groups from East Indian, as it established a yearly quota of 100 Indian immigrant.

Armenians/Armenian Americans

Like many immigrant groups, the Armenians came to American to escape the poor conditions of their home country and religious prejudice (Christians in a Muslim culture). Western Armenia (Eastern Turkey) was part of the expansive Ottoman Empire into the early 20th century. By the 1880s, increasing encroachment from Russia into Turkey and the growing Christianity movement among Armenians led to massive massacres of Armenians in 1894 to 1896 and 1909. During World War I, the Turkish government ordered the relocation of all Armenians, except those living in Constantinople (Istanbul). These orders lead to the Armenian Genocide, as those who refused to relocate were murdered and others were fore marched with little food, water, or rest to new locations in Syria. It is estimated at as many as 1.5 million Armenians perished between 1894 and 1915, after centuries of economic oppression and prejudice (Hamilton et al. 2011).

This atmosphere of tyranny, prejudice, and oppression resulted in many Armenians leaving their homeland and coming to America. The Armenian lifestyle in their home country was agrarian based and many of the newly arriving immigrants found work in fields. In 1881 five brothers fled their homeland and made their way to Fresno. After working for several years, the brothers bought land and began a packing and shipping business, focusing on dried fruit. During these early ears, the brothers frequently wrote home, extolling the benefits of the area, the fertile soil, and urging relocation. By the mid-1880s, 75 fellow Armenians arrived and settled in Fresno, buying lands. By 1906, Armenians/Armenian Americans owned over 12,000 ac. of land in the Fresno area and were considered largely responsible for development of California’s growing raisin and fig industries (Hamilton et al. 2011).

Throughout the 20th century Armenian immigrants arrived in the Fresno area, joining family members or former neighbors who had already made the move. Many arrived during World War I, escaping the Armenian Genocide in Turkey and the forced relocation. In contrast to the early immigrants, this new wave arrived with few possessions and little money, finding work as laborers rather than purchasing their own farmland. In the late 1940s and early 1950s Armenian refuges from the Soviet Union began arriving, released from forced imprisonment in Nazi labor camps, and assisted in relocation to California by the U.S. Government. Another wave arrived in the 1970s and 1980s, escaping war in Lebanon, particularly Beirut and Aleppo (Syria). In 1979, Iran's Shah was overthrown and once again Armenians fled to America. Today Armenians/Armenian Americans constitute a large part of Fresno's population and first, second, and third generation Armenian Americans continue to work in the produce industry as farmers, packers and shippers, and sellers (Hamilton et al. 2011).

Filipino/Filipino Americans

Filipinos began to be recruited by sugar growers in Hawaii in large numbers under a Gentlemen's Agreement of 1907, and later through the Immigration Act of 1924, which depleted the Japanese agricultural workforce. Minnick notes that the mass migration to California from the Philippines began around 1925, brought on by poor homeland opportunities and conditions such as population congestion in urban centers, unemployment, lack of opportunities on farms, lack of incentives for agricultural workers, and forced idleness during off seasons on farms. Finally, reports from those who had already entered the agricultural work force in California filtered home. These reports noted that wages in agricultural fields in California in 1915 were about $4.50 per day; the average agricultural worker in the Philippines at that time made only $0.30 per day (Minnick 1984).

Those who came were mainly single with limited education and skills, and many intended to return home after saving some money (Street 2004a:224–225). From 1925 to 1929, 22,767 Filipinos entered California; 93 percent of these were men under the age of 30 and often forced to leave home because of the family's economic hardship and poor conditions. Like Chinese, and later Japanese, and East Indian agricultural workers, Filipinos generally began working for labor contractors. Because many Filipinos could not speak English, contractors would act on their behalf in organizing work, providing transportation, and of course taking a cut from the grower or grower's agent (Minnick 1984).

In part, "as a result of growers recruiting in the Philippines and Hawaii, where thousands of young Filipinos worked in the sugar fields, the California Filipino population grew from only five in 1900 to over 30,000 by 1930, when Filipino workers made up nearly 15 percent of all California agricultural workers" (Salomon 1994:30–31). The influx of predominately male laborers became concentrated in specific agricultural provinces where specialized crops were harvested, such as sugar beets in the Salinas Valley. In the Sacramento and San Joaquin Valleys, Filipinos comprised nearly the entire asparagus-picking work force. They were also engaged in fruit picking, rice harvesting, grape picking, celery planting and ranch labor. As the newest recruits into the labor force, Filipino workers were generally paid lower wages, and in the case of certain crops like asparagus, growers found it more profitable to work more laborers per acre. Filipinos had a long history as laborers working in the sugar cane fields of Hawaii. "So when conditions demanded a similar response in California's fields, many Filipino workers had the organizing sophistication and experience, having already been involved in work slow-downs, stoppages and full-fledged strikes" (Salomon 1994:30–31).

At a personal level are stories retold by Filipinos/Filipino Americans who participated in California's agricultural industry, such as Frank Barba. Barba, a Filipino born northwest of Manila, came to California in 1924 after a brief stay in Hawaii. Barba managed a Filipino labor camp in Watsonville in 1927, acting as a labor contractor for the Birbeck Company who produced lettuce, string beans, broccoli, and sugar beets. Barba was interviewed in 1977 and provided a candid view of his experiences as a labor contractor in Monterey County during the 1920s through the 1960s (UC Santa Cruz 1997). Barba's experience mirrors several other cultural groups, including Japanese/Japanese American and Mexican/Mexican American farm laborers, who also worked in the Salinas area. However, Filipinos witnessed extreme prejudice during the late 1920s and early 1930, exemplified by anti-Filipino race riots in Watsonville. The passage of the Tydings-McDuffie Act in 1934, granted independence to the Philippines, but resulted in a process of legal exclusion of Filipinos by establishing quotas (Barba 1977).

Hispanic/Latino(a)/Latinx/Latinx Americans

Latinx farm workers, particularly from Mexico, are perhaps the largest single cultural group that participated in all aspects of agriculture. Their impact to California agriculture, especially during the early 20th century, cannot be overstated. "Between 1910 and 1930 three quarters of a million Mexicans flooded the labor market and provided a seemingly inexhaustible labor supply (Gonzalez 1994:7). The exodus from Mexico during the first three decades of the 20th century was associated with deteriorating economic and political conditions in their home country. According to Gonzalez, "most Mexican citrus worker communities formed during the 1910 to 1930 migration, and later evolved into today's suburban barrios" (Gonzalez 1995:7).

Many of the improvements made to agricultural labor camps came from strikes led by Mexican/Mexican Americans workers. In 1903, more than 1,000 Mexican and Japanese sugar-beet workers carried out a successful strike near Ventura. In 1913, Mexican workers participated in a strike against degrading conditions on the Durst hop ranch, near Wheatland, Yuba County. Although the intervention of National Guard troops and the arrest of some 100 migrant workers broke the back of the strike, the Wheatland events contributed to establishment of the California Commission on Immigration and Housing, and recognition of the oppressive living and working conditions of agricultural laborers (Waught et al. 1988).

The 1920s and 1930s were no exception, as Mexicans/Mexican Americans engaged in a number of strikes in the state, including the strawberry fields of El Monte, the cotton fields of the San Joaquin Valley, Hayward's pea fields, the lettuce fields in the Salinas Valley, Redland's citrus groves, and Ventura's lemon groves (Waught et al. 1988).

Unions formed by Latinx included "*El Confederacion de Uniones Obreras Mexicanas*" (CUOM, Confederation of Mexican Labor Unions), which organized in 1928. The union sought equal pay, "termination of job discrimination against Latinx workers, and limitation on the immigration of Mexican workers into the United States. At its height, CUOM had about 20 locals and 3,000 workers" (Musoke and Olmstead 1982:395–396).

The Great Depression of the 1930s resulted in displacement of thousands of Mexican/Mexican American laborers, as the waves of "Dust Bowl" migrant laborers flooded California's agricultural labor market. The shrinking job market of the 1930s and competition for agricultural jobs created a hostile environment for some Mexican/Mexican American workers. The government's solution was the Repatriation Program, which applied pressure on Mexicans to "voluntarily" return to Mexico. At times, this procedure resulted in outright deportation. "Mexican aliens who lacked documents of legal residency, including many who had entered the United States in good faith during an earlier period when immigration from Mexico was a more informal process, were particularly vulnerable" (Musoke and Olmstead 1982:395–396). Many of those most affected, were "naturalized and U.S.-born husbands, wives, and children of Mexican repatriates, who had to choose between remaining in the United States or maintaining family unity by moving to Mexico" (Musoke and Olmstead 1982:395–396).

World War II resulted in a significant increase in military personnel and a loss of farm workers, as workers left for military service.

Starting in the 1940s, immigration from Mexico increased substantially, largely because of the Bracero program. The Bracero movement began as a binational temporary contract labor program initiated in August 1942 through an exchange of diplomatic notes between the United States and Mexico.

The program was designed initially to bring a few hundred experienced Mexican agricultural laborers to harvest sugar beets in the Stockton area but soon spread throughout the rest of California and the United States to provide much needed farm workers during World War II. By 1945, the quota for the agricultural program was more than 50,000 braceros.

The Bracero agricultural program under various forms survived until 1964, when the two governments ended it as a response to harsh criticisms and reports of human rights abuses. The program made a large contribution to agricultural throughout California and the rest of the United States. However, most consider the program from a human rights standpoint to be a complete failure. Employers were supposed to hire Braceros only in areas certified as experiencing domestic labor shortages, and Braceros were not to be used as strikebreakers. In many instances, these rules were ignored, and Mexican and native workers suffered while growers benefited from the cheap labor provided by Braceros. Between the 1940s and the mid-1950s, farm wages dropped sharply as a percentage of manufacturing wages, partially resulting from the use of Braceros and undocumented laborers who lacked the full rights of American citizens. An estimated 4.6 million Bracero contracts were signed, with many individuals returning several times on different contracts (Bracero History Archive 2021).

Many of these Bracero workers became the next wave of migrant workers who ultimately established farms of their own. For example, Luis Chavez, arrived in California during World War II as part of the Bracero guest worker program. Chavez worked double shifts for 16 years at a Santa Maria dairy until he could least an acre of land. He planted strawberries on his acre in 1977. Today he and his family own more than 800 ac. of strawberries in Santa Barbara and San Luis Obispo counties.

Since the 1940s Latinx immigrants from Columbia, Guatemala, Nicaragua, Honduras, and other Latin American counties continue to find work in agriculture, often working with their American born children. It is estimated that 25 percent of Latinx strawberry farmers in California started out as field workers. Strawberries have given Latinx more ownership opportunities than any other major crop. Latinx now comprise two-thirds of strawberry growers in California, where 90 percent of the nation's strawberries are grown (California Strawberry Commission 2014).

Irish/Irish Americans and Welsh/Welsh Americans

Irish and Welsh sheepherders enjoyed some success establishing sizeable herds and ranches. During the latter half of the 19th century in El Dorado County, the Quinn brothers operated a large sheep operation, moving their animals from the foothills east along present-day State Highway 88 to the public domain that they considered their grazing lands. During the 1860s, sustained drought resulted in feuds between sheepherders and cattlemen as each sought out the best grazing land in the Sierra. According to United States Forest Service (USFS) records, an incident within the present-day El Dorado National Forest resulted in the murder of several sheepherders by cattlemen. The sheepherders were reportedly from the British Isles and were buried in unmarked graves near the site of their murder (USDA n.d.).

Basque/Basque Americans

A handful of Basques, such as Jean Baptiste Garat and Jean Pierre Indart, had settled in Nevada and California by the 1870s. Yet, they became cattlemen rather than sheepherders (Mallea-Olaetxe 2000:9). Basque people did not play an important role in shepherding in California and Nevada until after 1900.

Sheep herding followed a seasonal cycle. As part of this annual cycle, sheep were driven or transported into the higher elevations within the Sierra Nevada Mountains in the spring and taken out again in the fall. Summer grazing of sheep required constant movement and herders were employed to ensure that sheep were continually moving, getting adequate feed and were protected from predators. A great many of the sheepherders were of Basque descent. Author Robert Laxalt characterized the Basque herders as "lonely sentinels of the West" (Mallea-Olaetxe 2000:8). During the early 1900s, Basques migrated to California and Nevada in large numbers for many of the same reasons as other immigrants from Southern Europe. Many took jobs in the sheep industry, although Basque shepherds were still tending sheep into the 1960s (Baker 2004).

Basques/Basque Americans wintered and settled in the San Joaquin Valley, particularly in and around Fresno, Los Baños and Bakersfield. Today, Basque descendent families still reside in these communities, as well as Reno and Carson City, Nevada. Basque cultural history has left an important legacy for future generations, and institutions like the Center for Basque Studies at the University of Nevada, Reno work to document and relate the stories of these herders.

Portuguese/Portuguese Americans

Portuguese involvement in and dominance of the California dairying industry is largely a 20th century phenomenon. In 1880, only 5 percent of Portuguese in the state were involved in dairying. By 1929, Portuguese/Portuguese Americans controlled 80percent to 85 percent of the state's total dairy industry. Today's concentration of Portuguese/Portuguese American-owned and operated dairies in the San Joaquin Valley is directly associated with irrigation improvements in the early 20th century (Graves 2004:69, 74).

Dutch/Dutch American

During the 1930s Dutch people immigrated to the United States, and ultimately to Southern California where they found work in the dairy and cut flower industries. Southern California dairy farms decreased in size after the 1920s but increased in productivity. The animals were fed scientifically regulated fodder that included hay, cottonseed meal, copra, and exotic silage. During the 1940s the dairy industry in Southern California reportedly produced 500,000 gallons of milk monthly, for an annual profit of some $61 million. The temperate climate of the area was excellent for the cows and made possible the phenomenal milk production. Some Southern California cows produced three thousand gallons of milk a year—twice the national average. By the early 1950s, Hynes-Clearwater had combined as the community of Paramount and had become an internationally recognized center for the sale of hay. In 1953, business amounted to $32 million in hay and $12 million in other dairy feeds. The Dutch/Dutch American farmers established what became known as "Little Holland" in the area from Paramount to west Buena Park. They could hear sermons in the Dutch Reformed churches, read Dutch newspapers, and enjoy a rich social and cultural life in their own language. When Queen Juliana and Prince Bernhard of the Netherlands toured the United States in 1952, they made a special visit to this area.

Eastern Europe/Eastern European Americans

Political and religious and economic difficulties, including crop failures and high taxation, are some of the reasons for leaving traditional homelands in Eastern Europe. In addition, establishment of railroads opened many areas and provided easier access to ports from which immigrants could travel to the United States.

In Croatia, immigration began in the early 1870s while in Serbia immigration largely began after 1892 due to an increase in political repression and several years of crop failures. Croatians and Serbians found California similar to their homeland in many respects and many established orchards in the Santa Clara Valley, the Bay Area, and the San Joaquin Valley.

Mark Rabasa is remembered for starting the apple industry in Watsonville in the Salinas Valley. Stephen Mitrovich is credited with reinvigorating the fig industry in California. Immigrants from Prussia came after the U.S. Civil War, again because of political unrest in their homeland. Most Poles settled in cities, despite coming from agricultural areas. Immigrants from what is today the Czech Republic began coming in the 1870s; however, they comprised the smallest numerical group of all Slavic immigrants. While Russia established a presence at Fort Ross early in the 19th century, the Russian American Company's abandonment of that post effectively removed Russians from California for many decades. Russian immigration to California followed the pattern of other Slavic groups and was driven by political unrest at home. Russian Mennonites, for example, fled Russia to escape persecution in the early 20th Century and established colonies and farms in the Central Valley and near Orland in Butte County. As with the Poles, Russians settled mainly in cities and did not have a large agricultural presence in California (Caire 1937:20–27).

Black Americans

While Black Americans were never engaged in large numbers in California's agricultural industry, they were pioneers in the development of several agricultural enclaves or colonies in the state. Black Americans also were engaged as farm laborers, particularly in the Imperial Valley where cotton was being cultivated in the 1910s.

According to Ramsey and Lewis, "at least two different efforts at black colonization occurred in San Bernardino County between 1900 and 1910. The Forum, a Los Angeles civic club organized in 1903, solicited families to homestead government land in the Sidewinder Valley near Victorville. The first homesteader preempted a 640 ac. site "where ground water could be easily lifted, but water, although critical to subsequent development, was never available in ample supply." While little is known about the actual number of families who relocated to Sidewinder Valley during the Forum's promotional effort, in 1914, the Forum reported, "more than 20,000 ac. had been homesteaded by Blacks." Lucerne, which lies nearby in the Sidewinder Valley, has also been labeled by pioneers in Sidewinder Valley as an originally Black settlement.

In Tulare County, Black Americans settled in a small community they named AIlensworth. Established in 1908, Allensworth was created as a self-governed Black town. The town's promoters attracted more than 200 settlers in its first few years. Given the harsh environment of the southern San Joaquin Valley where the town was plotted, Allensworth's pioneers struggled. Underground aquifers soon stopped flowing at a volume needed to provide the community with its required domestic and agricultural needs. While plans were implemented to acquire water elsewhere, the community declined in population, and ultimately the settlement was abandoned. By the third and fourth decades of the 20th century, Black Americans were migrating away from the state's agricultural belt to the urban centers of the state, particularly the Bay Area and the Los Angeles Basin (OHP 1988:66–68).

Dust Bowl Migrants

During the Dust Bowl and Great Depression of the 1930s, individuals and families migrated in large numbers to California from the states of Texas, Arkansas, Oklahoma, and Nebraska. Often grouped under the derogatory term "Okies" (based on an abbreviation of Oklahoma), they migrated to the San Joaquin and Salinas valleys looking for work. The migration into California during the 1930s was dramatically different in that almost half of the migrants settled in non-metropolitan areas of the state. Most migrants entering the state in the 1930s were themselves rural-oriented, whether they came from farms or simply rural America. Perhaps drawn by familiarity with their previous place of residence, many chose to settle in similar settings or landscapes and work in jobs familiar to them. In California, there were three enclaves that attracted the vast majority of rural migrants during the 1930s**:** the San Joaquin Valley, Salinas Valley, and the greater Los Angeles basin. The flood of "dust bowlers" that arrived in California from Oklahoma and neighboring states in the latter half of the 1930s grew to about 350,000.

These workers flocked into small communities that were unprepared to cope with human needs on such a magnitude. In all, the new migrants represented a 50 percent increase in population for California's valley counties, doubling school enrollment and skyrocketing health costs. In spite of these initial impacts and negative stereotypes, many descendants of these migrants continue to reside in these communities today.

Like other immigrant groups, migrants during the Dust Bowl and subsequent economic depression faced great opposition. For example, in 1936 the Los Angeles Police Department chief of Police James Davis, acting totally outside his authority, sent officers to border counties to establish "bum blockades" in an attempt to intimidate and keep people out of California. He dispatched 136 Los Angeles police officers to 16 major entry points on the Arizona, Oregon, and Nevada borders with California with orders to refuse entry to migrants with no visible means of support. The Los Angeles Times and other newspapers supported Davis' efforts, while other papers such as the Los Angeles Evening News, pointed out the illegality of Davis' actions. The blockage was withdrawn after several months when a number of lawsuits were threatened and questions arose regarding the use of city funds for this action (Weiser 2021). Please note that while historic references may use some of these derogatory terms, thoughtful use by researchers is encouraged.

Labor Housing

Finding and hiring skilled laborers to harvest crops, prune trees, herd animals, brand cows, and perform a multitude of other tasks is one of the challenges of farming and ranching as is the need to house and feed the farm and ranch workers. Housing for workers has taken a myriad of forms depending in part on the geographical location of the work, duration and timing of work, capital investment by owners, and the harvesting of a particular crop. Because farms and ranches are often rural, worker housing was generally located on-site, particularly in the days before automobile and truck transportation.

Small family farms often provided a bed in the barn and fed laborers at the family table. Larger farm or ranch operations may have built bunkhouses; typically, little more than a single room filled with cots and a stove for heat. Food may have been served in the family kitchen to all hands or transported to the bunkhouse.

As family farms transitioned to corporate-run enterprises more formal camps were constructed to house both transient and permanent workers. Conditions in camps were often deplorable, with inadequate sanitation, crowded rooms, and no privacy. Workers were expected to share space; often, elevated platforms against each wall of a large room provided the only beds for dozens of men (California State Board of Control 1920). In response to many complaints received regarding agricultural labor camps, the Commission of Immigration and Housing of California came out with Rules for Labor Camps in 1914 and 1920, as a way to improve and regulate conditions at camps. These rules laid out standards for cookhouses and the numbers of men that could be housed in a single room. They also specified the quantity of sanitation facilities for the numbers of men employed and required screens on doors and windows, and many other factors (California State of 1914, 1920; Caltrans 2016; Appendix E).

Cowboys and shepherds typically were supplied with a bedroll and slept outdoors with the herd or in line camps. Operations that required labor for longer periods or even year-round, however, likely had some kind of permanent housing. In some cases, large agricultural operations had company-owned housing offsite. In addition, some workers rented private housing or a room in a nearby town. Therefore, worker housing may vary from ephemeral campsites to more permanent wood frame dwellings.

Some operations may have had company stores and other facilities designed to service the seasonal workers. Each of these settlement enclaves had its distinctive characteristics dictated by the owner or operator (Woirol 1992).

Agricultural workers often followed the cycles of crops and their harvest seasons. Since this pattern was transitory, they worked at many farms and encountered great diversity in company-supplied housing. Housing ranged from tents to small cabins or was not supplied at all. The size and placement of camps also varied, dependent on regional variation, type of farm, and crops. In the Sacramento-San Joaquin Delta region, there was one camp for every 100 to 500 ac. of land (Figure 33). On the many reclaimed islands in Delta, camps were always located around the perimeter of the islands, close to the river transportation routes and out of the fields. Camp size depended on the number of acres each camp was responsible for farming and ranged from a single bunkhouse and barn to many buildings, bathhouses, laundries, and corrals (Maniery 1993). In many instances, workers found ways to improve their living conditions. In 1918, Katsume Mitori arrived in California to join her new husband, Kango. She learned from other women in camp how to make do with little but still create a home. Recycled boxes served as cupboards, dressers, and shelving. Rice sacks provided material for drapes, flimsy room dividers (since even married couples lived in the communal room), tablecloths, shirts, and aprons. Strings from the rice sacks were crocheted with chopsticks to create useful items (Shimamoto 1990:13–15). These small efforts were used by many women living in camps to personalize their living spaces.

Agricultural work camps were like their counterparts in other industries, contrived communities created by employers, in most cases never designed to be complete, full-service towns (Van Bueren et al. 1999; Figure 34). They often provided only the most meager amenities, and workers had to simply camp out. Room and board were typically deducted from wages. In some cases, employers deliberately paid with checks from distant banks, discounting wages paid in cash, or offering scrip redeemable at company stores where exploited workers encountered inflated pricing. These hidden costs effectively reduced real earnings and created a captive market that employers took advantage of to reduce their overall operating costs.

The commercialization and specialization of citrus farms, for example, had a markedly different history from the general fruit or orchard industry. Company or corporate giants such as Sunkist, had a carefully managed segregated class structure in all its operations. Family-owned orchard crops characterized the citrus industry with seasonal laborers doing the bulk of the work.

Figure 33. Arvin Migratory Labor Camp, Spring 1936. Note the row of tent dwellings on the right and a sanitary unit on the left. (Migrant Labor Camp Photographs from the Harry Everett Drobish Papers, BANC PIC 1954.013:20-PIC, courtesy of The Bancroft Library, University of California, Berkeley, public domain.)

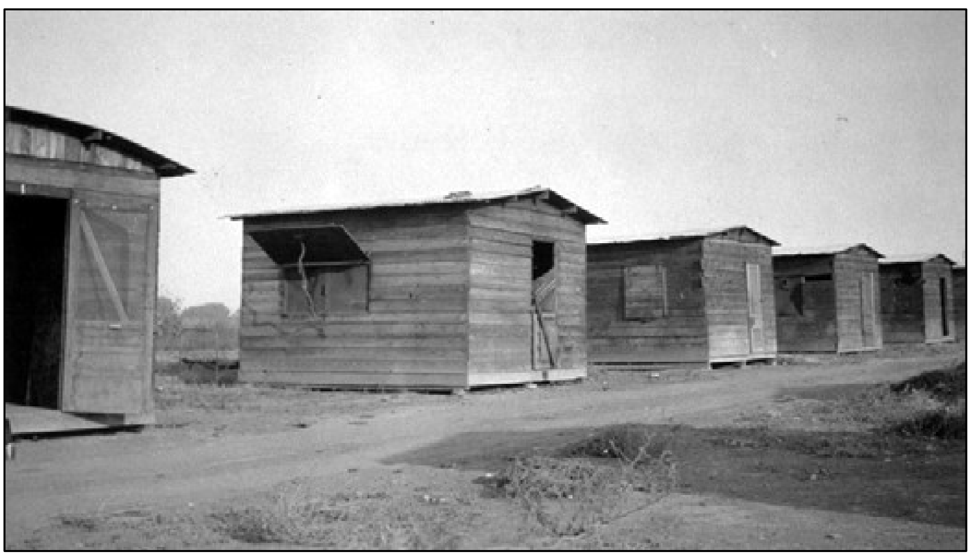

Figure 34. Farm laborer cabins in Kern County, 1936. (Migrant Labor Camp Photographs from the Harry Everett Drobish Papers, July 1936, Kern County, Kern Lake District, BANC PIC 1954.013:32-PIC, courtesy of The Bancroft Library, University of California, Berkeley, public domain.)

Orchard crops, particularly citrus, required more sustained labor than other crops, due to killing frosts, maintenance of the irrigation systems, picking the fruit, and pruning. Thus, while fundamental differences should be evident through the physical composition of the farms and labor camps, often more permanent types of worker housing are present at farms that grew citrus or orchard products. In addition to worker housing, properties devoted to orchard crops often had barns for temporary produce storage and processing areas or sheds associated with drying and packaging the crops.

Citrus growers were successful in creating a permanent workforce, typically comprised of workers from Mexico. Barrios grew up along the edges of the citrus farms often near railroad tracks or in dry stream bottoms. These “colonias” or “Mexican camps” became small villages, but without community amenities such as paved roads, indoor plumbing, or formal water and garbage services. It was not unusual for the white farmers or owners to live upslope or on higher elevations, forcing the barrio residents to live in the lowlands. Citrus farms provided opportunities for families to settle and remain gainfully employed. Women and children would work in packing houses, wrapping fruit for shipment. Men and women worked in the orchards. In 1914 an undercover investigator for the CCIH noted that living conditions on citrus farms were much better than those found at vineyards or strawberry ranches simply because it allowed for married couples to be together. While the work was not easy, citrus farms, particularly lemon farms with a year-round crop, became a coveted place to work, just for the stability they offered (Farmer 2013:264–266).

In contrast to citrus farms, cotton farms used a contract labor system that resulted in different types of camps. The contract labor system developed as a response to a fundamentally different seasonal pattern of labor demand found in the California cotton fields. Here many of these workers found jobs elsewhere in the state during other season, picking fruits and vegetables. Unlike in the South, where because of the lack of mechanization, wet weather, and weeds, cotton workers remained in high numbers during the chopping and hoeing season (spring and early summer), often two-thirds of, and sometime equal to, the peak labor requirements of the picking season, in California, the actual number of workers employed during the height of the harvest was approximately five times the number employed during the peak of the chopping period. Thus, most cotton laborers camped out in “labor camps” because of the lack of permanent housing or even temporary housing. (Nichols and Borg 1992:396–397). In 1933, Congress passed the Federal Emergency Relief Act (ERA), and funds for migrant workers’ camps became available.

It was the poor conditions of migrant farm life and housing during the Depression (Figure 35), which John Steinbeck meticulously described in *The Grapes of Wrath*, that provided the spark for many labor instabilities throughout the 1930s (Turner 1981:84).

Laborers and their families often were forced to find shelter wherever possible, as the crop rotation cycle resulted in non-permanence and essentially a homeless work force (Figure 36). In the words of Carey McWilliams, Commissioner of Immigration and Housing in California from 1938 to 1942:

> I have flushed scores of migrant families out of abandoned barns, from beneath bridges, and from the zaniest canal-bank habitations that one could possibly imagine. On tips from anonymous sources, I have gone in search of labor camps in areas where there were no visible signs of tents, cabins or shacks and, eventually, have turned up as many as 200 and three hundred families in artfully concealed camps. One can travel the length of the San Joaquin Valley, at the height of the season, on the main highway without being aware of the fact that tens of thousands of migrant workers, an army of 200,000, are somewhere camped, somewhere at work. But, once you know that this curious 'hidden' world exists, you are forever conscious of it and your eyes seek out the evidence that this phantom army is there, in the vineyards and orchards, in the camps and shack towns [McWilliams 1979:169].

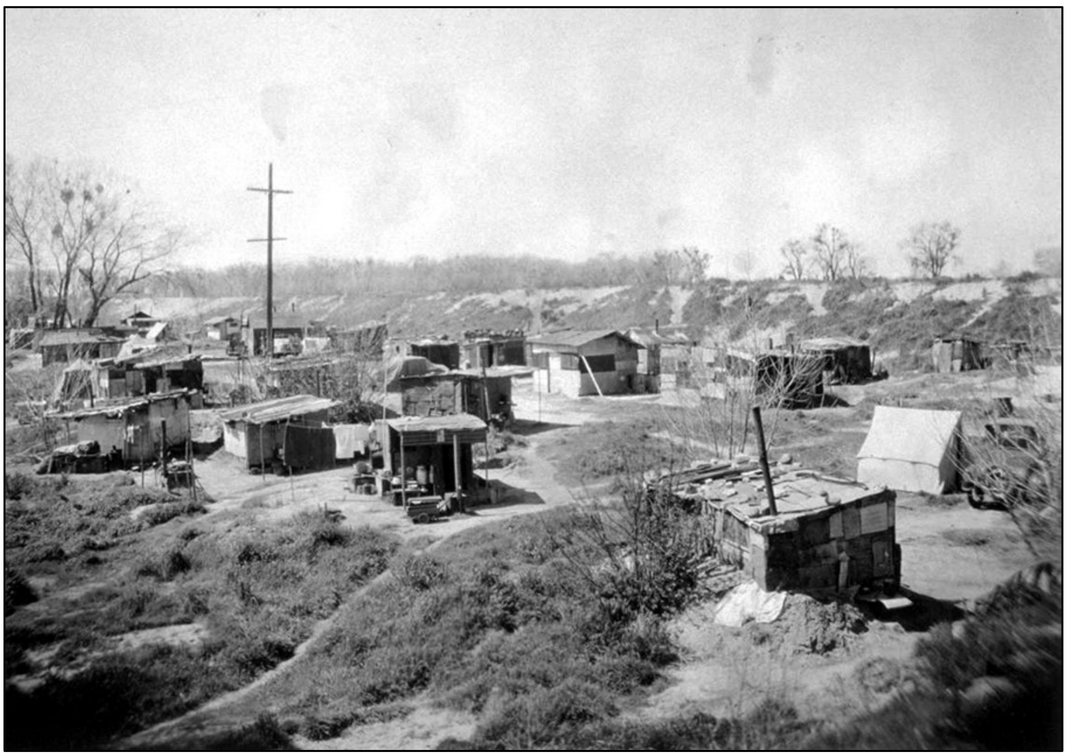

Figure 35. Depression Era migrant labor camp (Little Hooverville) in Sacramento below a river levee, ca. 1939. (Migrant Labor Camp Photographs from the Harry Everett Drobish Papers, BANC PIC 1954.013:48—PIC, courtesy of The Bancroft Library, University of California, Berkeley, public domain.)

After World War II, small trailers, mobile housing, campers, and other types of portable housing made an appearance in camps (Figures 37 to 40).

Figure 36. Migrant workers heading to the next crop, 1935. (From the Establishment of rural rehabilitation camps for migrants in California collection. 15 March 1935, collection of 57 photographic prints compiled by Paul S Taylor, Photograph by Dorothea Lange, Courtesy of the Library of Congress.)

Cooperatives, the Grange, and Farm Bureaus

Farm and ranch owners played an important role in local, regional, and national politics throughout much of this nation's history. Agricultural property owners engaged in populist struggles, often referred to as the "Farmer Movement," and sought opportunities for public land acquisition, low-interest loans, government-assisted infrastructure improvements such as irrigation, roads, and rural electrification, and government intervention in commerce and labor disputes. The economic importance of agriculture gave property owners significant political influence, but the interests of small and large operators also diverged in important ways.

A significant issue faced by the state's many small farmers and ranchers in the century following statehood was the domination of the marketplace by a growing number of large operators. Large operators had the advantage of greater capital and the consequent ability to produce goods at

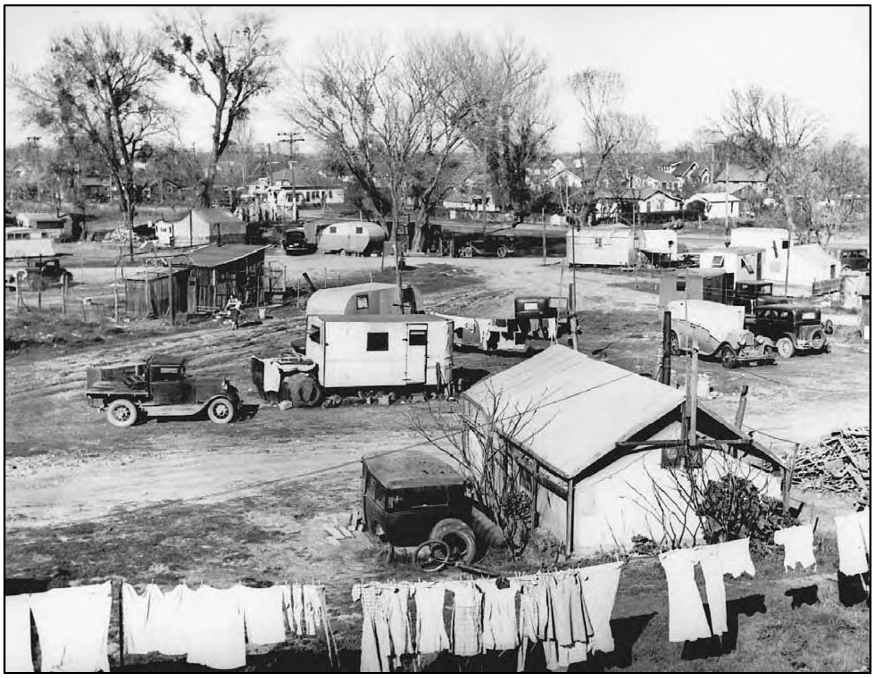

Figure 37. Migrant camp nestled at the base of the Sacramento River Levee near Marysville, 1953. Note trailers. (National Archives and Records Administration, image by Dorothea Lange, courtesy of the Department of Agriculture, Bureau of Agricultural Economics, Division of Economic Information.)

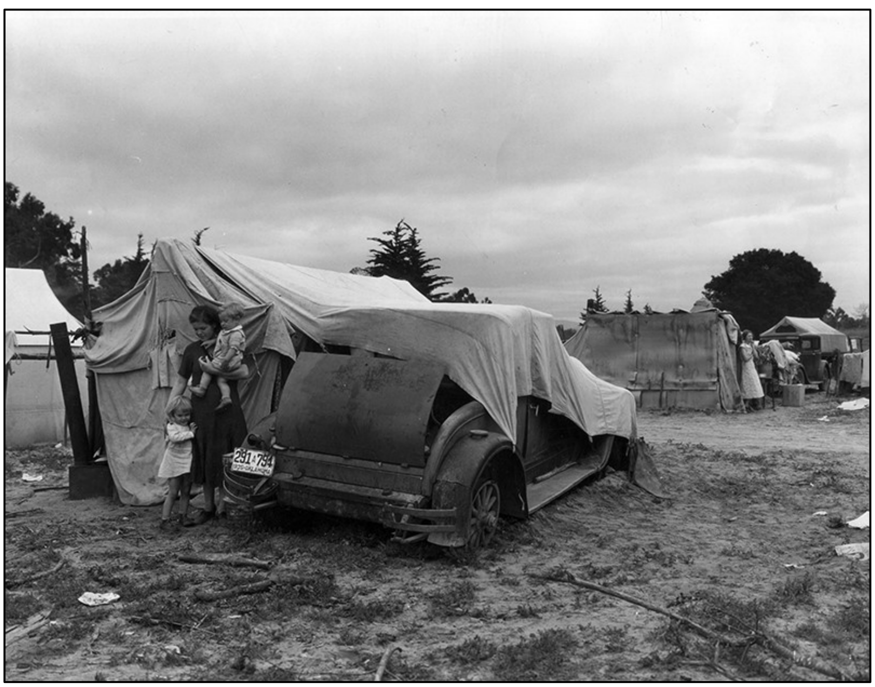

Figure 38. A migrant family looking for work in the pea fields of California, 1935. (Photograph by Dorothea Lange, 1935. Courtesy of the Franklin D. Roosevelt Presidential Library and Museum, Hyde Park, New York.)

Figure 39. Migratory Mexican field worker's home, Imperial Valley, 1937. (1942.008 Folder 102, Part 2 #16439E, California Cornerstones: Selected Images from The Bancroft Library Pictorial Collection, courtesy of The Bancroft Library, University of California, Berkeley.)

Figure 40. Eighteen-year-old mother from Oklahoma, now a California migrant, March 1937. (Courtesy of the Franklin D. Roosevelt Presidential Library and Museum, Hyde Park, New York.)

lower cost. Spreading the costs of new and more efficient technology, irrigation, product transport, and other expenses over larger acreages, increased efficiency and profit. Smaller operators found it challenging to remain competitive. They did so in part by forming cooperatives, organizing the Grange to promote their political interests, and improving the efficiency of production by using scientific advice provided by the Farm Bureau and other sources.

Cooperatives gave small agricultural operators the ability to share certain production and marketing expenses, and thus lower individual costs as a way to compete effectively against company or corporate farms, although some cooperatives worked in the interest of the large growers by stymieing competition and prohibiting labor organization. But in general, cooperatives shared processing and packing expenses, negotiated more competitive transportation costs, and shared investments in infrastructure, such as irrigation systems and equipment. As the timing of product sales increased in importance, cooperatives also invested in storage facilities for durable products that could sell later at more profitable rates. In certain instances, forming cooperatives provided the means to garner greater control over marketing and prices.

Cooperatives also had the end result of insulating workers from labor unions, whose members sought improvements regarding hours worked, wages, and housing (Woeste 1998; Figure 41). Whether cooperatives ultimately benefited the worker is a question deserving of further research.

The need for some form of local or regional organization became vital to the interests of farmers as California's agricultural production increased. The California State Grange became the earliest organization in California to rally behind small farmers. In contrast, large corporate or company farms relied directly on politicians for support and favorable policies and legislation. The establishment of the Grange in California in July 1873 paralleled the development of the National Grange movement. The persistent indebtedness of farmers through heavy mortgages, high rates of interest, transportation costs, manipulation of prices on certain products, uncertain land titles, and acquisition of water rights contributed, in part, to the popularity of the Grange (Chambers 1952:9). Principally, the Grange was founded to address farmers' grievances against the railroads and grain elevators, among others, for charging unfair prices for their services. At the same time, falling farm prices, coupled with increasing interest rates, resulted in farmer debt to meet costs of production, processing, shipment, and sale (Stewart 2022). Oliver Hudson Kelley, a Minnesota farmer, activist, and clerk for the U.S. Bureau of Agriculture receives credit for establishing the National Grange in 1867. Kelley believed that farmers, "because of their independent and scattered nature," needed a national organization that would represent them in the same manner as unions were beginning to do for industrial workers. Many looked upon the Grange, officially known as "the Order of Patrons of Husbandry," as a fraternal group akin to the Masonic Order. The early Grange leaders promoted cooperatives, which could help farmers economically. In theory, the Grange strived for nonpartisanship and generally did not endorse candidates for public office nor contribute to their campaigns (Grange Connection 1996 to 2004).

Figure 41. Butte co-operative farm, Gridley. This group of Filipino workers and their children engaged in distributing boxes to the orchards where they had been employed for two weeks. (WRA no. -196, War Relocation Authority Photographs of Japanese American Evacuation and Resettlement, 1942 to 1945, BANC PIC 1967.014-PIC, courtesy of The Bancroft Library, University of California, Berkeley.)

Grange halls acted as community centers in rural areas where residents gathered for educational events, dances, potlucks, town meetings, political rallies and other meetings (Howard 1992). On 15 July 1873, delegates from twenty-eight Granges met in Napa to write a constitution for the California State Grange. By 1874, membership had grown to over 14,000 individuals representing Napa, Sonoma, Santa Clara, Sacramento, San Joaquin, Santa Cruz, Sutter, El Dorado, and Los Angeles counties. Most of the early members were grain farmers (Chambers 1952:10). By 1879, membership in the California Grange reportedly dropped to less than 4,000 members statewide, as the wheat boom slowly died down. The depression of the mid 1870s made the plight of California's farmers more severe, although it ultimately led to political reforms as Grange members became more active in state politics. Between 1880 and 1921, the California Grange slowly increased its membership, particularly in Northern California. The rapid diversification of the state's agricultural products and the lack of confidence farmers had in the Grange's financial activities, however, contributed to the failure of the California Grange to become a formidable institution (Chambers 1952:12).

Most of the California Grange's success came in its fraternal and social activities rather than its political influence or financial capabilities. For rural areas, the Grange formed the center of social, community-based activities. Granges throughout the state had a reported 638,804 members before their decline in the early 1940s (Chambers 1952:12). Today, the Grange continues to function in much the same way as did prior to 1940, although with fewer Grange halls and active members.

Following the decline of the Grange, the Farm Bureau became one of the most important organizing forces in California agriculture during the 20th century. The university system and its Agricultural Extension Service served as the organizing arm in the birth of the Farm Bureau movement in California. Created by Congress in 1914, the Agricultural Extension Service operated through the nation's land grant colleges, providing educational programs to counties (California Farm Bureau Federation 2005; Chambers 1952:21–25).

Humboldt County formed its bureau in 1913 and became the first county in California to qualify under the Farm Bureau system. Yolo, San Joaquin, and San Diego counties founded their Farm Bureaus the next year, and B.H. Crocheron became the founder of California's Agricultural Extension Service. In a circular written in 1917, Crocheron envisioned the county Farm Bureau acting as "a sort of rural chamber of commerce and… the guardian of rural affairs. It can take the lead in agitation for good roads, for better schools, and for cheaper methods of buying and selling" (Chambers 1952:21–25). In September 1919, thirty-two county Farm Bureaus met in Berkeley to create the California Farm Bureau Federation. The fledgling organization, with a combined membership of 24,168, elected Dr. W.H. Walker of Willows as its first president and occupied two rooms within Hilgard Hall on the University of California campus in Berkeley.

Today, the Farm Bureau still serves as a grassroots organization where policy making begins at the local level. The Farm Bureau provided a number of functions including representing farmers' interests with regards to laws and utilities, the legal system, and at agricultural commission meetings. The *Farm Bureau Monthly*, which began publication in 1921, included scientific information for fledgling farmers. In an effort to improve the quality of life in the state's rural areas, the bureau established a Farm Home Department.

The purpose of the department was "to assist the farm family to maintain an adequate standard of living by supporting home-demonstration work and by exchanges of experiences in homemaking" (Chambers 1952:21–25). Farm Bureau membership decreased during the Great Depression, bottoming out at 15,270 in 1932 before recovering slowly the rest of the decade. The postwar years of the late 1940s saw increased membership and the establishment of "Young People's Program" bureaus, now the Young Farmer's and Rancher's program. The program began in 1947, designed to help young agriculturalists succeed in the business and to train new generations of Farm Bureau leaders (Chambers 1952:21–25; Figure 42).

As discussed above, the 4-H Club began in the 1910s and focused on rural farm children (Figure 43). A major change in 4-H occurred during World War II when many of the club's efforts were

Figure 42. Agricultural students at College of the Sequoias studying the fine points of dairy operations, ca. 1940. (The San Joaquin Valley Digitization Project, San Joaquin Valley & Sierra Foothills Photo Heritage, tca0013, Courtesy of the Tulare County Free Library, Annie R. Mitchell History Room, San Joaquin Valley Library System, Fresno.)

Figure 43. 4-H Youth displaying prized cattle, 1946. (Eastman's Originals Collection, 4H Livestock, C-794, courtesy of the Department of Special Collections, University of California Library, Davis.)

directed towards victory gardens, civilian defense, salvage programs, and bond campaigns, as well as food preservation. The victory garden program also brought 4-H to urban areas. Following a period of readjustment after the war, 4-H membership grew. Some states developed 4-H programs in close relationship to local school districts, while others established clubs as community programs separate from schools. The 1950s and 1960s witnessed increasing numbers of non-farm youth enrolling in the program. In 1948, 4-H turned international with the creation of the International Four-H Youth Exchange (IFYE, first called the International Farm Youth Exchange.) Today, Cooperative Extension and its 4-H programs serve people in towns, cities, and rural areas providing information on agriculture, family living, community development, and other related subjects.

Youths involved in 4-H often showcase their accomplishments at county fairs or the state fair. The first state fair was held in 1854 in San Francisco, moving to Sacramento permanently in 1859. It is an annual exposition under the direction of the State Board of Agriculture. There are county fairs held throughout the state. The largest is in Pomona, Los Angeles County. This county fair is the largest in the nation, annually attracting more than one million people (Leadabrand 1972). The huge exposition park covers 487 ac., and is landscaped with more than 5,000 trees, thousands of plants and flowers and acres of green grass. The paved parking area accommodates 45,000 cars. The 17-day-long fair is held in September and began in 1921, in what was at the time a major citrus production town (Pitt and Pitt 1997:285).

Labor Relations and Working Conditions

“If I suffer at this
typewriter
think how I’d feel
among the lettuce-
pickers of Salinas?”
Charles Bukowski (from *The Meek Have Inherited*, 1980)

As the composition of California’s agricultural work force evolved and mechanized farming increased, the character of relations between agricultural workers and their employers underwent significant changes. The initial decades after the U. S. annexation of California were characterized by labor practices that included coercing the indigenous population into virtual slavery and relying on immigrants who accepted less pay than white workers.

In many cases, teams of native and Chinese laborers worked under the direction of a member of their own group who could speak English and served as a cultural intermediary. Labor relations during this early period were generally paternalistic and often abusive. Law and strong social prejudices among the dominant population made the poor treatment of Native American and Chinese workers possible. Historical documents also suggest that Black American landowners frequently leased their fallow lands to Chinese. In some cases, absentee owners leased entire tracts of uncultivated land while in other cases the Chinese leased out only portions of existing farms. In the Delta region of the San Joaquin Valley, Chinese built levees, irrigation ditches, broke the sod, cultivated the fields, and planted potatoes, beans, onions, and sometimes asparagus on their leased land (Chan 1986:194).

By the 1860s Native American populations had dramatically declined due to violence, disease, and other causes, so farmers and ranchers were desperate for help. Thus, Chinese workers had mixed success overcoming racial prejudice, but were in demand because they worked hard, were reliable, and generally cost less than white workers. In 1880, as one example, Chinese fruit pickers in the Santa Clara Valley struck to increase their share of the harvest from half to two-thirds of the crop (Street 1994a: 319–320).

While few whites were actually willing to work for low wages and do the menial labor Chinese had done for years, anti-Chinese sentiments reached a crescendo in the late 1870s and early 1880s. Incendiary speeches, threats, barn burnings, and violence promulgated by various racist groups like the Order of Caucasians and the Workingman's Party intimidated employers and harassed Chinese workers (Minnick 1988; Street 1994a: 307). Those sentiments eventually contributed to the passage of the Chinese Exclusion Act of 1882, despite the opposition of many farmers. The Chinese community widely resented the act, and its passage contributed to growing Chinese militancy, collective action, and the strengthening of insular communities that offered protection and solidarity for besieged Chinese immigrants. Chinese workers from the same clan typically worked together in gangs, and the Six Companies, a well-organized group of various clans headquartered in San Francisco, played a significant role in labor contracts, labor peonage, and other legal and cultural matters. The Chinese Exclusion Act did lead to a steady decline in Chinese immigration, although many new immigrants were able to exploit its loopholes with the help of the Six Companies (Chan 1986).

White workers generally demanded a minimum of $2.00 per day throughout much of the late 19th century. Unlike white workers who generally demanded cash, the Chinese shrewdly cultivated a variety of arrangements with farmers that proved mutually beneficial. Chinese agriculturalists were able to negotiate arrangements that gradually raised their hourly income into essential parity with white agricultural laborers because they worked hard and with considerable efficiency. Chinese agricultural laborers often worked for shares of crops instead of wages and, in many cases, they also developed various tenancy arrangements whereby they worked the land directly for themselves. Some Chinese gang bosses even obtained the free use of land in exchange for reclaiming and readying new land for agriculture (Chan 1986:238–240, 259–267). Production intensified on lands directly controlled by the Chinese, a fact noticed by other farmers who undoubtedly changed their practices as a result.

Passage of the Interstate Commerce Act of 1887 and the McKinley Tariff Act in 1892 both expanded markets for California's agricultural products, contributing to significant growth in the industry by the turn of the century. While mechanization began to reduce labor requirements for some tasks, the work force continued to expand rapidly and became more ethnically diverse, as discussed above. This played into the hands of employers who exploited ethnic rivalries and sought to create an oversupply of labor by encouraging immigration, significantly expanding the use of children, and other similar measures. Employers thus gained the upper hand and as a result, wages and working conditions did not improve and perhaps even deteriorated in some cases.

In the spring of 1903, California witnessed its first effective labor action that brought together the interests of more than one immigrant group. It involved the nascent sugar beet industry, a crop made profitable by the heavy tax imposed on imported sugar by the Dingley Tariff Act of 1897. Oxnard growers sought to control the largely Mexican and Japanese work force with an industry-sponsored union that used scrip payable at the Japanese American Mercantile Store but provided no real benefits to workers (Street 2004a:446–451). Recognizing their position, workers sought help from established labor unions. While rebuffed by the American Federation of Labor, an organization that represented white workers in skilled trades, the Oxnard sugar beet workers organized the Japanese and Mexican Labor Association (JMLA). Help also came from Fred C. Wheeler and John M. Murray of the Los Angeles County Council of Labor (LACCL) and from the support of local commercial businesses thwarted by the scrip policy of the industry's union.

The industry repeatedly brought in strikebreakers while JMLA members sought to block and dissuade them. Several JMLA leaders went to jail but then were acquitted and released, to the dismay of the beet growers. The situation reached a climax on 23 March 1905, when JMLA strikers blocked several wagonloads of non-union laborers who organized as a second union. A melee ensued when an industry union member shot JMLA member Perfecto Ogas. When the turmoil quieted, at least five JMLA men were badly injured, and one died two days later (Street 2004a:457–460).

As negotiations continued, the JMLA was in a strong negotiating position with more than 1,300 members, against the roughly sixty strikebreakers or scabs in the industry's union. The JMLA held together and provided support to its members throughout the strike. With the immediate need to thin and plant, costs mounting for armed guards to protect scabs, and an impending visit by President Roosevelt, growers were forced to settle with the JMLA. The JMLA success reverberated across the state and was widely reported in newspapers. It challenged the idea that agricultural workers were impossible to organize, "establishing a basis for interracial action, and inaugurated a struggle that would grow over the next century" (Street 2004a:465) No trade union would accept Japanese or Mexican farm workers into their ranks despite their victory. In addition, many problems concerning the equitable allocation of work contracts surfaced. More importantly, graft among the union's labor contractors quickly eroded the support of members. As a result, the union dissolved by the next year. Japanese farm workers continued to expand their role in California agriculture in subsequent decades under the leadership of gang bosses or *keiyaku-nin*, while Mexicans, Sikhs, and other minorities also generally resorted to independent negotiations to improve their wages and working conditions. Yet, the possibility of organizing the multiethnic agricultural work force was now part of the broadening landscape of labor relations.

The International Workers of the World (IWW) was the first national labor organization to take up the cause of agricultural workers in a concerted fashion, although their efforts fell far short of embracing minorities. Often called "Wobblies," the revolutionary organization of IWW members contrasted sharply with those of other powerful national trade organizations like the American Federation of Labor (AFL), which sought to work within the system. Appealing to crowds of transient or seasonal laborers who sought work in cities to tide them over between harvests, IWW soapboxers, as they were called at the time, began to organize agricultural workers and other unskilled laborers at the bottom of the wage scale starting in 1908. "By the summer of 1910, IWW halls were serving as homes to hundreds of bindlemen, or migrant laborers in every city and agricultural district of California" (Street 2004a:602) Nothing scared farm owners more than the idea of a broad-based union comprised of bindlemen, Mexicans, and Asians.

A showdown of major importance took place in Fresno in 1910 and 1911 (Street 2004a:604–615). Fresno Police Chief Shaw banned speaking on public streets due to the mounting success of IWW efforts to organize railroad and agricultural workers there. IWW soapboxers defied the ban and went to jail in ever-growing numbers starting in the fall of 1910. As IWW Local 66 continued to rally support from transient workers, Fresno citizens became more aggressive. The police chief encouraged vigilante action and took no measures to stop violence against IWW speakers.

Despite such provocations, IWW soapboxers bravely continued to speak. The Fresno jail became so overcrowded the sheriff refused to accept more by February 1911. Wobblies continued to stream into town. Their presence assumed an ominous tone due in part to IWW support of Mexican revolutionaries who won several skirmishes against government troops in Mexicali. On the last day of February 1911, the Wobblies negotiated a decisive victory with city officials and a citizens' group. This negotiated agreement freed jailed speakers and established their right to speak in public on the condition that IWW members cancel an impending demonstration and that those members who could not find work would have to move on.

While the IWW delegates always stressed non-violent resistance; the Fresno action firmly established their revolutionary credentials. Their newsletter, the *Industrial Worker,* also blatantly encouraged sabotage of farm machinery, work slowdowns, and other measures that changed the character of the struggle between agricultural workers and employers. In addition, workers had many grievances other than just poor wages. They often had to live in squalor, were paid in scrip that only overpriced company stores redeemed, or had their pay docked for room and board. The IWW was also active in Northern California organizing agricultural, lumber, and dockworkers. As living conditions deteriorated at farms, labor agitation increased culminating in the largest strike at the time in California history. What followed mirrored the growing concerns of all workers, including women and children laborers, across the county, state, and country. An attempt at local organization of migrant laborers ended in bloodshed and failure on the Durst hop ranch in Wheatland, California, on 13 August 1913, resulting in a bloody confrontation, as described in the following quote (Street 2004a:624–625):

> When the toilets overflowed, drinking water became befouled, a system of wage holdbacks was instituted, and only a third of the twenty eight hundred hop-pickers, including many families with women and children, could get work. After walking out in the largest strike of farm workers in California history, the pickers gathered with job delegates [IWW representatives] to debate what to do. At that point, Yuba County sheriff's deputies and the district attorney arrived on the

> scene. A brief and violent riot broke out, there was a shoot-out, and two hop-pickers, the deputy district attorney, and a deputy sheriff died of gunshot wounds. After the pickers fled, the National Guard arrived to impose order and California police conducted a dragnet and arrested dozens of suspects. Two strike leaders were later tried and convicted of murder and inciting a riot and sentenced to twenty years in San Quentin Prison. During the subsequent decade-long struggle to free them, bindlemen and their allies marshaled their discontent and challenged California agriculture on an industry-wide basis for the first time.

The Wheatland Hop Riot showed, almost overnight, “that San Francisco unionism was not the sum total of her [California’s] labor problem” (Parker 1915:110). The riot, according to Carleton H. Parker, a young economist that served as the secretary to the Commission of Immigration and Housing of California, “brought the state to some degree of self-realization” (Parker 1915:114) Parker concluded, “The most import result of the riot was the study of the economics of the labor field” (Parker 1915:115) The California Commission on Immigration and Housing specifically formed because of the Wheatland Hop Riot. The commission produced an advisory pamphlet the following year with recommendations for improving work camps (California Commission of Immigration and Housing [CCIH] 1914). Among other recommendations, they suggested minimum standards for the square feet of space allocated per worker in dwellings, ventilation, the location, design, and number of toilets required to serve a given population, standards for potable water supply and trash disposal, and other related specifications (Figure 44). While labor instability existed in some of the state’s larger farms, other smaller farming operations continued to flourish without any disruptions in production due to labor unrest.

Labor actions did provide the impetus for progressive legal reforms and gradual improvements in working and living conditions for California workers, including those laboring on the state’s many farms and ranches. For example, California’s first eight-hour workday law was passed in 1908 and expanded three years later to cover women and children (Foster 1994:4–21). The Wheatland Hop Riot changed the character of agricultural labor relations, precipitating a new episode of violence and class warfare. While the labor strike in Wheatland resulted in some positive changes to working conditions for migrant workers, the labor struggle among agricultural workers persisted through the much of the 20th century.

The Commission produced an advisory pamphlet the following year with recommendations for improving work camps (CCIH 1914). The pamphlet suggested minimal standards for the square feet of space allocated per worker in dwellings, proper ventilation, the location, design, and number of toilets required to serve a given population, standards for potable water supply and trash disposal, and other related improvements (Appendix E).

During the 1930s a number of labor strikes caused instability and work stoppages. From the cotton fields of the San Joaquin Valley to the berry fields surrounding El Monte in the Los Angeles Basin, workers began organizing largely spurred on by labor organizations such as the Agricultural Workers industrial Union (CAWIU) (Wollenburg 1972:155–164). In subsequent

Figure 44. Depression Era migrant camp in Sacramento, ca. 1935. (Migrant Labor Camp Photographs from the Harry Everett Drobish Papers, BANC PIC 1954.013:48—PIC, courtesy of The Bancroft Library, University of California, Berkeley, public domain.)

years the government became more involved in suppressing labor actions that sought to better the conditions of agricultural workers. Nevertheless, some efforts emerged to curb the worst abuses of farmers and other employers that operated work camps.

Not surprisingly, California agricultural labor relations also witnessed frequent, widespread, and often violent disputes. During the upsurge of farm labor organizing of the 1930s, which erupted in 150 labor disturbances throughout the state, strikes in California's cotton fields drew more workers on a larger scale than those in any other crop in the state. In 1933 alone, an estimated 50,000 farm workers participated in 37 labor disturbances, culminating in October when 18,000 cotton pickers went on strike in the San Joaquin Valley (Vaught 1999:4–6). The massive San Joaquin cotton strike of 1933, which was followed by other strikes in 1938 and 1939, was an event of national significance and ranked among the largest and bloodiest strikes ever witnessed in American agriculture (Musoke and Olmstead 1982:395–396).

Industrialization and Labor

The progressive development of mechanized agriculture during the 1940s had an enormous impact on California's agricultural work force. Spurred in part by the early consolidation of arable land into huge farms and ranches, California was at the forefront of efforts to intensify agricultural productivity and maximize profits. Although agricultural workers were among the lowest paid workers in the state, company housing, steady work, and the low cost of goods and services made agricultural work attractive through much of the 20th century.

Fluctuations in the labor supply and organized strikes, as well as regional and national economic trends, strongly influenced agricultural wages. When labor was in short supply, workers could demand higher wages and "vote with their feet," choosing other employment. High unemployment reversed the dynamic in favor of employers. As a general trend, however, agricultural employers had to compete with the increasing concentration of jobs in urban areas.

In the century following the annexation of California by the United States, those living in rural areas dropped from 59 percent of the population to just 29 percent, according to the federal population census. Agricultural employers used a variety of tactics to limit labor costs and reduce the uncertainties associated with fluctuations in the labor supply. Some of those tactics involved efforts to artificially increase labor supplies and suppress organized labor, in part through hiring transient or seasonal laborers.

The other way farmers reduced labor expenses and sought to increase their profits was by transforming production from traditional smaller family-run approaches to larger ventures predicated on an industrial model that stressed efficiency and the maximization of profit. The mechanization of the agriculture industry also meant intensified production using machines, irrigation, soil amendments, and pesticides.

Large-scale mechanization came into use for some of the most labor-intensive tasks in agriculture such as tilling and harvesting. Over time, the invention of new machinery emerged to carry out virtually every agricultural task that was previously dependent almost solely on manual labor. While California agriculturalists appear to have been more willing to invest in new equipment as compared farms in other areas of the United States, initially only the largest farms could afford such mechanized approaches. Yet, the market dominance of large producers, combined with rising wages, and market competition that resulted in a wide variety of choices of equipment, eventually led most farmers to follow suit. Investments in machinery, irrigation, soil amendments, and pesticides all began to escalate significantly after the turn of the 20th century as this industrial approach came to dominate the marketplace.

The mechanization of agriculture had several noteworthy impacts on California farm and ranch workers. First, less labor was needed to produce a given amount of food. For example, combined harvester machines pulled by teams of horses or mules had by the 1890s reduced grain harvesting and threshing crews from twenty-one or more to as few as three or four men (Street 2004a:224–225).

While human labor was still required for many farm tasks, that work began to decline as a proportion of all employment in California after the turn of the century. The dangers inherent in farm labor also increased greatly as farmers adopted mechanized approaches, and workers and farm owners both faced serious physical injuries or death. Soil amendments and pesticides have known health risks, although symptoms were not always immediately apparent. Industrial safety standards and recourse to health care and disability benefits would take many years of struggle to establish, and some workers still lack those benefits today.

The operation of agricultural properties also had a number of other effects on hired workers. Agricultural work gradually changed from the flagrant abuses and paternalism of the Mission and the early American period to a subtler exploitation based largely on wages. Jobs became more contingent and agricultural workers more replaceable, creating a wandering work force of unprecedented proportions. Ethnic diversity within that work force was sometimes used as a wedge to pit one group against another, by conferring better wages or benefits on some groups, while paying less to others. Those groups beleaguered by public discrimination often received the lowest wages because they were the most desperate for work. The more industrialized farms separated the work force into a hierarchy of positions that received different pay and duration of work assignments.

Cesar Chavez and the Farm Worker Movement

This post-War period of inequality, poor conditions, and injustice led to the formation of the Farm Workers Union, led by Cesar Chavez. Chavez was raised in an itinerant family, living the life of a migrant workers child, attending over 30 schools before dropping out in seventh grade to go to work full time. He joined the Navy, serving in Korea. After his service he became active in union organizations and in 1962 he was working as a laborer in Delano and started the National Farm Workers Association. He aligned his new group with civil rights groups liberal clergy, and the striking Filipino Grape Pickers who were members of the AFL-CIO Agricultural Workers Organizing Committee. Chavez had much sympathy for the farm workers and supported them through activities and rallies against grape farmers in San Joaquin, Imperial, and Coachella valleys (Figure 45). The United Farm Workers Organizing Committee (UFWOC), formed by Chavez in 1966, joined his followers together with the Filipino group into one large union. As part of the UFWOC he led a long strike, or *huelga*, with intense passion. In early 1968, Chavez called for a national boycott of California table grape growers. Chavez's battle with the grape growers for improved compensation and labor conditions would last for years Once the grape strike was successful, he turned his attention to lettuce workers, leading a comparable strike for lettuce pickers in Monterey County (Hart 1978).

Chavez's fervor and passion won the support of other labor organizers, such as Dolores Huerta and Gil Padilla, was well as actors and playwrights. Luis Valdez, a Delano native and well-known playwright, returned to Delano to support the grape strike and founded Teatro Campesino, a traveling troupe. His plays were staged on the back of flatbed trucks, traveling over a 450-square-mile area of vineyards in Tulare and Kern counties and were used to amuse, entertain, and motivate the strikers. After several years of work, protests, and strikes, and with the assistance of such legal and political luminaries as Rose Bird, Philip Burton, and Jerry Brown, the Agricultural Labor Relations Act was passed by the state legislature and signed by Governor Brown, giving farm workers the right to have secret ballot elections for the union of their choice, or if they so choose, for no union representation.

In many ways Chavez's efforts were much more than establishing the rights for workers to vote for a union. He instilled pride and a sense of community in Mexican Americans and demanded recognition from the larger, white population base in California. Deeply religious, he drew on a collective faith, yet accepted non-Catholics into his fold. When he was chastised by the Catholic church for accepting aid and support from the Presbyterian and Protestant Migrant Ministry organizations, he observed that the Ministry gave much needed aid to his parents and other

Figure 45. United Farm Workers' Strike, 1965. United Farm Workers striking in 1965 in Delano at the edge of a Central California grape field. (Los Angeles Times Photographic Archive, California Cultures, uclamss_1429_b560_230496-1, courtesy of the Library Special Collections, Charles E. Young Research Library, UCLA.)

farm workers and their assistance was welcomed. The underlying religious roots of the strikes and his movement were evident in a 1966 march from Delano to Sacramento. The march was about recognition of the UFW union as a representative organization with legitimate rights to speak for farm workers. It transformed quickly into a pilgrimage to bring attention to farm workers and to gain recognition from white Americans and politicians on the importance of Mexican American community in the state. The march was held during the holy season of Lent and the slogan was purposely designed as a reminder of the many pilgrimages that have occurred over the century: "*Peregrinacion, Penitencia, Revolucion*," "Pilgrimage, Penitence, Revolution." (Ferriss and Sandoval 1997).

Chavez's work to form the UFW union, his protest marches, speeches, and rallies, took place during a time when civil rights movements were underway across the nation. His platforms were often community halls, Spanish-language theaters, or flatbed trucks. He took his message to the workers, visiting farm after farm, encouraging them to be courageous and strike for their rights. The UFW logo, the symbolic thunderbird, was colored white for hope, black depicting the plight of the workers, and red for the sacrifice required by them to acquire their rights. He was strong in his convictions and not afraid of adversity. As a labor leader, Chavez employed nonviolent means to bring attention to the farm workers. He led marches, called for boycotts and went on several hunger strikes. He also brought the nation awareness of the dangers of pesticides to workers' health.

Chavez gained support from unlikely allies, including the United Auto Workers Union. The Filipino Hall in Delano was often used as a headquarters and was visited by numerous politicians and dignitaries who came to see Chavez. His dedication to his work earned him numerous friends and supporters, including Robert Kennedy[4] and Jesse Jackson[5]. In 1970 he was arrested during the lettuce strike and was held in Monterey County Jail in Salinas. He embarked on a hunger strike to draw attention to his cause and to gather support. Candlelight vigils attracted supporters from around the world who gathered on the lawn of the jail. During his incarceration he was visited by Ethel Kennedy, the widow of Robert Kennedy.

Chavez's movement and the formation of the UFW changed the face of California agriculture, creating better working conditions and drawing attention to the inequalities found in the farms and ranches of the state. Chavez's battle with the grape and lettuce growers for improved compensation and labor conditions would last for years. At the end, Chavez and his union won several victories for the workers when many growers signed contracts with the union. He faced more challenges through the years from other growers and the Teamsters Union. All the while, he continued to oversee the union and work to advance his cause. Chavez passed away in Arizona in 1993, with the numerous hunger strikes he had endured for the cause weakening his health and contributing to his death. In 2014, President Barak Obama named March 31 as a day to commemorate Cesar Chavez and his work to create change in the lives of migrant farm workers and created a National Monument and National Historic Landmark at Chavez' home and UFW headquarters in Keene, Kern County.

PART II: THE DIVERSIFICATION OF CALIFORNIA AGRICULTURE

The following are summaries of specific agricultural industries in California that had a marked change upon the state's physical and cultural landscape. These agricultural industries are categorized and treated in culinary rather than botanical terms. Botanical terms and concepts are only referred to when they may better inform or add insight.

From asparagus to tomatoes, lettuce to broccoli, nuts to orchard fruits, farmers dedicated to growing a particular crop faced many challenges, including labor shortages, disease, market fluctuation, drought and floods. Archaeologists and architectural historians studying agricultural properties are encouraged to conduct crop-specific research to understand the processes and market production history, and to better identify any physical remains that characterize the specific crop.

[4] https://www.biography.com/people/robert-kennedy-9363052

[5] https://www.biography.com/people/jesse-jackson-9351181

Grain and Feed Crop Industry

California's earliest agricultural industry after 1850 centered around the production of grains. While the initial emphasis was placed on wheat and barley, other grains soon followed. The following discussion outlines the grain and feed crop industry that was a focal point of California's agricultural scene for decades.

Wheat and Barley

Much of the literature discussing California's early agriculture focuses on the production of wheat. Wheat became the principal crop of California's farmers in the mid-19th century and propelled the state's economy for decades. By the mid-1850s, according to Olmstead and Rhode, "the state's wheat output exceeded local consumption, and California's grain operations began to evolve into a form of agriculture quite different from the family farms of the American North" (Olmstead and Rhode 1997). Barley and wheat derive from the same crop and are processed differently but both were important to California agricultural development in the 1850 and 1860s. The production of wheat and barley in California not only influenced new technologies in the state, such as gang plows, large headers, and combines, but also established a world market for these products.

Wheat's preeminence in California during the 1860s and 1870s influenced the scale of farms, and often resulted in absentee land ownership, mechanization, and increased debt (Jelinek 1982:39). John W. Powell traveled throughout the west in the 1870s and noted that the arid land and limited rainfall that characterized the region required a change in the agricultural approach. He believed that no single family could do all the word required in this climate and advocated cooperative communal farming on vast acres of land (Olmstead and Rhodes 1997).

In California, these "bonanza farms" covered 1000s of acres and employed large numbers of wage paid workers. In the 1870s California's wheat and grain was grown on bonanza farms, with little need for labor except at harvest and plowing times (Figure 46). Some bonanza farms set the precedent for integration into world markets, mechanization, large irrigation systems, and reliance on hired labor during planting and harvesting times. These patterns of mechanized farming and hired labor on vast tracts became synonymous with California's farm industry as crops became diversified (Olmstead and Rhodes 1997).

The completion of the Transcontinental Railroad in 1869 formation of the bonanza farms, and the introduction of new technology in the 1870s, particularly mechanical equipment such as threshing machines that improved production and made rather infertile land suitable for wheat production, resulted in a major wheat boom (Rothstein 1985:4). At least 25 varieties of wheat were exhibited at the Third District Agricultural Association Meetings in California in 1880. The Third District included Sutter, Yuba, Butte, Colusa, Tehama, Yolo, and Sacramento counties. Sutter, Butte, Colusa, and Yuba counties were credited with producing 8,867,356 bushels of the 17,451,181 bushels reported by the assessor's offices in California in 1880 (CSAS 1881:268–269).

As of 1889, California had approximately 3.5 million ac. dedicated to wheat production, most of it in the Central Valley. Wheat had begun to decline in the 1880s, however, as a result of soil

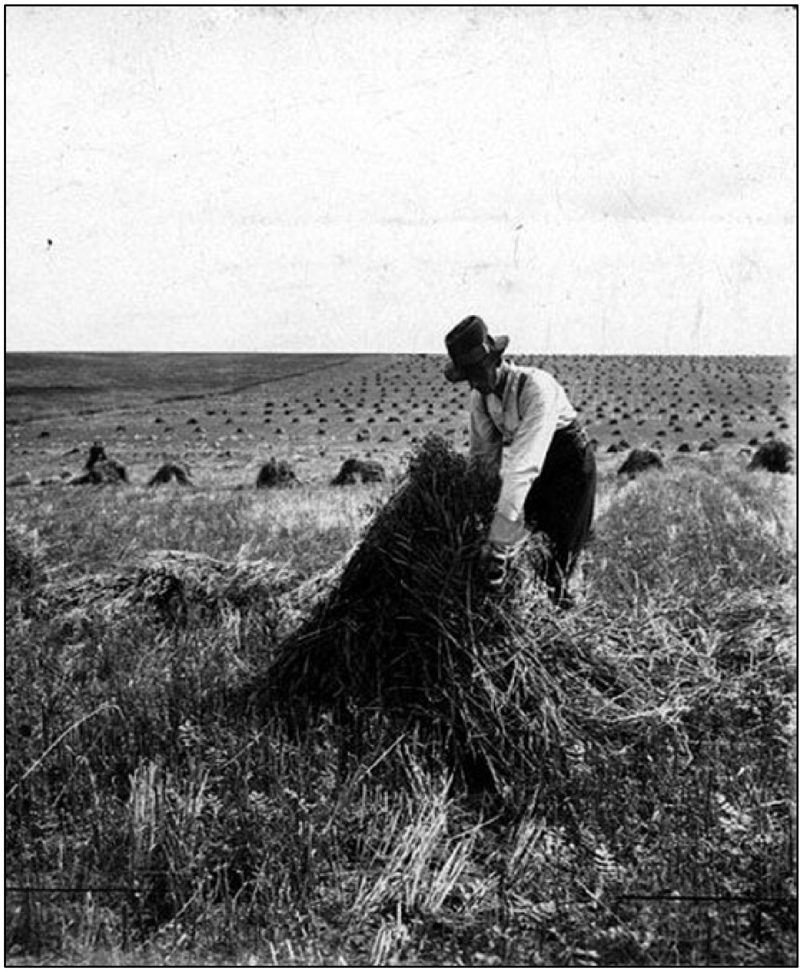

Figure 46. Hand-stacking wheat ca. 1920s. (Keystone-Mast Collection, KU45933, UCR/California Museum of Photography, courtesy of the University of California, Riverside.)

depletion. By the 20th century, wheat production plunged by 76 percent and total acreage fell by 50 percent. This abrupt shift left thousands of acres of land idle, and much of this land was infertile due to over-production with very little thought given to crop rotation or the use of fertilizers to enhance the crop yields (Olmstead and Rhode 1997:3).

Alfalfa

According to historian Robert Santos:

> Alfalfa came to California from Chile in 1851 and was called “Chilean clover.” In 1851, W.E. Cameron had planted several hundred acres of alfalfa along the Yuba River near Marysville. Alfalfa became particularly adaptable to California’s climate and soil. When irrigated the plant is quite productive [Santos 1995].

According to Olmstead and Rhode (1997:4), between 1859 and 1929, because of irrigation, increased production of alfalfa, and mechanization, the number of farms increased about seven hundred percent (Figure 47). "The average size of farms dropped from roughly 475 ac. per farm in 1869 to about 220 ac. in 1929, and improved land per farm dropped from 260 ac. to about 84 ac. over the same period. Irrigation followed in concert with intensification and diversification of California farms. By 1929, nearly 16 percent of California's farmland had some form of irrigation (Olmstead and Rhode 1997:4).

Figure 47. Michael Eltiste & Son Agricultural Implement Store, store interior, Orange County, 1910. (Local History Collection, courtesy of the Orange Public Library & History Center, Orange.)

Hay

Because of the vast numbers of livestock imported into California during and after the Gold Rush, the demand for forage crops such as hay outstripped the supply available (Figure 48). While the Central Valley concentrated on the lucrative wheat market, mountainous counties, such as Mendocino and Siskiyou, produced the highest tonnage of hay during the 1870s. In Mendocino County, 75,000 ac. went to hay, and production rose to 137,000 tons in 1870 to 1871 (CSAS 1872:392).

Material Remains Associated with Grain Crops

Types of material remains associated with grain production include plows for cultivation and planting, shelters such as barns, farrier facilities associated with draft animals, harvesting machines that evolved over time, and silos and granaries for product storage. Properties that produced grain and forage crops typically n required seasonal or temporary laborers who may have lived in temporary camps, served by traveling food wagons, or in more permanent housing near the core residential area of farms or ranches.

Figure 48. Haystacks and hay wagons in Kings County area, ca. 1880s. (San Joaquin Valley & Sierra Foothills Photo Heritage, kia0141, courtesy of the Kings County Library, Hanford.)

Rice Industry

The need to bring rice to California first became a concern among farmers in the 1850s due to Chinese immigrants' heavy reliance upon rice in their diet, most of which was imported from China. The average price for imported rice at this time was seven cents per pound. In 1856, farmers could make two-and-a-half cents per pound of wheat and two cents per pound of barley and oats, while rice provided a return of three to four cents per pound (Willson 1979).

Some of the earliest attempts to promote rice growing in the state occurred in the late 1850s and early 1860s when the California State Agricultural Society offered four prizes at the annual state fair in Marysville for the farmer who could grow the best ¼ ac. of rice. Despite the monetary awards being offered ($25 plus a commemorative plate for first place), no one produced rice for the competition.

A second impetus for the growth of rice farming in California was the decline in wheat harvesting during 1890s, which hit the region between the Feather and Sacramento rivers particularly hard. Willson states that, "Warehouses in the small towns of Biggs, Gridley, Nelson, and Durham that had once been bulging with wheat ready to be shipped to some faraway markets were virtually empty" (Willson 1979:26).

Before 1900, however, attempts at rice cultivation failed due to lack of knowledge on how to grow rice, heavy soils, and the short growing season (Swartzlow 1965:4; Willson 1979)

W.W. Mackie, an agronomist at the University of California conducted rice growing experiments in the overflow land of the San Joaquin Valley soon after 1900 and enlisted the aid of local ranchers in Butte, Sutter, and Glenn counties to conduct rice growing experiments at their ranches (Willson 1979:36). On one Butte County Ranch in 1908, for example, 275 different varieties of rice were grown on a 40 ac. plot of land (Mansfield 1918:356). The expertise of several Japanese immigrants, most notably Tokuya Yasuoka and Kenju Ikuta helped contribute to the success of these early rice growing experiments (Garone 2011:108).

Ernest L. Adams, known as the father of rice in California, established an agronomy station at Biggs in 1912 and conducted experimentation on rice crops for the U.S. Bureau of Plant Industry (Figure 49). He used a 57 ac. plot donated by the Richvale Land Colony to set up the Rice Experiment Station and initiated a research program. While in Biggs, he developed the calora and colusa rice varieties that are the best suited for California growers (Swartzlow 1965:5). In 1912, 1,300 commercial acres of rice were seeded in California, 1,000 of which were in Butte County and the remaining in Colusa and Sutter counties (Garone 2011:108). The following year, over 6,000 ac. of rice were grown in California, 5,000 of which were in Butte and the rest in Colusa and Sutter counties (Garone 2011:108). This increased ten-fold over the next three years, with 67,000 ac. of rice being irrigated in California (Robertson 1917:270). Adams resigned in 1918, grew his own rice, and developed the idea to control watergrass and weeds by submerging fields at planting time (Swartzlow 1965:5). From 1918 through 1941, California rice acreage was maintained between 100,000 and 150,000 ac. a year (Garone 2011:5).

The emergence of irrigated land companies and local ditch companies in the early 1900s spurred the development of rice farming. Companies like Pacific Gas and Electric Company and San Joaquin Valley Light and Power helped finance the construction of large irrigation reservoirs in exchange for the power that they generated. Local farmers formed corporations in order to purchase and operate the lateral canals that fed their lands from the main canals of the canal companies (McGee 1980:15). Disputes over whose responsibility it was to maintain the ditches frequently arose.

With the growth and development of rice farming and the need to manage water rights came the formation of rice growers' associations. Early problems tackled by local rice associations included building sufficient rice storage facilities; difficulties in the delivery of irrigation and water rates; and the drainage problems associated with rice cultivation (Willson 1979:191). Rice growers' associations often provided the following services to their members: rice seed cleaning; furnishing and servicing hardware items such as bolts and tractor parts; fuel storage, and fertilizer and chemicals for farm use (Willson 1979:192).

Farmers became increasingly frustrated with the frequent raising of water rates by private and corporate-owned canal companies. This frustration led to a trend from the 1920s through the 1950s of farmers buying out canal companies with voter-approved bonds and organizing their own water districts (McGee 1980:14; Windmiller et al. 2011:26). By owning their own districts, farmers had more control over the distribution of water and could set their own water rates on

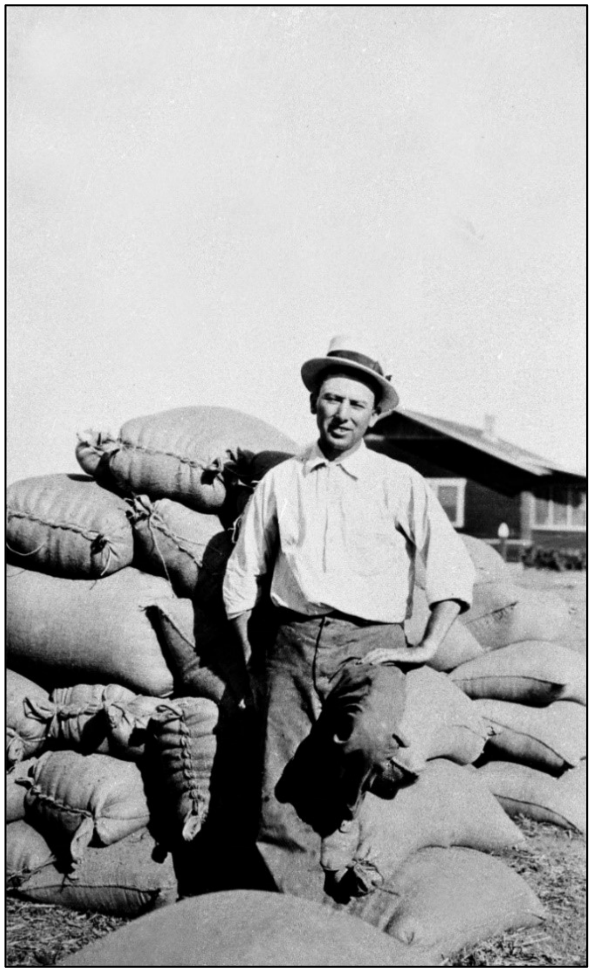

Figure 49. Ernest L. Adams at the Rice Experiment Station in Biggs, ca. 1920. (Courtesy of the California State University, Chico Special Collections.)

a non-profit basis. Today, small farmer-owned water and irrigation districts remain in operation throughout rice growing counties, managing the water needed for rice and other crops and maintaining reasonable water rates.

Technology also aided the development of rice farming. In 1919, low-flying biplanes were used to frighten off waterfowl that fed on the rice seeds. Fitted with extra-heavy propellers, they could fly through flocks of ducks and geese without having their blades shattered. Ten years later, two airplane fliers discovered that rice could be seeded by airplane at a rate ten times faster than ground machinery, raising the capacity from 5 to over 50 ac. per day. This new technique eliminated the problem of birds devouring seed before water could be released into the fields (Garone 2011:109).

In 1939, the Richvale Rice Drier was constructed (Figure 50). Designed by George Hurst and funded by a partnership of Richvale rice farmers—Glean Harris, Ralph Carlson, Henry Rystrom, and Roy Parsons, it could handle 400,000 pounds per day. The rice drier was made of 18 wood

Figure 50. Richvale rice drier, 1951. (John Nopel Photograph Collection, Richvale Rice Dryer, sc50932, Meriam Library Special Collections, Courtesy of the California State University, Chico.)

laminated bins, each with a storage capacity of 150,000 pounds, including receiving bins (where bags of rice could be converted to bulk), storage bins (for drying; a process taking 42 hours), and holding bins (where rice was moved until it was sacked and stored for market). Construction of the Richvale Rice Drier led to the implementation of a system that allowed for co-mingling of similar varieties of rice and the development of a multipass (multiple passes through the rice drier) with interim tempering (time between passes) that later became the standard for the California rice industry (Willson 1979:187).

Fruit and Nut Industry

The antecedents of California's citrus, olive, fig, and grape industries began during the Spanish and later Mission Period. The introduction of thousands of new species of crops by the late 19th century transformed California's agriculture. "Between 1890 and 1914, the California farm economy swiftly shifted from large-scale ranching and grain-growing operations to smaller-scale, intensive fruit cultivation" (Olmstead and Rhode 1997:3). Truck farms, the equivalent of today's farmers market participants, became prevalent in some areas of California, like Santa Clara County (Figure 51). By the 1910s, California emerged as the world's principal producer of grapes, citrus, and a wide variety of other fruits (Figure 52). Along with the diversification of crops came allied industries, such as canning, packing, food machinery, and transportation services (Olmstead and Rhode 1997:3).

Figure 51. Japanese American farmers working on a typical "truck farm" in Florin, near Sacramento, early 1900s. Many Japanese immigrants planted grapes and strawberries in Florin. They learned about the shallow soil and, by planting grapes between rows of berries, they insured two crops annually. (Japanese American farmers working on farm in Florin, JC17:112, n.d., Japanese American Archival Collection, JA 1, Box 6, Folder 147, Donald & Beverly Gerth Special Collections & University Archives, courtesy of the University Library, California State University, Sacramento.)

Pears, cherries, plums, prunes, peaches, apples, figs, apricots, nectarines, and grapes were planted beginning in the 19th century. Most homesteads had a small orchard for personal or commercial use. Typically, apples, pears, plums, cherries, and peaches were planted. A. P. Smith began one of the state's first nurseries in 1849 on 50 ac. several miles north of Sacramento. In 1850, Smith planted pears, which he exhibited at the state fair several years later (Butterfield 1938:4). Nurseries developed in San Jose, Alameda, Napa, and Stockton by the mid-1850s. Charles Reed started a nursery in Sacramento in 1855 and introduced 20,000 fruit trees and a quantity of fruit seed. In 1856, he had one million trees in his nursery (Butterfield 1938:5).

By 1859, California had a reported 212,650 pear trees planted. By 1930 over 728,000 fruit trees had been planted in Sacramento County alone (Butterfield 1938:5); Courtland became known as the pear capital of the world at that time. The pear blight of the 1950s, however, virtually wiped out the state's pear industry. El Dorado County, for example, produced 52,000 tons of pears in 1958; this number was reduced to only 8,435 tons by 1965, forcing farmers to turn to other crops.

Figure 52. Agricultural exhibit for Tulare County at the San Diego Exposition, 1915. Note the effort that went into arranging the exhibit and the indication of the importance of agriculture in the state during the period. (The San Joaquin Valley Digitization Project, San Joaquin Valley & Sierra Foothills Photo Heritage, tca0006, courtesy of the Tulare County Free Library, Annie R. Mitchell History Room, San Joaquin Valley Library System, Fresno.)

By the 1870s, California exceeded most other states in orchard-related crops. In 1870 to 1871, Santa Clara County alone had planted 1,107,840 apple trees, in addition to 83,650 peach trees, 75,260 pear trees, 25,890 plum trees, and 20,430 cherry trees (CSAS 1872:392). In 1889, California reportedly distributed 780,000 boxes of fruit to various markets. Only 30 years earlier, the United States imported almost all of its citrus produce (CSAS 1890:194–195).

Regional variations among orchard crops were a result of demand, adequate soils, available technology, and irrigation. For example, Napa County earned a reputation as a cherry producer until growers noticed that cherries ripened earlier to the south, resulting in a gradual shift towards the Vacaville area (Butterfield 1938:8). Farmers in the Beaumont area in Riverside County began planting cherries by 1912, aided by successful irrigation efforts. By the early 1960s, over 40 groves were located in this region (Thomas and Castells 2019).

While production of fruit, such as cherries, was largely successful, marketing the product was fraught with difficulties, particularly in transporting perishable goods to market, until efficient rail service became available. During the early 1900s, persimmons, raisins, apricots, nectarines, quinces, and pomegranates gained importance as California’s orchard industry expanded.

The Citrus Industry

The Spanish reportedly planted 400 citrus seedlings on 6 ac. around 1804 or 1805 at San Gabriel Mission (Gonzalez 1995:18). Following secularization of the missions in the 1830s, William Wolfskill acquired some of the surviving trees and replanted them on his property in Los Angeles (Gonzalez 1995:19), where he established the first commercial citrus orchard in California in 1841 (Ontario, City of 2007:8).

By the early 1870s, several citrus orchards had been established in Southern California. Riverside, for example, began growing oranges in the 1870s, after promotional literature advertised a "Colony for California." The first orange trees were planted here in 1871. Within a decade Riverside was known as a citrus center, famous for its Washington navel oranges. Riverside's orchards thrived due to a dependable water source—gravity-fed irrigation systems that transported water from the Santa Ana River to the orchards via two canals. By 1882, half of California's estimated 500,000 citrus trees were growing in Riverside. The industry was so successful, that in 1893 the Riverside area became its own county, formed from parts of San Bernardino and San Diego counties (George and Hintzman 2020; Figure 53).

Figure 53. Irrigating Oranges near Riverside, 1902. (California History Section Picture Catalog, Prints & Photographs Division, STEREO-2787, Courtesy of the Library of Congress, public domain.)

The increasing numbers of trees in Riverside County led to a greater need for water. The waters of the Santa Ana River were again tapped, and major canal systems were built, primarily by Chinese laborers, who established Chinese quarters in many of the small farming communities in the region. These hand-dug canals and expansive network of irrigation ditches were major contributors to the continued success of the industry (George and Hintzman 2020).

Along with the success of the crop, came the need to facilitate getting oranges to market. Thus, railroads routed several main and branch lines into the heart of the orange country. Packing houses, ice plants and storage areas were established along the railroads, leading to more growth. By the late 1890s, aided by refrigerated railroad cars and innovative irrigation systems, Riverside had become the state's wealthiest city per capita with over 12,000 ac. planted in oranges in the county (George and Hintzman 2020).

Southern California citrus growers formed a cooperative in 1893 called the Southern California Fruit Exchange, renamed the California Fruit Growers Exchange two years later. They adopted Sunkist as their brand in 1907. The cooperative became known as Sunkist Growers in 1952 (Sunkist Growers, Inc. n.d.).

Citrus had become the state's principal agricultural product by the 1930s was the predominant product of the Southern California economy (Gonzalez 1994:6), though it also extended to central and northern California.

The state's citrus production peaked during World War II and then declined when urbanization and sprawl began moving east from Los Angeles, aided by construction of new freeways and leading to the removal of citrus trees to make room for new developmental opportunities The Southern California tract housing building boom in the 1950s and early 1960s demolished the orange groves of San Fernando Valley. According to Nadeau (1977:401–404), tract home communities that expanded in San Fernando Valley were chiefly responsible for the growth of the city of Los Angeles from 1.5 million just before the war to 2.5 million by 1960.

Development then spread east, nearly reaching San Bernardino, and south along the coast. Orange County, which had been largely an agricultural region before the war, suddenly became the fastest growing county in the nation with the population quadrupling to 710,000 people following World War II, and vast rows of orange trees giving way to rows of tract homes. This expanding network of suburban and urban developments, such as Anaheim, Tustin, and Garden Grove in Southern California, engulfed the small citrus related villages. Housing replaced the orange groves so swiftly that for the first time in decades Los Angeles lost its place as the number one agricultural county in the nation, and relinquished to Florida the leadership in the citrus industry (Gebhard and Winter 1985:23; Gonzalez 1994:56–68; Nadeau 1977:401–404). By the end of the 1960s, only areas far beyond the reaches of Los Angeles, such as Owens Valley and the Mojave Desert, contained communities reminiscent of the small-town America that prevailed in the region before World War II (Gebhard and Winter 1985:23). Today, citrus trees are planted in the Sacramento and San Joaquin valleys from Orland to Bakersfield. In addition, the citrus industry continues to thrive around Hemet and Jacinto (George and Hintzman 2020).

Plums and Prunes

The plum and prune industry in California has its antecedents in the late 18th century at missions, such as Santa Barbara, San Gabriel, Santa Clara, and San Luis Rey. Known as the "mission prune," plums grew at Santa Clara Mission as late as the 1870s. The first commercial plum production in California was reportedly at Seth Lewelling's ranch in Sacramento around 1851. The first plums imported to the ranch came from Valpariso, Chile, but by the early 1850s, over 18 varieties were grown, and that number doubled by the late 1850s (Butterfield 1938:9). The Santa Clara Valley became a center for plum production in the 1850s, and by 1859 a reported 105,631 plum trees grew in California. The first prunes grown in California were in the mission gardens, and the first prunes reportedly appeared on display at the California State Fair in 1863 (Butterfield 1938:10).

The Japanese plum first appeared in California in 1870, and Luther Burbank introduced other Japanese varieties in the 1880s. Plums, like other perishable fruit, were constrained to sales within a local market until the advent of railroads and refrigeration (Butterfield 1938:12–13). Regionally, plums were grown and sold in inland areas of southern Humboldt and northern Mendocino counties and in the Santa Clara Valley. Plums grew in ranches throughout the Sierra Nevada foothills by the 1920s. Like apples, plums are one of the most common species found in many homestead sites.

The Olive Industry

Like citrus and other fruits, California's olive industry has its roots in the Spanish missions. Mission San Diego de Alcala is credited with planting olives in 1769. The first written account of olives in California is found in the Biannual Report of 1803. Fermin Francisco de Lasuen, in preparing the report, noted that cuttings from San Diego had been successfully planted at other Southern California and that Mission San Diego de Alcala was producing good olive oil. By 1838, the two San Diego orchards combined supported over 400 trees (Clark 2008).

The discovery of gold in California in 1848 shone a spotlight on California. Journalists and authors visited the state, writing about the land of opportunity and extolling the promise of this new land. References to olives were frequent. Newspapers and lecturers across the nation in the 1850s often mentioned olives, along with grapes, figs, and citrus, as thriving crops in California. The promotion of the olive continued in the 1860s when reputable journals, such as *Scientific American*, compared California olive oil, pressed from crops in San Diego, San Gabriel, and San Fernando, with oils from Italy and Spain and found that the taste equaled Italian oils from Florence and surpassed oils from Seville, Spain (Clark 2008:140).

The promotion and romanticism surrounding olives continued throughout the 19th century, due in part to frequent reports published in the Los Angeles Times and other newspapers. For many years, the optimism surrounding the olive industry was greater than the reality. It took a decade or more to cultivate a productive orchard and olive presses were infrequent. In most years, the annual production of oil was low, with the product selling out within 90 days. This low supply and high demand led to more articles anticipating the importance of olives in the future and predicting that the fruit would play an important role in California agriculture (Clark 2008).

San Diego County was at the forefront of the 19th century olive industry. In 1867, Anastario Navarro leased the old mission orchards and began producing olive oil and pickled olives. In 1868 Frank A. Kimball visited the orchards and obtained cuttings from the 100-year-old trees. He went home to National City, planted the cuttings, and they thrived. Kimball became a leader in processing pickled olives and sold cuttings to other farmers interested in olives. In 1883, for example, he shipped over 50,000 cuttings, at one dollar each, to Los Angeles farmers (Clark 2008).

His main competitor was Ellwood Cooper of Santa Barbara. While Kimball focused on pickling olives, Cooper produced olive oil. In 1879 Cooper sold 1,000 gallons of his "Mission" oil during a single trip to San Francisco. Cooper welcomed visitors to his orchards and became well known.

While there were other olive farmers in the 1870s and 1880s, these were considered small cottage industries and were not as successful as Kimball and Cooper. By the early 1890s, Cooper and Kimball, both prolific speakers and writers, were the face of the industry nationwide. They published often, extoling the benefits of their products, and worked tirelessly to promote and draw attention to California olives. Kimball displayed his olives at the 1893 World Exposition in Chicago and the 1904 World Fair in St. Louis, successfully gathering new consumers to enjoy the oils and pickled olives.

Despite cautionary words published by the California Horticultural Society and University of California Agricultural Experiment Stations, by 1890 young olive orchards had been planted throughout central and southern California counites and even as far north as Redding, totally an estimated 90,000 trees. California olive oil was begin advertised across the nation as pure and unadulterated when compared to its European counterparts. Olives became synonymous with California agriculture, more than any other crop, with the industry centered around southern California (Clark 2008 138-144).

By 1900, competition within the olive industry was fierce, with major facilities operating in Fallbrook at Charles Pratt's Loma Ranch. Processing and packing plants, independent of growers, sprang up in old town San Diego, Fallbrook, Escondido, and San Fernando Valley. Low prices and international competition, however, were affecting the olive growers by 1903. Many San Diego farmers began converting their orchards to other uses, such as dairies. This loss was slow. In 1909, San Diego led California in numbers of acres planted in olives; by 1924, they had dropped to sixth place (Clark 2008; Rivers 1998).

Despite the gradual loss of olives in some counties, the large processing facilities continued to thrive. For example, the Old Mission Olive Works opened a major facility in Old Town in 1900 and by 1911 the facility covered an entire block. By 1905 the first "black olives" were being canned and olive production in southern California thrived. San Diego canneries alone produced 120,000 cans of ripe olives in 1906 (Clark 2008:147-153; Rivers 1998). By that time olives had been planted in Imperial, Kings, Tulare, Butte, and Los Angeles counties, in addition to San Diego and Santa Barbara counties. By 1910, Tulare County served as the center of production of canned ripe olives (Lazicki and Geisseler 2016).

This enthusiasm for olive products exploded during World War I, when olive oil and products from Europe were not available. Loma Ranch in San Diego for example, produced over 15,000 gallons of high-grade olive oil a year during this time, shipping the product across the nation.

Fallbrook and Loma became even more well known when the California Olive Growers Association chose the town as the site of their Mill #1. Today this mill still stands in Fallbrook (Rivers 1998).

After World War I ended the domestic market for olive products diminished, as imports from overseas picked up. In southern California, this decrease led to a major decline in olive production, with many orchards changing over to citrus, and mills, such as the Fallbrook Mill 1, becoming citrus and tomato canneries (Rivers 1998). In central and northern California, however, the industry thrived. The popularity of ripe, black olives had grown and canned olives outsold olive oil. In the next few decades Oroville, Palermo, and other Butte County orchards became known for the olives from Sevillano trees, as they were large. The “colossal” canned black olive became a favorite (Puzo 1993).

By World War II, olive farming was not profitable and the industry was on the decline. This situation changed with the onset of the war, when products from Italy, Greece, and France were once again unavailable. Many farmers began rehabilitating neglected olive orchards. This revitalized interest in olive oil ended after the war, as more and more Americans began using vegetable oil as a less expensive alternative. The end of the olive oil popularity was showcased in the mid-1950s, when the large Old Mission Olive Works building in downtown San Diego was demolished and replaced with the Caltrans District 11 building (Clark 2008). Today, an olive press is preserved and displayed in the Old Town San Diego State Park, attesting to the long history of olive growing and processing in that region.

While orchards specializing in olives specifically suited for oil production declined, in the 1950s and 1960s the olive canning industry continued to grow. With the water provided by state and federal irrigation projects, such as the California Aqueduct and the Central Valley Project, olive orchards were planted in central California, particularly Tulare County, focusing on canned olives. In 1978, California’s olive industry had its first 100,000-ton harvest and sold 10 million cases of canned olives. This number grew to 14.7 million cases by the early 1990s, an increased credited to the popularity of olives on pizza, leading to a high demand of use of olives in food and restaurant industry. California olives represent a $200 million industry in 1993 (Puzo).

In the early 1980s, olive oil began to be popular again, after decades of vegetable oil preferences. Most oil was imported from Italy or Greece, as California had abandoned olive oil production right after World War II. The growth of California’s olive oil industry received a boost from the growth of the winery industry. As a marketing endeavor, some wineries added olive oil presses, experimenting with flavored oils, marketed as “gourmet” items. Before 1970, oil represented only four percent of California’s olive products; by 2016, this number increased to over 60 percent (Lazicki and Geisseler 2016).

As of 2022, California is the only important olive growing state in the United States. The industry is now centered in the San Joaquin and Sacramento valleys, although other areas, like Santa Barbara, still produce as well. For over 100 years California has maintained about 30,000 acres planted in olives (Lazicki and Geisseler 2016), even with a shift in orchard locations from southern to central and northern California. These numbers began to rise in the early 21st century, as olive oil became known as the “healthy” alternative resulting in increased popularity. Today, older groves represent cuttings from the original mission groves, or varieties brought in from Italy, Spain, and France over 100 years ago. New orchards have varieties, such as the Abequina, more suited to modern planting and irrigation methods. While canneries and processing plants still operate, there has been a return to smaller, focused cottage industries, particularly affiliated with wineries. Today, Tulare County has expanded their acres and remains the leading producer of olives.

Peaches

Peaches enjoyed widespread popularity in California during the 19th and 20th centuries. During the 1790s, the Spanish planted peaches in mission gardens, such as Mission Dolores and Santa Clara (Butterfield 1938:14). The Russians reportedly planted peaches at Fort Ross in 1814 (Butterfield 1938:15). John Sutter planted peaches and nectarines in his Hock Farm orchards near Yuba City in 1851, and Seth Lewelling is credited with importing the first peach varieties to California for his Sacramento orchards. Three to four million peach trees reportedly grew in the state by the 1890s, and were a popular fruit grown in small family orchards on homesteads. A thriving peach economy operated in Hemet and the San Jacinto Valley by 1910 (Beedle with Earle 2005). By 1924 California had over 13 million peach trees.

The commercial canning of peaches occurred with increased planting and surplus inventories. The first peaches commercially canned were freestones and, later, clingstones. In 1886, 675,000 packed peach cases reportedly shipped from California. The total soared to two million cases by 1913, aided by the completion of the Hemet-San Jacinto Grower's Association Cannery in 1916. This facility hired 300 workers in 1916 just to process and can the local peach crop (Beedle with Earle 2005). Canned peach production and reached five million cases during World War II (Butterfield 1938:18).

Peach orchards developed along the east side of the upper Sacramento Valley between Marysville and Chico during the 1930s. Smittcamp Ranch in Clovis began in the 1940s and is an example of a small, family peach orchard that transformed into a family ranch with a packing plant and purveyors of peaches. Earl Smith became known for his development of the Wawona Frozen Food Industry (M. Colleen Hamilton 2022, pers. comm.). Today, the Clovis and Marysville regions forms an important part of the state's peach industry.

Apples

Apples were another important variety of fruit grown in California during the 19th and 20th centuries. California's native apple species, commonly known as the "crab apple," were a food source for California Indians and early settlers. Apples were grown in the missions and at Fort Ross by Russian colonists. The Russians planted Gravenstein apples, a variety that gained widespread popularity during the 19th century (Butterfield 1938:19–20). In 1850, William. H. Nash and R. L. Kilburn are credited with importing the first varieties of apples from New York, including Rhode Island Greening, Roxbury Russet, Winesap, Red Romanite, and Esopus Spitzenberg. Kilburn and Nash planted these trees in Napa Valley near Calistoga (Butterfield 1938:20).

By the mid to late 1850s, apple orchards had sprung up along the Sacramento and Santa Clara valleys and in the foothills of the Sierra Nevada and Northern Coast Ranges and rapidly became a staple of homesteads throughout the state. Santa Clara Valley had earned a reputation as one the state's principal apple producing regions by the late 1850s. In 1857, Smith and Winchell had 100,000 trees in their nursery alone (Butterfield 1938:21). Apples also appeared in Southern California around San Diego County in the 1870s (Figure 54). The town of Julian became famous for applies and frequently won national awards for its crops into the 20th century (Gann and Castells 1016). The number of orchards in Southern California, however, were fewer than in the northern part of the state. In 1910, 2,482,762 bearing apple trees grew in California; this number increased to almost 2.9 million in 1930 (Butterfield 1938:22). Dried apples were also popular during the 19th century. In 1911, nine million pounds were dried in California, with Sonoma and Santa Cruz leading the state (Butterfield 1938:22).

Figure 54. Apple harvest, 1922. Note the use of wooden barrels for gathering and packing. (Keystone-Mast Collection, KU43616, UCR/California Museum of Photography, courtesy of the University of California, Riverside.)

The loss of the pear orchards to blight in the 1950s caused many farmers to change their focus and adapt. Throughout the Sierra Nevada foothills local farms realized that the soil and climate conditions were ideal for growing apples and began replacing their pear trees. As farmers switched from pears to apples, regional associations formed to market and sell their new crop. In El Dorado County, for example, 16 ranchers formed the Apple Hill Growers Association in 1964 and began competing with Washington State for a corner of the apple market.[6] Today, the group has grown to over 55 small family farms and holds annual events at harvest time to continue promotion of local apples.

Figs and Dates

Figs were an important part of the state's fruit industry during the late 19th and 20th centuries. Figs have fewer varieties as compared to many other fruits grown in California. During the California Mission Period, the common fig was referred to as the Mission, Black Mission, Black Mexican, California Black, or San Jose Black (Butterfield 1938:24). During the 1850s, figs grew in rancho gardens and ultimately found their way to early farms and ranches across the state, some growing to enormous size. The importation of other varieties of figs, many from France, began during the 1850s, and California nurseries began to advertise figs in their stock. William B. West of Stockton, one of the earliest fig growers, planted the varieties he imported from Massachusetts in the early 1850s (Butterfield 1938:25). The Smyrna fig, a popular fruit, first appeared in California during the 1870s, and over 100 other varieties of figs surfaced by the early 1900s. Dried figs appeared early but did not become a part of the market until the 1880s.

By the 1910s Coachella Valley farmers began irrigating with artesian well water and planted extensive fig and date crops. By 1936, production of dried figs reached 20,000 tons and fresh fig production 9,600 tons (Butterfield 1938:27). Coachella remained a major producer of dates and figs in the 1970s. This association with dates grown in a desert environment led to the Moorish-inspired architecture found in the Palm Desert region today and an associated date festival celebration to honor the "Arabia of America" (Wood et al. 2020).

Raisins

Raisins were reportedly introduced to California during the 1860s, although dried grape production for local consumption developed during the Spanish and Mission periods. B. N. Bugbey of Natoma Vineyards near Folsom, Sacramento County, emerged as one of the first commercial growers of raisins. In 1867, Bugbey advertised 1,500 boxes of fresh California raisins. Large pans, heated at night, were once used to dry grapes into raisins; later the pans were replaced with paper trays. Curing machines for making raisins first sold during the 1870s. The commercial value of raisins increased after the introduction of seeded raisins and the output rose to 700 tons in 1896, increasing to 43,000 tons in 1912 (Butterfield 1938:31) (Figure 55).

[6] http://www.applehill.com/

Figure 55. Raisins and figs drying on burlap ground cloth at Rancho El Tejon, Kern County, ca. 1880s. (The San Joaquin Valley Digitization Project, courtesy of the Beale Memorial Library Local History Room, Bakersfield, San Joaquin Valley & Sierra Foothills Photo Heritage, kew0012, San Joaquin Valley Library System, Fresno.)

The raisin industry was one of the first in California to form cooperatives and was known for employing a variety of ethnic groups, particularly Armenians from the Fresno area (Woeste 1998). The California Associated Raisin Company, formed in Fresno to combat low prices and fluctuating demand in the raisin market, was one of the cooperatives, eventually becoming Sun-Maid Growers of California (Sun-Maid 2019). Raisin samples from Sun-Maid were distributed to visitors at the Panama Pacific International Exposition held in San Francisco in 1915 by women wearing white blouses and bonnets, leading to the creation of the company logo (Figure 56). The exposure received from the nine-month-long exposition is credited with launching Sun-Maid and California raisins into a worldwide market (Sun-Maid 2019).

The completion of the Port of Stockton in 1933 led to the growth of the raisin industry. The Port, located 75 miles inland, provided international transport via rail and ship to overseas market, particularly the United Kingdom, one of the biggest purchasers of California raisins (Sprague 1/29/1953). The ease of shipping and rising demand for raisins led Sun-Maid to build a 640,000 square foot facility on 100 ac. of land 20 mi. south of Fresno. The Sun-Maid facility opened in 1964 and today ships their product to over 50 countries (Sun-Maid 2019), buying grapes from local farmers for processing in their Kingsbury facility.

Figure 56. Sun-Maid trademark logo, 1915. (Sun-Maid 2019, public domain.)

Apricots, Quinces, and Pomegranates

The introduction of apricots, like peaches, occurred during the Spanish Period. Improved varieties of apricots were propagated during the 1850s in Sacramento, Alameda, San Jose, and other regions of the state (Butterfield 1938:33). Apricots, although well adapted to California's climate, were susceptible to frost, and thus were not grown in the same quantities as other popular fruits, such as peaches. In 1886, California reportedly harvested over three million pounds of apricots. Successful irrigation efforts in the San Jacinto Valley and Hemet area, Riverside County, by 1900 led to a large deciduous fruit economy in that region by 1910 (Beedle with Earle 2005) (Figure 57).

While dried apricots became popular in the 1880s, large commercial packs of canned apricots did not reach the market until after 1900 (Butterfield 1938:34). Apricot packing plants in Hemet, Riverside County, for example, started in 1910 to dry apricots, with a second plant added in 1916 to can apricots and peaches. This new plant hired 100 workers to process the apricots in 1916 (Beedle with Earle 2005). The introduction of nectarines, unlike many of the state's other fruits, did not take place until after 1850. By 1938, about 147,306 nectarine trees grew in the state (Butterfield 1938:35).

Quinces and pomegranates date to the Spanish and Mexican periods, although persimmons were not grown in the state until the early 1850s. During the first decades of the 20th century, most of the state's quince production occurred within Placer, San Bernardino, Sonoma, Sutter

Figure 57. McPherson Warehouse and Fruit Processing Plant, Orange, ca. 1880. (Local History Collection, courtesy of the Orange Public Library & History Center, Orange.)

and Tulare counties (Butterfield 1938:37). At the same time large pomegranate orchards were established, focused largely in Fresno, Tulare, Imperial, Kern, and Riverside counties. Pomegranates never saw widespread commercial popularity in California (Butterfield 1938:37).

Berries

The story of California's berry industry has a long history. In 1849 a butcher from Alsace Lorraine, France, Joseph Reiter, arrived in California. In 1851 another immigrant from Ireland, Mr. Sheehy, came for gold. Initially, these men independently started experimenting with strawberries around the San Francisco Bay region with some success. From these humble beginnings came one of California's prominent markets.

The Reiter, Driscoll, and Sheehy families began experimenting with strawberries around the San Francisco Bay region and established farms around 1868 to provide berries to San Francisco markets. By 1870 they were planting in the Pajaro Valley and built large sheds to house their product. Driscoll Farms are still in the berry business, with most of their berries for market bought from independent farmers.

In the 19th century, most of the berry farms were worked, owned, or managed by migrants of European descent, including Italian, Portuguese, German, French, and Irish. These farmers established a presence from the Reiter's farm in Santa Clara Valley to Ventura County, where the Terry family arrived from Portugal in 1890 and began working the land (California Strawberry Commission 2014). Around the turn of the century, Japanese immigrants began arriving in California in large numbers and found work in the fields and orchards throughout California. At that time Reiters, Driscolls, Sheehys, and other farmers either hired workers for their berry fields, depended on independent farmers to provide them with berries for market, or used a combination of the direct hire and independent purchasing system to provide fruit for markets.

Strawberries proved to be an attractive crop for those with the right temperament and an interest in farming. More than any other crop, strawberries require attention to detail and daily care, similar to a personal garden. A large amount of fruit could be produced on small pieces of land and the harvest season stretched from January through July or later, providing steady work and income and allowing families to work in one place year-round, avoiding the typical following of crop cycle during harvest season. Japanese and Latinx immigrants worked in the fields, saved money, and leased a few acres of land. In some cases, large land holders provided the land free of charge, as well as strawberry cuttings in return for 50 percent of the crop, allowing migrant workers an opportunity to invest in their own farms. Thus, sharecroppers became commonplace in strawberry farming (California Strawberry Commission 2014).

By 1917, the strawberry farms were dominated by Issei (Japanese-born immigrants) and their families, with successful ventures found along the central California Coastal zone in Watsonville, Salinas, Santa Clara and Pajaro valleys, and Monterey (Figure 58). In Southern California, Japanese American strawberry farmers concentrated in Gardena Valley and Ventura County, growing an estimated 80 percent of the berries produced in the region by 1910 (Parsons 1997; Takeshita 2007).

Figure 58. Strawberry workers in Pajaro Valley, 1865. (Driscolls, public domain.)

Strawberries were grown on small lots by independent truck farmers in Santa Clara, sharecroppers in the Central Coast and coastal areas of Southern California, and tenant farmers in the Delta (Takeshita 2007). In 1926, 5 percent of strawberry acreage was in Los Angeles and Orange counties; 25 percent was on the Central Coast primarily surrounding San Francisco; 19 percent was in Sacramento County around Florin; and 12 percent was in the San Joaquin Valley (Geisseler and Horwath 2016). The forced evacuation and relocation of Japanese and Japanese American berry farmers in 1942 was detrimental to the berry industry (Figures 59 and 60).

Figure 59. Japanese ranch house and strawberry fields, 1942. (WRA no. -44, War Relocation Authority Photographs of Japanese American Evacuation and Resettlement, 1942 to 1945, BANC PIC 1967.014-PIC, courtesy of The Bancroft Library, University of California, Berkeley.)

Following World War II, the demand for berries soared due, in part, to the successful production and marketing of frozen strawberries. Many Mexican workers, initially working through the Bracero program, turned to berry farming (Figure 61). Salinas Valley became the largest commercial strawberry producing area in the world and acres planted in strawberries increased from 1,100 in 1945 to over 20,000 ac. by 1957 (Geisseler and Horwath 2016:2).

As the need for good, experienced workers grew, the Sheehy family, Driscolls, and others offered deals to recently freed Japanese American farmers that they had worked with prior to the war. They provided free housing and unlimited amounts of rice, and in return, the Japanese American farmers would be given 2 to 4 ac. of land and cuttings to farm strawberries. In return, they would share 50 percent of their crops. Initially, the houses were little more than tents elevated on platforms. The Sheehys began building wood frame housing for the families, averaging 800 square feet in size, with a kitchen, bath, living room and two bedrooms (George

Figure 60. Farm mother of Japanese ancestry picking strawberries in Florin a few days prior to evacuation, 1942. (WRA no. C-536, War Relocation Authority Photographs of Japanese American Evacuation and Resettlement, 1942 to 1945, BANC PIC 1967.014-PIC, courtesy of The Bancroft Library, University of California, Berkeley.)

2020). The Furakawas, Kagawas, Hayashi, and Matsumotos are a just a few of the families that took the Sheehys and other farmers up on their offer and went on to form their own successful berry companies. (Hodgson 2018). Since 1950 the berry industry has continued to grow and remains an industry relying on small, family-owned farms (Dune 2015; Goodyear 2017). Many of these farmers arrived in America and worked as field laborers, gradually working into leasing land and farming on their own, selling the berries to larger corporations.

Today California farmers produce two billion pounds of berries on 40,000 ac. that are shipped around the world and strawberries are a $2.5 billion venture. According to the California Strawberry Commission, 15 percent of all California strawberry farmers are of European descent, and many represent multigenerational farming families like the Sheehys, Reiters, Terrys, and Driscolls. While not as strong a presence as 100 years ago, Japanese Americans or others of Asian descent comprise 20 percent of strawberry farmers in the State. The success of the Bracero program led to an influx of workers from Mexico that eventually established farms

Figure 61. Farm workers picking strawberries next to Torrance Airport, 1961. (Los Angeles Times Photographic Archives, UCLA Library Special Collections, courtesy of the Charles E. Young Research Library.)

of their own. A total of 65 percent of all berry farmers in California today are of Mexican descent, a testament to the migrant history deeply embedded in this industry (California Strawberry Commission 2014).

Nuts (Drupes)

The history of California's nut or drupe crops is as varied as the products themselves. Nuts are often confused with seeds and drupes, such as almonds (a drupe) and cashews (a seed). A nut, in the botanical sense, is a dry fruit with one seed, rarely two, in which the ovary wall or part of it becomes very hard (stony or woody) at maturity. Furthermore, while a nut is a seed, not all seeds are nuts. A seed comes from fruit and can be removed from the fruit. In contrast, a nut is a compound ovary that is both the seed and the fruit that cannot be separated, such as a hazelnut or chestnut. Technically, a drupe is a type of fruit in which an outer fleshy part (exocarp or skin and mesocarp or flesh) surrounds a shell (the pit or stone) of hardened endocarp with a seed inside. Thus, some of the more popular drupes in California, more commonly associated with fruits, include peaches, plums, and cherries. These "fruits," however, receive discussion with citrus and orchard crops in this report. Likewise, just as most drupes receive discussion under the guise of fruits, historically and in literature, so do they receive treatment as nuts both in the culinary world and in literature. Indeed, numerous agricultural histories of California, such as Claude B. Hutchison's *California Agriculture* and Harry M. Butterfield's *A History of Subtropical Fruits and Nuts in California*, treat drupes such as almonds and walnuts as nuts, while cherries and plums are treated as fruits. For the purposes of this study, drupes commonly referred to as nuts, as well as one true nut, the chestnut, are all treated as nuts.

Immigrants brought chestnuts to California during the Gold Rush, mostly as seed of the European chestnut, but also some chestnuts of mixed origin and grafted varieties. Hundred-plus-year-old chestnut trees still exist in the Mother Lode region, such as the original Colossal tree planted by Benjamin Tonella, a Swiss Italian immigrant, in Nevada City. Century-old chestnut trees also survive in the North Coast and Central Valley regions. Most of the current chestnut production in California reflects post-World War II production (Vossen 2004). Chestnuts are typically grown on farms less than 10 ac. in size (Vossen 2000). Chestnuts are California's commercial true nut crop, although recently small in numbers with only 155 ac. under cultivation in 2005 (Ken Trott 2006, pers. comm.), decreased from 600 ac. planted in chestnuts in 2000 (Vossen 2000).

The most successful nuts grown commercially in California are walnuts and almonds. Post-World War II era nut production also included macadamia, pistachio, and pecan. Although pecans have been grown in California since the 19th century, the first commercial orchard was established in Clovis in the mid-1970s (Herrera 2000). Today, the pecan production belt is a narrow strip that stretches from Chico and Orland south to Bakersfield. In 2020, pecans were grown primarily on 6,000 ac. of farmland located in Fresno, Tulare, and Kern counties (American Pecan Council 2020; University of California, Davis 2020).

Professor C. H. Dwinelle of the University of California at Berkeley first introduced the macadamia nut to California in 1877. He obtained seeds from Australia and planted several seedlings along Strawberry Creek on the Berkeley campus. In addition, two nurserymen, Ernest Braunton and Charles Knowlton, started selling seedling trees in Southern California around 1910. Macadamia trees were planted as ornamental and backyard trees for many years before World War II, particularly in the southern seven counties of the state. People who served in the Pacific Theater during World War II were exposed to macadamia nuts in Hawaii and returned from the war to search local markets for the nut. Commercial planting of macadamia began in California in 1946 in response to this heightened interest, when Robert W. Todd planted 2 ac. of seedling trees on his property on Grandview Street in Oceanside. The California Macadamia Society was formed in 1953 to guide the newly developing industry, promote their product, and conduct research. In response, the University of California Los Angles established a Subtropical Horticultural Department to better study and understand the nut (Miller 1955:143–145). Macadamia trees thrive in high humidity, subtropical climates. Although the nut grows from San Luis Obispo south to the Mexican border, Southern California, particularly the San Diego County coastal zone, has in the neighborhood of 2,500 ac. planted in macadamias (Rios et al. 2020).

American traders first introduced the pistachio to California in the 19th century; the first tree was planted in Sonoma in 1881, primarily because of increased demand. In 1929 the commercial development of pistachios began when American plant scientist William E. Whitehouse spent six months in Persia (modern-day Iran) collecting seed that he brought back to California. The next year, experimental plantings were established in California. However, no standout pistachio trees emerged until 1950, because pistachio trees require at least a full seven to ten years maturing. The California variety, named Kerman for the famous carpet-making city in Iran near the area where the trees were first cultivated, began to expand throughout the state in the 1960s. Another account suggests that the California town of Kerman in Fresno County was actually named after two land speculators who subdivided and sold lots off to start the town (Ken Trott 2006, pers. comm.). In 1977, there were 1,700 ac. planted in pistachios in the state, primarily in the Central Valley. By 2005, California was the second largest producer of pistachios worldwide with over 100,000 ac. planted (Geisseler and Horwath 2016b). In 2020 there were 288,595 ac. planted in pistachios, primarily in Fresno, Kings, Madera, Tulare, and Kern counties, representing over 98 percent of all pistachios grown in the United States (aginfo.net 2020; Geisseler and Horwath 2016b).

The walnut, although first introduced by the Spanish padres around 1769, did not flourish until the time of the early American settlers. Varieties of walnuts were often planted on homesteads as part of cultivation requirements and frequently remain as indications of the locations of homesteads that no longer exist (Figure 62). The first attempt at commercial production was reportedly established at Warner's Ranch in San Diego County in 1843. More than a dozen plantings existed by 1850, mainly near Los Angeles but also scattered from San Diego to Napa counties. In the Bay Area, California walnuts grew along creeks and streams. Walnut Creek, for example, located in Contra Costa County, was named for the groves of native walnuts growing in the area (Gudde 1969).

Joseph Sexton, a horticulturist, initiated California's first commercial walnut enterprise in 1867 to 1868, when he planted a grove of English walnuts in Goleta, next to Santa Barbara. Within a few years, 65 percent of all fertile land in this region grew Sexton's English walnuts. Over the next thirty years, orchard plantings multiplied and extended as far north as Chico. In 1875, the State Agricultural Society recorded 138,673 walnut trees, with 15 counties reporting more than 1,000 trees each (Hutchison 1946:211). The 1870s marks a watershed for walnuts in California. Until this time, walnut plantings had consisted entirely of the small, round, hard-shelled, inferior walnuts introduced by the padres. In addition to Joseph Sexton's soft-shell English walnut, Felix Gillet introduced and developed certain French varieties at Nevada City, which became the basis for the industry in central and Northern California and in Oregon. Between 1880 and 1905 superior varieties of walnuts were planted, including Placentia and Eureka, which now make up most of the Southern California production (Hutchison 1946:212).

Between 1900 and 1930 walnut acreage increased nearly sevenfold and production increased tenfold. The California Walnut Growers' Association organized in 1912 and successfully applied the principles of cooperative effort to the solution of the problems of the industry. By 1910, the introduction of Valencia oranges and lemons along with increased urban population in

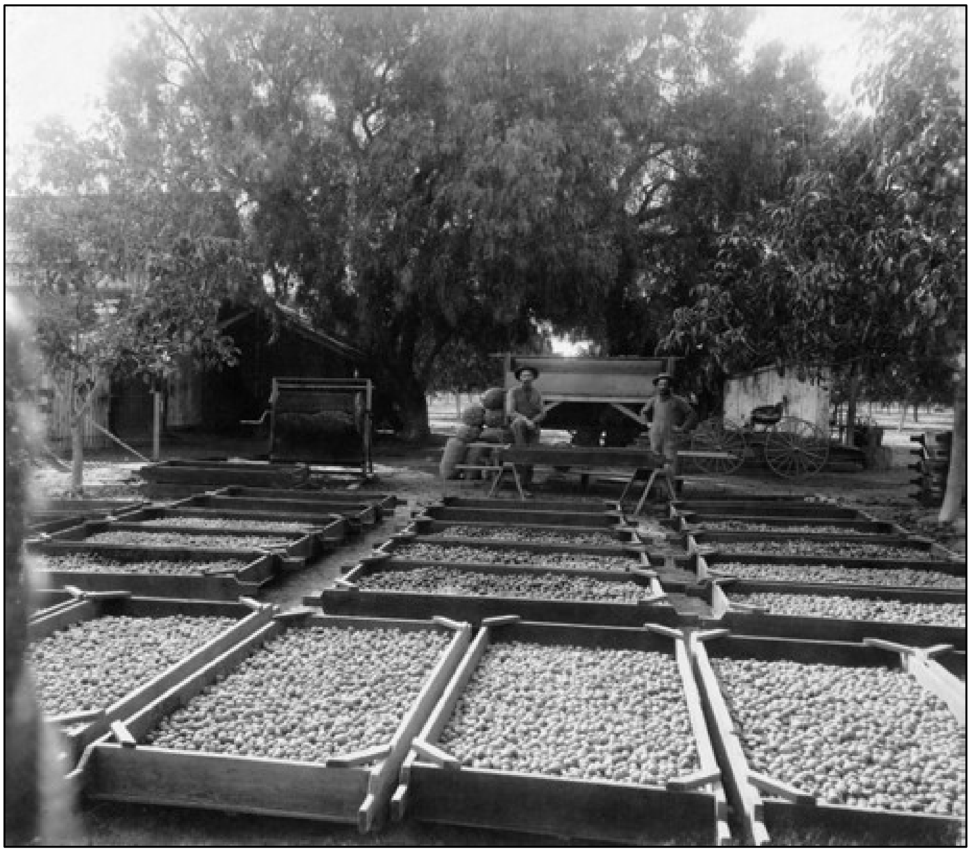

Figure 62. Drying walnuts on the John B. Rea Ranch in Anaheim, ca. 1900. (Courtesy of the Anaheim Public Library, Anaheim.)

Southern California, resulted in the elimination of walnut orchards in Los Angeles and Orange counties. The City of Walnut in Los Angeles County, for example, originated as part of Rancho Los Nogales ('Ranch of the Walnut Trees'), which was acquired piecemeal from Jose de la Cruz Lineras by the Vejar family beginning in 1837. Local growers in the city planted both lemon and walnut trees, with the latter being the major agricultural product until the 1930s, when a pest infestation destroyed the walnut orchards (Pitt and Pitt 1997:531–532).

In addition, declining yields and quality, increasingly warmer winters that caused a delay of blooming, and a pest infestation resulted in the restriction of acreage in Southern California and consistent expansion in the north. By the 1930s the commercial walnut business moved northward to Stockton where improved irrigation, better pest control, ideal climate, and rich soil were more conducive to larger yields (Hutchison 1946:212–213). By this time the California walnut had virtually displaced the imported product in United States markets and had become an important export.

California emerged as the largest producer of walnuts in the world by the 1940s (Hutchison 1946:213). The California Walnut Board was established in 1948 to represent the walnut industry and growers. Today, the Sacramento and San Joaquin valleys are the center of walnut production, producing 99 percent of the commercial United States walnut supply. On the global market, California produces two- thirds of the world's supply of walnuts (Walnut Marketing Board and California Walnut Commission 2020).

Today, almonds are California's largest drupe crop in both value and acreage. The Spanish introduced the almond tree to California in the late 1700s. The moist, cool weather of the coastal missions, however, did not provide ideal growing conditions, and trees were not successfully planted inland until the 1800s. The first attempts to grow almonds commercially in the United States occurred in New England and the Middle Atlantic and Southern states. Nevertheless, growers soon learned that the early blooming almond succumbed to late frosts or disease in areas of high humidity. California's Central Valley, with its Mediterranean climate, provided the right environmental conditions for successful almond production. In the early 1850s, plantings near Sacramento, Monterey, and Los Angeles all showed promise (Blue Diamond 2020; Hutchison 1946:170–176).

During the 1870s, through research and crossbreeding, several of today's prominent almond varieties had been developed. By the turn of the 20th century, the almond industry firmly established itself in the Sacramento and San Joaquin valleys. The rise of almond production in California is largely the result of the California Almond Growers Exchange, now Blue Diamond. In 1909, J. P. Dargitz of Acampo near Stockton took an active lead in promoting an almond cooperative and made an appeal for a state organization. Members from nine independent almond growing associations in Antelope, Orangevale, Fair Oaks, Davis, Capay, Sutter County, Live Oak, Oakley, and San Joaquin County then met in Sacramento on18 March 1910 to discuss the formation of a statewide organization. As a result, the California Almond Growers Exchange (CAGE) formed on 7 May 1910 consisting of 230 independent growers with headquarters in Sacramento. In 1915 the CAGE built a new receiving and packaging plant that eventually grew into the largest nut processing plant in the world. In 1915 the cooperative adopted the Blue Diamond (the rarest diamond in the world) as their brand symbol, as a way to distinguish the California project from Spanish and Italian imports. As a result of their marketing efforts, government lobbying, and quality control, California's almond production increased from an annual average of 3,500 tons in the 1910s to 9,440 tons in the 1920s (CAGE 1955:12–20).

In 1931, Blue Diamond had 400 growers supplying 20 million pounds of almonds and 2,000 growers by 1940. Today, approximately 3,500 growers cooperatively own Blue Diamond Growers (established in 1980 from CAGE) and along with another 2,500 growers in California, produce the entire supply of almonds in the United States and nearly 80 percent of the worldwide production. In addition, almonds currently rank as the seventh largest U.S. food export (Blue Diamond 2020). Today, California is the only place in North America where almonds are grown commercially, with more than 1.5 million ac. planted in the San Joaquin and Sacramento valleys, stretching 400 miles between Bakersfield and Red Bluff (Blue Diamond 2020). In 2019 three billion pounds of almonds were produced (Cavanaugh 2020).

Vegetable Industry

Among the first crops grown in California by the Spanish, Mexican, and later, European immigrants, were vegetables. Vegetables grew faster than other agricultural products and agriculturalists could profit on their initial investment within weeks rather than months or years.

Vegetable gardens appeared throughout the state by the early 1850s. The state's first horticultural exhibition or fair, such as the one held in San Francisco in 1851, displayed vegetables (Wickson 1923:7). Competition was fierce among vegetable growers, as new products filled the markets, and prices fluctuated wildly as speculation was common. Transportation of vegetables seriously concerned early growers. Even after the completion of the Transcontinental Railroad. the lack of reliable cross-country refrigeration made shipping across the Great Basin and the Intermountain West precarious at best.

By the late 1910s, California ranked at the top of the nation in vegetable production, with the exception of potatoes and sweet potatoes. In 1919, 115,260 ac. were devoted to vegetables with a total value of more than $17 million (Wickson 1923:13). The most popular vegetables grown during the first few decades of the 20th century included asparagus, cabbage, cantaloupes, carrots, cauliflower, celery, cucumbers, lettuce, peppers, potatoes, spinach, tomatoes, turnips, sugar beets, and watermelons.

By the 1920s, there emerged two principal types of growers; those who produced vegetables solely for commercial purposes and long-distance shipping, and those who produced vegetables for home or local consumption, sometimes referred to as truck gardeners (Figure 63). Truck gardens often were family owned, with the majority of labor accomplished by the family with seasonal help. In the 1920s, Riverside, Kern, San Bernardino, and Inyo counties began irrigating desert lands, turning dry sandy expanses into oases, and providing fresh vegetables and fruits to the Los Angeles basin.

For commercial growers the key was to ascertain the vegetable that brought the best crop at the right time for shipment (Figure 64). Vegetable growers relied upon the state's diverse immigrant workforce. Japanese, East Indian, and later Filipino and Mexican laborers followed the Chinese. By the early 1900s, with a large immigrant workforce in place, the volume of canned and dried vegetables produced in the increased.

Both canned and dried vegetables could be shipped out to national and international markets with little concern over spoilage. In the 1920s, the most common commercially canned vegetables included asparagus, string beans, peas, spinach, and tomatoes (Wickson 1923:14). Other sundry vegetable crops that were popular during the late 19th and early 20th centuries included corn, onions, peppers, capers, chayote, chervil, watercress, gherkin, ginger, mushrooms, mustard, okra, parsley, yams, and udo, a vegetable similar to asparagus grown by the Japanese.

In summary, vegetable production was an integral part of California farms and ranches since the first years of the Gold Rush. With the advent of irrigation, the spatial area of vegetable farms dramatically increased, as did the market for fresh vegetables. New technologies applied to canning vegetables gained wider acceptance after the turn of the century. Farmers marketed their surplus products to canning companies or cooperatives, which helped sustain them during price fluctuations or downturns in the economy. Cheap immigrant labor was a key component

Figure 63. Produce raised in Inyokern, near today's Ridgecrest. (Courtesy of the Historical Society of the Upper Mojave Desert, Ridgecrest, and the Vandevender Family.)

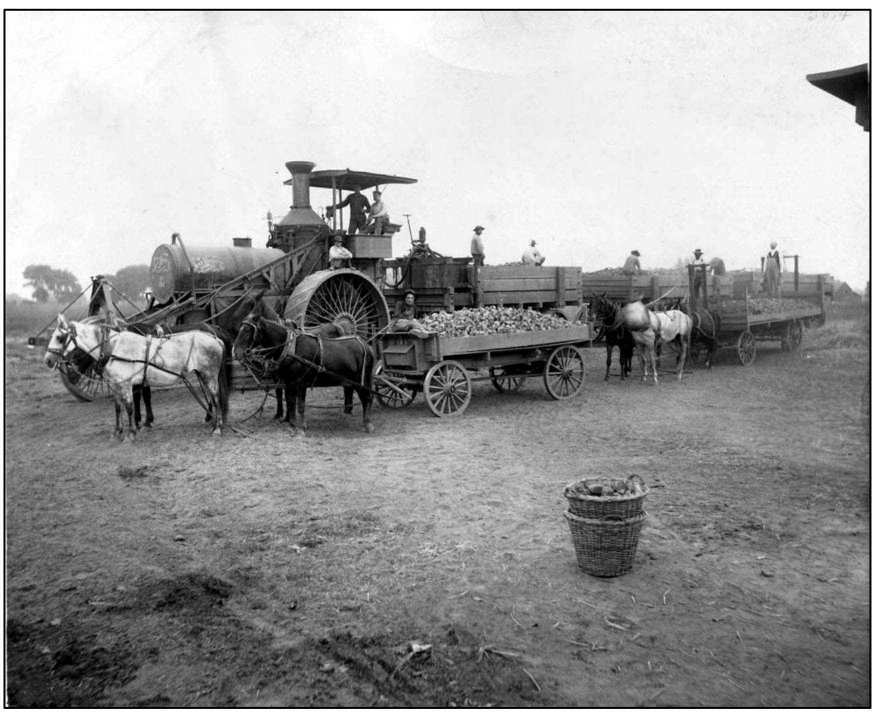

Figure 64. A traction engine hauls sugar beets 20 miles to a factory, Visalia, Tulare County, ca. 1900. Agricultural laborers on a traction engine to haul sugar beets. (General Subjects Photography Collection, PC-GS_00201, Agriculture-Crops-Sugar beets, courtesy of the California Historical Society, public domain.)

in farming vegetables. By the early 20th century, Japanese laborers replaced Chinese. Prior to World War II, Japanese were able to purchase labor. After 1900, Mexican laborers, who worked for even lower wages, replaced Japanese in many of California's vegetable farms.

Today, soil conditions and climate dictate regional variations in preferred crop production. Towns and cities often embrace this variation by marketing their community and region with annual festivals celebrating the harvest. Vacaville for many years was surrounded by onion fields. Gilroy, in Santa Cruz County, is known for garlic. Castroville is a center for artichokes, and Yolo and Sacramento are famous for the tomato crops. Lettuce is often associated with Monterey and Imperial counties, and asparagus, potatoes, and beans with the Sacramento-San Joaquin Delta. In 2019, almost a million acres were planted in vegetables. California, for example, supplies an estimated 85 percent of carrots consumed by Americans. Cabbage, broccoli, chard, collards, prickly pears, lettuce, and asparagus are all grown on commercial Central Valley farms, sometimes referred to as "the Land of a Billion Vegetables" (New York Times 10/14/2012), and truly the breadbasket of America (CDFA 2019). While there are over 100 vegetable crops grown in California, many came into popularity after World War II and are relative newcomers to the California farming scene. Several crops, however, were commercially produced in the 19th century and are discussed in more detail below.

Dry Beans

Dry beans have been a California staple for centuries. Tepary bean remains have been found in archaeological sites in the Mojave Desert and are believed to have been brought to California through the southwest by 1 Common Era (CE) (Jones and Klar 2007), along with corn and squash. The Spanish padres brought common beans with them as they established their 21 missions in California. Pinto, kidney, and garbanzo beans were all grown at the missions and incorporated into the daily diet of mission residents. Beans were found to be drought resistant, thrived in poor soil, and were adaptable to both heat and salinity in soil without requiring extensive irrigation and fertilizer. By the time of the Gold Rush, beans along with corn and small grains were common crops found on missions and ranchos in the state and were dietary staples. Since then, California has become known for four types of dry beans: common; Lima; garbanzo; and blackeye beans (Lazicki et al. 2016).

Common beans include kidney, pinto, and black beans and were considered hearty crops. These beans were the staple at most missions and ranchos and soon found their way into the California miners' diet. Easy to transport, full of protein and starch, and filling, this product was of high value to the mobile population found in mid-19th century California.

Lima beans arrived in California in the pockets of sailors arriving from Peru. California's venture into Lima beans as a profitable crop is credited to Henry Lewis. In 1868, while living in Santa Barbara, Lewis purchased bean seeds from a sailor arriving from Peru and planted them on his 109-ac. farm in Carpenteria. He became well-known for his "Lewis bean." By 1900, Lima beans were extremely profitable and thrived in the southern California coastal climate. Ventura County became the center of Lima bean production, growing over 75 percent of the world's Lima beans (Figure 65). Known as the Lima Bean Capital of the World, Ventura County had over

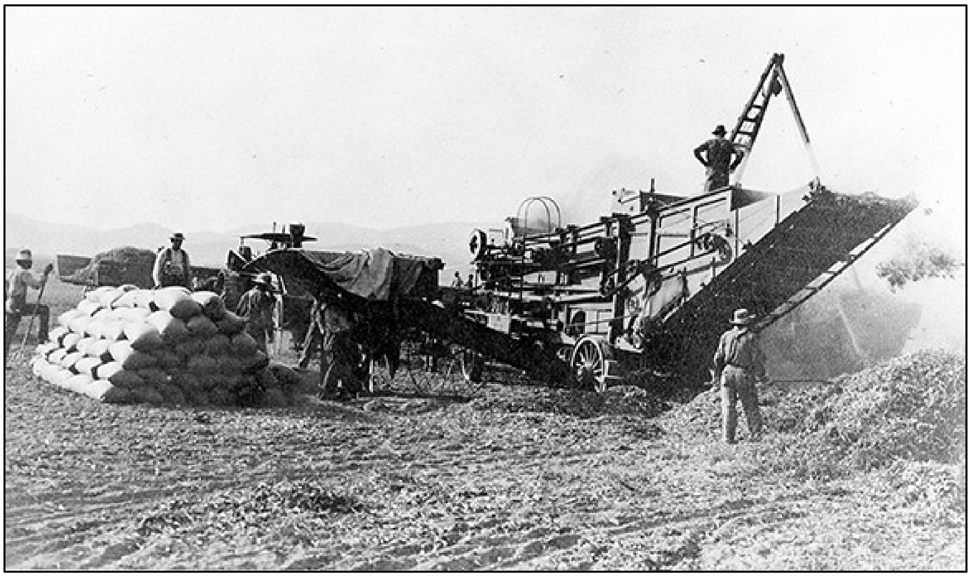

Figure 65. Threshing lima beans at Goodyear Ranch in Somis, Ventura County. (Courtesy of the Museum of Ventura County.)

120,000 ac. planted in lima beans in 1920. This bean remained one of the county's most important crop into the 1950s (Dubroff 2014; Lazicki et al. 2016). In 2012, about 23,000 ac of baby and large Limas were harvested in California, with a value of about $30 million. Today California growers continue to produce 60 to 80 percent of the world's market of dry Limas, with Japan providing the primary export market (Kan-Rice 2015).

Like common beans, garbanzos were also grown on the missions as a summertime dryland crop. Initially, traditional large-seed garbanzo beans (not chickpeas) were grown on the south-central coast. These beans became high in demand at canneries for their large, uniform size, and the fact that they maintained firmness after canning. In recent years chickpeas have dominated the garbanzo market in California, due to their use to produce hummus, flour, and other popular products (Long et al. 2019). In 1988 about 1,000 ac were planted in garbanzo beans in California; this number increased to more than 15,000 ac. by 1992. In 2019 approximately 10,000 ac. were planted in chickpeas (Lazicki et al. 2016).

While blackeye beans, also called cowpeas and black-eyed peas arrived in California with the Gold Rush, they were first commercially produced in California in 1880. By the early 1900s, about 40,000 to 60,000 ac. were planted annually, primarily in Riverside County and Northern California. These numbers have stayed constant, although production has shifted to Kern County in the southern San Joaquin Valley. Between 1960 and 1989, California planted about 50,500 ac. per year in blackeye beans.

Sugar Beets

Two sugar beet factories were built in California in 1870, one in Alvarado (now Union City) and the other in Sacramento. The Alvarado plant was bult by E. H. Dyer and organized as California Beet Sugar Company. The plant successfully manufactured sugar from the beets on 17

November 1870; the first sugar made in California. Nearly 1,500 ac. were planted in beets near the factory. Dyer paid $3.50 a ton for the beets and produced 500,000 pounds of sugar (Magnuson 1918).

The Sacramento Valley Sugar Company opened their factory in early 1871 in Brighton. This factory used a diffusion battery system for extracting the sugar, the first plant in the United States to do so. Their system soon evolved as the preferred way to extract sugar. By 1888, numerous factories had opened, and closed, including the Brighton plant, a second Sacramento plant at Isleton, the Soquel factory, and the plant at Alvarado. California's success changed in 1888 when Claus Spreckels, a German with considerable experience in the field, opened a factory in Watsonville. The Spreckels Sugar Company was successful, in part because it was located in Pajaro Valley, an area with rich soil ideally suited for growing sugar beets (Magnuson 1918). By 1912 other areas in southern California began experimenting with sugar beets with great success. Factories opened in Chino (1891), Los Alamitos (1897), Oxnard (1898) Hamilton City (1906), Visalia (1906), Santa Ana (1908), Corcoran (1908), Huntington Beach (1911) and Anaheim (1911). Orange County became the lead producer of sugar beets. In 1917, 154,700 ac. of beets were planted in California, about 100,000 of these in Orange County (Magnuson 1918:78).

During these years, the industry relied heavily on immigrant labor. Initially, Chinese laborers dominated the labor force, both in the fields and factories. By the late 1880s their role was limited to the fields, and European American workers filled the factories. By 1900, Japanese immigrants were replacing Chinese and by 1915 an estimated 80 percent of all laborers working in sugar beet fields were Japanese Issei and Nissei. East Indians migrated to Northern California and began work near Hamilton City in 1907. By 1909 the sugar beet farms in Oxnard and Orange County relied heavily on East Indians for their labor force. Legislation against Japanese in the late 1910s and 1920s led to increases in Mexican and Filipino workers. This great diversity in labor force continued throughout the 20th century (Berry [ed] 1938).

Sugar beet farmers and manufacturers had a unique relationship not found in the production of other California crops. Beets are a bulky and heavy crop, resulting in very high shipping costs. Most beets were grown within three miles of a factory. Farmers were paid a per acre cost in advance and were often supplied with seeds by the manufacturer. This contract system allowed for immigrants and others to grow the crop, often on land owned by the manufacturers, but limited payment for labor once the cost was set in advance.

In 1917, disputes arose between the sugar manufacturers and beet growers. These conflicts were compounded by unfavorable weather conditions, and a lack of irrigation water in the San Fernando Valley, one of the major growing centers. Farmers were also facing labor conflicts. Beet thinners refused to thin beets without adequate compensation. By the time the laborers made their demands for better wages, the farmers had already signed contracts with factories, committing to tonnage rates for beets. The conflicts escalated with no solution, and in 1918 many farmers indicated their reluctance to plant beets, even after Herbert Hoover, then head of the United States Food Administration, appealed to them on the nation's behalf. The situation became so dire, particularly when no sugar was produced, that Hoover appointed a federal commission to investigate the cost of raising beets and establish a fair price. At that time, California contained 23 percent of all beet crops planted in the country, and the loss of the California crops was considered a detriment to the World War I war effort. With the assistance of the federal intervention, sugar companies agreed to pay $100 per acre of beets, giving farmers a margin to allow better wages for laborers (it was determined that the average cost of raising beets was $84 per acre) (Magnuson 1918:79).

Sugar beets took on increased importance during World War II. Sugar beets were necessary for producing industrial alcohol used in manufacturing of munitions and synthetic rubber. According to the United States Sugar Beet Sugar Association in 1943, “every time a sixteen-inch gun was fired, 1/5 ac. of sugar beets went up in smoke” (Chesno 2019). Once again, the federal government pursued ways to encourage planting more sugar beets, including lifting restrictions on beets and increasing United States acreage by 25 percent. Wartime posters promoted service to the country by planting beets, targeting strong farmers and others who were too old to fight or medically unfit (Figure 66). They called these farmers “soldiers of soil” and offered “farm deferments” for men who were conscientious objectors. When labor became scarce during harvest season, the federal government established a “seasonal leave program,” allowing interred Japanese American farm workers and Italian prisoners of war (POWs) to leave internment or POW camps to do agricultural work on farms. Over a three-year period, Japanese American farm laborers helped cultivate and harvest thousands of acres of sugar beets and are credited with saving approximately one-fifth of the total sugar beet acreage (Mori 1916).

Sugar beets continued as one of California’s important crops for many years after the war. As ways to produce sugar have developed and improved the need for multiple factories has decreased. In 1917, 91 sugar beet factories were found in 18 states. California had over 107,000 ac. planted in beets that year, for a value of over $11 million. In 1936, 140,000 ac. were planted, but the value remained the same, as the price of sugar was low (Barry [ed] 1938).

By 2005, 23 factories, in 10 states, processed 30 million tons of beets grown on 1.4 million ac. While Colorado holds the honor of highest producer, California comes in a close second. In the last decade, however, sugar beet factories have closed; the last Northern California factory, Spreckels, closed in 2008 after 140 years of producing sugar for American consumption. As of 2020, only one sugar beet manufacturing plant, the Brawley plant in Imperial Valley, remains in operation in California. Today, beets are used for biofuels in California, opening new doors for farmers.

Potatoes

The potato industry in the early 20th century California centered on the Sacramento-San Joaquin Delta and was reliant on reclamation of the dozens of islands in the Delta. Reclaiming land in the vast Delta area for agriculture began in the early 1850s when farmers attempted to build levees to hold back water. These early efforts were largely unsuccessful, as the levees inevitably failed and flooded the islands (Chu 1970:23). Successful reclamation began in the late 1860s, when Chinese laid off from railroad construction projects found work in the delta. In many cases, entire crews with their foreman, shifted from railroad construction to reclamation work. As islands were reclaimed, these same crews became the agricultural labor force for the

Figure 66. Wartime advertisement, 1945. (Photograph No. 44-PA-919, "Grow More Sugar Beets in 1945. Meet Wartime need for Sugar," 1941–1945, World War II Posters, 1942–1945, Record Group 44: Records of the Office of Government Reports, 1932–1947; courtesy of the National Archives at College Park, College Park, Maryland).

region (Chu 1970; Thompson 1957). The early levees were fragile and required constant upkeep. By 1900, many of these early levees had failed and the rich farmland tracts in the Delta were again in danger of flooding (Thompson 1957:261).

Permanent reclamation of land in the Delta region began in direct response to the invention of dredging machines capable of digging and building large levees at greater heights. These dredgers allowed for levees to use river bottom sediments, instead of the unstable peat soils on the islands. The high levees also allowed for dryer soil conditions, as irrigation and drainage improved. The combination of dryer conditions, rich interior peat soils, and pumping systems to drain land and maintain conditions on the land were essential in establishing the Delta as a premier potato growing region (Walker 1992).

While potatoes were grown in the region before 1900, the crop was not commercially successful, as the high saturation rate of the soils led to a watery product. George Shima, son of a Japanese government official, was educated in various schools in Japan and came to America in 1888 with a drive to succeed and a background in agriculture. He began work as a laborer in potato fields. By 1895, he leased land and started his own farm, choosing potatoes as his crop. Over the next 20 years, Shima worked with American partners to reclaim the Delta islands and plant potatoes in the rich peat soil (Figure 67). In 1906, he leased over 8,000 ac. and dug over 3,000,000 bags of potatoes on his leased land, setting new records and gaining nationwide attention. Shima hired workers but also used a system of tenant farmers, mostly from Japan, to produce potatoes (Naka 1913; Waugh and Yamato 1980:162).

For the next few years Shima worked to promote Japanese farmers and his potatoes in the community. In 1910, he established the Fall Potato Festival in Stockton, providing free baked potatoes to every visitor. He purchased land in the Delta, increased his leases, and provided opportunities to other immigrants by using them as tenant farmers. He supplied land, seed potatoes, and housing to a farmer in exchange for a 45 percent share of the crop. This system allowed many immigrants to succeed as independent farmers with little capital outlay (Figure 68). As part of his endeavors, he established a fleet of barges to transport his “Shima Fancy” potatoes to market (Hata and Hata 1986).

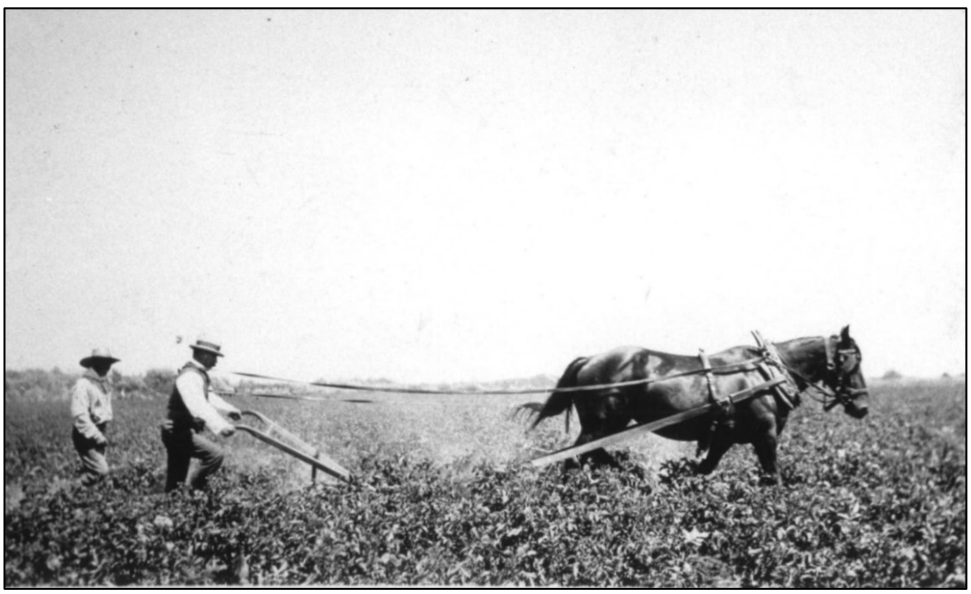

Figure 67. George Shima demonstrating the one-horse plowing method on Bacon Island, 1919.
(Ira Brown Cross collection, courtesy of The Bancroft Library, University of California, Berkeley, public domain.)

In 1913, Shima or his tenants farmed approximately 10,000 ac. of reclaimed land, rotating between potatoes, beans, and barley (Walker 1992:143). During World War I potatoes were in high demand for the troops, as were beans, and reclamation of lands in the Delta to convert to agricultural farms escalated. In 1917, 2,500,000 sacks of potatoes were raised in the Delta; the remainder of California produced 400,000 sacks; Shima was credited with 750,000 sacks of the Delta produce (*San Francisco Examiner* February 23, 1917:2).

Figure 68. Japanese workers in the Delta potato fields, ca. 1910. (Ira Brown Cross Collection, courtesy of The Bancroft Library, University of California, Berkeley, public domain.)

Shima passed away in 1926. After death, his legend grew, both in civil rights and in his innovative potato farming methods. He is remembered as a superb agriculturalist whose advanced methods of cultivating and marketing potatoes are still used today. He was the first farmer to wash, grade, and bag potatoes for market and to use techniques to keep them light colored and shiny (Byron Times 1912:81). He is credited with farming 20 islands, reclaiming over 100,000 ac. of land, and providing opportunities to hundreds of fellow immigrants, including Japanese, East Indians, Mexicans, Filipinos, and Portuguese. At the time of his death, potatoes were on the decline; after his passing they were not grown in mass numbers in the Delta again. The reclaimed islands of the Delta began producing onions, beans, sugar beets, and other crops instead (Thompson 1957).

During the 1930s, the center of potato production shifted from the Delta area to Kern County. Both acreage and yields rose sharply during the war years, as experimentation found that the Kern County area was ideally suited for growing “the White Rose” variety and Tulelake in the far northeast corner of the state supported russets. The completion of the CVP brought water to the Kern County area, and in 1969 Kern County was the second highest potato production region in the United States. Since 1960 a shift from fresh potatoes to processed frozen potato products, such as French fries, has led to a decline in the market, although White Rose, Russets, and specialty potatoes are still grown in the Delta, Tulelake, Kern, Imperial, and Riverside counties (Lazicki et al. 2016).

Cotton Industry

The Spanish first brought cotton to California in the late 18th century. While cotton could potentially be grown on virtually all irrigated lands, cotton's rise came slowly because of the lack of a home market, relatively high production costs, and competition over land with profitable fruit crops. Not until the early 1900s and 1910s did farmers who began to settle in the Imperial Valley and the lower reaches of the San Joaquin Valley attempt to grow cotton in any quantity (Hutchison 1946:129–131). World War I produced a cotton boom that flourished in the vast San Joaquin Valley. California cotton was also given a boost by boll weevil infestations that devastated the cotton industry in the South starting in 1915 while demand soared for the long-staple varieties which had long, silky fibers and were used in a variety of industries.

The arid West remained the only region free from the boll weevil and suitable for growing long-staple cotton. The USDA sent Wofford B. Camp, a young agronomist, to the San Joaquin Valley in 1917. Camp had an enormous impact upon the introduction and spread of cotton, having developed the varieties best suited to the region and helping organize farmers. The tremendous increase in California's cotton acreage in every decade since the 1920s contrasts sharply with the decline in cotton acreage for the United States as a whole. California's acreage in cotton ranked fourteenth out of fifteen cotton-producing states in 1919. Between 1925 and 1929, as well as 1955 and 1959, California's cotton production increased almost 900 percent, while total U.S. production declined by 15 percent (Musoke and Olmstead 1982:385–412). One of the remarkable features of cotton production in California has been the exceptionally high yields per acre (Figure 69).

While most of California's cotton grows in the southern interior valleys where rainfall is deficient, the Los Angeles Aqueduct, completed in 1919, and the State Water Project, with the first delivery of water coming in 1940, as well as the CVP which began during the early 1950s, provided controlled irrigation for cotton growers. In addition, during the 1940s, expensive wells, sunk as deep as two thousand feet, cleared the way for a significant expansion in cotton cultivation in these former arid lands. The combination of the dry, hot climate and irrigation water set western production apart from the old cotton fields in the Southern regions of the United States such as Georgia and Mississippi.).

The assurance of sufficient water delivered at the correct time gave California farmers a significant advantage over many producers in the South. Yield losses in the South due to insufficient or excessive moisture were larger than the losses attributed to the boll weevil in all but ten years between 1909 and 1950. Technologically advanced agricultural practices in the West, such as tractor-drawn cultivators greatly reduced weed growth. Wet weather in the South prevented similar practices in the fields for much of the growing season (Nichols and Borg 1992:387–389).

The structure of cotton farming in California differed from other states, particularly southern states. The California State Legislature passed laws in 1925 declaring that only a specific Acala strain could be grown legally in the San Joaquin Valley, apart from experimental plots. These laws protected high-quality cotton from contamination arising from cross-pollination with

Figure 69. San Joaquin Valley cotton field, ca. 1940. (The San Joaquin Valley Digitization Project, courtesy of the Tulare County Free Library, Annie R. Mitchell History Room, San Joaquin Valley & Sierra Foothills Photo Heritage, tca0102, San Joaquin Valley Library System, Fresno.)

inferior strains and varieties and ensured local gins of a uniform-quality raw material. The legislation increased the importance of the USDA cotton research facilities at Shafter in Kern County. This station conducted a continuing program to breed higher yielding strains of Acala and became the main source for the improved strains grown in the Central Valley.

California cotton producers harvested three to four times as many acres of cotton as the average cotton farmer in the country between 1924 and 1959. The scale of cotton farming in California reflects other important structural differences, such as western cotton farmers specializing in cash crops. Another distinctive feature of California cotton farms was the intensive use of mechanical equipment. California cotton farmers adopted tractors earlier and in greater numbers than did farmers in the south. When picking machines became available, farmers already possessed the mechanical skills and attitudes needed for machine-based production. The transformation from dry-land farming to irrigated farming meant greater capitalization and a shift towards marginal or under-utilized lands, such as those in the Southern San Joaquin Valley. By 1950, cotton had become California’s most valuable crop.

In 1963 there were 299 active cotton gins in California. The Port of Stockton had a cotton combine that was kept in operation 24 hours a day, seven days a week during this period. By 2011, only 30 active gins remained in the state, although the cotton industry exceeded two billion in sales (California Cotton Ginners and Growers Association 2020).

Labor scarcity and cost provided another impetus for mechanization. San Joaquin Valley growers often took pains to point out that their hand-picking rates always ranked among the highest in the nation because of the seasonal work. Consequently, early attempts to build a mechanical picker in the Imperial Valley date back to 1911, just a few years after cotton cultivation reappeared in California. Between 1917 and 1922, for example, several experiments with pneumatic machines in the Imperial Valley captured the attention of the agricultural press, but none of these machines proved acceptable. At about the same time, University of California agricultural engineers built and tested cotton-stripping machines. Professor H. B. Walker, head of the Department of Agricultural Engineering at Davis, took an active interest in cotton mechanization and developed the first detailed study on machine performance in the state. He observed a Gyracotn (made by George R. Myercord and Associates of Chicago) operate in Kern County in 1931. Although the Gyracotn collected almost one bale of cotton per hour, it left about 17 percent of the cotton in the field. Given that hand pickers probably left 2 to 3 percent of the crop, a net loss of about 15 percent occurred. This field waste, together with quality losses of two or more grades compared with hand picking, made the Gyracotn picker uncompetitive at Depression-era wage rates.

Likewise, California became the center of the Rust Brothers' developmental efforts in the 1930s. Mack Rust, along with his brother John, were leading figures in cotton mechanization research, and they developed several different versions of a spindle picker, a device consisting of moistened rotating spindles that grabbed the cotton fibers from open bolls, leaving the rest of the plant intact. Spindle pickers produced cotton that was as clean as or cleaner than handpicked cotton.

Both International Harvester and the Rust Brothers had made important strides in perfecting their equipment by the early 1940s. Yet, in 1943, only five International Harvester one-row pickers were reportedly operating commercially in the San Joaquin Valley. Beginning in 1949 Ben Pearson, Inc. and Allis Chalmers began manufacturing machines under the Rust license. In these early years, however, the International Harvester machines were more reliable, capturing a far larger share of the California market. By 1945, approximately 20 machines were in use in California (Musoke and Olmstead 1982:397–400).

Government policies played a crucial role in the early history of cotton in California during an era when farming had generally been free of government intervention. Camp's educational campaigns, the Shafter station's research program, and the political influence of cotton growers resulted in instigating massive government investment in water development. The single-variety community and centralized sources of seed, besides facilitating marketing and improving yields, brought farmers together with important consequences for labor relations, lobbying activities, and the spread of new techniques (Musoke and Olmstead 1982:389–390). California's cotton industry also gained a reputation for its abuse of immigrant and child labor, which ultimately caused the state's first widespread labor strikes, particularly during the 1930s (Figure 70).

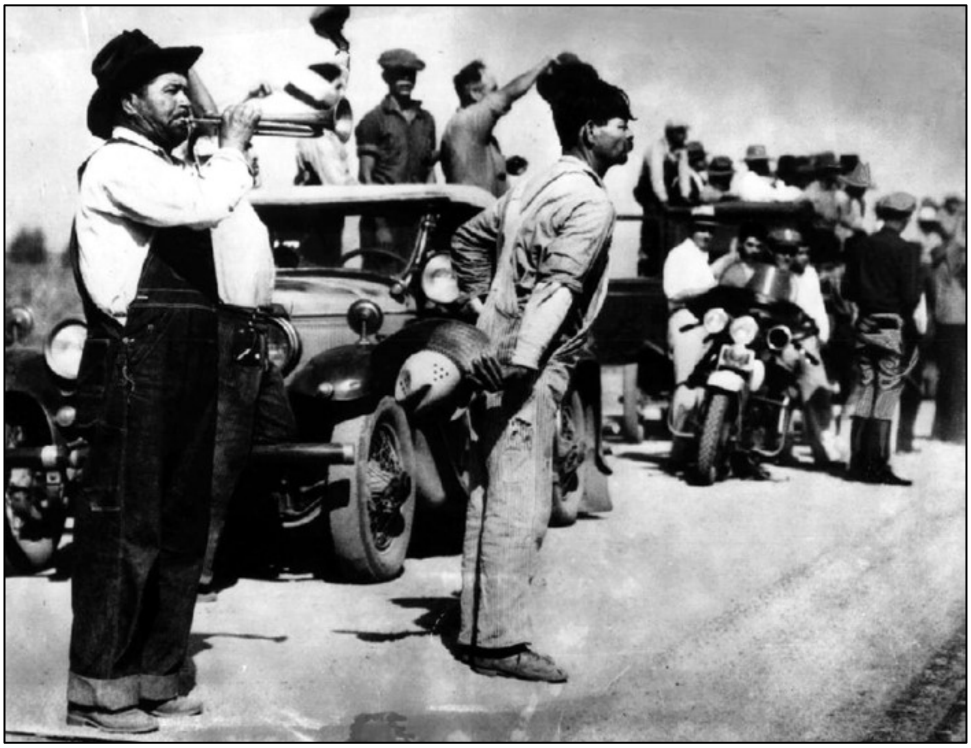

Figure 70. Pickets on the highway calling workers from the fields during the 1933 Cotton Strike. Probably near Corcoran in the Central Valley. (California Cornerstones: Selected Images from the Bancroft Library Pictorial Collection, 1945.007:6, courtesy of The Bancroft Library, University of California, Berkeley, public domain.)

Cut Flower Industry

The history of the cut flower industry in California dates to the 1870s, although the production of cut flowers was limited to specific geomorphic provinces within the state due to climatic conditions necessary for opportune flower growth. Reportedly, Theodosia Shepard, a Ventura County resident, sold the flowers she grew in her garden during the 1870s. Not long afterward, other women were cutting their flowers for the local market, and eventually the retail floral profession developed (CFAC 2005), aided by Shepard's growing business supplying seeds and cuttings to growers. By the early 1900s, the industry expanded across portions of Northern, Central, and Southern California, "as many immigrant families turned their love of beauty and their botanical talents to flower production, including Chinese, Japanese, Italians, and Dutch" (CFAC 2005) (Figure 71).

In 1912, the California Floral Association was founded in Southern California. The organization had 54 Japanese American flower growers as members, focusing primarily on carnations and chrysanthemums. This organization evolved into the California Flower Market of Southern California. As with other Japanese American dominated industries, the enforced incarceration of the majority of workers and owners in 1942 led to a quick collapse of the market. Following the war, many of the Japanese returned to the Southern California Flower Market and the

Figure 71. Paul S. Goya, former nurseryman from Sierra Madre. Goya, in charge of all flowers grown in the nursery, is shown with a bed of prize summer sweet peas. (WRA no. B-465, War Relocation Authority Photographs of Japanese American Evacuation and Resettlement, 1942 to 1945, BANC PIC 1967.014-PIC, courtesy of The Bancroft Library, University of California, Berkeley.)

industry began growing. Frigidaire's marketing of their deep freeze unit for storage led to a broader market, as flowers were transported out of California to other states (Cal Flowers 2020). Urban sprawl in the late 1950s and 1960s in Southern California resulted in a shifting of the industry from the Los Angeles basin to Carpinteria in Santa Barbara County, northern San Diego County, and coastal zones in Humboldt and Del Norte counties. By 2006 the cut flowers and foliage business had grown to a $330 million enterprise (Cal Flowers 2020).

Eucalyptus

The now ubiquitous eucalyptus was first introduced to California in the 1850s. The trees were thought to be a good source for hardwood and oil production, but proved to be unsuitable for both purposes, and the fad largely faded by the 1880s.

> After 1900, the eucalyptus was gaining popularity for use as windrows that repelled insects. Beginning in 1908 to 1911, approximately 6,000 ac. of eucalyptus, mostly of the blue gum variety, were planted on the western portion

> of the Nipomo Mesa of southern San Luis Obispo County by various individuals and companies. As described by W.W. Robinson:Keep to Highway No. 1, out of the Arroyo Grande lowlands. On it you drive up the mesa and through a eucalyptus forest mile long—more eucalyptus trees than can be seen this side of Australia. The air you breathe is pungent with eucalyptus aroma. You learn that two Pasadena men—acting through their Los Berros Forest Company—started the forest in 1908. They planted thousands of blue gum seedlings, then advertised and sold eucalyptus land. The trees grew fast for a while, and a hotel was built. The boom did not last long, for eucalyptus could not meet the hoped for requirements of good hardwood timber. The forest, however, is still there [Robinson 1957:50].

In 1924 a botanical investigator estimated that the state contained 40,000 to 50,000 ac. of solid eucalyptus, including 80 percent blue gum, 15 percent ‘red gums,’ 4 percent sugar gum, and 1 percent others (Farmer 2013). While it was still grown for firewood, citrus farmers planted the gums as windrows to shield their perishable crops from hot Santa Ana winds, cool coastal breezes, and frosty winter blasts. Long lines of eucalyptus became a familiar part of the skyline in Orange County, the Oxnard Plain, and the Salinas, San Fernando, San Gabriel, San Bernardino, Santa Clara, Ojai, and Coachella valleys. Fontana Farms Company contained 550 linear miles of eucalyptus windbreaks to protect their citrus (Farmer 1913). Today, many homestead sites found throughout the Central Valley of California and the coast are marked by one or two of these trees that once sheltered the home or lined the driveway.

They were also popular with the early California Division of Highways. Quoting from Farmer (2013):

> Even as it ripped out old eucalyptus, the state Division of Highways added thousands more young ones during the great freeway boom after World War II. The colorful trees somewhat softened the harsh landscape of concrete and asphalt. ‘I don’t know what we would do without the Eucalyptus as far as planting our State highways is concerned,’ wrote the supervising landscape in 1961. ‘We use the Eucalyptus far and above all the other varieties combined. Its ability to withstand varied climatic and soil conditions and the economy of maintenance makes it decidedly outstanding.’

Alcoholic Beverage Industry

Wine

California’s wine industry deserves special attention because of its relationship to the development of other forms of agriculture in the state and its economic importance, particularly after 1900. California’s viticulture industry had its antecedents during the Mission Period when grapes, commonly referred to as “mission grapes,” first were planted around 1770 (Carosso 1951; Dopson 1988).

Reports suggest virtually all of California's missions established between 1769 and 1830 had varieties of grapes grown within their confines. Mission grapes, by far the most common, were grown because they were hardy, fast growing, and matured quickly in most regions in the state.

Following secularization of the missions after 1834, vineyards either were abandoned completely or poorly attended, leading to the demise of many acres of grapes throughout California. The legacy of the Mission Period was continued by Mexican land grantees, such as General Mariano Guadalupe Vallejo, who revived wine growing near Sonoma Mission in 1836. His prosperous vineyards also attracted other growers to the Sonoma Valley (Dopson 1988:11). During the early 1850s, the *California Farmer* routinely mentions Vallejo's successful vineyards and the grapes he exhibited at local fairs and exhibitions.

Southern California gained a reputation as a region where wine grapes could be successfully grown, at a time when Northern California was still in the fledgling stage of winemaking (Figure 72). The El Pueblo de Los Angeles agricultural fields were known for their grape production in the 1830s, and wineries lined the streets of the oldest parts of town near present-day Los Angeles Union Station.

Figure 72. Koenig Vineyard and Winery, Anaheim, ca. 1885. (Anaheim Public Library Photograph Collection on Anaheim Local History, P43 and 43XX, courtesy of the Anaheim Public Library, Anaheim.)

By 1853, Los Angeles had about one hundred vineyards, mostly located within the city boundaries. A dozen or more wineries operated during these early years, many owned by French immigrants like Jean-Louis Vignes. Vignes arrived in Los Angeles from the Bordeaux region of France in the 1820s and established El Aliso Ranch. He planted his own vineyard by grafting Sauvignon Blanc and Cabernet vines from France to the Mission vines. Vignes emerged as the first California vintner to age wine in any quantity, including claret, muscat, sherry, and angelica. He is credited with producing 40,000 gallons in 1843 and having developed of some of California's first premium wines (Jacobs 1975:140). By 1850, his wine was considered the best in California. In 1855, he sold his operation to his nephews, the Sainsevain brothers. The brothers first shipment of wine to flourishing San Francisco was in 1855, followed by shipments to New York City in 1856. In 1860, 66,000 cases of wine were produced and sold from Aliso Winery, including some of the state's first champagne. The Sainsevain brothers also receive credit for shipping the first California wines to New York and opening a wine cellar there in 1860 (Carosso 1951:69-70; Dopson 1988:6). Vineyards and wineries continued to appear on historical maps into the 1860s and local streets retain the names of Vignes and Aliso today commemorating the location of the Sainsevain's Aliso Winery (Applied EarthWorks, Inc. and ICF International 2018).

William Wolfskill arrived in the Los Angeles area in the 1830s and is credited as being the first winemaker in California to export his wines, in 1849 (Dopson 1988:12). Other Southern California growers include Benjamin Davis Wilson, Louis Bouchet, Juan Domingo, William Logan, William George Chard, and Richard Laughlin (Jacobs 1975:139–174).

While most of the wine consumed during the peak years of the California Gold Rush appears to have come from abroad, particularly from France, local vintners eventually took advantage of the lucrative local demand for wine (Figure 73).

While Napa and Sonoma counties are often viewed as the wine capital of California today, in the 1870s Los Angeles County exceeded the Napa-Sonoma region in wine production, with 1,064,000 gallons as opposed to Sonoma's 750,000 gallons. Los Angeles County in the 1870s was also the leader in the production of brandy, with 59,600 gallons (CSAS 1872:392).

By the 1880s, floods, drought, and increased industrialization and growth began to push vineyards out of Los Angeles. The San Bernardino Valley and Redlands area had vineyards as early as 1859, when Benjamin Barton planted 80 acres in vines. By the late 1870s, his Brookside Winery in San Bernardino was shipping large quantities of wine to San Francisco (Sterner and Bischoff 2001). Cucamonga Valley, near Ontario, thrived as a vineyard producing area by the early 1900s, in part due to the vision of Secondo Guasti (Belden 1950).

Southern California's wine industry waned by the 1890s, while the industry in Northern California expanded. The first grapes were reportedly planted in the Mother Lode region in 1849 near the present-day community of Rescue in El Dorado County. In n Amador County, Benjamin Burt planted vineyards in the 1850s along Rancheria Creek near Amador City with Catawba, Isabella, and other foreign varieties (Costa 1994:3). Widespread production, however, did not begin until the next decade, and it was not until the 1870s that premium Mother Lode wines were produced.

Between 1870 and 1900, the wine industry witnessed strong growth, particularly in the Napa-Sonoma region (Figure 74). During the 19th century, vintners exhibited their products at local and regional agricultural fairs, competing with other vintners for recognition and marketing opportunities. The more successful vintners sometimes built lavish homes for themselves in

Figure 73. Picking grapes in Hanford, near Lemoore. Note the young children and women assisting in the picking. (San Joaquin Valley & Sierra Foothills Photo Heritage, kia0037, courtesy of the Kings County Library, Hanford.)

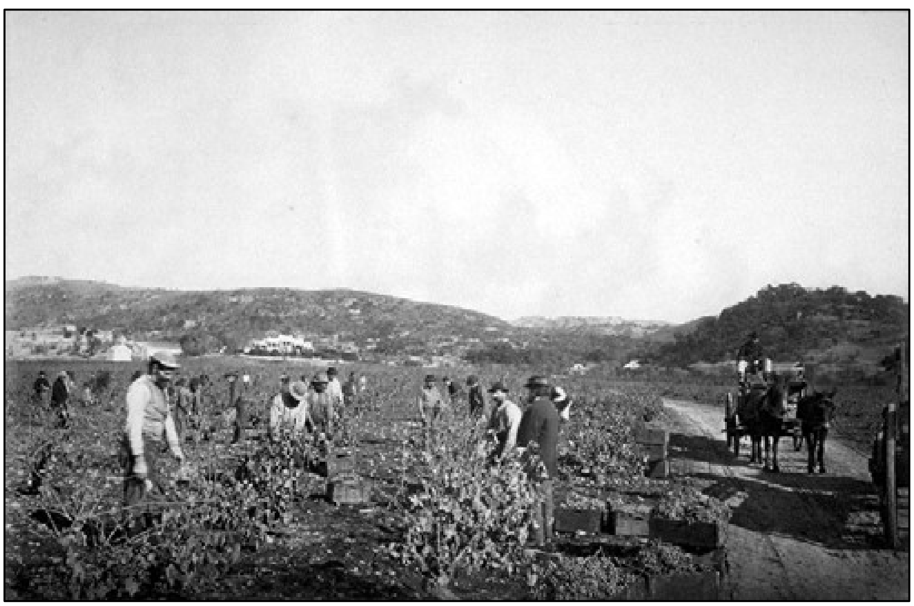

Figure 74. Cutting grapes at the Buena Vista Vineyard, Sonoma County, ca. 1880. (BANC PIC 1971.055:4169—ALB, Lone Mountain College Collection of Stereographs and Other Photographs by Eadweard Muybridge, BANC PIC 1971.055, courtesy of The Bancroft Library, University of California, Berkeley.)

styles popular at the time and expensive and utilitarian outbuildings to house their winemaking equipment, particularly in Southern California and the Napa and Sonoma valleys (refer to Chapter 3: Property Types for a discussion of popular architectural styles).

One example of a successful winemaker is Secondo Guasti. The area between Ontario Airport and the 10 freeway was home to Guasti Winery. Secondo Guasti, the son of an Italian wine merchant, left Italy and arrived in Los Angeles in 1878. He worked in a local restaurant, saving his money, and started a small winery in Los Angeles, and then a second one in Glendale. Legend has it that around 1900 he visited Cucamonga Valley (then a sandy desert), and found a remnant grapevine, left over from the Mexican Rancho era.

According to the local historians, Guasti dug down 24 feet through the sand, found water, and returned to Los Angeles. He began selling shares for his Italian Vineyard Company to fellow countrymen, raised $16,000, and purchased 1,500 acres of desert land. The company incorporated on October 4, 1900, with Secondo Guasti as president and J. Barlotti as Secretary. He planted hundreds of varieties of grapes, using grape cuttings imported from Italy, and grew his business. In 1917 the Italian Vineyard Company had over 5,000 acres planted in grapevines, along with 22 miles of narrow-gauge railroad. Secondo Guasti advertised his vineyard as the "Largest in the World." The winery produced 5 million gallons of wine in 1917, sent all over the world. The winery had stone packing houses and a stone winery building. The wine cellars were built of granite brought down from Alta Loma, located in the mountains about eight miles to the north. Initially, the winery produced fine table wines. During prohibition, they specialized in supplying sacramental, communion, and medicinal wines, including a world-famous dark red port (Colton Daily Courier 1922; Belden 1950).

To support the winery, Guasti built a small town designed after a village from the Piedmont area of Italy and a mansion for his family. He built an inn, schoolhouse, firehouse, post office, and hundreds of homes for the workers, primarily fellow countrymen from southern Italy who were recruited to work for him. In 1924 he and his wife built a Catholic church for the town, designed after a 17th century church found in Asti, his native village. San Secondo d'Asti took two years to build and was constructed by Italian and Mexican woodworkers and stonemasons hired by Guasti. The church was dedicated in 1926 and donated to the Catholic Church by the family in 1935. Today it is operated by the Diocese of San Bernardino (San Secondo d'Asti Catholic Church 2022).

Like other agricultural products, wine grapes were susceptible to pests, such as phylloxera, an insect of the aphid family. The phylloxera attacked vineyards in France in 1855 and eventually reached California where it slowly spread through the 1880s and 1890s. The phylloxera decimated vineyards in the Napa and Sonoma Valleys and then spread to other portions of the state before grafting techniques were able to abate it, including resistant root stock (Dopson 1988:84–85).

By 1914, the wine industry was powerful enough to successfully defeat a statewide ballot California Prohibition of Liquor measure that would have rendered California dry and formed a lobbying group, the Grape Protective Association, to protect its interests. Despite these successful efforts, the industry was given a major blow in 1919 with the passage of the Volstead

Act and the 18th Amendment to the Constitution establishing national Prohibition. In 1922 California passed a state prohibition law, the Wright Act. Prohibition lasted until 1933 when the 21st Amendment repealed it. During this time some winemakers like Guasti focused on producing sacramental, communal, and medicinal wines and experimented with other products (Belden 1950).

The Volstead Act outlawed the manufacture, sale and transport of alcoholic beverages, including wine. However, a provision in the Act allowed for limited home manufacture and consumption. During the 1920s home winemakers bought thousands of tons of fresh grapes. In some cases, those home winemakers were actually bootleggers who distributed the grapes out of state. Other winemakers dried their grapes, installing evaporators, or chose to sell their grapes for juice or syrups, for medicinal or religious use (Dopson 1988:91–93). While some of the state's vintners closed their doors for good during Prohibition, others sustained themselves through imaginative sales tactics or diversified their vineyards. By 1936, there were reportedly 257,000,000 grape vines in the state, as compared to 1,540,134 in 1856 (Butterfield 1938:32). Wine sales diminished during the Great Depression and through World War II, but California's wine industry emerged in the late 1950s and 1960s as one of the state's most important agricultural industries, as wine sales and winery production and development increased at an unprecedented rate.

The Guasti Winery also continued to thrive in the 1950s. Although the winery passed out of the family ownership in 1943, following the deaths of Secondo Guasti senior in 1927 and Secondo Guasti Junior in 1933, it remained an active industry well into the 1950s. In 1950, the San Bernardino Sun noted that over 4,000,000 gallons of wine were stored in the stone warehouses and the statewide corporation, the Fruit Industries, Ltd., operated a major plant at Guasti, known as the Cucamonga Growers Cooperative Winery (Belden 1950). The winery specialized in sweet dessert wines, cream sherries, and brandy. The stone winery building and some of the worker housing are visible today from the Ontario Airport runways.

Since the 1990s, the industry has expanded into the Central Valley and Sierra foothills. By 2020, California had 4,613 wineries (44 percent of the total United States wineries) and produced 81 percent of total wine produced in the United States. Vineyards and wineries stretch through the coast ranges from Napa County south to Los Angeles, and are a growing presence in the Central Valley around Lodi, and in the Sierra Nevada foothills from Nevada County south to Tuolumne County. California's wine industry was a $43.6 billion business in 2019, and the industry continues to grow (Wine Vine Analytics 2020).

Brandy, Sherry, and Cordials

Fermenting grapes into brandies and sherry, or other cordials, expanded along with winemaking during the 1860s. During the 19th century wineries often produced both wine and brandy. Brandy, in particular, saw widespread use during this period. The Brookside-Vasche Winery in San Bernardino County produced both wine and brandy and distributed it to markets on the East Coast.

Conti's stone distillery, built against a hillside in Newton (east of Placerville), El Dorado County, is one of the earliest known manufacturers of brandies in California. A stone cantina, where the serving of distilled beverages took place, stood next door to the distillery. The distillery, which is still standing, has circular walls and once included a wooden second story where the grapes were stored and crushed.

Similar distilleries emerged throughout California during the 1850s through the 1870s. Brandy production continued in California through the 20th century, although foreign competition resulted in a steady decline in its manufacture. Without further research, however, what impact California's distilled spirits industry had on the overall market is unclear because imports remained strong throughout the 19th century.

Beer

Beer manufacture began in California during the 1850s, made possible by the rapid expansion of local production of its chief ingredients—barley and hops. Barley production rose from just under 10,000 bushels in 1850 to over 17.5 million bushels by 1890. Kilns were used to make malt from the barley, but that mostly took place at breweries and not farms. During the late 1850s most of the hop production in the United States was in New York (Parsons 1940:110–116). The first hops in California were planted in 1856 (Hilton 2002). and by 1880 California had become a leader in the production of hops (Hilton 2002). Steady demand drove the market through the late 19th century. By the early 1900s hops production had become an important industry in California.

One the state's first hops-growing region was in Sonoma County. By the late 19th century California's Central Valley and the Northern California Coast had become important hops-growing regions. The Sacramento and San Joaquin valleys also successfully grew hops. Hops farms were developed along the rich fertile valleys along the Cosumnes River. Places like Hopland in Mendocino County and Sloughhouse in Sacramento County were noteworthy for their hops production, as were portions of the northern Bay Area.

As of 1900, California had approximately 2,000 ac. of hops in production (Figure 75). Sonoma County claimed responsibility for nearly one-half of all the hops grown in the state with one-third of the hops grown in or near Healdsburg (Healdsburg Museum and Historical Society 1983).

Tom Mahon, a fourth-generation hop farmer in Sacramento County, provided a detailed description of picking and curing hops for market along the Cosumnes River for the South County Citizens for Responsible Growth (Figure 76):

> Hop plants were spaced about six to eight feet apart in rows. The roots would send out new vines in the spring. They started by hand and then put up strings attached to the ground before finally attached to an overhead trellis at the other end. All summer the vines would grow, however, in the late summer the plants would start to lose their vigor. When time came to harvest the buds a large force of Chinese workers were assembled. These men would pull down the vines and pluck off every precious bud. The buds then went to a hop house, which is like a

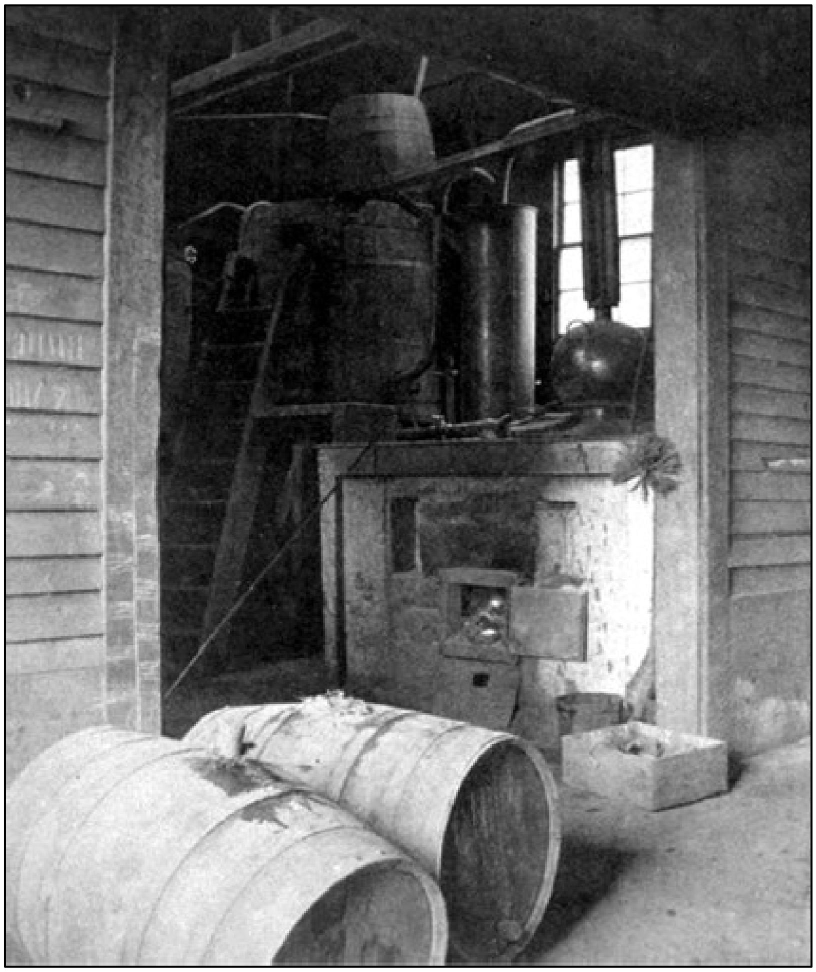

Figure 75. An interior view of the distillery at Buena Vista Vineyard, Sonoma County, ca. 1900s. (Photographer's Series: Photographic Illustrations of the Pacific Coast, 1988.103:15, courtesy of The Bancroft Library, University of California, Berkeley, public domain.)

kiln, for drying. Hop houses were two-story buildings. A burlap-slatted floor covered the room on top. On this floor, the buds would be poured out and raked around to create an even depth. The bottom floor, which was the ground, is where the heating unit was contained. This heating unit often came from the boiler of an old steam engine that no longer seemed safe to hold high pressure. These boilers came from old steamships used on the Sacramento or San Joaquin Rivers, as well as from stationary engines. Boilers received modification for use as a wood- burning heater by drilling a series of holes with a breast drill and then chiseling between the holes to break out square pieces to feed the fire and vent the smoke. Pans of sulfur were set near the boilers and the fires were stoked by someone experienced enough to keep the heat just right. Cordwood fed the boilers day and night and the hot sulfur released its noxious fumes to retard the

Figure 76. Hop fields on Sacramento River bottomlands, ca. 1920s. Note the poles and line used to suspend the hop plants off the ground. (BANC PIC 1977.019:14—ALB, Rivergarden Farms, BANC PIC 1977.019—ALB, courtesy of The Bancroft Library, University of California, Berkeley.)

> growth of mold and mildew and act as a preservative while the hops dried. The hops moved to a press after judged dry. The press was a stout box with a plunger. Two long pieces of burlap laid into the hops press at right angles to form a loose cross shape. The hops poured into the press and a horse in harness pulled on lines attached to a great, geared hoist to compress them into a bale. When the bale formed to the desired size and weight, two men with needles sewed the four sides and top closed. The bales would then be loaded on wagons. Around the turn of the century many of the Chinese laborers that had formerly worked in the fields had moved to the city presumably Stockton or Sacramento. Japanese immigrants began replacing the Chinese in the hops fields along the Cosumnes River (Caltrans 2007:80).

The industry required a large labor force and was also particularly vulnerable to the changing labor market and the instability created by a largely transient work force. Hop workers were often met with deplorable living and work conditions. On3 August 1913 agricultural hop workers at the Durst Ranch near Wheatland, Yuba County, demanded decent working conditions and eventually rioted, leading to four deaths and numerous injuries. This hop riot was the first major farm labor confrontation in California, although certainly not the last. For many reasons, the Wheatland Hop Riot was an important event in California agricultural labor relations. Perhaps the most important immediate change triggered by the riot was the establishment of the California Commission on Immigration and Housing the following year (1914). That same year, the Commission produced an advisory pamphlet with recommendations for improving work camp sanitation standards, among other things (Parker 1915).

By the early 1900s, however, hops growing in California fell victim to the economics of competition from the Pacific Northwest, which became a major hops-producing region after 1900 (Hilton 2002). By 1917 so many hops had been planted in California, Washington, Oregon, and Idaho that prices were plummeting. Instead of hops, alfalfa for hay was being planted along the Cosumnes River. The industry changed again as Prohibition affected hop growth. After Prohibition lifted, the majority of the hop production shifted to Oregon and Washington.

Large-scale hops production in California largely ended during the 1960s partially due to invasive pests that decimated crops. Today, hops are making a comeback aided by a growing market for craft beer and home brewing. While most hop farms are located in Oregon and Washington, there are a few dozen farmers growing hops on about 80 ac. of land in Marin and Sonoma counties and in the Central Valley around Stockton and Fresno (Mendonca 2019).

The cultural residue of California's wine, brandy, and hops manufacturing remains evident in the large number of geomorphic provinces in the state. Manufacturing buildings and structures, terraced walls that once supported vineyards or hops fields, barns, and equipment, provide visual evidence of these important industries.

Livestock Industry

California's economy before statehood included the consumption and production of meat products from cattle, sheep, and hogs. In addition, horses were a necessity on ranches and horse farms trained animals for herding, cutting herds, and other highly specialized skills. Sheep provided an important commodity, wool, while cattle were a source of tallow, hides, butter, cheese, and milk. Ranchers learned early that adaptation to market fluctuation and environmental events was needed to survive. Thus, a ranch may have included thousands of sheep, and a herd of cattle, while at the same time raising horses, and growing grain crops to feed the animals. It was common for a rancher who started in sheep to switch to cattle, back to sheep, back to cattle, and even start to raise turkeys or chickens as part of the cycle to retain the ranch. This practice created a ranch landscape with barns, outbuildings, outlying camps, pastures, corrals, and facilities to accommodate all types of livestock.

Sheep

The first domestic sheep arrived in California in 1769, brought in by the Franciscans. By 1825, an estimated one million sheep were raised to supply the 17 missions scattered throughout Alta California. Spinning and weaving the wool became the job of Native women and children, who produced blankets and clothes for the mission population. At the same time, cattle became a staple on rancheros, providing meat, pelts, and tallow for sale to trading ships roaming the Pacific (Miller 1930:5–6).

The discovery of gold at Sutter's Mill and the rapid influx of new immigrants into California resulted in an immediate demand for meat products and other animal by-products that far exceeded the available supply. In 1848, lambs sold for $12.00 and wethers (castrated male sheep) for $15.00. In response, many of the mission livestock were sold. By 1850, only 17,500 head of sheep remained in California (Miller 1930). Ranchers, recognizing the shortages of meat products in the state, drove cattle, sheep, and hogs overland or transported them aboard ships bound for California, along with other live animals, including poultry. During the 1850s, emigrants drove large herds of sheep overland into California. Kit Carson receives credit for bringing a large herd into California in 1853 to 1854. Carson purchased the sheep in New Mexico for 50 cents a head and sold them in California for $5.50 a head, making a handsome profit (Quaife 1935). From 1852 to 1857 an estimated 551,000 sheep were driven into California from New Mexico while thousands more were transported by ship from Australia, Vermont, New York, Ohio, and Pennsylvania (Miller 1930:6). Because of the rapid immigration into California during the 1850s, meat products were in high demand, and sheep constituted one of the principal sources of food, although not always the most desirable form of food.

In 1860, the California Sheep and Wool Growers Association organized "to foster and promote the enterprise of sheep breeding and wool growing" (Miller 1930:6-7). By the 1860s and 1870s, much of the northern end of the San Joaquin Valley and eastward into the foothills of the Sierra Nevada had well-established herds of sheep. As forage diminished in the lower foothills during the late spring, herders brought their sheep into the higher elevations of the Sierra where sufficient browse grew. In the Sierra, seasonal sheep camps were established, evidenced by rock cairns, holding pens, and trail markers. In some instances, camps included a simple wood-framed cabin, while in other cases they consisted of canvas tents or simply a sheltered location where the flock spent the night to avoid loss to predators, particularly coyotes. The home ranch, usually located in the valleys at the edge of the foothills, was generally much more substantial, often including a shearing barn or shed, feed barn, ranch house, lambing sheds, corrals, and other outbuildings, such as a slaughterhouse, if the sheep and lambs were raised for consumption.

American sheep, such as Merinos, did not replace what some people considered inferior New Mexico and Arizona sheep (sheep introduced from Spain in the early 1800s) until the 1860s and 1870s. One of the state's earliest and most successful breeders was William Wells Hollister. Hollister traveled to Ohio and purchased six thousand Merino sheep that he herded to California, although only two thousand survived the long journey (Solomons 1939:178). By 1875, records suggest that seven million head of sheep ranged through California's mountains, hills, and valleys, and in 1876, 56.5 million pounds of wool were clipped (Solomons 1939:180). The completion of the Transcontinental Railroad in 1869 allowed for the shipping of sheep and wool to points east, opening new markets and increasing the profitability for ranchers.

Irish, Welsh, and a few Basque sheepherders enjoyed some success establishing sizeable herds and ranches in the mid-19th century. The decade between 1880 and 1890 saw a decline in the sheep herds attributed to low prices of wool, increased use of valley and foothill ranches for fruit, and loss of feed through overgrazing. California ranchers drove herds across the mountains to intermountain states. Wickson (1923:247) estimated that in 1881 alone 150,000 sheep were driven east from Southern California and another 75,000 from Northern California. Numbers continued to decrease into the 1920s as grazing taxes were charged in newly formed National Forests.

Sheep herding followed a seasonal cycle. As part of this annual cycle, sheep were driven or transported into the higher elevations within the Sierra Nevada Mountains in the spring and taken out again in the fall. Summer grazing of sheep required constant movement and herders were employed to ensure that sheep were continually moving, getting adequate feed, and were protected from predators (Mallea-Olaetxe 2000:8).

Base camps were typically established at strategic locations within a given range or allotment to provide logistical support for these annual operations. Such camps would retain a camp tender (who was also often a Basque individual) that would supply the herders in the field and report back to owners regarding the health of the bands and communicate any support that might be required. As part of their duties, the camp tender would typically prepare food, including large quantities of bread, for the herders and deliver the food by horse to the outlying shepherds (Baker 2004; Figure 77).

The ubiquitous reminders in the high Sierra of Basque herding are the numerous carved aspen trees (Figure 78). Rock cairns, stone lambing corrals, and seasonal campsites also provide reminders of sheepherders in the Sierra during the early 1900s, as do traditional outdoor ovens found at high Sierra base camps from Lassen to Kern counties where shepherds from Spain, France, Italy, and other places tended the sheep in summer months, supported by a base camp cook (Baker 2004) (Figure 79).

As with many agricultural products, the sheep industry is a tale of ebbs and flows. In the second half of the 19th century the industry was at a peak. Incidences of hoof and mouth and other diseases, combined with the low price of wool and environmental damage done by free-ranging sheep also affected the business. In the 1920s and 1930s however, the industry began to rise. In 1922 there were 2.5 million sheep in California; that number rose to nearly 4.0 million in 1930 (Miller 1930:4). At that time the majority of home ranches were located in the Sacramento and San Joaquin valleys with easy access to the Coast Range and Sierra summer grazing lands (Miller 1930:8).

In 1942 an estimated three million sheep were raised in California. By 1950 that number had decreased to 1.6 million, a drop of nearly 50 percent. Numerous factors caused this sharp decline. First, California’s population increased by 50 percent between 1940 and 1950 and land that had been used for grazing was converted for housing or crops to feed the growing population. Second, cattle ranching and farming were more profitable than sheep herding, and the demand was low. Third, shepherds and skilled workers for sheep ranches were not available, and labor costs were high, while wool prices were low. Fourth, rangeland available for grazing allotment leases on the National Forests and Bureau of Land Management lands decreased, as timber became a priority, and sheep ranchers competed with cattle ranchers for allotments. Fifth, the presence of noxious brush on rangeland and increasing numbers of predators, like dogs, in the more heavily populated areas resulted in the loss of stock. Finally,

Figure 77. Irene Gallues Giosi and Ernest Giosi removing bread from a Basque oven built in 1927 at Wheeler Sheep Camp, Tahoe National Forest, 1941. The oven was used to bake fresh bread and stews for shepherds. (Courtesy of the Gallues family collection.)

the popularity of lamb and mutton in American diets was replaced by beef, pork, and fowl (Voorhies and Rudd 1950). By 2010 California's sheep herds numbered only 610,000; in 2017 the number decreased to 575,000 (California Department of Food and Agriculture 2017).

Cattle

California's cattle industry, similar to sheep herding, traces its beginnings back to the Spanish mission system. Brought in by the Franciscans as a meat source, over 400,000 head of cattle grazed in and around the 17 missions by 1835. Processing hides and tallow supported the missions and was a key element of the early *Californio* economy. Many of today's ranches began during this period as expansive Spanish and later Mexican land grants. Between 1849 and 1862 the cattle industry boomed throughout California. The Gold Rush created a demand for beef and cattle prices rose rapidly to $75 per head for cattle delivered direct to San Francisco, or $40 a head if purchased from the ranch. It has been estimated that 700 to 1,000 animals were driven from Southern California rancheros north, averaging 10 to 15 miles a day, to meet the

Figure 78. Basque carving on an Aspen Tree found in Diamond Mountain Range, Lassen County. (Courtesy PAR Environmental Services, Inc.)

Figure 79. Basque shepherd watching over the sheep in Tuolumne Meadows, Yosemite, ca. 1910. (Courtesy of the National Park Service, public domain.)

immediate need for beef. As the local ranchero sources were depleted, cattle were driven over the Sierra, across the state and to San Francisco, Sacramento, Marysville, and other booming towns. By the end of 1853 an estimated 62,000 head entered California from Missouri over the major immigrant roads (California cattlemen Association 2017; Ryan and Breschini 2010).

By 1856 sheep were the dominate livestock and cattle prices dropped to $18 per head. Major floods hit the state from Christmas, 1861 through New Year's Day in 1862, and an estimated 200,000 cattle were swept away and killed. This major flood event was followed by two years of extreme drought. This combination of flood and drought decimated the old herds of Spanish cattle, leading cattlemen to drive longhorns from Texas and pursue other breeds from other states to strengthen and restock their herds. During the drought of 1863 to 1865, herders drove out both cattle and sheep from their home range into the foothills or coastal mountains in search of feed. During the drought, hundreds of thousands of cattle and sheep perished or were slaughtered for their meat. The greatest losses reportedly occurred in the San Joaquin Valley and in Southern California (Pulling 1965:1–3). As ranches failed, companies like Miller and Lux, Kern County Land Company, and Sterns and Hearst began purchasing the remaining cattle, often for as little as $8 per head, and building vast livestock ranches. Between 1876 and 1877, another drought struck California resulting in the loss of thousands of cattle representing 75 percent of herds "on the ranges in Fresno, Tulare, and Kern counties, and during that drought hundreds of cattle were slaughtered to save the hides" (Pulling 1965:3). During the 1870s and 1880s irrigated pastures or wells helped sustain feed within home ranges when droughts occurred.

Even the most successful ranches were unsuccessful at preventing disease during much of the 19th century. As Pulling points out, the greatest scourge among California cattle herds was that of Texas or Southern fever. In 1866, the president of the State Board of Agriculture warned California cattlemen of the possibility that the cattle then arriving from Texas might introduce the disease to California herds. Yet, no quarantine occurred. By 1887, losses from the disease had become so great in the state that the USDA sent a special investigator to determine the nature, and if possible, the cause of the disease (Pulling 1965:3). Other diseases included blackleg, and anthrax. Together, these diseases resulted in a loss of 23,000 head of cattle between 1870 and 1884 (Pulling 1965). Pulling notes that cattle ticks, found to cause Texas fever, were especially difficult and deadly to cattle. In 1901 only two counties did not have cattle ticks. In 1906 inspectors checked 1,015 herds in 11 counties and found that half of the herds had tick infestations, particularly in the region between San Luis Obispo and Orange counties. Although an intensive, widespread effort began at that time to eradicate the pest, it took until 1917 (and the deaths of thousands of cattle) before the ticks, and resultant disease, were gone (Pulling 1965).

There appear to be three levels of ranches associated with the cattle industry that evolved in California: the large corporate or company ranch (generally exceeding 160 ac.), the mid-sized ranch (from 40 to 160 ac. on average), and the small ranch (from 1 to 40 ac.). Generally, the privatization of most of the state's grazing lands by the 1870s rarely allowed for the upward mobility from the mid-sized ranch to the large corporate ranch. In addition, large companies or corporations such as Miller and Lux, controlled the largest tracts of land and had the advantages of better capitalization and market dominance (Igler 2001).

Small ranchers and farmers, however, still had opportunities to expand their land holdings and acquire larger herds or greater acreage, generally through mortgaging their property. Examples of each level of ranch appear throughout the state's grazing lands, as do ancillary properties, needed to facilitate patterns of transhumance and the marketing of products. Small ranches generally created by individual homesteads, may consist of the main ranch house, barn, a windmill, slaughterhouse, corrals, and pastures (Figure 80). Mid-sized ranches may comprise multiple homesteads joined to form one large parcel or discontiguous ranches with the primary or home ranch and then grazing land located elsewhere. Large or corporate or company ranches may include multiple barns, feed lots, elaborate water systems, loading chutes, slaughterhouses, and bunkhouses for workers. Large ranches often consume thousands of acres that may be separated by hundreds of miles (Figure 81). The smallest property types are ranchettes, which became popular after the turn of the century, and were generally less than 40 ac. and often as little as 5 ac. Ranches, such as that operated by James Haggin in Sacramento, were carefully planned with buildings separated by 100 feet or more as a fire deterrent.

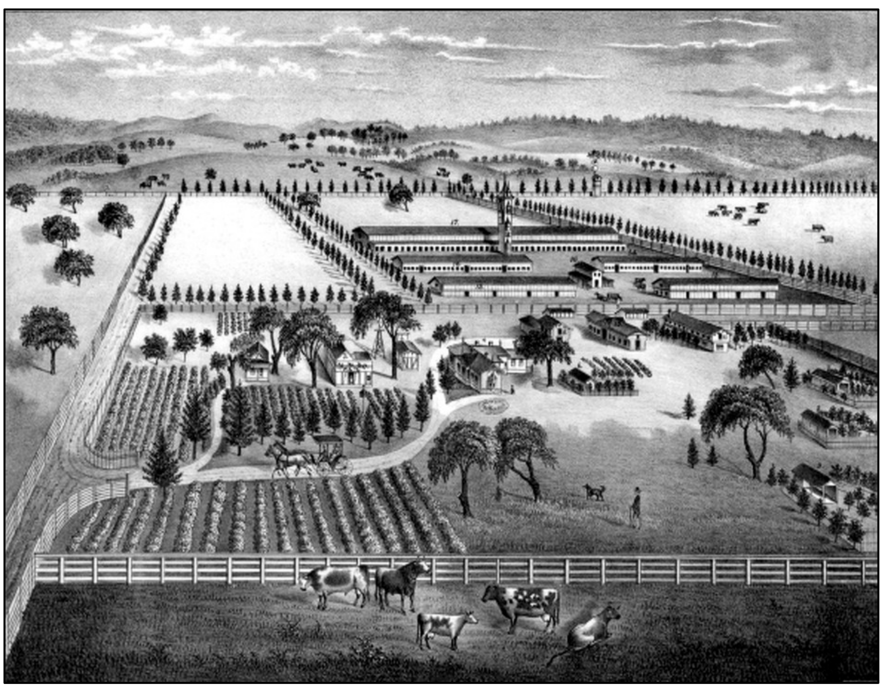

Figure 80. Peter Coutts' Ayrshire Farm, Palo Alto, 1876. The illustration suggests a strict spatial order to the farm that was more often than not idealized by the artist. Note the rows of trees lining pastureland and roads. (Originally Published by Thompson & West, 1876, republished by David Rumsey Digital Map Collection, public domain.)

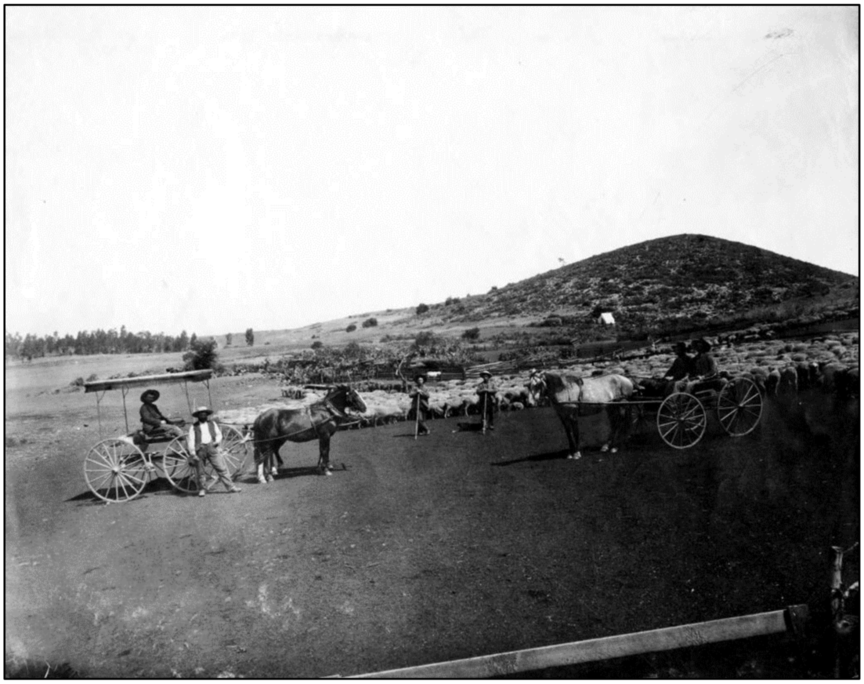

Figure 81. A sheep ranch in the hills near Anaheim, ca. 1880s. Note the denuding of virtually all the vegetation from intensive grazing in one area. (Anaheim Public Library Photograph Collection on Anaheim Local History, P25, courtesy of the Anaheim Public Library, Anaheim.)

The creation of cattle and sheep ranches followed a similar pattern, as did the creation of farms, often taking advantage of the current land laws. Ranchers often abused regulations governing public land use, particularly where marginal lands existed within the Central and San Joaquin valleys. Miller and Lux, among others, monopolized vast tracts of land within the San Joaquin Valley (Igler 2001:60–61). Acquiring large acreages helped sustain herds of cattle and sheep because of the unpredictability of rainfall and the uncertainty of forage or browse each year. Sheep and cattle followed a cycle of transhumance. Lower elevations provided forage in the winter and spring. Livestock were driven or transported to high elevations in summer and fall (California Cattlemen's Association 2017).

Whereas farmers generally concentrated their improvements, cattle and sheep ranchers spread their improvements over large areas of land and frequently moved from one location to another as the need arose. This pattern of land use required an adequate labor force and a general knowledge of husbandry if large herds of animals were involved. A similar pattern of land ownership evolved in other parts of California where the predominant industry was grazing livestock. Most of the western San Joaquin Valley was consolidated into vast ranches, particularly those owned by Miller and Lux. With the advent of the railroad, shipping cattle between states became more pragmatic, but due to rough handling, cattle often arrived in poor condition (Igler 2001:150).

As Breschini et al. notes, “the shift in economic dominance from cattle raising to grain farming was marked by a shift in political clout from the stockmen to the farmers with the passage of the ‘No- Fence Law’ in 1872” (Breschini et al. 1983). Where livestock formerly roamed freely, the new law required fencing them in so they would not damage crops. The law did not apply uniformly to all California counties, and regular enforcement most likely never occurred.

By the 1910s, cattlemen often used high country meadows and woods for open graze ranching, leasing grazing allotments from the newly-formed Forest Service and Bureau of Land Management. By 1910 California was home to 1.6 million head of cattle, but overgrazing had decimated the rangeland. The Taylor Grazing Act of 1934 was created in response to overgrazing and resultant related problems like erosion. The Act created grazing districts and regulated allotments with restrictions of the number of animals allowed to graze in a year (Larson-Praplan 2014).

Like shepherds, cowboys often camped out on the open range. During round up and branding season, cowboys set up temporary holding pens and corrals to control cattle (Figure 82). By the 1950s the cattle industry was changing, as ranches were split up, reduced in size, or abandoned under the wave of urban sprawl. As the loss of land increased, policies were put in place to protect rangeland from development. Today, grazing is used for vegetation management and cattle lands are viewed as open space. Beef lots, such as Harris Ranch, manage vast numbers of animals. Grazing allotments are still used in high county, especially as niche markets focused on grass-fed, free-range cattle raised in a drug free environment. Today, the cattle industry is in a slow decline. In 2007, there were about 5.5 million head of cattle raised on California ranches and another 204,000 on feed lots. By 2016, these numbers decreased to a little over 5 million on ranches and only 150,000 head on large feedlots (California Department of Food and Agriculture 2017).

Horses

Horses have played an integral part in California’s agriculture development. Spanish and Mexican vaqueros were renowned for breaking and training horses and their use of the horse to rope and herd cattle. During the Spanish period, Native Americans were trained as vaqueros to raise cattle for the Spanish missions. Because of the special skills required to learn the trade and the dangerous nature of the job, vaqueros earned high status and prestige at the Spanish missions. As mission cattle herds grew, so did the number of vaqueros needed to manage them. At Mission Santa Clara, a ranch foreman oversaw 25 vaqueros, all of whom were Native American (Bacich 2020).

After the Spanish period ended, the ranching economy expanded through trade of hides and tallow. Vaqueros were integral to the development of this industry in California (Bacich 2020). Among other things, leather was an important component in many new technologies, with leather belts used primarily to turn wheels and conveyors of power equipment. Through the work of vaqueros, California was able to join the global hide and tallow market, with Californian products being sold to the industrial markets of the world (California State Parks 2012).

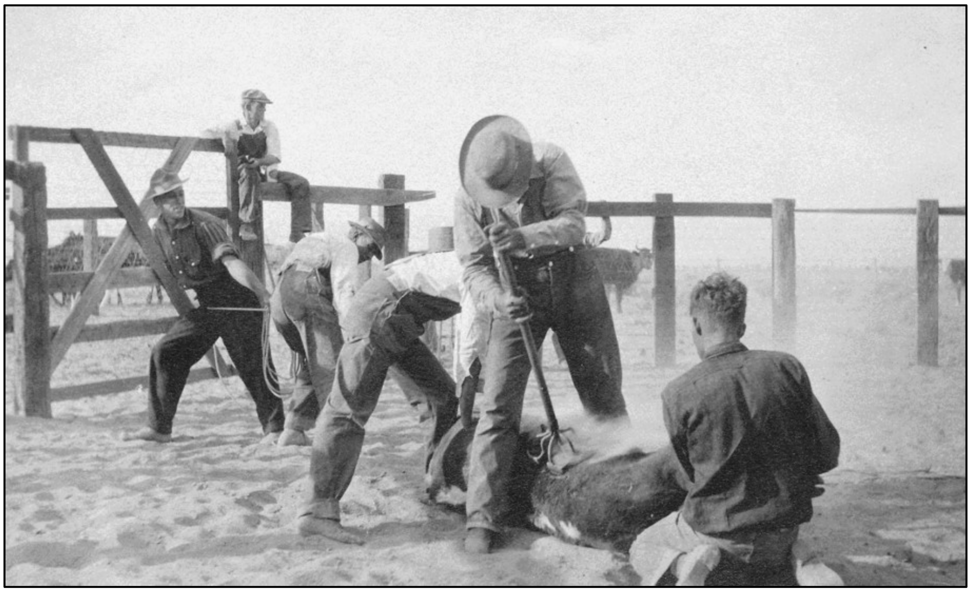

Figure 82. Branding cattle on the Calloway Ranch near Lone Pine, ca. 1930s. (Courtesy of the Eastern California Museum, Independence.)

Throughout the 19th century, Native Americans continued to work as vaqueros throughout California. For many, the vaquero lifestyle allowed them to preserve their native heritage (Bacich 2020).

The Gold Rush prompted a demand for meat when hundreds of thousands flocked from all over the world to try their hand at gold mining (California State Parks 2012). Because California was unaccustomed to supporting great numbers of European Americans who desired beef, this demand was first met by the importation of sheep from outside the state. Great sums of sheep (approximately 551,000) were driven from New Mexico to meet this demand (Weir and Albaugh 1954:1). Thereafter, cattle ranching would dominate the California agriculture industry for some time (California State Parks 2012). Horse ranches began development soon after the Gold Rush, with ranches focusing on various breeds. The Morgan horse, for example, was brought across the plains during the Gold Rush, and a ranch started in Point Reyes to breed, train, and sell the Morgan's (Tippin 2019). As these ranches developed, European American pioneers relied heavily on the work of Mexican vaqueros to establish and manage their herds of cattle (Library of Congress 2022).

Rancho del Paso in Sacramento County had cattle, sheep, and a breeding program for harness horses, ponies, and mules in the 1860s. A native Kentuckian, James Ben Ali Haggin had a passion for racehorses and began to breed and train thoroughbreds. In 1873, he hired John Mackey, a horse trainer, to run the rancho. Under Mackey's guidance, backed by Haggin's considerable wealth, Rancho del Paso became synonymous with well-trained, thoughtfully-bred racehorses. Haggin's racehorses dominated the racing world for nearly 20 years. One chestnut, Salvator, held the mile record and was named the United States Horse of the Year in 1889 and 1890. At its peak the Rancho had 30 stallions and 562 mares, the largest breeding operation in the world both then and now. The sole purpose of the rancho was to bread racehorses and all agricultural endeavors supported that effort. In 1900 the Rancho had 26 barns and paddocks and fields of hay and oats. Employees living on the Rancho included Mackey, the head trainer and manager, four horse trainers, four farriers, four Chinese cooks, six hostlers, a veterinarian, five-day laborers, a maid, and several jockeys (Steinmetz 2009:19). In 1891 Haggin retired from racing, leaving the operation of his breeding farm to Mackey. In 1905 he sold all his Sacramento stock in an auction (Miller 1982:2).

While Rancho del Paso was famous worldwide, Leland Stanford developed research programs to study horses and breeds, Lucky Baldwin established a ranch in Santa Ana, and Arabians were bred and trained starting in 1925 by the Kellogg family at El Cajon (Frank 1964). State legislature banned betting on horse racing in 1910, resulting in the closure of most racetracks. While racing continued at fairs and similar venues, the industry primarily was shut down in the state until the 1930s. Despite this ban on betting, California farms continued to breed and train horses. In 1933 California passed Proposition 5, legalizing pari-mutuel wagering on horses, leading to the return of harness and horse races. Fairplex Park in Pomona opened in September 1933. When Bay Meadows opened in November of 1934, 15,000 fans were in attendance to watch the eight races. Finally, Santa Anita Racetrack opened on Christmas Day, 1934, with over thirty thousand attendees (CalRacing 2011).

California's racing industry grew in stature in 1938 when Seabiscuit and jockey George Woolf won a historic $25,000 match race before 20,000 fans, an event broadcast nationwide to a radio audience. Today, Santa Anita, Bay Meadows, and other tracks hold races, continuing a long history of horse breeding. In addition, horse farms in Santa Maria, Sacramento, and other counties train animals for Olympic level events, such as dressage. In 2017 there were 700,000 horses on farms in California, representing a $7 billion industry (Frank 1964).

Hogs

Unlike cattle and sheep operations, hog farms never attained the size and economic value of other livestock industries. Hogs likely arrived in California with the Spanish in the 1700s; the 17 missions all reported sows and swine by the 1830s. While not as common as sheep or cattle, accounts of pigs appear in diaries and articles written during the Gold Rush. Etienne Derbec, a French journalist reporting from San Francisco, noted that spaces separating the shacks and houses were often filled with domestic animals. He wrote: "Horses, mules, sows, pigs, chickens live in freedom in these unusual sections [of town], and you, sir, can imagine all the inconveniences such a population brings in its train: one's sense of smell and of hearing are, as you can well believe, somewhat offended." (Nasatir 1864:170). Mary Ballou worked at Meredith's Hotel in Folsom, California in 1851 and wrote a letter to her son on 30 October 1852 relaying:

> Somtimes [sic] I am feeding my chickens and then again I am scareing [sic] the Hogs out of my kitchen and driving the mules out of my Dining Room. You can see by the description of that I have given you of my kitchen that anything can walk into the kitchen that chooses to walk in and there being no door to shut from the kitchen into the Dining room so you see the Hogs and mules can walk in any time of day or night if they choose to do so. somtimes [sic] I am up all times a night scaring the Hogs and mules out of the House [Ballou 1852].

The lack of literature regarding hog farming in California during the 19th century may indicate that hogs, while a ubiquitous part of California's farm and ranch industry, were not commercially farmed. The exception to this assumption may be hogs raised for consumption by Chinese, particularly in urban environments. These farms are often undocumented and are interpreted as viable from hog yards depicted on historic Fire Insurance maps (Maniery 1997).

During the 19th century, United States Agricultural Census records indicate that virtually every farm kept a few hogs, likely for domestic consumption and refuse disposal. Smokehouses were common occurrences and farmers smoked their own bacon. Butchering was often outsourced to local shops, with the farmers paying for the service in product. Farms devoted solely to hog production do not appear to be as common as farms that devoted part of their operation to hog farming.

While records on swine production generally are lacking, industrial census records for slaughterhouses provide some information. For example, Joe Miller, a Butte County butcher operating near Oroville in 1880, processed 2000 beef, 350 sheep and 100 hogs in 1880. While most of the meat from the cattle and sheep were sold fresh, this was not the case for the pork. He sold 200 pounds of fresh hog meat, salted and then sold another 1,800 pounds, cured 1,000 pounds for bacon, and rendered 250 pounds of lard. Selling the products from the hogs was more labor intensive than butchering and selling fresh meat (U.S. Bureau of the Census 1880).

In contrast, three Chinese butchers operated out of Oroville and were also enumerated in 1880. Combined, these three slaughtered 1,176 hogs, and reportedly did not process any beef or sheep. The hog meat was sold fresh, a total of 106,090 pounds of meat. They also rendered and sold lard, totaling 6,050 pounds (U.S. Bureau of the Census 1880). These figures indicate that while hogs may not have been farmed by mainstream populations, the Chinese likely did raise and sell hogs. Fire insurance maps of Chinese communities such as Folsom, in fact, depict hog pens and associated corrals, often in association with butcher shops, and refuse deposits with faunal material found in these urban Chinese communities are dominated by pork bones (Maniery et al. 1993).

Pork remained a popular food through the 19th and 20th century and was a staple on many menus in restaurants throughout the state. Today, hog farms are still minimal, compared to other livestock. In 2007, the CDFA reported only 155,000 animals in the state. This number decreased to 89,000 by 2016 (CDFA 2017:90–91).

By the early 1900s, the commercial meat industry shifted to a more industrial model, away from butchering at farms and corner butcher shops in cities to one that emphasized larger packing plants. This trend resulted in greater emphasis on feedlots as an intermediary stage of production. Range animals together with hogs were an important part of California's economy during the 19th and 20th centuries. The cattle industry was well entrenched in the state by the 1880s, and large ranchers, such as Miller and Lux, held control over vast acreages of land in the San Joaquin Valley.

Dairy Industry

In the 1700s when the Spanish missionaries entered California, they brought with them dairy cows. Milk and cheese were produced at the missions and sold to outlying ranchos. The first commercial dairy in California is credited to the Russians at Fort Ross on the Sonoma Coast. Between 1812 and 1841 Russians working the dairy at the Fort shipped butter and cheese to Alaska on a regular basis (Bishop and Shaffer 2005). Homesteads and ranches throughout the state often had a few milk cows for domestic use.

As with cattle and sheep, the Gold Rush recreated an immediate demand for butter and cheese. Immigrants who crossed the plains brought their dairy cows and eventually herds were kept and maintained next to urban centers to supply fresh dairy products to the growing population. California's Argonauts brought with them their desire for milk, cheese, and butter, and in certain cases, they also brought along the family cow to supply those needs. Surplus milk generally sold to the miners for a considerable profit. This excerpt from Phillip Lynch of Ophir, Placer County, in 1851 underscores their success:

> About October 1, 1851, I bought two American cows fresh with young for $400. These cows have averaged 12 quarts each per day, which I have sold at 50 cents per quart, totaling $720 for the two months. These cows I have fed on hay at $80 per ton, meal at $8 cwt and potatoes at $4 per cwt, at a cost not over $100 for the two months. I would not sell my two cows for $1,000 [Santos 1994].

San Francisco became the first major dairy center in the state. In 1850 California produced 705 pounds of butter and 150 pounds of cheese (Bishop and Schaffer 2005).

In 1870 to 1871, Sonoma County produced 850,250 pounds of butter and 200,250 pounds of cheese. Santa Clara County, however, exceeded Sonoma County in cheese production, having produced 2,375,440 pounds in 1870 to 1871 (CSAS 1872:392). The growth of the industry is illustrated in the amount of milk and cheese produced in 1880. In that year California produced 16 million pounds of butter and 3.7 million pounds of cheese. The production of butter rose to 52.5 million pounds and cheese rose to 43 million pounds by 1910 (Santos 1994:180). Other dairy regions in the state included San Luis Obispo County, San Bernardino County, the San Gabriel Valley, and by the 1900s, portions of the San Joaquin Valley (Bishop and Schaffer 2005).

Irrigation went hand in hand with the expansion of dairying in California because of the need to grow forage year-round. Irrigation also proved responsible for a much broader diversification of agricultural products, which this study treats elsewhere.

One of the first regions to develop as a center for dairy products was along the Northern California Coast. Because of heightened demand, abundant rain, and extensive natural pasturage, this region was ideal for dairies. A second dairy region developed on the Central California Coast. Rainfall is less and temperatures in this region are milder than the northern coast, so dairies in this region generally stockpiled more feed and irrigated their pastures more frequently. The third geomorphic province or region for concentrated dairying is within the vast Central Valley, which is arid but has moderate rainfall during the winter months. Irrigation and the stockpiling of hay for winter-feeding were critical in this region because of the uncertainty of rainfall. The final concentrated dairying region is the Sierra Nevada. In this region, snowfall exceeds rain, and the summer months are relatively dry with abundant natural feed.

According to Santos, dairy cattle introduced into California during the 1850s and 1860s were predominantly of the Jersey breed (Santos 1994:178). Cowboys drove shorthorn cattle from Texas to California to feed the hungry miners. Shorthorn cattle, although primarily used for meat, better served dairymen than the older Mexican stock. Dairy farmers and industries desired sturdy stock because of their use for meat as well as for dairying. In fact, the introduction of Devons and Durhams in the early 1850s abided by this model, followed during the 1860s by Alderneys and Ayrshires (California Farmer 1854; Santos 1994:178). As the urban population grew, the demand increased for dairy products, and by the mid-1870s, the Jersey became the dominant breed of dairy cattle in California.

Overall, the Jersey produced more butterfat, a critical ingredient for butter and cheese production. During the 1880s, Holstein-Friesians were introduced to California and soon became the leading dairy breed in the state. The Holstein-Friesian reportedly produced more milk and stood larger and stronger than the Jersey (Santos 1994:178–179). This breed of cattle is highly popularized in the public mind, serving as the quintessential cow featuring the stereotypical black on white coloring, popularly depicted as a happier breed of cattle.

California had a reported 210,000 dairy cows by 1860, rising to 307,000 in 1900, and 382,000 by 1910 (Figure 83). The Central Valley reportedly had 101,000 dairy cows in 1860, and that number reached 163,000 head by 1910. The *Overland Monthly* commented in 1870 that California had an “estimated one thousand dairies… containing from twenty to one hundred cows each” (Santos 1994:179).

California also produced its own distinctive brand of cheeses. Of particular importance was the cheese known commonly as “Monterey Jack.” According to Santos, David Jacks, a Scottish immigrant, owned several dairies in the Monterey Peninsula and developed a cheese based on the Swiss method of production. The cheese had high moisture, cured quickly, and had the texture of soft cheddar, which had a distinctive flavor of its own. Monterey Jack cheese shipped east and ultimately gained widespread popularity by the 1890s (California Milk Advisory Board 2002; Santos 1994:180–181). A number of important technological changes helped propel dairying into one of the state’s most important industries (Figure 84). California’s dairying success “came about with the introduction of the cream separator, refrigeration, irrigation, the milking machine, and extensive planting of alfalfa” (Santos 1994:183). Santos provides a description of how dairymen separated cream:

> The cream separator was first introduced in the United States in 1879. It was initially powered by steam. Prior to the development of the cream separator, separating cream from milk was done by placing milk in shallow pans and allowing the cream to rise to the top. The cream was skimmed off and processed, and the skimmed milk was fed to hogs or calves. In using the new cream separator, milk was fed into a bowl traveling at 6,000 to 7,000 rpms. The heavy particles found in the milk, usually manure or flies, were thrown at the top part of the bowl followed by the lighter particles of butterfat. The butterfat

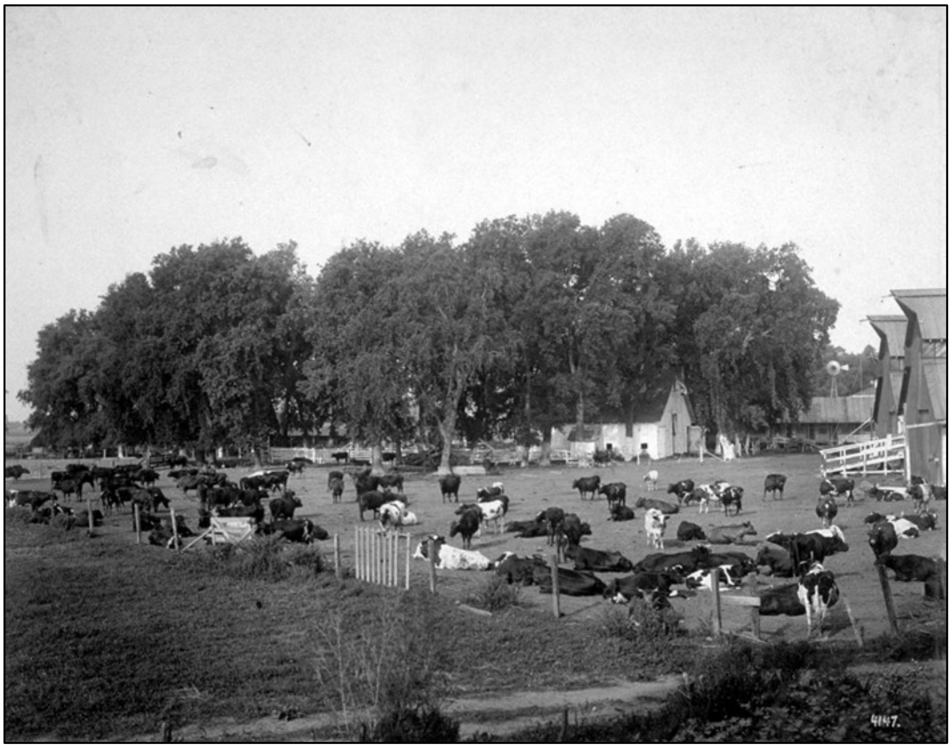

Figure 83. Near Rivergarden Farms, Colusa and Yolo counties. (BANC PIC 1977.019:17—ALB, Rivergarden Farms, BANC PIC 1977.019--ALB, courtesy of The Bancroft Library, University of California, Berkeley.)

Figure 84. California Fruit Exchange Dairy, Graeagle, Plumas County, 1939. Note the use of native cobblestones and the parapet walls. (Eastman's Originals Collection, Group 5, B-904, courtesy of the Department of Special Collections, University of California Library, Davis.)

> escaped through a tube while the skimmed milk below flowed out through another tube. With the introduction of the hand separator by Carl Gustaf De Laval of Sweden, dairymen could separate cream from milk at home rather than taking it to the creamery or separator stations. This relieved the dairymen from having to transport the skimmed milk back to their farms. milking machines had to be cost-effective, easy to use, maintain, clean, and not injurious to the cow. Most milkers welcomed the machine as it freed them from the monotony and drudgery of milking by hand. It also gave them valuable time to perform other duties. Centralized creameries were soon located near the dairies, and dairies were developed farther out in the countryside [Santos 1994:183–184].

Dairymen, along with the public, were concerned about the quality and quantity of milk produced. According to Santos (1994:185):

> Experimentation found that everything depended upon the skill and technique of the milker. In certain cases, older cows held up their milk and had to have their udders massaged as done when milked by hand. Generally, if cows were introduced to the milking machines as heifers, very little difficulty existed. By the 1920s and 1930s, dairymen began to breed stock selectively to produce a cow whose physiology was more conducive to machine milking.

Early California dairying did not take into account the potential for water-borne or fecal-borne diseases, particularly given the lack of scientific information available at the time. As dairying increased, so did interest in scientific principles of dairying. Dairy farmers also worried about the bacteria in milk products. The cleaning of cows' udders, as well as the equipment involved with the milking machines, was important in order to prevent bacteria from entering the milk supply. As Santos (1994:185) explains:

> In the 1880s and 1890s state officials and others, who were concerned about public health, became more alarmed daily as to the impurities that were being found in milk. Milk, being a nutrient, was considered especially beneficial to children.
>
> Milk looked pure because of its white color, but it was a deception as it could carry bacteria which would cause a variety of diseases, namely, tuberculosis, diphtheria, scarlet fever, typhoid, and sore throat.

Dairy stocks located near cities often fed on distillery swill, brewery slops, and garbage, which produced poor milk. The 1894 *Transactions* of the CSAS reported that "Many people… have little or no idea of the scrupulous cleanliness that must be observed and practiced in all things connected with dairy." Besides bad feed and water, unkempt corrals and barns, filthy milking equipment, dirty clothes used by milkers, and improper cooling and handling often caused diseased milk (Santos 1994:175–194).

Before 1900, little or no money went to dairy inspections. This changed in the early 1900s as California allocated funds towards inspections and assisting dairy owners to sanitize their barns and meet new state standards. These standards were imposed on the physical design and construction of California's dairies. In 1919 the California Dairy Council was formed to address growing concerns. Farmers were advised to use concrete, cement, and steel, and to introduce standards for easy cleaning. Those that met these standards were referred to in the industry as Grade A dairies. Grade B dairies, common prior to 1930, generally lacked the sanitation standards of the Grade A dairies and were much less expensive to construct. The reports of the California Dairy Bureau, along with local farm assistance organizations, passed out or sold designs of structures to help dairymen improve their operations. As dairy farmers acquired new technology, dairy farms increased in both size and capacity throughout California. Technological improvements were important, as were improvements in transportation, particularly the development of branch or short-line railroads (Figures 85 and 86). In 1946 the California Dairy Industry Advisory Board formed to help fund research (Bishop and Schaffer 2005).

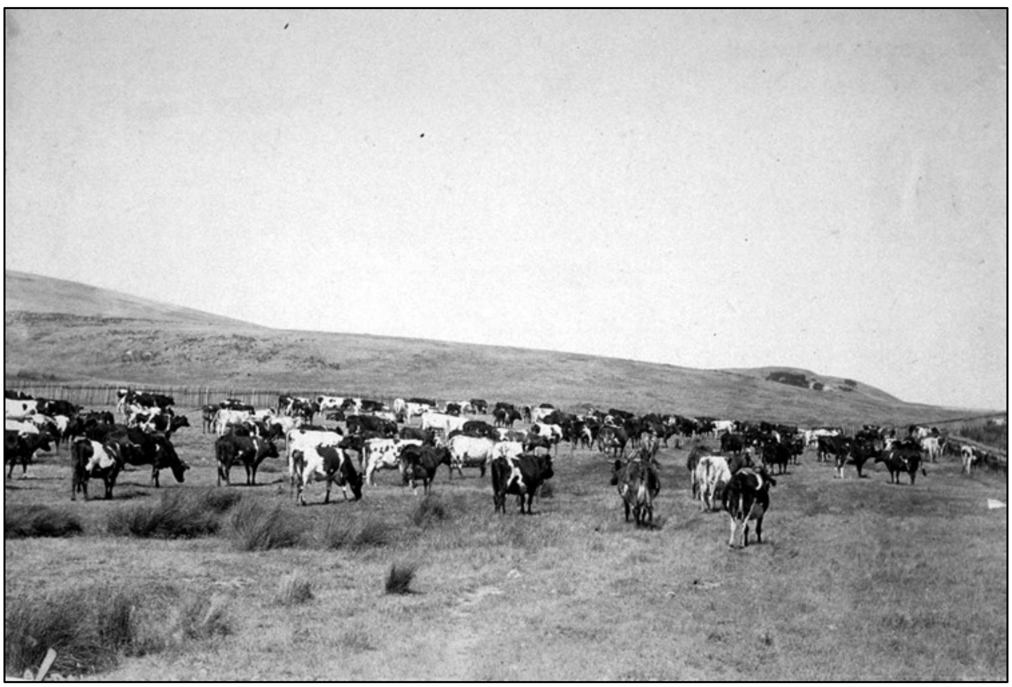

Figure 85. Dairy cattle grazing near Santa Cruz. (Alice Iola Hare Photograph Collection, 05022, courtesy of The Bancroft Library, University of California, Berkeley, public domain.)

Much like on the Central Coast, dairy farming prospered in the valleys of Southern California. By the 1880s there were a number of cheese factories and creameries in the Los Angeles area, with small, local dairies providing milk. Many of them were concentrated between Compton and Buena Park. As the dairy business expanded after the turn of the century, more milkers were needed, and Portuguese who had worked at dairies in the San Joaquin Valley moved to Los Angeles County. As residential and commercial development expanded beyond the margins of the communities in the San Gabriel Valley, the dairies were pushed eastward to Ontario and then to the Hynes-Clearwater area. Today, San Jacinto valley serves as the dairy center of Southern California (Cenovich 1995).

Figure 86. Dairy products speaker and agricultural exhibits train, 1930. (San Joaquin Valley & Sierra Foothills Photo Heritage, kia0105, Courtesy of the Kings County Library, Hanford.)

During the 1930s, Dutch people immigrated to the United States, and ultimately to Southern California where they found work in the dairy industry. Southern California dairy farms decreased in size after the 1920s, but increased productivity. The animals were fed scientifically regulated fodder that included hay, cottonseed meal, copra, and exotic silage. During the 1940s, the dairy industry in Southern California reportedly produced 500,000 gallons of milk monthly, for an annual profit of some $61 million. The temperate climate of the area was excellent for the cows and made possible the phenomenal milk production. Some Southern California cows produced three thousand gallons of milk a year - twice the national average. By the early 1950s, Hynes-Clearwater had combined as the community of Paramount and had become an internationally recognized center for the sale of hay. In 1953, business amounted to $32 million in hay and 12 million in other dairy feeds. The Dutch farmers established what became known as “Little Holland” in the area from Paramount to west Buena Park. They could hear sermons in the Dutch Reformed churches, read Dutch newspapers, and enjoy a rich social and cultural life in their own language. When Queen Juliana and Prince Bernhard of the Netherlands toured the United States in 1952, they made a special visit to this area.

By the late 1950s with encroaching development and demand for land rising, many of the smaller family-owned dairies in the Los Angeles Basin and the San Gabriel Valley closed. While many small dairies closed, other dairies continued to operate supplying milk to large grocery chains such as Ralphs Markets. For nearly 75 years, California’s dairies were clearly one of state’s most important industries. With the development of new technology, dairy farmers were able to increase production and lower costs. In general, dairy farm acreage decreased over time, but the number of milking cows per farm increased. Post-1900 dairy sites, particularly those developed after 1920, should reflect the technological changes occurring in the dairy industry, particularly the upgraded operations from Grade B to Grade A dairies.

Much of the improvement was related to sanitation that gained national attention during the early 1900s due to high infant mortality rates. During the 1930s cooperatives increased in order to support local dairymen, and to encourage competitive pricing. Dairies were also breeding grounds for cultural diffusion, since many were owned or managed by a variety of ethnic groups, such as Portuguese, Dutch, Italians, Italian Swiss, and Scandinavians.

Dairies remain an important part of local economies, particularly in the San Joaquin Valley and along the Central Coast. Today California has 1,300 licensed dairy farms. The largest dairies are in the Central Valley, particularly in Tulare County, and average 1,400 cows per dairy. Humboldt County and the North Coast dairies are smaller and often marketed as organic, averaging only 370 cows each. While Southern California once contained numerous dairies, the modern-day industry is focused in Chino and San Jacinto, with the regional dairies containing about 1,000 cows each (Dickrell 2019).

Poultry Industry

California's poultry industry gained importance regionally as certain communities attracted farmers who recognized the value of raising and marketing poultry. Before the turn of the century, poultry farming, like hog farming, provided subsistence in addition to profit. Chickens were present at the missions before 1840, were a common part of any small homestead, and were valued for their eggs. As noted above, Mary Ballou often had to chase chickens out of her kitchen in Folsom in 1852, and ships and wagon trains arriving to California during the Gold Rush often included chickens. During the initial years of the Gold Rush, eggs sold for $1.00 each. In 1952 Ballou sold a dozen eggs for $3.00 and a single chicken for $4.00 (Ballou 1852).

California's commercial egg industry began in 1880, and poultry farms seem to have been scattered across the state through the 1900s, although most were in the valleys where the climate was more favorable to the birds. Common breeds of chickens imported to California during the 1880s included Black Javas, Mottled Javas, Wyandottes, Plymouth Rocks, and Brahmas, to name just a few. Disease struck often, particularly where flocks of poultry roamed freely. Nonetheless, poultry farming became more of a science in the early 1900s as new methods of raising poultry improved productivity, the health of poultry, and ultimately the profitability of the operation.

According to Charles Weeks, an early California poultry farmer, at the turn of the century poultry farming lacked consistency, at least in regard to the physical aspects of the operation, because of the wide variety of brooders and laying houses (Weeks 1920). After 1900, farmers began to experiment with portable incubators and houses. In some instances, canvas tent-like houses formed brooders for the poultry. What was essential, as Weeks explains, "were good hens, a large variety of green feed, rich soil, and irrigation" (Weeks 1920:34).

Poultry farmers would feed their chickens virtually any greens. Nonetheless, Weeks (1920:39) recommended feeding the chickens beets, kale, chard, barley, rape, and alfalfa. Philo Elmiro of

New York reportedly helped revolutionize the poultry industry by printing a small pamphlet about raising chickens in small pens with no outside runs. Philo's methods included small flocks with lots of feed and water, in sanitary conditions with long sheds and flat shed roofs (Weeks 1920:43).

Discarding antiquated methods of incubation also occurred during the first two decades of the 20th century. A number of self-regulating incubators were on the market by the 1910s.

Successful brooding, according to Weeks (1920:55), involved having good parent stock, modern incubation techniques, plenty of fresh air, and no dust. By the 1920s, poultry cooperatives and marketing arms, such as the Central California Poultry Producers, surfaced. In the 1910s, Weeks established the Runnymeade Colony or Cooperative in Palo Alto, where he offered small parcels of land for sale to what he termed "colonists." The colony owned and operated a large poultry warehouse and exhibited their fowl and products at annual exhibits put on by the colonists.

About the same time, in Southern California, the Rose Lawn Poultry Farm in Artesia was marketing its products. Rose Lawn used the "Corning" type laying houses, which called for a simple wood gable design with a vent on one end for air circulation and a water tank or cooler attached to the side wall. Roofs were canvas and the entire structure was easily moved about from one location to another. Other components of the poultry farm included the feed house, which consisted of a 1½ story gabled barn, and the laying house, a long shed-like wooden building with large operable shutters on one of the structure's sidewalls (Artesian California 1900).

In California, Petaluma eventually became the "world's egg basket," a term the city used until the industry waned after World War II. Poultry farming in and around Petaluma began in earnest in the 1880s. A poultry society formed, and several years later, the Petaluma Incubator Company built a 2,000-egg incubator, reportedly the largest known at the time (Lowry 1993). Petaluma's poultry industry flourished through the 1940s, as World War II created a demand for eggs and chickens. During the 1950s, however, the local industry slowly declined as new technology resulted in the creation of huge corporate chicken farms that forced the smaller operators, such as those in Petaluma to cease operations (Lowry 1993). Today, one can still see the sheds, brooders, and barns associated with this once flourishing business throughout the Petaluma area, although many of the now abandoned ranches have been demolished in recent decades.

Turkey farming got a late start in California (Figure 87). Wild turkeys were first introduced on Santa Cruz Island in 1877 by private ranchers looking for a continual supply of game birds. By 1908, the California Fish and Game Commission (CFGC) was involved in the planting of wild turkeys. They purchased birds from Mexico and released them into the San Bernardino Mountains. At the same time the CFGC kept 20 birds on a small farm for future game-stocking. Between 1928 and 1951 these farm-raised birds continued to produce turkeys that were then released throughout the state as wild game birds (Batter 2013).

Independent turkey farms were a growing industry beginning around Turlock in 1920. The demand for turkeys exploded after World War II, as California's urban population centers grew. Turkey ranches in northern San Diego County, Northridge, Tujunga, and Placer County

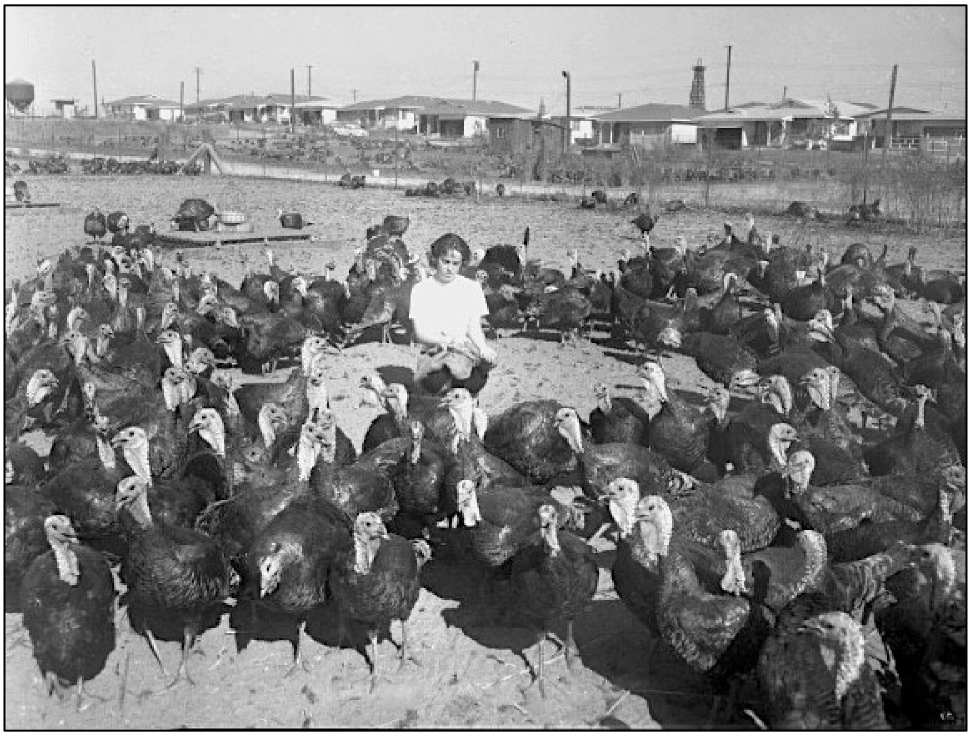

Figure 87. Mira Loma turkey ranch in Torrance, 1959. (Los Angeles Times Photographic Archive, uclalat_1429_b407_200026, Library Special Collections, courtesy of the Charles E. Young Research Library, UCLA.)

advertised "broad-breasted turkeys" for Thanksgiving and Christmastime. Locally raised turkeys were provided to regional grocery stores, and meat and poultry markets as well. Turkey farms peaked in the 1950s. One farm in Torrance, California reportedly sold between 15,000 and 20,000 birds annually at the peak of the industry. By 1961 urban sprawl affected many of the local turkey ranches and closures began (Gnerre 2018). Today, many of the small turkey farms have given way to large businesses, where turkeys are raised in large barns rather than free roaming. One of the largest, Foster Farms, operates out of Turlock and employees about 1,300 people in its plant, processing out of Stanislaus County (2.5 million birds in 2012), Merced County (2.6 million birds), and San Joaquin County (601,000 in 2012) (Holland 2014).

Summary

California agriculture and its farmland form a significant chapter in the state's environmental, social, and economic history. Several characteristics set California apart from virtually every other state. First, an already existing system of Spanish/Mexican laws that were in direct conflict with American laws regarding land acquisition and ownership influenced California's settlement patterns. Land division in parts of California, such as in Sonoma County, reflects the conflict between Mexican and American land laws. Second, the discovery of gold at Sutter's Mill in Coloma in 1848 led to California's rapid settlement. These two factors, combined with the ethnic diversity of the state after 1850 and the high demand for agricultural products created an economic boom for those willing to invest in farmland.

Another unique characteristic of California agriculture was its rapid mechanization. Economic forces drove the desire to mechanize, particularly market demand products, experimentation, and the state's natural resources and favorable climate. The mechanization of California agriculture, together with the consolidation of large land holdings, led to labor shortages, and consequently the migration into the state of a large pool of ethnically diverse laborers. By the 1870s, large company-owned farms, whose workforce was made-up largely of transient laborers, replaced the ideals of a Jeffersonian democratic society based on yeomen farmers. By this time, California's most productive farmland was in private hands, and acquisition of new lands, at least for some, was out of reach. Between 1850 and the 1920s Congress enacted legislation that provided for the settlement of the nation's remaining public lands. The Homestead Act of 1862 followed the Preemption Act of 1841. The Homestead Act, widely used in California, provided for the acquisition of 160 ac. parcels through improvement and use and with minimal cash outlay.

While the Homestead Act had its share of abuse, individuals seeking to consolidate vast tracts of land for their personal benefit consistently abused other acts as well, such as the Swampland Land Act and the Timber and Stone Act.

By the 1870s, California's agricultural economy was booming, and wheat was the dominant crop cultivated on many of the state's agricultural lands. By the end of the 19th century with prices for wheat plummeting, California entered another period of sustained growth, this time focusing on other products such as citrus. By the early 1900s, major regional variations appeared, because of product specific industries, capital investment, and a widespread and ethnically diverse agricultural workforce. The Japanese had largely replaced the Chinese in the fields working alongside Mexicans, Filipinos, and later, Pakistanis, to name just a few.

Inequality was prevalent throughout the labor pool, but agricultural work in California paid far better than the wages earned in other developing countries, particularly Mexico. Thus, opportunity and persuasion from corporate farmers who required a labor-intensive seasonal workforce drove the labor supply.

The vestiges of California's 19th and 20th century agricultural history remain, both as part of the landscape and as part of the state's cultural heritage. The primary goal of this study is to establish a baseline of information that Caltrans cultural resources staff and various other professionals in public and private employ can use to evaluate the significance of the state's diverse agricultural architectural and archaeological resources, which are ubiquitous along the state's highway system. It is hoped that the information gathered in this study, together with site-specific data, will lead to defensible arguments regarding National Register of Historic Places eligibility.

CHAPTER 3. PROPERTY TYPES

It may be that the peripheries of farmyards and farm fields hold the best clues to farming and farm life. The core-and all its domestic artifacts-is still important, but not the only place to tell the story of farmers and farm life.
– David J. Grettler quoted in Beaudry (2001:139)

From the days when Thomas Jefferson envisioned the new republic as a nation dependent on citizen farmers for its stability and its freedom, the family farm has been a vital image in the American consciousness. As the main structures of farms, barns evoke a sense of tradition and security, of closeness to the land and community with the people who built them.
– Michael Auer (1989:1)

INTRODUCTION

California's diverse agricultural industries created a wide range of architectural and archaeological resources that reflect the domestic lives of the owners and operators, tenants and laborers, as well as the agricultural enterprises in which they worked. The domestic landscapes often overlap with the specialized infrastructure that was used to produce and manufacture the products. To be best understood, those resources need to be identified and evaluated within their functional and historic contexts. This chapter provides guidance for understanding the range of agricultural property types that may be encountered in California. In addition, this chapter provides consistent definitions of specific property types. Property types are an organizational tool, providing the conceptual link between the contextual histories developed in Chapter 2, the research themes presented in Chapter 4, and the methodology outlined in Appendix B. The features, deposits, buildings, structures, and objects are often linked through associated property types allowing researchers to build inferences, understand a property's history, and determine its local, regional and national significance.

It is important to note that not every property type will fit neatly into each category. There will always be variations given the time period when a property was established, the local landscape, the amount of capital available to facilitate improvements, social or cultural influences, the types of animals and crops raised, along with a multitude of other factors. Recognizing the shortcomings of existing resource inventory databases and the lack of consistency when recording and describing the state's agricultural resources, a number of broadly defined property types are recommended here. This is not intended as an exhaustive list and attributes of historic-era property types should be identified based upon a combination of physical characteristics, documentary research, and appropriate historic context.

There is the potential for a variety of cultural deposits to exist at every agricultural property, making collaboration between disciplines an important tool in gaining a comprehensive understanding of these property types. There may not always be architectural elements, but farming activities leave some evidence behind in the form of archaeological deposits, ruins, and other landscape features, such as irrigation ditches or orchard remnants. Archaeologists need to be involved in the evaluation process for the entirety of agricultural resources, while architectural historians must be involved when built elements are present. Landscape elements and ruins hold mutual interest and need to be evaluated by a multidisciplinary team.

Each of the properties that architectural historians and archaeologists record and evaluate were once occupied by people of differing backgrounds and origins. It is important to work collaboratively with descendants and stakeholders to get a full understanding of the property and to give them a stake in the evaluation of the property. Do not lose sight of the ethnicity, race, culture of origin, language and gender of those who lived and worked at these properties. Unequal relationship between landowners and renters, bosses and employees, citizens and non-citizens, English speakers and non-English speakers affected the way properties were used.

DEFINITION OF TERMS

National Register and California Register Terms

This chapter uses specific terms for describing cultural resources as defined by the NPS in a series of National Register Bulletins (Bulletin). These Bulletins provide guidance for nominations to the NRHP. The Bulletins[7] used in this chapter include:

- How to Apply the National Register Criteria for Evaluation (NPS 1997a)
- How to Complete the National Register Registration Form (NPS 1997b)
- Guidelines for Evaluating and Documenting Rural Historic Landscapes (NPS Revised 1999)
- Guidelines for Evaluating and Registering Archeological Properties (NPS 2000)

The OHP of the California Department of Parks and Recreation (DPR) has guidelines for applying the CRHR, which uses the same terms to categorize historical resources (OHP 1995, Appendix 4). Caltrans' SER[8] also provides definitions and guidance for Caltrans-specific processes.

National Register property categories are described by NPS as buildings, structures, objects, sites, and districts (NPS 1997a:4–5). A **property type** is "A grouping of individual properties defined by common physical and associative attributes" (NPS 1997a:53).

Property types can be seen as a single thing or can be grouped or compared to examples at other locations. It is important to understand that districts and cultural landscapes are made up of the constituent buildings, structures, objects, sites, and districts. **Property types** include the individual elements of agricultural resources such as residences, worker housing, barns, chicken

[7] These bulletins are all available online at the National Register of Historic Places' website <https://www.nps.gov/subjects/nationalregister/publications.htm>.

8 Caltrans SER, Volume 2 (2022) is available online <https://dot.ca.gov/programs/environmental-analysis/standard-environmental-reference-ser/volume-2-cultural-resources>.

coops, creameries, cropland, pastures, smokehouses, and windmills. Archaeological sites might include privies, wells, cisterns, refuse pits, burn areas, and dump sites. Simple sites may have only one or two property types while complex sites may have many, linked by function and time.

A **building** is “a resource created principally to shelter any form of human activity, such as [a] house” (NPS 1997b: Appendix IV: 1). Buildings are the primary places where people work and live. In an agricultural context, examples of buildings include houses, garages, barns, mill buildings, and wineries (Figure 88). **Structures** are distinct from buildings because they are constructed for purposes other than human shelter or activities. Examples of structures include truss bridges, irrigation features, earthen works, ponds, windmills, as well as storage for agricultural products and livestock, including grain elevators, corn cribs, chicken coops, silos, stables, corals, and fences. Objects are constructions that are “primarily artistic in nature or are relatively small in scale and simply constructed” (NPS 1997a:5). **Objects** might be movable, but they are associated with a specific setting or environment. Examples of objects include boundary markers, watering troughs, fountains, mileposts, monuments, sculptures, and statuary.

Figure 88. San Miguel Flour Milling Company, San Luis Obispo County. (Courtesy Bob Pavlik.)

A **site** is the physical “location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historic, cultural, or archeological value regardless of the value of any existing structure” (NPS 1997a:5). In the agricultural context, examples of sites include family farms or ranches as well as campsites and other habitation locations, family cemeteries, designed landscapes, agricultural fields/orchards/forests, and ruins of buildings or structures (NPS 1999).

Districts "… possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development" (NPS 1997a:5). The Bulletin *How to Apply the National Register Criteria for Evaluation* continues:

> The identity of a district results from the interrelationship of its resources, which can convey a visual sense of the overall historic environment or be an arrangement of historically or functionally related properties. For example, a district can reflect one principal activity, such as a mill or a ranch, or it can encompass several interrelated activities, such as an area that includes industrial, residential, or commercial buildings, sites, structures, or objects. A district can also be a grouping of archeological sites related primarily by their common components; these types of districts often will not visually represent a specific historic environment. (NPS 1997a:5)

Districts can also be discontinuous where they are "composed of two or more definable significant areas separated by nonsignificant areas" (NPS 1997a:6). Examples of agricultural districts include canal systems, groups of habitation sites, estates and farms with large acreage or numerous properties, mills wineries, or other processing centers, irrigation systems, transportation networks, and rural historic districts.

Rural historic landscapes "reflect the day-to-day occupational activities of people engaged in traditional work such as mining, fishing, and various types of agriculture" (NPS 1999:2). Small landscapes, such as an orchard without other improvements, are classified as a site. However, larger properties with multiple buildings, sites, and structures are classified as historic districts.

> For the purposes of the National Register, a rural historic landscape is defined as a geographical area that historically has been used by people, or shaped or modified by human activity, occupancy, or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features. (NPS 1999:1–2)

Historic districts have concentrations of built resources while historic landscapes extend over a larger area and contain substantial vegetation or open space (NPS 1999:3). Historic landscapes differ from designed landscapes because they are not the work of a professional designer.

Cultural landscapes are defined by NPS as "a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person, or exhibiting other cultural or aesthetic values" (NPS 2021). There are four types of landscapes: historic designed, historic site, historic vernacular and ethnographic. (For more information look at the NPS website for Cultural Landscapes.[9]) Many large-scale

[9] NPS Cultural Landscapes website <https://www.nps.gov/subjects/culturallandscapes/index.htm>.

properties would fit under that definition, especially when significance is tied to the land versus the built environment.

The terms **cultural resource** and **property** refer to any evidence of human activity regardless of it being determined eligible or listed on the NRHP or CRHR (Caltrans 2022, Chapter 2:2). The term **historic property** refers to properties that are eligible for or listed on the NRHP, while the term **historical resource** refers to properties that meet the criteria for listing in the NRHP or the CRHR. Historical resource is also used for properties designated as historic under local ordinances and properties identified as significant in a local survey that meets the state OHP standards. Historic properties may have **significance** at local, state, or national levels.

There is no single way to define what constitutes a particular property type, and many factors should be considered in constructing each definition. The definition of property types is thus inextricably tied to the utility of the classification as an aid to recording and evaluating the property.

Multicomponent sites are historic properties that have more than one cultural component represented (NAHC 2021). Archaeologists often use this term, as well as dual component site, to refer to an archaeological site that has overlapping prehistoric and historic-era components. For this study, the use of multicomponent refers to a resource containing different property types—architectural and archaeological—on a shared historic landscape. Multicomponent resources may be standing architecture built over an earlier Native American and/or historic-era archaeological deposit. Similarly, a multicomponent resource may include standing structures and buildings with associated archaeological features, deposits, and artifacts; it is the latter case on which this study is focused. Collaboration between historical archaeologists and architectural historians has the potential to inform on the history of multicomponent resources in a way that increases its data potential and significance of a property overall (Caltrans 2022, Chapter 5).

Many colloquial terms used to describe agricultural resources can have multiple meanings. The term **agriculture** is the theme of this publication and is the overarching term used to define all the resources discussed in this study relating to produce and livestock. **Agriculture** also refers to cropland, pastures, orchards, vineyards, feeding operations and other places where the farm and ranch commodities are grown/produced. In this study, the working areas of the property, including cropland, gardens, and orchards, are referred to as **agricultural production areas**.

Farm and **ranch** are two general types of agricultural properties. For this study, farms are generally described as properties where crops and/or orchards are grown, as well as livestock that does not require pasturage, including poultry and pigs. Ranches focus on raising livestock that require rangeland, such as sheep and cattle. On the landscape though, the definition between farm and ranch is not always clear cut and production practices often overlapped. A simplified way to think about the difference is that farms cultivate crops and may raise some animals, whereas a ranch specializes in raising livestock but may also have agricultural fields to raise feed or gardens to raise produce for the owners and workers. The National Agricultural Library (NAL) at the United States Department of Agriculture (USDA) defines a farm as "a piece of land and its buildings used to grow crops or raise livestock," (USDA 2021a) but uses the same definition for ranch. These definitions are general guidelines and do not have real bearing on the interpretation of the property; there is certainly overlap between these categories. Individual farmers and ranchers may use the terms in their own way. Therefore, this study did not use these terms to categorize agricultural properties.

U.S. Census Agricultural Definitions

The United States started recording populations in 1790. In 1850, the U.S. Census Bureau started collecting farm data on Agricultural Schedules. The definition of "farm" has shifted over time[10]. The 1870 Census' definition of farms included nurseries, orchards, market gardens, "so-called ranches where stock raising is the principal activity," wood lots, sheep pastures, feedlots, nurseries, and greenhouses (U.S. Census 1900:746). It did not include family vegetable gardens or ornamental lawns but did include "many market gardens in the neighborhood of large cities, where, although the area is small, a high state of cultivation is maintained and considerable value produced" (U.S. Census 1900:746). To be considered a farm, properties needed at least 3 ac., unless a smaller property sold at least $500 worth of produce during the year.

By 1930, the definition of "farm" expanded to include all market and truck gardens, fruit orchards, nurseries, greenhouses, poultry yards, places for keeping bees, and all dairies in or near cities, villages, and incorporated towns, even though little land is employed, provided they produced agricultural products valued at $250 or more (U.S. Census 1930). In 1940, the definition included the production of crops or plants, vines and trees (excluding forestry operations), or the keeping, grazing, or feeding of livestock for animal products (including serums). Livestock included poultry of all kinds, rabbits, bees, and furbearing animals in captivity in addition to mules, asses, burros, horses, cattle, sheep, goats and hogs (U.S. Census 1940:81). Operations excluded were fish farms and hatcheries, oyster farms, and frog farms.

All Censuses distinguished between goods produced in connection with farms and those produced at independent manufacturing enterprises. The manufacture of butter, cheese, cider, vinegar, or other products in buildings and plants operated in connection with farms were included on the Agricultural Schedule. Production of these same goods at independent manufacturing enterprises were covered by the Manufactures Schedule (U.S. Census Bureau schedule for collecting information about manufacturing). This division continued in the 20th century. In 1940, they specifically identified canning factories on farms as covered by the Agricultural Schedule.

All the Census definitions refer to "farms" and provide scanty guidance for "ranches" as a distinct entity. In 1900, Census enumerators were tasked with identifying western farms and ranches that utilized the public domain or range for grazing (U.S. Census 1900:754). In 1930, ranches were counted as farms, even those operations where stock raising is the primary activity. (U.S. Census 1930:963). By the 1950s Census, there was a new category of large farms. In western states these were defined as 5,000 ac. or more (U.S. Census 1950:X-XI).

[10] There have been seven different definitions. Although the US did a regular agricultural Census every decade from 1840 to 1950, few of the records are available for our use today. Separate Censuses were taken in 1925, 1935 and 1945.

Cultural Resources Considerations

Agricultural properties can be small and self-contained, widely spread out, or part of a larger network of sites and landscape features. As William Adams (1990:93) notes, archaeologists must look beyond the "house, yard, and outbuildings" to the broader landscape, contending that an agricultural resource "…must be studied in its entirety, not in pieces." These resources may be small family farms, large corporate agribusiness, cooperatives, or components of an agricultural support system like livestock and equipment auction houses or local fairgrounds. This same approach applies to studies of the built environment, where architectural historians examine buildings, structures, and objects as well as cropland and landscapes when assessing the eligibility of an agricultural resource. Agricultural properties can have a wide range of property types from residences, worker housing, fields, barns, storage structures, and infrastructure such as roads, tree rows, boundary structures (e.g., enclosures, fences, rock walls), and water conveyance systems, along with subsurface deposits such as wells, privies, cisterns, burn areas, refuse disposal areas, burials, etc. The definition of property types is tied to the utility of the classification as an aid to decision-making for site recordation and understanding the property.

From an archaeological perspective, agricultural properties are resources consisting of many discrete features and deposits that can collectively contribute to the historical importance of the property as a whole. Important information may be gained from historic properties when examined at two interrelated scales of analysis: **intrasite** and **intersite**. The intrasite level of analysis addresses the individual features and deposits, or meaningful groups of features and deposits, that constitute the activities that occurred at the agricultural site. Features and deposits may have research potential individually or in relation to other features (as is true for a site locus or a discontinuous activity area across the site), or when considered in the context of the agricultural resource as a whole. The Smittcamp Ranch in the Clovis-Fresno area is one example of considering the property as a whole. The significance determination was only realized when all resources related to the property were considered, including the ranch house, landscape, crop land, and nearby packing house (van Onna 2019).

The intersite level of analysis compares agricultural properties at many possible scales: local, regional, statewide, or even national/international. At this level, the purpose may be to analyze change through time, to consider variation within or across different industries, or to sample from a set of standardized agricultural property types. In certain instances, broader research questions may only be addressed by comparing data from several sites. The Washington Irrigated Colony Rural Historic Landscape in the Fresno area is an example of intersite analysis at a local level, looking at 75 farmstead sites interconnected over 37 miles of irrigated canals (Weitz 1992).

Property types at the intrasite level are presented in Table 8, together with their possible archaeological signatures expressed in features and artifacts. It is important to keep in mind the absence of a particular class of artifact can be, in certain circumstances, as indicative of a feature's function as presence of said artifact class.

Also important to archaeological discussion is the concept of "focus" introduced by James Deetz (1977) in *Small Things Forgotten*. By focus, Deetz means the level of clarity with which archaeological remains can be seen to represent a singular deposit/strata, episode, or event. Archaeological remains that represent several activities, events, or themes that cannot be separated from one another are said to lack focus (e.g., mixed fill). Sites that lack focus, will be more difficult to find eligible for the NRHP.

For this study, property type categories are divided broadly between the domestic activities and agricultural activities, referred to in this study as **domestic production areas** and the **agricultural production areas**. On many agricultural properties, the domestic sphere physically overlaps with production areas, so it is important that the researcher identify the function each feature or structure represents. This may require an interdisciplinary approach drawing from historical archaeologists, architectural historians, and historians. Property types in these production areas can include:

- Domestic Production Area: residences, domestic water (cisterns, wells, canals), domestic outbuildings, domestic refuse disposal (privies, refuse disposal areas), domestic agriculture, and domestic landscaping, etc.
- Agricultural Production Area: barns, commercial land use areas (cropland, orchards, pasture), commercial buildings and structures, grain bins and silos, fruits and vegetables, poultry farms, horse farms, dairies, ranches, irrigation systems, boundary markers and fence lines, etc.

In addition to a residential or domestic areas, farms generally comprise buildings and structures that facilitated the growing and production of foodstuffs, such as fruits, vegetables, grains, and nuts, and some animals (Figure 89). Cotton, hemp, and other products used in manufacturing were also grown on farms. Farms ranged in size from as few as 3 ac.—as defined by the 1900 U.S. Census—to well over 1,000 ac. Census records are a useful tool to verify the occupation of the owner of each property, often indicating if the owner/tenant considered himself or herself a rancher or a farmer. For smaller farms, cottage industries often supplemented agricultural incomes and can be seen on the landscape as specialized use areas or structures (Van Bueren 2014).

Ranches generally consisted of buildings and structures that facilitated the raising of livestock for domestic and commercial use. The majority of ranches developed in California first as Mexican Ranchos, through United Sates Statehood ranches became increasingly anglicized after the 1850s. Most ranches focused on cattle, sheep, and horses, although other livestock such as goats and hogs were often raised concurrently within the same property. Generally, ranch properties contained a minimum of 40 ac. Larger ranches may contain many thousands of acres, either through purchase or lease agreements, such as the Miller and Lux properties

Table 8. Common Property Types Associated with Agricultural Resources.

PROPERTY TYPES	ARCHITECTURAL CONSIDERATIONS	ARCHAEOLOGICAL FEATURES	ARTIFACTS*
DOMESTIC PRODUCTION AREAS			
RESIDENCES			
Adobe brick or rammed earth structures	Clay source, foundation materials (generally local stone), roofing materials, style	Adobe block wall foundations, adobe blocks or adobe melt	Structural items including adobe blocks, milled lumber from doors and windows, roofing material (traces of tejas and asphaltum), burnt remains of structures and buildings (charcoal, twigs and grass), window glass. Domestic items including lighting/heating, food-preparation, serving vessels, furnishings, faunal remains. Personal items including clothing
Tent platforms/pads	Leveling methods	Leveled areas, compact flat surfaces, pads, stone platforms, small berms, ditches, stakes with wire or other anchoring elements, drainage trenches, rock or wood entry areas	Structural items including milled lumber; nails, burrs, grommets. Domestic artifacts including lighting/heating, food-preparation and serving vessels, clothing, personal items, faunal remains
Permanent or semi-permanent shelters	Cabins, huts, shacks, dugouts, trailers, Quonsets	Leveled areas, compact flat surfaces, pads, dugouts, chimneys, fire hearths, small berms, drainage ditches	Structural items including building remains such as milled lumber, corrugated sheet metal, hardware—cut and wire nails. Domestic artifacts including lighting/heating, food-preparation and serving vessels, clothing, personal items, faunal remains
Log cabins	Hewn or hand cut logs, dovetailed or overlapped, foundation, roof supports	Leveled areas, foundations, chimneys, fire hearths, drainage ditches	Structural items including logs, flooring, nails—cut or wire, foundations, roofing material including shingles, window glass, plumbing, electrical. Domestic artifacts including lighting/heating, food-preparation and serving vessels, clothing, personal items, furnishings, faunal remains
Houses	Architectural styles (1850 to 1970), foundations, siding, walls, fenestration, alterations, embellishments	Foundations, dugout, leveled areas, platforms, chimney, archaeological remnants of buildings or structures, cellars, basements	Structural items including milled lumber; stone; corrugated sheet metal; roofing material like shingles, window glass, hardware--cut or wire nails. Domestic artifacts including lighting/heating, food-preparation and serving vessels, furnishings; faunal remains. Personal items including clothing

Table 8. Common Property Types Associated with Agricultural Resources *continued*.

Property Types	Architectural Considerations	Archaeological Features	Artifacts*
Domestic Production Areas continued			
Residences continued			
Worker Housing	Various forms of domestic shelters, associated outbuildings (privies, shower or bath house, laundry house, small gardens, garage, parking areas)	Ruins or remnants of any of these architectural features, fire hearths, refuse deposits.	Domestic artifacts including needles, thimbles, lighting/heating, food-preparation and serving vessels, storage, furnishings, faunal remains. Personal items including buttons, eyeglasses, musical instruments, tobacco pipes, children's toys
Domestic Water			
Water Towers	Styles include Straight Box, Inset-top, Full-Tapered, Tapered Tower box, Straight-box Overhang, and Tapered Tower types; associated wells, windmills, pumps, pipes	Water tank, support posts, piping from a windmill or to a house, sheets of galvanized metal, remnants of wood staving from tank construction, posts from wood supports or concrete footings, or a concrete slab foundation	Structural items including sheets of galvanized metal, remnants of wood staving from tank construction, wood supports or concrete footings, hardware–cut or wire nails, concrete slab foundation
Windmills	Construction details (wood, steel, lattice, ladder), blade type, power source	Concrete footings, remnants of the lattice tower, windmill blades, well, water tower	Structural items including concrete footing, windmill blades, power source foundation, pipes leading to a trough or water tank
Wells	Hand dug, mechanically excavated, lined with redwood, rock, or concrete, well house	Hand dug wells typically have a larger diameter and may be lined partially with rocks, bricks, or redwood, particularly at the top of the well; mechanical wells are small in diameter and may appear as a metal or cast standpipe extending vertically from the ground.	Structural items including hollow features lined with stones, redwood, brick, or concrete; wood remains from well house, remains from mechanism to draw water; may be filled with refuse or rubble

Table 8. Common Property Types Associated with Agricultural Resources *continued*.

PROPERTY TYPES	ARCHITECTURAL CONSIDERATIONS	ARCHAEOLOGICAL FEATURES	ARTIFACTS*
DOMESTIC PRODUCTION AREAS continued			
DOMESTIC OUTBUILDINGS			
Vehicle Storage	Plain, gable roof, rectangular structures (maybe more elaborate) built to house different types of vehicles including wagons, automobiles, trucks, carriages	Concrete or earthen floor, footings, foundations	Structural items including hard packed earth floors, leveled pads, concrete slabs, structural debris, light fixtures or electrical fuses, nails. Industrial artifacts including spark plugs, gears, cans
Sanitation facilities	Standalone outhouses, underground septic tank with access at ground level, leach fields	Depression, often lined with brick or redwood, if abandoned filled with clean soil or refuse; primary vs secondary deposits	Structural items including hollow feature, possibly lined with redwood. May be filled with clean soil, refuse or rubble
Outdoor Cooking; Summer kitchens	Outdoor bar-b-ques or outdoor cooking facilities. May be a standalone building or an open ramada	Concrete, tile or earthen floor, remnant building remains, cooking features, burned sediments, possibly with plumbing or electrical	Structural items including collapsed building, hard packed earth floors, leveled pads, brick or stone piles, charcoal, burned areas, nails and boards from open sided structure, hooks in trees for hanging implements; domestic remains including discarded faunal material
Outdoor ovens	Summer oven, traditional cultural heritage structures sometimes protected by an open sided structure	Earthen or brick oven	Structural items including brick or stone piles, charcoal, charred surfaces, discarded faunal material, highly burned bone, nails and boards from open sided structure, hooks in trees for hanging implements
Root cellars	Subsurface with wood or metal doors	Dug into a hillside or beneath the house to keep food products cool	Structural items including collapsed structure, depression, milled lumber, nails. If abandoned filled with refuse
Signage	Many farms, large or small, used signs to advertise their farm, elaborate entryways or driveways to identify their property to passersby and visitors; often incorporated into fencing or gates, or painted on sides or roofs of barns	Wood or stone structures or fencing	Structural items including milled wood, nails, rock walls, galvanized sheet metal

Table 8. Common Property Types Associated with Agricultural Resources *continued*.

PROPERTY TYPES	ARCHITECTURAL CONSIDERATIONS	ARCHAEOLOGICAL FEATURES	ARTIFACTS*
DOMESTIC PRODUCTION AREAS continued			
DOMESTIC OUTBUILDINGS continued			
Gates	The intersection of the main road and driveway could be marked by a gate or arch with or without a sign, mailbox	Wood or stone structures or fencing, compacted roadway, trail ruts	Structural items including latches, gate posts
Other Structure types	Structures and activity areas such as work sheds with a carpenter's bench, storage shed, smokehouse, forge/blacksmith, small weather shelter for children to wait for the school wagon or bus, or other identifiers, laundry house, structures related to a cultural heritage preference like bath houses, shrines or any type of religious/sacred structures	Ruins of structures	Structural items including stone, concrete or wood, nails, window glass
Refuse	Disposal receptacle, burn barrels, incinerator, discard pile or refuse filled pits, refuse dump	Landfill in a nearby gully or artificially created pit. Garbage was burned or deposited, using dirt to cover refuse, and creating family-specific refuse deposits. Refuse dumps located away from residences—possibly down the hill, in a creek or outer portions of the resource. Random dump by the roadside or in visibility isolated areas	Structural items including hollow feature filled with burned or buried artifacts; domestic artifacts disposed in household refuse. Industrial items including mechanical waste products (cans or other containers)

Table 8. Common Property Types Associated with Agricultural Resources *continued*.

Property Types	Architectural Considerations	Archaeological Features	Artifacts*
Domestic Production Areas continued			
Domestic Agriculture			
Kitchen gardens	Gardens were often planted near the kitchen and contained vegetables, herbs, and other produce that were grown, canned, and preserved. Often surrounded by fencing, marked by irrigation or sprinklers, faucets, trenches	Herbs, such as mint, grow wild on some sites. English ivy is a hearty plant that often remains at historic ranches and farm sites, as do grape vines	Structural items including collapsed fencing, single posts with a spigot, remnant rows
Trees/small orchards	Fruit and nut trees provided shade around the house and kept the residents supplied with apples, peaches, pears, plums, olives, and other produce used to eat fresh, bake, pressed, pickled or preserve as jams and jellies, also grapevines	Remnant fruit trees range from apple trees in the foothills and cooler areas to figs, apricots, peaches, pears, cherries, and plum in valleys and coastal climates	Activities items including remnants of vegetation including stumps, grape vines, trellis, boundary markers
Irrigation Systems	Sprinklers or irrigation features, separate from those used throughout the remainder of the farm, were supplied with water from a water tank or reservoir and used to water the garden, flowerbeds, orchard, or lawn areas. Other uses include domestic use, water for bath and laundry houses	Irrigation reservoirs or ponds lined with earth, local rock or concrete, earthen ditches, siphons, standpipes, small dams, wells, remnants of windmills or pumping systems. Small diameter water pipes (usually 1 to 1.5 in. in diameter) may be shallowly buried	Structural items including pipes, spigots, remnant windmill parts, remnant ditch segments

Table 8. Common Property Types Associated with Agricultural Resources *continued*.

PROPERTY TYPES	ARCHITECTURAL CONSIDERATIONS	ARCHAEOLOGICAL FEATURES	ARTIFACTS*
DOMESTIC PRODUCTION AREAS continued			
DOMESTIC LANDSCAPING			
Ornamental landscape features	Fountains, patios, gazebos, statues, fire pits, benches, light standards, and other structures were used to enhance the yards of farm or ranch steads. Also, designed landscapes like Japanese gardens (fountain, bench, meditation areas)	Ruins or remnants of any of these architectural features	Structural remains including brick or other building material, water pipe, below ground ruins or foundations
Pathways	Often lined with rock, brick, or wood, leading to the garden, outbuildings, mailbox, or other use areas. Are common in the 19th and early 20th centuries	Remnant foot paths, ruts, compacted surfaces, often lined with rock or wood, fountain, flagstone walkways, patios marked with concrete slabs or flagstones, circular drives, and isolated plants are important to identify and record as part of the domestic landscape	Structural remains including remnant foot paths lined with building material (rock, wood, brick or other material) flagstone walkways, patios marked with concrete slabs or flagstones, circular drives, isolated plants
Driveways	Larger properties have driveways lined with palms and other types of trees	Ruts, compacted surfaces, and remnant asphalt or gravel	Structural remains including compacted earth, concrete, asphalt, brick or other paving material
Boundary Markers (encompassing property boundary, fencing, tree rows)	Boundaries marked with accent trees and hedges placed along foundations, at the corners of buildings, or on either side of the main entry	Roses, Italian cypress, wax leaf privet, box hedges, post holes	Structural remains including Remnants of tree rows, fencelines, post holes

Table 8. Common Property Types Associated with Agricultural Resources *continued*.

Property Types	Architectural Considerations	Archaeological Features	Artifacts*
Domestic Production Areas continued			
Domestic Landscaping continued			
Tree Rows (See also Boundary Markers below)	Homestead and farms often used tree rows as windbreaks, to demarcate property lines, emphasizes and enhance the driveway leading to the main domestic areas or define fields. Often reflect popular landscape trends of the time (palms in late 19th century; eucalyptus in 1910s and 1920s)	California fan palms and Canary Island palms, eucalyptus tree rows, Monterey cypress, olive trees, and oleander were also employed as wind breaks, tamarisk trees (salt cedar), Osage orange trees	Activities items including stumps, fence lines, stone walls, wooden fence remnants
Agricultural Production Area			
Barns			
Barns	Various architectural style and forms indicate the types of crops and livestock were produced on the property, as well as ethnicity of the builders. Most common are Gable, 3-Bay wide, Broken Angle, Clearstory, Gambrel, Round, Octagon, Pole, and Quonset Hut. Open sides pole barns for hay storage	Flat pad, footings, evidence of work areas, concrete pads, water, power supply	Industrial items including nails and other hardware, horseshoes and other animal shoes, hardened earth floors, animal grooming instruments (hoof picks, brushes), water troughs
Storage			
Grain Bins and Silos	Grain elevators, conveyors, metal tanks	Ruins or remnants of any of these architectural features	Structural remains, farm equipment, metal tanks
Citrus & other Fruit Sorting and Packing Houses	Open-sided wooden shed	Ruins or remnants of architectural features	Structural remains including lumber, nails
Ice Houses	Double walled structure	Ruins or remnants of these architectural features	Structural materials, nails, sawdust, drains

Table 8. Common Property Types Associated with Agricultural Resources *continued*.

PROPERTY TYPES	ARCHITECTURAL CONSIDERATIONS	ARCHAEOLOGICAL FEATURES	ARTIFACTS*
AGRICULTURAL PRODUCTION AREAS continued			
STORAGE continued			
Equipment Storage	Structures to house equipment. May be housed in barns structures listed above	Flat pad, footings, evidence of work areas, concrete pads, water, power supply	Activity items including hardened earth or concrete floors, structural debris, light fixtures or electrical fuses, nails; industrial artifacts including spark plugs, gears; parts of plows, bulldozers, harvesters
Sheds for specific specialties	The farm production areas need sheds for purposes tailored to each industry, storing things like fertilizer and fuel	Ruins or remnants of any of these architectural features	Structural items including concrete or wood, nails, window glass, possibly lighting or plumbing
AGRICULTURAL LANDS			
Orchards	Fruit or nut crop orchards, beehives, wind machines	Root runs and stump remnants found in orderly rows	Activities items including smudge pots, wind machine remnants, stumps
Fields	Terracing, land leveling	Field modifications, furrows, dikes	Activities items including Rock dumps, farm equipment
Wood lots	Trees in rows	Rows of stumps or remnant furrows	Activities items including Rock walls or other fencing.
Greenhouses	Structures for growing plant starts	Ruins or remnants of any of these architectural features	Structural items including concrete or wood, nails, window glass, plastic sheeting, metal framing, drainage features, possibly smudge pots or a heat source
LIVESTOCK			
Poultry facilities for chickens, turkeys, and ducks.	Range from small coops for individual family use to large warehouses with controlled air for agribusiness. Includes beak and wing cutting buildings, feeding areas, egg laying house	Coops, concrete foundations, drain features (drain channels)	Structural remains including lumber, chicken wire, nails, waterer
Horse specialty facilities	Corrals, pastures, foaling barns, race tracks, stables, training areas, paddock, dry lot, rest shelter, tack room, groom quarters	Ruins or remnants of these architectural features, fencing remnants, water trough	Horse tack or horses

Table 8. Common Property Types Associated with Agricultural Resources *continued*.

Property Types	Architectural Considerations	Archaeological Features	Artifacts*
Agricultural Production Areas continued			
Livestock continued			
Dairy specialty buildings including milking barns and cheese making facilities, ice houses, milk storage tanks, feeding troughs	Milking barns and cheese making facilities, ice houses, milk storage tanks, feeding troughs, feed silos	Unique concrete floors for "sanitary dairies," ruins or remnants of any of these architectural features	Structural items including lumber and nails, mechanical milking and other machine parts, milk pans, concrete, window glass, draining features, milking equipment, structural elements reflecting scientific dairy buildings
Cattle specialty facilities	Corrals, chutes, branding areas, castration areas, calving barn, bull pen, salt licks, stock ponds, corrals, shade shelters	Cowboy camps, round up remains of corrals and cattle chutes, salt licks, camp features such as fire hearths	Refuse deposits, sleeping platforms, concrete pad for salt licks; metal, wood, rock, wire mesh
Sheep specialty facilities	Lambing barns, feeding areas, sheep shearing sheds, troughs, hoof treatment areas, sheep dip tanks	Valley and mountain base camps. Structural ruins, stone walls. Campfire features	Activities items including Arborglyphs (tree carvings), refuse deposits, trails, personal items (musical instruments, tobacco pipes, cans scatters, boards, wire and nails in trees for hanging items, "tin dogs"
Infrastructure			
Water	Windmills, wells, cisterns, irrigation pipe, water tanks, troughs, towers, reservoirs, stock ponds	Wood, hollowed log, concrete or metal troughs and tanks	Activities items including irrigation pipe, bathtub, windmill blades, hardware, tools
Irrigation Systems	irrigation reservoirs or ponds lined with earth, local rock or concrete; earthen, rock lined or concrete/gunite lined ditches, valves and gates on ditches, pumps, small dams, wells, cast iron tubs and wood, concrete or metal troughs, ditches, dams, berms, pipes, pumps, stock ponds	Irrigation reservoirs or ponds lined with earth, local rock or concrete, earthen ditches, small dams, wells, remnants of windmills or pumping systems	Activities items including small diameter water pipes, shallow ditches, used to transport water to orchards and crop fields, farm equipment, hardware
Transportation and Utility Infrastructure	Roads, utilities, sewage, waste removal, power including electrical, and telephone lines; docks, piers, wharves, railroad sidings, ports for shipping	Powerlines, generators, roads, wharf features, railroad grades	Activity artifacts including hardware, pipes, cables, tools, insulators, wood, wire date-markers such as nails indicating date of installation

Table 8. Common Property Types Associated with Agricultural Resources *continued*.

Property Types	Architectural Considerations	Archaeological Features	Artifacts*
Agricultural Production Areas continued			
Infrastructure continued			
Boundary Markers (including Tree Rows and Fencing)	Trees and tree rows, stones/rocks, Opuntia (cactus), fences around properties, fields, pastures, etc.	Palm and eucalyptus tree rows, Monterey cypress, olive trees, and oleander wind breaks, tamarisk trees (salt cedar), Osage orange trees, box hedges, stumps, stones/rocks. Fences made of wood hewn, wood plank, wire, stone, etc.	Activity artifacts hardware, tools, wire fencing, insulators, stump holes
Agriculture Related Support Facilities			
Agriculture-Related Support Facilities	Grange halls, farm bureau, county fairs, canneries, auction houses, stockyard, rodeo grounds, winery, brewery, roadside stand, schoolhouses, offices	Ruins or remnants of these architectural features, fire hearths	Structural remains, wide variety of refuse randomly disposed of following public events

*Note: This column references functional categories, which are discussed in Table B.1 in Appendix B: Field Methods for Evaluating Historical Archaeological Sites.

Figure 89. Example residence, home of M.P. Grove, Los Angeles. (Thompson and West, Los Angeles County, California, with Illustrations and Descriptive of its Scenery, Thompson and West 1880:152.)

scattered throughout the Central Valley. On these larger ranches, domestic areas may be located far from agricultural production areas. Ranches may reflect seasonal changes with a base in the valley and summer camps and ranges in the mountains.

While many agriculture properties were acquired and developed for a specific purpose or use, other properties were planned to adapt to marginally suitable soils or extreme environments often by employing a variety of activities, particularly during the mid to late 19th century. In the mountainous regions of California, for example, homesteaders often carried out subsistence agriculture that included raising livestock, planting row crops, and maintaining a small orchard. Prior to the development of irrigation in areas where water was scarce, such as the southern San Joaquin Valley, Imperial Valley, portions of the east side of the Sierra Nevada Mountains, and Mojave Desert, agricultural property owners had to diversify in order to subsist and turn a profit. Property types were created and used by a variety of racial and ethnic groups. The racial and ethnic background of the site residents is often not evident from the property type, so it is necessary to do archival background research to identify the people who lived and used the resource.

PROPERTY TYPES

Cultural resources are composed of one or more property types. Property types are groupings of the specific elements, such as a Queen Ann house, windmill, barn, burn pit, etc.–whether standing or archaeological. Discussions of property types can be complicated by the complex history of a resource, with overlapping and changing uses of a particular resource or property type over time. Sometimes what is seen on the ground does not reflect the documentary history. When an agricultural resource is located, it is important to identify and record the specific property types that are parts of the whole resource.

The discussion below divides property types into two broad functional categories—domestic and agricultural production areas (see Table 8). Here, the domestic area refers to the activities in and immediately around the residence that supported the direct needs of the family unit or worker housing, while agricultural production areas refer to the more substantive and focused commercial or industrial activities that took place at the property. Again, it should be noted that domestic and agricultural practices were not always clear cut and often overlapped. Residential structures and adjacent activity areas often contain cottage industries that helped support the economic viability of the overall farm or ranch. Domestic and agricultural production areas are further refined into subclassifications based on the function or use of an individual feature. These subclassifications are based upon physical evidence or documentary records. Subclassifications may include features and/or structures and objects that were ruins of residences, workers' or laborers' cabins, bunkhouse, barns, smoke houses, cisterns and wells, water tanks, corrals, fields, fencing, etc. While there may be many variations of the above-mentioned properties, the following descriptions apply to the most common property types found throughout California on farms and ranches. Similarly, the range of components or features will vary with each broad property type, although the property's primary function will cause some continuity in the physical remains present at the site. The description of artifacts that may be found with a property type are based on the functional categories of artifacts as described in Appendices B and D: activities, domestic, industrial, personal and structural.

Domestic Production Areas Property Types

For this study, domestic production areas are those elements of a resource associated with the household activities of the farm or ranch owners, tenants, their families, laborers, and in certain cases, their domestic help. The primary built environment property types anticipated at most agricultural properties in the domestic area include the house, water infrastructure including towers, garden areas, outhouses, and vegetation that define the built environment around the house. The domestic area may also include buildings and structures representing activity areas such as a summer kitchen, outdoor ovens, kitchen gardens, small fruit and/or nut orchards, garage or carriage house, and smokehouse for family use. Archaeological features may include a house foundation or pad, cellar, or basement depression, privy, well, cisterns, drainage features, sheet refuse, refuse deposits or burn pits, and other associated elements.

Ornamental landscaping, such as fountains, pathways, stone walls, entry gates, arches, and introduced vegetation, is included in the domestic area when located near the residence. Certain types of plants can indicate the presence of a homestead when no structures remain.

Tree rows may be present to protect the house from wind, to emphasize the driveway leading to the main house, and to distinguish the main residence from agricultural production areas. Bulb flowers will continue to grow long after the abandonment of the location, as well as will non-native and ornamental trees and plants.

The following sections discuss domestic production area property types, including residences, worker housing, domestic water, domestic outbuildings, domestic landscaping and finally domestic agriculture.

Residences

Domestic property types (see Table 8) are centered around the buildings that served as the home for the residents of the property. As farming families expanded, the next generation often expanded the main house or built additional residences relatively close to the main or original home. These buildings may consist of a vernacular cabin or a highly stylized Victorian residence. The primary home generally supports the needs of the family, support staff, and its related household activities. Until indoor plumbing for water and sewage became the standard—a convenience that was often adopted later in rural areas than in urban, sometimes as late as the 1940s—wells and privies were critical infrastructure. As indoor plumbing became widely accepted, wells, cisterns, and privies were critical facilities and once abandoned often became convenient receptacles for refuse (Huddleson 2003). Such clean out episodes could date important changes to the site including change of residents, new improvements, or necessary upgrades.

There are wide variety of residential dwelling styles found on agricultural properties in California between 1850 and 1970 (McAlester and McAlester 2015). The choice of materials, design, size, and location were dependent upon regional differences. Additional variables were ethnic and cultural traditions, availability of building materials, price, the personal wealth of the occupants, and whether the property was owner occupied or a rental. Many plans for houses, barns, and outbuildings were available at low cost from the state. Catalogs such as those from Sears & Roebuck or Montgomery Wards, offered kits to build entire houses as well (Massey and Maxwell 2021). The kit came with plans and all the precut wood, nails and other supplies need to build the desired structure. These were less expensive and more convenient for many places where wood was expensive to obtain from mills. Historic documents, illustrations, and photographs do not suggest that there were significant differences between ranch and farm dwellings, although the spatial arrangement of buildings and structures were likely predicated on the primary function of the resource (Figure 90).

Four principal materials were used in the construction of residential structures on agricultural sites: adobe, brick, stone, and wood, including logs or milled lumber. Adobe is often associated with some of the earliest Spanish and Mexican occupation in California. Adobe block and rammed earth adobe materials were primarily used in California from the 1830s through the early 1850s. Adobe structures required a firm foundation that would not allow water to wick-up the walls and damage the adobe. It was an affordable building method using local materials and had a resurgence in use beginning in the 1930s (McAllister and McAllister 2015).

Figure 90. Queen Anne residence at Nelson Farm in Fresno County. (Courtesy of PAR Environmental Services, Inc.)

The use of stone and logs generally occurred in geomorphic regions where the materials were naturally available, particularly California's montane regions. Native fieldstone construction was common in the 1850s and generally declined by the 1870s, although exterior stone cladding gained popularity in Southern California after the turn of the century. For residential buildings, the residence was often constructed of wood, while the foundation or basement was constructed of fieldstone and may be all that remains of a dwelling. Log construction generally occurred in geomorphic regions where wood was readily available, and in areas where milled lumber would not sustain heavy loading by winter snowfall (Figure 91). Logs were also preferred by specific immigrant groups, whose traditions used logs for all forms of building construction in their respective home countries. Scandinavians and Germans are credited with spreading log construction technology throughout the United States. For a discussion of log cabins see Daniel and Ward (1993). Balloon-framed and block-framed milled boards were the most common material and form used throughout California from 1850 through 1950. The California Gold Rush can be credited with the advancement of this building technology. There was a huge demand for building supplies and lumber came from sawmills in northern California, the Sierra, and in neighboring Oregon and Washington, and sawmills in the northeastern United States (Eastman 1998). Bunkhouses or line camps for hired labor are also included within Domestic Property Types, though they are often located closer to activity areas associated with the commercial/industrial functions for which they were employed. Residential houses may differ from bunkhouses and temporary houses by form, material, and size. Additionally,

Figure 91. Log Cabin remains, Placer County. (Courtesy of PAR Environmental Services, Inc.)

residential houses tend to be better constructed with more durable materials. Temporary houses include seasonally occupied shacks or housing in the form of a trailer or otherwise portable building. See a more detailed discussion of worker housing below.

Most of the materials produced in the early 1850s in California were simple 12 in. to 16 in. rough- sawn milled boards and 4 in. to 5 in. battens, along with non-dimensional 2 x 4 in. and 2 x 6 in. framing material (Figure 92). Where milled materials were not readily available, logs were split to form 3’ to 4’ long boards that were applied to the exterior horizontally as cladding. Shakes and shingles remained a popular choice for both roof and sidewall cladding from the 1850s through the 20th century.

Stucco (a mixture of Portland cement, sand and lime) is an exterior treatment for buildings and structures and has been around for a long time. Stucco buildings were especially prevalent in California, compared to other parts of the country apparently because of its Spanish heritage (Grimmer 1990:3). It was popular because it was inexpensive and easily made building treatment. Stucco became more prevalent about 1890, and “… by the 1920s, it was used for an increasing variety of building types” (Grimmer 1990:2), continuing into the 1930s and 1940s. According to Grimmer (1990:2):

> …stucco was associated with certain historic architectural styles, including: Prairie; Art Deco, and Art Moderne; Spanish Colonial, Mission, Pueblo, Mediterranean, English Cotswold Cottage, and Tudor Revival styles; as well as

Figure 92. Remains of a Farm Outbuilding, near Ridgecrest, Kern County; a Domestic Residence with Chimney can be Seen in the Background. (Courtesy of PAR Environmental Services, Inc.)

> the ubiquitous bungalow and "four-square" house. The fad for Spanish Colonial Revival, and other variations on this theme, was especially important in furthering stucco as a building material in the United States during this period since stucco clearly looked like adobe.

From the 1850s to the 1870s, there is increasing availability of building materials. During the 1850s, few differences existed between urban and agricultural home construction. By the mid-1850s, sawmills were operating in the largest of California's cities including San Francisco and Los Angeles and throughout most of the montane regions of California where lumber was readily available. Brick was being manufactured in urban areas and transported to interior communities by the 1860s. Also in the 1860s, sash and door companies opened in many of California's larger more urban communities, and by the 1870s, sash and door materials were readily available throughout California. While timber framing and log joinery was used for residential and barn construction, wood or stick-framing was built with cut nails, with wire nails introduced in the late 1880s and becoming the dominant technology after 1900 (Wells 1998:87).

Greek Revival, Gothic Revival, Italianate, Stick, Folk Victorian, Second Empire, and Queen Anne style homes were constructed in California's agricultural areas through the 19th century, as were more vernacular designs that were interpretations of popular architectural styles or amalgams of several different styles (Figure 93). In Southern California and along the Central Coast, ranch and farmhouses often reflected the Mediterranean influence of the region, built in Greek Revival (ca. 1840s to 1860s), or Mission Revival (ca. 1890 to 1912) (based on Gebhard

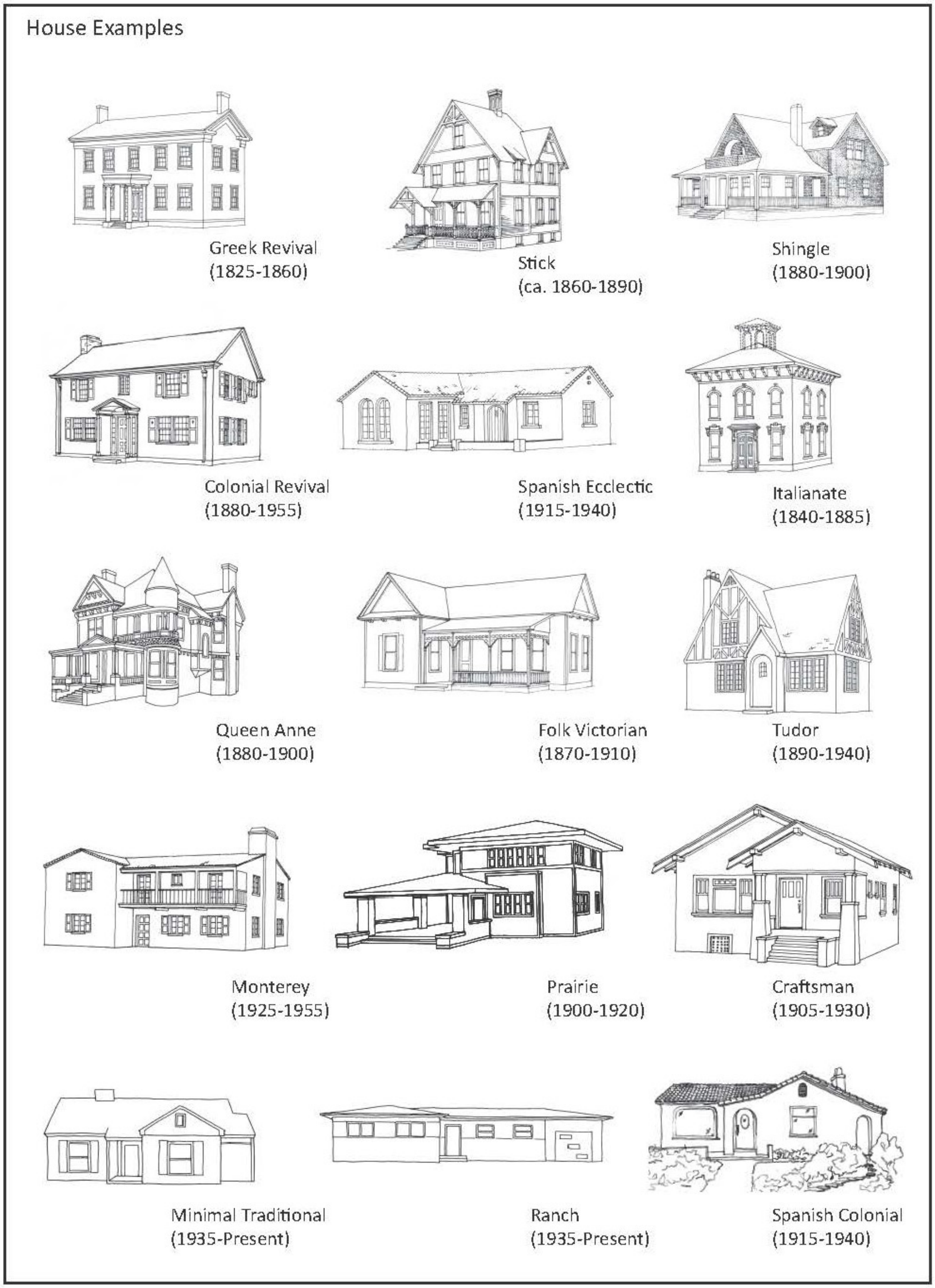

Figure 93. Examples of popular house styles found in California. (Adapted from McAlester and McAlester 1985).

and Winter 1985) design elements worked into the primary house style. The footprints of these homes provide clues about how they were constructed, their configuration or massing, and perhaps the degree of skill employed in their construction.

After the turn of the 20th century, agriculturalists and ranchers could choose from widely available stock or standard plans that were found in numerous popular magazines, department store catalogs, pattern books and house journals of the period. Local contractors, or in some cases the property owner, would order the plans and then acquire the building material locally. In certain cases, the entire house was shipped piece-by-piece via the railroad to the nearest depot, where it could be taken to the job site and assembled. Detailing could be added to suit the individual taste of the homeowner, resulting in a basic vernacular home that can, for example, exhibit elements of Craftsman, Queen Anne, and Tudor styling (Reiff 2000; Smeins 1999).

The most popular residential style found in California in the first quarter of the 20th century is Craftsman, a design that had its roots in Pasadena, California, where it was developed by the Green brothers. The Craftsman style quickly became popular and was readily obtained from catalog books. Its popularity coincided with the continued subdivision of large farms and ranches into smaller units and the 1910s trend of family-owned small farms. One of the most common agricultural properties encountered on Caltrans' projects is smaller units that were once part of a larger agricultural properties.

Rural hygiene began to change around this time, with more and more rural homes abandoning outside privies in favor of indoor plumbing. Both remodeled and new home construction added bathrooms with electricity (Bailey and Wallman 1971). Indoor sanitation required construction of septic tanks, large underground chambers that hold the waste. This change in sanitation practices meant that outdoor privies were largely discontinued and potentially filled with household refuse.

The economic hardship of the 1930s and the subsequent war years of the 1940s, limited availability of construction materials, resulting in the Minimal Traditional style, a basic, no-frills architectural style that was economical to build. The end of World War II saw the start of suburban sprawl and the birth of the popular Ranch style modern home. The Ranch house style became popular and often included a garage, providing space for automobiles. On many of the older farms and ranches, homes were built to accommodate the growing generations of families that often lived on these properties.

The architecture found on ranches and farmsteads is often fluid and evolved through time as a families expanded. It is not unusual to find a Queen Anne style home with additions to the sides or rear, accommodating the addition of indoor plumbing, a new bedroom, or kitchen. Porches were often enclosed over time as a family grew, to provide additional sleeping space or other changes in activity. Second homes were added around the main house as children married and stayed on the farm or ranch to work the land.

These changes in house designs and layout reflect the normal growth and evolution of an agricultural property. Evaluation of these resources should include an understanding of the evolution of agricultural properties—these resources are dynamic and rarely fixed in time.

The archaeological signature of domestic structures varies widely across the state. Some of this variation is based on the local environment, including the climate and accessibility to natural resources such as water and windbreaks. Other factors are tied to the family itself, including consideration of cultural traditions, their income levels, skill sets and other factors during both initial construction and later additions or remodels. Archaeological evidence of houses ranges from a slightly leveled terrace or pad to extensive foundations. Foundations and chimney construction were often built of locally obtained fieldstone or brick. Intact or toppled walls or freestanding chimneys are indicators of former house locations. For houses built on posts, often the chimney is all that remains of the structure, other than a leveled pad and/or cut. Cellars and foundations usually appear as depressions with or without stone lined walls. Cellars are smaller and were often dug under the kitchen to serve as a cool environment for food storage. In the desert, cellars have been found away from cabins, dug into hill sides. Foundations may or may not extend the length of a structure. Other house remnants include nail scatters, remains of wood posts or milled lumber, wooden or stone thresholds, stairs or lined paths that led to the house, vegetation around the former foundations, or cellar entries. After the turn of the 20th century, Portland cement concrete was increasingly used for poured foundations (Wisconsin Historical Society 2022). Concrete blocks also gained popularity and use during this period.

In general, the longer the occupation of a farmstead, the greater potential for archaeological remains to be present. Failed home sites, such as short-term homesteads, may be represented only by collapsed structures, footings or foundation remains, refuse scatters, sheet refuse, and depressions from a privy or well. In many areas neighbors or new homesteaders salvaged stone, lumber, nails, and other goods from abandoned farmsteads, leaving few traces of the structural elements that once marked the site. Abandoned hollow features like privies and wells were often used to dump refuse including ash from a stove or fireplace. Residents may have dug smaller discreet hollow features to dispose of refuse. Although the surface of the site may appear as if little activity occurred, it is important to look for hollow-filled features to get a fuller understanding of how the site was used.

Worker Housing

Housing provided for workers was typically inexpensive to build, often flimsy, of wood construction, and utilitarian (Caltrans 2013). While some small cottages or shacks were provided, communal bunkhouses or boarding houses were common (Figure 94). Some operations used portable cabins or shacks, similar to those used in logging and other work camps that could be transported from location to location. These buildings typically were small, set on wood posts or blocks, and gable roofed. Other farms built larger bunkhouses or boarding houses, two or more stories in height, supported on wood posts or concrete foundations, similar to military barracks. After World War II, trailers, mobile homes, campers, and other portable housing began to be used in addition to the more permanent wood structures. In most cases, worker housing was rarely of exceptional design or construction and reflected the utilitarian and temporary use. Rare exceptions do occur, such as the “Monterey Revival” style cowboy bunkhouse designed by Julia Morgan (Kastner 2013) for workers at the Hearst Ranch or

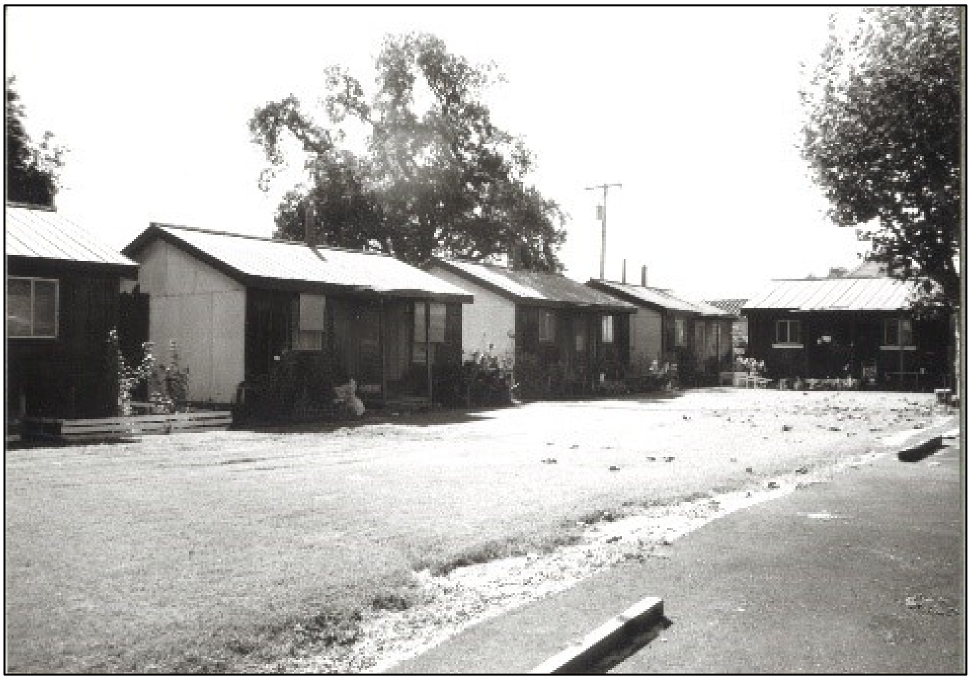

Figure 94. Worker housing, Locke, Sacramento County. (Courtesy of PAR Environmental Services, Inc.)

the Sespe Bunkhouse for citrus workers in Santa Clara Valley's historic district (Moomjian 1997). These architect-designed worker housing were built for skilled laborers. There may be a correlation between the quality of the housing and the skill of the employee.

Housing for workers often came with ancillary structures and activity areas, including a laundry or wash house, privies, cook areas, outdoor picnic-style tables for eating, clotheslines, free-standing water tanks with spigots, or other facilities. Horseshoe pits are sometimes present as well. Archaeological remains found at worker housing sites are similar to those found at domestic properties and include foundations, sheet or pit refuse deposits, privy depressions, rock-lined paths or garden areas, remnant irrigation and water systems, outdoor kitchens with collapsed ovens or cooking hearths, or concrete slabs.

The types of facilities provided for workers often hold clues into the heritage and personal preferences of the labor force. Potato farmers working in the Sacramento-San Joaquin Delta area in the 1910s and 1920s, for example, relied on Japanese immigrant workers, and worker camps typically included a bathhouse with large metal tubs for communal bathing and small designed meditation gardens (Maniery 1993). Base camps in the Sierra Nevada built by sheep ranchers included traditional beehive shaped outdoor brick or stone ovens used to bake bread and other food for the Basque shepherds (Smith and Baldrica 1993). Practitioners recording buildings, structures, landscapes, and sites associated with workers are encouraged to consider the lives and cultural heritage of temporary farm workers when identifying property types.

Although this study categorizes worker housing in the domestic production area, some worker housing is also located in agricultural production areas. These may include satellite features such as permanent worker housing complexes, temporary camps used by workers, seasonal base camps at higher elevations, holding pens at railroad sidings or next to highways and roads, corrals, fruit sorting and packing areas, water troughs, and salt or mineral licks. These are still categorized as components of the domestic production area. Workers' housing in Southern California desert areas had banks of windows shuttered at night but opened during warm weather. Features such as privies and sheet refuse would still be expected at worker housing in direct proportion to the duration of the occupation. Fire rings and sheet refuse are often found out on ranges and in summer grazing areas, reflecting the accompaniment of livestock by cowboys or shepherds.

Domestic Water

Agricultural properties had differing infrastructure to regulate, direct, and store water for domestic use (see Table 8). A combination of windmills, wells, ditches, pipes, reservoirs, water towers, and tank houses, were used across the state (Figure 95). In the late 1800s, many North American farmers began installing elevated water tanks and windmills on their properties, providing efficient gravity water pressure systems for both domestic and farm-related use. From the 1870s to the 1930s, California farmers enclosed the elevated water tanks to create the tank house. The tank house became a prominent element on most farms and ranches, standing two to three stories high, usually near the house. Typically, there was a windmill nearby or attached to the tank house, and the tank house sat about 10 or 20 feet behind the house (Pitman 1976:84). The tank house needed to be structurally sound enough to support a 2,000 to 10,000-gallon water tank. Heavy vertical support posts, cross bracing, and wood beams were all used in the construction of these structures providing a usable interior space. These tank houses were an important phase in the development of rural domestic water systems in California.

The straight box style was the most popular, found from Modoc County to San Diego, but dominated in the Sacramento and San Joaquin valleys (Figure 96). The inset-top style was built primarily in the Fresno area. The full-tapered house and tapered tower box type are found primarily in the Sonoma and Napa valleys, although they have been recorded in the Sacramento-San Joaquin area as well. An example of a tapered tower box style water tower was found in Wildomar, Southern California (Figure 97). The structure had four vertical support posts infilled with local river cobbles, which supported a frame platform on which the metal tank sat. Nearby was a windmill (Smallwood 2016). Finally, the straight-box and tapered tower overhang styles are common in the San Francisco Bay Area and south to the Salinas Valley, as are open platform or partially walled structures (Pitman 1976:86–87) (Figure 98).

In some areas of California, particularly around Fresno and Bakersfield, farmers began integrating the tank house with their primary residence around 1900. These engaged (attached) tank houses began at a time when gasoline and electric motors replaced the windmill as a power source. The attached tank house provided a better gravity-fed water pressure source, while the lower half of the tank house provided extra domestic living space and storage (Pitman 1976).

Figure 95. Remains of a well at a San Diego County 19th century homestead. (Courtesy of PAR Environmental Services, Inc.)

Figure 96. Nelson Farmhouse with engaged three-story tank house at right, Fresno County, ca. 1900. (Courtesy of PAR Environmental Services, Inc.)

Figure 97. Tapered Tower Box Style water tower, with windmill and Couts residence in background, Wildomar, Riverside County. (Courtesy of Applied Earthworks.)

Tank houses often were built to mirror and complement the primary residence's architectural style. The tank house "is a product of a preindustrial age and is a folk or vernacular architectural expression designed to meet practical and functional needs on the farm" (Pitman 1976:84). According to Pitman, the tank house was one way a farmer or rancher could demonstrate pride in the appearance of his domestic area, covering up a sometimes-unsightly functional item with a more attractive building. These houses were usually built of wood and may exhibit knee braces, multi-pane windows, and other elements of the residences.

Today, tank houses are rapidly disappearing as farmlands yield to urban expansion. Very few were built after 1935, as they were replaced with hydro-pneumatic pressure tanks and electrification. Existing tank houses were often converted to domestic space or storage. Tank houses are considered a rapidly-disappearing property type on the rural landscape; it is estimated that only one-third of the historic structures remain in California, with 20 percent of the total extant tank houses in the state found in Fresno and Tulare counties (Cooper 2011; Pitman 1992).

Architectural remnants of tank houses may include sheets of galvanized metal, remnants of wood staving from tank construction, posts from wood supports or concrete footings, or a concrete slab foundation. Some tank houses had an associated well and windmill. Wells vary in size, according to age (hand dug in the 19th century; mechanically drilled after ca. 1910). Hand dug wells typically have a larger diameter and may be lined partially with rocks, bricks, or wood, particularly at the top of the well. Mechanical wells are small in diameter and may appear as a

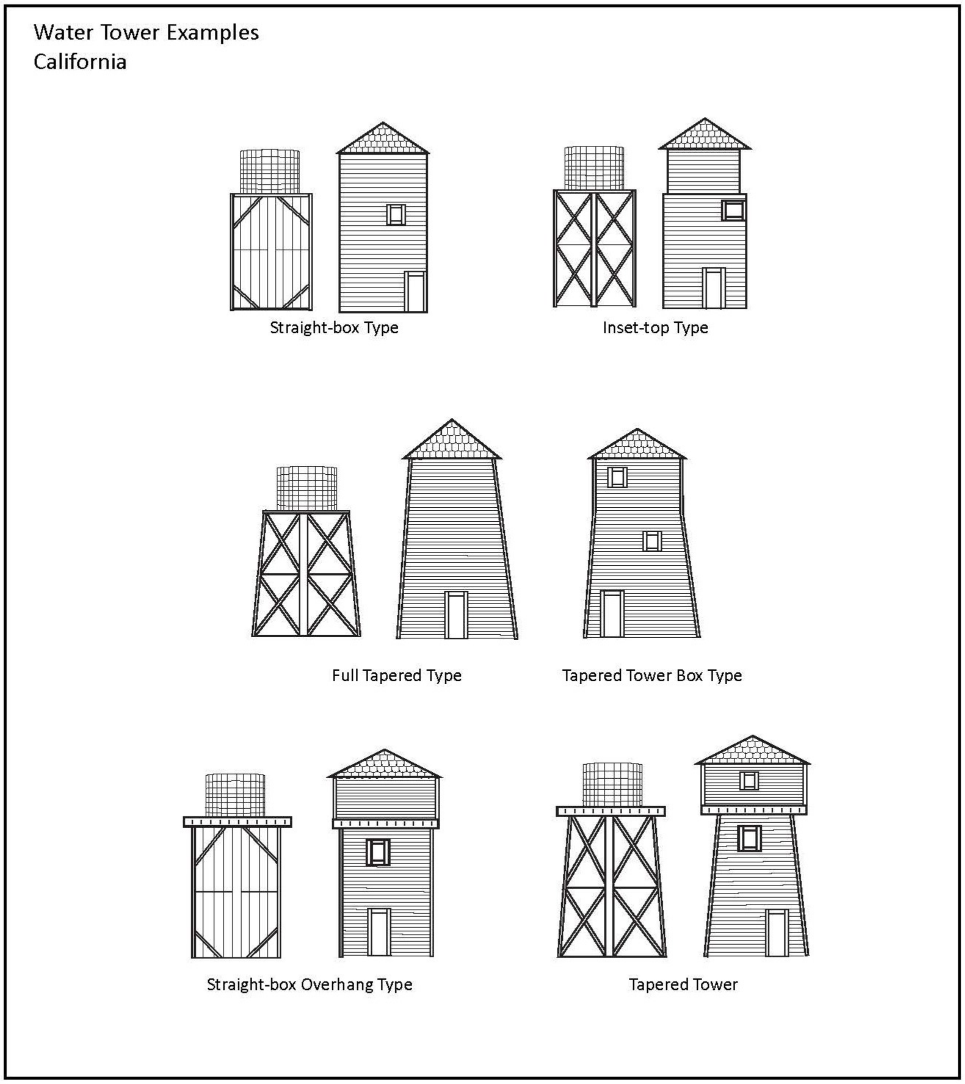

Figure 98. Water Tower Examples in California. (Extracted from Pitman 1976.)

metal or cast standpipe extending vertically from the ground. Windmills were often supported on four concrete footings. Many were abandoned in place, and remnants of the lattice tower and windmill blades are often found on the ground in association with the well and tank house.

Spigots are often present in garden and orchard areas and around the house location. Shallow ditches, used to transport water to gardens, orchards, and foundation plants are often part of the archaeological record.

Domestic Outbuildings

The space immediately surrounding farm and ranch residences was a dynamic use area, serving as both an extension of the residential space as well as agricultural production and activity areas. Multiple outbuildings and activity areas can be found in the area, serving a variety of functions (see Table 8). The progression from wagons to modernized vehicles brought the need for garages, resulting in the adaptation of existing structures or construction of new ones. While barns were often used for vehicle storage, more frequently, plain, gable roof, rectangular structures were built to house vehicles. On some properties, carriage houses were converted to garages or garages were built to look like carriage house. Other outbuildings associated with household use included sanitation facilities, outdoor bar-b-ques, cooking stations or kitchens, or ovens (Figure 99), root cellars (dug into a hillside or beneath the house to keep food products cool), laundries or bathhouses, and smoke houses (Figure 100). Work sheds with a carpenter's bench, blacksmith forge, storage sheds, smokehouse or other outbuildings are often found around the domestic residence (Figure 101).

Figure 99. Stone and mortar outdoor oven, Wildomar, Riverside County. (Courtesy of Applied Earthworks.)

In addition to the outbuildings, many farms used signs to advertise their farm, or to identify their property to passersby and visitors. The intersection of the main road and driveway could be marked by a gate or arch with or without a sign, decorative stonewalls/entryways, mailbox, small weather shelter for children to wait for the school wagon or bus, or other identifiers.

Figure 100. Outhouse near Sheep Ranch, Calaveras County. (Courtesy of PAR Environmental Services, Inc.)

Archaeological expressions of outbuildings may be similar to those outlined above for houses. Evidence of wood posts from foundations, concrete slabs or footings, stone or brick remnant walls, and artificially created flats used for building pads may mark former locations of outbuildings. Privies and burn pits were excavated into the ground, and shallow depressions may be the only visual remnant of their locations. Outdoor ovens or bar-b-que's may be characterized by toppled rocks or bricks, a fire hearth, or domed shaped oven. Smokehouses are often identified by hardened earth floor with ash or charcoal, yellow firebricks or stone foundations, and faunal material (Figure 102).

Basque shepherds' base camps had domed-shaped bread ovens. These ovens were constructed of brick or unshaped granite stone and were mortared. They were usually protected by a metal covering supported on posts and open on four sides. These traditional Basque ovens have been documented at numerous sheep ranch summer base camps throughout the northern and

Figure 101. Brick smokehouse (1860s to 1870s) and storage shed at Fiddyment Ranch, Placer County. (Courtesy of PAR Environmental Services, Inc.)

Figure 102. Beehive brick oven used by Basque cooks, Plumas County. (Courtesy of PAR Environmental Services, Inc.)

eastern Sierra Nevada (Smith and Baldrica 1993; Stevens 2014). In the southern Sierra Nevada, similar ovens, called hornos, were used at base camps that hired Spanish and Mexican shepherds.

From an archaeological perspective, refuse disposal patterns on agricultural resources are critical to understanding the behavior of residents. Prior to the early 20th century, there were almost no county waste disposal services and household refuse was disposed of on or near the agricultural holdings. In the absence of a formal garbage collection system, farmers often disposed of refuse in a nearby gully or creek channel, or deposited refuse on a parcel away

from the residence or dumped it in an artificially created pit (Figure 103). On some properties, more than one type of refuse disposal method was employed. Some refuse was burned to reduce the amount of waste, while other refuse was deposited as-is and covered with dirt. Composting of organic waste also occurred. These deposits created family or site-specific refuse landfills. Communal dumping by multiple farm families in ravines and creek channels off main routes was not infrequent.

Figure 103. Refuse deposit at a homestead in Inyo County. (Courtesy of PAR Environmental Services, Inc.)

Self-sufficiency on many farmsteads and ranches varied and can be seen in both activity areas and artifacts. Typical artifacts reflecting these behaviors include home canning, which is represented by jars, lids, and liners. Self-sufficiency or frugality is also seen in reuse, such as mending or other adaptation of artifacts. Ceramics and other household objects could be mended for continued use. For reuse of cans, the metals could be cut into shapes for patches and other repairs or punched with holes to create strainers buckets, or other useful objects.

Hand-fabricated tools and other modified household items exhibiting evidence of reuse and adaptation can also be interpreted in this way. The economic well-being of an enterprise can often be reflected in this self-sufficiency. Some farming families were forced by isolation, low incomes, and lack of a ready market to be self-sufficient, and this is often seen in the archaeological record in by evidence of local fish and game.

Domestic Landscaping

It is common to find lined or paved pathways (marked with rock, hedges, or brick) leading from the house area to the privy, gardens, or orchards (see Table 8). Accent trees and hedges were often placed along foundations, at the corners of buildings, or on either side of the main entry. Preferences for domestic vegetation changed through time; in the 19th century, roses were often planted along foundations. In the early 20th century until the Great Depression, it was common to find Italian cypress planted to accentuate either side of the doorway and at the building corners (tall, thin trees) with wax leaf privet or box hedges along the foundations. Fountains, patios, gazebos, and other structures were used to enhance the yards of farms or ranches.

Homesteads and farms often used tree rows as windbreaks, to demarcate property lines, or to define fields (Figure 104). California fan palms and Canary Island palms were often used to line driveways leading to the main residence in the late 19th and early 20th centuries. Many isolated and remnant palms are visible while driving through northern and central California. In the 1910s and 1920s, eucalyptus trees became popular for use in lining roads and surrounding houses and provided shade and windbreaks. An example is the Carmel Valley Road-Boronda Road Eucalyptus Tree Row in Monterey County (Barrett 2007). This tree row was planted in the 1870s to line the driveway up to the Spaulding ranch.

Monterey cypress, olive trees, oleander, and other drought-resistant plants were also employed as wind breaks. In the desert and drier regions, tamarisk trees (salt cedar) were planted. As they grew, they formed a dense hedge, blocking the wind from blowing away the fragile topsoil. Extant windbreaks with no standing structures nearby may be an indication of a former dwelling location and should be researched and surveyed for potential archaeological remains. Tree rows may be considered resources in and of themselves if considered heritage trees. The Carmel Valley Road-Boronda Road Eucalyptus Tree Row is listed on the National Register for its local significance under Criterion A (Barratt 2007).

Archaeological expressions of landscaping are important to document. Remnant foot paths, often lined with rock or wood, fountains, flagstone walkways, patios marked with concrete slabs or flagstones, circular drives, non-native trees and isolated plants are important to identify and record as part of the domestic landscape.

Domestic Agriculture

The majority of farms and ranches were self-sufficient, relying on food grown on the land and livestock for daily subsistence (see Table 8). Gardens were often planted near the kitchen and contained vegetables, herbs, and other produce that were grown, canned, and preserved. Fruit

Figure 104. Fruit trees lining the driveway of a farmhouse, Tulare County. (Courtesy of PAR Environmental Services, Inc.)

trees provided shade around the house and kept the residents supplied with apples, peaches, pears, plums, and other produce used to eat fresh, bake, pickle, or preserve as jams and jellies. Sprinklers or irrigation features, separate from those used throughout the remainder of the farm, were supplied with water from the tank house or reservoir and used to water the garden, orchard, or lawn areas. Their presence can highlight the ethnicity of former residents, personal preferences, or their innovation/adaptation to specific conditions. Olive trees can hallmark the presence of Spanish/Mexican Rancho, while remnant fruit trees can reflect by-gone orchards.

Many homestead sites contain remnant fruit trees. These range from apple trees in the foothills and cooler areas to figs, pears, peaches, cherries, and plum in valleys and coastal climates. Herbs, such as mint, grow wild on some sites. English ivy is a hearty plant that often remains at historic ranches and farm sites. Olive trees were planted at Spanish missions and remain on the landscape today.

Small scale irrigation efforts at homesteads may be evident in lined irrigation reservoirs or ponds, earthen ditches, small dams, wells, remnants of windmills, or pumping systems. Small diameter water pipes (usually 1 to 1.5 in. in diameter) may be shallowly buried. Spigots are often present in garden and orchard areas and around the house location. Shallow ditches, used to transport water to gardens, orchards, and foundation plants are often part of the landscape and archaeological record.

Agricultural Production Area Property Types

California's diverse agricultural base and climate has resulted in regions specializing in specific crops that use specific property types (see Table 8). While the vineyards of Napa, Sonoma, Santa Barbara, and San Luis Obispo counties are well known, it is essential to understand the types of crops, both historically and currently, that are characteristic of a certain area. For example, Gilroy is known for garlic; Vacaville was a former onion producer; Watsonville and south to Oxnard has a coastal climate ideal for growing strawberries; Butte County is known for producing rice, almonds and walnuts; Sacramento County is famous for pears and asparaguses; Del Norte County has numerous blueberry and flower farms; Lompoc is known for its flowering seed industry. Riverside and Redlands have a long history of citrus farms; Santa Clara produced beans, peas, and other truck farm crops; Sierra, Lassen, and Plumas and other high Sierra Nevada counties produced alfalfa and hay and are known for cattle ranches; Imperial and Monterey counties are ideal for growing lettuce and other leafy greens, Indio is unique for its date farms, while Stockton became known as California's potato capital. Each of these crop types require specialized structures and buildings for sorting, packing, treating, and growing. Smudge pots (used to provide heat to nut and citrus orchards in freezing weather), greenhouses, and beehives are common. Rice growing regions have irrigation features that include surface ditches, pivots and wheels, fields lined with levees. Specific crops also need different equipment, from balers to plows, harvesters to ladders used to hand pick fruits. Understanding the type of crop is essential in identifying related property types and archaeological remains.

As technology evolved and changed, some methods of farming became obsolete, and equipment was often abandoned in place. For example, gang plows, pulled by a team of horses, were no longer needed in the 20th century with the advent of mechanized tractors and other equipment. Plows, hay wagons, hay rakes and hooks and other farming implements have been recorded archaeologically throughout the state. Some of these farm implements can be seen on display at agricultural museums located throughout the state. In some hay fields, foundations from hay storage facilities, such as pole barns, have been found and recorded as well. These storage sites may include concrete slabs or footings, remnants of pulley systems used to lift hay into the facility, hay hooks, and other related equipment (Compas et al. 2002).

Agricultural production areas comprise those elements of the agricultural operation primarily or exclusively designed and used for production for market. In this study these properties include buildings and functional activity areas comprising blacksmith shops and forges; carpentry sheds; storge facilities for wagons and plows and harvesting equipment; cheese making facilities; citrus sorting and packing houses; dairy milking barns; milk storage houses; fertilizer storage sheds; garages; greenhouses; grain bins and silos; hop kilns; ice houses; lambing, calving, or foaling barns; chicken coops; sheep shearing sheds; branding corrals; apiaries and bee yards; utility buildings; warehouses; wineries; worker housing, and workshops (see Table 8). In addition, the fields are important elements where croplands were irrigated or flooded depending on the crop (i.e., row crop vs. rice) (Figure 105). Levees and irrigation differed depending on the type of crop grown or orchards planted.

Figure 105. Vineyard and barns with tank house, Monterey County. (Courtesy Bob Pavlik.)

Following the U.S. Census Bureau definition, these property types do not include standalone manufacturing facilities that produce items like butter, cheese, cider, and vinegar.

Agricultural properties share the need to transport and sell their goods (Figure 106). In the 19th and early-20th century, farmers along the Sacramento and San Joaquin rivers and their major tributaries relied on barges and boats to transport goods to market. Many farms constructed wharfs and docks into the river to accommodate the barges. After 1900, as railroad companies constructed more main lines and spurs, sidings were built up and down the Central Valley, in Southern California, and along the coast. Spur lines were built specifically to carry crops to market. Boxcars equipped with double insulated walls filled with ice and sawdust led to better preservation of fruits and vegetables and allowed farmers to transport their produce to far-flung markets.

Barns are the most common property type found in the agricultural production area and are often situated with or near the domestic property type area. Barns served a wide variety of functions and thus possess many distinctive architectural elements related to those functions (Noble 1984). The agricultural production area also includes fencing, corrals, pens, fields, orchards, activity areas, refuse scatters and deposits, landfills, agricultural machinery, water conveyance system/irrigation features, access roads, grain bins, silos, and many more. Specialty structures might include milk houses or creameries, long rectangular poultry sheds, blacksmithing areas, cold storage, and loading chutes.

Figure 106. Farm workers maintaining row crops, Holtville, Imperial County. (Courtesy Bob Pavlik.)

There may also be evidence of specialized activities or craft industries, such as distilling, weaving, spinning, woodworking, bee keeping, or metalworking. While some portion of the craft production may be for domestic use, craft industries are usually part of the "working" portion of agricultural resource and are classified here as part of the agricultural property type. Blacksmithing was also a necessity at many agricultural resources, driven by the need to mend and repair tools and implements, shoe horses, and complete other metal tool fabrication and repair jobs.

Property types associated with agricultural production areas encompass locations where specific functional activities occurred in order to produce a particular product. Examples include a dairy or orchard, or areas to raise a particular species of animal, such as cattle, sheep, hogs, chickens and other fowl, or horses. In essence, the agricultural property type is the infrastructure necessary for a resource to operate at its most efficient level. The amount of infrastructure within a particular resource generally was dependent upon capital, labor, marketing, and technology. Depending upon the size of the operation, the type of product being produced, and the amount of capital available. Worker housing was either relegated to a specific location away from the domestic production area property type or contained within or near it. Within most agricultural production properties are numerous ancillary buildings and structures that function together or are independent of the primary sphere of production. In essence, farms and ranches may have independent parts that lie within the same resource, but function quite differently in order to support the farm or ranch family. One of the most common dual agricultural property types includes the combination of orchards with row crops, or ranches that are divided between sheep and cattle.

Barns

Barns are a staple on California farms, dairies, and ranches, whether a small, isolated homestead, large agribusiness, or commercial dairy. See Table 8 for barn property types and Figure 107 for types of barns and hay hoods found in California. Dairy barns are classified under farms, since dairying made more intensive use of land, often within small acreages. Virtually all ranches include at least one barn, and many had multiple barns. Farms and dairies, on the other hand, may include only one barn, along with numerous sheds used for specific tasks. Many farms and ranches also used temporary or makeshift sheds or shelters since their operations were seasonal.

Barns are typically recorded by form and materials. There were four primary building materials used in 19th and early-20th century barn construction: adobe (least common), logs (common mainly in the mountain regions of California), stone, and wood-frame. Some immigrants favored one material over another. For example, Scandinavian or German immigrants are often associated with log barns, while stone barns were often built by immigrants from the British Isles. Brick was also incorporated into barn construction, typically for foundation materials. Wood- frame barns are clearly the most common among the barn types represented

throughout California. Wood-frame barns were generally built with mortise and tenons or were stick-frame construction held together by nails and spikes. In the 20th century, galvanized steel sheets of metal were often used as siding or roof coverings. After World War II, metal posts and steel beams were incorporated into barn construction, particularly on commercial dairies and feed lots.

Although most of the barns built in California have been classified as “Western” barn types, there were important variations to this form of barn. The most basic form of Western barn consists of a square or rectangular two-story structure with a gable roof. These barns could have brick or stone foundations, with the interior built directly on dirt or could be elevated on posts with wood floors. In the 20th century, concrete floors with drains and pipes were installed to allow for the flushing out of pens and stalls in response to growing attention towards sanitation in food production.

Hay was stored on the upper story or loft and was transported into the loft by a pulley system that lifted bales up and through a large window. The hook and pulley (often referred to as a hay hook) extended out from the roof and was often protected by a hood. The main floor of the barn may have been open to allow for equipment or hay storage or could contain a central aisle with individual stables, stalls, or larger pens on either side, depending on the type of barn (horse, sheep, dairy). If stalls were present, feeding and water troughs lined the aisle. A barn may also have a small, enclosed space in one corner that may have a window. This space could serve as an office, sleeping area, tack room, combination of all of the above, or for other uses as needed.

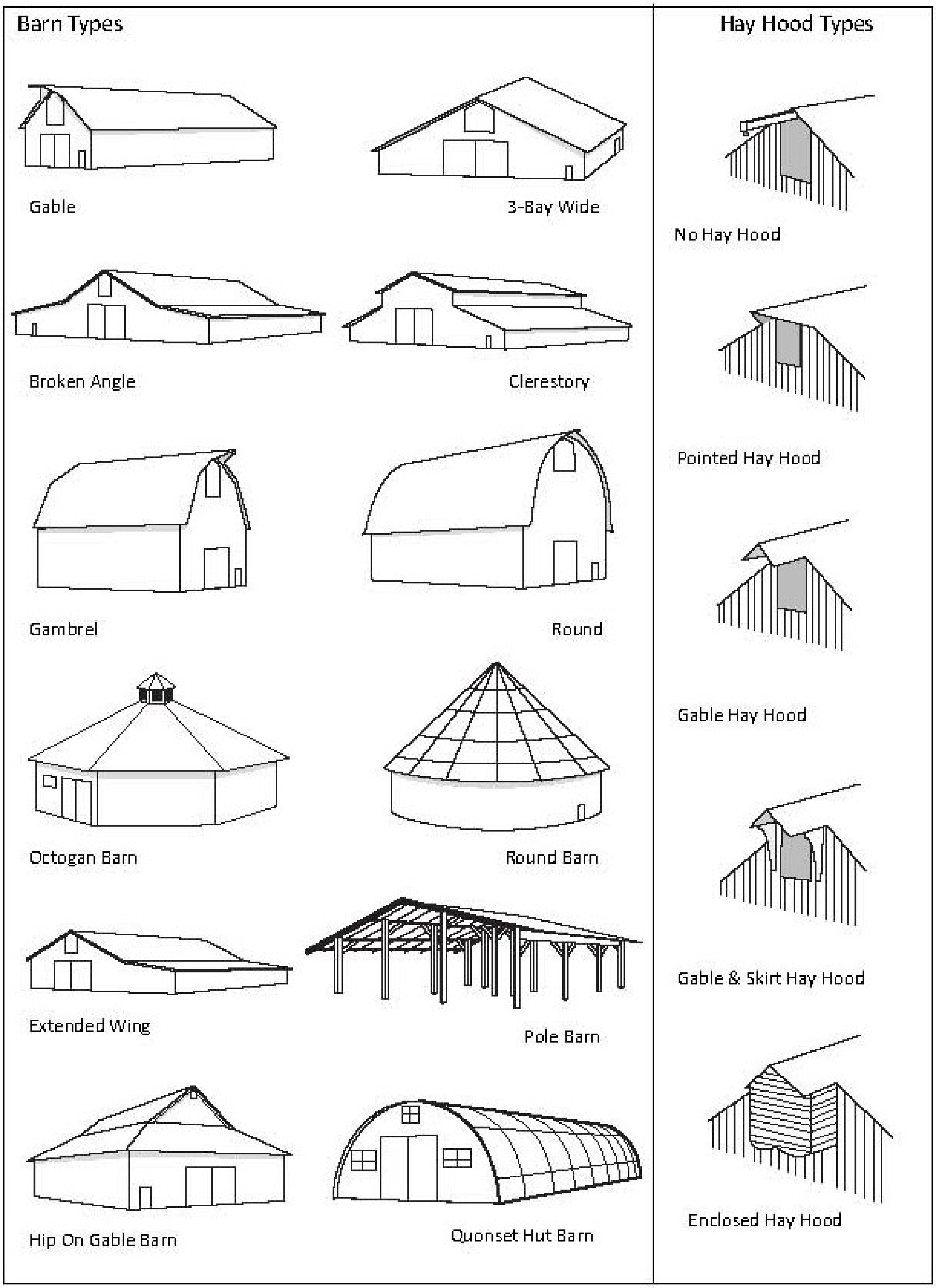

Figure 107. Types of barns and hay hoods found in California. (PAR Environmental Services, Inc, based on Noble and Cleek 1995.)

The basic Western square or rectangular barn shape allowed for expansion. Single-story shed-roofed wings could be added on one or both sides. It was not unusual for the wings to be accessed with a pedestrian door, instead of the large double wood bay doors usually centered on either end of the barn. Barn shapes varied according to use; a dairy barn may be three bays wide, for example, to allow for milking stalls. The scientific approach to dairying brought new innovation to the dairy barn that improved on feeding and milking space (Galvin et al. 2004). Other barns had clerestories with high windows for light; gambrel or round roofs; or were octagonal or round in shape (rare but documented in California). In the Central Valley, barns with combined roof forms have been documented, such as a hip-on-gable structure. Ranches constructed open-sided barns with metal-clad gable roofs in the fields and out on the range for hay storage. These pole barns were often constructed using metal posts and frames after 1945. By the late 1940s many farmers and ranchers took advantage of military surplus sales and purchased Quonset huts for use as equipment storage, barns, and occasionally residences (Figure 108). These huts typically had steel frames clad with metal or steel sheets, with or without windows.

Identifying the age of barns may be accomplished by the technology employed in their construction. Mortise and tenon barns generally pre-date 1900. The same is true for machine-cut nails used in framing. After 1900, wire nails became much more common, and by 1910 virtually all stick-frame barns were built with wire nails. In many cases, cut nails and wire nails are found together demonstrating the reuse of material as barns were rebuilt or remodeled,

Figure 108. Quonset hut residence, Humboldt County. (Courtesy of PAR Environmental Services, Inc.)

particularly after sustaining heavy use or suffering from extreme environmental conditions, such as heavy snows, rain, winds, and flooding. Nails provide chronological clues for architectural historians recording the age of standing barns, as well as for archaeologists studying the material remains of collapsed buildings.

Typically, archaeological barn remains include foundations of mortared or unmortared fieldstone, stone piers, stacked fieldstone walls, fieldstone floors, floor joists, cut and wire nails, and concrete perimeter foundations and slabs. In the Sierra Nevada foothills, some pre-1880 barns were built into side hill cuts that required bank stabilization in the form of ashlar (masonry made of large square-cut stones) or randomly stacked rock or fieldstone. Many of these barns could be entered from the top of the bank, which are commonly referred to as bank barns in the Northeastern United States.

Storage Facilities

Grain Bins and Silos

Grain bins and silos were structures constructed of wood, metal, concrete, or even concrete block with round or peaked roofs, built for a specific purpose in agricultural storage (Figure 109). The difference between a silo and a grain bin depends on what the structure stores.

Figure 109. Grain bins on Bitterwater Road, San Luis Obispo. (Courtesy of Bob Pavlik.)

A silo is a tall, narrow structure, usually with a dome-shaped roof. Silos store what is known as "silage," which is grass or other animal fodder that is harvested green and kept moist, that can be stored for long periods of time, and is used primarily for feeding dairy or beef cattle. The silo can be constructed of concrete, concrete blocks, brick, metal (iron or steel), and sometimes, wood. Concrete or concrete blocks or bricks work best as they keep the product being stored at a consistent temperature and moisture, which is essential for its longevity.

A grain bin stores dry grain that will be used for animal feed, fuel, or as a future food source for people. Grain bins might hold nuts, corn, rice, wheat, oats, barley or other similar "cereal" type products. There may also be several bins lined up in neat rows, sometimes with a catwalk across the top. The structures must allow for proper ventilation, so that the product does not spoil while in storage.

Citrus, Other Fruit and Nut Packing Sheds

Grapes were the first fruit widely grown commercially in California because they could be made into wine (Eastman 1998:172), which had a longer shelf life. Citrus and other perishable fruit needed more infrastructure to ship to market. Packing sheds were inexpensive buildings constructed to shelter workers while they were processing fruit from the field to box and ship to market (Figure 110). A variety of nuts were grown and harvested in California, including chestnuts, walnuts, and almonds and after WWII macadamia, pistachio, and pecan. Vegetables such as green beans and others became commercially viable once canning became widespread in the 1890s (see Figure 111 of a cannery work camp). During harvest time, seasonal camps formed to house people who picked, processed, packed, canned, froze and shipped the products. Needed infrastructure included work areas to sort, wash and process produce, packing sheds, and machinery sheds.

Other Storage Facilities

Other storage facilities included icehouses, equipment sheds, and sheds for specific purposes. Equipment may have been stored in barns or other sheds. As automobiles became more common, they were housed in garages to protect from the sun and weather. Other sheds were used for storing fertilizer, fuel, or even drying meat.

Agricultural Lands

This category of property type encompasses the areas where crops or livestock were grown. The orchards were planted with citrus, apples, avocados, pears, stone fruit and nuts. Fields were planted with a range of crops from wheat and corn to grapes and cotton. Cattle and other livestock grazed in pastures and on the open range. Woodlots were the staple of many properties to produce wood for heat or to be sold. These property types may be easily overlooked because there are few improvements above ground; however, they are an important part of the property.

Figure 110. Packing shed in Chatsworth, City of Los Angeles, northwest San Fernando Valley, Los Angeles County, 1973. (Courtesy Bob Pavlik.)

Figure 111. Clear Lake Cannery workers camp, ca. 1897 to 1905. Date based on clothing style. (Courtesy of the Lakeport Historic Courthouse Museum.)

Livestock

Poultry Farms

Chickens were a part of every homestead and needed specialized feeders and structures to house them. Coops for individual domestic use are often small, screened enclosures with shelves to accommodate nests and brooders. An outside fenced or penned area may also be present to keep the birds contained. Coops, no matter the size, require good ventilation to keep humidity levels down. Farm coops often had solid lower walls built of wood, brick, or stone and screened upper walls. Roof shapes typically were shed or gabled.

In contrast, commercial poultry farms rely on long, rectangular, gable-roofed houses to protect the birds from the elements, predators, injury and theft (Figure 112). Poultry require a dry, draft-free environment. Typical houses have brick, dressed stone, concrete, or concrete block foundations and south-facing sliding windows to allow the sun to warm and dry the coop. Screened upper walls, outside fenced runs, inside and outside water bins and feeding troughs, shelves for nests, and concrete or stone floors that slope or have drains are common features of poultry houses. Outside fences are often buried up to a foot in depth and toed or slanted out to discourage predators. Houses are humidity controlled and, if egg producing, well lit, with one electric light every 40 feet.

Figure 112. Commercial chickenhouse, Stanislaus County. (Courtesy of PAR Environmental Services, Inc.)

Associated structures and indicative artifacts may include egg-packing and storing sheds or refrigerated houses, compost houses to process waste, wing clipping houses, incubators for chicks, and cages. Archaeological manifestations of a poultry farm include concrete slabs with or without a drain, foundation remains, and collapsed wood frame buildings.

Horse Farms

Horse farms are characterized by stables, paddocks, corrals, and barns. A paddock is a small enclosure or field of grassland where horses are kept or exercised. Corrals are enclosures, often associated with a stable or barn, where training and breaking horses occurs (Figure 113). A stable is a building divided into separate stalls for individual animals. It could be a separate facility or the lower floor of a barn. Feeding and water troughs are provided for each stall. Most horse farms also include a tack area. Farms that raise or board horses for show or racing also may have obstacle courses, jumping areas, racetracks, and bleachers or viewing areas. Foundation remnants, configurations of fencing to form smaller enclosures and corrals, remnant feed troughs, and remains of jump obstacles are archaeological features associated with horse farms.

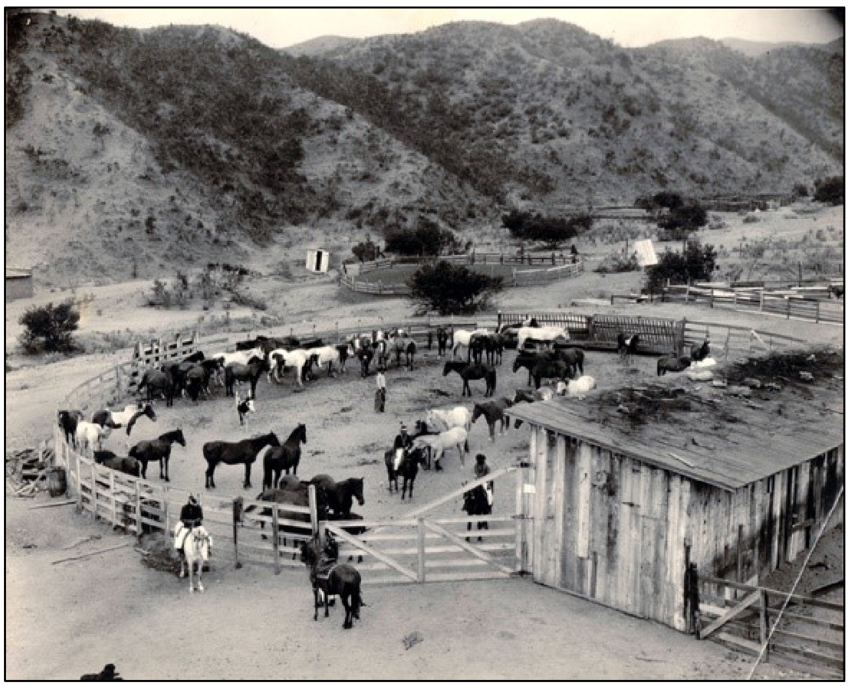

Figure 113. Horse corral and wooden stables at the Harry Carey Ranch in Saugus. Located at the Mouth of San Francisquito Canyon Road (just north of today's Copper Hill Drive), in northern Los Angeles County. Note the presence of Dine (Navajo) Native Americans Indians who lived and worked at the ranch, pre-March 1928. (Santa Clarita Valley History, DC2202., courtesy of Harry Carey Jr.)

Dairying

California dairies began in the 1850s to supply miners with fresh butter and cheese. This small-scale industry has grown into one of the largest industries in California (Figure 114). By the early 2000s, California had nearly two million lactating dairy cows with about 75 percent of the dairies located in the San Joaquin Valley (UCD 2005). Like any specialized industry, dairies have certain features lacking at other agricultural sites. Dairy products spoil if not kept cool so

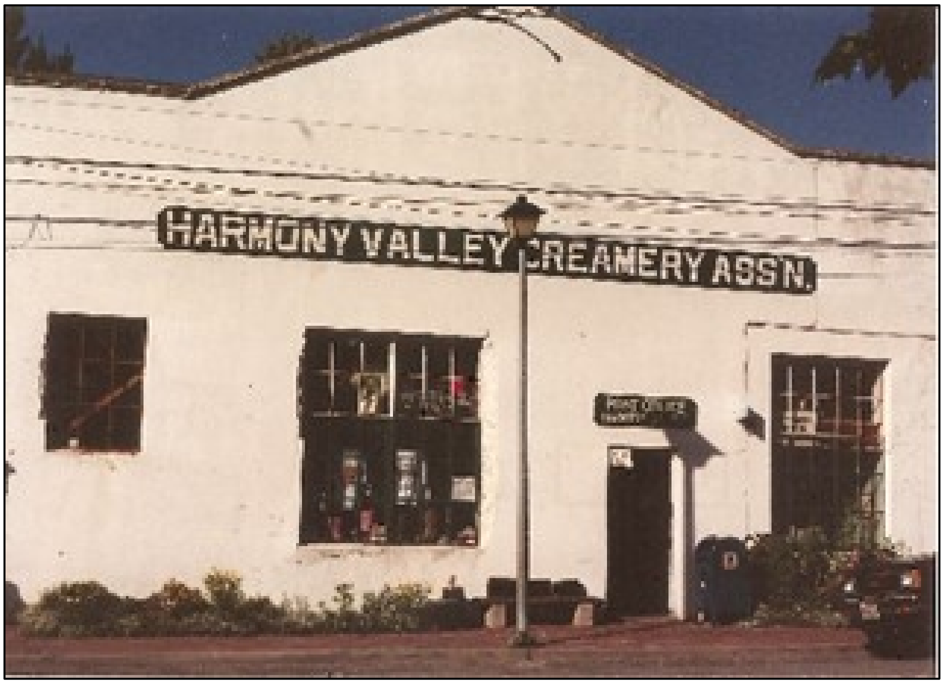

Figure 114. Harmony Valley Creamery and Post Office, San Luis Obispo County. (Courtesy Bob Pavlik.)

devising cooling structures was an utmost concern and key to a successful dairy. In the 19th century milk houses were often built of stone, rather than wood, were tucked into the side of rock faces that had been dynamited and excavated to form caves, or were kept in double walled, insulated wood structures cooled with blocks of ice.

Many dairies created artificial ponds on their mountain ranches to encourage winter ice formation. Blocks of ice were cut from the ponds and insulated with sawdust to retard melting. As the weather warmed, the blocks were dropped between the insulated double walls of the milk house, creating a cool environment for storage of cheese, butter, and milk products (Ferris and Smith 1882; Rood 1993).

The dairy business lent itself to emigrants who came from dairy-focused countries. For example, Italian and Italian Swiss emigrants came during the Gold Rush and, by the 1860s, established summer and year-round dairy ranches in the Sierra Nevada from Quincy to Sonora. These Italian Swiss dairymen processed the milk into butter and cheese following traditional, European methods, creating a unique archaeological signature (Rood 1993; Rucks 1987).

One element of a traditional Italian Swiss cheese curing production was a cheese cellar, usually about twenty feet square and six or more feet high constructed of locally obtained blocks of granite. Cheese cellars were located near a spring or creek, and the water was used to keep the house cool (Rood 1993). Italian Swiss dairies contained circular dairy pans and racks used to store the cheese pans. The milk house often had racks built into the walls for letting cheese cure.

The rise of industrial dairies in the Central Valley and Southern California led to the need to adjust equipment and facilities. Large commercial dairies built open-sided, covered feed troughs. Milking barns were long, with individual stations for milking. At first, equipment was semi-automated; in general, by the mid-1920s, milking became fully automated. Stainless steel holding tanks for milk and sanitation equipment began to appear on dairies with the increase of regulation in the 1930s. Around that same time the continuous ice cream freezer was developed, and the commercial homogenization of milk became practical. The widespread adoption of stainless-steel containers in dairies and creameries became a reality. In 1938 the first farm bulk tanks for milk storage came into use and began to replace milk cans (California State Parks 2005: 6). The scientific approach to dairying brought innovation to the dairy barn's internal spatial organization that improved on feeding and milking activities (Galvin et al. 2004). This new arrangement of space allowed for the management of greater number of animals on smaller tract of land, as seen in New Colony near Ontario and San Jacinto in southern California.

These large dairies needed to dispose of waste byproducts, particularly nitrogen. Nitrogen is drained from manure and put in pits or open storage ponds for evaporation. Manure is stored and dried (often under plastic sheets held in place by tires) and then sold or used for fertilizer (UCD 2004).

Archaeological remains of dairies, other than the living sites, include granite outcrops that have been blasted to remove blocks of rock; drill bits and wedges; black powder cans; constructed cheese cellars dug into the ground or into a hill but always near water; developed springs; stone or double walled building remnants; and fenced pasture or corral areas. Deep depressions with or without pipes for effluent flow are archaeological signatures of these depressions or holding ponds. Stockpiles of tires, foundations, slab floors with drains, and mounts for milking machines are other examples of archaeological features found with dairies.

Ranching

Livestock operations include dairies, cattle ranches, and animal husbandry of hog/pig, sheep, and goats. As opposed to ranches, a cattle or swine farm may have many animals confined in a small space, such as Harris Ranch in Fresno County. These large-scale commercial ventures have open sided feeding areas, mounded hills within the fenced pastures, sprinkling systems to keep animals cool, shade shelters, and loading ramps and corrals to transport animals to summer pastures, auction, or slaughterhouses. These feed lots may also have associated auction houses. Large amounts of water are a must at these locations, and free-standing, elevated industrial steel water tanks are common features. Corrals and pens are used for livestock on a dairy farm or ranch, whereas smaller enclosures are used for sheep and hogs/pigs (Moore et al., 2013:5–51).

Archaeological remains of commercial farms may include water pipes, foundations, hard packed leveled areas where animals were kept, pits for processing manure, posts or footings from shelters, and fencing.

Cattle

Cattle ranching in California began during the Spanish and Mexican periods. Beef cattle ranching required large spaces with room for the cattle to graze. Initially, cattle were left to graze on the open range with no fencing or restrictions. Overgrazing of public lands and the creation of the Forest Reserves led to government-regulated grazing allotments, the need for special use permits, and the assignment of rangeland to individual ranches.

Hand-in-hand with the allotment of space came the erection of fences. In the arid climate found in much of California, vast amounts of acreage are needed for cattle to survive, and traditional fencing methods such as posts or wire often proved cost prohibitive. More common were low walls constructed of locally obtainable rock by shepherds, cowboys, and other ranch hands. The walls were successful in keeping cattle and sheep confined to a desired location and required only a good back and patience to erect. Today, rock walls extend across the landscape throughout northeast California, northern Sacramento Valley, arid lands of Southern California, and the Mother Lode foothills, mute testimony to the long ranching history of the region.

Unlike sheep, which required constant supervision, cattle often roamed free within a given range until round up, although they would gather at watering locations. Occasionally a few cowhands would move with the cattle or drive them to a new location, but the major effort usually only took place during round up. Larger operations established line shacks at regular intervals and kept them stocked for emergency or overnight use, temporary shelter during routine fence maintenance work, or round up headquarters (Mackey et al. 2000:7.1–8). The pattern can be seen on Vandenburg Space Force Base near Lompoc. Archaeological remnants of developed water locations, stock ponds, remnants of line cabins, corrals for horses, rock walls, and salt licks can be found on the open range. Ranchers also often reused items to accommodate their operations and evidence of this can also be found archaeologically; it is not unusual to find cast iron clawfoot bathtubs reused as a water trough, located next to a well head and windmill. Ruins of windmills are also seen.

Cowboy line camps were perhaps the most ephemeral of all temporary work camps. Cowboys moved from ranch to ranch during round up. While camp spots could be used year after year, they were usually occupied only for a night or two. Cowboys generally slept out in the open range without the benefit of tent or cabin. During round ups and drives, ranch owners provided a chuck wagon and a camp cook who followed along with the men and heard. These camps are often marked archaeologically by remnants of the campfire ring and a few discarded cans or tobacco containers (Mackey et al. 2000:7.1–7). Other locals had a small shack or cabin located along fence lines out in the range where cowboys could shelter from cold wind or a storm. These had a small wood stove for heat and to heat cans of food, and occasionally had a cot and a few blankets.

Branding sites required hot fires, holding pens, and processing areas. The sites were usually used on an annual basis for short periods of time. Archaeological signatures of branding areas include fire-hardened earth and rock circles, complete or fragmented branding irons, waste byproducts (coke and slag from blacksmith operations), remnants of corrals, cattle chutes, fenced pasture, and domestic refuse deposits (Figures 115 through 117).

Figure 115. Corral in Placerita Canyon, southeast of Santa Clarita and adjacent to the Los Angeles National Forest, Los Angeles County. (Courtesy Bob Pavlik.)

Figure 116. Cattle chute in Sacramento County. (Courtesy of PAR Environmental Services, Inc.)

Figure 117. Cattle feeding barn, Stanislaus County. (Courtesy of PAR Environmental Services, Inc.)

Cattle and sheep drives entailed herding thousands of animals down roads and trails to the nearest railroad siding or highway where they could be loaded onto cars and moved to market. The routes of the cattle and sheep drives are visible today, particularly across arid lands. Railroad loading areas are marked by elevated cattle chutes and docks with gates to allow animals onto cars in controlled numbers. Loading chute and holding areas are visible next to many California highways today, and include enclosed areas formed by logs, boards, or wire fencing; ramps to guide stock into elevated trucks; and narrow chutes.

Sheep

Sheep ranching began soon after the Gold Rush in direct response to the need to feed miners. Permanent ranch headquarters were based in the valleys or foothills, while the higher elevations were used during summer months for grazing (Jackson et al. 1982:165–166). Even after overgrazing of public lands led to the establishment of the Forest Reserves and restrictions on grazing, sheep ranches continued to move their herds through the high country in the summer under the auspices of special use permits and grazing allotments (Jackson et al. 1982). Winter camps are often found in valleys at the base of foothills. Sheep ranch headquarters may have large barns for lambing, corrals and fenced pastures, low concrete troughs (used to walk sheep through for treatment of hooves), shearing facilities, feeding pens, watering troughs, developed springs, wells, storage reservoirs, windmills, and other water impoundment and conveyance features (Figures 118 and 119).

Basque and Armenian immigrants, used to managing stock in their homelands, became heavily involved in the sheep industry of the American west, particularly in the Sierra Nevada mountains. Basque herders were hired by large sheep outfitters and roamed the high country with their herds, sleeping out in the open for months on end with little more than a pack animal, tent, bedroll, and food. Large sheep ranches maintained base camps in the mountains that served as headquarters for the summer ranching operations (Smith and Baldrica 1993).

Figure 118. Pierce Henley sheep lambing barn, Calaveras County. (Courtesy Julia Huddleson.)

Figure 119. Sheep shed in Watsonville, Santa Cruz County. (Courtesy of PAR Environmental Services, Inc.)

Base camps usually contained one or two log or wood-frame cabins for the cook and foreman, a bunkhouse for the men, sheep pens, a corral and barn, a privy, and a water source. Generally, the camp had a permanent cook who prepared food and maintained the camp. Once a week, bread and other staples were delivered to the shepherds by the camp cook on horseback. That weekly visit was often the only contact shepherds had with the outside world for the months they lived in the mountains.

A second characteristic indicative of Basque sheep herding is graffiti left on trees and rocks by the shepherds. Numerous studies have been conducted regarding these arborglyph sites and have classified the aspen art into several categories: dates and names; human figures; females, sex, and courtship; interpersonal relationships among herders; ethnic pride; and linguistic divisions. The historical value of the carvings lies in a record of the experiences of immigration and the sheep industry and is considered extremely significant, given the short lifespan of the aspen tree (around 80 years) and the resulting rapidly disappearing record of 19th and early-20th century herding efforts in the high country (Claytor and Beasley 1979; Mallea-Olaexte 1992; Smith and Baldrica 1993).

Swine

Swine farms, also known as piggeries, need specialized facilities including pens, feeding troughs, farrowing pens, and manure removal systems (Eastman 1998). Pigs use less space than most livestock (O'Connor 2017). Swine farms can range in size from just a few animals to large operations for pork production. Large operations can cover many acres and utilize large, open-air industrial type buildings with appurtenant grain bins and silos, as well as processing facilities. Swine do not have the ability to regulate their temperatures, so they use mud holes to cool off in the heat, and their enclosures need to protect them from the cold in the winter (Becchetti in O'Connor 2017). According to Olmstead and Rhode (2017), swine production in California has been relatively less important than in the rest of the country.

Infrastructure

Infrastructure property types are features that contributed to the successful operation of the agricultural enterprise. The agricultural production area used similar infrastructure as in the domestic production area, but on a larger scale. Methods to draw and transport water included wells, windmills, ditches, canals, and pipes. Other infrastructure included utility and communication lines, roads, and trails, as well as water, gas, sewer lines, sumps, and septic tanks or cesspools. Transportation within and between agricultural areas used trails, roads and railroads.

Archaeological evidence of these property types may include parts of a larger system. Depending on the temporal period and industry, some companies, particularly those under the jurisdiction of the State Railroad Commission, were required to inventory all their assets. Archaeologists have been able to use these inventories when recording sites (Baker and Maniery 1997; Baker 2001). Agencies such as the CCIH carried out investigations regarding matters of health and sanitation at various camps throughout California, including agricultural camps. See Appendix E for CCIH'S "Rules for Labor Camps."

Irrigation Systems

Whether raising chickens, operating a dairy, running herds on the open range, or growing fruits and vegetables, all operations rely on water. Initially, agricultural development consisted of little more than fenced-in meadows or open grass lands that used water from local streams or drawn up from hand-dug wells (see Table 8). As settlers poured into California, the need for water became crucial. The first attempts at irrigated fields consisted of little more than hand-dug earthen ditches leading from local creeks or streams into the hay fields or pastures on river flood plains. Public land entry laws of the late 19th and early 20th centuries attracted homesteaders and settlers who expanded agricultural fields from the floodplains to outlying dry lands, importing water through elaborate and expensive irrigation systems. Early systems were developed by groups of settlers banding together to build dams of locally obtainable rock and earth, dig canals and ditches, and share water. Other systems, such as the Klamath Project, were developed under the auspices of a federal or state agencies and could consist of an elaborate series of dams, numerous canals, gate valves, and the like. See Chapter 2 for discussion of George Shima and the reclamation of the Sacramento Delta.

As water was brought to dry lands, more and more farmsteads developed, usually consisting of 160 ac. —the land allotment allowed for individuals by public land acts. Most farmers and ranchers raised hay in their fields but also maintained vegetable gardens and small orchards for their own use or for sale. Some took advantage of grazing opportunities on federal land and ran large herds of cattle in the surrounding range land and forest. After 1900, local irrigation districts were formed as a way to control water and prevent frequent flood episodes, and to provide equitable water to local farmers. In Northern California, these irrigation districts and accessibility of water led to new agricultural ventures, such as rice production. The ability to construct small berms around fields to contain the water necessary to grow rice led to new industry (Figure 120).

California has a long history of drought. Areas with rich soils, such as Southern California and the Central Valley, floundered without a steady supply of water. Efforts to transport water from Northern California to the dry areas in Central and Southern California began by 1900. Large-scale projects resulted in the construction of the California Aqueduct as part of the California State Water Project, Delta-Mendota Canal as part of the Central Valley Project, Los Angeles Aqueduct, All-American Canal, Colorado River Aqueduct and other major conveyance systems to transport water for domestic and agricultural use to arid regions. These consistent water supplies, in turn, led to construction of smaller ditch and canal systems, dams, check dams, gates, valves, and other measures to transport water to individual farms and dairies, resulting in the creation of major agribusinesses (Caltrans 2000) (Figure 121).

Small-scale irrigation efforts at homesteads may be evident in irrigation reservoirs or ponds lined with earth, local rock or concrete; earthen ditches; small dams; wells; and remnants of windmills or pumping systems (Figures 122 through 124). More organized and large-scale systems are marked by large, channelized canals and ditches (some lined with gunite), gate valves, check dams, and large dams. As water traveled from the large main canals to fields, ditches usually became narrower. Wood gates that operate on pulleys to lift them up and down

Figure 120. Biggs-Gridley Irrigation District canal and diversion feature used to water orchards, Butte County. (Courtesy of PAR Environmental Services, Inc.)

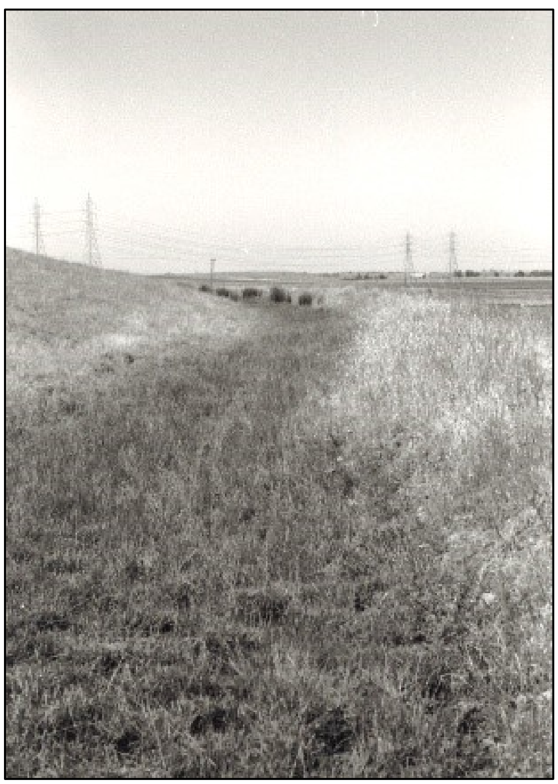

Figure 121. Irrigation ditch at Silva Ranch near Rancho Seco, Sacramento County. (Courtesy of PAR Environmental Services, Inc.)

Figure 122. Irrigation pipe, Kern County. (Courtesy PAR Environmental Services, Inc.)

Figure 123. Remnants of a reservoir, Kern County. (Courtesy PAR Environmental Services, Inc.)

Figure 124. Stock pond with rock retaining wall, Sacramento County. (Courtesy PAR Environmental Services, Inc.)

controlled the flow of water from the main and secondary canals into the field ditches. In higher elevations, pivot and wheel lines commonly are used to irrigate alfalfa and hay fields. Archaeologically, shallow ditches or raised berms, remnant earthen dams, small diameter iron pipes used to transport water, abandoned spigots, irrigation sprinklers, canvas and rubber hoses, lined or unlined storage ponds or reservoirs, pumps, and other equipment are reminders of the crucial role that water plays in agriculture.

Boundary Markers

Although stone, wood, and wire fencing and ditches have been discussed, it is important to consider the presence of other types of property boundary types. Homestead and farms often used tree rows as windbreaks, to demarcate property lines, to emphasize and enhance the driveway leading to the main domestic areas, or to define fields. Vegetative markers, such as trees and shrubs, were planted to denote property lines (Figure 125). Depending on the location and the type of resource, there may be planted rows of Monterey cypress, walnut trees, olive trees, eucalyptus, Lombardy poplar, pepper trees, Osage orange trees, berry bushes, opuntia (also known as prickly pear or nopal cacti), oleander, roses, and grapevines. Many agricultural properties were bounded by dirt roads (public and private) or water conveyances, which were aligned along the straight survey lines that define township/range. These boundaries can sometimes be dated to the land transfers found on General Land Office (GLO) records dating as early as the 1860s. Stone cairns were also constructed on property corners. Vegetation often reflected popular landscape trends of the time (palms in late 19th century; eucalyptus in 1910s and 1920s).

Figure 125. Cactus fencline, Opuntia Fence Line SLO-01 near Cayucos, San Luis Obispo County.
(Courtesy Bob Pavlik.)

Agriculture Related Support Properties

This study focuses on the agricultural property where the crops are grown, and the animals are raised. If processing or manufacturing occurs at that location, then it is part of the agricultural property. Farther from the farm fields are a broader category of properties related to agriculture in several ways. Some are manufacturing facilities like wineries, breweries, canneries, auction houses, weigh stations and stockyards where agricultural products are brought to be processed or sold. California's first cannery was opened in 1856 in San Francisco for fruit from the Santa Clara region. By the late 1800s, many canneries were built or under construction. Many of these canneries were built in the heart of the local agricultural center for easy access to harvested crops. While most are gone, their foundations, remnants of workers housing, and transportation networks (docks, sidings, spur lines) remain.

Other property types are social such as grange halls, county fairgrounds, and rodeo grounds. Grange halls are found in areas with strong agricultural roots throughout California and serve as local or regional gathering places for farmers to share their concerns, responses to natural disasters such as drought and insect infestations, serve as community gathering spaces for immigrant populations, advocating political change, and other matters.

These agricultural communities may be far enough from town that stand-alone schoolhouses are located along a county road. A few other types of properties are experimental stations, local irrigation district offices, farm bureaus, offices and roadside stands. Experimental stations, often associated with universities, are also essential to agricultural development, as are small airports and crop-dusting planes.

CHAPTER 4. ARCHAEOLOGICAL AND ARCHITECTURAL RESEARCH DESIGN

There may have been a time when preservation was about saving an old building here or there, but those days are gone. Preservation is in the business of saving communities and the values they embody.
– attributed to Richard Moe, National Trust for Historic Preservation

INTRODUCTION

The discipline of historical archaeology, with its strength in the combination of archaeological and documentary data sets, is well positioned to study the development of California's agricultural economy. While the focus of this chapter is primarily on archaeological resources and the development of a well-crafted research design, these research themes and questions are also applicable to understanding the existing architectural layout and land use of a property. Research domains that consider demographics, cultural heritage, and other issues are often important to consider when evaluating standing buildings and structures. When built environment and archaeological components are both present in a historic property, the resource benefits from the professional collaboration between disciplines. That multi-disciplinary collaboration is enriched even further when the scholarship of ethnic, women's, gender, and equity studies are included in the discourse.

Cultural resources, including buildings, structures, landscapes, and archaeological sites from the 19th and 20th centuries are non-renewable resources. Once significantly altered, damaged, or destroyed, the physical information a resource contains is lost forever. For architectural historians, historians, and historical archaeologists, it becomes incumbent that they work to recover as much information as possible from resources being impacted by transportation projects. It is also critical to understand and interpret that data from a broad viewpoint and in a way that captures these expressions of the past, preserving that information for descendant communities and future researchers who will enter the field with new tools and perspectives. One of the most important steps in evaluating a historic-era resource, particularly when investigating archaeological sites, along with its importance and meaning to descendent communities, is a well-developed research design that can highlight the ability of a site's data to answer important questions about local, state, or national history.

Using archaeological data—landscapes, features and deposits, and artifacts—to address important research questions works in tandem with the thoughtful evaluation of documentary research, oral histories, sociocultural memories and stories, and other historical evidence, as well as consideration of the standing buildings, structures, and landscape of the site. Several independent lines of evidence, including archival, archaeological, architectural, and oral history sources, can be useful to compare and strengthen interpretations, as well as address the biases and gaps that may be present in each source individually. In addition, there's a growing recognition among researchers on how memories and stories of descendant communities make different contributions in comparison to archival and oral histories. However, it is important to recognize that physical remains—archaeological and architectural—may possess the information needed to answer important questions regardless of whether site-specific documentary evidence is scarce or abundantly available. One of archaeology's greatest strengths is the ability to tell those stories that are not documented in words or images, both the mundane and the extraordinary.

Abundant documentation does not necessarily lessen the important contributions of archaeological data. While some historical documentation is straightforward, other information can be viewed subjectively and those interpretations contestable. This subjectivity of history—how the past has been interpreted through a personal social perspective—can challenge practitioners going forward. As Barbara Little (2007) explains in *Historical Archaeology: Why the Past Matters*, "Documentary history offers us one set of evidence about the past. Archaeology offers us a different kind of evidence. Historical archaeology is a kind of scholarship that challenges our certainties is useful ways." Similarly, Alison Wylie (1999) ties this idea to the archaeology, "historical reasoning from documentary evidence is mediated, in practice, in all the same ways as is historical reasoning from archaeological evidence" (34). It is not possible to reinforce, alter, or challenge current assumptions about the past if historical sources are presumed *a priori* to have a corner on the truth. What is needed instead is a "vigilantly incredulous [critical] attitude" about all sources of historical data (Wylie 1999:33). Oral and sociocultural histories provide additional ways of challenging those assumptions about the past and should be considered as aspects of abundant documentation efforts to refine archaeological, architectural, and historical methods.

On the other end of the spectrum, it is sometimes inappropriately assumed that poorly documented resources or archaeological remains have little value for addressing important historical questions. While it is certainly true that limited documentation may make it difficult to define sharply focused associations, one of archaeology's strengths is the ability to recreate the lifeways of historically underdocumented communities. A careful study of existing buildings, structures, and objects also has the potential to inform on lifeways of historically underdocumented communities. Additional guidance on using the following research themes to evaluate the information potential of agricultural properties is presented in Appendix B: Field Methods for Evaluating Historical Archaeological Sites.

The research themes included in this study focus on specific domains where both historical archaeological and architectural data contribute to a better understanding of those themes. The themes include site structure and land use patterns, agricultural economic strategies, understanding ethnic and cultural heritage traditions, technology and scientific innovation in California agriculture, household composition and lifeways, and labor history and relations. Contemporary archaeological research themes, which often overlap with more traditional research questions, are introduced in this update. These contemporary issues, often focused on climate change, can be applicable to the built environment and multicomponent resources as well.

The following sections provide background on historical inquiry into agricultural properties with emphasis on the unique ways farm and ranching life developed in California. Where possible, this study focuses on research and project work done for Caltrans projects. In addition, a suggested theoretical orientation that considers current professional thought is included. It is important to note that research themes and questions are not static ideas—this would defeat the idea of improving upon the work of cultural research specialists—but an active continuum of thought. Themes should be adapted to specific resources and improved upon over time as new issues and questions are raised within the disciplines of historical archaeology, history, and architectural history, as well as related disciplines.

UNDERSTANDING THE BUILT ENVIRONMENT

When historical archaeologists evaluate a site for the NRHP and/or the CRHR, they make a good faith effort to identify the value of the property. This consideration requires a combination of documentary and site-specific research, comparative property type research, and when necessary, the development of an excavation proposal with a relevant research design, and test excavations. These decisions are all balanced by an archaeologist's professional judgement and experience. The process architectural historians follow for evaluating a built environment property is similar: a good evaluation considers the documentary and site-specific research, compares the resource to others (locally, regionally, and nationally), and examines cultural heritage affiliations by looking for features representing that heritage (i.e., traditional meditation gardens, rammed earth buildings and foundations, etc.). By its nature, the built environment is more readily accessible than an archaeological site, where the majority of the resource can be buried, and data is less immediately accessible.

The process for recording and evaluating an architectural resource is often very compressed, with recordation immediately followed by evaluation, generally without a need for further field visits:

> For the built environment, significance is generally viewed within the local historical and architectural context, which is the interpretive and comparative framework, composed of similar resources in an area. This framework provides the basis for assessing the historical or architectural significance of a property. For example, a property determined eligible for its architectural style in one community might not be considered significant in another community that had a richer stock of similar historic properties. In addition to meeting one or more of the criteria, a property must retain its historical integrity to be eligible [Caltrans 2022 SER Vol 2, Ch 6:16–17].

While the NRHP and/or CRHR criteria focus for archaeologists is traditionally Criterion D/4, it is important for specialists to document the fact that they have taken into consideration the applicability of the values of criteria A/1, B/2, and C/3 on historic-era archaeological sites. Similarly, built environment properties, generally found important based on criteria A/1, B/2, and C/3, should be considered under Criterion D/4, although eligibility under Criterion D/4 is rare.

When the circumstances for multicomponent resources exist, archaeologists and architectural historians benefit from working collaboratively. Multicomponent resources are defined in Chapter 3 – Property Types as historic properties that have more than one cultural component represented, including Native American, historic-era, and/or below ground and architectural properties. For this study, the use of multicomponent refers to a resource containing different property types—architectural and archaeological—on a shared historic landscape. Multicomponent resources may be standing architecture built over an earlier Native American and/or historic-era archaeological deposit. Similarly, a multicomponent resource may include standing buildings and structures with associated archaeological features, deposits, and artifacts; it is the latter case that this study is focused on (Caltrans 2022 Chapter 5). In these situations, the property should be documented as a single resource with a single finding of effect. More and more, historical archaeologists are seeing the importance of a multidisciplinary approach to fully understanding archaeological sites, finding the resulting collaboration to more completely reflect the history and importance of a resource (Sarah Miller 2021, pers. comm.; Fong 2021). Collaboration should be across disciplines, with an understanding that what may be viewed as a "ruin" by an architectural historian, is seen by an archaeologist as an informative aspect of the archaeological component. Similarly, a standing structure that may not have clear historic value to an archaeologist, may have intrinsic significance to an architectural historian. Practical guidance for effective collaboration and documentation is provided in Chapter 5.

A comprehensive perspective is imperative and helps how investigators view cultural resources in terms of property types, districts, and landscapes. The threshold for eligibility can be slightly lower in a district, with certain architectural and/or archaeological features or deposits considered "contributors" to an overall district when they might not be found eligible individually (Hardesty and Little 2009:11). Research conducted by one specialist should inform upon the work of the others, resulting in one set of documents addressing the resource comprehensively.

Multicomponent resources with related historic-era archaeology and built environment components often occur on farms and ranches established prior to 1915 to 1920. After this date, new homes began to increasingly include indoor plumbing and sewer in rural settings, eliminating the need for privies. Examples of Caltrans projects with multicomponent resources can be found throughout the state, including sites in the Capay Valley, Yolo County, near Lincoln, Placer County, and near Aspen-Fales, Mono County (St. John and Wooten 2005; Huddleson and Fine 2008; Larson and Costello 2016). At the time they were recorded, the Capay Valley and Lincoln resources represented complex family agricultural compounds with a mix of standing residential buildings and outbuildings, architectural ruins, complex archaeological deposits, orchard and row crops, and livestock. While the Capay Valley property of Taber's Corners continues to be occupied and farmed by the same family since the 1870s, the Lincoln property had been recently abandoned when surveyed (St. John and Wooten 2005; Huddleson and Fine 2008). The Mono County agricultural property represented a "seasonal livestock camp" with multiple standing structures dating to 1930; archaeological components may be present but were not identified at the time (Larson and Costello 2016). It may not be unusual to reach the conclusion that the standing component of a resource is ineligible, but the archaeological features and deposits are eligible (Baxter et al. 2019); the reverse situation is also possible. To further understand the process for evaluating built environment resources, see Volume 2 of the SER, Chapter 6 – Built Environment Cultural Resources Evaluation and Treatment (2021).

PRIOR RESEARCH ON AGRICULTURAL RESOURCES

While many agricultural properties with standing architectural resources have been recorded and evaluated based solely on the built environment, the archaeological component can oftentimes go unseen. For historic-era multicomponent sites, studies should consider the archaeological potential of the resource under Criterion D of the NRHP or Criterion 4 of CRHR, in tandem with the architectural importance. Researchers of archaeological studies of farms, ranches, homesteads, and other agricultural resources have used a combination of architectural, historical, and archaeological data and methodologies to address pertinent research questions. Historical archaeology helps uncover a variety of perspectives on individual farming households, as well as those households in relation to other households and regions, allowing for a deeper understanding of the broad issues playing out through time and across local, regional, and national settings.

Beyond California, several edited volumes have focused attention on farms in the Northeast and South (Baugher and Klein 2001:1–8; Orser 1990). Amy Friedlander (1990) pointed to the potential for examining regional differences and the reasons why farms in the Eastern and Southern United States were generally more stable than those in the West and Midwest. While work in other regions of the United States reveals differences in research orientations, some shared themes have broad applicability. Among Northeastern archaeologists, the most significant issues addressed were the transition from subsistence to market farming in the 19th century, ethnicity, and the impacts of technological innovation on farming, according to one study (Klein et al. 2001:11).

On South Carolina’s Aiken Plateau, Melanie Cabak and Mary Inkrot (1997) studied 54 rural farmsteads that were purchased by the federal government *en masse* in 1951 to build a nuclear power plant. The authors used modernization theory to explain how farm life changed during the period when technological innovations were rapidly restructuring agrarian lifeways in many parts of the nation. Modernization theory initially developed during the Cold War to explain cultural and socioeconomic processes. Scholars, recognizing its limits, restructured the theory and today see it primarily as a theory of economic development. Today “modernization is considered to be the result of technological, agricultural, and industrial forces, including urbanization” (Cabak and Inkrot 1997:17). Cabak and Inkrot’s study examined regional architectural trends, socioeconomic differences between tenure classes, and the extent of farmstead complexity.

Some investigators have sought to examine how rural farming households responded to the emerging dominant cultural values and practices of the rising urban middle class in the late 19th century. Friedlander (1990:104) suggested that investigations of status in farming households are not about making obvious statements such as “rich people buy expensive ceramics,” but rather “how was consciousness of status or aspiration to status reinforced by the dishes on the table, pictures on the wall, and clothes on people’s backs?” Viewed in this way, artifacts deliberately conveyed messages regarding class orientation and social beliefs and structures, reinforcing the social position of a given household.

In a similar way, architecture can be informative as seen in upgrades to homes, changes in ornamental landscaping, and additions of outbuildings and barns. Rural and urban households employed different economic strategies and had different opportunities for social intercourse and expression. The emergence of mass marketing and brand name products, the domestic reform movement, and other pervasive changes that swept the nation in the late 19th and early 20th centuries influenced both artifacts and architecture. Despite this, farmers were characteristically more frugal than their urban counterparts, and wealth was often measured in terms of acreage and/or herd size rather than material possessions. There is significant interest in comparing the experiences and practices of rural and urban households. It may also be useful to compare purchasing habits during periods when the regional or national economy was most depressed, such as during the 1870s, 1890s, and 1930s.

The importance of analyzing farms as entire landscapes encompassing the farmhouse, outbuildings, fields, fences, water systems, and other elements has also been widely recognized. William Adams (1990:101) suggested, for example, "The placement of structures in relation to one another and to the outside world reflects the degree of conservatism and innovation of the farmer." Such observations are important for understanding adaptations of people emigrating from other countries and their responses to the dominant culture surrounding them. In California's Central Valley for example, Swedish, Armenian, and Portuguese immigrants created whole communities independent from other European groups. There is also a potential to glean insights concerning the evolution of sustainable versus extractive approaches to farming within a landscape approach, including how farming practices from different regions were adapted to California. In a similar vein, Mary Beaudry (2001:139) argued that:

> An archaeology geared to the level of the household is not adequate for comprehending farms as farms; rather, what is required is a landscape archaeology approach that examines the farm feature system as an integrated whole. Ideally, archaeology done at the level of the household intersects with and enriches the results of broader scale work done at the level of the farm as a whole.

Some of the questions Beaudry (2001:139) raised include, "What can we learn about the structure of the farm family and perhaps of its multiple income strategies? How can we link the individual farm to the farm neighborhood?". While intended for the archaeological community, Beaudry's questions may also be relevant to architectural historians researching and studying agricultural resources. A similar situation is seen with irrigation colonies—intentionally established farming communities that helped offset the costs of developing irrigation infrastructure—such as the Washington Irrigated Colony, a rural historic landscape along Adams Avenue in Fresno County, and in colonies across California's Central Valley and beyond (St. John and Wooten 2005; Van Bueren 2006). It should be noted that while these colonies could be predatory and often failed, in other cases they were so successful that the original colony is no longer distinguishable architecturally or archaeologically from the surrounding urban landscape.

LuAnn De Cunzo (2001) similarly called for an effort to "delineate the 'cultures of agriculture'" through a melding of landscape archaeology, documentary research, and ethnography. De Cunzo (2001:105) pointed out the importance of understanding the transformation from an agrarian to an industrialized society as reflected in the agricultural sites of farmers and farm laborers of different means. In a paper delivered as a plenary address to the Society for Historical Archaeology in 2003, Lou Ann Wurst argued that rural households and industries joined in a dialectical interrelationship with urban households and industrialization and not as passive, static recipients of an exclusively urban process of industrialization.

As vernacular creations, agricultural landscapes illustrate not only the practices employed by farmers and ranchers, but also their social values and attitudes toward nature. In analyzing the use of fences by Mormon farmers, for example, Mark Leone (1978:197) observed that "no library has the answer to the question: What do Mormon fences enable Mormons to do?" He concluded that fences protected crops from the destructive force of the wind, drew a line between closeness and privacy, conveyed "the state of [a Mormon's] religion," and reinforced the compartmentalization of apparent contradictions in the way Mormons understand their world (1978:199). In a similar way, the orderly visages conveyed in so many late 19th century illustrations of farms reveal Victorian concepts of structure, order, productivity, and subjugation of nature. Some farmers designed their farms based on explicit plans provided in numerous publications and guidebooks. Studies in both architectural history and archaeology are able to consider whether and how agricultural landscapes are reflections of the values of farm families.

Prior studies have also examined the influence of household life course, inheritance, and women's roles in long-term family farming ventures. Robert Hine and John Faragher (2000:345) note many women homesteaded their own land and, in fact, "women proved up at a similar or better rate than men." They also acknowledge that women often did men's work on farms due to labor shortages or extended absence or death of the husband. "Girls who grew up on cattle ranches usually worked outside with their fathers," and there is "little doubt that growing up on a ranch helped to develop women of strong and independent character" (2000:316). One archaeological study of a Colorado farm homesteaded by a woman supported the idea that women did extend themselves into spheres such as farm management and finances normally dominated by men (Stone 1998).

Increasingly, published diaries, letters and other correspondence, and journals are available to support and expand the study of women's roles on the farm. In oral history interviews conducted for the historic wine growing and farming regions in Amador County, California, it was clear that both the domestic and physical farm labor of women were integral to the success of a farm. When women were widowed—which occurred with high rates on farms—all the farm tasks would fall to them, in combination with more traditional tasks of housekeeping and child rearing. Equally important, women who chose not to marry participated in farm economies for their families in critical roles (Kimberly Wooten 2022, pers. comm.). Religion, race, ethnicity, cultural heritage, economics, and family structure are just a few factors that would influence whether and how a female agriculturalist chose to manage the family farm.

Women routinely controlled the management of the household, or at least some of its key functions. Social developments in fashion and the advance of domestic reform and mass consumption gradually transformed the economic strategies of farm households. Changes in the female head of household, however, often produced the most dramatic and sudden wholesale alterations in farmhouses, farmyards, and materials discarded because of household renovation. Archaeologist Kathleen Wheeler (1999) examined such changes at several late 18th and early 19th century New England residences, and her approach holds broad value for sites occupied for more than one generation. She found that changes in the female head of household coincided with discards of entire sets of kitchen and serving wares and the construction of new wings on residential structures.

Marilyn Holt (1995:5) pointed out that “the push for rural change was as likely to come from the outside agricultural districts as from the inside”. Furthermore, progressives saw farm women as the progenitors of change within the farm community. Farm women were enlisted to promote “social engineering and economic growth” (1995:5). Donald Marti (1991:1) noted that the Grange, one of the most important institutions found in most farm communities across America during the late 19th century, “created opportunities for sociability and cooperation among women. The Grange was also instrumental in promoting women’s voting rights”. As a matter of caution, historian Paula Nelson noted that “it is important that the lives of women in the West, as elsewhere, be understood in all their diversity and complexity and that no rigid interpretive framework be forced onto the study” (quoted in Holt 1995:5).

It needs to be acknowledged that this literature review places a strong emphasis on families, and while an update of the 2007 study, continues to center on the experiences of nuclear, heteronormative families. The existing studies aren’t always inclusive of the agricultural experiences of BIPOC (Black, Indigenous, and People of Color) communities. Given how agriculture developed in California in terms of labor (e.g., migrant farmworkers fostering large scale commercial agriculture) and property ownership (e.g., Alien Land Laws preventing Asian immigrants from owning property), it is important to think about the different racial and socioeconomic groups that lived on and traveled through these agricultural spaces and not just the more permanent, nuclear families. Further work needs to focus on these issues, along with discussions about racialized communities and agriculture.

The West

Pat Stein’s (1990) historic context for Arizona homesteads is relevant to this study, although its focus is not the broad topic of agriculture but rather individual homesteads. Based on archaeological studies of seven homesteads, Stein (1990:28-31) identified the following research issues:

1. To what extent were homesteads economically self-sufficient?
2. To what extent was agriculture practiced?
3. What was the role [or roles] of women?
4. What were the patterns of land use?

5. How did the social mores of particular groups evolve in response to life on the frontier?
6. What were the long-range goals, or motives, of homesteaders in staking claims, and how successfully were those goals met?
7. What factors contributed to the "success" of a homestead, as measured by the conveyance of a title patent from the government to the claimant?

A concern central to the archaeological endeavor and underlying many of Stein's research questions is the comparison of the actual behavior of homesteaders to what is known or expected from documentary evidence or oral history. For example, archaeology may prove to be the most reliable method to reveal disparities between requirements for proving up claims and the actual improvements made on a property. Archaeological data may shed light on topics such as applied technology, adaptive reuse of artifacts, home production versus purchasing of new goods, farm layout, and the evolution of agricultural approaches stemming from traditional practices originating in other regions. The questions and concerns raised by Stein can also be relevant to studies of the built environment. A family's additions of cottage industries (such as bee keeping to produce honey) to supplement the farm income, incorporation of traditional cultural features (bread baking ovens, bathhouses), landscaping analysis, and other built environment elements are important to consider in evaluating the built environment associated with an agricultural resource.

Mary Panelli (1983) has placed many of the same questions in an evolutionary ecological framework, focusing attention on early 20th century homesteads in Nevada. She suggested that for many homesteaders, occupying more marginal lands meant they had to resort to highly flexible and adaptive farming behavior just to survive. In addition, she saw the development of a strong tendency to conserve available resources and minimize purchases. While this observation is plausible for remote, post-1900 homesteads in Nevada where water was at best unreliable and soils were marginally productive for agriculture, it can also be extended to the most arid parts of California. Rural farms, ranches, and homesteads in California often have reused and adapted items for a range of reasons, including distance from markets and economic decisions (Mary Maniery 2021, pers. comm.). A study of nine homesteads in Colorado documented the same conservative tendency, with much adaptive reuse of artifacts indicated (Buckles and Rossillon 1986).

It is not always clear what factors stimulated greater dependence on outside markets, as opposed to higher self-reliance among farmers. While standard economic theories looking at costs of goods and transportation may help predict certain behaviors, human behavior cannot always be explained by theories and equations. For example, one might expect a lower reliance on purchased goods during periods of economic hardship, however, archaeological findings sometimes do not support this pattern.

For example, a study of 10 homesteads and 3 ranches in northeastern California and northwestern Nevada investigated in connection with the Tuscarora Gas Pipeline Project noticed a pattern of reliance on purchased goods despite the relative isolation (Mackey et al.

1997). In that study, all the homesteads were successfully proved up, though some were later abandoned. In contrast, James Ayers and Gregory Seymour (1993) saw establishing a homestead on available government land as one Arizona family's solution to economic problems brought about by the Great Depression. Several homesteads occupied during the 1930s in Arizona revealed less self-sufficiency in hard times (Stein 1990). By the 1930s, however, transportation had improved to such a point that goods and services could be acquired more cheaply and perhaps more efficiently through direct purchase rather than reuse. Time management, rather than cultural or environmental factors, then became more relevant to the adaptation strategies of an individual household.

California Examples

An extensive homestead study on Edwards Air Force Base in the Mojave Desert also followed the evolutionary ecological framework. Researchers defined successful economic adaptation as "the ability for home site settlers to derive and sustain a long-term successful economic existence from their rural home site" (Tetra Tech 2004:54). The study measured economic success in terms of the relationship between length of occupation and structural complexity of the home site, that is, variety and diversity of structures. Researchers found a complex mix of factors influenced success of a homestead; ultimately, the site interpretations indicate that success depended upon the ability to adapt to local environmental conditions as well as local and national economic conditions. Adaptation included diversification of economic pursuits, as evidenced by the presence of mining, farming, and railroad equipment at a single site. Settlers might also diversify their crops or experiment by growing two crops at once. In response to national economic conditions, such as the Depression of the 1930s, many homesteaders chose to leave the region rather than adapt. National trends such as Congress' passage of the Enlarged Homestead Act and rise of the Scientific Dry Farming movement were seen as influencing land prices and stability.

Mackey and others found that late 19th and early 20th century homesteads in their northern California and Nevada study never achieved a high level of self-sufficiency. Claimants remained dependent on purchased goods, as illustrated in the variety and dominance of manufactured goods found at the sites. Most lived at "a subsistence level, in a style less than the contemporary ideal" supplementing their income with wage labor (Mackey et al. 1997:30–45). Ranchers with larger spreads fared much better, exhibiting more diversity within functional assemblages when compared to farming families. These differences imply the need for further research into how purchasing patterns of rural agrarian households correlated with hardship, cycles of economic depression, and the expanding availability of mass-produced goods that resulted from late 19th century industrialization.

Yet another investigation in northeastern California suggested the most successful farmers invested the most in improvements, were willing to experiment, and were innovative in terms of adapting to the dry environment (Garate 1982). In certain situations, among California farms, various public water projects provided a steady and reliable supply of water that mitigated environmental uncertainty. Innovation, however, was not the sole predictor of success, as many immigrants employed traditional farming techniques with good results (Garate 1982).

A study of rural homesteads in the Knoxville and Morgan Valley areas of Lake and Napa counties found that local homesteading experiences ranged from long-term, successful agricultural ventures to short-lived, debt-ridden occupations (Praetzellis and Praetzellis 1985). More successful ventures developed earlier in time (1860s) and had a higher degree of self-sufficiency. In this setting, self-sufficiency emerged in a wider variety of crops grown and wider variety of artifacts remaining on site. Later homesteads (e.g., 1890s and later) often failed, despite the easing of reporting requirements for proving them up. Such failures may have been due to market conditions (e.g., the recession of the 1890s), household dependency on external suppliers, settlement of increasingly marginal lands, and other factors. Other situations, such as with certain land colonies, the dream of being independent met with the challenging reality of farming and self-sufficiency (St. John and Wooten 2005).

A social history model helps to examine a continuum of relations between core and peripheral areas in the developing global economy. On this continuum, the model expects rural agrarian households to exhibit considerable self-sufficiency. Utilizing this model, a large study for the New Melones Reservoir Project in Calaveras and Tuolumne counties involved excavations at four rural homesteads (Greenwood and Shoup 1983). Based on studies of the Coffill Ranch, Douglas Ranch, Shea Homestead, Vonich Homestead, and other sites, Greenwood and Shoup noted a change from a dependent economy during the Gold Rush to increasing self-sufficiency until about 1900. This interpretation critically notes that farms and ranches along the Stanislaus River system were clearly part of the Gold Rush economic system in that Mother Lode economies included a wider diversity of products and services than remote rural farms or isolated mining settlements. Although the farms and ranches continued to exhibit self-sufficient behavior after the turn of the 20th century, affordable mass-produced goods gradually became more prevalent. Ongoing adaptations at such properties included supplementation of agriculture with small-scale mining, particularly during the Great Depression.

Commenting on the New Melones results, Judith Tordoff (1988) observed some widespread changes in trade patterns and dependency on external markets over time. With regard to the availability of imported goods, the New Melones sites reveal an early dependence on materials imported to California. While there was continuing demand for products from the eastern U.S. and foreign markets later in time, products made within the state increased not only in volume, but also in importance as California became more industrialized. The growing availability of cheaper mass-produced products in the latter 19th century influenced even the most self-sufficient rural householders. Tordoff concluded that the most productive topics for future investigations involve local, regional, and international trade; cultural heritage retention and adaptation; the growth and loss of community autonomy; and the effects of industrialization on such rural agrarian households.

Investigations at the Vasco adobe site have also looked at the importance of social relations among rural households of an isolated portion of eastern Contra Costa County. The remoteness of the Vasco site contributed to the emphasis on interaction among the culturally diverse families of that area (Ziesing 1996). Relative isolation forced people of varying cultural backgrounds to interact for both social and economic reasons. For example, Margaret Purser (1991) found women played a prominent role in maintaining social and economic ties among widely dispersed farms and ranches of rural northern Nevada and California. Those ties facilitated seasonal exchanges of labor, resources, and information.

Two California studies have involved farms operated by Irish immigrants, providing a glimpse into the lives of the small minority of Irish immigrants that returned to farming for a livelihood. An excavation of two privies associated with the 4 ac. Haggarty Farm near Castroville found deposits from the mid-1870s to ca. 1890. This diachronic evidence suggested the Haggartys remained poor and relied on a combination of home production, materials gathered from the wild, and careful purchases. Despite their limited means, the Haggartys placed importance on Victorian values such as education, social display, gender-based divisions of labor, and aspirations for social advancement. How much religion and culture, rather than Victorianism per se, bound these values is uncertain (Van Bueren, Grantham, and Huddleson 1994).

A large refuse deposit associated with the Carnduff farm near Menlo Park in San Mateo County provides an interesting example of the wide range of interpretations that may be possible in cases where such deposits connect to pivotal household transitions. The Carnduff farm, established in 1865 by Irish immigrants, remained in the same family until the mid-1940s. After Samuel Carnduff's death in 1884, Anne Carnduff operated the farm with the help of her only son William until she passed away in 1917. After Anne passed away, the historic landfill remained. It provides insights into farm and household management by a woman. It also reveals how the different values of two generations may have resulted in the wholesale renovation of the household by Anne's daughter-in-law Kate at the time she assumed control of the household (Van Bueren et al. 2004).

Current scholarship, including Asian American Studies specialists, is shifting and use of both "incarceration" and "internment" can be found in current literature. Internment technically only refers to the detention of noncitizens while Japanese immigrants and United States citizens alike were removed from the West Coast (Kelly Fong 2022, pers. comm.; Stacey Camp 2023, pers. comm.). Under the rubric of cultural heritage shaping farming practices, an investigation of a Japanese truck farm established on Otay Mesa in 1952 discerned evidence of the traditional practices of the farm owners in the aftermath of their incarceration during World War II. The farm complex included an *ofuro* (traditional bath), among other features (Van Bueren and Walter 1994). Elsewhere, John Kelly and Christian Gerike (2002) used a landscape perspective to evaluate a Japanese American farm in Placer County and found the perspective provided important information on how Japanese Americans retained cultural traditions while adapting to the economic and agricultural conditions present in California. This same approach was used to examine architectural and archaeological elements of Japanese American camps located on four islands in the San Joaquin Delta around Stockton (Maniery 1993). Larger samples will help to analyze the role that cultural affiliation played in farming practices and the lifeways of western farm households. A consideration of the built environment, landscape features, and archaeological remains may also lead to conclusion on cultural affiliation and retention of ethnic and cultural traditions. While discussed to a limited degree in the historic context, this research design does not address the farming and gardening practices that occurred at internment camps as a result of the forced relocation of Japanese, Japanese Americans, or other U.S. citizens during WWII.

The investigations of several late 19th and early 20th century agrarian households in various California locales have also occurred. Within San Diego County, the Root, Liefering, Hubert, Israel/Taylor, Peñasquitos, Rancho Jamul, and Schott farmsteads received the attention of one or more episodes of archaeological study (Van Wormer 1979; Van Wormer 1984; Hector 1984; Hector and Van Wormer 1986; Kupel 1986; Van Wormer and Hector 1988; Van Wormer and Schaefer 1988). Several other rural households in the Rainbow and Woods valley localities, elsewhere in the county, have received attention (Van Wormer 1985; Wade, Cheever, and Van Wormer 1990). Those San Diego County investigations share a common emphasis on the recognition of artifact patterns according to functional categories, following the approach developed by Stanley South (1977) (see a discussion of functional categories in Chapter 5). The goal of such efforts has been to define patterned regularities in human behavior to support comparisons among sites. The outcome was a discussion of a “rural community cultural pattern” dating between 1870 and 1940 for the local area (Van Wormer and Schaefer 1988; Shackley and Van Wormer 1989; Schaefer, Van Wormer, and Walter 1994). While efforts to understand patterning are important, few local studies have gone on to ask what those patterns mean and why they developed. Criticism over pattern recognition as a viable approach has emerged because it tends to mask variations among households of differing age, wealth, and cultural heritage composition (Deagan 1993; Orser 1989). Such variations are important subjects for thematic archaeological and historical study.

Data recovery excavations at the Sanderson Farm near Sutter Creek (CA-AMA-364/H) identified interesting archaeological assemblages associated with several structures that had been occupied by temporary farm workers (Van Bueren 2005). Earlier in time, farm hands occupied a semi-subterranean dwelling near the main house, and evidence of Chinese and Native American workers was also discovered. Starting in the 1890s, workers lived in a dwelling located farther from the main house. A wide array of traditional cultural artifacts suggests significant turnover in the transient male work force. An unusual collection of women’s health and other personal articles buried in the earth floor of the feature suggests visits, rather than occupation, by women. The author interpreted the group of special materials as possible evidence of visits by prostitutes based on comparisons with assemblages from brothels, families, and transient male housing sites (Van Bueren and Wooten 2009).

PROPOSED THEORETICAL ORIENTATION

This section discusses how choosing a specific theoretical framework can shape the nature of a research design and help thoughtfully direct NRHP evaluation outcomes. The intent here is not to advocate for a specific framework, rather to help the specialist think through the assumptions and theoretical lens they are applying in their study of historic agricultural landscapes. This allows for the development of tailored research designs, with questions specific to the resources they are examining. The better a researcher can apply different theories as needed, especially those crossing into disciplines of social or biological scholarship, the better a researcher can address important questions about both past and present social dynamics. This cross-disciplinary approach and collaboration strengthens the disciplines of archaeology and architectural history, moving them beyond the limitations of a single discipline (see Orser et al. 2020 for historical archaeology and Cheverko et al. 2020 for application of bioarchaeology in historic contexts). This is particularly important when thinking through themes that can address the data potential requirements in Criterion D/4. These themes can also be relevant to the other NRHP/CRHR criteria.

When cultural research specialists think of importance—or significance—of a resource to local, California, and U.S. history, the fundamental value of any event is how it has been shaping and influencing lives and lived experiences; and how that is conceived of is going to be innately influenced by the perspective of the researcher. One of the primary goals in evaluating a property is to test new hypotheses about the past and to reinforce, alter, or challenge current assumptions (Little et al. 2000:29). Rather than presuming that life was the same from one place to another, applying different theoretical frameworks and specifying the one a study design is based on recognizes and specifies how the study is understanding the variable fabric of American life from the chosen perspectives of focus, and reasons why life occurred in that way. This concept is also important when evaluating architectural and landscape elements of an agricultural resource.

While the earlier iteration of this study (Caltrans 2007) advocated for a *contextual* or *interpretive* approach, based on the belief that all archaeological scholarship is essentially interpretive, a perspective influenced by views articulated by Ian Hodder, George Marcus and Michael Fischer, and Mary Praetzellis, among others (Hodder 1986; Marcus and Fischer 1986; Praetzellis 1994). This emphasis on context comports well with *Guidelines for Evaluating and Registering Archaeological Properties*, which identifies one of the main objectives of archaeology as an effort that “describes, records, and reconstructs past lifeways across time and space” (Little et al. 2000:29). These guidelines encompass the built environment and landscapes as well. The goal of this contextual framework is not absolute proof in archaeological terms, but deeper insights into the human condition. This perspective arises from the notion that understanding human behavior best comes in relation to its specific social and historical context. Central to this approach is the understanding of “the meaning of social life to those who enact it” (Marcus and Fischer 1986). A contextual approach also recognizes the subjectivity of this interpretation of history, and each cultural resources specialist’s role in creating—or recreating—the past must be expressly acknowledged.

The drastic transformation from a traditional “face-to-face” society to one that emphasized rationality in economic relationships, specialization, anonymity, and efficiency profoundly affected native-born and immigrant peoples alike. Measurement of progress in this period became, to a large degree, dependent on material terms (Brown 1976:29; Wallerstein 1980). Materials in fact became the *lingua franca* of this new age and understanding how their meanings evolved in the contexts of the dynamic social interactions is at the center of the research agenda considered here. Much work in the social sciences generally, and in archaeology in particular, has focused on the multilinear and complex nature of this social revolution (Gutman 1977; Bender 1978; Hodder 1986; Leone 1978; Orser 1990; Cantwell and diZerega Wall 2001). This has included the examination of multicultural influences, symbolism and meaning, conflict, and resistance. Only through the examination of agrarian cultural resources, within California and further afield, will it be possible to build a progressive understanding of a process that so fundamentally transformed American life in a way that compliments other fields of scholarship and local understandings of history.

The current study suggests a wider range of theoretical frameworks including *racial formation theory*, concepts of *intersectionality* emerging from Black feminist theorists, and *Marxist theory*, among others. It also assumes that the researcher is comfortable with contemporary hybrid epistemologies that take a pragmatic approach to theory; namely, not being limited to whether a research design is processual based or post-processual based or claiming superiority of one theoretical framework over another (Trigger 2006; Johnson 2010). Instead, a pragmatic approach to theory is to choose one that seems appropriate to the contexts and relevant issues. At the same time, it is important to understand the assumptions and limitations that are being made using the theoretical framework of choice. It is important to keep in mind that there may be other interpretations or better theoretical frameworks that may broaden our perspectives in the future, allowing for critique and development of studies that may either corroborate or counteract your own (Johnson 2010). These shifting perspectives contribute to the scientific process of reinforcing, altering, or challenging current assumptions. Applying some form of generalization and structure to the study honestly, with a critical eye towards the fact that study findings are not always the end-all answer, but part of the interpretation process. This is core to any good evaluation of a property, because fundamentally an evaluation for the NRHP and CRHR is based on creating a strong *argument* for a finding, not being unequivocally and irrevocably tied to the evaluation outcome—or the theoretical perspective supporting that finding.

For some background as to how theory is used today in California agricultural contexts, here are a few examples:

- The *racial projects concept* from *racial formation theory*, combined with the concept of environmental justice, was applied to a case study of immigrants and people of color in Silicon Valley to demonstrate how institutional racism and environmental racism formed a set of practices that resulted in the exploitation of both people and natural resources in Santa Clara County's Agricultural Period between 1870–1970 (Park and Pellow 2004).
- *Intersectionality* is a powerful theory from Black feminist theorists that examines the interactions between forms of systemic oppression (e.g., racism, sexism, classism, political systems, and other social structures) and social positions of overlapping social difference and identity (e.g., race, gender, sexuality, socio-economic class, disease status, immigration status) (Battle-Baptiste 2011; DeWitte and Yaussy 2020; Supernant et al. 2020). Because intersectionality by definition is focused on heterogeneity of experiences even within social categories, it becomes an extremely useful tool in avoiding essentializing the experience of "women" or specific immigrant, ethnic, or labor categories in agricultural contexts. Scholarship that applies intersectionality to California in agricultural contexts includes historical works by Cecilia Tsu on Asian immigrants in agricultural Santa Clara

County, including as her study of gender relations and intra-ethnic conflict among Japanese immigrants in rural Santa Clara Valley between 1900–1913 (Tsu 2009).

- The history of labor movements and agriculture in California discussed in Chapter 2 are inescapably tied to understandings of Capitalism and Marxism. Traditional capitalism ideology and its corresponding rationalism emphasize people making self-interested choices, and that rationality is acting for your own good and commoditizing everything into things to be exchanged (Prangnell 2020). *Marxist theory* uses dialectical thinking and internal relations theory to view everything, including economy, labor, materials, and political systems, as webs of social relationships with opposite poles (e.g., capitalist and labor, agriculture and industry) (Wurst and Lewis 2020). Marxism is composed of multiple theories to understand capitalism and its flaws, highlighting capitalism as a system where control of production lies with the few while the masses of people who don't control production necessarily sell their labor to them (Wurst and Lewis 2020). World systems theory takes the understanding of capitalism further, showing capitalism as a system where the core (e.g., Europe or the United States) controls production in the periphery (e.g., colonies) then circulates supply back to the core while extracting surplus (Prangnell 2020).

Theories have useful questions built in that can be applied to particular themes that are going to extend beyond the interests of just the analyst, and because of this will also be useful for drawing comparisons between resources when necessary or useful. In other cases, theories are part of important historical context themselves, such as with Capitalism and Marxism. When applying a theoretical orientation in the evaluative process, the researcher should state what framework they are using to establish the research themes, and then build questions based off of them to test if the data potential of a particular resource will be able to address those questions.

RACE AND ETHNICITY IN CULTURAL STUDIES

For this study, the authors have attempted to employ thoughtful choices in the use of terms, language, and topics concerning race and ethnicity. These choices reflect the growing awareness and diversity of both archaeological practices and practitioners in cultural resources management (CRM). A national survey of Black heritage resources and Black heritage practitioners provides guidance in both treatment of cultural resources, as well as engagement with members of the Black preservation community (Franklin et al. 2022). The white paper, *Recommendations for Raising Visibility of Black Heritage Resources and Engaging with Black Stakeholders: Results from a Survey of State and Territorial Historic Preservation Office and State Archaeologists*, includes guidance for the best practices for, as well as the importance of, associating cultural resources with a cultural or ethnic affiliation (Franklin et al. 2022:4-5).

Race is a social construct focused on identity, one that archaeologists have been exploring for several decades (Orser 2004, 2007; White and Beaudry 2009; Battle-Baptiste 2011; Agbe-Davies

2020; Fong et al. 2022). Grey literature in CRM often looks at race peripherally, applying instead definitions of ethnicity or ethnic affiliation, and understanding this leads to a deeper awareness of the impact of racism and racialization in archaeology and architectural history. Kelly Fong (et al. 2022:234) explores the deep connection between race and racism within the archaeological research of Chinese American communities and the authors have seen a "a shift toward a diasporic lens and critical perspectives on race and racism. This transformation coincides with the entry of Chinese American archaeologists to a field whose practitioners have been and continue to be predominantly white." Tied to racism, Charles Orser (2004:5) defines *racialization* as a harmful process "that consists of assigning men and women to essential groups, based on physical appearance." This racialization extends to material culture, as Anna Agbe-Davies (2020:89) writes: "Perhaps one reason that historical archaeologists have turned to race as a major topic is that archaeology offers one means of examining not only the material consequences of the race concept/racism, but also the material evidence of those past processes that created and produced racial categories." With the majority of archaeology in the United States grounded in western practice, Uzma Rizvi (2020:90) notes "Any attempt to move beyond this… requires particular care not to consume difference in a manner that approximates appropriation, while at the same time learning to respect and honor the cultural differences that make us unique."

For this study, *ethnicity* is loosely defined as the ways in which people identify themselves in terms of community through shared traditions, languages, and histories, etc.; *ethnic affiliation* is how an individual sees or places themselves within an overarching community (also *cultural/ethnic affiliation* in Franklin et al. 2022). That definition can be by country, or by communities within, overlapping, or not identifying within or by those geopolitical boundaries. Chapter 2 presents discussions of different populations in terms of the "major waves of immigration" that influenced the development of agriculture in the United States. Ethnicity and race inform on culture and cultural heritage, but they are not the same thing. Culture is then an expression of ethnicity, as defined by the members of that community. Archaeologists and architectural historians often try to identify these expressions of identity in the material culture, architecture, and cultural landscapes left behind (Battle-Baptiste 2011:71). These are very basic definitions for highly complex ideas and issues and researchers are encouraged to explore further to reach deeper understandings, starting with the references and organizations provided in this discussion.

An understanding of race and ethnicity overlaps with queer or inclusive archaeology—especially in terms of advocacy for visibility. Queer and/or inclusive archaeological practice is defined by Robert Muckle and Stacey Camp as "Archaeology that confronts essentialist, Eurocentric, and heteronormative ideas about sexuality, sex, gender, race, class, and identity in the past" (2021:264). Discussions of inclusive archaeological practices helps create a more comprehensive understanding of the themes and questions presented in this research design. Similarly, intersectionality also contributes to discussions of race, ethnicity, and gender (Springate 2020); this subject is touched upon in the *Proposed Theoretical Orientation* in this chapter. In thinking of advocacy in archaeology, the mission of the Society for California Archaeology's *Coalition for Diversity in California Archaeology* (CDCA) is "to provide a venue for members to seek support and mentorship in the profession, advocate and work toward increasing diversity, visibility, and to discuss and address issues and challenges related to ethnicity and race in archaeological practice in California (CDCA 2020). The CDCA, as well as the Society of Black Archaeologists (SBA), can also be resources for archaeologists and historians.

In the earlier iteration of this study (Caltrans 2007), the research theme that focused on race and ethnicity was presented as *Ethnicity and Cultural Adaptation*. In the study on work camps (Caltrans 2013), this discussion was captured under the research theme of *Immigration and Ethnicity*. Views on "acculturation" and "assimilation"—the implication that an ethnic community is adapting to the cultural norms of the dominant culture—have shifted. Anthropologists and historians have begun to see the ways ethnic communities and immigrants creatively and actively adapt and accommodate dominant cultural paradigms in the United States. In this volume, that theme was shifted to *Ethnic and Cultural Heritage Traditions* in an attempt to shift the narrative from comparisons of ethnic minority farmers, ranchers, and farm workers with a dominant group, generally white, or Eurocentric model. For researchers exploring themes of race, equity, social justice, and ethnicity, the research themes and questions presented throughout this study can and should be tailored to reflect the men and women who ranched, farmed, and raised families in California's diverse agricultural landscapes.

PROPOSED RESEARCH THEMES FOR AGRICULTURAL PROPERTIES

This section identifies research themes that may be useful for evaluating the significance of agricultural properties under NRHP Criterion D or CRHR Criterion 4 and are intended to encourage careful consideration of a wider variety of themes when evaluating architectural sources under criteria A/1, B/2, or C/3. The research themes are introduced with some contextual discussion, followed by some specific research questions and description of various types of data that might inform the questions. The proposed questions are necessarily broadly stated and general. They are grouped as a way to highlight particular aspects of human behavior, although most topics are actually inextricably linked.

While the research design covers a wide array of important themes and questions, it should not be considered comprehensive. It is instead merely a place to initiate investigations. Not every research theme is expected to apply in all situations. Individual researchers are encouraged to modify and supplement these themes and questions as appropriate, given the specific site conditions and historic context. The historical context provides base level data necessary for the formulation of research questions and theoretical assumptions of agriculture in California. Again, it should be noted that archaeological deposits should be considered for NRHP and/or CRHR criteria A/1, B/2, and C/3 in addition to Criterion D/4; architectural features should take all criteria into consideration, including D/4. A detailed discussion on how to apply the NRHP or CRHP criteria can be found in Chapter 5.

A general discussion of data needs follows the research themes section, including both archaeological and documentary data sets. A wide range of examples is provided for each data set and can be applied to resources as appropriate. Architectural data can include buildings, structures, objects, and general domestic and work activity area layout. Consideration should be given to what data sets are most appropriate for interpreting a specific site's information. Chapter 5 provides further discussions for evaluating site significance, as well as the significance of individual features within a site, that are important to keep in mind for understanding the contributions of archaeological and artifact data sets.

This study acknowledges the issues of prejudice, racism, and racialization in historical archaeology and architectural history and the harms they have caused and continue to cause to descendant communities. Development of the transportation system has targeted communities of color, as well as those facing economic hardship, for project alignments and construction. Across the United States, many of those projects are being revisited in an attempt to acknowledge, reduce, and mitigate those historic harms. Similarly, the disciplines of archaeology and history have pasts based on colonization and racialization. Attempts to mitigate archaeology's past injustices include engagement with Tribal and descendant communities when project work impacts their cultural heritage, including active consultation and project input.

Site Structure and Land Use Patterns

At the most basic level, the history of an individual site should be known (who, what, when, and where) to allow a meaningful interpretation of the data that inform our understanding of history. This research theme sets the physical stage for other analyses: the nature of the architectural resource or archaeological site must be understood in order to meaningfully interpret the lives of its occupants. Determining the nature and size of farm or ranch support facilities provides indications of the site's economic prosperity and activities, and household composition and is important to consider no matter the discipline. The dates of construction, configuration, use, modification, and reuse or abandonment of site structures provide important insights on the history, cultures, and behaviors of the inhabitants. It is important to note, developing an understanding site structure is a building block for answering broader questions and application of this theme alone would not constitute the level of importance necessary for NRHP or CRHR eligibility under any criteria.

In addition to answering basic questions on site use and chronology, this research theme also incorporates larger social, historical, and anthropological issues. William Adams' (1990) settlement analysis of Silcott, Washington, showed that farmers would build structures on the least agriculturally desirable portion of their property to maximize usable land. Environmental variables such as elevation, slope, aspect, and soils factored greatly in site location and layout. In some cases, farmers had folk wisdom about solar energy and put it into practice with respect to the location of their farmhouses, fields, and pastures (Mires 1993:82–91). Understanding the way land and geography influenced selection of the location of croplands and buildings can benefit architectural historians analyzing use of space, design, and landscapes, as well as archaeologists. Knowing whether the occupants owned the property or were tenant farmers is crucial to a well-constructed interpretation. Researchers have shown that tenant farmers were less likely to invest money or time and labor in improvements or changes where they would not realize a return on their investment (Cabak and Inkrot 1997; Ziesing 1996).

Research Questions

The following questions provide a baseline of inquiry to pursue regarding the theme of *Site Structure and Land Use Patterns*. These questions are intended to be applied by historians, architectural historians, and archaeologists when analyzing a resource for all four NRHP or CRHR criteria.

- What factors contributed to the differences in the ways agricultural properties were organized? To what extent are those differences attributable to variations in household composition, cultural heritage, duration of occupation, environmental constraints, or other factors? Do the orientation, layout, or composition of structures and buildings on the property reflect changes in race, ethnicity, gender, and household composition over time or retention of heritage traditions? What do the structures, features, and layout of the property reveal about the philosophy and approaches used to carry out agriculture? Is continuity evident in those approaches or did they change over time, and why?
- Are there indications of specialized work areas or gendered uses of space, and what do they reveal about the organization of work and how it may have changed over time? Do land use patterns reflect traditional cultural behavior? How do cultural enclaves, such as Los Banos or Solvang, result in creation of spaces, cultural landscapes, distinct settlement patterns, building styles, or material remains? How are the physical limits of “space” culturally shaped?
- Is there a high degree of specialization or more generalized use of the property and activity areas? Was production diversified or specialized, and did the focus change over time? What factors account for changes in production focus? Is there evidence that the plot size changed over time and how does that relate to broader historical trends of land ownership? Is there evidence that changing plot size influenced the degree of family participation or adoption of scientific farming practices?
- To what extent did geomorphological conditions influence the success or failure of a settlement? Did distance to major transportation routes influence the long-term success of the farmstead?
- Does the layout and organization of the property reveal information about the way the owner or tenant related to neighbors?
- In working with descendants and descendant communities, what questions would they like the archaeology to answer? What is important to their local history and identity that the archaeological resources can address?

Economic Strategies

This theme broadly encompasses the economic strategies employed by agricultural property owners, tenants, and temporary farm workers. Regardless of ownership, those operating farms and ranches, decisions concerning how to meet household needs and produce income or basic subsistence from agricultural production were integrally linked. In many cases, income may have been supplemented with other types of activities or work outside of the farm. For temporary farm workers, economic strategies were forever contingent and subject to negotiation. Property owners needed to make decisions about when to invest in their property's infrastructure, when to expand, add decorative non-functional elements, construct new buildings, and buy new equipment. Their choices reflect many things about their motivations.

Consumer behavior and the economic strategies of households are longstanding concerns in the field of historical archaeology, and material remains are by their very nature well suited to examining such issues. Within this theme special attention is devoted to the shift from a bartering economy to one based on cash, why a "throwaway culture replaced one grounded in reuse" (Strasser 1999:18). Other focuses of inquiry may include how large-scale economic fluctuations influenced household purchasing patterns, and how a pattern of conspicuous consumption and discard came to dominate American life, albeit at different rates among different population segments, or vice versa when greater rural self-sufficiency increased as farmsteads matured and home production became more diversified. Farm families reflect a type of household and economic orientation that shifted regionally in terms of settlement patterns, the diversity of farmers, and the use of certain lands over time. Hence, historical archaeology provides an opportunity to examine the ways such families adapted to changes and how their lives compared to households in other settings.

As a mode of exchange, barter may have continued in rural settings for much longer than it did in urban ones. Country stores and traveling peddlers regularly exchanged farm products and secondhand items for newly manufactured goods during the late 19th century (Carson 1999:19–38; Strasser 1999). In these exchanges, relationships between merchants and customers were personal and deals were negotiated. By the 1870s, however, cash stores and mass marketing rapidly came to replace this traditional system of exchange, especially in urban centers. This new system was based on principles of economic rationality including fixed standards (one price for all buyers), efficient mass production, and even anonymity (especially that made possible by mail orders) (Brown 1976:42–43). There is much to be gained in understanding how mass marketing and urbanization influenced traditional systems of exchange for farm families.

Collectively, these changes contributed to the depersonalization of commerce, lower costs for many goods, and the ascendancy of advertising as a means to promote consumption. At the same time, "the growth of markets for new products came to depend in part on the continuous disposal of old things," rather than their reuse, repair, or resale as valuable recyclable material (Strasser 1999:15). Hence, disposability was from an early period promoted to make people feel rich, while reuse was discouraged as unfashionable. In this light, the practice of discarding useful materials increasingly came to symbolize social standing. At the same time, reuse and repair remained essential economic strategies for many rural households. This can be especially interesting in comparison to households in urban settings, where dynamics of access to used goods in secondhand stores may play out differently. These subjects are also explored under the agricultural science and technology research theme.

Why and how these changes occurred is something archaeology is positioned to illuminate. Some factors that may have influenced changes in consumer practices include, but are not limited to, access to resources, cost, product familiarity and reliability, fashion, cultural preferences, differences in wealth, and status aspirations (Yentsch 1993:278). Multigenerational immigrant families may have had differing opinions on the use and reuse of these goods, even between generations. National or regional economic instability cycles, as well as direct changes in the circumstances of families, undoubtedly had an influence on the strategies employed by farm families.

Historical research at agricultural properties may yield important information concerning national economic cycles and the degree of self-sufficiency manifested at the site (Van Bueren 1998). The relative abundance of imported goods may provide some indication of the degree of reliance on and general availability of purchased commodities. Other materials such as crocks, canning jars, and related items, combined with the presence or absence of wild game, indications of home butchering, floral microconstituents, and related indicators may be instrumental in the evaluation of how much home production was occurring at the site. Evidence of repair, reuse, and on-site fabrication may be present in the form of sewing paraphernalia, home craft industries, or home blacksmithing. Race, ethnicity, and generational immigration status plays a role in how these objects are used and disposed. Architecturally, the reuse and conversion of a carriage house to a garage; additions of outbuildings to accommodate new equipment or growth; reuse of doors and windows from original dismantled buildings into new construction; or incorporation of Quonset huts into the farm or ranch after World War II are a few examples that may be indicators of economic strategies.

Research Questions

The questions below build on the documentary information and details of the physical environment specialists have collected and mapped, providing a point for understanding an individual, family, or communities' agricultural choices in terms of *Economic Strategies*. These questions are intended to be applied by historians, architectural historians, and archaeologists when analyzing a resource in reference to all four NRHP or CRHR criteria.

- To what extent did outside factors (e.g., access to shipping facilities, market forces on crop prices, etc.) influence choices in what to produce at farms and ranches, and how quickly did the owners or tenants respond to changing external market conditions? To what extent did access to capital, that is, ability to procure new technology, influence changes in production methods and the types of products grown on the farm?
- To what extent did access to markets influence individual or household purchasing decisions? Is it possible to see the influence of mass marketing

and urbanization in how the household is managed? To what degree did site occupants depend on products of an industrialized world for their material needs? How did multigenerational immigrant families use and dispose of these products?

- How did households adapt to changing economic circumstances brought about by changing market conditions, variable production output, and periodic environmental disasters such as drought, flood, and pestilence? Under what circumstances were manufactured goods favored over home-made products, recycling, and repair, and did that change over time? What does that indicate about household purchasing decisions? Does the architecture reflect construction and design based on standard plans, such as those issued by the USDA and California Department of Agriculture, or is the design more vernacular? Do buildings and structures reflect a reuse of boards and other goods from dismantled buildings or the purchase of new lumber? Was power for the well and other buildings generated by reused vehicle engines or by purchased specialty generators? Was more home production a response to decreased economic circumstances? Or by weather patterns?
- Were site occupants full-time farmers and ranchers or did they work for wages offsite, mine their property, local sale of farm products or participate in craft industries? How would such differing economic strategies influence the material remains at an individual site? How do the remains from such sites compare to sites where economic diversification was not practiced? Is there evidence of behaviors stereotypical attributed to agricultural families, such as forms of industry, frugality, and family stability visible in the archaeological record? What other factors might contribute to this mindset? What archaeological, historical, or built environment evidence might dispel or support these hypotheses?
- Is there any evidence that by the 1930s farm families were more self-sufficient then in previous years or perhaps later years? How does self-sufficiency intersect with race and cultural/ethnic affiliation? When comparing homesteaders from the 1860s or 1870s to the 1920s or 1930s, what are commonalities or differences? What do those commonalities and differences suggest for larger interpretations of agricultural history?
- In working with descendants and descendant communities, what questions would they like the archaeology to answer? What is important to their local history and identity that the archaeological resources can address?

Agricultural Technology and Science

The historic context demonstrates that California was a focal point for technological innovation and agricultural change, and that innovation happened earlier and at a more rapid pace than in Eastern states. This has been attributed to a variety of factors, including the state’s once vast public domain, labor shortages that inspired technological solutions, rich soil and natural resources, public and private educational efforts, and general inventiveness of an immigrant population not bound by established patterns. Changes in technology were closely tied to market availability, both as a source for manufactured items and a market for agricultural items produced in the state. It is well known that the Transcontinental Railroad opened Eastern markets to California farmers, while at the same time providing access to suppliers and manufactured goods. Invention of refrigerated rail cars had an enormous impact on bringing California produce to wider markets. Availability of electricity also altered the access of California farmers to broader markets, revolutionized irrigation, and other agricultural practices. In addition, modernization such as electricity, indoor plumbing, and communications encouraged changes in social or cultural patterns of work and leisure. Introduction of these amenities occurred in many rural areas as late as the 1940s (Kimberly Wooten 2022, pers. comm.).

Homesteads in particular are excellent laboratories for understanding the difference between “real” versus “ideal” behavior and investment in agricultural improvements. As Stein discussed (1990:25):

> First, there is the government’s perspective on what should have happened at homesteads, as stated in laws and regulations. Second, there is the homesteader’s sworn testimony of what he or she claimed to have done to satisfy these legal requirements and attempt to take title to the land. Third, there is the homesteader’s recollection, often many years after the fact, of what he or she remembers doing on the property. And fourth, there is the testimony of the physical remains themselves to act as an independent check on the homesteader’s word. Sometimes these data sets coincide tidily to produce an unambiguous picture of the past. But more often they conflict, and it is at this collision point that the social scientist’s fun begins.

Adaptive reuse or modification of readily available items may indicate resistance to technological change but may just as equally indicate acceptance of the Victorian concept of thriftiness or a general frugality brought on by limited monetary resources. Frugality was not only a Victorian concept, but was embraced by many cultures and ethnic communities, including first generation immigrants. Researchers at Edwards Air Force Base found a “philosophy of opportunity” among occupants of the region: “the concept of ‘secondary usefulness’ was retained among consumers… despite the amount and variety of obtainable goods: ‘Every individual was aware of an object’s secondary value, a use generally beyond its intended function’” (Nettles et al. 2003 cited in Tetra Tech 2004).

The timing and extent of adoption of mechanized equipment, intensified use of fertilizers and pesticides, development of more productive or better-adapted hybrids and animal stock, and other related industrial approaches to production are of key interest. In many cases, larger operators pioneered such approaches, while smaller operators were compelled to follow suit or become uncompetitive. There is considerable interest in understanding the variable responses of different operators as agriculturalists focused increasing energy on market production over time. The adoption of industrial practices varied widely due to differences in the size of properties, wealth of their owners, labor shortages and uncertainties, cooperation, and other factors. Understanding the forces that contributed to such changes and the roles of experimentation with new technology and labor in the transformation are a central concern in the history of American agriculture.

In California, where much of the precipitation falls in the winter and spring, leaving six months of the year virtually dry, irrigation became an important part of farm infrastructures. In many areas, windmill technology was crucial for a reliable supply of water, but even so, wells could run dry as groundwater supplies diminished. The Aerometer Windmill Company was instrumental in the conversion of windmills from wood to steel and dominated the market by 1900 (Baker n.d.:38). On the Vasco Rancho in eastern Contra Costa County, continual use of older windmill pump technology was seen as reflecting the economic status of the occupying family, “or perhaps the disappointing performance of the tenanted land” (Ziesing 1996:207). Alternatively, since windmill pump technology is universally similar and has changed little over the years, such a decision may reflect simple practicality rather than direct expression of economic status. At Edwards Air Force Base, Tetra Tech, Inc. found changes in pumping technology such as using gasoline motors (evidenced by concrete engine mounts) as acceptance of and investment in new technology. They caution that changes in market availability related to World War I and World War II production priorities should be considered when analyzing agricultural properties from such periods (Tetra Tech 2004:61).

Research Questions

The technology, science, and operational adaptation of farms and ranches investigated in the *Agricultural Science and Technology* research domain is a complex topic and can require collaboration with specialists in agricultural equipment, mechanics, animal husbandry, and crop production that is frequently outside the expertise of historical archaeologists and architectural historians. In addition, an understanding of technology and science is often closely tied to economic issues. The *Agricultural Science and Technology* and *Economic Strategies* themes provide an excellent opportunity to strengthen one another.

- Is there evidence of efforts to increase productivity through the application of new technologies, irrigation, amendments, and other practices associated with the rise of mechanized agriculture? To what extent is new technology employed over adaptive reuse of existing technology? Is diffusion of technology visible at the site? What can it be attributed to? Is there evidence in the architectural or archaeological record of additions to the resource to accommodate new technologies, such as use of Quonset huts, the creation of secondary irrigation to accommodate new crops, or the addition of sheep dipping troughs?
- Did diversification of activities at individual agricultural properties influence the success of the operations? And to what extent? What evidence is there of agriculturalists modifying their property to comply with sanitation laws? What were the effects of these laws on the property owner? What influence did government and/or agribusiness recommendations have in the use of

chemicals such as fertilizer, treatments for animals, and sanitation of products? Did Tribal or other ethnic practices influence application of this technology?

- Is there evidence of crop experimentation or innovation in growing techniques? What was the short-term and/or long-term success of such innovations? Is there evidence indicating which groups—based on economics, social status, or cultural heritage—were more likely to experiment and innovate?
- Are the policies and advisories of agricultural institutions, cooperatives, or governmental entities reflected in the architectural or archaeological record, demonstrating whether or how those policies were followed?
- In working with descendants and descendant communities, what questions would they like the archaeology to answer? What is important to their local history and identity that the archaeological resources can address?

Ethnic and Cultural Heritage Traditions

Agricultural practices constitute one of the longest traditions across all continents and cultures. When people immigrated to California, they brought both the economic strategies of agricultural practice, as well as personal and private ethnic and cultural heritage traditions. These may be traditions that came across the United States with multi-generation families or arrived with first generation immigrants to the state. People with shared ethnic and cultural heritage traditions—such as Portuguese, Mexican, Greek, Italian, Basque, Chinese, Korean, Japanese, South Asian, etc.—often had common understandings that help define a way of life, maintain social order, and provide a sense of well-being associated with one's home, whether in another state or another country. During the California Gold Rush, diverse people were thrown together not knowing what to expect in an environment of rapid, sometimes chaotic, growth and opportunity. There is considerable interest in understanding how particular households of known culturally distinct communities adapted to life in pluralistic and monolithic settings. What aspects of their cultural background were retained or reshaped, and how were new social identities and alliances forged? Did this result in stratification of the community/work camps?

The role of cultural pluralism—when minority communities retain their cultural identities in the face of differing or dominant societies—and heritage remain an active area of debate. Early 20th century models stressed "cultural assimilation" into a "melting pot" that effectively extinguished the diverse pasts of immigrant populations. Those models advocated a top-down approach where immigrants uniformly assumed a new, homogenized American identity. With the ascendancy of the civil rights movement at mid-20th century, scholars began to question that interpretation and to recognize that immigrants did not in fact abandon their cultural roots, but instead adapted to the shifting influences of a pluralistic society and the availability of goods. The terms "acculturation" and "assimilation" have become less accepted within the social sciences, with some researchers acknowledging a greater maintenance of heritage traditions. Recognizing how identities are negotiated within multicultural settings is critical to understanding the processes of negotiation, persistence, maintenance, and adaptation (Fong 2021; Fong et al. 2022).

Over the last few decades, archaeologists have focused increasing attention on unraveling the complex layers of meaning that artifacts acquire in pluralistic social settings, soundly rejecting the uncritical use of ethnically derived artifacts as indicators of preconceived behavior. This has facilitated the deconstruction of stereotypes, allowing more sophisticated insights into the true complexity and variability of ethnic and cultural heritage traditions. Studies of sites such as a predominantly Irish block in New York's Five Points neighborhood and Sacramento's Chinatown suggest that material expressions of personal and family traditions are often complex, requiring careful consideration of factors influencing the use and meaning of both traditional and non-traditional items (Griggs 1999:87–101; Yamin 1998; Yamin 2001; Praetzellis and Praetzellis 1997). Farms owned and operated by persons of color and other immigrants offer unique insights because they often retain traditional practices along with adaptations and accommodations made to adjust and respond to the expectations of the dominant culture. Similarly, agricultural ventures that hired minority ethnic and migrant workers and provided housing are important in ascertaining the integration and retention of traditional cultural elements or marginalization of the workers in a situation where housing and goods are provided by the dominant culture.

There is ample evidence that new cultural practices are assumed in a selective manner, with certain new traits readily adopted while various traditional practices are retained. For example, immigrants may adopt fashionable new clothing styles or footwear more practical for work, while adhering to traditional religious observances and social institutions (Nettles and Hamilton 2005). In this way, immigrants may adopt different identities for private and public spheres. The preparation and choices in food and dietary supplements often are reflective of personal preferences steeped in tradition. Outdoor cooking ovens, such those Mediterranean heritage, or the preference for imported fish or fowl over locally obtained species at Chinese and Japanese American camps, are reflective of these traditions.

In the complex process of negotiating social identities, artifacts also frequently acquire meanings different from those assigned by the dominant culture. Finally, how is racism addressed and navigated? For example, as Fong (et al. 2022:242) discusses of Chinese Americans who navigated "…multiethnic/multiracial relationships that Chinese Americans formed to survive and thrive within structures of institutional racism and white supremacy." Understanding those meanings and the sequence and rate at which nontraditional artifacts have been adopted is essential for explaining how particular cultures and communities have creatively adapted over time. A key focus for many recent studies has been an understanding of the ways in which artifacts were used as symbols of messaging in multicultural interactions.

Research Questions

Questions related to *Ethnic and Cultural Heritage Traditions* are an important focus for agricultural properties and can include a discussion of the farm owners or tenants, household help and labor. These questions can focus on the individuals, family units and extended families, as well as the surrounding community. Questions can include a focus on maintenance of traditions, as well as adaptation. Adaptation doesn't always indicate a shift in cultural perspective, but for rural areas simply a shift in product use or production. An understanding of the interaction between individual, family, and community can enlighten the discussion.

- To what degree did people retain or adapt traditional cultural heritage behavior as reflected in architectural features, landscaping, site structure, materials, composition, technology employed, or farm/ranch production orientation? To what extent do differences in material culture at the site indicate heritage preferences in purchasing decisions, access to goods, or other factors? How are these decisions reflected by multigenerational families?
- How did people from different ethnicities respond to discrimination or marginalization? Is there evidence of the "multiethnic/multiracial relationships" (Fong et al. 2022:242) developed to persist within communities dominated by European Americans? What evidence of retention of traditional behaviors is present? And what evidence might indicate cross-cultural adaptation towards the cultural traditions of immigrants?
- What degree of market integration is discernible at the site (e.g., how extensively did site residents emphasize the purchase of mass-produced goods over traditional or home-made ones)? When considering material from a dominant culture supplied camp, is there evidence of dietary supplements from locally obtained resources rather than a reliance of provided goods? What does it indicate about the site occupants?
- In working with descendants and descendant communities, what questions would they like the archaeology to answer? What is important to their local history and identity that the archaeological resources can address?

Household Composition and Lifeways

Households constitute the smallest residential units that can usually be discerned in archaeological analyses. A household, in the sense used here, refers to any group of people "sharing domestic activities such as consumption and production" (Hardesty 1988:15). It may consist of single individuals, a nuclear or extended family, or some other combination such as a group of unrelated individuals sharing living quarters (e.g., a boarding house, worker housing). As discrete social and economic units, households reflect patterns of behavior that are a microcosm of broader societal interactions (Deetz 1982:724). The study of households affords a foundation for understanding interactions within a domestic unit, as well as relationships between that domestic group and the larger society in which its members were actors (Wilk and Rathje 1982).

Agricultural sites hosted a wide variety of household types from as many different backgrounds as can be imagined, including individuals, extended families, tenants, and laborers. These diverse family units can be compared and contrasted—both intrasite and intersite comparisons—to understand, the different experiences of those occupying and operating the farm or ranch (for further discussion of intrasite/intersite analysis, see Chapter 3). In addition, the experiences of agrarian households can be compared to their urban and suburban counterparts to evaluate differences and explore what factors were responsible for those variations. To understand the adaptations of different agrarian households, it is important to sample for many possible factors such as cultural heritage identity and origins (immigrant, second generation, etc.), household composition (including changes over time), gender of household heads, owner/occupant status (owners, tenants, wage laborers), household wealth, and other factors that may have contributed to observed variations. Household composition is also reflected in the layout of buildings, changes and additions, and the landscape of the properties. Landscape can refer to both the overall layout of a farm or ranch, as well as its decorative spaces, including public and private outdoor spaces. In terms of these outdoor spaces, ceremonial and mortuary spaces should be considered, including shines and family cemeteries. These features often provide clues to cultural identity, and careful analysis by architectural historians, historians, and archaeologists can help reveal heritage traditions within the agricultural property.

Because agrarian households other than those occupied by transient workers often achieved some measure of independence by providing for their own subsistence, traditional lifeways may have been more persistent than in other settings such as cities. These traditional preferences may be evident in buildings, structures, objects, or sites associated with an agricultural resource. Foodways are one aspect of culture that often change slowly, but other traditional aspects of culture also may have been retained, and there is interest in ascertaining why and under what circumstances. In some cases, transient workers associated with a single cultural heritage group moved from one location to another together seeking work. Those groups, typically consisting of single males, may be identifiable through artifact deposits present on agricultural properties. This may well apply to the material cultural of women, children, and families who may all contribute to varying degrees as a transient; less research has focused on these demographics and that archaeological footprint may remain unseen. Sometimes the background research for a project can indicate the presence of women and children in ways not seen immediately seen in the archaeological record (Tordoff 1988; Van Bueren and Wooten 2009).

Farms and ranches owned and operated by women constitute a relatively rare type of agricultural property, but one that has the potential to address many important questions related to gender strategies, adaptations, and economic opportunity. For example, there is much interest in learning if women used different income and spending strategies than men, what factors contributed to the success or failure of women-owned ventures, and other related topics. Even on agricultural properties largely controlled by men, women often had substantial charge of the domestic sphere or (in the case of agricultural camps) were expected to assist in kitchen work in addition to working in the fields (Maniery 1993). In many cases women contributed significantly to other farm and ranch functions. Many investigators have pointed to the need to critically appraise how gender roles were actively created through continuous negotiation in a rapidly changing society (Purser 1991:82–108; Spencer-Wood 1996). Susan Strasser suggested paying particular attention to understanding how men and women influenced economic decisions, a perspective amenable to the material focus of archaeological studies (Strasser 1999).

There is considerable interest in the social sciences in comparing urban and rural woman-run households. Likewise, there is interest in understanding whether and how rural households embraced the "cult of domesticity" favored by the urban middle- and upper-class social reformers (Keister and Southgate 2011). Called "domestic science" by its proponents, the "theory" emphasized gadgets that supposedly simplified household tasks and promoted cleanliness and hygiene. Part of that agenda involved purchasing new, disposable products—a practice at odds with a tradition of reuse still essential to the economic survival of many farm and ranch households.

The analysis of class relations also may be particularly amenable to study using households on agricultural properties. Class is a relational concept wherein one's position is defined relative to others through social practices, affiliations, and the symbolic use of cultural materials. In contrast to cities where different classes resided separately in a process that Walter Licht (1995:65) called "a districting of difference," owners and laborers on farms and ranches often lived and worked in close proximity. How did that social proximity influence the negotiation of class relations and display of class-related ideology? Were class struggles and social differences brought into sharper focus, sublimated, or more readily subject to resolution because the locus of conflict encompassed work and residential areas all located relatively close together? Differential access to resources, opportunity, and power are at the root of perceived class differences. While the struggle between owners and wage laborers defines a fundamental duality in the capitalist world economy, class exists as a dynamic relationship that permeates all levels of social interaction and is affected by many other variables (Spriggs 1984).

At the most general level the term "class" can be understood as a relationship among members of society that is subject to continuous negotiation. When seen as "the struggles among members of society over the exercise of social power" (McGuire and Paynter 1991:1) the concept provides for the analysis of class "as an analytical concept that operates on many scales and thus can be used to tease out the complexity of the social relations of everyday life" (Wurst and Fitts 1999:3). That broad perspective avoids a rigid scheme of rankings that have ambiguous validity and are oversimplified by rote efforts to rank status based on tableware value indicators and related procedures. Instead, efforts to examine class relations may more productively seek to expose the manipulation of class-specific ideologies as a facet of the class struggles.

The values most commonly associated with the rising American middle class in the Victorian era included emphases on hard work, duty, social order, progress, morality, and punctuality (Houghton 1975:507–532). Such values permeated both private and social life, with an emphasis placed on outward symbols that were later considered by some social critics as gaudy and ostentatious. The outward symbols of Victorian value systems included formal dining and social visits, which demanded the use of appropriate tableware and parlor decorations symbolic of an orderly and moral social life. Victorian values also emphasized proper upbringing and education of children. The practice of social visiting among rural householders, particularly women, served an additional function by facilitating the adoption and dissemination of such Victorian values (Purser 1991).

Victorian material expressions were promoted by the dominant classes during the late 19th century but, by the 1890s, came to be seen as cluttered gaudiness that connoted moral rigidity. These material expressions were then largely rejected in favor of materials that evoked simplicity, efficiency, and naturalness epitomized by the Craftsman style. There is some question, however, whether rural farm families' adoption of this physical change really signaled a change in personal value systems as they related to material things, social mores, and/or religion. Of course, not all members of society adopted changing fashions and aesthetics across the board. The working classes and some rural householders continued to embrace the clutter of Victorian décor long after it was considered unfashionable, while maintaining some traditional practices rejected by the dominant culture.

Agrarian households of all types hold interest for many reasons other than the few outlined above. Research issues pursued in connection with many other types of households are likely to have at least some general relevance for evaluations of those encountered at agricultural resources. The foregoing social context provides a place to begin thinking about the research value of domestic feature systems at agricultural resources. It is not intended as a comprehensive treatment of all aspects of social life at farms and ranches that may be worth investigating.

Research Questions

Questions relevant to analyzing *Household Composition and Lifeways* reflect the many personal preferences of households ranging from what dishes were chosen for formal dining, to physical reminders of their unique cultural heritage, to emphasizing economic divisions between owners and workers. While the questions listed below are broad in nature, they are only an example of the direction any analysis and research can take when addressing this research theme.

- How did site occupants manifest age or gender roles? What methods can be used to effectively distinguish and interpret individual behaviors (disabilities, gender roles, sexual orientation, and mental health) at agricultural properties? Is it possible to distinguish control of household assets by individual members? Is there evidence of familial and cultural priorities valued over individual priorities and what might those priorities indicate about the household?
- How is the teaching of values (family, cultural, ethnic, social, political, moral, religious) reflected in children's artifacts? Is there evidence of the household's general health and physical condition? What can poor or good health be attributed to? Is there evidence of the family life cycle and changes over time? What would such evidence indicate about household adaptations? How did religion, cultural heritage, or regional cultural differences factor into how an agricultural household was managed and by whom?

- How did the households of owners, tenants, and workers identify their class status using cultural materials? Is there a difference in the architectural features or material record associated with owner occupancy versus tenancy? Is there evidence of class distinctions and/or social distancing (e.g., hired help treated differently) found in the built environment or archaeological remains? Is there material evidence of the way agrarian households negotiated relations with neighbors, landlords/tenants, and employers/employees? Is it possible to distinguish public from private space or activities? What would such evidence indicate about the household? Is it possible to see larger patterns that indicate changing influences of traditional institutions such as the Grange and social clubs? Is there evidence of conformance with state requirements for sanitation and health in agricultural camps or bunk houses?
- How are outdoor spaces approached in terms of ceremonial activities and mortuary practices?
- In working with descendants and descendant communities, what questions would they like the archaeology to answer? What is important to their local history and identity that the archaeological resources can address?

Labor History

Understanding the composition of the agricultural labor system is a prerequisite for placing the architectural elements or material remains into a balanced evaluative context. Knowing who occupied a house or labor camp or created an archaeological deposit, or its associations, is essential to accurately interpret patterning and variability in behavior linked to cultural heritage, class, religious affiliation, household composition, and other factors. Yet, discerning who lived and worked at agricultural properties is sometimes difficult. While it is often possible to learn a fair amount about property owners and even tenants through documentary research, agricultural workers are much less visible in the historical record because they commonly led much more transient lives. That implies archaeology has the potential to add to the limited knowledge of these agricultural workers. Those contributions, however, are also circumscribed by the degree of uncertainty about who created certain archaeological deposits. For further information about agricultural labor history and resources, please see *A Historic Context and Research Design for California Work Camps* (Caltrans 2013).

During the 1850s and 1860s, indigenous peoples were exploited as labor, although the full extent of their participation in agricultural work remains poorly documented. Chinese laborers were also widely employed, and they assumed an ever-larger role in agriculture in the last quarter of the 19th century as they were pushed out of other lines of employment due to widespread unemployment and prejudice. The composition of the workforce also evolved during the later 19th century as a variety of cultural groups chose to take the difficult agricultural work few others wanted.

The negotiation of relations between workers and owners/tenants is an important area of research. Both employers and workers, in a struggle that continues up to the present day, used wide varieties of negotiation strategies. Living and working conditions for laborers gradually improved because of organized strikes, and government intervention and regulation, and other resistance, but occasionally enlightened employers saw an advantage to improving conditions on their own. Progress was irregular and many employers sought their own advantage by using methods such as scrip payments, charging room and board, playing different marginalized groups against each other, and providing poor living conditions. Striker camps and worker housing areas, while often lacking closely focused associations, are in some cases the only way to learn about the struggles of an enormous sector of the agricultural work force. Newspaper accounts, oral testimony, and historical documentation are also important in identifying strike or union related architectural resources or places where a rally, secret organizational meetings, or other important events occurred. This potential has been explored in studies of other worker camps such as the coal strike settlements and the Ludlow, Colorado, massacre site (McGuire and Recknor 2002).

It should be noted that this update retains the term “laborer” for the majority of the study. Laborer overlaps with other terms such as farm worker, temporary farm worker, transient worker or laborer, wage laborer, hired hands, etc. Laborer is a broad term and, in the future, other language to described skilled and unskilled farm workers may be more appropriate and can be considered on a project-by-project basis.

Research Questions

Questions revolving around *Labor History* are relevant to all avenues of study at an agricultural resource or in the surrounding community. For example, the Teatro Azteca in Fresno—an important location where Cesar Chavez spoke about the need for creating a union for farm workers—may be evaluated in a labor history context related to agriculture and is equally as important as a 19th century archaeological deposit reflecting separation of workers (Gonzalez 2006). The day-to-day historical resources representing labor camps or seasonal housing may overlap and/or contrast with sites where active organization of farm labor occurred. See *A Historic Context and Research Design for California Work Camps* (Caltrans 2013), with assistance for developing further questions about agricultural labor history and resources. Questions relevant to this theme are provided below.

- To what extent did site occupants rely upon family labor or hired help? To what extent were farm workers integrated into farm households, and how did that influence social life, farm success, and cultural accommodation over time? How were relations between farm labor and owners/managers influenced by industrial modes of production that emphasized mechanization, labor specialization, etc.? Is it possible to distinguish differences between the social structure of agrarian versus urban hired help or servants?
- Is there evidence in the archaeological record of employers’ efforts to control farm workers’ behavior? Is there evidence of workers’ responses to those

control efforts? What does such evidence indicate about the nature of the management/labor relationship? How can the archaeological data contribute to our understanding of labor conflict, resistance, and the experiences of striking workers?

- Is there evidence in the archaeological record of improvements in workers' living conditions? Are these improvements evident in the architectural or landscape features? To what can those improvements be attributed (e.g., labor activism, paternalism, government regulation, owner choices)?
- Is it possible to distinguish inter-cultural divisions, particularly among rival cultural groups? Are there regional differences in ethnic and cultural heritage traditions from one region to another?
- When comparing workers in California to elsewhere in the nation, what trends remain consistent and which change over time? Was the California labor force more transient than that of the nation as a whole? What implications does that have for material remains? What about the difference between properties where transient labor and owners are from the same social, economic, and cultural backgrounds? What about different backgrounds?
- In working with descendants and descendant communities, what questions would they like the archaeology to answer? What is important to their local history and identity that the archaeological resources can address?

Contemporary Archaeology and Climate Change

California has always had a climate impacted by varying degrees of drought conditions, creating boom and bust years of rainfall. The Sacramento region for example, located at the confluence of the Sacramento and American rivers, has been historically susceptible to flooding. These cycles of wet and dry years heavily influenced crop choices and rotations, as well as which livestock could be raised and in what numbers. Farmers and ranchers changed their focus based on water availability, irrigation costs, and market demands (Arax 2019). Given the state's vast size and geographic variations, the cycles of drought can be seen through a regional lens. It is a cycle that continues to this day, impacting agricultural operations at all economic levels (Arax 2019). The history and archaeology of California's agricultural landscapes can help inform on these trends and changes over time, providing baseline data on the current climate crisis.

Research Questions

Questions relevant to the theme of *Contemporary Archaeology and Climate Change* are provided below. California is a large state representing multiple geographic and environmental regions, and in response to this diversity, agricultural traditions were also dynamic. Some agricultural practices were developed in direct response to the state's regional diversity, while other practices were brought with immigrating families and communities and adapted to meet new needs. Both approaches require a creative implementation of known agricultural practices to environmental changes over time. As with most archaeological studies, contemporary archaeological studies of climate change benefit from cross comparison of resources within the state, as well as other with other states and countries. Other avenues of study regarding agricultural resources include a combined understanding of architectural adaptations to climate, especially prior to the widespread availability of electricity. Further questions and discussions can focus on documenting changes in technology, material culture, agricultural products, and the development of sustainable farming and ranching practices.

- How did a region's climate change historically, and how did this change affect crop and livestock decisions, including disease, productivity, success, and failure? How do those climate variations compare to regional differences today? How did farmers react to changes in aquafer levels brought on by drought and overuse? In comparison, what can contemporary farming practices us tell us about historical practices in California and beyond?
- What implications do these questions have for physical data sets—archaeological and architectural—as well as for documentary data sets, including contemporary oral histories? Is there any information about sustainable/organic farming practices that might have developed and adopted in response to the larger environmental movement of the 1960s or earlier?
- Are historical farming practices reflected in contemporary local practices, such as selection of crops, orchards, livestock, agricultural markets, agricultural fairs? Can innovative technological development be identified through archaeology or architecture? Can the locations of multigenerational agricultural events such as fairs, livestock events, horse races, and the like be considered Traditional Cultural Properties (TCP)? How do agricultural practices and choices intersect with ethnicity? How is are these practices reflected in multigenerational immigrant families?
- From knowledged based on historical archaeological data, can there be a reintroduction and/or maintenance of historic crops and species (heirloom varietals, old vines, etc.) that are better adapted to current climate conditions?
- In working with descendants and descendant communities, what questions would they like the archaeology to answer? What is important to their local history and identity that the archaeological resources can address?

DATA REQUIREMENTS FOR AGRICULTURAL PROPERTY RESEARCH THEMES

Data requirements, often referred to as data sets or data needs, are classes of information, interpretation, and facts necessary for addressing the themes and related questions explored in the research design. These data are derived from a combination of architectural analysis, archaeological inquiry, and/or archival research. The specific questions elicited by research themes, as well as the themes themselves, evolve over time. Through the thoughtful interpretation of a resource's physical and material culture, archaeological and other data contribute significantly to these evolving discussions. By using these data to elicit answers to research questions—the sources of the site's interpretive or informational value—archaeologists can ultimately evaluate a resource's eligibility for listing in the NRHP and/or CRHR under Criterion D/4 and architectural historians may add to their evaluative analysis under criteria A/1, B/2, and C/3.

Historical archaeologists rely on a number of complementary data requirements to address the gap between theoretical research and archaeology. These practices also lend themselves to a better understanding of architectural and landscape elements. These data sets fall into two basic categories of data: physical remains, including archaeological and architectural features, and documentary/archival data. Archaeological data include site-specific information ranging from physical features—such as foundations or landscapes—to artifact-filled deposits. These can include privies, refuse pits, and other hollow features that have been filled. Information about these deposits can be provided by the features, artifacts, as well as site stratigraphy. Architectural data may be found in the presence or absence of detailing and embellishment, the relationship between various buildings, structures, and objects found at an agricultural resource, the presence of buildings or structures that reflect traditional cultural heritage use, and changes and abandonment of equipment and its storage facilities. Both these disciplines need to integrate sociocultural memories and stories from descendant communities. While there may not be any physical remains or mention in archival literature, descendent communities may have social memories of a space that continues to be important.

The information contained in the architectural record and in individual classes of artifacts, such as ceramics, and entire assemblages can be used to address research questions. In addition, although not all artifacts or features contain information that is applicable to each research theme, architectural studies and archaeological data often can inform more than one question. For example, a refuse dump on the edge of an agricultural field has the potential to address questions under the theme of Site Structure and Land Use Patterns, as well as questions related to Household Composition and Lifeways, while an outdoor oven at a sheep camp catering to Basque shepherds or a bath house at a Japanese workers camp may inform on the research domains of *Site Structure and Land Use* and *Traditional Cultural Heritage*.

Documentary data sets—also called archival data—can be derived from a wide variety of primary and secondary sources and can include any document that sheds light on a resource's history, structure, or material culture. Documentary data sets are also used to place the site in a broader historical context. Contextual histories, such as the one provided in Chapter 2 – Historic Context, allow researchers to place agricultural sites within a broader context of California's history and within a national or international framework. Chapter 5 offers a practical application of data requirements along with a discussion of data thresholds and redundancy. The discussions below focus on several categories of data used to interpret a site's physical and material culture in the context of social, cultural, and historical issues.

Figure 126. Hopalong Cassidy applied color label drinking glass, ca. 1930s, Mariner Ranch, Lincoln, Placer County. (Courtesy Julia Huddleson.)

Archaeological Data Sets

Data sets include all potential features, such as buildings and structures, wells, foundations, other structural remains, and landscaping, as well as deposits containing artifacts, such as sheet refuse or refuse deposits. The latter may take the form of hollow, artifact-filled features; subsurface deposits; sheet refuse reflecting the property use on individuals, families, or other social groups; or refuse dumps. Ideally, these features should have structural or depositional integrity, known use and function, and association. Although a tightly dated assemblage is ideal and may have a higher interpretive value with respect to research themes, a feature or deposit does not have to be tightly dated to contain information. Additionally, association does not have to be with a specific individual or family, but may be representative of a broader population, such as farm laborers or ethnic communities. Please note, in rural areas where most agricultural properties are located, the quantity and variety of artifacts may be found at much lower counts than in urban communities; also, disturbance of cultural deposits does not necessarily mean a feature or deposit lacks integrity. Data requirements for features include, but are not limited to the following:

- Deposits with sufficient quantity and variety of materials to support statistically valid analyses (see discussion of AIMS-R in Chapter 5; see Figure 126).
- Hollow refuse-filled features with distinguishable depositional integrity and identifiable associations.
- Temporally discrete refuse or sheet refuse deposits.
- The locations of features and deposits with identifiable functions and periods of use.
- Horizontal distribution of features—such as foundations or water conveyance systems—indicating spatial organization, sheet refuse indicative of specific activities, and/or landscaping events.
- Refuse pits associated with individual or group disposal patterns.
- Residential landscape features including household subsistence gardens, recreational areas, private/meditation area, and additional decorative landscaping.
- Evidence of environmental adaptations such as windbreaks, water conveyance systems, reservoirs, natural landform alterations including leveling and terracing, etc.
- Specialized activity areas such as outdoor ovens, cellars/cold-storage areas, smokehouses and other animal processing areas, farming equipment, workshop areas, etc.
- Features and deposits organization that indicates different residential and/or agricultural activity areas.
- Structural remains with evidence to distinguish function.
- Fence posts holes corresponding to corrals, pastures and other structures or spatial divisions.
- Spatial arrangement of surviving plantings, particularly non-native trees and hedges.
- Family shrines, burial plots, and cemeteries.

General layout of the resource, with the relationship between buildings, structures, objects, sites, and the natural landscape indicting cultural traditions, traditional approaches, and philosophies. An archaeological site’s artifact assemblage is the source of primary materials that historical archaeologists use to address research themes when evaluating deposits or sites under Criterion D/4 (or other applicable NRHP/CRHR criteria). Interpreted along with documentary data, these materials reflect aspects of technology, personal economies (such as self-sufficiency), use of commercial products, or ethnic and cultural traditions. An ideal data set includes individual artifacts, artifact classes, and large assemblages, though this is not always the reality with isolated, rural deposits. These may include, but are not necessarily limited to the following:

- Artifacts in identifiable features.
- Sufficient variety of distinctive materials.
- A minimum number of items (MNI) or minimum number of vessels (MNV) frequency/proportion sufficient to support interpretation.
- Materials associated with specific activities.
- Materials reflective of self-sufficiency (i.e., canning jars, homemade items, reuse).
- Materials demonstrating reuse for a secondary purpose, repair or refurbishment vs. items showing little use.
- Proportion of decorative vs. functional items (i.e., decorative and functional items in large enough quantities to discuss comparisons).
- Proportion of items indicative of home manufacture vs. commercial manufacture, indication of home use vs. commercial sales.
- Artifacts associated with farm workers, owners, and/or tenant households reflecting a variety of different cultural heritage traditions and/or ethnicities.
- Evidence of the use of materials in different or non-traditional ways aside from the manufacturer's intended use.
- Artifacts indicative of living conditions or changes in economic/social status.
- Artifacts related to social and labor movements.
- Indication of labor resistance or violent altercations.
- Materials reflective of traditional cultural practices or preferences.
- Materials that can be identified as to place of origin or manufacture.
- Evidence of repair or reuse.
- Medicines indicative of health status or home health remedies.
- Hidden items indicative of surreptitious behavior.
- Artifacts attributable to specific demographic groups.
- Abundance, type, and manufacture dates of different artifact classes (i.e., ceramics).
- Artifacts related to gender or age groups.
- Artifacts associated with specific activities.

- Artifacts related to self-sufficiency, such as canning jars, homemade items, as well as artifacts demonstrating repair, reuse, and repurposing.
- Decorative vs. functional items.
- Spatial organization of both residential and work areas of the farm/ranch, including layout of crops, orchards, vineyards, and livestock areas.
- Chemical residue analysis of artifacts and soils.
- Deposits and structural remains related to the work force through time.
- Machinery, smithing tools, hand tools.
- Materials/tools recommended in government advisory bulletins and publications.
- Materials reflective of recreation activities (pipes, dice, dominos, etc.)

Ecofacts, a subcategory of artifacts, include both faunal and floral remains. Usually, these remains inform questions regarding diet, but not always in expected ways. Ecofacts can include the remains of wild and/or domestic species of plants and animals, as demonstrated by butchered bones, as well as processed and whole botanical remains that are indicative of diet, including seeds, pits, pollen, kernels, and phytoliths. These ecofacts can provide information on such topics as commercial vs. home butchering practices, including preferences of meat cuts; hunting and foraging practices; retention of traditional dietary preferences; the spatial organization of kitchen and truck gardens, agricultural crops and livestock raised for private subsistence vs. commercial sales, along with other agricultural practices. Parasite studies from privy deposits, one form of specialized investigation, can provide information about the health of a farm's residents (Holm 2013). Some ways of looking at the information value of ecofacts include:

- Wild vs. domestic species of plants and animals; preference of species or meat cuts.
- Floral and faunal remains indicating retention of traditional dietary practices and cultural traditions.
- Botanical remains indicative of crops, orchards, and vineyards.
- Commercial vs. home butchering techniques.
- Floral analysis; column sample analysis.
- Parasite studies.

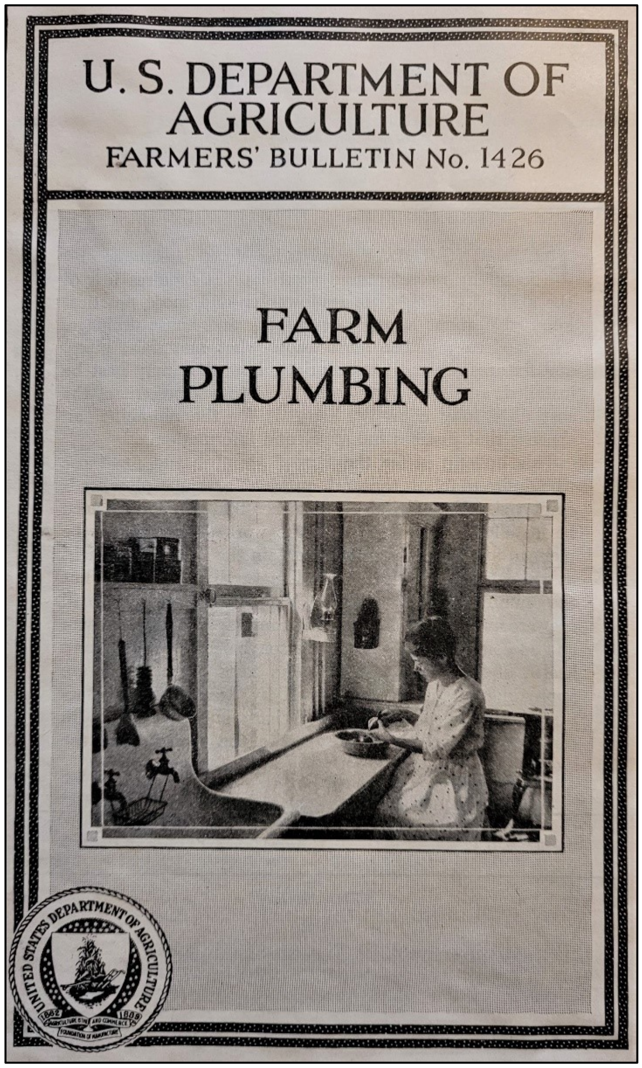

Figure 127. Farmer's Bulletin No. 1426: Farm Plumbing (U.S. Department of Agriculture 1924).

Documentary Data Sets

The information that a site provides through its material culture can be understood best when interpreted in concert with a variety of documentary sources. Chapter 5, Appendix A, includes more detail on repositories and websites where documentary sources can be found. Primary documentary sources can include, but are not limited to the following:

- Federal census data (including agricultural census data)
- Property tax assessments
- Leases, deeds, and water rights information
- Probate records
- Maps, including topographic, *diseños*, plat maps, and Sanborn maps

- Aerial photographs
- Financial, production, and other farm and ranch records
- Blueprints
- Newspapers
- Correspondence, journals, and diaries
- Family histories and genealogies
- Agricultural society and fair records
- Farm Resettlement Agency records
- Bureau of Indian Affairs records
- Records from churches, schools, and other social organizations, including benevolent societies
- Vital statistics, including birth, death, and marriage records
- Identifiable labor force
- Sociocultural memories and stories
- Oral histories
- Photographs
- Paintings and illustrations
- Agricultural and product specialty journals and catalogs (see Figure 127)
- Booster histories

Data from comparable architectural studies or archaeological sites, in published and grey literature, can put a resource into a broader historic context, making the study more valuable as a research tool. Written documentation, resource records, and maps that document the built environment and landscaping, and oral history can provide both specific and contextual data that reveals the historical associations of data extracted from architectural or archaeological features, deposits, or artifact assemblages at a site. Contextual sources may include primary and secondary source material on California’s farms and ranches (see Chapter 2). Archaeological, architectural, historical, and anthropological literature should be consulted, including published and grey literature on similar property types. Called comparative studies, the ability to compare one architectural property or archaeological site to another are critical for addressing research questions. These modes of inquiry provide a solid starting point for studies addressing agricultural properties. Architectural, historical, and archaeological research must be conducted by professional cultural resource specialists qualified in their respective discipline. Data from secondary sources can include/be useful in terms of:

- Comparisons to similar-sized properties to form expectations on research themes and questions.
- General information on the range of size and wealth for similar types of properties.
- Various economic strategies and their impact on farm and ranch owners/residents.
- Comparison of architectural and archaeological findings from other studies of similar resources and sites.
- Literature on cultural traditions related to the people occupying the site.
- Secondary literature on general economic trends as they relate to California agriculture.
- Studies of gender, children, labor, cultural heritage in relation to agriculture.

Public Outreach and Descendant Communities

Public outreach is a critical way to engage individuals, families, and descendant communities. These communities often have long and active ties to agricultural properties that appear long abandoned. Conducting interviews or detailed oral histories provides a deeply layered opportunity to document the detailed history of a place through a deeper engagement with individuals, families, and communities. In return, cultural resources specialists should be continuing these dialogues through the life a project and give back to communities by providing completed documentation. As historical archaeologist Kelly Fong (2021) noted, archaeology should not be an extractive science. Outreach with descendant communities should be ongoing, often extending beyond the life of a project. Local historical societies and social organizations can often provide a starting place for outreach. It should be noted that while general interviews can be a way of gathering important details about a cultural resource, conducting respectful and effective oral histories often requires specialized training.

CONCLUSION – “LOOKING FORWARD”

Archaeologists and architectural historians recognize the need to be multidisciplinary, with an awareness of one another’s fields—as well as those outside the traditional anthropological and historical spheres—in order to both understand and best protect the historical resources within project areas and wider transportation corridors (Fong 2021; Sarah Miller 2021, pers. comm.). To promote collaboration, it is important to rely on the expertise of the Caltrans cultural resources specialists, consultant partnerships, tribal and descendant communities, and professional relationships. The purpose of this research design is to provide cultural resources specialists with a readily accessible series of research domains applicable to agricultural property types. The intention is the thoughtful application of research themes to a specific resource or district in a project area. When site-specific circumstances are appropriate, themes and questions provide a starting place and should be tailored to the resources present. Since architectural resources and archaeological sites are non-renewable resources, reaching those deeper understandings with thoughtful application of questions and themes become all the more critical. Looking ahead, the best interpretations and evaluations occur if the research questions asked are well-grounded in the current theory, literature, and issues, and community input, while remaining adaptive and creative in their approach.

CHAPTER 5. IMPLEMENTATION PLAN

It has been said that, at its best, preservation engages the past in a conversation with the present over a mutual concern for the future.
– attributed to William J. Murtagh, first Keeper of the National Register for Historic Places

The preceding historical context and research design chapters are intentionally broad in scope. Designed as a foundation, they provide the essential context 1) that often is impractical to develop for initial architectural or archaeological investigations; and 20 that is background for the more developed or complex studies and investigations. In most cases, the contextual and thematic framework will need to be supported by focused resource or site-specific research. This chapter offers guidance on how to document and evaluate agricultural properties under all NRHP and/or CRHR criteria; how to implement the research design presented in Chapter 4; and how to assess the importance of agricultural properties. If complying with CEQA, use CRHR criteria to determine if resources are historical resources for the purposes of CEQA.[11] Also included are recommended methods of historical research, architectural and archaeological fieldwork focusing on identification and evaluation of agricultural property types, and post-field and archaeological laboratory analysis. The methods outlined below are intended to encourage consistency and efficiency during studies of agricultural properties and to provide a holistic approach to these studies—by incorporating aspects of archaeology, built environment studies, landscape architecture, and historical research.

EVALUATING AGRICULTURAL RESOURCES

When evaluating the architectural and/or archaeological component of an agricultural property, it is important to identify its period of occupation, date of construction for standing buildings, structures or archaeological foundations or remains, dates of physical modifications or alterations for standing buildings or structures, and understand the social or thematic context that drove the need (or created the demand) for the resource and why it was abandoned or sold. The process is similar for evaluating archaeological sites and components, relying on feature types and artifact classes, along with contextual history, to identify date ranges. Understanding a resource's historic context is a key factor in assessing the importance of a resource under all NRHP criteria and in ascertaining if it is part of a larger distinct community. Chapter 2 provides a general contextual history for the development of agriculture that discusses various types of farms or ranches, and other considerations that can be used as a starting point in an evaluation.

---

[11] NRHP and CEQA criteria are very similar but not exact. In this document a slash separates the two processes (Criterion A/1) with letter criteria representing NRHP and numbers representing CRHR. For more information, see the Caltrans' Standard Environmental Reference (SER), Volume II, Exhibit 4.3 <https://dot.ca.gov/programs/environmental-analysis/standard-environmental-reference-ser/volume-2-cultural-resources>.

The DPR 523 forms for previously recorded resources may contain a synopsis of relevant historical data. Those data are useful for placing sites within a thematic context. Additional archival and contextual research is often required during the evaluation phase to establish a comparative basis for analysis and identify functional areas and past disturbances that may affect the overall integrity of a resource.

The level of effort when researching a resource should be commensurate with the scope and scale of the project. Conducting archival research in order to evaluate a specific resource and assess its importance under various criteria may begin with historic maps and county histories. If additional data is need, an examination of other records found in local archives or county offices, or through a perusal of online sources like population and agricultural census records, city directories, voter records, historical photographs, or federal and state Department of Agriculture reports may be necessary. In the case of agricultural properties, soil surveys and California Division of Mines and Geology reports are also useful. It is important to conduct adequate research to demonstrate a reasonable and good faith effort to support NRHP eligibility statements.

Architectural evaluations benefit from adequately identifying dates and methods of construction, physical changes in agricultural properties through time, modifications, diversity in the work force or ownership, and use of various areas of the property for different activities. Evaluating a historical archaeological site also requires a knowledge of specific functional areas, chronology of use, and comparative data. This information includes identifying the occupational history and property types that may be present on each site, as well as the sequence of activities occurring there through time. Additional research may reveal the demographic composition of the site through chronological sequencing, heritage or religious ties, and other characteristics essential in addressing the research domain questions presented in Chapter 4 and assessing the rarity of a particular resource.

Potential source materials vary from theme to theme and include primary data from a number of archives and grey literature found at agencies such as the United States Forest Service (USFS), Bureau of Land Management (BLM), historical societies, county archives, the California State Library, and museums. Suggested repositories are provided in Appendix A. In addition to primary and secondary written sources, evaluations may require discussions and interviews with past and present property owners, neighbors, farm or ranch managers, or agribusiness managers. It is important to gather input from descendent and/or stakeholder communities as well. Significant knowledge can be gained through lived experiences or memories passed down through generations. Oral interviews can play a crucial role in assessing themes and functions of a property.

Comparative research needs will guide the level of effort appropriate for establishing an adequate context to evaluate a particular resource. The condition of a resource may be used to guide the level of research needed for evaluation. For example, resources that would not qualify for the NRHP or CRHR due to compromised integrity or limited data potential may not require archival research beyond a general identification of relevant themes and date of construction or period of use.

The goal of any archival research effort at the evaluation phase is to gather enough information to assess the property's overall integrity and place it within its historic context and period of significance. Archival research efforts focus on identifying past owners, period of use, type of agricultural property and its products, changes in the property use over time, and understanding the functional and chronological evolution of the property's design.

Agricultural properties tend to evolve over time, changing with family succession, market demands, technological advances, or sales. It is not uncommon for a property to represent over 100 years of agricultural use. The longevity and complexity of these resources may necessitate an interdisciplinary approach to evaluation. An architectural historian recording the built environment may note depressions or mounds in the back lot but may not recognize that they could be indicative of remnant outhouses, artifact-filled features, or landfill that could be important under Criterion D/4. Historians often find information through archival research or oral history that can be used to address archaeological research needs, such as locations of specific activity areas, ethnic affiliations, or chronological development of the property. Historians may also be positioned to provide information on migrant or transient populations whose site footprint may be limited or invisible. An archaeologist may not recognize important architectural styles or construction methods. An archaeologist may record a shed or barn but lack the historical insight and understanding of the construction techniques and methods that may represent a unique approach to outbuilding construction under Criterion C/3. Architectural historians, historians, and archaeologists may record landscaping elements and plantings, but input from a botanist may provide insight regarding generational preferences in plantings, ages of trees or vegetative cover, types of cultivars, ethnic preference for a certain plant species, or other information beneficial to a more comprehensive approach to resource evaluation. Sharing information and data sets assures a holistic approach to evaluation under all NRPH/CRHR criteria.

Assessing the physical condition of a resource is also a critical step in the evaluative process. The NRHP and CRHR criteria for evaluation identify seven aspects of integrity: location, design, setting, materials, workmanship, feeling, and association. The National Register Bulletin (Bulletin) *How to Apply the National Register Criteria for Evaluation* (NPS 1997a) and *Guidelines for Evaluating and Registering Archaeological Properties* (Little et al. 2000) provide detailed, practical guidance on how to determine each of these aspects of integrity (Table 9). Every evaluation of NRHP or CRHR eligibility must discuss the aspects of integrity that are relevant to the important qualities of the resource in light of its period of significance.

Assessing Effects

Not every agricultural property found on a project requires formal evaluation. Generally, the level or research and evaluation for a property is based on the effects to the property by a proposed project, its physical integrity, and data potential. During initial scoping of a proposed project, a review of historical maps and aerials often are useful in identifying agricultural properties that may be older than 50 years of age. If an agricultural property that meets the age threshold is located adjacent to a proposed project, then it becomes important to assess the potential effect on the property under Section 106 or if the impacts could be significant under CEQA.

To comply with Section 106 of the National Historic Preservation Act (NHPA) and California Public Resource Code (PRC) 5024, Caltrans has a Programmatic Agreement[12] (106 PA) and a PRC 5024 Memorandum of Understanding[13] (5024 MOU) that implement alternate procedures. In accordance with Stipulation III of the 5024 MOU, Section 106 projects that include Caltrans-owned resources may use the Section 106 document for concurrent compliance with PRC 5024. The attachments to the 106 PA and 5024 MOU provide general guidance that Caltrans follows to comply with CEQA. These documents are available on the Caltrans SER, Volume 2. The 106 PA and 5024 MOU require that certain actions are undertaken by Professionally Qualified Staff (PQS) (SER Vol 2, Ex 1.6). It is important to note that the *First Amended Programmatic Agreement among the Federal Highway Administration, the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California Department of Transportation Regarding Compliance with the Section 106 of the National Historic Preservation Act* (Section 106 PA) does not apply to Tribal or Federal land (unless the federal or tribal land manager agrees) and standard Section 106 compliance and consultation procedures should be followed on land managed by a federal agency or tribe. Below is an outline of steps to follow if evaluating resources under Caltrans' Section 106 PA:

- <u>Will this Project result in effects to all or part of a property? Will the project alter the setting or viewshed of a property?</u> If the answer is NO then the property may not require evaluation (106 PA). For example, a road restriping project is usually confined to the existing right-of-way and will not have any permanent effects to a neighboring agricultural property. In this instance, it is likely that no additional survey or evaluation work, other than the desktop review, will be required.
- <u>Will this Project result in effects to all or a part of the property? Will this acquisition affect any defining characteristics of the agricultural property?</u> A road widening project may require acquisition or impacts to a strip of property along the existing road right-of-way. Driveway improvements may also be required. Oftentimes, these changes are minimal in scope and do not result in effects to the main buildings compound, agricultural fields, or other character-defining elements of a property. In a case like this, where the property is minimally affected, the initial survey and recordation of the physical characteristics of a property may be conducted, but a formal evaluation may not be necessary. It is reasonable to assume that the property is eligible for the NRHP and/or CRHP for the purposes of the specific project and avoidance measures can be implemented (106 PA/5024 MOU

[12] First Amended Programmatic Agreement Among the Federal Highway Administration, the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California Department of Transportation Regarding Compliance with Section 106 of the National Historic Preservation Act as it Pertains to the Administration of the Federal-Aid Highway Program in California, effective January 1, 2014.

[13] 2015 Memorandum of Understanding between the California Department of Transportation and the California State Historic Preservation Officer Regarding Compliance with Public Resources Code Section 5024 and Governor's Executive Order W-26-92, addended 2019.

Stipulation VII.C). By assuming eligibility and avoiding any impacts to the property, the Project can often proceed without a formal evaluation of the agricultural property, although survey and identification will be necessary, as well as measures to protect the property.

- Will this Project result in acquisition of all or a significant part of the agricultural property? Will this Project result in removal or any buildings, structures, objects, or sites on the property? If a project could potentially result in removal of a building, structure, tree rows, orchard, agricultural fields, significant alterations to the driveway, or effects to other elements that comprise an agricultural property, then a formal evaluation of the property is likely needed.

Assessing NRHP or CRHR Potential

The initial assessment of an agricultural property involves several steps, depending on the complexity, condition, and expected research potential of the property, as well as the investigation's legal context (e.g., 36 CFR 800, Caltrans Section 106 Programmatic Agreement, or CEQA.

DETERMINE THE PROPERTY'S STRUCTURE, CONTENT, AND CLASSES OF DATA

The initial process in assessing an agricultural resource involves gathering baseline data by (1) conducting preliminary historical research and/or oral interviews to define the agricultural resource's function, temporal occupation, and associations and (2) recording and identifying the constituents of the resource to assess whether potential for information-bearing features or deposits exists. The historic context in Chapter 2 provides baseline data for the initial assessment of agricultural properties in consideration of agricultural output, work force, and technology. In certain cases, further research or documentation, possibly combined with archaeological investigation, will be necessary depending on the complexity of the resource and the period of occupation. The components that make up the agricultural resource are often linked through associated property types discussed in Chapter 3, which allows researchers to build inferences and to understand a site's history. Architectural and/or archaeological documentation may include detailed mapping and photographing of buildings, structures, objects, landscape features, archaeological features and site boundaries. Additionally, an equipment or artifact inventory or test excavation may be required. As archaeological excavation is both costly and an impact to the resource, excavations should be limited to what is necessary for evaluation under Criterion D/4 or for adequate data recovery.

Once an agricultural resource has been located, the researcher should base field strategies on expectations for identifiable structures, stratigraphy or features, baseline historical research described below in Prefield Research, and any previous investigations. For archaeology, nondestructive remote-sensing techniques may be useful in identifying artifact-filled pits, foundations, and other subsurface features. The level of site-specific research must be appropriate to the complexity of the site and its data potential. Rather than employing excavation, use the least intrusive and most cost-effective methods—such as simple probing or remote sensing—where they will produce the required information without disturbing intact deposits. Specific approaches and methods applicable for documenting agricultural properties are discussed below in the Methodological Consistency section.

James Deetz (1996:128) applied the concept of *focus* to assess the research potential of archaeological sites. Deetz referred to the level of clarity with which resource remains can be determined to represent a particular historical activity. Architectural or archaeological features or remains that represent a number of activities or other components and cannot be separated from one another are said to lack focus. An agricultural property that has no focus effectively lacks integrity. *Visibility* is the prominence or abundance of the surviving physical remains of a property (Deetz 1996). Architectural and/or archaeological features with identifiable functions such as a smoke house, sheep barn, milking shed, as well as artifacts with identifiable functions and production dates contribute to the focus of a resource. Without these categories of data, the agricultural resource may lack focus and visibility. Documentary data such as employment records, official farm or ranch maps, and oral histories may be needed to link the physical structures or remains to events, processes, and individuals.

The goal of this initial identification is to establish some basic facts about the characteristics of the resource and the discrete buildings, structures, objects, deposits and features that it contains. Establishing the essential groundwork for later analyses, the researcher must ascertain the "what, who, when, and where." At this stage, the quality and quantity of the various elements at a given agricultural property are assessed by addressing the following basic questions:

- What is the temporal period or periods of occupation?
- What is the function?
- What are the physical features? What property types are present?
- What classes and quantities of landscape elements, artifacts and ecofacts might contribute data sets for future analysis?
- Who created the resource and where were they from?
- What is the resource's horizontal and vertical extent?
- Does the resource have physical integrity?

A combination of architectural and archaeological physical observation and documentary research is necessary to answer these questions and to place the resource into its appropriate historical context. At the initial phase of study, only preliminary documentary research is necessary to determine the potential for further investigation. If no documentary evidence is identified, it likely will be necessary to reach out to the descendent or stakeholder communities in order gain answers or a better understanding of the resource. Although they provide crucial data, in most cases the answers to these questions do not constitute the important information required by NRHP and CRHR criteria. Refinement of these questions during post-field evaluation is usually required, after physical integrity has been identified. Historians and archaeologists use these questions as building blocks to help assess whether a resource has the focus and integrity necessary for assessing importance in history or construction and addressing more specific research questions to establish data potential.

In some instances, Caltrans PQS can determine a resource ineligible for listing in the NRHP or CRHR after the initial assessment if (1) standing structures have been modified as to appear modern and/or potentially eligible archaeological remains are unlikely to exist at the site (e.g., occupation was ephemeral; septic tanks rather than earth privies were used; refuse was disposed of offsite) or (2) physical integrity has been compromised by subsequent development or archaeological post-depositional disturbance (as evidenced, for example, by a lack of stratigraphic integrity and mixing of deposits from different periods). Other Federal or State agencies with written protocols and agreements to how to approach evaluations with OHP concurrence may also apply this approach during the initial assessment process.

To move forward in the evaluation process, the data must be supported by analysis indicating that the property retains vital characteristics as previously defined. With very few exceptions, properties that clearly lack focus do not require further study, as they would not meet NRHP or CRHR eligibility criteria.

Assessing the Need for a Multidisciplinary Approach

One critical element of this first identification phase is to assess the need for bringing in additional experts to adequately record and evaluate a property. Not every project requires collaboration, but researchers should always be aware that a cross-discipline approach may be the best method to assess all criteria during evaluation. Table 9 provides questions to consider when assessing the need for a multidisciplinary approach. If the answer to any question is YES, then the identification and evaluation likely will benefit from collaboration. Please note that it was not unusual for rural residences occupied prior to 1940 to still have outdoor plumbing and privies, making the need to involve an archaeologist more important (Mary Maniery 2022, pers. comm.).

Identify the Appropriate Historic Context

Moving beyond the initial research outlined above, the next phase in the process seeks more focused, resource-specific data—both historical and archaeological—and, if necessary, enlarges the scale of research to assess the agricultural resource's place within a broader historic context. At this stage, the researcher seeks to answer questions such as the following:

- What was the resource's role in local, regional, national, or international history?
- What activities are known to have been carried out at the resource?
- Who occupied the farm/ranch?
- Was it affiliated with a company or particular family?

Table 9. Assessing Multidisciplinary Needs.

Architectural Historians, Historian Considerations	Potential Resolution	Archaeological Considerations	Potential Resolution
Was the property occupied before 1940?	Consult with an archaeologist to establish the potential for abandoned privies, refuse deposits, and/or abandoned wells, that could contain artifact deposits.	Do any abandoned or partially collapsed buildings or structures have a roof?	Ask an architectural historian to collaborate on identification and evaluation.
Are there visible depressions uphill from the house or in the back lots?	Collaborate with an archaeologist to identify potential privies, trash pits, burn pits, or other hollow features that could contain important data sets.	Are there any standing buildings or structures still in use?	Ask an architectural historian to collaborate on identification and evaluation.
Are there foundations of former buildings?	Collaborate with an archaeologist to survey and record the foundations and complete evaluations under Criterion D.	Is there abandoned equipment?	Coordinate with an architectural historian or historian to address technology related questions within a historical context.
Are pieces of glass, ceramics, metal or other materials visible on the ground surface?	Collaborate with an archaeologist to survey, identify and record the refuse and establish its potential importance under Criterion D.	Are there intact landscaping elements, tree rows, or orchard remnants?	Coordinate with a historian, landscape architect, and/or botanist to identify the plants and establish importance of the landscape design or crop.
Is there an obvious associated landfill or burn pit?	Coordinate with an archaeologist for recordation and assessing the potential of the feature.	Are there rock walls, fencing, or other boundary determinants?	Collaborate with an architectural historian and/or historian to evaluate under Criterion C and establish the historical context.
Does the property have a septic system? When was it installed?	If occupation occurred before a septic system was installed, consult with an archaeologist regarding the potential for abandoned privies on the property.	Is the context unclear or uncertain?	Coordinate with a historian for assistance.
Does the property have any wells? If not in use, when was it abandoned?	Consult with an archaeologist to ascertain the potential for discarded artifacts in the well.	Is the source of water unclear or uncertain?	Consult with a historian and/or architectural historian to verify presence or absence of historical wells.

- How well does the resource represent important historical events identified in the historic context? Is this resource representative or unique in comparison to other sites where similar activities were carried out?
- To what extent has the resource been disturbed?
- Which of the resource's components have focus?

The answers to these simple questions are an essential step toward determining whether the property is associated with an event or person important in history or contains data that may be used to address important research questions or contribute to ongoing thematic studies. The goal at this stage is to assess the quality and quantity of architecture, landscape, and archaeological remains.

- If the resource will be affected or impacted by the project and an archaeological site or deposit is identified within the boundaries, then this stage may require test/Phase II excavations to reveal the site's structure and content. The archaeological field strategy needs to be based on expectations of the site's structure from its surface characteristics, previous investigations, and historical research. The level of testing must be appropriate to the objective. Archaeologists are encouraged to use the least intrusive and most cost-effective methods—such as probing, auguring, or ground-penetrating radar—rather than excavation if they will produce the required information. Research and analysis must be carried out by qualified individuals experienced with the types of sources associated with the category of site that is being investigated. Appendix B provides further guidance regarding archaeological analysis and evaluative procedures.

The historic context presented in Chapter 2 provides a broad foundation for understanding the evolution of California's agricultural history from the 1850s through the early 1970s. To evaluate a particular property, additional archival research may be needed to place the property within its context. This more focused historic context consists of three elements: theme, place, and time. *Theme* implies the principal industry for which the resource was developed, its function, and the diversity of its constituents, such as ethnicity, race, and gender, which can be derived from the categories presented in Chapters 2 and 4. *Place* is the geographical location where the activity was carried out and may be identified at a local, state, national, or, perhaps, international scale, depending on the nature of the resource. *Time* indicates the period during which the resource was occupied or made its contribution to California history. For example, the historic context for a Filipino agricultural property might be *The Role of Contracted Filipino Agricultural Workers in California's Central Valley, 1920–1940*.

To create the specific context, focus archival research on the period represented by the architectural buildings and structures and/or archaeological remains. Note that these may represent differing periods. For example, if a 19th century outhouse or refuse pits were abandoned and filled (creating archaeological deposits), and associated houses were demolished and replaced with mid-20th century buildings, then two different time frames will be represented in one resource. These overlapping time frames may or may not share association. Primary and secondary documentary sources, including oral accounts, may contribute to development of the resource-specific historic context. Concentrate historical research on the most cost-effective sources of the information: in general, secondary sources followed by primary documents at a level of detail in keeping with the project scope.

One of the goals of historical research is to establish the property's period of significance, defined in the Bulletin *Guidelines for Evaluating and Registering Archaeological Properties* (Little et al. 2000:34) as "the time range during which the property was occupied or used and for which the property is likely to yield important information." For example, an archaeologist may determine that a cache of domestic artifacts includes a few items made in the 1830s, whereas the project historian discovers that a particular family occupied the site at a period beginning with the discovery of gold in California. The artifacts with earlier manufacturing dates, then, may be interpreted as heirloom pieces deposited decades after manufacture. The property's period of significance corresponds to the family's occupation (e.g., from 1849 to 1859). Periods of significance do not necessarily have to have consecutive dates, the essential task is to establish why the property is significant and during what period or periods it gained significance. Bulletin 15 *How to Apply the National Register Criteria for Evaluation* (NPS 1997a) contains an extensive discussion of this concept.

Identify Important Research Themes and Questions

At this point, the researcher has identified the property types that exist or are likely to exist at the resource through a combination of architectural and/or archaeological fieldwork and historical research, as well as the appropriate historic context in which to assess the site. The next step is to determine the applicable research themes and questions that the properties may be able to address. Chapter 4 provides examples of themes and questions that relate to agricultural properties. These domains may be used to derive the important research questions relevant to the agricultural property under evaluation. While researchers are encouraged to use these research questions, they should keep in mind that they are only a sample of questions that can be posed. Developing research themes and questions based on site-specific research are key to crafting strong eligibility arguments.

The primary goal of this step in the process is to devise research questions that can be substantively addressed by applying architectural history and/or historical archaeology methodologies. Research questions must be *pertinent* and *important*. To be pertinent, a question must reflect the research themes and the appropriate historic context represented by the property. Under Criterion D/4, a question is important if it has the potential to significantly contribute to a better understanding of the theme and the historic context through the methods of historical archaeology and/or architectural history. New facts about the past do not have to be derived exclusively from archaeological data; interpreting the built environment, its functionality, and the landscape are equally important. However, the archaeological contribution to new understandings must be substantial enough to justify the significance of the site as a repository of "information important in … history" (36 CFR 60.4[d]).

Research questions developed under this step address substantive scholarly issues at various scales of analysis. The researcher must use information gained in the first few steps of the process regarding the structure and content of the resource and its appropriate historic context and thematic association to assess whether built environment or archaeological data can make a useful contribution to important research themes and questions. Questions to consider include the following:

- What research themes are relevant to this resource?
- What research questions can be developed from these themes?
- What types and quantities of architectural or archaeological data must be present to address these research questions?
- Does the resource contain these data sets?

These frameworks are also the sources of relevant research questions when they are applied to the resource's historic context. The historic context is useful in assessing gaps and biases in existing information, as well as areas where landscape, architectural, or archaeological interpretation may complement or contribute to the reassessment of ideas about the past.

To develop questions that are both pertinent and important, the researcher must consider the specific historic context and make a realistic assessment of the quality and quantity of the data present. Comparing the data from a resource to similar site and resource types strengthens the overall understanding of resource importance and physical character and is a critical step in the process of evaluation. Different research questions will require differing types and quantities of data, and data requirements needed to address one or more questions needs to be explicit so that the determination of whether the resource contains the necessary data sets is clear. Some practical guidelines to help assess these thresholds are presented in Appendix B.

Assess Quality of the Data

The evaluation process requires the researcher to assess the relationship between a resource's physical characteristics and a more abstract dimension—its contribution to substantive research. The NRHP and CRHR use the concept of integrity to bridge this conceptual divide. Bulletin 15 *How to Apply the National Register Criteria for Evaluation* (NPS 1997a) defines integrity as the "ability of a property to convey its significance." A resource must have integrity to be eligible for listing in the NRHP or CRHR. Although researchers often take the concept at face value to mean merely a site's physical condition, integrity is actually a measure of the property's ability to convey its history, construction, or to yield important information through consideration of the NRHP's seven aspects of integrity, discussed later in this chapter. It is important to consider the estimated period of significance while assessing integrity. The resource must retain adequate integrity to represent the important event, person, style, work of a master, or potential data that has been identified.

AIMS-R

The simple mnemonic AIMS-R is useful for quickly assessing whether an archaeological property contains important information. Historical archaeologists at Sonoma State University have refined a set of basic criteria designed to assess archaeological research potential of a specific property or feature that can be useful for this study; in certain instances, it can also be adapted to the built environment. This technique may be used on a feature-by-feature basis to determine contributing or non-contributing elements or may be used to determine eligibility of the site as a whole. The mnemonic AIMS-R captures the following set of principles:

1. *Association* refers to the ability to link an assemblage of artifacts, ecofacts, and other cultural remains with an individual household, an ethnic or socioeconomic group, or a specific activity or property use.
2. *Integrity* addresses the physical condition of the deposit, referring to the intact nature of the archaeological remains. In order for a feature to be most useful, it should be in much the same state as when it was deposited. However, even disturbed deposits can yield important information (e.g., a tightly dated deposit with an unequivocal association).
3. *Materials* refers to the number and variety of artifacts present. Large assemblages provide more secure interpretations as there are more datable items to determine when the deposit was made, and the collection will be more representative of the household, or activity. Likewise, the interpretive potential of a deposit is generally increased with the diversity of its contents, although the lack of diversity in certain assemblages also may signal important behavioral or consumer patterns.
4. *Stratigraphy* refers to the vertically or horizontally discrete depositional units that are distinguishable. Remains from an archaeological feature with a complex stratigraphic sequence representative of several events over time can have the added advantage of providing an independent chronological check on artifact diagnosis and the interpretation of the sequence of environmental or sociocultural events.
5. *Rarity* refers to remains linked to household types or activities that are uncommon. Because they are scarce, they may have importance even in cases where they otherwise fail to meet other thresholds of importance (McIlroy and Praetzellis 1997:277).

Another mnemonic is QIVA which stands for Quantity, Integrity, Variety, and Association (Meyer, Gibson, and Costello 2005:114). Similar definitions may be applied with quantity and variety being extensions of the materials category in AIMS-R. This second acronym is provided here to clarify for researchers that may encounter the term QIVA in the gray literature that they essentially encompass the same criteria. When applying AIMS-R, one should also keep in mind that these were developed based on the archaeology of urban centers where features and deposits are more frequent, but the agricultural properties can be much more modest in their material culture signatures. The incremental contributions at agricultural properties may collectively inform important research issues and thus a small site might still be eligible under Criterion D. The archaeologist's professional expertise should inform that somewhat subjective threshold.

Identify the Important Information That a Property Contains

At this point, the researcher has identified a specific property, devised a context for evaluation with applicable research themes and questions, and determined that the property is likely to contain the information and integrity necessary to support the themes, questions, and history. The final stage requires the evaluator to condense this process into a statement that makes clear what important information the property is likely to contain. The statement must explain how applying the methods of architectural history or historical archaeology to the data will inform the understanding of an important research theme under one or more criteria. This concept is discussed in greater depth below.

This statement probably will involve demonstrating the relationship between the built environment, archaeology, and the historical data (documentary and oral interview information) that pertain to the property. The researcher can then weave data from a variety of sources into a richer interpretation of the past.

The process delineated above, when appropriately applied, will lead the researcher through the exercise of determining if a resource contains important information and meets NRHP or CRHR criteria. An important aspect of determining whether a resource meets NRHP or CRHR requirements is to compare it to resources of a similar type and establish its uniqueness or rarity. To facilitate such comparisons, the following section on methodological consistency is offered. Adhering to currently accepted best practices will improve the profession's ability to contribute to the collective understanding of the past, ensuring that the findings continue to provide important information for identifying and interpreting 19th- and 20th-century agricultural properties and their inhabitants.

METHODOLOGICAL CONSISTENCY

To build a successful argument for a resource's eligibility for listing in the NRHP or CRHR under any criteria, the investigator must demonstrate that the property possesses an important association with significant events or people; is of significant design, construction method, or art; contains important information either as a unique resource, in comparison with other sites; or is a significant contributor to data accumulated from similar resources on important research issues. In each of these cases, the interpretation of the resource—and assessment of its importance—is only as reliable as the quality and consistency of the data on which they are based. Keep in mind that any assessment of significance should consider the opinions of what is important as expressed by descendant communities; these may not always align with what a researcher finds significant but may reflect a more accurate expression of local value and meaning. The Secretary of the Interior's Standards emphasizes that uniform methods, appropriately applied, will allow future researchers to replicate the analytical processes employed and "to address problems not recognized at the time the data were recovered" (United States Department of the Interior 1983). This section provides guidelines for methodological consistency in the areas of initial and prefield research, fieldwork, and post-field analysis and documentation preparation.

Initiate Prefield Research

During the planning phase, an initial search of online records and previous documentation is essential. This preliminary archival research begins with a record search at the appropriate branch of the California Historical Resources Information System (CHRIS). This search will provide information regarding previously recorded resources and past surveys, local listings of significant properties, and various federal, state, and local listings (e.g., NRHP, CRHR, and others). Similar searches in neighboring states may be required if a project straddles a state line or overlaps historically with another state.

In recent years numerous historic maps and documents have been made available online (Table 10). These online resources provide baseline data that allows “ballpark” estimates on age and size, as well as a general overview of land use patterns through time. A quick search of these basic sources, combined with the record search from the CHRIS, is essential in understanding the potential resources that may be present within a proposed project footprint, as well as a gross estimate of their age.

Table 10. Online Resources useful for Baseline Prefield Research.

Source	Web Address	Summary of Available Data
U.S. Coastal Survey T-Sheets	http://www.caltsheets.org	Coastal survey maps that include landowners, fields, and other information
David Rumsey Historical Publications Store	http://rumsey.mapranksearch.com	A wide variety of maps and documents searchable with free viewing, including county maps listing landowners
General Land Office Records and land status maps	www.glorecords.blm.gov	General survey plats that depict houses and fields; lists of homestead patents by Township, Range, Section
United States Geological Survey maps	https://ngmdb.usgs.gov/topoview	USGS maps dating back to the late 19th century depicting structure locations
Historical aerial photographs	https://www.historicaerials.com/viewer https://mil.library.ucsb.edu/ap_indexes/FrameFinder/	Searchable by location; important in identifying former locations of fields, buildings, trees, and related property types
California Built Environment Resource Directory (BERD)	www.ohp.parks.ca.gov/?page_id=30338	BERD files provide information, organized by county, regarding non-archaeology resources in the OHP inventory, including evaluation status. Useful for comparative information

Establish a Thematic Context

Once an agricultural resource has been identified, either through prefield research or through a combination of prefield and field surveys, it is necessary to begin the development of an appropriate historic context for the property. This research may focus on the following:

- The industry or enterprise for which the property was constructed (type of crop or livestock focus); its economics, environmental and other constraints; the nature of the work; and its labor history;
- The economic, political, and social conditions during the time of the property's occupation that may have had an impact on design and operation of the farm or ranch (e.g., economic depression, periods of social reform, labor tensions, tight labor market); and
- Innovative changes in industry technology during the time of the property's occupancy that may be reflective through design or equipment changes.

The family, corporation, or company and workers camps may require more focused research, including primary-source materials or interviews with descendent or stakeholder communities that focus on the following:

- The overall history of the agricultural property;
- The scale of the property and the nature of its operations;
- The owner or company's policies and interactions with regard to its work force;
- The demographics of the family or work force, including race, ethnicity, presence of families, gender of workers, job structure, permanent or temporary transient work force, and pay rates, among other characteristics; or
- Plans for the layout and construction of the agricultural property and/or its associated camps, including applicable governmental regulations and guidelines.

Summarize Research

The end goal of the focused and preliminary research is to define themes as historical patterns or trends. Knowing possible themes, the general chronological history of a region or agricultural property, and crop or product informs on functional classifications of buildings, structures, sites, or objects identified during fieldwork.

Identify Potential Districts and Landscapes

The historical research, examination of aerial photographs, and maps should be used to ascertain the potential of a district, rather than single entity properties. A district may include a cluster of farms united by a single purpose. For example, around Fresno, the colony system of the late 19th and early 20th century often resulted in a large area of land divided into small farms. Immigrants from a single village, province, or geographical location or sharing a similar ideology bought these farms, came to America, and established a community focused on the collection of individual farms, with or without shared agricultural fields. In various part of California, these colonies reflect heritage associated with Danish, German, Armenian, Amish, Mennonite, and many other heritages. This allowed all farmers to benefit from shared communal resources. The combination of individual farms in a colony, linked by a common immigrant event, may qualify as a district. In the colony example, contributing elements to the district may also include a community hall, school, or other communal buildings built and maintained by the colony members. It is important when examining a single farm to consider if it was part of a larger whole and evaluate it both for its individual importance and as a contributing element of the larger colony or commune.

Most farms or ranches, regardless of the number of resources within their boundaries, are treated as a single entity rather than a historic district. They may be regarded in the context of a cultural landscape, when warranted, depending on the relationship between dwellings, outbuildings, animal shelters, fields, and other features with the natural environment. Eastman used the NPS definition of types of agricultural landscapes that could be important in the analysis phase (Table 11). These include: cultural, rural historic, historic vernacular, historic agricultural, ethnographic, and historic designed.

In considering the presence of a landscape consider processes that have shaped the land, including cultivation and grazing, siting and construction of individual ranches and farms, development of transportation routes, and other natural processes. Physical components include farm houses, tank houses, barns and corrals, fenced pastures, spring houses, livestock sheds, milking houses, equipment, vineyards, fruit dryers, and many others. Orchards, hay fields, crops, wharves, bridges, reservoirs and other features also contribute to a landscape.

Table 11. Landscape Type and Definitions.

Landscape Type	Definition	Example
Cultural Landscape	A geographic area (including both cultural and natural resources and the wildlife or domestic animals therein) associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values	A large tract of land organized into a colony and subdivided into small farms, with communal irrigation canals, fields, often a community center, school, colony graveyard, and other amenities may represent a cultural landscape.
Rural Historic Landscape	A geographic area that historically has been used by people, or shaped or modified by human activity occupancy, or intervention, and that possess a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings, and structures, roads and waterways, and natural features	Bacon Island is a 6,000 ac. reclaimed island with levees, docks, wharves, pump and irrigation systems, 12 Japanese tenant and hired worker camps spaced around the island at the base of the levee, roads, natural piper soil mounds, and agricultural fields linked by roads and canals in the central area. The entire island is eligible as a Rural Historic Landscape (Maniery 1993).

Table 11. Landscape Type and Definitions *continued*.

Landscape Type	Definition	Example
Historic Vernacular Landscape	A landscape possessing a significant concentration, linkage, or continuity of natural and manmade components which are united by human use and past events or aesthetically by plan or physical development	Wilder Ranch State Park's ranch buildings, "are representative of rural vernacular architecture and reflect a century of traditions associated with innovative and progressive dairy ranching in California. The ranch adopted the newly developed cream-separator, and the majority of the machinery was water powered using a Pelton wheel and a belt-drive system, including the electrification of the dairy in the 1890s. In the 1930s the emphasis at the ranch shifted from milk to beef stock, as well as thoroughbred horses and artichoke production" (santacruz.org 2022)
Historic Agricultural Landscape	A rural historic landscape or historic vernacular landscape that possesses a significant concentration or continuity of components that are united by past uses in agricultural productivity	Family farm with several generations of use or adaptation to economic demands with buildings, structures, objects or sites that reflect that adaptation over time.
Ethnographic Landscape	An ethnographic landscape encompasses an area that contains natural and cultural features that play an important role in the traditions of contemporary people who use the landscape. Religious activities, resource collecting, or transportation are among the contemporary traditional uses of an ethnographic landscape	Camps for agricultural workers where the workers have added meditation gardens, communal alters, bathhouses, planted traditional peppers or other plants in a makeshift garden, or make other improvements reflecting their religious, cultural, or personal preferences.
Historic Designed Landscape	A landscape that was consciously designed or laid out by a landscape architect, master gardener, architect, engineer, or horticulturist according to design principles.	Community parks or community gardens with planned irrigation, shade areas, individual garden plots with boxes or terraced areas, foot paths linking the plots, and signage or road entry points.

Having a general idea of districts versus single properties and the types of landscapes prior to conducting pedestrian surveys will allow for an informed field recording effort and the careful collection of information and data based on landscape and resource type.

Evaluations of agricultural properties often require a visual presentation of each resource, through a photographic appendix or by selecting a few overview photographs for inclusion in the DPR form and/or evaluation report to illustrate the physical descriptions and support integrity assessments. Selected historical photographs gathered during the archival phase illustrating past (or original) condition and appearance of a property that can be compared to a similar image of the current condition are useful in supporting integrity discussions and addressing changes in setting.

Obtaining Access and Defining Legal Boundaries

It is important during prefield research work to carefully consider the need to access a property. Many agricultural properties are set back from roadways or blocked from view by tree rows, hedges, or fencing. As such, it is not possible to record elements from the public right-of-way. It is not uncommon to acquire formal right of entry permissions and coordinate the survey effort. Assessing the need for right-of-way permissions for one or more parcels is an important aspect of prefield research. Using Google Earth Street view or similar programs to “drive” the roadways and identify visibility of a property from a public ROW is important in ascertaining the need for more formal permissions to enter and record an agricultural property.

It also important to consider the size of a property when requesting access permissions. Architectural historians often rely on Assessor Parcel Numbers (APN) to identify property boundaries. In agricultural properties, however, it is not unusual to have one APN number for the domestic residential area and a series of additional APN number for fields, worker camps, orchards, or other related agricultural landscape elements. All the APNs may represent the agricultural property, yet recordation and evaluation may be limited to only the domestic residence due to project impacts, access, or cultivation limitations. In these instances, the use of aerial photographs, oral interview data with owners, and parcel owner data obtained from the accessor’s office may be relied on to define the overall boundaries of the property for evaluative purposes.

Fieldwork

As noted above, approaching fieldwork in a consistent manner is important in resource evaluation, as it allows for comparisons between resources. Approaches to gathering data necessary to make evaluations under the four NRHP criteria are discussed below.

Evaluation of agricultural resources generally involves completion of California State DPR 523 forms. Understanding the boundaries and internal structure of the agricultural resource can be accomplished through systematic surface reconnaissance, possibly in combination with invasive or less invasive methods to identify archaeological components. The reconnaissance should identify and map all visible features. Recording and numbering methods need to be sufficiently flexible to accommodate numerous activity areas, each with associated buildings, structures, objects, or archaeological features.

In addition to identifying activity areas within the agricultural property, define the overall layout and the relationships between different functional areas of the resource (e.g., work areas, residential areas, animal-related areas, or refuse disposal areas), following guidance provided in Chapter 3. Map relevant landscape features that may have been important for the location and layout. These might include water sources, fields, irrigation, tree rows, roads, and topography.

Several NPS bulletins and guides provide discussions pertinent to recording resources. The Bulletin 15, *How to Apply the National Register Criteria for Evaluation* (NPS 1997a), provides basic examples by criteria; Bulletin 30 *Guidelines for Evaluating and Documenting Rural Historic Landscapes* is applicable to farms and ranches (McClelland et al. 1991); *Surveying and Evaluating Vernacular Architecture*, discusses the types of resources often found at agricultural properties (Wyatt 1998); and Bulletin 39 *Researching a Historic Property* discusses the types of contextual information to look for in the field (O'Donnell 1998). Another NPS publication, *Recording Historic Buildings* (Harley McKee 1970) discusses approaches to architectural surveys. The Secretary of the Interior's *Standards for Archeological Documentation* provide general guidance on the conduct of archaeological investigations (United States Department of the Interior 1983). Caltrans SER (2022) also provides guidance for general recordation and documentation of resources. In addition, Bright Eastman prepared a Master of Arts thesis in 1998 available through Sonoma State University library that provided guidelines for documenting and evaluating historic agricultural properties on California's north and central coast. Her approaches to standardize fieldwork and collect data are incorporated below, along with the pertinent bulletins.

Fieldwork to document agricultural properties consists of describing the buildings, structures, objects, and sites or archaeological features; photographing the identified property types; and preparing a sketch map that represents all elements of the agricultural resource (including landscaping, tree rows, fields, and other characteristics besides the built environment or site).

Take descriptive notes on the architectural and engineering characteristics of a property and its surroundings. Important to note are a building's foundation, footprint or mass, size, fenestration, architectural detailing, exterior siding, roof shape and material, layout and design within a larger landscape, plantings and landscape furniture, lighting, and evidence of physical additions, modifications or alterations to the original design and materials. Record any associated outbuildings, archaeological features, or artifact deposits during this step.

Photographic documentation provides digital images of the property and its setting. Photographs should include overview shots of the main structure and related outbuildings that depict two facades in one frame, detailed shots of architectural elements that contribute to potential eligibility, shots of the setting surrounding a building or outbuilding and overviews of the entire property depicting the spatial arrangement of buildings, structures and objects. For industrial sites that could be important for engineering design or technology, relevant equipment positioning or individual machines or equipment may require photographic documentation to assist in the development of an eligibility assessment. Photograph manufacturer identification plaques mounted on equipment may require photography as well. Artifact concentrations, abandoned equipment, and foundations also warrant photographing. In addition, representative artifacts or groupings of artifacts by function are important to photograph.

The fieldwork evaluation process requires preparing a sketch map that includes the locations of all buildings, structures, objects, or archaeological sites within the property. The sketch map will include any walkways, significant landscaping, windrows, fencing or other built environment features that are relevant to establishing the resource's character and setting. The DPR 523 forms do not require scaled built environmental sketch maps but stress that the design and spatial arrangement of all elements of the property should be provided. Images obtained through internet or other venues can be useful in providing general spatial arrangements of properties, with additional landscaping or outbuilding details added by hand drawing in the field. Archaeological features and artifact concentrations are usually represented on scaled maps. The overall sketch map prepared for the project should include all physical elements of the resource, while detailed archaeological sketch maps may be needed to supplement the overall map and are typically attached to the Archaeological Site Record form.

Describing the Resource

In general, recording a resource begins with a walk around the property to identify all the elements. Is it a single building or an agricultural complex with a dwelling, barn, outbuildings, and perhaps landscaping? This initial survey should focus on gathering overview impressions of the site to create a life history, identify functional areas as outlined in Chapter 3, and define the horizontal stratigraphy. Careful attention should be paid to groupings of buildings and the environmental conditions or setting. Are they related to a domestic property type or do they reflect the agricultural nature of the overall farm? Ask basic questions while gaining an impression of the property including: What is the general layout of the farm or ranch? Are buildings linked by roads, trails, footpaths? Where are the fields, corrals, pastures in relation to the buildings? Where is the water supply coming from? If the property was used before 1940, where would a privy or outdoor kitchen been located? Are there any depressions that could represent abandoned wells, privies, or trash pits? While the who, what, where, when questions are described above, additional consideration should be given to the following, as outlined in Eastman (1998).

Economic Activities: Is there evidence of changes in agricultural products over time or in technological advances? This could include a supplemental small-scale operation (raising chickens to sell eggs to supplement a poor producing fruit crop year); an increase in marketing and distribution (resulting in adding warehouses or storage areas); changes to accommodate legislative restrictions (adding screens to windows or doors, or improved facilities at temporary worker camps), or other decisions that affect economic strategies.

Social Activities: Is there evidence of social factors that influenced a property's development? This may include land ownership changes, addition of camps, and/or changing labor sources resulting in ethnic, racial, or cultural diversification. It may also include a family member or new employee bringing a skill set that was previously lacking, instigating changes in building construction or design (blacksmithing, carpentry, masonry).

Building Activities: Can changes in building design, materials, or function be identified? Is there information on why the changes occurred? Buildings and structures often change through time as evident in alterations, new constructions, additions, recycling of materials, adaptive reuse of materials and the buildings themselves, and responses to legislative requirements. For example, when houses are improved and windows and doors replaced with more efficient materials, the older windows or door are often reused in outbuildings. Local and state regulations in the early 20th century affected ventilation and sanitation decisions and resulted in modifications to older buildings or construction of new facilities.

Once the initial pedestrian survey is complete, recordation can begin. In general, recordation of individual buildings, structures, and objects begins with a general overview, such as mass and the building footprints, and then continues to narrow in focus with specific details, from foundations, siding, and roof to fenestration and architectural detailing around windows, doors, in eaves (Table 12). It is important to note when assigning building style that many farm or ranch buildings are vernacular, although they may contain some elements drawn from a standard style. Pay particular attention to the details (knee braces, exposed rafters with decorative ends, etc.) and describe accordingly (vernacular with Craftsman Elements, for example). All buildings and structures should be described and their function considered. Note whether they are domestic or agricultural properties as outlined in Chapter 3. Landscape elements should be described as well.

Table 12. Descriptive Terms for Completing Site Records.

PRIMARY CATEGORY	SUBCATEGORY	DESCRIPTIVE EXAMPLES
Massing/Shape	Ground Plan (in feet and inches)	Rectangular, square, cross-gable, L-shaped, T-shaped, U-shaped, H-shaped, extensions, linear, additions, irregular, connected buildings, other
	Height	One-story, two-story, one-and-one half story, two-and-one half, three stories, other
	Roof shape	Gable, hipped, pyramid, gambrel, mansard, gable-on-hip, round, lean-to, shed, complex, flat, monitor, arched gambrel, broken gable, other
	Roof pitch	Low, moderate, steep
Construction Methods/Materials	Materials	Wood, concrete, earth, brick, cement, stone, corrugated metal, adobe, iron, aluminum, other
	Framing	Timber, balloon, braced, pole frames; rammed earth, masonry, single/double wall, iron rods, bents, combination, other
	Exterior Siding	Vertical boards, board and batten, horizontal wood, corrugated metal, stucco, composite; asbestos siding, brick, logs, other; sawn or milled lumber; wire or square head machine cut nails
	Roof coverings	Split shakes, wood singles, corrugated metal, asphalt sheeting/shingles, asbestos shingles, composition shingles, other
	Roof construction	Common rafters, exposed rafters, trusses, purlins, other
	Floor	Wooden planks, concrete/cement, stone, packed earth, pavers, other
	Foundation	Raised, post-on-pier, wood sill, concrete perimeter, concrete slab, on ground, boulders, sloping, combination, brick
	Masonry	Dressed stone, poured concrete, board formed concrete, concrete blocks, dry-laid stone, brick

Table 12. Descriptive Terms for Completing Site Records *continued*.

PRIMARY CATEGORY	SUBCATEGORY	DESCRIPTIVE EXAMPLES
Openings	Door Entries	Number of entries, location of main entry, location of secondary entries; access (ground level, first floor, basement, second floor, etc.); access type (ramp, stairs);
	Doors	sliding, hinged, Dutch, French, trap, other
	Window	Location, number, size placement (symmetrical/ asymmetrical)
	Window type	Sash, casement, hopper, awning, fixed, sliding, pivot, louvered
	Ventilation	Clerestory, cupolas, dormers, spaced exterior siding, chimney, vents
Character defining Elements	Formal architectural styling or elements thereof	Craftsman, Revivals, Victorian, Mission, other
	Applied detailing	Paint, decorations (weathervanes, etc.), brackets, hay hood, fancy hardware, signage
Additions		Location to original building; height and width; roof type and pitch; openings; construction methods/materials; internal divisions
Age		Known construction date, estimated construction date, additions/modification dates
Integrity	Condition assessment	Excellent, good, fair, poor, deteriorated, collapsed, dilapidated
Internal Divisions	Floorplan	Open, parallel bays, rooms, loft, complex, aisles, stalls, semi-enclosed partitions, alleys
Landscape	Vegetation	Foundation shrubs, door/corner accent trees, wind rows, formal gardens, kitchen garden, fields, other
	Driveways/Walkways	Foot paths, materials (dirt, rock, concrete, wood), borders (pavers, wood, concrete, rock, other), asphalt, access to front, rear or side;
	Defining spaces	Wood post and barb fence, wood fence, picket fence, log fence, metal post and barbe fence, shrubbery fence, other
	Other	Patios, gazebos, ponds, waterfalls, fountains, sitting areas, benches, outside cooking area, swimming pool, other
Other	Movable Objects	Trailers used for housing, bee boxes, smudge pots, horse trailers, tractors and equipment, other

Note: Extrapolated from Eastman (1998).

Domestic Property Types—Residences

Recording buildings, structures, objects and sites related to Domestic Residences should take into account the possible property types presented in Chapter 3. A residential area may include dwellings, barns, outbuildings, kitchen gardens, a small orchard, landscaping, and recreational areas. Attention should be given to the access to the main house and barn, walkways or paths connecting buildings, and the location of fields. Descriptive text should be consistent in the level of detail for all buildings and structures including elements provided above in Table 11. Do not ignore the potential presence of subterranean storage features and hidden storage like root cellars.

Archaeologists should be aware that identifying ephemeral architecture at domestic sites, particularly agricultural worker camps with portable or temporary dwellings, presents special challenges. The archaeological signature includes cut and/or filled level areas (flats); stake holes; postholes; drip lines; drainage ditches or gutters; and concentrations of nails and other structural components, such as screws or window glass. Structures and buildings that were on artificial flats or pads are relatively easy to identify on the surface. Those that were on wooden platforms or on unmodified ground may be visible only as concentrations of nails. Barring outstanding surface visibility, at such sites a systematic metal detector survey may be necessary, using nail concentrations to determine the location of structural remains.

When recording, identify the type, construction methods, and materials of the buildings if possible. For worker housing, were they tents, boxcars, lean-tos, dugouts, or portable cabins? Sometimes, building characteristics can be determined from documentation, such as plans, corporate construction and maintenance ledgers, and contemporary photos. If such information is lacking, the nature of the buildings must be determined from the architectural features and artifacts. Even when good documentation exists for a farm or camp, the researcher needs to bear in mind the distinction between the ideals of planning and on-the-ground realities. This distinction can itself be an important research issue.

An agricultural related domestic building may not have a substantial associated refuse deposit(s), because refuse was normally disposed of in a designated landfill. In addition, sheet refuse (a horizontal often dense deposit of artifacts) or artifact scatters can result from the loss of small objects (buttons and the like) in the building and small-scale, localized refuse disposal, such as sweeping trash out the door, dumping ashes, or just tossing a bottle under the steps. The presence of artifacts such as toys or women’s clothing articles has implications for the demographics of the household. Other items, such as sewing articles, recreational artifacts, bottles, and food remains, can inform on activities that took place outside of working hours: for example, clothing repair, drinking, gaming, or food preparation and consumption away from a communal kitchen area. In contrast, a family farmstead or home may have hollow artifact-filled features such as outhouse or privies, burn pits, or designated pits used for household refuse.

Domestic and Agricultural Property Types—Outbuildings

When recording a resource, look for evidence regarding the type and numbers of support buildings. Were showers or a bathhouse present? A commissary? Gardens? Centralized cooking and dining facilities? An office? Were these facilities sufficient for the number of people in the camp? For example, determining whether the mess hall was sufficient for the camp would entail some understanding of the building’s size, as well as the number of camp occupants. Detailed data on architecture can inform if cultural modifications may have been made in the architecture of certain buildings, such as bathhouses or places of worship. If the surviving architectural remains are of sufficient quality that they can be compared to contemporary blueprints—such as those of the Commission of Immigration and Housing (CCIH) pamphlets—and determination of conformity to legislation may be possible.

Some support facilities, like cookhouses, mess halls, and laundry facilities, may be associated with artifact deposits. Typically, these deposits would have been generated through localized cleanup, casual disposal, and loss. Early 20th-century investigators did note, however, that kitchen refuse was often broadcast straight out the back door of the cookhouse (Appendix E, CCIH, State of California 1919:44; Higbie 2003:39). Deposits of cooking and dining remains are rich resources for study. Deposits associated with bathhouses, garden or reflective areas, or other support facilities may also be valuable in addressing questions of cultural heritage or other research topics. While recording artifact deposits during the initial pedestrian survey, make note on the potential for any depth and assess the need for a Limited Phase I or test excavation to establish the presence of subsurface artifacts or the need to conducted underground exploration to address research potential for evaluation under Criterion D/4.

Domestic Property Types—Water and Structures

Assessing the associated infrastructure at an agricultural resource can reveal much about living conditions. Drainage of wastewater and sewage, access to fresh water, transportation and supply roads, the availability of electricity or natural gas, and telephones or telegraphs are significant for quality of life on the property and should be noted and recorded.

Details on the construction of some of these standing or abandoned features, particularly with respect to water supply and drainage, can be informative. Key questions include what the source of water for the resource is and if it changed through time, where does the source lay in relation to potential sources of contamination (e.g., was it downhill from outhouses? upstream from trash disposal?), whether and how the water is or was treated, and, if the source is/was distant, how water was transported to the resource. If drainage features are present in the residential area, the nature of their construction and maintenance should be determined. For example, does the construction indicate that the drainage features are part of a planned network, or did the inhabitants informally construct them? These features are also useful in understanding compliance with legislative requirements that addressed access to clean water, proper drainage for showers and bathhouses, and other steps to upgrade agricultural residential living conditions.

Transportation features and technology, both within the residential areas and linking the residential areas to the outside world, headquarters, or fields, can be significant indicators of living conditions. The presence of pavement indicates considerable investment by management in the efficiency of associated roads. Whether roads and pathways followed a formal pattern or developed without specific plans can inform on the level of planning undertaken. During recordation, notes should be taken on road or path surfaces and other construction elements. Evidence of other infrastructural improvements, such as the presence of electricity, natural gas, or telephone lines, should be noted. These features may exist only in the form of artifacts like copper wire or insulators strung in trees or on poles and attention should be paid by architectural historians and archaeologists to the potential of infrastructure properties in locations up to 20 feet above ground.

Domestic and Agriculture Property Types—Landscaping

As pointed out in Chapter 3, features for domestic-related recreational property types associated with landscape may include the architectural remains of or in use formal social activity centers and informal gathering places where families, owners, or workers spend their leisure time. The location of buildings or outdoor recreation facilities (like horseshoe pits) can inform on residential organization. The level of formality (for example, use of recycled materials vs. manufactured sporting equipment) may indicate the level of effort invested by the owner, family, or company. Firepits, particularly in the absence of food waste, might indicate outdoor gathering spaces. Formal or informal gardens associated with an agricultural property may indicate the need to supplement provided food (or the need for workers to supply food for themselves), a cultural heritage preference, or a family’s need to have their own garden close to the house. Sites occupied by Japanese Issei and Nisei owners or workers often contain remnants of a formal meditation garden (stacked rock, informal fountain or water feature) or other landscaping elements. Small alters and religious icons have been recorded at Hispanic and other encampments. Artifact scatters associated with recreation may reveal the availability of items such as tobacco or liquor at the site.

Domestic and Agriculture Property Types—Outbuildings (refuse)

Refuse disposal property types are consistently one of the most important features in archaeological investigation. Refuse deposits at most large corporate-run, agricultural properties lack diversity, consisting, as they often do, of large dumps of tin cans from the communal kitchen. Family residences, tenant farms, and small worker living quarters often have greater variety in cans, ceramics, and other refuse, indications of family centered or individual worker food preparation and consumption practices. Long-term generational properties typically created landfills away from the family home or burned refuse in pits. Agricultural worker refuse may be present as surface deposits discarded in nearby drainages, convenient depressions, or a specified dumping area. Family-owned properties often disposed of household debris the same way (in convenient drainages, ditches, or depressions). Architectural historians need to be aware of potential patterns and keep an eye open for these surface disposal features during their walk around a property. If any of these features are identified, then the architectural historian should bring in an archaeologist as outlined in Table 9, to record the material and assist with the property evaluation.

Both the location and the type of refuse disposal needs to be considered by archaeologists and architectural historians. The location of the refuse disposal in relation to residence, workspaces, and infrastructure (water supply, in particular) suggests its potential impact on health and sanitation. Are privies located uphill from wells? Was refuse disposed of away from the water supply for drinking or bathing? Does evidence indicate an effort to remove the refuse from residential and cooking areas? Is there a landfill?

Domestic and Agricultural System Property Types—Landscape

Landscaping around a domestic or agricultural area is important to document. While most landscaping features are surficial, their location, construction, and possible function should be carefully noted. A footpath between bunkhouses, kitchen, shower or bath house, and privies may have increased importance if there is evidence that the path was lined with rock or boards or enhanced in any way. Improvements to a path could indicate a long-term agricultural workers residential area as opposed to a short-term temporary residence, the need to create separation between domestic facilities, or other factors. Identifying and describing tree rows, fencing (formal or informal), and/or rock walls is important when addressing separation of space, camp layout and design, or responses to environmental factors.

Agricultural Property Types—Production Areas

In the absence of historical documentation, artifacts and architectural information from production related property types can aid in identifying the function of the property and specific activity loci. The location of fields, orchards, rangeland, and other related industrial features in relation to domestic use areas or specialty buildings can contribute to our understanding of overall property living and working conditions and sanitation. In addition to avoiding odor, noise, and industrial waste, or simply maintaining a separation of work and home life was often important for workers (e.g., Baxter 2002).

Researchers should note the presence, location, and size of agricultural production features such as barns, stables, corrals, pastures, icehouses, milk houses, smokehouses, storehouses, offices, and warehouses. Places of work—such as offices, packing houses, canning sheds, or blacksmith shops—may reveal information on work processes, control of labor, and, sometimes, gendered or ethnically or racially stratified workers (Taksa 2005). Certain artifacts found in association with places of work may indicate covert activities like on-the-job drinking or isolated areas for socializing, or gender-specific tasks, such as the use of a primarily female work force in offices or canneries during peak harvesting seasons (Van Bueren et al. 1999).

Photographing a Resource

Photographs taken in the field serve two purposes. First, representative photographic examples of property types are a required element of the DPR 523 Primary Form. Second, digital images are a cost-effective way to quickly gather data in the field that can then be studied, enlarged, and examined during the post-field analysis phase. A photo provides the evidence needed to support findings of eligibility and are the most convincing data set relied upon in assessing building integrity. Care should be taken to select photographic positions to limit over exposure from sun and other lighting issues.

The photography efforts should begin with a general view and then narrow in focus. Overview photos of the ranch or farm should be taken from four cardinal directions. They should clearly show the relationship of roads, landscaping, dwellings, outbuildings and sites. These photographs become important when assessing the integrity of setting, feeling, and association of the overall property. The number of photographs taken of a property and its individual components is proportionate to its complexity, interest, age, and importance. A ranch historically important for producing chickens, with a modern facility for swine may only need a single photo of the modern facility but require many images of the chicken sheds and outbuildings.

It is important to keep in mind the proposed project and photograph the portions of the property adjacent to the ROW or areas that would be physically affected. Also keep in mind where the agricultural boundary might be drawn; in some instances contributing elements might extend into the ROW, so the boundary would be delineated beyond the parcel boundary. Photographic documentation serves to support or justify the proposed agricultural property boundary and to assess effects of the undertaking. It is important to photograph properties protected from construction impacts. In the event of unanticipated impacts, photographs can help document the pre-construction state.

NPS recommends that photographs of buildings and individual structures be divided into five parts: exterior general view; exterior details; interior general view; interior details; and unusual or special features (McKee 1970). Caltrans surveys rarely, if ever, include interior views. If permission is granted and the building function is related to its internal layout, then interior views may be important. For example, the internal layout of a dairy barn may be important to documenting certain changes in technology. Specialty use buildings can have specific internal character defining features and if not called out those features can be lost. To record all sides of a building’s exterior, at least two photographs are required, with two facades in each. If the building is complicated, exterior shots may be needed of addition junctions with the core building, individual windows, and porch details.

Common mistakes often made while photographing buildings or archaeological features include standing too far away from the structure to depict details, or standing so close that the roof peak is cut out of the photo. Ideally, the building or structure should fill the image, with all sides, roof, and foundation completely visible. General overview shots taken from further back can then be used to demonstrate the surrounding landscape, relation of buildings with roads or paths, and positioning within the agricultural property. Digital photos should be reviewed in the field and retaken if blurry, overexposed, or reflect inadequate framing of the building, structure, site, or object.

Clusters of buildings or activity areas should each have a general overview from several directions to establish the relationship of buildings with each other, their position within the cluster, and the location of the cluster within the overall agricultural property.

If time is of the essence due to land access restrictions or lighting, close up photographs of windows, doors, porches, eaves, and other details can be crucial in filling in gaps in fieldnotes. It is always advisable to take an excess of photographs and not use them on the DPR 523 form, rather than taking only a few and finding out later that the detail is not visible or the photo is too dark or light due to weather conditions.

Items of special interest that may warrant photography include decorative arts, historic lighting or heating elements, uncommon details of construction, accessory buildings, garden furniture and accessories, and landscaping. In general, if something is depicted on the sketch map then it likely warrants a photograph or two.

Maintaining a photograph log is an important element of fieldwork. The OHP provides DPR 523 photo logs for use during recordation. These include a frame or digital number, direction, and description. Buildings, landscaping or archaeological features, structures, objects, and related elements described in the field and mapped should be numbered and the photo log should cross-reference those numbers. Some researchers prefer to have a sketch map or aerial of the site and number photographs on the map with arrows pointing to the view as a method of cataloging photographs. In either case, organizing your data while it is being gathered will save time and effort during post-field analysis.

Preparing a Sketch Map

A sketch map of a property is important and a required component of the DPR 523 Building, Structure, and Object form or Archaeological Site form. For a single building or a handful of buildings, the map may be as simple as quick sketch indicating relationship to roads, the driveway, and the buildings. Often, an image extrapolated from Google Earth or a GIS program is adequate with labels for buildings, structures, and roads. An elaborate ranch or farm with numerous residences, barns, outbuildings, fences, irrigation system, etc. may require more care. Eastman (1998:29–31) provides a tabulated check list of landscape characteristics to include in both descriptive text and on the Sketch Map. This list is comprehensive and only the largest, complicated agricultural complex may have all elements (Table 13). Many times, only one or a few categories may be present. Some elements may no longer be in use, such as abandoned ditches or breached dams but need to be mapped and included as part of the archaeological record. The detail in a sketch map is dependent on the recorder’s observations and should reflect the gathering of pertinent data in a timely manner.

Table 13. Sketch Map Elements for Site Records.

IDENTIFY	DOCUMENT ON MAP	FEATURE/ DETAIL DOCUMENTATION
Building Clusters	Outbuildings	Proximity to each other, function
	Dwellings	Associated ancillary buildings such as wash or bath house, carriage houses, garages, cookhouse, bunkhouse; tank house, water system, reservoir, windmill, shrines or religious structures.
	Related Building types	Smoke house, milk house, cow barn, creamery, ice house, stable, chicken coops, pig pens, etc.
Structure Clusters		Corrals systems, connected holding pens, loading ramps, connected aisles, squeeze chutes; concentrations of feed cribs, watering troughs, exercise rings
Activity Areas	Dwelling Related	Clotheslines, laundry, lawn/ yard, garden, ornamental plantings, recreational areas (pool, patio, gazebo, courtyards)
	Animal Care	Medical, birthing, branding, hoof treatment
	Agricultural processing	Collection and storage areas, preparation areas, final product and loading areas and associated buildings, garages, storage warehouses, ice houses, rails, etc.
Circulation Networks		Roads, trails, animal paths, footpaths, railroads on or adjacent to the property; waterways in or adjacent to the property, canals, docks, piers, platforms

Table 13. Sketch Map Elements for Site Records *continued*.

IDENTIFY	DOCUMENT ON MAP	FEATURE/ DETAIL DOCUMENTATION
Land use Vegetation		Orchards, ornamental shrubs, trees, flower beds; crops; seeded grasslands; range forage; hay fields; truck gardens; vineyards; flowers; groves; non-native plants, other
Boundary demarcations		Fence; walls; vegetation barriers; windrows; markers; roads; hills; water that mark a property edge
Isolated/small scale elements		Silos; corncribs; farm machinery; transportation vehicles; hand operated equipment; mechanized equipment; crates and packing materials; building materials; waste and debris collection sites; animal waste collection areas; buildings/structures that are not in close proximity to like components; associated cemetery
Archaeological features (abandoned, not used, filled, silted, burned, etc.)	Buildings	Foundations, slabs, walls, post holes, cellars, privies, cisterns, collapsed buildings, artificial earth pads, imprints, other
	Structures	Ditches, canals, roads, wells, ponds, reservoirs, former field, crop or orchards, fences, refuse or landfills, burn pits
	Objects	Machinery parts, building debris, discarded furnishings or building parts, artifacts
	Prehistoric sites	Lithics, tools, midden, hearths, ground stone, other
Natural Features		Native plant communities; natural ground cover; rock outcrops, creeks or streams, ground slope, major topographic features; wind and sun exposures, microclimate, soil types
Spatial Organization	Building clusters	Distance between buildings, proximity to main road, entry orientation of buildings, roof axis, distance between individual parcels, function
	Dwellings/Outbuildings	Relationship of dwellings to activity areas, relationship to road and trails, linking trails and paths between dwellings and outbuildings, relationship to gardens, pastures, natural features, transportation, wells and water

Note: Based on Eastman (1998).

Post-Field Processing and Reporting

Once fieldwork is complete, the next step is to analyze the historical information, physical descriptions, photographs, and physical location. It may be necessary to return to the archives, contact past or present landowners to conduct oral interviews, or search newspapers.com to supplement previously gathered information regarding the farm or site. For example, initial research may have focused on the cattle industry owned by a large corporation, but fieldwork documented sheep troughs associated with medical treatment for hoof disease, and a traditional outdoor oven. Additional research may be needed to identify this earlier use and assess its importance. Appendix A provides an annotated discussion of repositories and sources that often contain more detailed information used when evaluating agricultural properties. Major sources discussed in Appendix A that have websites or online research links are included in Table 14.

Table 14. Sources for Online Resources.

Source	Web Address	Summary of Available Data
California Agricultural Society	https://catalog.hathitrust.org/Record/009134600	Annual meeting records beginning in the 1850s. Some records and publications are online.
Sonoma County Wine Library	https://sonomalibrary.org/locations/sonoma-county-wine-library/collections-and-research	Digital and hardcopy source material related to the state's wine industry, including a large quantity of primary source documents.
National Park Service	https://www.nps.gov/subjects/nationalregister/database-research.htm	Official list of the Nation's historic places that are listed on the National Register of Historic Places. This source contains searchable excel spreadsheets or downloads for GIS.
	https://www.nps.gov/hdp/coll.htm	A searchable collection consisting of architectural, engineering, and landscape documentation.
United States Department of Agriculture	https://www.usda.gov	Agricultural publications by state from the 19th and 20th century including statistics, census reports, track records, trends and price reactions available for download in PDF format.
U.S. Department of Agriculture, Soil Conservation Service	https://casoilresource.lawr.ucdavis.edu/soilweb-apps/ https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm https://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/survey/tools/	Maps of soil types with descriptions and photographs are available through a variety of online facilities. Some of these include interactive GIS maps
United States Geological Survey	https://ngmdb.usgs.gov/topoview and https://livingatlas.arcgis.com/topoexplorer/index.html	Research tools include series of historic topographic maps available for free downloads as a PDF, GeoTiff, GeoPDF or KMZ files.
United States Patent and Trademark Office	https://www.uspto.gov/patents/search	Patents and trademarks are searchable by number. This site is useful for identifying farm equipment when patent numbers are present
California State Archives	https://www.sos.ca.gov/archives/california-digital-archives	The Archives has a searchable online descriptive catalog (Minerva) and an online archive that contains select digitally available materials or collection overviews as well as instructions for access to those materials

Table 14. Sources for Online Resources *continued*.

SOURCE	WEB ADDRESS	SUMMARY OF AVAILABLE DATA
University of California and California State University systems	https://cnas.ucr.edu/about/history/citrus-experiment-station https://mil.library.ucsb.edu/ap_indexes/FrameFinder/	Numerous colleges have online research collections or minimally online catalogs of material. Some of the major ones are provided here. UC Davis publications are available through the Online Archive of California.
Online Archive of California	www.oac.cdlib.org	Manuscripts, photographs, artwork, scientific data and more through collection guides and 250,000 digitized images and documents.
California Department of Food and Agriculture	https://www.cdfa.ca.gov/	Annual reports summarizing agricultural production in California are available for recent years. Older reports are housed at the State Archives.
California Office of Historic Preservation (OHP)	https://ohp.parks.ca.gov/?page_id=24544	The OHP maintains a digital library of historical contexts that include agriculture, immigration history, architecture, and other subjects. It also provides guidance on preparing historical contexts.
County Tax Assessors	Search by county for relevant web addresses	County assessor's offices typically contain property tax information, land use and subdivision records, as well as parcel maps. Current assessment maps are often available on line through the general county website page.
County Archives	Search by county for relevant web addresses	Some counties have scanned old assessor parcel maps, business directories, and other records and photographs for researchers.
County and City Libraries	Search by City or County for relevant web addresses	Many libraries offer free online links to resources for current library patrons. Examples of links include free access to Sanborn Fire Insurance Maps, county or city historical maps, photograph collections, special collections materials.
County and City or Regional Historical Societies	Search by City or County for relevant web addresses	Many historical societies have digitized collections accessible on-line.
Agricultural History Society	https://www.jstor.org/journal/agrihist	Past issues of the Journal of Agricultural History (1919 to 1921) published by the Society are available through JSTOR

Table 14. Sources for Online Resources *continued*.

SOURCE	WEB ADDRESS	SUMMARY OF AVAILABLE DATA
California Lands Patent Database	https://thelandpatents.com/usa/california	Provides a county-by-county lists of successful homestead entries with locational and owner information as well as some ranching information
Calisphere	https://calisphere.org/	Digital collections from California archives, libraries and museums. Contains documents and photographs.
Ancestry	www.ancestry.com	Research based website for genealogy research. Includes U.S. Census rolls, voter registration records, county and city directories, immigration records, and links to FindAGrave and other sites
Newspapers	www.newspapers.com	Scanned archive of newspapers from across the United States. Paid subscription, free with Ancestry subscription.
California Digital Newspaper Collection	https://cdnc.ucr.edu/	Searchable articles. Also has issues of the California Farmer and Pacific Rural Press.

Preparing DPR 523 Forms

California's integrated resource recording system was designed in 1995 as a way to incorporate all information on a single resource in one packet. Each resource is documented on a single Primary form (DPR 523a) that combines architectural, archaeological, and landscape architectural descriptive information. This approach eliminates the separation of disciplines and assignment of a numerous numbers to the same resource due uncoordinated recordation efforts (i.e., one number for Primary form submitted by an architectural historian; another number assigned to the Primary form submitted by the archaeologist).

In general, the lead researcher for Primary form preparation is dependent on the nature of the resource. The Primary Form for an agricultural property with numerous buildings and structures and a single archaeological feature would be prepared by the architectural historian, with the archaeologist providing a brief description of the archaeological component and relevant photographs for inclusion in the form. An archaeologist may take the lead in form preparation when the resource consists primarily of archaeological feature or deposits but has a partially collapsed buildings or structure that retains a roof and visible architectural features. In this case, the architectural historian would prepare a description of the building and provide it to the archaeologist for inclusion in the form. The Primary form includes a Location Map, depicting the resource on a 1:24,000 scale UGSG Topographic Quadrangle Map. If resources have no archaeological component and are not affected by the proposed project or are assumed eligible for inclusion in the NRHP or CRHR for the purposes of a particular project, then the Primary Form and Location Map may serve as adequate documentation for the resource.

Additional forms may be needed if an archaeological feature or site is located on the agricultural property, or if a formal evaluation is required for project implementation. Feature specific forms are then prepared as attachments to the Primary form. Architectural historians or historians may need to complete a Building-Structure-Object form, while the project archaeologist may prepare an Archaeological Site Record form. For fences, roads, trails, canals and other linear resources, a DPR 523 Linear form may also be appropriate and would be prepared by the architectural historian (if still in use and standing) or the archaeologist (if abandoned and collapsed). Completion of these forms should follow directions provided in the OHP's publication *Instructions for Recording Historical Resources* (OHP 1995).

It is essential that the exchange of information between disciplines continue during the DPR and report preparation phases. Historical information gathered by architectural historians, historians, and archaeologists often are collected for different purposes and sharing information can benefit the thoughtful discussion of research topics and questions. Contexts prepared by the historian and/or architectural historian should be reflected in the archaeological documentation, as should input gathered from descendant or stakeholder communities. The archaeologist can add to the context or provide additional texts and edits, based on their detailed interpretation of the artifacts.

The BSO form is the evaluative documentation used by architectural historians and historians to apply NRHP or CRHR criteria to an agricultural property. If an archaeological feature or site can be evaluated at the inventory level without further investigation, that evaluation under Criterion D/4 should be provided to the architectural historian for inclusion on the BSO form. For further direction on preparation of composite reports (such as the Historic Resources Evaluation Report) that combines architectural history and archaeology refer to the Caltrans SER (2022) The following discussion provides information on applying the NRHP and/or CRHR criteria to agricultural properties.

It should be noted that comparative data is an essential component of assessing eligibility. Uniqueness or rarity play an important role in the evaluative process. In general, architectural or archaeological remains that represent uncommon content or activities have more research potential and importance than resources of well-represented entities. Their scarcity may give these resources significance even when they fail to meet other thresholds of importance. Unique architectural or archaeological sites, though they have special importance, are not easily compared with more common site types, and their interpretation and evaluation require independent research and creativity.

Architectural resources may require a higher level of comparative data to assess the rarity of a particular property type. For example, an architectural historian who is evaluating a barn in region or area that is not familiar, may find a gable-on-hip roofed barn rare. Before committing to this assessment, it is important to drive through the region on back roads and conduct a windshield survey of basic barn types. After the windshield survey, reassess the rarity of the gable-on-hip barn, as it may be uncommon in the state, but typical of construction styles found in this particular region.

EVALUATING RESOURCES

Applying NRHP Criteria A and B and CRHR Criteria 1 and 2

Resources eligible under NRHP and CRHR Criterion A/1 or B/2 are associated with a particular historical theme, event, or person important in local, state, or national history and retain adequate physical characteristics (see integrity discussion, below) to reflect their significance. Generally, the property retains a sense of time and place through its historic setting, spatial design, architecture, and layout or physical remains reflecting the historical theme or person and period of significance.

Archival research is required when assessing the NRHP or CRHR eligibility of a resource under all criteria but is especially important when assessing importance under Criterion A/1 or B/2. In general, initial research identifies the thematic context of a resource and its function. Once a theme is known or presumed, the research is focused according to the theme represented at a site, as records pertaining to the dairy industry, for instance, may be located in different places than records related to the citrus or rice industry.

As discussed above, archival research provides the contextual framework necessary for evaluating sites for their role in history or affiliation with a person. According to the Bulletin 39 *Researching a Historic Property* (O'Donnell 1998), the historic context provides information about the period, place, events, or individuals that created, influenced, or formed the backdrop to the historical resource. In order for a resource to qualify for the NRHP or CRHR under criteria A/1 or B/2, there must be a direct and important connection between the property and the area of significance, established through documentation and physical evidence. In addition, rarity of the resource should be considered. There are many agricultural resources in California that may be associated with specific theme but not all are eligible. The final assessment in the link between documentation, physical evidence, and theme relies on rarity and integrity assessments. A property significant under Criterion A/1, for example, must contain physical evidence (building, structure, objects, sites) that convey a sense of time and place reflecting the important events associated with the resource and their period of significance. An archaeological site can qualify under Criterion A/1 if it contains foundations, pathways, artifact deposits, and other features that reflect the layout, design, functional use areas, or other indicators of the important event.

For example, a 1910s agricultural site associated with Japanese/Japanese American workers and related to the early development of the San Joaquin Delta potato industry may meet Criterion A/1 if it has physical remains that convey its association with the industry (integrity; see discussion below) and its predominately Japanese/Japanese American workers. Potential significant resources include a bathhouse, meditation garden, boarding house, barn, workshop areas, laundry, visible foundations related to work and residential areas (if standing buildings are no longer present), proximity to the fields, refuse deposits or privies, and connections by foot paths or roads. Without the visible structures, foundations, rock work, paths, or trails the property likely would not retain enough physical evidence to convey its association with Japanese immigrant and Japanese American workers.

Under Criterion B/2, for example, a worker camp or tenant farm associated with George Shima (credited with starting the potato industry in the Delta, reclaiming the Delta islands rich in peat soil, and establishing a credible work force in the Delta by hiring his countrymen to work the fields) needs to include the office where Shima planned his operations, or his home or Delta residence, or other physical remains tied to his planning and implementing the potato farming efforts in the Delta in order to qualify for the NRHP or CRHR. The buildings, structures, sites, or objects must represent where the person lived, worked, or operated during the period when the person accomplished the significance activities. As noted above, rarity and integrity play an important role when considering eligibility under Criterion B/2.

Therefore, assessing eligibility of an architectural and/or archaeological resource under criteria A/1 and B/2 must include a discussion of site attributes and property types that retain enough physical integrity to convey the sense of history or association with a person during the period of time that the event or activity occurred and their uniqueness. If the physical remains are not present, or if the building, structure, site, or object has been altered so that it no longer looks like it did during the period that the event took place, then it likely would retain adequate integrity to qualify under Criterion A /1or B/2 conditions for eligibility. A property that contains both standing buildings, structures, and objects and also has archaeological components (refuse deposit, foundations, etc.) but does not meet Criterion A/1 or B/2 for built environment elements would still need to be assessed for Criterion C/3 for its architecture and Criterion D/4 for its data potential.

Applying NRHP Criterion C and CRHR Criterion 3

Criterion C/3 relates to the architectural, engineering, or artistic elements of a property or the work of a master. As discussed below, the NRHP defines integrity as the ability of a property to convey its significance. A property has to have significance under Criterion C/3 and retain integrity in order to qualify. While all properties change over time, an eligible property must retain the physical features or characteristics and historic fabric that are essential to convey a sense of the time and place related to the property’s period of significance. For agricultural resources, the connection between the buildings, structures, sites, and objects and the fields, orchards, gardens, windrows, and other character-defining elements of an agricultural property is also important to identify and consider, as is assessing of elements on the property reflect the work of a master engineer, architect, or artist.

When evaluating buildings and structures it is important to determine the original design, mass, height, and fenestration for the resource in comparison with the current condition and appearance. A residential property that has doubled in size due to continued additions, or has an added story to increase its height, may no longer reflect the original design, workmanship or materials important to its significance, unless the alterations have gained significance in their own right during the defined period of significance.

Conversely, not all changes are detrimental. Some additions and changes may support the eligibility of a property. Assessing condition changes also requires an understanding of the historical context. For example, a family-owned ranch or farm may have started with a small, simply designed house with minimal rooms that was enlarged over time to accommodate a growing family. The alterations, therefore, may reflect the longevity and growth of the ranch during its defined period of significance.

When identifying additions or changes in the original design of an agricultural building or structure, it is important to consider the context that inspired the change. Changes or modifications to a sheep barn that was later converted to a cattle barn or milk house as a family agricultural property evolved with the times, may qualify under Criterion C, even with the modification, because it reflects the growth and efforts of a family farm to remain solvent in changing economies. The Wilder Ranch in Santa Cruz County is an example of a family enterprise that evolved with the times. Now a state park, the ranch originally served as grazing land for sheep and cattle during the 1830s and 1840s Mission era. By the 1850s it was purchased by Moses Meder, who had a dairy and creamery. Meder sold to Deloss D. Wilder in 1885, who enlarged the dairy and creamer. The dairy remained in operation until the late 1930s, although Wilder's son added horses to the farm around 1900. By 1937 dairying was no longer profitable and the family turned to beef cattle. As part of this new venture, additional horses were raised for the cowboy work force, a rodeo was built to showcase cowboy talents and promote sales, and the ranch became known for its beef. In 1974, with cattle no longer profitable the family sold the ranch to State Parks. Today, the ranch is home to goats, horses, and chickens (California State Parks 2022).

When assessing integrity, the rarity of a property in comparison to similar resources in some cases might be taken into consideration. A rare surviving example of a type (such as a roadside fruit stand shaped like an orange) may be elevated as eligible, even if the integrity is somewhat compromised, simply because there are limited remaining numbers of the resource type. According to Bulletin 15 *How to Apply the National Register Criteria for Evaluation* (NPS 1997a), comparative information is particularly important to consider when evaluating the integrity of a property that is a rare surviving example of its type. The property must have the essential physical features that enable it to convey its historic character or information. The rarity and poor condition, however, if other extant examples of the type may justify accepting a greater degree of alteration or fewer features, provided that enough of the property survives for it to be a significant resource. Rarity may also reflect changes in technology. A dairy milk house that retains and uses stanchions and milking equipment reflecting a pre-World War II technology may meet Criterion C/3 because of the technology represented at the dairy, even if the buildings themselves are not representative of a type or have no integrity.

Historical archaeological sites that retain enough physical remains can be eligible under Criterion C/3 if they represent a type, period or method of construction, or the work of a master architect, engineer, or artist. Examples of historical archaeological sites eligible under Criterion C/3 include

- remains of an abandoned irrigation system with a timber crib or other type of dam that exhibits an engineering design that is rare or unusual;
- features or remains reflecting landscape or architectural/engineering modifications associated with diverse communities;

- brick foundation remains that clearly were designed and constructed by a master mason, or a combination of stone or concrete foundations and structural remains that represent the layout, design, and planning of an agricultural property.

Evaluation of sites under Criterion C/3 must consider the age and context of a feature, the integrity of the physical remains, and the ability of those remains to convey qualities that qualify it as eligible. For example, a collapsed rock hearth with no discernible structure, firebox area, or design would not meet Criterion C/3, even if it was built by Chinese/Chinese American workers, because it no longer conveys the mass, shape, and unique construction design particular to traditional Chinese/Chinese American cooking features.

Applying NRHP Criterion D or CRHR Criterion 4

Criterion D/4 examines the potential of a resource to contribute data important in understanding Important aspects of local, regional, or national history. In rare cases a building may be eligible under Criterion D/4 for its data potential. For example, removing siding and sheetrock in a residential building during renovation may expose historic newspapers, wallpaper, or other architectural features used as insulation or reflecting original design elements. At the Estudillo Mansion in San Jacinto, California, a border prints and other original paint techniques were exposed when wallpaper was removed during renovation (M. Colleen Hamilton 2022, pers. comm.). Most commonly, however, archaeological sites or features are evaluated under Criterion D/4.

The crux of every evaluation under Criterion D/4 is an assessment of the property's research or data potential. Archaeological potential is defined by the ability of a deposit, feature, or property to contribute to the questions posed under a variety of research themes. Since eligibility under this criterion requires the potential to yield "information important in… history" (36 CFR 60.4[d]), the evaluator must identify the kinds of important information—the data requirements—that are sought, as well as demonstrate that the property is likely to contain that information. *Guidelines for Evaluating and Registering Archaeological Properties* (Little et al. 2000:29) is a useful guide for determining the research potential of an archaeological site. Identifying data appropriate for addressing important research issues is crucial to assessing NRHP eligibility.

Data Sets and Data Requirements

As discussed in Chapter 4, data requirements are the categories of data that are necessary to address a given research question. Examples of the range of architectural, archaeological and documentary data sets can be found in that chapter and in Appendix B. The discussion here focuses on the practical application of data requirements. To determine the construction dates of a series of buildings or structures either standing or through archaeology, for example, requires the presence of associated temporally-sensitive architectural elements of standing resources, documentation, temporally-sensitive artifacts, stratigraphic integrity, or all of the above. To address questions about subsistence requires associated food remains and/or food processing artifacts. As Chapter 4 notes, more than one research question may be addressed by a single data set. To avoid redundancy, research designs may present some data requirements in a table or matrix. Although the required quality and quantity of specific classes of data depend on context and research issues, general thresholds of importance are offered in Appendices B and D.

As archaeological and architectural data sets are the sources of the important information required for assessing eligibility for listing in the NRHP or CRHR under Criterion D/4, an evaluation must determine whether a resource contains or is likely to contain these data sets. Tightly dated assemblages may have higher interpretive value with respect to research themes, but a feature or deposit need not be tightly dated to contain information. Data requirements often include but are not limited to

1. deposits with sufficient quantity and variety of materials to support statistically valid analyses;
2. the locations of buildings, structures, objects, archaeological features and deposits with identifiable functions, ethnic affiliations, and/or periods of use;
3. hollow, refuse-filled features with distinguishable depositional integrity and identifiable association;
4. horizontal distributions of features indicating spatial organization, or sheet refuse, indicative of specific activities;
5. refuse pits associated with individual or group disposal patterns;
6. landscape features;
7. Buildings, structures, and objects that preserve evidence of how they were constructed;
8. specialized-activity areas; and
9. the layout of features and deposits, indicating different residential and/or industrial activity areas.

It is not unusual for a property to contain both architectural and archaeological features. An interdisciplinary approach should be used when evaluating an agricultural property with buildings and structures combined with archaeological features or sites.

Assessing Integrity

The Bulletin *How to Apply the National Register Criteria for Evaluation* recommends that evaluators first assess if a property meets any of the criteria described above. If it meets any of the four criteria, then its physical integrity is considered, in light of the period of time or single point in time that defines a resource’s significance. An eligible property must meet one of the four criteria AND retain integrity to convey a sense of time and place to the period when it was important. NPS has identified seven aspects of integrity to consider when evaluating the physical characteristics of an agricultural property (Table 15).

Table 15. Aspects of Integrity.

CRITERIA FOR EVALUATION	DESCRIPTION
Location	The place where the property was constructed or where the historic event occurred.
Design	The combination of elements that create the form, place, space, structure, and style of a property.
Setting	The physical environment of a property.
Materials	The physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property.
Workmanship	The physical evidence of the crafts of a particular culture or people during any given period in history.
Feeling	A property's expression of the aesthetic or historic sense of a particular period.
Association	The direct link between an important historic event or person and a property.

Source: Little et al. (2000:36); NPS Bulletin *How to Apply the National Register Criteria for Evaluation* (NPS 1997a).

Location

The relationship between an agricultural property and its location can reveal why a property was created or why an event took place. It can also elucidate the importance of a historic property. Resources by nature, usually have integrity of location (unless a standing structure has been relocated). Secondary archaeological deposits can contribute to the eligibility of a property if the redeposition is important as part of the site's formation process. Agricultural resources are by nature linked to their environment and geographical factors, such as proximity to natural resources, accessibility, climate, and soil conditions are important to consider as part of the integrity of location. Examine if the relationship between the built element and natural features are clearly visible, as well as landscape features (Eastman 1998).

This aspect of integrity also includes spatial integrity (intact stratigraphy) as well as the condition of features. Surface deposits are often subject to ongoing disturbance or admixture of later items that may compromise their association with a particular period or group. Changes to a building expanding over time may also reflect sequential changes. A building, structure, feature or site that has discrete vertical or horizontal depositional units has greater research potential than an unstratified deposit. An archaeological feature with a complex stratigraphic sequence may provide an independent chronological check on artifact analysis as well as the opportunity to reconstruct the sequence of events that created the deposit.

Agricultural resources, both architecturally and archaeologically, frequently have horizontal stratigraphy; because vertical layering is rarely present their stratigraphy is more aptly about the preservation of the resources structure (design) and layout (location). This horizontal stratigraphy may be reflected in changes in functional use areas through time inspired by adaptation to new crops or livestock ventures. For example, ground level troughs once used by sheep farmers to combat hoof diseases may have been abandoned once the focus switched to cattle or dairy ventures. Where vertical stratigraphy does exist, it can reflect significant changes in site usage over time, both in site function and in demography.

Design

Integrity of design involves retention of the elements that convey the form, plan, layout, style, and structure of a historic property. Considerations include the apparent organization of space, scale, technology, and materials. Changes in agricultural activities can also be reflected through redesign of existing buildings, additions of subsequent design alterations, or reuse of functional activity areas (Eastman 1998).

Because agricultural property integrity tends to be horizontal and spatial rather than vertical and stratigraphic, integrity of design is an important part of determining the integrity of an agricultural property. Integrity of design requires that the resource must retain significant portions of its layout and internal structure. Consider the clear separation of functional areas, use of tree rows to shelter or separate spaces, links between work places by paths or trails, relationship between buildings, structures, objects, and sites and landscaping, placement of pastures, orchards, fields, or water systems. Archaeological sites may have integrity of design in the foundations, features, landscaping remnants, water systems, and artifacts that remain allow for distinct clarification of functional use areas, display adaptations and expansions or changes through time, and convey a sense of time and place that reflect the period of significance and the importance of the property.

Setting

Setting illustrates the character of the places where the resource played an historic role (Stein 1990). A property that retains integrity of setting conveys the historic sense of the relation between the property and its surroundings; between buildings; and between landscape features. In assessing setting, determine if development following the period of significance for the property has encroached on the rural character of its surrounds (Eastman 1998).

Changes to the setting that can affect integrity may result in urbanization and suburbanization, introduction of new industry, impacts from infrastructure (addition of railroads, powerlines, canals, transportation that recontour the local topography or result in massive environmental changes). Changes to the surrounding viewshed that diminish the feel of an agricultural property are important to consider. New highways or roads that resulted in a permanent separation of fields or orchards from the domestic residence and outbuildings should be noted. For example, a fruit farm that retains the core building cluster, but has lost the surrounding fruit orchards through urban development likely no longer retains integrity of setting as a fruit farm. Even on archaeological sites, evaluation of the setting can add to the understanding of spatial interaction between the built environment and archaeological deposits.

Materials

Integrity of materials involves retention of the physical elements that were created or deposited during a particular period to create the historic property. When integrity of materials is retained, details of preference, choice, and availability of goods and technologies are typically conveyed. The research potential of an agricultural property relies on integrity of materials. An architectural resource with visible machine-cut nails, wavy glass, vintage vegetation, and other indicators of 19th century construction or landscaping is more reflective of that time period than a house or barn that has been reconstructed or modified. The potential of an artifact cache from a deposit increases with the number and variety of items represented. Like rural residents whose access to town is often limited by distance, those living at agricultural camps or on isolated ranches and farms tend to reuse and adapt objects to suit their needs. Buildings, structures, objects, and artifacts that reflect this adaptation are important components to consider in an evaluation and the environmental constraints on occupants.

Salvage operations or cleanup and demolition after the property served its purpose can result in a loss of integrity of materials, especially if heavy equipment was involved. Older barn and outbuilding structures were often salvaged and reused for other buildings, as were windows, doors or door knobs, or other architectural elements. Ranch buildings or worker cabins are often portable and move from location to location, resulting in a loss of materials as well. The agricultural resource may also lack the full range of materials used, either because of the portable nature of buildings and equipment, refuse disposal policies in which garbage was removed far enough from the residential areas that association is uncertain, or because occupants never discarded enough for the material to have research potential.

Like rural residents whose access to town is often limited by distance, those living at agricultural camps or on isolated ranches and farms tend to reuse and adapt objects to suit their needs. Buildings, structures, objects, and artifacts that reflect this adaptation are important components to consider in an evaluation. Traditionally, the research potential of an artifact cache from a deposit increases with the number and variety of items represented. While greater artifact diversity can likely answer more questions, impoverished collections also tell us things it may be important to know: the people were poor and thus had impoverished collections, they used only certain types of goods, etc. This diversity is often reflected in the integrity aspect of materials.

Workmanship

Integrity of workmanship is “the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory” (NPS Bulletin 15:45). It is the labor and skill the artisans used in constructing or altering a building, structure, object, or site. In historical agricultural properties, workmanship may be demonstrated in outstanding examples of a technology or craft, innovative solutions to structural or technological problems, or identifiable socioeconomic or cultural preferences or influences (Eastman 1998).

In agricultural contexts, integrity of workmanship is often expressed in vernacular methods of construction and plain finishes or in highly sophisticated configurations and ornamental detailing. It can be based on common traditions or innovative period techniques. Workmanship may be evident in how fences were constructed, orchards were planted, fields were irrigated, gardens were designed, how buildings were constructed, or in the repurposing of materials and artifacts for a different use (Eastman 1998).

Feeling

NPS defines feeling as “a property’s expression of the aesthetic or historic sense of a particular period of time. It results from the presence of physical features that, taken together, convey the property's historic character. For example, a rural historic district retaining original design, materials, workmanship, and setting will relate the feeling of agricultural life in the 19th century" (NPS Bulletin 15:45). Agricultural properties associated with an event important in the development a particular crop, labor movement, or technology between 1900 and 1920, for example, may retain integrity of feeling if the material remains from that period of significance are dominate at the property, conveying a sense of time and place.

Association

Integrity of association requires that a resource must be the place where specific historical activities occurred and that it retains physical features that convey the historic character to an observer. Identifying a historical association for each resource, whether a worker camp or farm headquarters or cowboy camp, is important. Integrity of association for a remote worker camp, for example, entails that the resource needs to be relatively "pristine," with little later occupation, unless the occupation is sequential or directly related to the original function and use. This is true of farm or migrant work camps that were occupied seasonally by ethnically and racially diverse permanent or temporary workers, with or without families, sometimes for as many as 50 years, or the main ranch or farm headquarters, where generations of one family are present.

The research potential of an architectural resource or an archaeological deposit that has reliable sociocultural, historical, and chronological associations is greater than one whose associations are less certain. However, some settings, such as studies of worker residential housing, it is not necessary to know the name of every person who lived in the housing in order to have an association. While association at the farm or ranch headquarters may be clear-cut and tied to ownership, the association at a cowboy camp or workers residential camp is rarely as clear, as it is at a permanent or semi-permanent residential site. At a residential agricultural area, association may refer to a socioeconomic, ethnic, or racial group of individuals as a whole. The architecture or archaeology itself may in fact be key to identifying associations that have poor documentation.

Identifying Common Changes to Agricultural Properties that Alter Integrity

Eastman (1998:92) provided a list of changes that commonly reduce the historical integrity of an agricultural property if they occurred after the period of significance. While not inclusive of all changes or regions throughout the state, the list provides a general guide on what to consider when assessing integrity. These include

- deterioration, relocation, or abandonment of historic buildings and structures and removal of archaeological ruins and foundations;
- replacement of structures such as barns, bridges, or dams;
- loss of vegetation related to significant land uses;
- the introduction of non-historic land uses (commercial or residential development and subdivisions, sanitary landfills, wastewater treatment plants, industrial development, highways, and others);

- substantial post-historic alteration of buildings, structures, or sites;
- construction of new buildings and structures non-compatible with the historic construction;
- loss of boundary demarcations and small-scale landscaping elements (fences, walls, tree rows, ponds);
- resurfacing, widening, abandonment, or realignment of historic roadways; and
- removal of historic landfills, refuse disposal areas, or filling in of privies and historic burn pits that may have contained intact archaeological deposits.

Preparing A Statement of Significance

Once significance has been determined and integrity assessed, a statement of significance should be prepared for inclusion in the DPR 523 BSO form and/or in the report documentation for the agricultural property. The statement of significance explains how a property meets or does not meet specific criteria. Each criterion is discussed separately with narrative that draws from the historical context. Reasons for eligibility or non-eligibility should be clearly stated. For Criterion A or B, for example, a statement may summarize the chronological history of the property, focusing on details of events or persons that support its importance, without reiterating the historical context already provided. Relevant themes (see Chapter 4) should be discussed and consideration as to ethnic, racial, or cultural affiliation should be included in the discussion.

Once significance has been established, integrity should be considered. It is important to carefully consider each level of integrity with equal weight and not just prepare a blanket statement that a property remains integrity. Thoughtful discussions on individual levels of integrity within identified periods of significance by Criteria (if more than one) should be provided.

Finally, the Statement of Significance should consider the level of significance, following guidance provided in *How to Apply the National Register Criteria for Evaluation* (NPS 1997a). Generally, a property may be eligible at a local level, state level, or national level. Most agricultural properties are assessed at a local level (important in local or regional history). A property may be important at a state level if the technology or event affected the agricultural industry throughout the state, such as Delano where the United Farm Workers of America union was formed. In general, sites of national importance are determined by NPS or federal entities. If a property appears nationally important, it may require discussing the level of significance with the OHP or NPS staff prior to making that assessment.

CONCLUSION

Agricultural properties can range widely from those that are clearly defined and continue to be in use, to long abandoned homesteads, seasonal agricultural or cowboy camps, or ephemeral features that are not easily identified or defined. With little presence in the historical record and material culture deposits that may seem nondescript, some agricultural properties can appear to be undifferentiated landscapes of features and artifacts. It should be kept in mind that those who built and owned a farm and those who occupied and worked it are not always the same people. Domestic buildings, barns, and work areas were often designed for cost efficiency and may not be a perfect reflection the ethnic or racial identities or religious or socialistic beliefs of the inhabitants. Some agricultural properties contain strong indications of the identities and/or beliefs of inhabitants and clearly defined living and work areas with definition of space. Ultimately, what constitutes an agricultural property is subjective and somewhat arbitrary: is a 19th homestead with a house and barn, a few cattle and a pasture, an orchard or garden for personal family use considered a farm? If not, what if that same homestead raised a few chickens and sold eggs and fruit from their orchard to neighbors or local residents in a nearby town? Agricultural properties can be as simple as a small family homestead or as complicated as a huge industrial dairy or cattle ranch with hundreds of cows. Defining a property as agricultural relies on understanding what activities occurred at a resource, who used the space, and developing a contextual history.

Investigations of agricultural properties tend to focus on a particular crop, stock, or ethnic or racial group. For example, researchers evaluating the built environment or archaeological remains at a berry farm may look only to nearby berry farms for comparative information. This narrow focus can result in the loss of data about the broad trends and experiences of regional agriculture, including the migration of workers from one crop to another; interaction with farmers of many different products or livestock with a local grange; or changes in crop selection based on weather, economic trends, and consumer preferences. To maintain coherence in any investigation of an agricultural property, the focus of research must be broadened to allow comparisons among selected crop or livestock industries and eras.

The itinerant, seasonal, worker camp should not be forgotten. In California, they are a part of the system and allows it to function at planting and harvesting—getting the product to market. The sites are neither designed nor closely regulated, but they can tell a lot about a little-known agriculture population. Agricultural worker camps and the workers who occupied them were part of an underreported national and transnational economy, and significant gaps exist in the understanding of this type of agricultural property. In addition, little research has been done to identify or expand upon the variations in worker and worker camp conditions in light of individual owners, families, and corporation approaches and attitudes.

In the past, studies of agricultural properties have often been segregated by discipline. Architectural historians and historians recorded the built environment and researched properties and their occupants with little thought to the presence or importance of buried archaeological deposits. Archaeologists conducted their own research without seeking input from knowledgeable architectural historians or historians for assistance in interpretation of features or in exploring the importance of a property in a more regional context linking the buried deposits with above ground expressions of the same behavior. This study recommends multidisciplinary investigations of farms and ranches, regardless of size, era, or function, including varying management styles; the presence, nature, and diversity of the permanent and migrant work force through time and space; the impacts of progressive legislation; and the effects of unionization and progressive movements. It also recommends the exploration of innovation in crops, equipment, technology, and approaches to harvesting. The study of agricultural properties can make important contributions to our understanding of the everyday lives of the working people—owners, tenants, workers (permanent and migrant/transient), corporations - who contributed to California's international reputation as a veritable "bread basket."

To balance the benefits of standardization with those of new information and methods, this document needs to be thoroughly reviewed and revised at regular intervals. At those intervals, the research orientations, methods, and entire epistemological basis should be reexamined. The interaction between historians, architectural historians, and archaeologists should also be revisited to promote and encourage interdisciplinary work. Individual researchers must modify and add to this work to adapt these general statements to specific contexts. The historic context in Chapter 2 may form the basis of a general understanding of the evolution of agriculture in various regions of California, but such an understanding does not make site-specific research unnecessary. Oftentimes, archaeologists and historians/architectural historians pursue the same historical information necessary for evaluating a resource. Sharing data, methods of research, and results is important in creating a wholistic evaluation of an agricultural property that includes built environment, abandoned or buried features or deposits, landscaping elements, and related property types. Similarly, the research issues and questions asked by researchers at any given resource must be modified to respond to the history and characteristics of particular resources. This document is a starting point for the architectural historian, landscape architect, historian and/or archaeologist who must prepare a research design or develop methodologies to examine an historic-era agricultural property. This is not a one size fits all product; simply cutting and pasting sections will not constitute an adequate research design.

REFERENCES CITED

Adams, Frank

1946 The Historical Background of California Agriculture. In *California Agriculture*, Claude B. Hutchison, editor, pp. 1-50. University of California Press, Berkeley, CA.

Adams, William H.

1990 Landscape Archaeology, Landscape History, and the American Farmstead. In Historical Archaeology of Southern Plantations and Farms, edited by Charles E. Orser, Jr. *Historical Archaeology* 24(4):92-101.

2003 Dating Historical Sites: The Importance of Understanding Time Lag in the Acquisition, Curation, Use, and Disposal of Artifacts. *Historical Archaeology* 37(2):38-64.

Anna S. Agbe-Davies

2022 Race. In *The Routledge Handbook of Global Historical Archaeology*, Charles E. Orser, Andrés Zarankin, Pedro Paulo A. Funari, Susan Lawrence, and James Symonds, editors, pp. 80–94. Routledge, Abingdon, Oxon, UK.

Agbe-Davies, Anna, Kimball Banks, Jodi A. Barnes, Thomas Cuthbertson, Sarah Herr, J.W. Joseph, Edward Morin, Burr Neely, Holly Norton, Tsim Schneider, and William White

2022 Recommendations for Raising the Visibility of Black Heritage Resources and Engaging with Black Stakeholders: Results from a Survey of State and Territorial Historic Preservation Offices and State Archaeologists <https://core.tdar.org/document/470405/recommendations-for-raising-the-visibility-of-black-heritage-resources-and-engaging-with-black-stakeholders-results-from-a-survey-of-state-and-territorial-historic-preservation-offices-and-state-archaeologists>. Accessed 10 December 2022.

Aginfo.net

2020 California Tree Nut Report, 2020. Ag Information Network of the West <https://www.aginfo.net/report/455441/California-Tree-Nut-Report>. Accessed 10 November 2020.

Alston, Lee, and Randy Rucker

1986 *The Dynamics of Farm Failures and the Effectiveness of Government Policies to Alleviate Agricultural Distress: 1925-1939*. Working Paper Series No. 25. Department of Economics, Williams College, Agricultural History Center, University of California, Davis, CA.

American Can Company

1937 Nutritive Aspects of Canned Foods: A Bibliography of Scientific Reports and Helpful Tables of Food Data. American Can Company, New York, NY.

1943 *The Canned Food Reference Manual*. Second edition. A publication of the American Can Company Research Department. American Can Company, New York, NY.

American Pecan Council
2020 California has 6,000-Plus Acres of Pecans. Ag Information Network of the West <https://www.aginfo.net/report/45441/California-Tree-Nut-Report/California-Has-6-000-Plus-Acres-of-Pecans>. Accessed 10 November 2020.

Anonymous
n.d. Finding Aid for the Department of Agriculture Records 1915-1975. California State Archives, Sacramento, CA.

Apple Hill Growers
2021 The Apple Hill Growers Welcome You. Apple Hill Gowers Association, Camino, California <https://applehill.com/>. Accessed 15 December 2021.

Applied EarthWorks, Inc., and Earle and Associates
2014 DRAFT: Historic Context and Overview: Settlement and Development of the Hinkley Valley, San Bernardino County, California. Submitted to Pacific Gas and Electric Company, Fresno, CA. Prepared by Applied EarthWorks, Inc., Hemet, CA, and Earle & Associates, Lancaster, CA.

Applied EarthWorks, Inc., and ICF International
2018 Union Station Patsaouras Plazas El Monte Busway Station Project, Archaeological Identification, Evaluation, and Treatment Plan, Los Angeles, California. Prepared by Applied EarthWorks, Inc., Hemet, California and ICF International, Los Angeles, CA.

Arax, Mark
2019 *The Dreamt Land: Chasing Water and Dust Across California*. Alfred A. Knopf, New York.

Arax, Mark, and Rick Wartzman.
2003 *The King of California: J.G. Boswell and the Making of a Secret American Empire.* Public Affairs, New York.

Artesian California
1900 Rose Lawn Poultry Farm Brochure. Artesian California, n.p.

Auer, Michael J.
1989 *The Preservation of Historic Barns*. National Park Service Preservation Brief No. 20. U.S. Department of the Interior, Washington, DC.

Ayers, James, and Gregory Seymour
1993 Life on a 1930s Homestead: Historical Archaeological Investigations of the Brown Homestead on the Middle Agua Fria River, Yavapai Count, Arizona. SWCA Anthropological Research Paper Number 2, Tucson, AZ.

Bailey, James, and Harold Wallman
1971 A Survey of Household Waste Treatment Systems. *Water Pollution and Control Federation* 43(12):2349-2360.

Baker, Cindy
2004 National Register of Historic Places (NRHP) Evaluation of Three Sheep Camps, Sierra and Nevada Counties, Tahoe National Forest. On file, United States Department of Agriculture, Forest Service, Tahoe National Forest, Truckee, CA.

Baker, T. Lindsay
1984 *A Field Guide to American Windmills*. University of Oklahoma Press, Norman, OK.

Bacich, Damian
2020 Indian Vaqueros in Alta California. The California Frontier Project <https://www.californiafrontier.net/indian-vaqueros/#Indians_The_First_Mission_Vaqueros>. Accessed 11 April 2022.

Ballou, Mary
1852 Letter to her son, Seldon Ballou, dated October 30, 1852 from Negro Bar, California. Letter on file, Folsom Historical Society Museum, Folsom, CA.

Barba, Frank
1977 Filipino Labor Contractor Watsonville, California, 1927-1977. Interview, University of California, Santa Cruz, Regional History Project, McHenry Library, Santa Cruz, CA <https://library.ucsc.edu/reg-hist/barba>. Accessed 16 February 2023.

Barron, Hal S.
1995 Citriculture and Southern California: New Historical Perspectives. *California History* 74(1):2-5.

Batter, Thomas
2013 Coexisting with California's Wild Turkeys. CDFW Wildlife Investigations Lab Blog <https://calwil.wordpress.com/tag/wild-turkey-in-california/>. Accessed 20 December 2021.

Battle-Baptiste, Whitney
2011 *Black Feminist Archaeology*. Left Coast Press, Walnut Creek, CA.

Baugher, Sherene, and Terry H. Klein (editors)
2001 Introduction to the Archaeology of Nineteenth-Century Farmsteads in Northeastern Canada and the United States. *Northeast Historical Archaeology* 31:1-8.

Baxter, R. Scott
2002 Industrial and Domestic Landscapes of a California Oil Field. In Communities Defined by Work: Live in Western Work Camps, Thad M. Van Bueren, editor. Thematic issue, *Historical Archaeology* 36(3):18-27.

Baxter, Scott, Thad M. Van Bueren, Lisa Shapiro, and Elizabeth Thompson
2019 Data Recovery at CA-YUB-1848/H and CA-YUB-1852/H on State Route 20 Near Smartsville in Yuba County, CA, 03-YUB-20, PM 18.1 to 20.23, EA 03-3F5100. Prepared for California Department of Transportation, Marysville, CA.

Beaudry, Mary C.
2001 Trying to Think Progressively About 19th-Century Farms. *Northeast Historical Archaeology* 31:129-142.

Beck, Warren A., and Ynez D. Haase
1974 *Historical Atlas of California*. University of Oklahoma Press, Norman, OK.

Bedeau, Michael (editor)
1994 *Homesteading and Agricultural Development Context*. South Dakota State Historical Preservation Center, Vermillion, South Dakota.

Beedle, Peggy, with contributions by David Earle
2005 Historic Structures Evaluation of the Hemet-San Jacinto Grower’s Association Cannery. Prepared for the City of Hemet, California. Prepared by Applied EarthWorks, Inc., Hemet, California.

Belden, L. Burr
1950 Fruit Industries Serve Vineyards Covering Around 4,000 Acres in Cucamonga District. San Bernardino Sun December 3, 1950. Page 15 <https://www.newspapers.com/image/legacy/49516779/?terms=Guasti&match=1>. Accessed 13 September 2022.

Bender, Thomas
1978 *Community and Social Change in America*. John Hopkins University Press, Baltimore, MD.

Bertolini, Jim
2017 Agriculture on the Carson River in Nevada’s Douglas and Ormsby Counties, National Register of Historic Places Multiple Property Documentation Form. Nevada State Historic Preservation Office, Carson City, Nevada.

Barry, Raymond P. (editor)
1938 Labor in California Sugar Beet Crop. Federal Writers Project, Oakland California <https://oac.cdlib.org/view?docId=hb88700929;NAAN=13030&doc.view=frames&chunk.id=div00115&toc.id=div00111&brand=calisphere>. Accessed 16 February 2023.

Better Bee
2022 Glossary of Beekeeping. Betterbee <https://www.betterbee.com/glossary/>. Accessed 3 November 2022.

Binford, Lewis
1964 A Consideration of Archaeological Research Design. *American Antiquity* 29(4):425-441.

Blanck, Dag
2009 Swedish Immigration to North America. Swenson Swedish Immigration Research Center, Augustana College, Rock Island, Illinois <https://www.augustana.edu/swenson/academic/history>. Accessed June 30, 2022.

Blue Diamond
2020 The Blue Diamond Story. Blue Diamond, Sacramento, CA <https://www.bluediamond.com/history>. Accessed 16 February 2023.

Bowen, M.
1988 The Desert Homestead as a Non-Farm Residence. *Nevada Historical Society Quarterly* 31(3):198-211.

Bracero History Archive
2021 About. Bracero History Archive <https://braceroarchive.org/about>. Accessed 11 April 2022.

Bradsher, Greg
2012 How the West Was Settled: The 150-Year-Old Homestead Act Lured Americans Looking for a New Life and New Opportunities. *OzarksWatch* 6(2):35.

Breschini, Gary S., Trudy Haversat, and R. Paul Hampson
1983 A Cultural Resources Overview of the Coast and Coast-Valley Study Areas. Coyote Press, Salinas, CA.

Brewer, Chris
1999 *Southern San Joaquin Valley Scenes*. Arcadia Publications, Charleston, SC.

Brewer, William
1966 *Up and Down California in 1860-1864: the Journal of William H. Brewer*. Francis P. Farquhar, editor. University of California Press, Berkeley, CA.

Brooks, Allison, and S. Jacon
1994 *Homesteading and Agricultural Development Context*. South Dakota State Historical Preservation Center, Vermillion, SD.

Brown, Cheryl L., Grace Dote, Christopher M. Edmonds, Jeffrey M. Perloff, Howard R. Rosenberg, and Nanyan Xiong
1990 Farm Labor Research Bibliography. California Agricultural Studies Report No. 91-94. Department of Agricultural and Resource Economics, UC Berkeley, for the Labor Market Information Division (LMID) of Employment Development Department, Sacramento, CA.

Brown, J. B.
1972 The United Farm Workers Grape Strike and Boycott, 1965-70: An Evaluation of the Culture of Poverty Theory. Latin American Studies Program. Cornell University, Ithaca, NY.

Brown, Richard D.
1976 Modernization: A Victorian Climax. In *Victorian America*, edited by Daniel Howe, pp. 29-46. University of Pennsylvania Press, Philadelphia, PA.

Bunje, Emil T. H.
1957 *The Story of Japanese Farming in California*. U. S. Works Administration Project Number 165-05-6336. University of California.

Buckles, W. G., and N. B. Rossillon

1986 Summary—High Mountain Valley Ranching and Farming Area. In *Old Dallas Historical Archaeological Program, Dallas Creek Project*, by W. G. Buckles et al., pp. 343-370. U.S. Bureau of Reclamation, Salt Lake City, UT.

Butterfield, Harry M.

1938 *History of Deciduous Fruits in California*. California Fruit Exchange, Sacramento, CA.

Byron Times

1912 Third Special Booster Edition. On file, San Joaquin County Historical Society and Museum, Mickey Grove Park, Lodi, California.

Cabak, Melanie A., and Mary M. Inkrot

1997 *Old Farm, New Farm: An Archaeology of Rural Modernization in the Aiken Plateau, 1875-1950*. Savannah River Archaeological Research Papers 9. Occasional Papers of the Savannah River Archaeological Research Program, South Carolina Institute of Archaeology and Anthropology, University of South Carolina, Columbia, SC.

Caire, Helene

1937 On the Trail of the Slavonic Pioneers. In *Slavs in California*, edited by Stephen N. Sestanovich. Slavonic Alliance of California, Oakland, CA.

California Agriculture

1950 November. University of California, Division of Agriculture and Natural Resources <www.calag.ucanr.edu/Archive/?article=ca.v050n06p22>. Accessed 15 November 2020.

2020 Summary of Agricultural History. University of California, Division of Agriculture and Natural Resources <www.calag.ucanr.edu/Archive/?article=ca.v050n06p22>. Accessed 15 November 2020.

California Almond Growers Exchange (CAGE)

1955 *Almonds from California*. California Almond Growers Exchange, Sacramento, CA.

California Commission of Immigration and Housing (CCIH)

1914 Advisory Pamphlet on Camp Sanitation and Housing. San Francisco, CA.

1919 Advisory Pamphlet on Camp Sanitation and Housing. San Francisco, CA.

California Cotton Ginners and Growers Association

2020 California Cotton Facts. California Cotton Ginners and Growers Association <https://ccgga.org/cotton-information/ca-cotton-facts/>. Accessed 10 November 2020.

California Department of Food and Agriculture (CDFA)

2017 California Agricultural Statistics Review, 2016-2017. California Department of Food and Agriculture, Sacramento <https://www.cdfa.ca.gov/Statistics/PDFs/2016-17AgReport.pdf>. Accessed 15 December 2021.

California Department of Food and Agriculture (CDFA) *continued*

2021 California Agricultural Production Statistics. California Department of Food and Agriculture <https://www.cdfa.ca.gov/Statistics/>. Accessed 15 December 2021.

California Department of Transportation (Caltrans)

1999 *General Guidelines for Identifying and Evaluating Historic Landscapes*. Cultural Studies Office, California Department of Transportation, Sacramento.

2000 *Water Conveyance Systems in California, Historic Context Development and Evaluation Procedures*. Cultural Studies Office, California Department of Transportation, Sacramento.

2007 *Historical Context and Archaeological Research Design for Agricultural Properties in California*. Cultural Studies Office, California Department of Transportation, Sacramento.

2008 *A Historical Context and Archaeological Research Design for Mining Properties in California*. Cultural Studies Office, California Department of Transportation, Sacramento.

2010 *A Historical Context and Archaeological Research Design for Townsite Properties in California*. Cultural Studies Office, California Department of Transportation, Sacramento.

2011 *Tract Housing in California, 1945-1973: A Context for National Register Evaluation.* Cultural Studies Office, California Department of Transportation, Sacramento.

2013 *A Historical Context and Archaeological Research Design for Work Camp Properties in California*. Cultural Studies Office, California Department of Transportation, Sacramento.

2014 First Amended Programmatic Agreement among the Federal Highway Administration, the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California Department of Transportation Regarding Compliance with the Section 106 of the National Historic Preservation Act. Cultural Studies Office, California Department of Transportation, Sacramento.

2016 *A Historical Context and Methodology for Evaluating Trails, Roads, and Highways in California*. Cultural Studies Office, California Department of Transportation, Sacramento.

2022 *Standard Environmental Reference* (SER). Cultural Studies Office, California Department of Transportation, Sacramento.

California Governor's Office of Planning and Research

2019 California Almond Acreage Report. California Governor's Office of Planning and Research <https://www.nass.usda.gov/Statistics_by_State/California/Publications/Specialty_and_Other_Releases/Almond/Acreage/202004almac.pdf>. Accessed 10 February 2023.

California Farm Bureau Federation

2005 Farm Bureau History. California Farm Bureau Federation <https://www.cfbf.com/about-the-farm-bureau/about-farm-bureau>. Accessed 16 February 2023.

California Farmer

1854 *California Farmer* 1(1). San Francisco, CA. On file, California History Room, California State Library, Sacramento, CA.

Cal Flowers

2020 Flowers – The California Way: A History of the California Floral Industry. California Association of Flower Growers and Shippers <http://www.cafgs.org/history-of-California-floral-industry >. Accessed 12 February 2023.

California Foundation for Agriculture in the Classroom (CFAC)

2005 Commodity Fact Sheet: Cut Flowers. Information compiled by the California Cut Flower Commission. CFAITC, Sacramento, CA.

California Macadamia Society

2001 The Macadamia. California Macadamia Society, Fallbrook, CA <http://users.aol.com/CalMacSociety>. Accessed 5 December 2005 (site now discontinued).

California Milk Advisory Board

2002 Monterey Jack: California's Native Cheese, Facts, Folklore, & History. MooMilk.com <http://www.moomilk.com/archive/highlights-08.htm#MONTEREY%20JACK>. Accessed 10 April 2005 (site now discontinued).

California Pistachio Commission

2005 California Pistachio Commission <https://americanpistachios.org/growing-and-harvesting/history>. Accessed 16 February 2023.

California State Agricultural Society (CSAS)

1872 Transactions of the California State Agricultural Society During the Years 1870-1871. State Printer, Sacramento, CA.

1873 Transactions of the California State Agricultural Society During the Year 1872. State Printer, Sacramento, CA.

1881 Transactions of the California State Agricultural Society During the Year 1880. State Printer, Sacramento, CA.

California State Agricultural Society (CSAS) *continued*

1888 Transactions of the California State Agricultural Society During the Year 1887. State Printer, Sacramento, CA.

1890 Transactions of the California State Agricultural Society During the Year 1889. State Printer, Sacramento, CA.

1893 Transactions of the California State Agricultural Society During the Year 1892. State Printer, Sacramento, CA.

1895 Transactions of the California State Agricultural Society During the Year 1894. State Printer, Sacramento, CA.

1904 Transactions of the California State Agricultural Society During the Year 1903. State Printer, Sacramento, CA.

1910 Transactions of the California State Agricultural Society During the Year 1909. State Printer, Sacramento, CA.

California State Board of Control

1920 California and Oriental: Japanese, Chinese, and Hindus. Sacramento. On file, California State Library, Government Publications Room, Sacramento, CA.

California State Office of Historic Preservation (OHP)

1995 *Instructions for Recording Historical Resources*. Office of Historic Preservation, Sacramento, CA.

2001 How to Nominate a Resource to the California Register of Historical Resources. Technical Assistance Series #7. Department of Parks and Recreation, Office of Historic Preservation <https://ohp.parks.ca.gov/pages/1056/files/07_TAB%207%20How%20To%20Nominate%20A%20Property%20to%20California%20Register.pdf>. Accessed 19 December 2021.

California State Parks

1982 A Survey of the Development of California Agricultural Machinery 1860-1960. State of California, The Resources Agency, department of Parks and Recreation, Sacramento, CA.

1988 *Five Views: An Ethnic Sites Survey for California*. State of California, the Resources Agency, Department of Parks and Recreation, Office of Historic Preservation, Sacramento, CA.

2005 Guide to the California Dairy Industry History Collection. PDF of Finding Aid on the Online Archive of California <https://oac.cdlib.org/findaid/ark:/13030/kt0d5nc666/>. Accessed 15 November 2021.

California State Parks *continued*

2012 ¡¡Vaqueros!! California State Parks <https://www.parks.ca.gov/pages/485/files/vaquero%20revised%203-13-12.pdf>. Accessed April 11, 2022.

California Strawberry Commission

2014 Growing the American Dream: California Strawberry Farming's Rich History of Immigrants and Opportunity. California Strawberry Commission Report July 4, 2014 <https://www.calstrawberry.com/Portals/2/Reports/Community%20Reports/Growing%20the%20American%20Dream.pdf?ver=2017-06-05-164558-787>. Accessed 10 October 2020.

CalRacing

2011 California Racing History. CalRacing <http://www.calracing.com/wp-content/uploads/2011/12/CMC_California-Racing-History.pdf>. Accessed 10 February 2023.

Camp, Stacey

2011 The Utility of Comparative Research in Historical Archaeology. In *Historical Archaeology and the Importance of Material things*, Vol 2, Julie M. Schablitsky and Mark P. Leone, editors, pp. 13-28. Society for Historical Archaeology, Special Publication 9. Rockville, MD.

Can Manufacturer Institute

2021 History of the Can. Can Manufacturers Institute <https://www.cancentral.com/can-stats/history-of-the-can>. Accessed 17 June 2022.

Cantwell, Anne-Marie, and Diana diZerega Wall

2001 *Unearthing Gotham: The Archaeology of New York City*. Yale University Press, New Haven, CT.

Carosso, Vincent P.

1951 *The California Wine Industry: A Study of the Formative Years 1830-1895*. University of California Press, Berkeley, CA.

Carson, Gerald

1999 *The Old Country Store*. Oxford University Press, New York, NY.

Carter, Nancy Carol

2008 San Diego Olives: Origins of a California Industry. *San Diego Historical Society Quarterly* 54(3):137-161.

Carter, Susan B., and Elizabeth Savoca

1991 Gender Differences and Earning in Nineteenth Century America: The Role of Expected Job and Career Attachment. *Explorations in Economic History* 28:323-343.

Cavanaugh, Patrick

2020 California has 6,000-Plus Acres of Pecans. Ag Information Network of the West <https://www.aginfo.net/report/45441/California-Tree-Nut-Report/California-Has-6-000-Plus-Acres-of-Pecans>. Accessed 10 February 2023.

Cenovich, Marilyn

1995 The Story of Cerritos: A History in Progress. City of Cerritos. Cerritos, CA.

Chambers, Clarke

1952 *California Farm Organizations: A Historical Study of the Grange, the Farm Bureau, and the Associated Farms, 1929-1941*. University of California Press, Berkeley, CA.

Chan, Sucheng

1986 *This Bitter Sweet Soil: The Chinese in California Agriculture, 1860-1910*. University of California Press, Berkeley, CA.

Chapman, Susan

1995 Guide to Historical Research at the National Agricultural Library: The General Collection. Washington, DC.

Chesnos, Robert

2019 History of sugar beets in the USA and Cottle Ranch. *Martial Cottle Park Newsletter*.

Cheverko, Colleen M., Julia R. Prince-Buitenhuys, and Mark Hubbe, editors

2020 *Theoretical Approaches in Bioarchaeology*. Routledge/Taylor & Francis Group, London, UK.

Chu, George

1970 Chinatown in the Delta: The Chinese in Sacramento-San Joaquin Delta 1870-1960. *California Historical Society Quarterly* 49:22-34.

Civilian Conservation Corps Legacy

2018 A Brief History of the Civilian Conservation Corps. Civilian Conservation Corps Legacy Edinburg, VA <https://ccclegacy.org/CCC_History_Center.html>. Accessed 16 February 2023.

Cloyd, L. H. Larry

2001 The Evolution of Waterfowl Refuges and the Early Years of the Gray Lodge Wildlife Area. *Outdoor California Magazine*.

Coalition for Diversity in California Archaeology

2020 Coalition for Diversity in California Archaeology (CDCA). Society for California Archaeology <https://scahome.org/about-us/committees/coalition-for-diversity-in-california-archaeology-cdca/>. Accessed 10 December 2022.

Cohen, Stan

1980 *The Tree Army: A Pictorial History of the Civilian Conservation Corps, 1933 1942.* Pictorial Histories Publishing Company, Missoula, MT.

Colton Daily Courier
1922 Story of the Italian Vineyard Company. Colton Daily Courier Industrial and Horticultural Edition. October 30, 1922, page 6. <https://www.newspapers.com/image/legacy/626147340/?terms=Guasti&match=1>. Accessed 13 September 2022.

Colton Courier
1943 Guasti Families Sell Majority of Stock in Famous Vineyard and Winery. The Colton Courier, September 21, 1943, page 4. <https://www.newspapers.com/image/legacy/626394658/?terms=Guasti&match=1>. Accessed 13 September 2022.

Compas, Lynn C., Monica Schmidt, John Doughtery, and Mary L. Maniery
2002 Cultural Resources Inventory for the Pacific Gas and Electric Company Upper North Fork Feather River FERC Relicensing Project, Plumas County, California (FERC #2105). On file, CHRIS, Northeast Information Center, Chico, CA.

Congressional Research Service (CRS)
2005 *Agriculture: A Glossary of Terms, Programs, and Laws*, 2005 Edition. 97-905. CRS Report for Congress. Prepared for Members and Committees of Congress. https://www.everycrsreport.com/files/20050616_97-905_d375e71d033e12af00d1bfe5853cfbdca14966db.pdf>. Accessed 10 February 2023.

Cooper, Thomas
2011 *Tankhouse: California's Redwood Water Towers from a Bygone Era*. Barn Owl Press, Perham, MN.

Cornford, Daniel (editor)
1995 *Working People in California*. University of California Press. Berkeley, CA.

Costa, Edward J.
1994 Old Vines: A History of Winegrowing in Amador County. Cenotto Publications, Jackson, CA.

Costello, Julia
1998 Bread Fresh from the Oven: Memories of Italian Breadbaking in the California Mother Lode. *Historical Archaeology* 32(1):66-73.

Costello, Julia G., and Mary L. Maniery
1988 *Rice Bowls in the Delta: Artifacts Recovered from the 1915 Asian Community of Walnut Grove*. Institute of Archaeology, University of California, Los Angeles, CA.

Critz, Jose Morilla, Allen L. Olmsted, and Paul W. Rhode
1999 *International Competition and the Development of the Dried Fruit Industry, 1880-1930*. Working Paper Series No. 99. Agricultural History Center, University of California, Davis, CA.

Daniel, Randolph I., Jr., and H. Trawick Ward
1993 *Test Excavations at Selected Log Cabin Sites in Orange County, North Carolina*. Research Report No. 10. Research Laboratories of Anthropology, The University of North Carolina, Chapel Hill <http://www.rla.unc.edu/Publications/pdf/ResRep10.pdf>. Accessed 15 November 2021.

Davidson, J. Brownlee
1908 *Farm Machinery and Farm Motors*. Orange Judd Company, New York, NY.

Deagan, Kathleen
1993 Retrospective on the Society for Historical Archaeology, 1977-1982. *Historical Archaeology* 27(1):19-22.

De Cunzo, Lu Ann
2001 The Archaeology of Agriculture and Rural Life in Northern Delaware, 1800-1940. *Northeast Historical Archaeology* 31:85-112.

De Cunzo, LuAnn, and Ann Marie Garcia
2006 Historic Context for the Archaeology of Agriculture and Farm Life in the New Castle and Kent Counties, Delaware. Delaware Department of Transportation.

Deetz, James
1977 *In Small Things Forgotten*. Anchor Books, New York, NY.

1982 Households: A Structural Key to Archaeological Explanation. In *Archaeology of the Household: Building a Prehistory of Domestic Life*, edited by Richard R. Wilk and William D. Rathje, pp. 717-725. American Behavioral Scientist 25.

1986 Scale in Historical Archaeology. Paper presented at the 19th Conference on Historical and Underwater Archaeology, Sacramento, CA.

1996 *In Small Things Forgotten: An Archaeology of Early American Life*. (expanded and revised edition). New York Anchor, Doubleday.

De Groot, Henry (comp)
1884 California: Information, General and Statistical, in relation to the Agricultural, Commercial, Manufacturing, and other Resources, Interests, and Industries of the State. In the *4th Annual Report of the State Mineralogist, California*. State Mining Bureau, Sacramento, CA.

Deverell, William, and Thomas Sitton
1994 *California Progressivism Revisited*. University of California Press, Berkeley, CA.

DeWitte, Sharon N., and Samantha L Yaussy
2020 Bioarchaeological Applications of Intersectionality. In *Theoretical Approaches in Bioarchaeology*, Colleen M. Cheverko, Julia R. Prince-Buitenhuys, and Mark Hubbe, editors. Routledge/Taylor & Francis Group, London, UK.

Dickrell, Jim

2019 What Does a Typical California dairy Farm Look Like? <https://www.milkbusiness.com/article/what-does-typical-california-dairy-farm-look-like>. Accessed November 2020.

Dopson, Betty

1988 *Fruit of the Vine: 200 Years of Winemaking in California*. Lexikos, San Francisco, CA.

Drennan, Robert

1996 *Statistics for Archaeologists: A Common Sense Approach*. Springer Science and Business Media, New York, NY.

Driscoll's

2020 Our Story 1872-Now <https://www.driscolls.com/about/heritage>. Accessed November 2020.

Dubroff, H.

2014 Spilling the beans on Ventura County's lima legacy. Pacific Coast Business Times, 5/2/2014 <http://www.pacbiztimes.com/2014/05/02/spilling-thebeans-on-ventura-countys-lima-legacy/>. Accessed. 16 February 2020 (site now discontinued).

Dune, Lawrence

2015 How Driscoll's is Hacking the Strawberry of the Future <https://www.bloomberg.com/news/features/2015-07-29/how-driscolls-is-hacking-the-strawberry-of-the-future>. Accessed October 2020.

Eastman, Bright

1998 Guidelines for Documenting and Evaluating Historic Agricultural Properties on California's North and Central Coast. Master of Arts Thesis submitted to Sonoma State University, Rohnert Park, California.

Eigenheer, Allen R.

1976 Early Perceptions of Agricultural Resources in the Central Valley of California. Doctoral dissertation, University of California, Davis, CA.

Fairchild, Jonathan

2020 "Planted in the Soil": The Homestead Act, Women Homesteaders, and the 19th Amendment. Homestead National Monument of America.

Farley, Adriana, and Marilyn Corley

1996 Durham Land Colony, Butte County, California: History of the State Land Settlement at Durham, 1917-1931. On file, California State University, Chico.

Farmer, Jared

2013 *Trees in Paradise: A California History*. W. W. Norton & Company, New York, NY.

Farris and Smith

1882 *Illustrated History of Plumas, Lassen & Sierra Counties, with California from 1513 to 1850.* Farris & Smith Company, San Francisco, CA. On file, California Room, California State Library, Sacramento, CA.

Ferris, Susan, and Ricardo Sandoval
1997 The Fight in the Fields: Cesar Chavez and the Farmworkers Movement. Harcourt Brace, New York, NY <https://libraries.ucsd.edu/farmworkermovement/essays/essays/cec.pdf>. Accessed 10 February 2023.

Fite, Gilbert
1966 *The Farmer's Frontier*. Holt, Reinhart, Winston, New York, NY.

1981 *American Farmers: The New Minority*. University of Indiana Press, Bloomington, IN.

Flood, Ellen Casper
2020 Social History of Farm Labor in California. *California Legal History* 15:292-516.

Fontana, Bernard L., and J. Cameron Greenleaf
1962 Johnny Ward's Ranch: A Study in Historic Archaeology. *The Kiva* 28(1-2):1-115.

Fong, Kelly
2021 The Delta is in the Heart: Uncovering the Historical Archaeology of Iselton's Chinese American Community. Presentation for the Stanford Archaeology Center Workshop Lecture Series, Stanford, CA.

Fong, Kelly N., Laura W. Ng, Jocelyn Lee, Veronica L. Peterson, and Barbara L. Voss
2022 Race and Racism in Archaeologies of Chinese American Communities. *Annual Review of Anthropology*, 51:233-250.

Foster, James C.
1994 A True Blue Labor Organizer: Edward Crough and the Western Federation of Miners, 1907-1920. *Labor's Heritage* 6(2): 4-21.

Franklin, Maria, Anna Agbe-Davies, Kimball Banks, Jodi A. Barnes, Thomas Cuthbertson, Sarah Herr, J.W. Joseph, Edward Morin, Burr Neely, Holly Norton, Tsim Schneider, and William White
2022 Recommendations for Raising the Visibility of Black Heritage Resources and Engaging with Black Stakeholders: Results from a Survey of State and Territorial Historic Preservation Offices and State Archaeologists <https://core.tdar.org/document/470405/recommendations-for-raising-the-visibility-of-black-heritage-resources-and-engaging-with-black-stakeholders-results-from-a-survey-of-state-and-territorial-historic-preservation-offices-and-state-archaeologists>. Accessed 10 December 2022.

Friedlander, Amy
1990 Beyond Regionalism: History, Archaeology, and the Future. In *Historical Archaeology of Southern Plantations and Farms*, edited by Charles E. Orser, Jr., pp. 102-109. Historical Archaeology 24(4).

Fuller, Varden
1991 Hired Hands in California’s Farm Fields: Collected Essays on California’s Farm Labor History and Policy. Giannini Foundation of Agricultural Economics, University of California, Davis, CA.

Galvin & Associates
2004 The City of Ontario’s Historic Context for the New Model Colony Area. For the City of Ontario Planning Department. Ontario, CA.

Gann, Tara, and Justin Castells
2016 Historic Building Assessment: 2019 Main Street, Julian, San Diego County, California. Prepared for Jon Edney, Community Valley Bank, San Diego. Prepared by Applied EarthWorks, Inc., Hemet, California.

Garate, D. T.
1982 *Termo to Madeline: Northern California’s Last Frontier*. Graphic Dynamics, Susanville, CA.

Garone, Philip
2011 *The Fall and Rise of the Wetlands of California’s Great Central Valley*. University of California Press, Los Angeles, CA.

Gebhard, David
1976 *A Guide to Architecture in San Francisco & Northern California*. Peregrine Smith, Inc. Santa Barbara, CA.

Gebhard, David, and Robert Winter
1985 *Architecture in Los Angeles: A Complete Guide*. Peregrine Smith Books, Salt Lake City, UT.

Geisseler, Daniel, and William R. Horwath
2016a Strawberry Production in California. Prepared as part of the Assessment of Plant Fertility and Fertilizer Requirements for Agricultural Crops in California Project, funded by California Department of Food and Agriculture Fertilizer Research and Education Program, University of California, Davis <https://apps1.cdfa.ca.gov/FertilizerResearch/docs/Strawberry_Production_CA.pdf>. Accessed November 2020.

Geisseler, Daniel, and William R. Horwath
2016b Pistachio Production in California. Prepared as part of the Assessment of Plant Fertility and Fertilizer Requirements for Agricultural Crops in California Project, funded by California Department of Food and Agriculture Fertilizer Research and Education Program, University of California, Davis <https://apps1.cdfa.ca.gov/FertilizerResearch/docs/Pistachio_Production_CA.pdf>. Accessed November 2020.

George, Bill
2020 The History of Strawberry Farming in California. Written and produced for PBS <www.californiastrawberries.com/the-history-of-strawberry-farming-in-California>. Accessed November 2020.

George, Joan, and Kholook Abdo Hintzman
2020 Phase I and Phase II Cultural Resources Investigations for the Sycamore Hills Distribution Center Project, City of Riverside, Riverside County, California. Prepared for Ruth Villalobos & Associates, Inc., Ontario, California. Prepared by Applied EarthWorks, Inc., Hemet, California.

Gnerre, Sam
2018 Torrance's Mira Loma Turkey Ranch sold homegrown birds for holiday feasts <http://blogs.dailybreeze.com/history/2018/11/10/torrances-mira-loma-turkey-ranch-sold-homegrown-birds-for-holiday-feasts/>. Accessed 10 February 2023.

Gonzales, Alan
1971 Filipino Farm Workers in American History. *Kalayaan International* 1(2).

Gonzalez, Gilbert G.
1994 *Labor and Community: Mexican Citrus Worker Villages in a Southern California County, 1900-1950*. University of Illinois Press, Champaign, IL.

1995 Women, Work, and Community in the Mexican Colonies of the Southern California Citrus Belt. *California History* 74(1):58-67.

2006 *Guest Workers or Colonized Labor? Mexican Labor Migration to the United States.* Routledge, Abingdon, Oxon, UK.

Goodyear, Dana
2017 How Driscoll's Reinvented the Strawberry. In *The New Yorker Annals of Agriculture*, August 21, 2017 issue <https://www.newyorker.com/magazine/2017/08/21/how-driscolls-reinvented-the-strawberry/amp>. Accessed November 2020.

The Governor's Office of Planning and Research
2003 CALIFORNIA AGRICULTURE: Feeding the Future. Governor's Office of Planning and Research California Rural Policy Task Force, Sacramento, CA <https://rural.legislature.ca.gov/sites/rural.legislature.ca.gov/files/OPR_report.pdf>. Accessed 10 February 2023.

Grange Connection, The
1996-2004 America's Family Fraternity <http://www.grange.org>. Accessed November 2020.

Graves, Alvin
2004 *The Portuguese Californians: Immigrants in Agriculture*. Portuguese Heritage Publications of California, Inc., San Jose, CA.

Greenstein, Paul, Nigey Lennon, and Lionel Rolfe
1992 *Bread & Hyacinths: The Rise and Fall of Utopian Los Angeles*. SBC Distributors and California Classics Books, Los Angeles, CA.

Greenwood, Roberta S., and Laurence H. Shoup

1983 New Melones Archaeological Project, California: Review and Synthesis of Research at Historical Sites. Final Report of the New Melones Archaeological Project, VII. Submitted to the National Park Service, Washington, DC.

Griggs, Heather

1999 GOGCUIRE DIA RATH AGUS BLATH ORT (God Grant That You Prosper and Flourish): Social and Economic Mobility Among the Irish in Nineteenth Century New York City. *Historical Archaeology* 33(1):87-101.

Grimmer, Anne E.

1990 *The Preservation and Repair of Historic Stucco*. Preservation Briefs 22. U.S. Department of the Interior, National Park Service, Preservation Assistance Division.

Griswold del Castillo, Richard, and Richard A. Garcia

1995 *Cesar Chavez: A Triumph of Spirit*. University of Oklahoma Press, Norman, OK.

Gudde, Erwin G.

1969 *California Place Names. The Origin and Etymology of Current Geographical Names*. Fourth Edition, revised and enlarged by William Bright. University of California Press, Berkeley, CA. 1998.

Gutman, Herbert G.

1977 *Work, Culture, and Society in Industrializing America*. Vintage, New York, NY.

Hall, Anthony E. and Carol A. Frate (editors)

1996 *Blackeye Bean Production in California*. University of California Division of Agriculture and Natural Resources Publication 21518. http://beans.ucanr.edu/files/226601.pdf>. Accessed 10 February 2023.

Hamilton, M. Colleen, Randy Baloian, Kholood Abdo Hintzman, and Keith Warren

2011 Results of Archaeological and Paleontological Monitoring and Data recovery at CA-FRE-3544H, Fresno Veterans Home, Fresno, California. Prepared for ICF Jones & Stokes, Los Angeles. Prepared by Applied EarthWorks, Inc., Hemet, California.

Hanna, Phil Townsend

1951 *The Dictionary of California Land Names*. The Automobile Club of Southern California. Los Angeles.

Hardesty, Donald L.

1988 *The Archaeology of Mining and Miners: A View from the Silver State*. The Society for Historical Archaeology, Pleasant Hill, CA.

2010 *Mining Archaeology in the American West: A View from the Silver State*. University of Nebraska Press, Lincoln, NE, and the Society for Historical Archaeology, Peasant Hill, CA.

Hardesty, Donald L., and Barbara J. Little

2009 *Assessing Site Significance: A Guide for Archaeologists and Historians*, 2nd edition. AltaMira Press, Walnut Creek, CA.

Harris, Edward
1989 *Principles of Archaeological Stratigraphy*. Academic Press, London.

Hart, George H.
1946 Wealth Pyramiding in the Production of Livestock. In *California Agriculture*, edited by Claude B. Hutchison, pp. 51-112. University of California Press, Berkeley, CA.

Hart, James
1978 *A Companion to California*. Oxford University Press, New York, NY.

Hart, John Fraser.
1998 *The Rural Landscape*. John Hopkins University Press, Baltimore, MD.

Haslam, Gerald W.
1993 *The Other California: The Great Central Valley in Life and Letters*. University of Nevada Press, Reno.

Haslam, Gerald W. and James D. Houston, (editors)
1978 *California Heartland: Writing from the Great Central Valley*. Capra Press, Santa Barbara, CA.

Hata, Don, and Nadine Hata
1986 George Shima: The Potato King of California. *Journal of the West* 25(1):55-63.

Hattersley-Drayton, Karana
2015 Azteca Theater DPR records. On file Cultural Studies Office, California Department of Transportation, Sacramento, CA.

2002 Style Versus Type: The Transverse Crib (Frame) Barns of Los Banos. Prepared as Appendix E for Historic Evaluation Report and Historic Architecture Survey Report for Los Banos Bypass State Route 152, Merced County, 10-MER-152, PM 17/24, 10-419100. Prepared for California Department of Transportation, Fresno.

Healdsburg Museum and Historical Society
1983 Agriculture and Industries. In *Healdsburg Cultural Resource Survey, Final Report.* Healdsburg Museum and Historical Society, Healdsburg, CA <https://healdsburg.gov/DocumentCenter/View/10941/1983-Cultural-Resource-Survey-Final-Report >. Accessed 16 February 2023.

Hector, Susan M.
1984 Cultural Resource Management Plan for Los Peñasquitos Ranch House Resource Area, San Diego. *Proceedings of the Society for California Archaeology* 6:129-139.

Hector, Susan M., and Stephen R. Van Wormer
1986 Broken Fragments of Past Lifeways: Archaeological Excavations at Los Peñasquitos Ranch House Resource Area, San Diego. Submitted to the City of San Diego, Department of Parks and Recreation, San Diego, CA.

Herrera, Esteban
2000 Historical Background of Pecan Plantings in the Western Region. College of Agriculture and Home Economics, New Mexico State University, Guide H-626 PH 1-110 <https://pubs.nmsu.edu/_h/H626/index.html >. Accessed 16 February 2023.

Hester, Thomas R., Harry J. Shafer, and Kenneth L. Feder
1997 *Field Methods in Archaeology*. Mayfield, Mountain View, CA.

Higbie, Frank Tobias
2003 *Indispensable Outcasts: Hobo Workers and Community in the American Midwest, 1880-1930*. The Working Class in American History series. University of Illinois Press, Urbana and Chicago.

Hilton, Jerald J.
2002 Hops: The Essence of Beer 160th Anniversary Edition. Hopsteiner, S. S. Steiner, Inc., New York, NY <http://www.hopsteiner.com/history1.htm>. April 2005 (site now discontinued).

Hine, Robert V., and John M. Faragher
2000 *The American West: A New Interpretive History*. Yale University Press, New Haven, CT.

Hintzman, Kholook Abdo, Annie McCausland, and Evan Mills
2019 Phase I Cultural Resource Assessment for the Alabama and Palmetto Project near the City of Redlands, San Bernardino County, California. Prepared by Albert A. Webb Associates, Riverside, California. Prepared by Applied EarthWorks, Inc., Hemet, California.

Historical Marker Database
2021 Del Monte Packing Plant History <https://www.hmdb.org/m.asp?m=168464>. Accessed April 2021.

Hittell, John S.
1863 The Resources of California: Comprising Agriculture, Mining, Geography, Climate, Commerce, etc. etc. and the Past and Future Development of the State. A. Roman & Company, San Francisco, CA. Hittell put out seven editions of this work between 1863 and 1879.

Holland, John
2014 Turlock has thrived on turkey. Modesto Bee June 18, 2014 <https://www.modbee.com/news/local/turlock/article3166522.html>. Accessed November 2020.

Hodder, Ian
1986 Reading the Past: Current Approaches to Interpretation in Archaeology. Cambridge University Press, Cambridge, UK.

Hodgson, Michael

2018 Strawberry growers honored at EconAlliance agricultural forum. Santa Maria Times, February 5, 2018, updated April 27, 2018 <https://santamariatimes.com/business/agriculture/strawberry-growers-honored-at-econalliance-agriculture-forum/article_ed49dc07-0fea-5021-8ded-84432fb350e7.html>. Accessed November 2020.

Holm, Steven

2013 Fecalphilia, or How Archaeologists Learned to Stop Ignoring and Start Loving Fecal Deposits. *Nevada Archaeologist* 26:63-72.

Holt, Marilyn Irvin

1995 *Linoleum: Better Babies & the Modern Farm Woman 1890-1930.* University of New Mexico Press, Albuquerque, NM.

Hornbeck, David

1979 The Patenting of California's Private Land Claims, 1851-1885. *Geographical Review* 69(4): 434-448.

Houghton, W.E.

1975 *The Victorian Frame of Mind, 1830-1870*. Yale University Press, New Haven, CT.

Howard, David H.

1992 People, Pride and Progress: 125 Years of the Grange in America. The National Grange, Washington, DC.

Huddleson, Julia

2003 The Railroad Exchange Hotel: A Working Class Boardinghouse in West Oakland. Unpublished master's thesis, Department of Anthropology, Sonoma State University, Rohnert, Park California.

Huddleson, Julia, and Joan Fine

2008 Historical Resources Evaluation Report for the Lincoln Bypass Mitigation Parcel Project on State Route 65, Placer County, California. Prepared for California Department of Transportation, Marysville, CA.

Hundley, Norris Jr.

2001 *The Great Thirst, Californians and Water: A History*. University of California Press, Berkeley, CA.

Hutchison, Claude B. (editor)

1946 *California Agriculture*. University of California Press, Berkeley, CA.

Igler, David

2001 *Industrial Cowboys: Miller & Lux and the Transformation of the Far West, 1850-1920.* University of California Press, Berkeley, CA.

Italian Cultural Center of Sacramento

2022 NOSTRA STORIA, The Italian Legacy in the Gold Country <https://italiancenter.net/images/nostrastoria.pdf>. Accessed 28 March 2022.

Jackson, W. T., R. Herbert, and S. Wee

1982 *History of Tahoe National Forest: 1840-1940*. Jackson Research Projects, Davis, California. On file, Tahoe National Forest.

Jacobs, Julius L.

1975 California's Pioneer Wine Families. *California History* 54:139-174.

Jefferson, Thomas

1781 *Notes on the State of Virginia*. Reprinted 1999 as Penguin Classics, Penguin Books, New York, NY.

Jelinek, Lawrence J.

1982 *Harvest Empire: A History of California Agriculture*. Heinle & Heinle Publishing. 2nd Edition (June 1, 1982).

1999 "Property of Every Kind: Ranching and Farming During the Gold Rush Era," in *A Golden State: Mining and Economic Development in Gold Rush California*, James J. Rawls and Richard J. Orsi, editors, California History 77 No.4.

Johnson, Matthew

2010 *Archaeological Theory: An Introduction*. 2nd ed. Wiley-Blackwell, Chichester, West Sussex, UK.

Johnston, Warren E.

1997 Cross Sections of a Diverse Agriculture: Profiles of California's Agricultural Production Regions and Principal Commodities. In *California Agriculture Issues and Challenges*, edited by Jerry Siebert, pp. 63-100. Division of Agriculture and Natural Resources, University of California, Giannini Foundation, Berkeley, CA.

Johnston, Warren E., and Alex F. McCalla

2004 Whiter California Agriculture: Up, Down or Out? Some Thoughts About the Future. Giannini Foundation of Agricultural Economics, University of California Davis <https://s.giannini.ucop.edu/.../43/.../escholarship_uc_item_4232w2sr.pdf>. Accessed April 2020.

Jones, Lynn

2000 The History of Japanese Immigration and Assimilation. *The Brown Quarterly* 3(4).

Jones, Terry L., and Kathryn Klar

2007 *California Prehistory: Colonization, Culture, and Complexity*. Altamira Press, Walnut Creek, CA.

JRP Historical Consulting Services (JRP)

1997 Before the Navy: A Contextual Overview of Naval Air Weapons Station, China Lake, Kern, Inyo and San Bernardino Counties, California, Prior to its Acquisition by the U.S. Navy. Prepared for Department of the Navy, Engineering Field Activity West, Naval Facilities Engineering Command, San Bruno, California.

Johnston, Warren E.
1997 Cross Sections of a Diverse Agriculture: Profiles of California's Agricultural Production Regions and Principal Commodities. In *California Agriculture Issues and Challenges*, Jerry Siebert, editor, pp. 63-100. Giannini Foundation, Division of Agriculture and Natural Resources, University of California, Berkeley, CA.

Kan-Rice, Pamela
2015 UC helps California lead the way in lima beans. University of California, Davis <https://www.universityofcalifornia.edu/news/uc-helps-california-lead-way-lima-beans>. Accessed 10 February 2023.

Kastner, Victoria
2013 *Hearst Ranch: Family, Land, and Legacy*. Harry N. Abrams, New York, NY.

KCET
2019 Los Angeles County's Forgotten Farming History <https://www.kcet.org/shows/la-foodways/los-angeles-countys-forgotten-farming-history>. Accessed 10 February 2023.

Kelly, John, and Christian Gerike
2002 Historic Study Report for the Sierra College Boulevard/Interstate 80 Interchange Modification, City of Rocklin, Placer County, California. Prepared by LSA Associates, Inc. Submitted to City of Rocklin, Engineering Services Division, Rocklin, CA.

King, Jerome, Kelly McGuire, Kimberly Carpenter, Mary Maniery, and Cindy Baker
2004 *Class I Cultural Resources Overview and Research Design for the Alturas, Eagle Lake, and Surprise Resource Areas*. Submitted by Far Western Anthropological Research Group, PAR Environmental Services, Inc. and Cultural Resources Consulting to the Bureau of Land Management Surprise, Eagle Lake, and Alturas Field Offices, Contract No. NAC030074. Copies available from the Bureau of Land Management, Alturas, Eagle Lake, and Surprise Field Offices, CA.

Kirk, Anthony
2000 *A Bibliography of Dairying in California 1770-1945*. California Dairy and Educational Foundation, Sacramento, CA.

Klein, Terry H., George L. Miller, Mark D. Schaffer, Wade P. Catts, Mary C. Beaudry, Lu Ann De Cunzo, and Dena Doroszenko
2001 The Archaeology of 19th-Century Farmsteads: The Results of a Workshop Held at the 1997 Annual Meeting of the Council on Northeast Historical Archaeology. *Northeast Historical Archaeology* 31:9-14.

Krasner-Khait, Barbara
2005 The Impact of Refrigeration. History Magazine, February/March 2005 <http://www.history-magazine.com/refrig.html>. Accessed 16 February 2023.

Kupel, Douglas

1986 Historical Analysis. In Bonita-Miguel Substation: Archaeological Investigations into the History and Prehistory of the Substation Area, by WIRTH Environmental Services, pp. 128-190. Submitted to San Diego Gas and Electric, San Diego, CA.

Larson-Praplan, Stephanie

2014 History of Rangeland Livestock Production. In Ecology and Management of Annual Rangelands, Chapter 4 <www.Rangelandarchive.usdavis.edu>. Accessed November 2020.

Larson, Bryan, and Julia Costello

2016 Historical Resources Evaluation Report Aspen-Fales Shoulder Widening Project, Mono County, California. Prepared for California Department of Transportation, Bishop.

Layton, Standord J.

1988 *To No Privileged Class: The Rationalization of Homesteading and Rural Life in the Early Twentieth Century American West*. Charles Redd Center for Western Studies, Brigham Young University, Salt Lake City, UT.

Lazicki, Patricia, and Daniel Geisseler

2016 Olive Production in California. California Department of Food and Agriculture Fertilizer Research and Education Program <https://apps1.cdfa.c.gov/FertilizerResearch/docs/Olive_Production_CA.pdf>. Accessed November 2020.

Lazicki, Patricia, Daniel Geisseler, and William R. Horwath

2016 Potato Production in California. California Department of Food and Agriculture and University of California, Davis <https://apps1.cdfa.ca.gov/FertilizerResearch/docs/Potato_Production_CA.pdf>. Accessed November 2020.

2016 Dry Bean Production in California. UC Davis Publication <Https://apps1.cdfa.ca.gov/FertilizerResearch/docs/Bean_Production_CA.pdf>. Accessed November 2020.

Leadabrand, Russ

1972 *Guidebook to Rural California*. Ward Ritchie Press, Los Angeles, CA.

Lee, W. Storrs

1962 *The Sierra*. G.T. Putnam's Sons, New York, NY.

Leone, Mark P.

1978 Archaeology as the Science of Technology: Mormon Town Plans and Fences. In *Historical Archaeology: A Guide to Substantive and Theoretical Contributions*, edited by R. L. Schuyler, pp. 191-200. Baywood Publishing Company, Inc., Farmingdale, NY.

Leuchtenburg, William E.

1963 *Franklin D. Roosevelt and the New Deal, 1932-1940*. Harper and Row, New York, NY.

Lewarch, Dennis E., and Michael J. O'Brien
1981 The Expanding Role of Surface Assemblages in Archaeological Research. In *Advance in Archaeological Method and Theory*, Vol. 4, Michael B. Schiffer, editor, pp. 297-342. Academic Press, New York, NY.

Lewis, Oscar
1966 *Sutter's Fort: Gateway to the Gold Fields*. Prentice-Hall, Inc., Englewood Cliffs, N.J.

Library of Congress
2022 Vaqueros <https://www.loc.gov/collections/ranching-culture-in-northern-nevada-from-1945-to-1982/articles-and-essays/buckaroo-views-of-a-western-way-of-life/vaqueros/>. Accessed 11 April 2022.

Licht, Walter
1995 *Industrializing America: the Nineteenth Century*. John Hopkins University Press, Baltimore, MD.

Liebman, Ellen
1983 *California Farmland: A History of Large Agricultural Landholdings*. Rowman & Allanheld, Totowa, NJ.

Little, Barbara
2007 *Historical Archaeology: Why the Past Matters*. Left Coast Press, Inc., Walnut Creek, CA.

Little, Barbara, Erika Martin Seibert, Jan Townsend, John H. Sprinkle, Jr., and John Knoerl
2000 National Register Bulletin Guidelines for Evaluating and Registering Archaeological Properties. United States Department of the Interior, National Park Service, Washington, DC.

Limerick, Patricia N.
1987 *The Legacy of Conquest: The Unbroken Past of the American West*. W. W. Norton and Company, New York, NY.

Lindström, Susan G., Sharon A. Waechter, Meredith Rucks, Ron Reno, and Charles D. Zeier
2007 From Ice Age to Ice Works: Archaeological, Ethnohistorical, and Historical Studies for the Truckee River Legacy Trail Project (Phase 3). Report prepared by Far Western Anthropological Research Group, Inc., for the Town of Truckee Public Works Department.

Long, Rachael, Michelle Leinfelder-miles, Konrad Mathesius, Khaled Bali, Sarah Light, Mariano Galla, Shannon Mueller, Allan Fulton, Nicholas Clark, and Roland D. Meyer
2019 Garbanzo Bean (chickpea) Production in California. University of California Agriculture and Natural Resources Publication 8634 <https://escholarship.org/uc/item/30s4j9tx>. Accessed 10 February 2023.

Los Angeles, City of

2020 Los Angeles Historic Resources Inventory, Historic Places LA <http://historicplacesla.org/reports/cf443293-736a-4ade-9810-d6d6786c8f99>. Accessed December 2020.

Lowry, Thea S. (editor)

1993 Petaluma's Poultry Pioneers: Recall the Heydey of Chicken Ranching. Manifold Press, Ross, CA.

Mackey, Barbara J., Diane Fenicle, Stephen J. Mikesell, Ronald L. Reno, C. Lynn Rogers, Vickie L. Clay, Larry Hause, Dave N. Schmitt, Jeanne Albin, and Tim Purdy

1997 Jackrabbit Tamale: Recipe for Historic Era Homesteading. In Culture Change Along the Eastern Sierra Nevada/Cascade Front, VIII. Submitted to the Tuscarora Gas Transmission Company, Reno. NV.

Mackey, Barbara J., Ronald L. Reno, C. Lynn Furnis, Vickie L. Clay, Sherri Gust, and Jeanne Albin

2000 Wrestling with the Elements: Historical Archaeology in Northeastern California and Northwestern Nevada. In Archaeological Investigations along the California−Great Basin Interface: The Alturas Transmission Line Project, Vol. 4, Kelly R. McGuire, editor. Report to Sierra Pacific Power Company, Reno, NV, from Far Western Anthropological Research Group, Davis, CA.

Magnuson, Torsten A.

1918 History of the Beet Sugar Industry in California. *Annual Publication of the Historical Society of Southern California* 11(1):68-79.

Mahon, Tom

2005 A Brief History of the Cosumnes River near Elk Grove. South County Citizens for Responsible Growth, Elk Grove, CA <http://www.sccrg.org/index.htm>. Accessed April 2005 (site now discontinued).

Mallea-Olaetxe, J.

1992 History That Grows on Trees: The Aspen Carvings of Basque Sheepherders. *Nevada Historical Society Quarterly*, Spring:21-39.

2000 *Speaking Through the Aspens: Basque Tree Carvings in California and Nevada.* University of Nevada Press, Reno, NV.

Maniery, Mary L.

1993 National Register of Historic Places Determination of Eligibility Report, Bacon Island Rural Historic District, San Joaquin County, California. On file, Central California Information Center, Turlock, CA.

Maniery, Mary L., and Leslie Fryman

1993 National Register of Historic Places Determination of Eligibility Report for the Three Historic Sites in Contra Costa and San Joaquin Counites, California, Manuscript, Central California Information Center, Stanislaus State University, Turlock, CA.

Maniery, Mary L., with Steve Heipel, Jody Brown, Leslie Fryman, and Keith Syda
1993b *Phase II Investigations for the American River Bridge Crossing Project, City of Folsom, Sacramento County, California*. Prepared for United States Bureau of Reclamation, Sacramento, CA. On file, North Central Information Center, California State University, Sacramento.

Mansfield, George C.
1918 *History of Butte County, California*. Historic Record Company, Los Angeles, California.

Marchell, Robert
2018 World War I and the Homestead Act of 1862: When Farmers Fought and Soldiers Farmed for American's Homestead States. Homestead National Monument of American.

Marcus, George E., and Michael J. Fischer
1986 *Anthropology as Cultural Critique: An Experimental Moment in the Human Sciences*. University of Chicago Press, Chicago, IL.

Marti, Donald B.
1991 *Women of the Grange: Mutuality and Sisterhood in Rural America, 1866-1920*. Greenwood Press New York, NY.

Martinez, John Ramon
1971 *Mexican Emigration to the U.S. 1910-1930*. University of California. R & E Research Associations, San Francisco, CA.

Massey, James C., and Shirley Maxwell
2021 The Story on Sears: Houses by Rail and Mail. *Old House Journal* 30(4, July/August) 2002 <https://www.oldhouseonline.com/house-tours/story-sears-houses/>. Accessed 10 February 2023.

McBane, Margo, and Mary Winegarden
1979 Labor Pains: An Oral History of California's Women Farmworkers. *California History* 58(2):179-181.

McAllister, Virginia, and Wayne McAllister
2015 *A Field Guide to American Houses (Revised): The Definitive Guide to Identifying and Understanding America's Domestic Architecture*. Alfred A. Knopf, New York, NY.

McAlester, Virginia Savage, and Lee McAlester
1985 *A Field Guide to American Houses*. Knopf, New York.

McClelland, Linda F., Genevieve P. Keller, and Robert Z. Melnick
1991 *Guidelines for Evaluating and Documenting Rural Historic Landscapes*. National Register Bulletin 30. National Park Service, Department of the Interior, Washington DC.

McClurg, Sue
2000 *Water & the Shaping of California*. Heyday Books, Berkeley, CA.

McDannold, Thomas A.
2000 *California's Chinese Heritage: A Legacy of Places*. Heritage West Books, Stockton, CA.

McGee, Joe P.
1980 *A History of Irrigation in Butte, Sutter, Glenn, and Colusa Counties*. Joint Water District Board, Gridley, CA.

McGuire, Randall H., and Paul Reckner
2002 The Unromantic West: Labor, Capital, and Struggle. *Historical Archaeology* 36 (3):44-58.

McGuire, Randall H., and Robert Paynter (editors)
1991 *The Archaeology of Inequality*. Basil Blackwell, Oxford, UK.

McIlroy, Jack and Mary Praetzellis (editors)
1997 Vanished Community—19th Century San Francisco Neighborhoods: From Fourth Street to Mission Creek and Beyond. Archaeological Research Design and Treatment Plan for the SF- 80 Bayshore Viaduct Seismic Retrofit Projects. Prepared for California Department of Transportation, Oakland.

McKee, Harley J., compiler
1970 *Recording Historic Buildings*. Historic American Building Survey, National Park Service, Department of the Interior, Washington, DC.

McWilliams, Carey
1939 Factories in the field: The Story of Migratory Farm Labor in California. Little, Brown, Boston, MA.

1979 *California: The Great Exception*. Peregrine Smith, Inc., Santa Barbara, CA.

Mermilliod, Jennifer
2019 Bumann Ranch, San Diego County, National Register of Historic Places Registration Form. California Office of Historic Preservation, Sacramento, CA.

Merriam, C. Hart
1905 The Indian Population of California. *American Anthropologist* 7:594-606.

Miller, M.
1982 *History of McClellan Air Force Base*. Office of History, Sacramento Air Logistics Center, McClellan Air Force Base, Sacramento, CA.

Miller, Robert F.
1930 Sheep Production in California. California Agricultural Extension Service Circular 49 <https://ucanr.edu/sites/UCCE_LR/files/202126.pdf>. Accessed November 2020.

Miller, Wells W.
1955 The Macadamia Nut: A New Commercial Crop for California. In *California Avocado Society Yearbook* 39:1430145 <http/www.avacadosource.com/CAS_Yearbooks/CAS_39_1955/CAS_1955_PG_143-145.pdf>. Accessed November 2020.

Minnick, Sylvia Sun

1984 *History of the Filipinos in the Sacramento Area*. Sacramento Ethnic Communities Survey. On file, Center for Sacramento History, Sacramento, CA.

1988 *Samfow: The San Joaquin Chinese Legacy*. Panorama West Books, Fresno, CA.

Mires, Peter B.

1993 The Importance of Aspect to Historic Farmstead Site Location in the Green Mountains of Vermont. *Historical Archaeology* 27(4):82-91.

Moomjian, Scott A.

n.d. Sespe Ranch, Bunkhouse, Telegraph Road, Fillmore, Ventura County, CA. California Ventura County Fillmore, HABS No. CA-2687-A. Historic American Buildings Survey <http://lcweb2.loc.gov/master/pnp/habshaer/ca/ca2300/ca2392/data/ca2392data.pdf>. Accessed 10 February 2023.

Moore, David W., Jr., Martha Freeman, and Maryellen Russo

2013 *Agricultural Theme Study for Central Texas*. Historical Studies Report No. 2013-01. Environmental Affairs Division, Historical Studies Branch, Texas Department of Transportation, Austin, TX.

Mori, Darryl

1916 From Beets to the Battlefield: How WWII Fam Laborers Helped the War Effort. *Discover Nikkei* November 18, 2016.

Muckle, Robert J., and Stacey L. Camp

2021 *Introducing Archaeology*, 3rd edition. University of Toronto Press.

Mueller, James

1975 *Sampling in Archaeology*. University of Arizona Press, Tucson.

Muir, John

1911 *My First Summer in the Sierra*. Houghton Mifflin Company, Boston, MA.

Musoke, Moses S., and Alan L. Olmstead

1982 "The Rise of the Cotton Industry in California: A Comparative Perspective," *The Journal of Economic History* 42(2).

2009 Building Human Capital. *UCLA Magazine* <http://magazine.ucla.edu/depts/atissue/building_human_capital/>. Accessed 8 November 2021 (site now discontinued).

Nadeau, Remi

1977 Supersubdivider. In *Biography of a City*, John and Large Caughey, editors, pp 401-404. University of California Press, Berkeley.

Naka, Kaizo

1913 *Social and Economic Conditions Among Japanese Farmer in California*. Master of Science thesis, University of California, Berkeley.

Nasatir, Abraham (editor)
1964 *A French Journalist in the California Gold Rush: The Letters of Etienne Derbec*. The Talisman Press, Georgetown, CA.

Nassaney, Michael S., and Majorie R. Abel
1993 The Political and Social Contexts of Cutlery Production in the Connecticut Valley. *Dialectical Anthropology* 18:247-289.

National Association of Civilian Conservation Corps Alumni
2000 A Brief History of the Civilian Conservation Corps. National Association of Civilian Conservation Corps Alumni Website. National Association of Civilian Conservation Corps Alumni, St. Louis, MO <https://ccclegacy.org/>. Accessed 16 February 2023.

National Japanese American Historical Association
2001 Nikkei Heritage: The Flower Industry. *National Japanese American Historical Association* 13(3).

National Park Service (NPS)
n.d. The Homestead Act <https://www.nps.gov/articles/the-homestead-act.htm>. Accessed September 2020.

1983 Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines [as amended and annotated]. National Park Service, Washington DC <https://www.nps.gov/subjects/historicpreservation/upload/standards-guidelines-archeology-historic-preservation.pdf>. Accessed 16 February 2023.

1997a *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation*. Finalized by Patrick W. Andrus and edited by Rebecca H. Shrimpton. United States Department of the Interior, National Park Services, Washington, DC.

1997b *National Register Bulletin 16A: How to Complete the National Register Registration Form*. United States Department of the Interior, National Park Services, Washington, DC.

1999 *National Register Bulletin 30: Guidelines for Evaluating and Documenting Rural Historic Landscapes*. United States Department of the Interior, National Park Services, Washington, DC.

2000 *National Register Bulletin 36: Guidelines for Evaluating and Registering Archeological Properties*. United States Department of the Interior, National Park Services, Washington, DC.

2021 Understanding Cultural Landscapes <https://www.nps.gov/subjects/culturallandscapes/understand-cl.htm>. Accessed 11 January 2023.

Nationwide Environmental Title Research, LLC (NETR)
2019 Historic Aerials <https://www.historicaerials.com/>. Accessed 22 May 2019.

New York Times
2012 The Land of a Billion Vegetables. *New York Times* 14 October2012.

Nelson, J. S.
1901 The Canning Industry. *In Seventh Biennial Report of the California State Board of Horticulture for 1899-1900*, pgs. 143-146. Sacramento, CA.

Nettles, Wendy M., and M. Colleen Hamilton
2005 Rethinking Ethnic Markers in Material-Culture Analysis. In *Proceedings of the Society for California Archaeology* 18:26-29.

Nichols, Kathy McKenzie, and Jane W. Borg
1992 *Nihon Bunka: Japanese Culture: One Hundred Years in the Pajaro Valley*. Pajaro Valley Arts Council, Watsonville, CA.

Noble, Allen George
1984 *Wood, Brick and Stone, the North American Settlement Landscape: Barns and Farm Structures.* University of Massachusetts Press, Amherst, MA.

Noble, Allen G., and Richard K. Cleek
1995 *The Old Barn Book; A Field Guide to North American Barns and Other Farm Structures.* Rutgers University Press. New Brunswick, NJ.

Norris, Frank
1901 *The Octopus: A Story of California*. Doubleday, Page & Co., New York, NY.

O’Connor, Teresa
2017 Raising Pigs on California’s Small Farms has Benefits, UC Food Observer <https://www.ucfoodobserver.com/2017/05/07/raising-pigs-on-californias-small-farms-has-benefits/> Accessed 19 December 2021.

O’Donnell, Eleanor
1998 *Researching a Historic Property*. National Register Bulletin 39. National Park Service, Department of the Interior, Washington DC.

Olmstead, Alan L., and Paul W. Rhode
1990 *The Agricultural Mechanization Controversy of the 1920s*. Working Paper Series No. 64. Agricultural History Center, University of California, Davis, CA.

1997 *An Overview of the History of California Agriculture*. Working Paper Series No. 89. Agricultural History Center, University of California, Davis, CA.

2017 A History of California Agriculture. Giannini Foundation Information Series 017-1, Giannini Foundation of Agricultural Economics, University of California Agriculture and Natural Resources. Regents of the University of California Division of Natural Resources <https://s.giannini.ucop.edu/uploads/giannini_public/19/41/194166a6-cfde-4013-ae55-3e8df86d44d0/a_history_of_california_agriculture.pdf>. Accessed 16 February 2023.

Olmstead, Alan L., and Paul W. Rhode *continued*
2003 The Evolution of California Agriculture: 1850-2000. In *California Agriculture: Dimensions and Issues* (edited by Jerry Siebert).

Ontario, City of
2007 Historic Context for the City of Ontario's Citrus Industry. City of Ontario Planning Department, Ontario, CA.

Orser, Charles E. Jr.
1989 On Plantations and Patterns. *Historical Archaeology* 23(2):28-40.

2004 *Race and Practice in Archaeological Interpretation*. University of Pennsylvania Press, Philadelphia.

2007 The Archaeology of Race and Racialization in Historic America. University Press of Florida, Gainesville.

Orser, Charles E., Jr. (editor)
1990 Historical Archaeology of Southern Plantations and Farms. *Historical Archaeology* 24 (4).

Orser, Charles E., Andrés Zarankin, Pedro Paulo A. Funari, Susan Lawrence, and James Symonds (editors)
2022 *The Routledge Handbook of Global Historical Archaeology*. Routledge, Abingdon, Oxon, UK.

Orsi, Richard J. (editor)
1974 A List of References for the History of Agriculture in California. University of California, Davis, CA.

Orton, Clive
2000a *Sampling in Archaeology*. Cambridge University Press, Cambridge, UK.

2000b Spatial Analysis. In *Archaeological Method and Theory: An Encyclopedia*, Linda Ellis, editor, pp. 584-588. Garland, New York, NY.

Otto, John Solomon
1984 Cannon's Point Plantation, 1794-1860: Living Conditions and Status pattens in the Old South. Academic Press, New York, NY.

Pajus, Jean
1937 *The Real Japanese California*. James J. Gillick Co., Berkeley, CA.

Palmer, Hans Christian
1965 *Italian Immigration and the Development of California Agriculture*. Doctoral dissertation, University of California, Berkeley, CA.

Panelli, Mary D.
1983 An Ethnohistorical Study of Homesteading in Central Nevada. Master's thesis, University of Nevada, Reno, NV.

Park, Lisa Sun-Hee, and David N. Pellow

2004 Racial Formation, Environmental Racism, and the Emergence of Silicon Valley. *Ethnicities* 4(3):403–424 <https://journals.sagepub.com/doi/10.1177/1468796804045241>. Accessed 3 January 2023.

Parker, Carleton H.

1915 The California Casual and His Revolt. *The Quarterly Journal of Economics* 30(1):110-126.

Parker, Clifton B.

2009 63 years of California Agriculture journal now online. University of California, Davis <https://www.ucdavis.edu/news/63-years-california-agriculture-journal-now-online>. Accessed 7 July 2022.

Parsons, James J.

1940 Hops in Early California Agriculture. *Agricultural History* 14:110-116.

Parsons, Russ

1997 Our Strawberry Roots. *Los Angeles Times*, 1 April 1997.

Paul, Rodman W.

1973 The Beginning of Agriculture in California: Innovation vs. Continuity. *California Historical Quarterly* 52(1):16-28.

Paule, Dorthea Jean

1952 *The German Settlement at Anaheim*. Thesis prepared for the University of Southern California. Reprinted in 1974 by R and E Research Associates, San Francisco, CA

Peterson, George M.

1935 Laissez Faire in Theory and Practice. In *Proceedings of the Annual Meeting* (Western Farm Economics Association) 8:1-9.

Pisani, Donald J.

1984 *From the Family Farm to Agribusiness: The Irrigation Crusade in California and the West, 1850-1931*. University of California Press, Berkeley, CA.

Pitman, Leon

1976 Domestic Tankhouses of Rural California. *Pioneer America*, 8:84-97.

1992 The Domestic Tankhouse as Vernacular Architecture in Rural California. *Material Culture* 24(1992) 1:13-32.

Pitt, Leonard

1966 *The Decline of the Californios*. University of California Press, Berkeley, CA.

Pitt, Leonard, and Dale Pitt

1997 *Los Angeles A to Z: An Encyclopedia of the City and County*, pp 531-532. University of California Press, Berkeley, CA.

Potter, Lee Ann, and Wynell Schamel
1997 The Homestead Act of 1862. *Social Education* 61(1):359-364.

Praetzellis, Adrian, and Julia Costello
2002 Don't Keep Everything: Historic Artifacts Discard Policy. *Society for California Archaeology Newsletter* 36(3):30-33.

Praetzellis, Mary (editor)
1994 West Oakland, A Place to Start From. Research Design and Treatment Plan, Cypress I-880 Replacement Project, Volume 1: Historical Archaeology. Prepared by Anthropological Studies Center, Sonoma State University, Rohnert Park. Prepared for California Department of Transportation, Oakland, CA.

Praetzellis, Mary, and Adrian Praetzellis
1985 Historical Archaeology in the Knoxville and Morgan Valley Areas, Lake and Napa Counties, California. Anthropological Studies Center, Sonoma State University, Rohnert Park, CA.

1997 Historical Archaeology of an Overseas Chinese Community in Sacramento, California, Volume 1: Archaeological Excavations. Submitted to U.S. General Services Administration, San Francisco, CA.

2004 *Putting the "There" There: Historical Archaeologies of West Oakland: I-880 Cypress Freeway Replacement Project*. Anthropological Studies Center, Sonoma State University, Cypress Replacement Project Interpretive Report, No. 2. Rohnert Park, CA.

Prangnell, Jonathan
2022 Capitalism and Globalization. In *The Routledge Handbook of Global Historical Archaeology*, Charles E. Orser, Andrés Zarankin, Pedro Paulo A. Funari, Susan Lawrence, and James Symonds, editors, pp. 117–132. Routledge, Abingdon, Oxon, UK.

Pulling, Hazel Adele
1965 California's Range-Cattle Industry: Decimation of the Herds, 1870-1912. In *Journal of San Diego History* 11(1). San Diego Historical Society, San Diego, California.

Purser, Margaret
1991 "Several Paradise Ladies Are Visiting in Town": Gender Strategies in the Early Industrial West. In Gender in Historical Archaeology (Special Issue), edited by Donna J. Seifert. *Historical Archaeology* 25(4): 6-16.

Puzo, Daniel P.
1993 California's Bitter Fruit: Olives. *Los Angeles Times* 9 September 1993.

Quaife, Milo Milton (editor)
1935 *Kit Carson's Autobiography*. R.R. Donnelley & Sons Co. Chicago, IL.

Ramsey, Eleanor Mason
1977 Allensworth – A Study in Social Change. Unpublished PhD Dissertation, Department of Anthropology, University of California, Berkeley.

Ramsey, Eleanor M., and Janice S. Lewis
1988 A History of Black Americans in California. In *Five Views: An Ethnic Historic Site Survey for California*. Dwight Dutschke, editor, pp 59-101. California Department of Parks and Recreation, Office of Historic Preservation, Sacramento.

Redman, Charles
1987 Surface Collection, Sampling, and Research Design: a Retrospective. *American Antiquity* 52(2):249-265.

Regents of the University of California
2017 Agricultural History Center. eScholarship, Open Access Publications from the University of California <https://escholarship.org/uc/ahc#:~:text=The%20Agricultural%20History%20Center%2C%20an,education%2C%20and%20other%20public%20services>. Accessed 21 March 2022.

Reiff, Daniel D
2000 Houses from Books: Treatises, Pattern Books, and Catalogs in American Architecture, 1738-1950: A History and Guide. Pennsylvania State University Press, University Park, PA.

Reith, John W.
1951 Los Angeles Smog. *Yearbook of the Association of Pacific Coast Geographers* Volume 13:24-32 <https://muse.jhu.edu/article/462031>. Accessed October 2020.

Rios, Sonia, Gary Bender, and Ben Faber
2020 Macadamia Production in California – A Hidden Gem on an Industry? Published March 5, 2020 in Topics in Subtropics, University of California Annals in Nut Research blogs <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=39358>. Accessed October 2020.

Rivers, Don
1998 *The Illustrated History of the Olive Industry of Fallbrook*. Fallbrook Village News, October 1, 1998. Reprinted in 2020 by Fallbrook Historical Society, Tom Frew, editor. Fallbrook, CA.

Rizvi, Uzma Z.
2020 Community-Based and Participatory Praxis as Decolonizing Archaeological Methods and the Betrayal of New Research. In *Archaeologies of the Heart*, Kisha Supernant, Jane Eva Baxter, Natasha Lyons, and Sonya Atalay, editors, pp. 83-96. Springer Nature, Cham, Switzerland.

Robertson, Ralph D.
1917 Irrigation of Rice in California. *California Agricultural Experiment Station Bulletin* 279: 254-270.

Robinson, William W.
1948 *Land in California*. University of California Press, Berkeley, CA.

1957 *The Story of San Luis Obispo County*. Title Insurance and Trust Company, San Luis Obispo. On file, History Center of San Luis Obispo County, San Luis Obispo.

1979 *Land in California*. University of California Press, Berkeley, CA.

Rolle, Andrew
1963 *California: A History*. Thomas Y. Crowell Company, New York, NY.

Rood, Judy
1993 Italian Swiss Dairy Operations in the Sierra Nevada. Paper Presented to the Society for California Archaeology, April 1993.

Rucks, Meredith (Penny)
1987 The Historic Archaeology of Italian Swiss Settlement in Sierra Valley: A Preliminary Study. Report on file USFS-LTBMU. South Lake Tahoe, CA.

Ryan, MaryEllen, and Gary Breschini
2010 The California Cattle Boom, 1849-1862. Monterey County Historical Society <www.mchsmuseum.com>. Accessed November 2020.

Sackman, Douglas Cazaux
1995 By Their Fruits Ye Shall Know Them: Nature Cross Culture Hybridization and the California Citrus Industry, 1890-1940. *California History* 74(1).

Sacramento History
2020 Sacramento History On-line Timeline <http://www.sacramentohistory.org/resources_timeline.php>. Accessed November 2020.

Salomon, Larry
1994 Filipinos Build a Movement for Justice in the Asparagus Fields. *Third Force* 2(4):30-31.

Salt Lake City Historic Landmark
2012 A Preservation Handbook for Historic Residential Properties & Districts in Salt Lake City <http://www.slcdocs.com/historicpreservation/GuideRes/ResidentialGuidelines.pdf>. Accessed 10 February 2023.

San Francisco Examiner
1917 Shima Denies Potato Corner. *San Francisco Examiner* 23 February 1917:2 <https://www.newspapers.com/image/458084601>. Accessed 10 February 2023.

San Secondo d'Asti Catholic Church
2022 History <https://www.ssdachurch.org/>. Accessed 13 September 2022.

Santacruz.org
2002 Wilder Ranch: Land of Milk and Honey. Visit Santa Cruz County <https://www.santacruz.org/blog/wilder-ranch-land-of-milk-and-money/>. Accessed 25 March 2022.

Santos, Robert L.
1994 Dairying in California through 1910. *Southern California Quarterly* 76(Summer):175-94.

1995 *Azoreans to California: A History of Migration and Settlement*. Alley-Cass Publications, Denair, CA.

Schaefer, Jerry, Stephen Van Wormer, and Susan Walter
1994 Draft Historic Study Report of Sites CA-SDI-11374H, -11383H, -12272H, and -12273H for State Route 125 on Otay Mesa, San Diego County California, 11-SD-125, 0.0/9.6, 11221- 926475. Prepared for California Department of Transportation, San Diego, CA.

Scheuring, Ann Foley
1995 *Science & Service: A History of the Land-Grant University and Agriculture in California*. The Regents of the University of California, Division of Agriculture and Natural Resources, Oakland, CA.

Schofer, Jerry P.
1975 *Urban and Rural Finnish Communities in California: 1860-1960*. R & E Research Associates, San Francisco, CA.

Schoenherr, Allan, A.
1992 *A Natural History of California*. University of California Press, Berkeley, CA.

Schwartz, Stephen
1998 *From West to East: California and the Making of the American Mind*. The Free Press, New York, NY.

Shackley, M. Steven, and Stephen Van Wormer
1989 Cultural Resources Technical Appendix for the Mt. Israel Reservoir Project. Submitted to Olivenhain Municipal Water District, Encinitas, CA.

Shennan, Stephen
1988 *Quantifying Archaeology*. Academic Press, San Diego, CA.

Shimamoto, Chiyo Mitori
1990 *To the Land of Bright Promise*. San Joaquin County Historical Society and Museum, Loki, CA.

Silliman, Stephen W.

2004 *Lost Laborers in Colonial California: Native Americans and the Archaeology of Rancho Petaluma*. University of Arizona Press, Tucson, AZ.

Smallwood, Josh

2011 Phase I Cultural Resources Survey and Evaluation Report for the Kuhns Drive Redevelopment Project, City of San Jacinto, Riverside County, California. Prepared for City of San Jacinto Community Development Department, San Jacinto, California. Prepared by Applied EarthWorks, Inc., Hemet, California.

2014 Cultural Resources Assessment of the Desert View Dairy, Assessor's Parcel Number (APN) 0494-211-01, 37501 Mountain View Road and 22920 Santa Fe Avenue, Hinkley, San Bernardino County, California. Volume 5 in Cultural and Paleontological Resource Studies for the Pacific Gas & Electric Groundwater Remediation Project, Hinkley Compressor Station, San Bernardino County, California. Prepared by Applied EarthWorks, In, Hemet, California for Pacific Gas and Electric Company, Fresno, California.

2016 Wong Parcel site record. In Letter Report: Architectural Survey of Assessor Parcel Numbers (APNs) 369-021-031, -035, -036, -039, and -044, and Evaluation of a Historic-period Residence and Associated Structures on APN 369-021-035, in the City of Wildomar, Riverside County, California. Applied EarthWorks, Inc., Hemet, CA.

Smeins, Linda

1999 *Building An American Identity: Pattern Book Homes and Communities, 1870-1900.* AltaMira Press, Lanham, MD.

Smith, Carrie, and Michael Baldrica

1993 Basqueing in the Sun: Research and Interpretation of Basque Sites on the East Side of the Tahoe National Forest. Paper presented at the Society of California Archaeology Annual Meeting, April 7-11, 1993.

Snider, Sandra L.

1980 "The Queen Anne Cottage and Coach Barn at the Los Angeles State and County Arboretum." National Register of Historic Places Inventory/Nomination Form. California Historic Commission, Sacramento, June 19, 1980.

Solomons, Theodore S.

1939 Sheep Raising in California. *California History Nugget* 6(6). California State Historical Association, Los Angeles, CA.

Sonoma County Library

2020 Sonoma County Wine Library. Sonoma County Library, Healdsburg <https://sonomalibrary.org/locations/sonoma-county-wine-library>. Accessed 23 March 2022.

South, Stanley

1977 *Method and Theory in Historical Archaeology*. Academic Press, New York, NY.

Spencer-Wood, Suzanne M.
1996 Feminist Historical Archaeology and the Transformation of American Culture by Domestic Reform Movements, 1840-1925. In *Historical Archaeology and the Study of American Culture*, edited by Lu Ann De Cunzo and Bernard L. Herman, pp. 397-446. Henry Francis De Pont Winterthur Museum, Winterthur, DE.

Sprague, Irvine
1953 The Port Story. Series of 12 articles published January 19-31, 1953 in the Stockton Record. Copies of the articles on file San Joaquin County Museum and Archives, Mickie Grove, Lodi, California.

Spriggs, Matthew
1984 *Marxist Perspectives in Archaeology*. Cambridge University Press, New York, NY.

Springate, Megan E.
2020 Intersectionality, Queer Archaeology, and Sexual Effects: Recent advances in the archaeology of sexualities. In *The Routledge Handbook of Global Historical Archaeology*, Charles E. Orser, Andrés Zarankin, Pedro Paulo A. Funari, Susan Lawrence, and James Symonds, editors, pp. 95–116. Routledge, Abingdon, Oxon, UK.

St. John, Gail F., and Kimberly J. Wooten
2005 Historical Resources Evaluation Report for a Proposed Safety Improvement Project on State Route 16, Yolo County. Prepared for California Department of Transportation, Marysville, CA.

Starr, Paul F.
1998 *Let the Cowboy Ride: Cattle Ranching in the American West*. Johns Hopkins University Press, Baltimore, MD.

Statista.com
2019 Farmers and Ranchers in United States Agriculture <https://www.statista.com>. Accessed 10 February 2023.

Stein, Pat H.
1990 *Homesteading in Arizona*. Arizona State Historic Preservation Office. Phoenix, AZ.

Steinbeck, John
1939 *The Grapes of Wrath*. Viking Press, New York, NY.

Steinmetz, Hilary N.
2009 *Rancho del Paso, the World's Largest Thoroughbred Farm*. M.A. Thesis, History, Sacramento State University, Sacramento.

Sterner, Matthew A., and Matt C. Bischoff
2001 The Brookside-Vache Winery: Architectural Evaluatin and Archaeological Testing at a Nineteenth-Century Winery in Redlands, California. Prepared for the US Army Corps of Engineers, Los Angeles, CA. SRI Technical Report 01-35, Statistical Research, Inc., Tucson, Arizona.

Stewart, James I.
2022 The Economics of American Farm Unrest, 1865-1900 <https://eh.net/encyclopedia/the-economics-of-american-farm-unrest-1865-1900/>. Accessed 11 April 2022.

Stoll, Steven
1998 *The Fruits of Natural Advantage: Making the Industrial Countryside in California.* University of California Press, Berkeley, CA.

Stone, Tammy
1998 The Renegotiation of Gender Roles on Homesteads in Colorado During the Victorian Era. Paper presented at the annual meeting of the Society for Historical Archaeology in Salt Lake City, UT.

Strom, Claire
2019 Idiosyncratic Reflections on Ninety Years of Agricultural History, Written in Celebration of the *Agricultural History'*s One-Hundredth-year Anniversary. *Agricultural History* 93(1):139-172.

Strasser, Susan
1999 *Waste and Want: A Social History of Trash*. Henry Holt, New York, NY.

Street, Richard S.
2004a *Beasts of the Field: A Narrative History of California Farmworkers, 1769-1913.* Stanford University Press, Stanford, CA.

Supernant, Kisha, Jane Eva Baxter, Natasha Lyons, and Sonya Atalay (editors)
2020 *Archaeologies of the Heart*. Springer Nature, Cham, Switzerland.

Sudderth, Jake R.
2001 Migration of a Cultural Landscape Pattern: Leavenworth & Pacific Northwest Fabricated Communities. *Columbia: The Magazine of Northwest History* (Winter 2001-2002):37-44.

Sunkist Growers, Inc.
n.d. Historical Note. Sunkist Growers, Inc. Records Finding Aid, University of Riverside Library, Special Collections and University Archives. Cdlib.org

Sun-Maid
2019 The Sun-Maid Story <http://www.sunmaid.com/wp-content/uploads/2019/02/US-Edition_Ch3.pdf>. Accessed November 2020.

Sutton, Mark Q, and Brooke S. Arkush
1996 Archaeological Laboratory Methods: An Introduction. Kendall/Hunt, Dubuque, IA.

SWCA
2013 The History of Agriculture in South Dakota: Components for a Fully Developed Historic Context. SWCA Environmental Consultants for South Dakota State Historic Preservation Office.

Swartzlow, Ruby Johnson
1965 California Rice Industry. *Butte County Diggins'* 9(4):4-19.

Takeshita, Vernon
2007 American's Strawberry: Fruit of Our Labor. *Japanese American National Museum Magazine* October 3, 2007 <https://www.discovernikkei.org/en/journal/2007/10/3/americas-strawberry/>. Accessed November 2020.

Taksa, Lucy
2005 The Material Culture of an Industrial Artifact: Interpreting Control, Defiance, and Everyday Resistance at the New South Wales Eveleigh Railway Shops. In Landscapes of Industrial Labor, Mark S. Cassell, editor. Thematic issue, *Historical Archaeology* 38(3):8-27.

Tetra Tech, Inc.
2004 Cultural Resources Evaluation of Historic Period Homesites, Edwards Air Force Base, California. Prepared by Tetra Tech, Inc. and Jones & Stokes, Inc.

Thickens, Virginia E.
1946 Pioneer Agricultural Colonies of Fresno County. *California Historical Society Quarterly* 25(2):169-177. University of California Press, Berkeley.

Thomas, Roberta, and Justin Castells
2018 Phase I Cultural Resource Assessment for the Beaumont Wastewater Treatment Plant Upgrade/Expansion and Brine Pipeline Project, Riverside and San Bernardino Counties, California. Prepared for Albert A. Webb Associates, Riverside, CA. Prepared by Applied EarthWorks, Inc., Pasadena, California.

Thompson, John
1957 *The Settlement Geography of the Sacramento-San Joaquin Delta, California*. Ph.D. dissertation, Stanford University, Palo Alto, CA. University Microfilms International, Ann Arbor, MI.

Thompson & West
1880 *History of Los Angeles County, California: with illustrations descriptive of its scenery, residences, fine blocks and manufactories*. Oakland, Thompson & West. Reprinted by John Albert Wilson. Salem, MA, Higginson Book Co, 1916.

Thompson, Anthony W., Robert J. Church, and Bruce H. Jones
1992 *Pacific Fruit Express*. Signature Press, Wilton, CA.

Tordoff, Judith D.
1988 Historical Archeology: Interpretations. In *Culture Change in the Central Sierra Nevada, 8000 B.C.-A.D. 1950, Final Report of the New Melones Archeological Project IX* by Michael J. Moratto, Judith D. Tordoff, and Laurence H. Shoup, pp. 477-496. Submitted to the National Park Service, Washington, DC.

Towne, Marvin W., and Wayne D. Rasmussen

1960 Farm Gross Product and Gross Investment in the Nineteenth Century. In *Trends in the American Economy in the Nineteenth Century, The Conference on Research in Income and Wealth,* editor, pp 255-316. Princeton University Press, Princeton.

Trigger, Bruce G.

2009 *A History of Archaeological Thought*. 2nd ed., repr. Cambridge Univ. Press, Cambridge, UK.

Tsu, Cecilia M.

2009 Sex, Lies, and Agriculture: Reconstructing Japanese Immigrant Gender Relations in Rural California, 1900–1913. *Pacific Historical Review* 78(2):171–209 <https://online.ucpress.edu/phr/article-abstract/78/2/171/78258/Sex-Lies-and-Agriculture-Reconstructing-Japanese?redirectedFrom=fulltext>. Accessed 3 January 2023.

Tufts, Warren P.

1946 The Rich Pattern of California Crops. In *California Agriculture*, edited by Claude B. Hutchison; pp. 114-146. University of California, Berkeley Press, Berkeley, CA.

Turner, John

1981 *White Gold Comes to California*. California Planting Cotton Distributors. Bakersfield, CA.

United States Census Bureau

1900 Agricultural Schedules: 1850-1900. Pp 741-767

<https://www.archives.gov/research/census/nonpopulation#agricultural>. Accessed 16 February 2023.

<https://www.census.gov/history/pdf/agcensusschedules.pdf>. Accessed 16 February 2023.

1930 Extract from the Census Act. Instructions to Enumerators for the Census of Agriculture, 1930. Farm Schedules Census of 1930, 1925, and 1920.

1940 Sixteenth Decennial Census of the United States. Instructions to Enumerators: Population and Agriculture, 1940. Page 80.

1950 *U.S. Census of Agriculture: 1950*. United States, Washington, DC.

United States Department of Agriculture (USDA)

n.d. El Dorado National Forest Records. National Forest Service. Placerville, CA.

University of California, Santa Cruz

1997 Agricultural History of Santa Cruz County, Oral History Interviews, Regional History Project, McHenry Library, University of California, Santa Cruz, CA <https://library.ucsc.edu/regional-history-project>. Accessed 20 January 2023.

University of California, Davis
2004 *Managing Dairy Manure in the Central Valley of California*. University of California, Davis, Division of Agriculture and Natural Resources, Davis.

2020 Pecan in California. University of California, Davis Fruit & Nut Research and Information Center <https://fruitsandnuts.ucdavis.edu/pecan-california>. Accessed 16 February 2023.

United States Bureau of the Census
1880 Industry and Special Schedules, Butte County, Volume 4, sheet 3. On file, California History Room, California State Library, Sacramento, California.

U.S. Department of Agriculture (USDA)
2021a National Agricultural Library's Agricultural Thesaurus and Glossary. U.S. Department of Agriculture, Washington, DC <https://agclass.nal.usda.gov/>. Accessed 19 December 2021.

2021b Economic Research Service's Glossary. U.S. Department of Agriculture, Washington, DC <https://www.ers.usda.gov/data-products/major-land-uses/glossary/>. Accessed 19 December 2021.

United States Department of the Interior
1983 Secretary of the Interior Standards for Archeological Documentation.

United States Department of the Interior, Bureau of Land Management (editor)
2016 The Federal Land Policy and Management Act of 1976 as amended. USDI, BLM, Office of Public Affairs, Washington DC.

Valdes, D. N.
2019 National Agricultural Statistics Service. 2019 California Walnut Acreage Report <https://walnuts.org/report/acreage-report-2019/#:~:text=California's%202019%20walnut%20acreage%20is,variety%20with%20133%2C609%20bearing%20acres>. Accessed 10 February 2023.

2020 Farms and Land in Farms: 2019 Summary. USDA, National Agricultural Statistics Service <https://www.nass.usda.gov/Publications/Todays_Reports/reports/fnlo0220.pdf>. Accessed October 2020.

Van Bueren, Thad M.
1998 Dragstones and Stockraising: Results of Archaeological Test Excavations at CA-AMA-363/H and -364/H in Amador County, California. Prepared for California Department of Transportation, Stockton, CA.

2005 Lending a Hand: Archaeological Perspectives on Farm Labor at the Brown and Sanderson Farm (CA-AMA-364/H) in Amador County, California. Prepared for California Department of Transportation, Stockton, CA.

2006 Between Vision and Practice: Archaeological Perspectives on the Llano del Rio Cooperative. *Historical Archaeology* 40(1):133-151.

Van Bueren, Thad M. *continued*

2009 (Not) Just Another Isolated Historic Refuse Scatter. *California Archaeology* 1(2):163–182.

2014 Archaeological Excavations at CA-YUB-438/H and CA-YUB-1772, near Smartsville in Yuba County, CA. Prepared for California Department of Transportation, Marysville, CA.

Van Bueren, Thad M., Steve Grantham, and Julia Huddleson

1994 CA-MNT-1382/H. In *Phase II Archaeological Investigations for the Castroville Bypass Project, Monterey County, California* by Terry L. Jones, Thad M. Van Bueren, Steve Grantham, Julia Huddleson, and Teresa Fung, pp. 115-182. Prepared for California Department of Transportation, San Luis Obispo, CA.

Van Bueren, Thad M., Judith Marvin, Sunshine Psota, and Michael Stoyka

1999 Building the Los Angeles Aqueduct: Archaeological Data Recovery at the Alabama Gates Construction Camp. Prepared for California Department of Transportation, Bishop, CA.

2004 Contemplating Household Transitions: Investigations at the Carnduff Dump (CA-SMA- 368/H) in San Mateo County, California. Prepared for California Department of Transportation, Oakland, CA.

Van Bueren, Thad M., and Kimberly Wooten

2009 Making the Most of Uncertainties at the Sanderson Farm. *Historical Archaeology* 43(2):108-134.

Van Bueren, Thad M., and Susan Walter

1994 Historical Study Report for the Root Homestead (CA-SDI-9258H) and Yamamoto Farm Workers Camp, Interstate 125 South Project. Prepared for California Department of Transportation, San Diego, CA.

Van Wormer, Stephen R.

1979 Historical Analysis of Site W-2198. In *Phase I Archaeological Investigations at Rancho Jamul Estates, Unit 3, Jamul, California* by Richard L. Carrico. Submitted to San Diego County Department of Planning and Land Use, San Diego, CA.

1984 *Analysis of Refuse Recovered from Two Privies at the Hubert Ranch, Oceanside, California*. Submitted to San Diego County Department of Planning and Land Use, San Diego, CA.

1985 An Analysis of a Historic Trash Deposit at W-1969. *Pacific Coast Archaeological Society Quarterly* 21(4):39-50.

Van Wormer, Stephen R., and Susan M. Hector

1988 *Historical and Archaeological Assessment of the Lieffering House*. Submitted to San Diego County Department of Planning and Land Use, San Diego, CA.

Van Wormer, Stephen R., and Jerry Schaefer
1988 Hardscrabble Ranch: Archaeological Investigations at the Robert Israel Adobe. Submitted to Olivenhain Municipal Water District, Encinitas, CA.

Vaught, David
1999 *Cultivating California: Growers, Specialty Crops, and Labor, 1875-1920*. Johns Hopkins University Press, Baltimore, MD.

2007 *After the Gold Rush: Tarnished Dreams in the Sacramento Valley*. John Hopkins University Press, Baltimore, MD.

Voorhies, Edwin C., and Robert W. Rudd
1950 Sheep and Wool Situation in California, 1950. California Agricultural Experiment Station, University of California, Berkeley <https://ucanr.edu/sites/UCCE_LR/files/202125.pdf>. Accessed November 2020.

Vossen, Paul
2004 *Chestnut Culture in California*. University of California Division of Agriculture and Natural Resources, publication 8010, Oakland, CA.

Wade, Sue A., Dale M. Cheever, and Stephen Van Wormer
1990 An Archaeological Testing Program for Twelve Sites within the Woods Valley Ranch Project Area, Valley Center, California. Submitted to San Diego County Department of Planning and Land Use, San Diego, CA.

Waghorn, Annita, and Michael D. Meyer
2004 Historic Archaeological Investigations of the City Center Cinemas Block Bound by Miner Avenue and Hunter, El Dorado, and Channel Streets, Stockton, California. Prepared for the Redevelopment Agency of the City of Stockton, Stockton, CA. On file, Anthropological Studies Center, Sonoma State University, Rohnert Park, CA.

Walker, Don
1992 Race Relations and Specialty Crops: San Joaquin county Agriculture, 1902-1925. Master of Arts thesis, California State University, Sacramento.

Wallerstein, Immanuel
1980 The Modern World System II: Mercantilism and the Consolidation of the European *World Economy, 1600-1750.* Academic Press, New York, NY.

Walnut Marketing Board and California Walnut Commission
2020 Walnut History. California Walnuts <https://walnuts.org/about-walnuts/history/>. Accessed November 2020.

Water Resources Collections and Archives (WRCA)
1997 U.C. Berkeley, California Water Resource Library. “Liquid Gold: California’s Water,” an Exhibit by the Water Resources Center Archives. Formerly at UC Berkeley, now at UC Riverside, CA.

Watson, Bruce
2022 Beyond “Migrant Mother” <https://www.theattic.space/home-page-blogs/2022/3/10/beyond-migrant-mother>. Accessed 11 April 2022.

Waugh, Isami A., Alex Yamoto and Raymond Y. Okamura
1988 Japanese Americans in California. In *Five Views: An Ethnic Site Survey For California*, California Department of Parks and Recreation, Office of Historic Preservation, Sacramento, CA. Online Book <https://www.nps.gov/parkhistory/online_books/5views/5views6.htm>. Accessed 11 January 2023.

Weeks, Charles.
1920 *Egg Farming in California: A Poultry Book*. Schwabacher-Frey Stationery Co., San Francisco, CA.

Weir, William C., and Reuben Albaugh
1954 *California Sheep Production*. University of California College of Agriculture. University of California, Davis.

Wells, Ronald A.
2009 *Cesar Chavez’s Protestant Allies: The California Migrant Ministry and the Farm Workers*. National farm Worker Ministry archive, University of California-Berkeley Library.

Wells, Tom
1998 Nail Chronology: The Use of Technologically Derived Features. *Historical Archaeology* 32(2):78-99.

Weiser, Kathy
2021 Legends of America: The “Bum Blockade” – Stopping the Invasion of Depression Refugees <www.legendsofAmerica.com>. Accessed 10 February 2023.

Wheeler, Kathleen L.
1999 Women, Architecture, and Artifacts. Paper presented at the annual meeting of the Society for Historical Archaeology in Long Beach, CA.

White, Carolyn L., and Mary C. Beaudry
2009 Artifacts and Personal Identity. In *International Handbook of Historical Archaeology*, Teresita Majewski and David Gaimster, editors, pp. 209-225. Springer, New York, NY.

Wickson, Edward J.
1923a *The California Vegetables in Garden and Field: A Manual of Practice With and Without Irrigation for Semi-Tropical Countries*. Pacific Rural Press, San Francisco, CA.

1923b *Rural California*. The Macmillan Company, New York, NY.

Wilk, Richard R., and William D. Rathje (editors)
1982 Archaeology of the Household: Building a Prehistory of Domestic Life. *American Behavioral Scientist* 25.

Wilkins, Thurman
1995 *John Muir: Apostle of Nature*. University of Oklahoma Press, Norman, OK.

Wilson, Jack H. (editor)
1979 *Rice in California*. Butte County Rice Growers Association. Richvale, CA.

Wilson, John
1990 We've got Thousands of These: What Makes a Historic Farmstead Significant. *Historical Archaeology* 24(2):23-33.

Windmiller, Ric, Kenneth L. Finger, and Carol Roland-Nawi
2011 Gray Lodge Water Supply Project. Cultural Resources Inventory and Evaluation. Butte County, California. Prepared for Harvey Consulting Group, LLC, Gold River, California <https://www.usbr.gov/mp/nepa/includes/documentShow.php?Doc_ID=15404>. Accessed 14 May 2019.

winesvinesanalytics
2020 United States Wineries: Statistics by State <wva.com/statistics/winery>. Accessed November 2020.

Wisconsin Historical Society
2022 Identifying Problems with Your Historic Poured Concrete Foundation. Wisconsin Historical Society webpage <https://www.wisconsinhistory.org/Records/Article/CS4219#:~:text=Origins%20of%20Poured%20Concrete%20Foundations,Homes%E2%80%9D%20catalog%20starting%20in%201912>. Accessed 10 February 2023.

Woeste, Victoria Saker
1998 *The Farmer Benevolent Trust: Law and Agricultural Cooperation in Industrial America, 1865-1945*. University of North Carolina Press, Chapel Hill, NC.

Woirol, Gregory R.
1992 *In the Floating Army: F. C. Mills on Itinerant Life in California, 1914*. University of Illinois Press, Chicago, IL.

Wollenburg, Charles
1972 "Race and Class in Rural California: The El Monte Berry Strike of 1933," *California Historical Quarterly*, LI, No. 2, (Summer 1972): 155-164.

Wood, Susan, Joan George, and Evan Mills
2020 Phase I Cultural Assessment for the Public Safety Campus Project in the City of Indio, Riverside County, California. Prepared for Albert A. Webb Associates, Riverside, CA. Prepared by Applied EarthWorks, Inc., Hemet, California.

Works Progress Administration
1939a *California: A Guide to the Golden State*. Compiled and written by the Federal Writer's Project of the Works Progress Administration for the State of California. Hastings House, New York, NY.

Worster, Donald

1985 *Rivers of Empire: Water, Aridity, and the Growth of the American West*. Pantheon Books, New York, NY.

Wurst, LouAnn

2003 A Breath of Fresh Air: Viewing Industrialization from the Countryside. Paper presented at the Society for Historical Archaeology annual meeting in Providence, RI.

Wurst, LouAnn, and Robert K. Fitts (editors)

1999 Confronting Class. *Historical Archaeology* 33(1).

Wurst, LouAnn, and Quentin Lewis

2022 Marxism, Historical Archaeology, and the Web of Life. In *The Routledge Handbook of Global Historical Archaeology*, Charles E. Orser, Andrés Zarankin, Pedro Paulo A. Funari, Susan Lawrence, and James Symonds, editors, pp. 336–352. Routledge, Abingdon, Oxon, UK.

Wyatt, Barbara

1998 *Surveying and Evaluating Vernacular Architecture*. National Register Bulletin 31. National Park Service, Department of the Interior, Washington, DC.

Wylie, Alison

1999 Why Should Historical Archaeologists Study Capitalism? The Logic of Question and Answer and the Challenge of Systemic Analysis. In *Historical Archaeologies of Capitalism* edited by Mark P. Leone and Parker B. Potter, Jr., pp. 23-50. Plenum Press, New York.

Yamin, Rebecca

1998 Tales of the Five Points: Working-class Life in 19th-Century New York. Submitted to U.S. General Services Administration.

2001 Becoming New York: The Five Points Neighborhood. *Historical Archaeology* 35 (3).

Yentsch, Anne

1993 Domestic Sites. In Tar Flat, Rincon Hill, and the Shore of Mission Bay: Archaeological Research Design and Treatment Plan for SF-480 Terminal Separation Rebuild, edited by Mary Praetzellis and Adrian Praetzellis, pp. 256-285. Prepared for California Department of Transportation Oakland, CA.

Ziesing, Grace H.

1996 Investigations of Three Historic Archaeological Sites, CA-CCO-447/H, CA-CCO-445H, and CA-CCO-427H, for the Los Vaqueros Project, Alameda and Contra Costa Counties, California. Submitted to the Contra Costa Water District, Concord, CA.

PRIMARY SOURCES, REFERENCES REPOSITORIES AND COLLECTIONS

Agriculture History Project

Codiga Center and Museum, Agriculture History Project, Watsonville, CA. Anaheim Public Library.

Anaheim Public Library Photograph Collection on Anaheim Local History, Digital Anaheim: Primary Sources in the Classroom, Anaheim Public Library, Anaheim, CA <https://www.anaheim.net/2456/Classroom-Sources>. Accessed 16 February 2023.

Bancroft Library, The

The Bancroft Library Pictorial Collection, The Bancroft Library, University of California, Berkeley, CA.

California Historical Society

North Baker Research Library, California Historical Society, San Francisco, CA.

California State Archives

California State Archives Government Publications Unit, California State Archives, Sacramento, CA.

California State Parks

California Dairy Industry History Collection, California State Parks, State Museum Resources Center, West Sacramento, CA.

California State University, Sacramento

The Japanese American Archival Collection, Department of Special Collections and University Archives, Library, California State University, Sacramento, CA.

El Dorado National Forest

El Dorado National Forest Records, El Dorado National Forest, Placerville, CA.

Imperial County Historical Society

Museum Archives, Pioneers Museum & Cultural Center of the Imperial Valley, Pioneers Park, Imperial, CA.

Monterey County Agricultural & Rural Life Museum, The

Archive Room, the Monterey County Agricultural & Rural Life Museum, San Lorenzo Park, King City, CA.

Oakland Museum of California

The Dorothea Lange Collection, Oakland Museum of California, Oakland, CA.

Regents of the University of California
The Online Archive of California (OAC), California Digital Library <https://oac.cdlib.org/>. The OAC brings together historical materials from a variety of California institutions, including museums, historical societies, and archives. Over 120,000 images; 50,000 pages of documents, letters, and oral histories; and 8,000 guides to collections are available.

San Joaquin Valley Library System
San Joaquin Valley & Sierra Foothills Photo Heritage, San Joaquin Valley Digitalization Project, San Joaquin Valley Library System, Fresno, CA <http://www.sjvls.org/>. Accessed 16 February 2023.

University of California, Davis
Agricultural and Resource Economics Library, University of California, Davis, CA.

University of California, Davis
Eastman's Originals Collection, Department of Special Collections, Peter J. Shields Library, Davis, CA.

University of California, Los Angeles
Los Angeles Times Photographic Archive, Department of Special Collections, Charles E. Young Research Library, University of California, Los Angeles, CA.

United States Department of Agriculture
National Agricultural Library, Beltsville Agricultural Research Center, United States Department of Agriculture, Beltsville, MD.

APPENDIX A

HISTORICAL RESEARCH

APPENDIX A
HISTORICAL RESEARCH

Archival research is a process that needs to be conducted by qualified individuals in concert with researchers familiar with the nuances of the property being evaluated. Once an agricultural property is identified, the historic context (Chapter 2) included in this study should be reviewed, followed by examination of secondary and primary source materials in preparation of a land-use history that interprets the type, duration, and characteristics of occupation and the activities that occurred on the property. Depending on the nature of the agricultural property, different resources and archives may need to be consulted. Investigations at an 1880s Chinese agricultural reclamation camp would require an archival research strategy and a set of sources different from those required by a family farm homesteaded in the 1910s. However, some basic approaches can be laid out.

CONDUCT RESEARCH

Natural conditions, land laws and regulations, technology, economics, and culture all interact to shape the diverse landscape of California. The literature on agriculture is so voluminous that it would be difficult to consider every useful publication much less the substantial gray literature produced largely from cultural resource studies of individual properties. For that reason, this study seeks to synthesize some of the most important repositories without filling in all the regional, cultural, and temporal variations typically considered when approaching the evaluation of a particular agricultural property.

A variety of publications are available that describe California's agricultural diversity. The *California Farmer* (later *the Pacific Rural Press*), which dates to 1854, is perhaps the oldest and most informative periodical on specific products and technology, including individual farms and ranches. Issues of the *California Farmer* and the *Pacific Rural Press* are available from the California Digital Newspaper Collection[1]. The California Agricultural Society published the proceeding of its annual meetings beginning in the 1850s. The society's publications provide a good context for interpreting the evolution of California agriculture, its products, and requisite technologies and are available on the Hathi Trust website[2].

A wide variety of more descriptive books emerged between the 1860s and 1880s and often outlined each county's resources as they related to various industries. County or regional histories became widespread after 1880 and extolled the virtues of the region's industries, such as agriculture. Critical analyses regarding the state's diverse agricultural industry appeared later in the twentieth century. Of particular importance to interpreting California's diverse citrus industry is a series of articles that appeared in *California History* in the Spring of 1995. The volume entitled *Citriculture and Southern California* (Barron 1995) provides a good overview of

[1] https://cdnc.ucr.edu/

[2] https://catalog.hathitrust.org/Record/009134600

the citrus industry and how it evolved. Richard Stephen Street's *Beasts of the Field* (2004) provides an overview of California agriculture, labor conditions, and minority/ethnicity and identify issues. *Cultivating California* (Vaught 1999) discusses specialty crops and labor issues. *After the Gold Rush* (Vaught 2007) provides an overview of California's wheat industry and the diversification of the Sacramento Valley.

Much of the state's agricultural history has focused on the wheat industry because of its unprecedented economic importance, as well as the consequences of the industry in the development of new technology and the beginnings of mechanized farming (Jelinek 1982). The cattle industry has garnered attention, in books by Paul F. Starr (1998), David Igler (2001), and a series of articles in various journals including the *Journal of San Diego History*.

Interest in the viticulture industry has gained the attention of both historians and journalists in recent years because of brisk wine sales across the United States and has resulted in the publication of hundreds of books and articles on the subject. Vincent Carosso (1951) provides a good overview of how the industry evolved in California from the nineteenth through the mid-twentieth century. An excellent website titled, "Sonoma County Wine Library" focuses on the state's viticulture industry and is based out of the Healdsburg Branch of the Sonoma County Library (2020). This site is extremely useful for accessing source material related to the state's wine industry, including a large quantity of primary source documents. It can be found on the Sonoma County library's website[3].

There have been a number of regional and statewide historic studies of the important dairy industry. Anthony Kirk produced a comprehensive bibliography about the dairying industry between 1770 and 1945 (Kirk 2000). Much of what Kirk extracted came from records at the California Dairy Museum and Educational Foundation at Cal Poly San Luis Obispo. Of particular importance are works by Sue Abbot (1989), Lawrence Jelinek (1982), and Robert Santos (1994). Santos (1994), who provide a well-documented and comprehensive glimpse at the industry from its beginning through the first part of the 20th century.

The City of Ontario prepared a study of the New Model Colony (NMC) dairy district landscape (Galvin & Associates 2004) highlighting the dairy farms operated primarily by Portuguese, Dutch and French Basque farmers. The NMC historic context looks at three periods in in local and regional dairy farming: free grazing, dry lot to mechanization, and intense high technology.

Gathering data on a specific resource, placing it into a local, regional, or state context, understanding when it was constructed and how it evolved through time, and determining significance often requires more specialized research. Records are available from federal, state, local, and private repositories and online sources that can inform on past owners, a property's physical development over time, and its role in local history. The following discussion provides a synopsis of major repositories, the information they contain, and the usefulness of the data. Online links and websites are valid as of 2022.

[3] https://sonomalibrary.org/locations/sonoma-county-wine-library

Federal Records

United States Department of the Interior, Bureau of Land Management

The Bureau of Land Management (BLM) houses General Land Office (GLO) records that include Federal land conveyance records from 1788 to present. California has 233,797 records of land patents on public land managed by BLM. These records can include federally issued land patents, survey plat images, field notes, land status records, control documents, and tract books. Materials are available in online in digital format[4] and searchable by type (rancho plats, homestead entry, stone and timber act, mineral claim, etc.), location (township, range, section), or document identifier (patent, general survey). In addition, regional BLM offices maintain hard copies of cadastral survey and other plats, surveyor notes, and mine claim records.

Regional BLM offices are responsible for issuing special use permits on lands managed by the BLM, including grazing permits. Regional offices vary in the years of available permits, as some records are sent to the National Archives for storage. However, permits related to grazing provide the number and type of livestock grazed on BLM lands, season of use, owner and permittee, and numbers of acres with affiliated range maps. Cultural resources departments at the regional offices maintain a wide variety of historical maps and research, prehistoric and ethnographic information, reports and site records (not always filed with the Information Center), as well as memoirs, oral interviews, photographs, and other pertinent data. A list of regional offices can be accessed on the BLM website[5].

United States Department of the Interior, National Park Service

Authorized by the National Historic Preservation Act of 1966 (NHPA)and maintained by the National Park Service (NPS), the NRHP database can be accessed on the NPS website[6].

Library of Congress

The Library of Congress is the research library that official services the United States Congress and is one of the largest libraries in the world. The Library has digitized collections of governmental records, photographs, maps, and other primary data sources that are available to researchers. The Historic American Buildings Survey (HABS) and the Historic American Engineering Record (HAER) collections are among the largest and most heavily used in the Prints and Photographs Division of the Library of Congress. Since 2000, documentation from the Historic American Landscapes Survey (HALS) has been added to the holdings. The collections document achievements in architecture, engineering, and landscape design in the United States and its territories through a comprehensive range of building types, engineering technologies, and landscapes.

Administered since 1933 through cooperative agreements with the National Park Service, the Library of Congress, and the private sector, ongoing programs of the National Park Service have

[4] https://glorecords.blm.gov/default.aspx

[5] https://www.blm.gov/california

[6] https://www.nps.gov/subjects/nationalregister/database-research.htm

recorded America's built environment in multiformat surveys comprising more than 581,000 measured drawings, large-format photographs, and written histories for more than 43,000 historic structures and sites dating from Pre-Columbian times to the twentieth century. This online presentation of the HABS/HAER/HALS collections includes digitized images of measured drawings, black-and-white photographs, color transparencies, photo captions, written history pages, and supplemental materials. The HABS, HAER and HALS programs add new documentation to the collections each year. The searchable HABS/HAER/HALS collection can be found on the NPS website[7].

United States Department of Agriculture, Forest Service

California's national forests are primarily included in the United States Department of Agriculture's Region 5. The headquarters for Region 5 is housed in their regional office (RO) located on Mare Island in Vallejo, Solano County. Each of the 13 individual forests in Region 5 has a single Supervisor's Office (SO), as well as numerous outlying small district offices. A list of Forest Service offices can be found at

Similar to the BLM, the USFS maintains a variety of records in their RO, SOs, and outlying district offices. Heritage offices have historical forest maps, oral interview and other files, homestead application and grazing records, tribal information, site records (that are not always filed with the Information Center), and other data. Land departments in the USFS districts and SO maintain grazing permits and records, including developed springs, watering areas, cowboy camps, and related records that reflect over 100 years of homesteading and ranching use on the forests.

United States Department of Agriculture, Census of Agriculture Historical Archive

The official USDA website contains a variety of historic agricultural publications by state from the 19th and 20th centuries including statistics, census reports, track records, trends, and price reactions available for download in PDF format. Census reports provide information regarding land use, ownership, operator characteristics, production practices, income and expenditures, and other information. USDA records can be accessed on their website[8].

United States Department of Agriculture, Soil Conservation Service

Field operations of the United States Soil Survey, now known as the National Cooperative Soil Survey, began in 1899. The recognition and initial documentation of San Joaquin soil as one of the first four soil series in California considered to have agricultural importance occurred in 1900. The USDA and the Soil Conservation Service meticulously mapped out the state's diverse soil types and published the results by county between the early 1930s and 1960s. These documents include detailed descriptions, maps, and photographs, and are available at the California State Library, Government Publications Section, Sacramento. Some archived soil

[7] https://www.nps.gov/hdp/coll.htm

[8] https://www.usda.gov/

survey documents are available online at the California Soil Resources Lab[9] and on the USDA Web Soil Survey website[10]. The Natural Resources Conservation Service maintains an online resource/tool website[11].

United States Geological Survey

The United States Geological Survey (USGS) provides an assortment of research tools for many diverse industries, including agriculture. Historical topographic maps are a small part of the department's service repertoire; however, they are remarkably helpful to historical research. The USGS TopoView[12] service and USGS Historical Topographic Map Explorer[13] presents a free digital archive of historical and recent topographic maps that can be overlaid onto any part of the United States. The maps can also be downloaded as a high-resolution PDF or as a GeoTiff, GeoPDF, or KMZ for use with geo-referencing tools such as Google Earth, ArcGIS, and others.

United States Patent and Trademark Office

US Patent and Trademark Office Records are useful in identifying farm equipment, artifacts, structural material, automobiles, windmill blades, and any item when patent numbers or patent registration dates are present. The USPTO website[14] includes detailed tutorials on how to conduct preliminary searches and advanced searches. Patents may be searched in the USPTO Patent Full-Text and Image Database (PatFT). The USPTO houses full text for patents issued from 1976 to the present and PDF images for all patents from 1790 to the present.

State Records

A selection of state repositories and record types is provided below. This is not considered a comprehensive list. It is important to check local colleges, district state agency offices, and other repositories when planning archival research. While some items may be accessed online, most records held at state repositories, especially older or rare materials, typically require an on-site visit and therefore should be considered in the second tier of research.

California State Library

The California History Room of the California State Library, contains reference materials related to agricultural history including resources for researching California land grants, pamphlets, photographs, books maps, county histories and historical society publications, cataloged newspapers, trade journals such as the California Farmer (later Pacific Rural Press); voter's registrars, selected Probate, Court and Superior Court case files; letters, diaries, and manuscripts donated to the library; and oral histories. The Government Publications section includes books, documents and reports produced by federal, state, and local government

---

[9] https://casoilresource.lawr.ucdavis.edu/soilweb-apps/

[10] https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

[11] https://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/survey/tools/

[12] https://ngmdb.usgs.gov/topoview

[13] https://livingatlas.arcgis.com/topoexplorer/index.html

[14] https://www.uspto.gov/patents/search

entities, including the USDA and the Soil Conservation Service reports mentioned above under Federal Records.

California State Archives

The California State Archives[15] contains all California related governmental public records, registered maps, books, papers, rolls, documents and other materials from 1850 to the present including articles of incorporation from 1850 to 1959, which are filed alphabetically by company name and include purpose, place of business, names of officers, and amount of capital invested; and California trademarks from1861 to the present, filed numerically by trademark number and chronologically by date of filing, including name of claimant, type of product, label specimen or written description and occasionally business address(Claimant and trademark name indexes are available). The Archives also has collections associated with California's Agricultural Society formed in 1854, otherwise known as the Transactions of the California Agricultural Society; the William (Ham) J. Hammond Collection, which includes numerous maps, diaries, and journals related to water and irrigation; and historical records from the California Department of Food and Agricultural (see below)

The Archives has a searchable online descriptive catalog (Minerva) and an online archive that contains select digitally available materials or collection overviews as well as instructions for access to those materials. Research services can be provided for a fee.

University of California and California State University systems

California Universities and State Universities usually house special collection rooms that focus on local and regional histories. Campuses located in predominately agricultural areas, such as the University of California (UC) Davis, UC Santa Cruz, UC Riverside, San Jose State University, California State University (CSU) Bakersfield and CSU Chico, have extensive collections documenting the general agricultural history as well as photographic and other collections emphasizing individual farms, dairies, or ranches. UCLA, UC Berkeley, UC Riverside, UC Merced, and UC Davis have collections of theses and doctoral dissertations related to California Agriculture, some of which date back to the 1930s and include original photographs. CSU-Chico has a large collection of papers, photographs, and theses relating to the wheat and rice industries in northeast California. Humboldt State University (now Cal-Poly Humboldt) and CSU-Bakersfield collections emphasize the dairy industry.

Cal Poly Pomona has a very large agriculture program with available online resources[16]. The Cal Poly Pomona library includes a link to a compiled list of agricultural references[17] prepared by Richard Orsi in 1974.

[15] https://www.cdfa.ca.gov/CDFA-History.html

[16] https://www.cpp.edu/agri/

[17] https://csu-cpp.primo.exlibrisgroup.com/discovery/fulldisplay?docid=alma991000838539702915&context=L&vid=01CALS_PUP:01CALS_PUP&lang=en&search_scope=everything&adaptor=Local%20Search%20Engine&tab=Everything&query=title,exact,List%20of%20references%20for%20the%20history%20of%20agriculture%20in%20California.,AND&mode=advanced&offset=0

The agricultural history collections at UC Davis focus primarily on the Sacramento and San Joaquin valleys and are housed in the Shields Library, Archives and Special Collections branch. The Agricultural History Center Collection contains records related to the Center, founded in 1964, including correspondence, reports and card files. A preliminary list of contents for this collection is available from the Special Collections at UC Davis or as a PDF from the Online Archive of California (OAC). The Online Archive of California[18] provides free public access to primary sources—including manuscripts, photographs, artwork, scientific data and more—through collection guides and 250,000 digitized images and documents. The COA and the related Calisphere site includes an extensive photograph collection, searchable by county, topic, name, or place. The images are important in establishing nearby local comparative examples of a farm or ranch, or in finding images of a specific property. The archives provide both primary and secondary data.

The Shields Library houses an important collection of documents related to viticulture and enology, and UC Davis curates a diverse collection of seeds from historical properties throughout the state. The Shields Library also contains a large collection of secondary sources related to agriculture, including bibliographies and bound issues of the Agricultural History Society's journal. Since 1946, the UC Davis has published a peer-reviewed quarterly journal about Californian agriculture. The journal includes research, reviews, news, and photographs and is an open-access resource that allows for reading, download, and distribution.

UC Davis and UCLA serve as Experimental Laboratories for Agriculture. Collections associated with the labs are extensive and include farm-specific data, photographs, and information on innovative technologies and approaches to farming equipment, harvesting, planting, fertilizing, and pest control.

UC Riverside maintains the Water Resources Collections & Archives (WRCA), established in 1958 as part of the University of California's Water Resource Center at UC Berkeley and relocated to UC Riverside in 2011. The archive acquires, preserves, and provides access to materials that document water-related issues throughout the United States and beyond, with a particular emphasis on issues affecting California. The collection consists of more than 200,000 technical reports, 45,000 historic photographs, over 5,000 geographic maps, 1,500 specialized newsletters, more than 200 manuscript collections, and continues to grow. Nearly all WRCA material can be accessed on line in the UC Riverside catalog. Finding Aids to the WRCA collections are available through the OAC. The records include original documents, maps, engineering drawings, and records related to California's dams, canals, siphons, ditches, and water conveyance. UC Riverside also has collections related to the citrus industry[19] and an experimental citrus station that was established in 1909.

[18] https://oac.cdlib.org/

[19] https://urldefense.proofpoint.com/v2/url?u=https-3A__cnas.ucr.edu_about_history_citrus-2Dexperiment-2Dstation&d=DwMFaQ&c=euGZstcaTDllvimEN8b7jXrwqOf-v5A_CdpgnVfiiMM&r=2T-EMbvVbpqNU2_OAVE9CXaDnxkQXtwSZ7gZ_a07xqo&m=GNmdechSsjhtBMiFQAtDcz8lZcYcL--dGWoXtC4mRFE&s=43U62cSTScPp2NGUdyVIFMZqsf6WrOMmHpR1qYyuLcE&e=

UC Riverside also hosts the California Digital Newspaper Collection[20] (CDNC). The CDNC is a project of the Bibliographical Studies and Research department and is supported by the US Institute of Museums and Library Services. This collection to date contains 675,782 issues comprising nearly 8 million pages and over 45 million articles. It is free and searchable by title, date, county or newspaper.

The Bancroft Library at UC Berkeley contains numerous collections essential to understanding California's agricultural history. The Western Americana Collection includes Hubert Howe Bancroft's documents and accounts of agricultural development in California, including specialized crops, as well as the formation and success of large-scale agricultural and ranching operations, including Miller & Lux. The papers of Paul S. Taylor, a UC Berkeley economist who studies rural populations, provides documentation related to Mexican American and other agricultural laborers. The library has an extensive oral interview collection, gathered over many years, including interviews and photographs of dust bowl migrants and agricultural camps of the 1920s and 1930s. A guide to the manuscript collections is available through the OAC.

The UC Santa Barbara Library[21] also has historical aerial photographs. This collection is free to access if they have already been scanned.

California Department of Food and Agriculture

Established in 1919 by the California State Legislature, the California Department of Food and Agriculture is responsible for ensuring the state's food safety, the protection of the state's agriculture from invasive species, and promoting the California agricultural industry. The department produces annual reports that summarize production, including produce, dairy, grains, and other crops. While much of their historical data (field reports, photographs, investigations into individual farms or dairies) are housed at the State Archives, the Department's website[22] includes several years of annual reports, statistical information on numbers and types of farms, and current work.

California Department of Transportation

Extensive highway roadwork was conducted in the late 1920s and throughout the 1930s and again following World War II by the Department of Public Works' Division of Highways—Caltrans' precursor. As part of the road engineering effort, detailed maps were prepared that included locations of buildings and structures present at the time, land owners, fences, agricultural fields, and other information. While the collection of maps does not include every highway and is incomplete, when available, these "As-Built" plans provide snapshots of what was physically on the ground in or adjacent to a planned state route at a given point of time.

[20] https://cdnc.ucr.edu/

[21] https://mil.library.ucsb.edu/ap_indexes/FrameFinder/

[22] https://www.cdfa.ca.gov/CDFA-History.html

California State Parks Office of Historic Preservation

The California Office of Historic Preservation (OHP) Historic Context Library[23] offers a limited inventory of local and statewide histories and underrepresented community studies with a select few on agriculture. Additionally, this resource also provides National Historic Landmarks (NHL) thematic studies and instructional guidelines for writing historic contexts.

California State Historical Landmarks (SHL), and California Points of Historical Interest (CPHI) are also maintained by the OHP. SHLs include sites related to farming, ranching, wineries, orchards, labor, or other agricultural-related topics. The CPHI is a state program that identifies and acknowledges locations of former resources of local and regional interest and importance, including agricultural resources, even if the resources no longer exists.

Local Government Records

Since the formation of California, counties and cities have been charged with maintaining local legal records. Knowing the county repositories and their specialties is important in forming a thorough and time efficient historical context and/or archaeological research plan. Major records available in some form at most counties and cities are discussed below.

Tax Assessor Records

County assessor's offices typically contain property tax information, land use and subdivision records, as well as parcel maps. Current assessment maps are often available online through the general county website page. However, the 58 counties of California that now exist (originally 27 counties in 1850) vary in the years and depth of available information. In addition, the recording methods used by former tax assessors were highly variable from county to county. In nineteenth and early twentieth century Sacramento County, for example, new plat books were developed every year, with land owners of each parcel written in pencil. During the same period, San Luis Obispo County assessors used one set of tax assessment plat books, erasing old owners and writing in the new owner's name as parcels changed hands, or gluing a new piece of paper over the parcel and then writing the new name. The plat books provide names of owners for the parcel in question. Once the land owner is known, the tax assessor rolls are valuable for the lists of taxable items for each parcel's owners (including farm equipment, livestock, numbers of buildings and types).

Tax Assessment records also track changes in value for a home, barn, or farm and list additions to individual structures and additions of new buildings to a property, as well as other improvements or alterations that affect the value of the property. These tax assessment records are valuable for verifying, new additions, and improvements to property over time. While these records may provide dates of construction, these are not necessarily correct. In general, the older the property, the less accurate the information, so additional research may be required to support the estimated dates of initial construction. The Tax Assessment offices also may include appraisal records. While these primarily post-date 1940, in some cases they

[23] https://ohp.parks.ca.gov/?page_id=24544

have earlier documents. These appraisal records are by APN and often provide detailed information on construction dates, building types, and locations (sketch maps are included) through time, allowing for more accurate assessments of integrity). Access to the appraisal records are only as allowed by law. Caltrans staff has access and contractors may gain access in some cases with intervention from Caltrans.

County Recorder

The county recorder’s office contains the legal records of the county including birth and death certificates, marriage licenses, property deeds, grantor/grantee indexes, liens, leases, homesteads, and sales. Probate, will, and other records may include inventories of properties, including number of livestock, farm equipment, and personal belongings. The recorder’s office also contains legal deeds for homesteads issued by the federal government, mineral claims, water rights, and road easements. Researching past owners of a parcel may involve a visit to the tax assessor first to review old plats for land owner names, then a trip to the county recorder to find the deed filed when the land was purchased.

Building Inspector Records

Building inspectors are charged with examining new construction, remodels of older buildings, and damaged buildings for compliance with local and state laws and regulations. Building records may be useful in determining dates of construction, dates of remodels or additions to older homes, or when a building was removed from a property due to damage, decay, or natural disasters. Some counties only have records dated after 1970; others have records extending back to the late 1940s.

County Archives

County archives typically act as repositories and storage facilities for historical records of county offices such as the county assessor and county recorder. Each county archive repository is independent and may hold different types of materials and have its own way of organizing historical information. Digitally available materials and access (free or paid) also varies from county to county. Many of the pre-World War II historical assessor land ownership plat maps are now housed at county archives. Some county archives, such as San Bernardino, retain the indexes to mine claims and other recorder’s office lists that detail the book and page number of a particular deed or land transaction. Once that book and page is known, a researcher must then go to the recorder’s office to view the actual document.

County Libraries

Some county and city main or central branch libraries have local history rooms that contain a variety of material gathered by the library staff and volunteers, such as vertical files, newspaper clippings and accounts, books on local history written by county or city residents, private manuscripts and papers donated by families or businesses, maps, city or county directories, and other material useful in understanding the evolution of a homestead or agricultural property. Other pertinent information may include telephone books, accounts of county fair entries and awards, student papers, photograph collections, or scrapbooks kept by volunteer staff (often by subject). For example, the Sacramento Room in the Sacramento Central Library has county and city directories dating back to 1852, shelves of telephone books, drawers of Sanborn Fire Insurance Maps, and local histories. The Arda Haenszel California Room at the San Bernardino Central Library has extensive vertical files, subject binders of oral interviews, newspaper accounts, photographs, and other data collected by local avocational historian Arda Henzel; and a complete collection of the *San Bernardino Sun* (as well as many other records). The Los Angeles Public Library has a digitized collection of agricultural images available online.

County Historical Societies and Museums

Individual county historical societies and museums are often small, but usually contain unique or difficult to find documents and artifacts that are not available at the State level. Employees or volunteers tend to be well versed in the local county history. Some historical societies and museums are free, while others offer services for a fee. Some publish (or did publish) newsletters or other publications on various local historical topics or events. They may have extensive photographic collections, vertical files arranged by subject or persons; personal letters or diaries; and oral history collections. The historical society and its collections may be separate from the local museum (for example, Humboldt and Inyo Counties), or combined into one facility (Del Norte County).

Other Useful Sources

Place Names

The name of town or community itself can be a source of information on not only history, land use, living and working conditions, climate and soils, but issues related to race, ethnicity, and gender. There are several major publications that explore the origin of California place names including studies by Gudde (1998) and Hanna (1951). Erwin Gudde's *California Place Names* was first published in 1949 and revised numerous times since its initial printing. Hanna compiled a dictionary of California land names in 1951 in conjunction with the Auto Club of Southern California. Both sources provide insight into the etymology of California's place names.

Private Colleges, Universities, and Libraries

Some private colleges and universities contain special collections or specialized libraries focusing on agricultural. For example, the University of Southern California Gale Agricultural Collection has materials that span the entire industry, from practical aspects to cutting edge research in horticulture. A database to access their collections is available online. Stanford University also has collections, theses and dissertations related to agriculture in the Santa Clara area. The Huntington Library has photographic and manuscript collections. Private colleges often have restrictions for non-affiliated researchers and must be contacted in person.

Private or Local Museum and Farms

California has several museums that specialize in agricultural exhibits and research. Heidrick Agricultural History Center (also known as the California Agricultural Museum) in Woodland is dedicated to enhancing understand of California's rich cultural heritage. It retains a large collection of antique tractors, harvesters, and other equipment. Researchers are available to assist with identification of farm implements, and the research center has catalogs and publications related to California's agricultural industry. The Agricultural Museum of Ventura County in Santa Paula houses a broad collection of farm implements and equipment. Numerous privately owned historic farms and ranches, such as Casa de Fruta in Santa Clara County, are open to the public and include self-guided tours, antique plows, tractors, and equipment. A search of local sources is useful in finding experts who can assist in identification of buildings, structures, objects, remnant equipment, or archaeological features and artifacts related to the agricultural industry. The Autry Museum of the American West collections[24], including a large collection of citrus packing labels.

On-Line Resources

The California Lands Patent Database[25] provides a county-by-county list of all the successful homestead entries and the names of the individuals receiving patents, including the date, township, range, and section of the entry.

Ancestry.com[26] is a research based website was created The Church of Jesus Christ of Latter Day Saints (LDS) as a tool for genealogy research, but in 2020 it was acquired by The Blackstone Group. A free subscription allows for basic searches of United States and Voters Registration records. The paid subscription opens up access to immigration records (including ship logs and registers), military records, birth and death information, and other data. This site can be a useful component in researching family groups, immigrant labor forces, and connections between farming colonies and communities with their overseas families.

Holders of a California State Library[27] Card (any state employee is eligible) can access HeritageQuest. This site provides access to census roll images and has other records useful for searching specific names.

Newspapers.com[28] is also owned and maintained by the Church of Jesus Christ of Latter Day Saints. This is a paid subscription service that provides access to a large archive of newspapers from across the US, dating back as early as the 18th century. The database is searchable by keyword, state, date range, and newspaper provider. It is useful in identifying innovations in agricultural technology, studying the success and failures of ranches and farms, and general industry history.

[24] http://collections.theautry.org/mwebcgi/mweb.exe?request=home

[25] https://glorecords.blm.gov/

[26] https://www.ancestry.com/

[27] https://www.library.ca.gov/

[28] https://www.newspapers.com/

HistoricAerials.com[29] is a service offered by Nationwide Environmental Title Research that allows for the viewing of a limited chronology of historic aerials, typically ranging from the mid-20th century to recent years. Historic aerials can be compared side by side, by overlay, or compared to topographic overlays. While the service is free to use, images are copyrighted and must be purchased to download or print.

[29] https://www.historicaerials.com/

APPENDIX B

FIELD METHODS FOR EVALUATING HISTORICAL ARCHAEOLOGICAL SITES

APPENDIX B
FIELD METHODS FOR EVALUATING HISTORICAL ARCHAEOLOGICAL SITES

The Secretary of the Interior's *Standards for Archeological Documentation* provide general guidance on the conduct of archaeological investigations (United States Department of the Interior 1983). Although field investigation methods vary with site structure and the overall goals of the work, archaeologists need to use generally accepted professional standards, or best practices, to evaluate the information potential of historical archaeological sites. This section offers guidance on these standards. Its goal is to foster common standards without constraining genuine innovation.

Metal detection is often used at rural homesteads or farms to identify remnants of buildings, buried refuse deposits, or activity areas. One of the more important and noninvasive routes for subsurface identification at an archaeological site is geophysical survey (ground-penetrating radar [GPR], magnetometry, or resistivity). These methods may provide a subsurface image of features at an archaeological site. Ideally, this type of survey can be done before test excavations. Combining results with metal detection, allows archaeologists to focus limited resources as efficiently as possible. Information gained through geophysical survey may aid in the identification of a site and in the evaluation of its NRHP eligibility and CEQA significance by gathering context-related data on subsurface components. This option can be especially helpful in the identification of historical structures and other features (e.g., privies or millraces) that are buried beneath parking lots, streets, or fill. Chapter 5 of The Caltrans *Standard Environmental Reference* (SER) Volume II (2022) contains a discussion of the requirements for and benefits of incorporating a geophysical survey into project schedules.

No hard-and-fast rule dictates how much excavation is necessary to determine eligibility. Subsurface investigation may not be necessary to gather sufficient data for evaluation. Little et al. (2000:31) noted that

> The patterning of artifacts and features on the ground surface of some properties may be sufficient to warrant nominating them to the National Register. If this is the case, then demonstrating the presence of intact subsurface artifacts or features patterning through test excavations may not be required.

Archaeologists should conduct the minimum amount of subsurface research necessary to determine NRHP eligibility. Researchers carrying out evaluation or data recovery excavations in compliance with Section 106 of the NHPA or CEQA need to limit their excavations to portions of the site that will be impacted by the proposed undertaking. Keep in mind that the research themes in Chapter 4 provide for comparisons at the intersite level where significant information might not be present at the individual site level (Camp 2011).

Historical maps, memory maps, and other sources can be used to reconstruct the locations of former buildings, structures, use areas, and parcel boundaries, where these sources are available. To improve cost efficiency, these locations can be pinpointed before excavation begins so that fieldwork can be focused on potentially sensitive areas. For example, distinguishing among the structural remains of domestic and support buildings is often difficult. Formal mapping created by farm owners, insurance companies, or federal surveyors would provide detailed information to help researchers make these distinctions in feature uses. Homesteads filed under the Homestead Act, for example, were surveyed and mapped by GLO representatives and are more likely to have maps than are private ventures or farms settled through Cash Entry or by other means.

Remote sensing and/or metal detection is often used where the method is likely to reveal potentially important resources with less impact to the property or at less expense than conventional exposure techniques, although a range of tools and techniques—from hand excavation to auguring to mechanical scraping or trenching with heavy equipment—can be used to remove modern overburden and to expose archaeological features. Approach fieldwork with concern for efficiency in cost, time, and preservation and to minimize disturbance to the site or feature. A note of caution: Although mechanical trenching has positive applications in archaeological investigations, it can also be very destructive to historical features, which may be better located by surface stripping. Finally, in addition to the danger of working around heavy equipment, some historical deposits have the potential for hazardous waste issues; this possibility should be addressed before fieldwork begins.

Where discernible layers and features are present (particularly in hollow filled features, urban sites, or in landfills), stratigraphic excavation is the standard method to allow for analysis of complex deposits. In most rural sites, arbitrary levels are used as a measure of control within unstratified deposits or very large deposits. The Harris Matrix system (Harris 1989) is one tool used by archaeologists to record stratigraphy during the excavation and to interpret the stratigraphic sequence. The matrix helps to define meaningful analytical units from contexts (layers and features) associated with various phases of site occupation. This analysis may assist the archaeologist in distinguishing elements of the site that contribute to its significance from noncontributing elements. Each context, including the original cut and subsequent fill episodes, is assigned a unique designation and recorded on a standard form when using Harris's 1989 approach.

As cultural features and stratification are identified during the test investigation, they should be exposed in plan view by hand, photographed, and mapped in relation to a permanent datum. An appropriate portion should be exposed and hand excavated to assess each feature's structure, content, stratigraphy, and physical integrity. An artifact filled pit, for example, may be sectioned and partially excavated to extract an adequate sample; the rest of the feature would then remain in place until a determination of eligibility can be made. Given the destructive process of excavation, a frugal approach to test excavations is warranted. Extract sufficient data to address research questions and assess the potential of the feature to contain important data while keeping as much of the feature and deposits intact and unexcavated.

Excavated soils need to be screened through $^{1}/_{4}$- or $^{1}/_{8}$-inch screen, as appropriate, to extract and document the presence of all classes of artifacts. In general, start with 1/8-inch screen to assess the types of materials that may be present (small fish bone or shell for example), then switch to larger mesh, if it appears that data loss will be minimal. Alternatively, screen soil using ¼ inch mesh onto a drop cloth, then screen the drop cloth soil again using 1/8-inch mesh.

Column samples may be collected if smaller materials are likely to be present and may contribute to addressing research questions. Analysis of macrobotanical and microbotanical remains or parasite studies from column samples and features can yield important information about diet and health, sanitation, the surrounding landscape, agricultural products being grown and consumed, and myriad other topics.

When taking a sampling approach all feature types should be considered. Some answer questions based on artifact content while others relay more about site layout, function and land use over time. These differences in feature type and data content should be considered when developing a testing/data recovery sampling strategy. For additional guidance refer to Chapter 5 and Exhibit 5.14 of the Caltrans (SER) Volume II.

COLLECTION STRATEGY

Historical archaeologists recognize that the research potential of some classes of artifacts within defined features or areas may be exhausted by recording them in the field or by collecting a representative sample. Prior to any subsurface excavation, a collection policy should be incorporated into the work plan or project specific research design. This policy should consider on-site cataloging and non-collection of artifacts such as:

- undiagnostic fragments of glass;
- undiagnostic fragments of ceramic vessels (i.e., white improved earthenware); and
- metal fragments and redundant food containers such as cans
- Nails, screws, and other structural hardware

Archaeologists may record and leave in situ all but an appropriate sample of certain items according to an approved record/discard plan contained in the project research design. For example, a landfill associated with a ranch or farm may have numerous amounts of the same item (such as a fluted catsup bottle). While all of these bottles may be cataloged on site, the collection strategy may allow for only one to be collected and curated as an example of a type.

Before and during excavation careful thought should be given to what artifacts are being bagged and tagged for further analysis in the laboratory. Once collected and removed from the site, it should be assumed that those materials will be curated or that a formal approved plan is in place that allows for discarding certain classes of artifacts after cleaning and processing in the lab. Discarding artifacts is discussed below under Laboratory Methods.

Detailed Recording of Agricultural Related Property Types

An understanding of the boundaries and internal structure of the agricultural resource can be accomplished through systematic surface reconnaissance, possibly in combination with invasive or less invasive methods. The reconnaissance should identify and map the site limits and all visible features. A property type such as a bunkhouse may have an archaeological signature consisting of multiple features; recording and numbering methods need to be sufficiently flexible to accommodate this fact.

In addition to identifying features within the agricultural property, define the overall layout, including different areas of the resource (e.g., work areas, residential areas, animal-related areas, or refuse disposal areas). Also, map relevant landscape features that may have been important for the location and layout. These might include water sources, fields, irrigation, tree rows, roads, and topography.

At properties where the architectural foundations (such as wooden tent or building platforms) were ephemeral, few surface remains may be visible, and the entire activity area may appear as an indistinct smear of artifacts. In that case, the internal layout of the area, or even whether such a layout exists, may have to be determined through systematic sampling, such as artifact counts on transects or a grid.

Domestic Property Types--Residences

Identifying ephemeral architecture at domestic sites, particularly agricultural camps, presents special challenges. The archaeological signature of this property type (tents, boxcars, movable cabins) includes cut and/or filled level areas (flats); stake holes; postholes; drip lines; drainage ditches or gutters; and concentrations of nails and other structural components, such as screws or window glass. Camp structures and buildings that were on artificial flats or pads are relatively easy to identify on the surface. Those that were on wooden platforms or on unmodified ground may be visible only as concentrations of nails. Barring outstanding surface visibility, at such sites a systematic metal detector survey may be necessary, using nail concentrations to determine the location of structural remains.

Archaeological work on domestic features should attempt to recover the original orientation and dimensions of the building. Sometimes this recovery may not be possible or may be possible only within very general limits. Historical documentation on the population of the camp may allow estimation of how many people lived in the building and how cramped or spacious conditions were.

Identify the type, construction methods, and materials of the buildings if possible. Were they tents, boxcars, lean-tos, dugouts, or portable cabins? Sometimes, building characteristics can be determined from documentation, such as plans, corporate construction and maintenance ledgers, and contemporary photos. If such information is lacking, the nature of the buildings must be determined from the architectural features and artifacts. Even when good documentation exists for a farm or camp, the researcher needs to bear in mind the distinction between the ideals of planning and on-the-ground realities. This distinction can itself be an important research issue.

In addition to flats and pads, archaeological features such as postholes and stake holes are obviously important evidence for construction, indicating tent posts and stakes, platforms, anchoring for portable architecture, elevated structures, and local modifications such as porches and ramadas. Do not ignore the potential presence of subterranean storage features and hidden storage.

Some artifacts that are usually of little research value at urban sites acquire importance at agricultural camp sites and may be indicators of compliance with state or federal legislation. For example, the presence of mesh screen, window glass, and nails at an urban site would probably indicate little more than the presence of buildings that had windows and screens and wooden architectural elements. At an agricultural camp site, however, window glass and nails, corrugated iron, milled lumber, fragments of door and window screen, and tent grommets are important evidence for the presence of specific types of architecture and indicators of compliance with legislation requiring door and window coverings.

Record nails in detail. The technology of wire and cut nails has obvious chronological implications. The tight dating of many domestic farmsteads and agricultural camp sites can refine our understanding of the transition from cut to wire nails and thus assist in the dating of other archaeological sites. Nevertheless, the function of the nails is most important for reconstructing architecture. Specialized nails (roofing nails, for example) can be identified through their shape, but nail pennyweight provides the main clue for ephemeral architecture (Fontana and Greenleaf 1962; Otto 1984; Sutton and Arkush 1996:163). Although nail catalogs contain very detailed information as to what pennyweight is appropriate for what task, on the average archaeological site the functions assigned to nails needs to be as general as possible, as the nails may have been used for tasks for which they were not designed.

An agricultural related domestic building may not have a substantial associated refuse deposit(s), because refuse was normally disposed of in a designated landfill. In addition, sheet refuse (a horizontal often dense deposit of artifacts) or artifact scatters can result from the loss of small objects (buttons and the like) in the building and small-scale, localized refuse disposal, such as sweeping trash out the door, dumping ashes, or just tossing a bottle under the steps. The presence of artifacts such as toys or women's clothing articles has implications for the demographics of the household. Other items, such as sewing articles, recreational artifacts, bottles, and food remains, can inform on activities that took place outside of working hours: for example, clothing repair, drinking, gaming, or segregated eating. In contrast, a family farmstead or home may have hollow artifact-filled features such as outhouse or privies, burn pits, or designated pits used for household refuse.

Archaeologists should examine a sufficient sample of domestic property types to assess variation within the family farmstead or agricultural camp and to address questions of segregation and stratification along ethnic, racial, gender, or class lines. Even if the agricultural camp is relatively homogeneous, it may have research potential in relation to other camps—for example, by containing information on conditions in camps occupied by different ethnic groups or on changes in camp conditions in one industry through time. It may also inform on variations in camp amenities and conditions on different farms, indications of treatment of workers by individual farm owners, or of variations between a family farm or large corporation in their agricultural camp accommodations.

Domestic and Agricultural Property Types -Outbuildings

The architecture of the support buildings and structures related to an agricultural property can be reconstructed with the same methods used for domestic buildings. Although, in general, detailed architectural information may not be necessary, at some properties it could be used to detect differences between facilities provided for management or workers, reflect a family farm or a corporate-operated camp, or elucidate construction technology through time. The research significance for many support facilities lies primarily in their presence or absence in the camp and their numbers. A single bunkhouse on a small family farm, for example, may have included a kitchen where workers were expected to fend for themselves. A large corporate-operated agricultural property may have provided a community dining hall and a dedicated cook who prepared meals for the workers.

When recording a resource, look for evidence regarding the type and numbers of support buildings. Were showers or a bathhouse present? A commissary? Gardens? Centralized cooking and dining facilities? Were these facilities sufficient for the number of people in the camp? For example, determining whether the mess hall was sufficient for the camp would entail some understanding of the building's size, as well as the number of camp occupants. Detailed data on architecture can inform if cultural accommodations may have been made in the architecture of certain buildings, such as bathhouses or places of worship. If the surviving architectural remains are of sufficient quality that they can be compared to contemporary blueprints—such as those of the CCIH pamphlets—and determination of conformity to legislation may be possible.

Some support facilities, like cookhouses, mess halls, and laundry facilities, may be associated with artifact deposits. Typically, these deposits would have been generated in much the same way as the residential deposits were—through localized cleanup, casual disposal, and loss. Early 20th-century investigators did note, however, that kitchen refuse was often broadcast straight out the back door of the cookhouse (Commission of Immigration and Housing, State of California 1919:44; Higbie 2003:39). Deposits of cooking and dining remains are rich resources for study. Deposits associated with bathhouses, garden or reflective areas, or other support facilities may also be valuable in addressing questions of cultural heritage, retention of traditional practices, or other research topics.

Domestic Property Types – Water and Structures

Assessing the associated infrastructure at an agricultural resource can reveal much about living conditions. Drainage of wastewater and sewage, access to fresh water, transportation and supply roads, the availability of electricity or natural gas, and telephones or telegraphs are significant for quality of life on the property.

Details on the construction of some of these features, particularly with respect to water supply and drainage, can be informative. Key questions include what the source of water for the camp was, where the source lay in relation to potential sources of contamination (e.g., was it downhill from outhouses? upstream from trash disposal?), whether and how the water was treated, and, if the source was distant, how water was transported to the camp. If drainage features were present in the residential area, the nature of their construction and maintenance should be determined. For example, does the construction indicate that the drainage features were part of a planned network, or did the inhabitants informally construct them? These features are also useful in understanding compliance with legislative requirements that addressed access to clean water, proper drainage for showers and bathhouses, and other steps to upgrade agricultural residential living conditions.

Transportation features and technology, both within the residential areas and linking the residential worker camp to the outside world, owner's headquarters, or fields, can be significant indicators of living conditions. The presence of pavement indicates considerable investment by management in the efficiency of associated roads. Whether roads and pathways followed a formal pattern or developed without specific plans can inform on the level of planning undertaken. Evidence of other infrastructural improvements, such as the presence of electricity, natural gas, or telephone lines, may exist only in the form of artifacts like copper wire or insulators.

Domestic and Agriculture Property Types - Landscaping

Archaeological features for domestic-related recreational property types associated with landscape may include the architectural remains of formal social activity centers and informal gathering places where workers spent their leisure time. The location of buildings or outdoor recreation facilities, including uncontrolled spaces used by workers, can inform on residential organization. The level of formality (for example, use of recycled materials vs. manufactured sporting equipment) may indicate the level of effort invested by the company. Firepits, particularly in the absence of food waste, might indicate outdoor gathering spaces. Formal or informal gardens associated with an agricultural camp may indicate the need to supplement provided food (or the need for workers to supply food for themselves) or a cultural heritage preference. Sites occupied by Japanese workers often contain remnants of a formal meditation garden (stacked rock, informal fountain or water feature) or other landscaping elements. Artifact scatters associated with recreation may reveal the availability of items such as tobacco or liquor at the site.

Domestic and Agriculture Property Types – Outbuildings (refuse)

Refuse disposal property types are consistently one of the most important features in archaeological investigation. Refuse deposits at most large corporate-run, agricultural properties lack diversity, consisting, as they often do, of large dumps of tin cans from the communal kitchen. Family residences, tenant farms, and small worker living quarters often have greater variety in cans, ceramics, and other refuse, indications of family centered or individual worker food preparation and consumption practices. Often, refuse was deposited in hollow features, such as privies and refuse pits, or, (in the case of temporary occupation areas) during post-abandonment cleanup, in wells and sumps. Long-term generational properties typically created landfills away from the family home or burned refuse in pits. Ideally, hollow, refuse-filled features should have depositional integrity, known function, and identifiable associations. More often, agricultural temporary or worker refuse is present as surface deposits discarded in nearby drainages, convenient depressions, or a specified dumping area. Family-owned properties often disposed of household debris the same way (in convenient drainages, ditches, or depressions). These surface disposal features, which can range from diffuse scatters to dense deposits several feet thick, are discussed here.

Domestic refuse disposal features have research potential for what they are and for what they contain. First, such features can reveal information about refuse disposal, sanitation, and hygiene practices at the site, which in turn inform on living conditions; conformity to prevailing regulations, if any; and changing attitudes toward these practices. Second, these deposits can contain artifacts useful in determining camp demographics and cultural heritage (toys, women-related products, Chinese or Japanese manufactured ceramics, consumption and procurement patterns, etc.).

Both the location and the type of refuse disposal needs to be considered. The location of the refuse disposal in relation to residence, workspaces, and infrastructure (water supply, in particular) suggests its potential impact on health and sanitation. Are privies located uphill from wells? Was refuse disposed of away from the water supply for drinking or bathing? Does evidence indicate an effort to remove the refuse from residential and cooking areas?

The type of trash disposal needs to be characterized. Is the deposit the result of community-wide dumping, or is it associated with individual households or industrial activity loci? Is it back door sweepings, sheet refuse, or a landfill? Is the deposit informal or the result of formal policy? Were measures such as burning, liming, or burial taken to render the deposit less offensive? How do these methods compare with contemporary ideas and regulations about health and sanitation?

Refuse deposits are also important for the artifacts that they contain. Once the type of deposit has been defined (e.g., communitywide dump, household sweepings, privy), determine its dimensions (area and depth) to the extent possible. For many surface refuse deposits, great precision in defining boundaries may not be possible, as deposits often spread diffusely from a central concentration.

Complete recovery or recording of the cultural material constituting a refuse deposit is rarely possible. A statistically valid sample of the material is necessary for comparison with that of other deposits. The literature on sampling in archaeology is extensive (e.g., Binford 1964; Mueller 1975; Lewarch and O'Brien 1981; Redman 1987; Shennan 1988; Drennan 1996; Hester et al. 1997; Orton 2000a, 2000b) and is not reviewed here. No single approach is best for all circumstances; the archaeologist's judgment and knowledge of the specific conditions must be applied. For example, a small, well-defined deposit might be bisected or quartered, whereas a systematic grid of small sample units, or narrow trenches that cut through the width of the deposit in several places, might be the best sampling method for an extensive, intermittent spread of refuse. A large deposit that is considered internally heterogeneous may require some sort of stratified sampling. Whatever the specific conditions, the sampling strategy needs to be explicit so it will yield an unbiased sample of the deposit that can be compared to those from other deposits or sites.

Oftentimes, the diversity of artifacts at agricultural camp sites can be limited, particularly when owned and operated by a large corporate entity. This material culture lends itself to in-field recording on prepared forms. Archaeologists tasked with in-field recording need to be familiar with historic-era material culture and well trained in the collection of pertinent data. For camps with a communal kitchen or mess hall, a familiarity with the manufacturing details, dating, and contents of tin cans is strongly recommended, along with a working knowledge of the tools and products used in the industry specific to that camp. Tenant farms or family farms or ranches often contain a greater diversity in artifact type and may not lend themselves to in-field recording. A time lag can exist between the purchase and the subsequent disposal of an item, and not all artifact types are retained for the same period. Although glass vessels are often disposed of quickly, Adams (2003) found that ceramic artifacts can be owned for 15 years or more before being discarded.

Domestic and Agricultural System Property Types - Landscape

Landscaping around a domestic or agricultural area is important to document. While most landscaping features are surficial, their location, construction, and possible function should be carefully noted. A footpath between bunkhouses, kitchen, shower or bath house, and privies may have increased importance if there is archaeological evidence that the path was lined with rock or boards or enhanced in any way. Improvements to a path could indicate a long-term agricultural laborers residential area as opposed to a short-term temporary residence, the need to create separation between domestic facilities, or other factors. Identifying and describing tree rows, fencing (formal or informal), and/or rock walls is important when addressing separation of space, camp layout and design, or responses to environmental factors.

Agricultural Property Types – Production Areas

In the absence of historical documentation, artifacts and architectural information from production related property types can aid in identifying the function of the property and specific activity loci. In other cases, the archaeological data are a critical physical manifestation of the existing historical record. The location of fields, orchards, rangeland, and other related industrial features in relation to domestic use areas or specialty buildings can contribute to our understanding of overall property living and working conditions and sanitation. In addition to avoiding odor, noise, and industrial waste, or simply maintaining a separation of work and home life was often important for workers (e.g., Baxter 2002).

Archaeologists should note the presence, location, and size of agricultural production features such as barns, stables, corrals, pastures, icehouses, milk houses, smokehouses, storehouses, offices, and warehouses. Detailed architectural reconstruction is unnecessary. Places of work—such as offices, packing houses, canning sheds, or blacksmith shops—may reveal information on work processes, control of labor, and, sometimes, gendered or stratified labor (Taksa 2005). Certain artifacts found in association with places of work may indicate covert activities like on-the-job drinking or isolated areas for socializing, or gender-specific tasks, such as the use of a primarily female work force in offices or canneries during peak harvesting seasons. If industrial waste is associated with the workplace, evidence of industrial processes, sabotage, or individual innovation may be indicated (Nassaney and Abel 1993; Van Bueren et al. 1999).

Archaeological Laboratory Procedures

Analysis of historic-era artifacts has two goals: to allow investigators to address questions identified in the research design and to generate comparative data for other researchers to use.

To meet these goals, treatment must be consistent throughout the process, from analytical unit to analytical unit and from site to site, so that intra- and intersite comparisons can be made. Data must be collected from the artifacts and standardized in a master database in such a manner that queries can be run to answer a variety of research questions. An example of such a database is the free, relational Sonoma Historic Artifact Research Database (SHARD; available online at http://www.sonoma.edu/asc/shard/index.html), used to catalog historic-era artifacts. Laboratory and cataloging procedures must be clearly detailed and explained so that other researchers can easily use the assembled information. Presented below are suggestions for how to process and catalog artifacts, enter the information in a database, and prepare tables. In addition, Appendix D provides selected references useful for historical archaeology laboratories for identification of specific artifact types.

Cleaning

From the time artifacts arrive in the laboratory, care must be taken to preserve all associated information that may be extracted from them. Typically arriving in bags, boxes, and buckets, artifacts need to be sorted and grouped by associated proveniences (e.g., all levels or contexts from a single feature). Next, draw up a master sheet recording each provenience and the quantity of associated boxes/bags. From this, a tracking sheet can be constructed so that laboratory processing can be recorded and provenience information is not lost. One at a time, spread out material from each provenience and sort it for hand cleaning. Different treatments are used for different kinds of artifacts, and each needs to be individually inspected before cleaning begins. Take extra care to avoid brushing off or washing away and destroying any diagnostic details or residues. For example, bottles often retain fragments of paper labels that fall off when washed; painted or gilded ceramic decoration may be inadvertently scrubbed away; some ceramics are so friable that they will fall apart in water. Occasionally, bottle contents are still intact and, if safe to handle, remove and preserve the contents for later analysis. Some specialty labs prefer to receive the bottle and extract the contents themselves for processing. Starch residue analysts may prefer to receive artifacts unwashed to preserve the residue. Contact the specialists and seek advice on their preferred procedures prior to washing artifacts.

Shell and bone disintegrates if left to soak in water. Dry brush the bone to remove as much residual dirt as possible and then, if not too fragile, quickly wash; shell is simply dry brushed. Carefully inspect textiles by very gently rinsing them in running water to remove as much dirt as possible and laying them flat to dry. Dry-brush metal with a toothbrush or a wire brush to remove as much encrustation as possible without destroying useful information. The goal is to clean the artifacts as much as possible without losing any information; too often, data are inadvertently destroyed by carelessness at this stage. Washed artifacts need to be placed in drying trays clearly labeled with all provenience information.

Provide each artifact with, at a minimum, a catalog number. A provenience-based system, in which each provenience has its own number, is by far the simplest, allowing the cataloger/analyst to know exactly where the artifact came from by reading the numbered label. Regardless of the size or duration of the project, catalogers should not duplicate these numbers, even across sites, to avoid accidental mixing of artifacts in the laboratory. A subcatalog number or lot number should be added after cataloging. This assigned sequential number begins with 1 for each artifact or lot (group of like artifacts) within a single provenience.

Cataloging

Once artifacts are cleaned, the cataloging process can begin. One material class (e.g., ceramics, glass, metal) and one analytical unit (e.g., feature, grid unit, shovel-test unit) at a time, labeled artifacts can be spread out and sorted. Sort ceramics first by material (e.g., porcelain, earthenware, Chinese brown-glazed stoneware, yellowware, etc.) and then by form (e.g., plate, saucer, pitcher) and decoration (e.g., plain, molded, blue transfer print, gilded). Note the vessel form and part, along with any maker's marks. Sort glass first by color (e.g., dark olive, cobalt, aqua, colorless) and then by maker's marks and product embossments, form, and part (e.g., bottle, drinking vessel, lamp chimney; finish, base, body). Sort metal by material (e.g., ferrous, copper alloy, zinc) and function (e.g., nail, button, canning jar lid). Sort other items (e.g., buttons, bone artifacts, clay pipes) by material and function. Appendix D offers several suggestions for artifact identification references.

Classify artifacts into functional categories and calculate MNI (both discussed below). Classes of data may be saved and analyzed differently on the basis of the research questions being asked. For example, although nail sizes and quantity of window glass usually are not particularly helpful at urban sites, except in connection with specific contexts (e.g., remodeling; reflecting early versus later construction efforts), they can be important at rural sites. The presence of window glass in work camps might be a gauge of relative permanence; the pennyweight sizes and clustering of nails might suggest building sizes and perimeters.

Faunal analysis, which must be conducted by an experienced investigator, needs to include, at a minimum, scientific name, common name, number of identifiable specimens, and minimum number of individuals represented. The count and weight of unidentified bone are also important. Should butchered bone be recovered and meat-weight/price analysis undertaken, the methods must be clearly explained so that other researchers may be able to use the data in comparative studies. Faunal analysis should also include the cut of meat (roast, ribs, etc.) and type of butchering methods (non-industrialized butcher, cleaver or knife cuts, mechanically cut). These data categories are useful in assessing the value of meat provided in camps when compared to the family farmer or tenant farmer (stews vs cuts of steak, for example).

A catalog is only as good as its creators' ability to accurately identify artifacts. If catalogers are unfamiliar with the various material types and artifacts recovered, identification errors can quickly multiply, rendering the data tenuous at best. For example, the presence of porcelain on a site is often an indicator of wealth or of Asian occupants; if porcelain is misidentified as White Improved Earthenware (WIE), the error skews the data and interpretations. A working knowledge of the industrialization of ceramics overtime is key to an adequate analytical approach. A specialist should review the final identification of ceramics based on paste and glaze attribute, secondary decoration, and manufacturers marks. Similarly, analysts must be familiar with specific research questions identified for the project, so that appropriate and adequate information can be gleaned to address those issues.

Functional Categories

Artifacts can be cataloged using a general functional classification based on South's (1977) categories, which have been modified and expanded for use with mid-19th- to early-20th-century sites in the western United States. The materials are separated into broad *Group* divisions and then are further split into *Class* and *Subclass*. For the purposes of analytical research and intersite comparison, the Class division is most versatile, allowing a comprehensive range of functions while maintaining a manageable aggregate of categories (Table B.1). Another advantage of this classification system is that additions can be made as necessary to accommodate a variety of site types and research questions.

Minimum Number of Items (MNI)

Once the artifacts have been sorted, they can be physically crossmended within the analytical unit (feature/context) using masking or painters' tape (if used for a short time). There are several reasons to use tape instead of glue to hold the pieces together; gluing is too time-consuming, inevitably the missing piece is found after the item has been mended, and the resulting bulkier items increase curation costs substantially. Refitting the objects allows for more-accurate MNI counts and, for discrete features (e.g., wells, privies), for delineation of any stratigraphy. MNI counts help calculate the minimum number of individual items, not the number of fragments, represented. For example, 10 pieces of a broken bottle are counted as one bottle. Likewise, weight usually is not important: the critical information is not that one plate weighs 10 ounces and the other eight, but that two plates are present.

After crossmending is completed, the artifacts can be cataloged and the MNI determined. For each intact object (e.g., a complete, unbroken bottle), an MNI of 1 is assigned. Items that crossmend and can be reconstructed, with no missing pieces, also receive an MNI of 1. The remaining items are carefully studied to ascertain whether non-crossmending pieces might be parts of the same item. For example, saucer rim fragments that do not physically mend but are of the same material, curvature, thickness, glaze type, and decoration may collectively receive an MNI of one. Similarly, each fragment representing a unique form or decorative pattern is assigned an MNI of one (e.g., the only fragment of blue transfer print in the analytical unit). All items with makers' marks that cannot be associated with other items in the feature receive a separate MNI count. Unmarked/nondiagnostic fragments that might be associated with marked/diagnostic items do not receive an MNI count.

Artifacts that always would have been used together receive an MNI of 1 (e.g., a teapot and its lid or a soap dish with its drainer and lid). On the basis of this criterion, objects of different materials can be combined and given a single MNI. For example, a glass nursing bottle and its associated ceramic cap would have an MNI of 1, as would a brown glass beer bottle with its ferrous crown cap or an aqua glass canning jar and its zinc lid. For items that are often considered a set but are not always purchased or used together, such as a cup and saucer or a

Table B.1. Functional Categories of Artifacts.

GROUP	CLASS	SUBCLASS EXAMPLES
Activities	Advertising	pins, signs
	Agriculture	equipment, orchard remnants
	Collecting	coral, stalactites, petrified wood, shell
	Commerce	banks, coins, scale pans, coins
	Entertainment	music (e.g., harmonicas), games (e.g., checker pieces, dominoes)
	Firearms	guns, ammunition
	Painting	paintbrushes, paint cans
	Pets	bird feeders, dog collars
	Tools	axes, files, folding rulers
	Writing	pens, pencils, ink bottles
Domestic	clothing/footwear maintenance	needles, thimbles, bluing balls, shoe polish bottles
	Food	retail food containers (e.g., pickle bottles, Worcestershire sauce bottles)
	food preparation/ consumption	kitchen (e.g., baking pans, skillets), serving (e.g., platters, teapots), tableware (e.g., plates, forks), drinking vessels (e.g., tumblers, stemware, cups)
	food storage	canning jars, crocks
	Furnishings	furniture, decorative items (e.g., flowerpots, vases, mirrors)
	heating/lighting	lamps and chimneys, lightbulbs, candleholders, lanterns, stove parts
Indefinite Use		identified items with more than one potential original use
	miscellaneous beads	beads with more than one potential original use
	miscellaneous closures	closures associated with contents of indefinite use
	miscellaneous containers	bottles, jars, and cans with unidentified contents
	miscellaneous metal items	hardware metal artifacts (e.g., wire, sheet metal), items with more than one potential original use (e.g., bells)
Industrial		machinery, spark plugs, gears
Personal	Accoutrements	purses, eyeglasses, jewelry
	Clothing	garments, buttons
	Footwear	shoes, eyelets, shoe buttons
	grooming/health	toiletry items (e.g., perfume bottles, brushes, chamber pots), medicine bottles (e.g., patent/proprietary, pharmacy, bitters, vials), syringes
	social drugs	retail alcoholic-beverage containers and closures (e.g., wine, beer, champagne, distilled beverages); spittoons; pipes; tobacco tins; opium pipes, lamps, and tins
	Toys	dolls, tea sets, marbles
Structural	Fixtures	sinks, toilets, faucets
	Hardware	hinges, brackets, nails
	Materials	bricks, window glass
Undefined Use		unidentified items (e.g., melted glass, amorphous metal), slag, coal

slop bowl and pitcher, each is given a separate MNI. Shoes are given MNIs based on pairs (e.g., three shoes of the same type and size, two left and one right = MNI 2); shoe-related paraphernalia, such as eyelets, are not given an MNI when located in deposits with shoes. Similarly, individual buttons are given MNIs, as it is not feasible to assign button counts to separate items of clothing. Another artifact for which it is difficult to determine MNI counts is beads: for example, a single lamp whimsy can contain hundreds of beads of various styles and colors; thus, beads are counted in the same way as buttons.

MNI assignment is one of the most important aspects of cataloging, and it is important to avoid over estimating MNI calculations. If artifacts are quantified in this standard analytical manner, they can be used for intrasite and intersite comparison and analysis. Decisions on assignments of MNIs must be clearly explained so that others can use the data presented. Not all analytical units may be studied in detail. If a deposit has been severely disturbed and too much information has been lost, its research potential will be diminished. This decision typically is made in the field at the time of survey or excavation. Some deposits may appear to have little research potential (e.g., looted or partially destroyed deposits) but retain enough information to warrant further study. Deposits with too low an MNI may not merit additional study. Depending on the project, it may be useful to set a minimum MNI threshold for artifact analysis and faunal analysis.

In a final note, with sites that have a large number of surface features where the boundaries are not neatly contained, the analytical unit for which the MNI is to be calculated should be given careful thought. With some agricultural camps, it is appropriate for the MNIs to be calculated across the entire site. For others, the appropriate analytical unit might be the feature, or even the sampling unit.

Discard Policy

Especially important in historical archaeology is a comprehensive discard policy. This policy should be prepared prior to fieldwork and incorporated into the project specific research design. Give serious consideration to what materials will be retained, will be discarded, or will not be collected during field excavation. Once artifacts and ecofacts have been thoroughly catalogued for purposes of data analysis, many materials with low research value (e.g., nails, nondiagnostic fragments of glass) may be appropriately discarded. In such cases, the discard policies that will be used during fieldwork need to be explicit. A discussion of discard policies for California historical sites can be found in Praetzellis and Costello (2002). Clearly define items to be discarded and quantify discards by both count and weight. Fully explain and document the reasons for discard, with reference to the discard policy approved for the project.

Dating Artifacts

Study each artifact to determine if it is temporally diagnostic. Makers' marks are the first and most obvious tool to use and can be combined with temporally diagnostic manufacturing techniques and decorative patterns to arrive at a production date range. Also, include an entry in the catalog for the period of deposition for the feature/context where the artifact was recovered. This may be the known period of the agricultural resource occupation or a more specific date if one can be determined from historical data or the dating of all artifacts found within the context. The date of farm or camp abandonment should generally be the end date for all artifacts from a camp unless subsequent use was made of the area. At camps that were reoccupied, the admixture of materials from different episodes of occupation compromises their ability to yield important information.

Glass containers with embossments (typically on bottle sides) and makers' marks (typically found on the heel or base of the bottle) should be noted and researched to determine place of origin, contents, and production date ranges. Date ranges are based on when a company was formed, when it changed ownership or moved to a new address as listed in the embossment, and when the product was patented. By means of both the bottle manufacturer and the bottle contents manufacturer (often not the same), date ranges can be refined. For example, two different companies manufactured Lea and Perrins Worcestershire sauce bottles between 1840 and 1920: Aire and Calder Bottle Company between 1840 and 1877 and thereafter by John Duncan and Sons. Temporally diagnostic manufacturing techniques are also used for dating. Use trained laboratory technicians who are familiar with these techniques and know what to look for when cataloging. For instance, the crown bottle cap was introduced in 1892; if a bottle company was in business from 1880 through 1900 and the bottle has a crown finish, a beginning date of 1892 is assigned. Take care to note all diagnostic bottle attributes, such as mold seams, pontil marks, finishes, and suction scars. Other marked glass items might include insulators and canning jar lid liners. Occasionally, glass items are embossed with patent dates (e.g., glass illuminators, some food containers). Often, tableware and serving vessels are decorated with pressed patterns. These patterns should be studied and identified where possible, as they can often be assigned to a manufacturer and dated.

Frequently, small finds retain marks or patent dates. For instance, hard rubber buttons are often embossed with company information, clothing fasteners have patent names and dates, and lamp thumb wheels are stamped with patent information. Dolls, ammunition, and coins all frequently provide date information. Attention to these items can lead to determination of a *terminus post quem* (TPQ) for a deposit. A single deposit may have dozens of items with differing date ranges. The TPQ is typically determined by the latest beginning date of manufacture from all datable items recovered from deposit. This date becomes the earliest date when the feature could have been deposited.

Carefully document marks and enter the information into the database exactly as the marks appear on the artifact so that other researchers know the basis of the assigned dates. If letters are missing and can be extrapolated, use brackets around extrapolated text (e.g., IRONSTO[NE]); if they cannot be interpreted, use two dots ("..") in their place. A slash ("/") indicates a new line of text, two slashes ("//") indicate a new side of the bottle, and three slashes ("///") indicate the base. Symbols and mark placement (e.g., around shoulder, upper arch) should be placed in parentheses. Manufacturing techniques used for date determinations also must be clearly explained.

Databases and Data Entry

Once artifacts have been sorted, mended, assigned functional categories and MNIs, dated, cataloged, and analyzed, enter the information in a database for table generation and statistical analysis. The more information that is included, the more useful the database is for different purposes. Minimal information to include is presented in Table B.2.

Table B.2. Basic Data Fields for Artifact Catalogs.

FIELD	INFORMATION
Catalog Number	Individual provenience number.
Lot Number	Number assigned during cataloging.
Site	Site trinomial.
Provenience	Provenience (e.g., feature number, layer, shovel-test unit, survey area). This can be split into additional fields as needed.
Artifact Group	Functional group (e.g., activities, domestic, personal).
Artifact Class	Functional class (e.g., entertainment, food preparation/consumption, grooming/health).
Artifact Type	Functional subclass (e.g., games, kitchen, toiletry).
Artifact Description	What the artifact actually is (e.g., domino, skillet, basin).
Material	What the artifact is made of (e.g., porcelain, aqua glass, ferrous).
Maker's Mark/Dating Information	Enter the maker's mark exactly as it appears. If item is being dated by manufacturing techniques, enter the technique (e.g., two-piece mold, crown finish) as well.
Maker	Maker of item and, if needed, contents; last name first.
Origin	Origin of item (e.g., East Liverpool, Ohio; Tunstall, England).
Beginning Date	Earliest possible date of manufacture.
End Date	Latest possible date of manufacture.
References	References, as appropriate, for sources used to date the artifact.
Whole Count	Number of whole/intact items.
Fragment Count	Number of fragments.
MNI	Minimum Number of Items.
Remarks	More-thorough description of the item. Include part of artifact represented by fragment (e.g., base, rim, finish), shape (e.g., oval, circular), decoration (e.g., molded–Fig Pattern, painted), size (e.g., diameter, height, volume), and crossmending information, including catalog number(s) of mending item(s). The data for this field can be split into additional fields as needed.
Percent Complete	Vessel completeness (e.g., <25%, 50%–75%).
Association	Function of feature/context where this artifact was found; details about the people who produced this deposit, if known (e.g., ethnicity, position in labor hierarchy, gender, race).
Deposit Date	Period of deposition for the context where the artifact was recovered. Normally, this would be the dates when the camp was in use but could be even more specific.

As is true for other aspects of cataloging, data entry must be standardized. Databases are a practical way to store and retrieve data, but they are only as good as the information entered. Simple things like typographic errors (e.g., "palte" instead of plate) create havoc for running statistics. Creating a series of pull-down menus from which to choose artifact descriptors can prevent these types of errors. What is cataloged one way for one deposit must be cataloged the same way for a different deposit (e.g., a canning jar must always be entered under the class of food storage, not food). Depending on the deposit to be studied and the research questions to be answered, new artifact descriptors may be added, or placement of artifacts may be slightly changed. For example, the deposit may be associated with a camp laundry. A new artifact group, Laundry, may be created, and buttons may be moved from Personal to Laundry. These types of changes must be documented and carefully explained in the methods section of the report.

Generating Tables

When all pertinent information has been gleaned from the artifacts and entered into a database, it is time to generate tables. Care and thought should be given to what data are to be presented and how. A data table presenting all datable artifacts, their marks and manufacturing techniques, maker, origin, date range, MNI, and pertinent references is an important inclusion in any report. A simple list of artifact descriptions, with counts and MNIs, assembled by material and type within group and category will give a quick look at what was in the deposit and is far easier to sort through than the entire artifact catalog printed out in numerical order (though this also should be included, usually as an appendix). Additional summary tables—by group and by category with counts, MNIs, and percentages—are useful for rough comparisons among analytical units. In urban contexts, archaeologists often look at food preparation/ consumption artifacts to answer questions about social status and wealth. This is also true for ranch or farm headquarters occupied by a family for generations. For agricultural camp sites, however, artifacts from all functional categories can help determine feature function and contribute to the interpretation of activities. Presentation of these attributes in a series of tables can be beneficial in answering these types of research questions.

Other tables may be displayed as necessary. A faunal remains table (including one for fish or shellfish) may include common name, scientific name, number of identifiable specimens, and MNI. For deposits with clear evidence of butchering, meat weight may be added. For these types of deposits, a second table might include meat type, relative price, cut, weight, percentage within type, and percentage within price.

Throughout the laboratory process, two guiding principles are of paramount importance. First is consistency. Careful thought should be given to the research questions asked and data needed to answer them before anything is done in the laboratory. Making substantive changes after starting significantly increases the potential for human error and increases time spent in the laboratory. Equally important is the need to explain exactly what was done, how, and why. Data that are not comparable to those from other archaeological sites are good only for intrasite analysis, and then only if the data are collected and analyzed consistently across analytical units.

Curation

Prior to excavation, prepare a curation agreement with a reputable facility for the permanent curation of artifacts, as well as field notes, photographs, and reports. Guidelines for curation are found in *Curation of Federally-Owned and Administered Archeological Collections* (36 CFR

79). California (State Historical Resources Commission 1993) has also adopted state curation guidelines that should be consulted when preparing a curation plan. If a site has been determined not eligible for listing in the NRHP, then it typically is not necessary to curate the artifacts and associated documentation.

It is important to prepare artifacts for curation. Once a repository is identified, coordinate laboratory efforts so that cataloging and labeling comply with the repository's specific requirements. Label the artifact in an area as inconspicuous as possible without obscuring diagnostic attributes. Write catalog numbers as small and legibly as possible, in either white or black ink, depending on the color of the item being labeled. Label all ceramic and glass specimens with this number near an edge; cover labels for glass specimens with a clear coat, such as paraloid B-72, to prevent the numbers from being rubbed off. Some metal objects can be labeled; most cannot. Use paper tags with string if necessary. Items that cannot be labeled or tagged can be bagged with paper tags marked with the catalog number. Every effort must be made to keep the provenience information with the artifact.

Many repositories require labels to be printed on archival paper, either with pencil or ink. Check with the repository prior to producing labels to assure that requirements are met. In addition, be prepared to provide electronic copies or original scans or copies of original field notes; field maps and sketches; unit records; the complete catalog (including items that have been discarded); and any report or document prepared for the work.

Dissemination of Research Results

One of the goals of archaeological research is the dissemination of information to other professionals and the broader public. At a minimum, the excavation methods, findings, and interpretations should be reported in a technical document that is filed at the appropriate information center of the CHRIS, which allows access to that information by peers and other interested parties. Archaeologists, however, should make every effort to convey their findings beyond the confines of their immediate peers, with adequate permissions from land owners, agencies, or reviewing entities. For example, present research results at professional conferences or in professional publications. Public outreach in some form is the ideal end result of archaeological research. Often archaeological reports have the potential to be expanded or distilled into publications that reach beyond the borders of professional archaeology and into the realm, and thus the imagination of the public. This outreach can take many forms, several of which are economical, from tours to history pamphlets. Site tours for elementary school children, as well as other interested parties, can encourage a lifetime interest in history and archaeology. The development of permanent or traveling displays can also convey research results to wider audiences. Providing the historic context to a local historical society allows them to build upon your research, while protecting the location of the site. Summarizing archaeological results for local historical societies, museums, or special interest groups, either in written form or by presentation to their board or members is another way of completing public outreach in an economical fashion.

THRESHOLDS AND REDUNDANCY

This section offers guidance on redundancy: when enough becomes too much. The authors approach this topic with trepidation; archaeologists of the future will likely chuckle at our attempt to pinpoint just how much data an archaeologist might need to make confident interpretations. In historical archaeology, questions of thresholds (How much is enough?) and redundancy (How much is too much?) in the studies of both the material culture and a particular site type can be difficult to answer. Most archaeological understandings are not amenable to the application of hard-and-fast rules or formulae. In the context of public-funded research, however, it is important for archaeologists to articulate the bases of their interpretations. Experienced professionals must thoughtfully apply the following guidelines in relation to particular archaeological contexts.

Qualitative and Quantitative Data

The application of the first three steps of the Five-Step Process section above elaborates on the first three steps in NRB *Guidelines for Evaluating and Registering Archaeological Properties* for assessing the kinds of information contained in an agricultural resource. Steps 1 and 2 ask questions addressing simple issues such as the age of the site, its basic structure and content, and its level of physical integrity. Data requirements at this stage are primarily qualitative: descriptions, presence/absence, and datable artifacts; assessment of buildings and structural ages through architectural detailing; review of historical data to address construction dates and use periods. Although architectural historians, historians, and archaeologists may disagree in particular cases, the types of data and the methods used to arrive at an acceptable inference at this level of description are founded on established architectural and archaeological principles.

Step 3 calls for research questions that will elicit the kind of important information that is required by NRHP or CRHR criteria. For Criteria A-C (1-3), questions focus on who, what, when and where. Who lived there, where did they come from and when, what were they farming or raising, how did they do it? These basic questions provide the general context for a resource (e.g., a farm leased by Japanese, using basic technology to raise potatoes versus a corporate-owned dairy employing the latest equipment and technologies using a wide variety of workers).

In most cases, questions asked to evaluate under Criterion D/4 require more than mere description of the site's structure and content. They must address issues to which the site or feature can be expected to make a useful contribution. Many of these questions are aimed at generalizations about the past based on qualitative and quantitative archaeological data. Qualitative approaches at this level may involve determination of presence/absence, description, and symbolic interpretation, which are valid even when artifacts are few. The success of a quantitative approach, however, is heavily dependent on the available sample size, as a larger sample is statistically more accurate than a smaller one. Some threshold may exist below which the data set is of questionable value.

Sampling and Comparing Artifact Deposits

James Deetz (1986) pointed out that research potential in historical archaeology is largely "a matter of scale." Archaeological remains should be assessed at the scale (or scales) that will best exploit their research potential. Each scale requires a different level of sampling. For example, a residential site may contain contemporaneous architectural remains, sheet refuse, and an artifact-filled pit. As these features functioned together, they should be evaluated as a group. In addition, each individual feature has research potential and needs to be evaluated separately. The importance of the artifact deposit, which would be most costly to treat, depends on what it can contribute at two scales: the immediate context of its creation (the household that created it) and larger issues that require comparison with other data sets. Quantitative data required at the second scale must be adequate for the task.

Certain classes of material, such as seeds and fish bone, are sometimes present in such large quantities that extracting a sample for analysis is both essential for practical purposes and acceptable for statistical ones. Similarly, archaeologists sometimes uncover a deposit so rich in artifacts that sampling is appropriate. For example, the approximately 1,500 cubic feet of artifacts and ash that accumulated under a backyard platform at Stockton's Sing Lee Laundry site was sampled with a trench that extracted about eight percent of the feature's volume—and more than 9,500 artifacts and faunal remains (Waghorn and Meyer 2004).

Past a certain point in the study of an individual site, analysis and excavation may produce redundant data. Can archaeological collections that have certain historical associations be considered redundant because, as has been said of historical farmstead sites, "we've got thousands" of those (Wilson 1990:25)?

This question implies that archaeologists can define the research potential of a site if they know its defining characteristic—for example, the national/ethnic origin of its creators. However, this is only partly true. If an archaeologist's goal were to study the immigrant Irish population per se, then a case could be made that a sample would be sufficient. Statistical studies of the archaeological correlates of nativity, ethnicity, wealth, and other characteristics, however, reveal patterns that cannot be explained by reference to conventional analytical categories (Praetzellis and Praetzellis 2004). If such patterns relate intuitively to nativity/ethnicity and do so consistently within and between data sets, they provide strong evidence of behavioral significance. But other statistical relationships are not so easily understood. These patterns do not appear to be mere statistical coincidences, yet they have no immediately discernible, intuitively satisfactory meaning. Sampling strategies must be justified in relation to specific research issues. If the most important goal is to define 19th-century populations in ways that were not revealed by other analyses, then statistically valid samples must represent both individual sites and classes of sites related to those populations.

To develop the statistically valid data needed by quantitative research agendas, consistent methods are essential in historical research, architectural recordation, archaeological excavation, and laboratory analysis. Consistency also requires that an archaeological context must contain enough artifacts to be useful for quantitative research. Small data sets may not be representative, whereas overly large ones are unnecessary. The use of size to eliminate data sets must be undertaken with care and an understanding of the feature; not all activities produced large artifact deposits, and certain types of archaeological phenomena should not be eliminated from analysis because of data quantity alone.

APPENDIX C

ACRONYM GLOSSARY

APPENDIX C
ACRONYM GLOSSARY

AAA	Agricultural Adjustment Act
AD	*Anno Domini*
ADA	Americans with Disabilities Act
AFL	American Federation of Labor
AFL-CIO	American Federation of Labor and the Congress of Industrial Organizations
AIMS-R	Association, Integrity, Materials, Stratigraphy, and Rarity model
APN	Assessor's Parcel Number
BERD	Built Environment Resource Directory
BIPOC	Black, Indigenous, and People of Color
BLM	Bureau of Land Management
BSO	Building, Structures, and Objects
Bulletin	National Register Bulletin
CAGE	California Almond Growers Exchange
Caltrans/CT	California Department of Transportation
Canco	American Canning Company
CAWIU	Agricultural Workers Industrial Union
CCC	Civilian Conservation Corps
CCIH	California Commission of Immigration and Housing
CDCA	Society for California Archaeology's Coalition for Diversity in California Archaeology
CDFA	California Department of Food and Agriculture
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CES	Cooperative Extension System

CFAC	California Foundation for Agriculture in the Classroom
CFGC	California Fish and Game Commission
CFR	Code of Federal Regulations
CHRIS	California Historical Resources Information System
CPRR	Central Pacific Railroad
CRHR	California Register of Historical Resources
CSAS	California State Agricultural Society
CSO	Caltrans' Cultural Studies Office
CSU	California State University
CUOM	El Confederacion de Uniones Obreras Mexicanas/ Confederation of Mexican Labor Unions
CVP	Central Valley Project
DPR	Department of Parks and Recreation
ERA	Emergency Relief Act
FCA	Farm Credit Administration
GIS	Geographic Information System
GLO	General Land Office
GPR	Ground Penetrating Radar
HABS	Historic American Buildings Survey
HAER	Historic American Engineering Record
HALS	Historic American Landscapes Survey
IWW	International Workers of the World
IFYE	International Four-H Youth Exchange/ International Farm Youth Exchange
JMLA	Japanese and Mexican Labor Association
JRP	JRP Historical Consulting Services
LACCL	Los Angeles County Council of Labor
MID	Modesto Irrigation District

MNI	Minimum number of items
MNV	Minimum number of vessels
MOU	Memorandum of Understanding
NAHC	California Native American Heritage Commission
n.d.	No date
ND	No data
NAL	National Agricultural Library
NHPA	National Historic Preservation Act
NIRA	National Industrial Recovery Act
NPS	National Park Service
NRA	National Recovery Administration
NRB	National Register Bulletin
NRHP	National Register of Historic Places
OAC	Online Archive of California
OHP	Office of Historic Preservation
PA	Caltrans' Programmatic Agreement
PAR	PAR Environmental Services, Inc.
PFE	Pacific Fruit Express
POW	Prisoner of War
PQS	Professionally Qualified Staff
PRC	Public Resource Code
PWA	Public Works Administration
QIVA	Quality, Integrity, Variety, and Association model
ROW	Right of Way
SBA	Society of Black Archaeologists
SER	Caltrans' Standard Environmental Reference

SHARD	Sonoma Historic Artifact Research Database
SHPO	State Historic Preservation Officer
SPRR	Southern Pacific Railroad
SWP	State Water Project
TID	Turlock Irrigation District
TPQ	*Terminus Post Quem*
UC	University of California
UCD	University of California, Davis
UCLA	University of California, Los Angeles
UCR	University of California, Riverside
UFW	United Farm Workers
UFWOC	United Farm Workers Organizing Committee
UPRR	Union Pacific Railroad
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFS	United States Forest Service
USGS	United States Geological Survey
WIE	White Improved Earthenware
WPA	Works Progress Administration
WRA	War Relocation Authority
WRCA	Water Resources Collections and Archives

APPENDIX D

SUGGESTED REFERENCES FOR THE HISTORICAL ARCHAEOLOGY LAB

APPENDIX D
SUGGESTED REFERENCES FOR THE HISTORICAL ARCHAEOLOGY LAB

CERAMIC MARKS:

Gates, William C. Jr., and Dana E. Ormerod
1982 The East Liverpool, Ohio, Pottery District: Identification of Manufacturers and Marks. *Historical Archaeology* 16(1–2).

Godden, Geoffrey A.
1991 *Encyclopedia of British Pottery and Porcelain Marks*. Revised from 1964 edition. Barrie and Jenkins, London, England.

Kowalsky, Arnold A., and Dorothy W. Kowalsky
1999 *Encyclopedia of Marks on American, English, and European Earthenware, Ironstone and Stoneware:1780–1980*. Schiffer Publishing Ltd., Atglen, PA.

Lehner, Lois
1988 *Lehner's Encyclopedia of U.S. Marks on Pottery, Porcelain and Clay*. Collector Books, Paducah, KT.

Praetzellis, Mary, Betty Rivers, and Jeanette K. Schultz
1983 Ceramic Marks from Old Sacramento. *California Archaeological Reports No. 22*. Department of Parks and Recreation, Sacramento, CA.

MOLDED PATTERNS:

Dieringer, Ernie, and Bev Dieringer
2001 *White Ironstone China Plate Identification Guide:1840–1890*. Schiffer Publishing, Atglen, PA.

Sussman, Lynne
1985 The Wheat Pattern: An Illustrated Survey. *Studies in Archaeology, Architecture and History*. National Historic Parks and Sites Branch, Ottawa, Canada.

Wetherbee, Jean
1974 *White Ironstone*. Published by the author, Canajoharie, NY.

1980 *A Look at White Ironstone*. Wallace-Homestead Book Company, Des Moines, IA.

1985 *A Second Look at White Ironstone*. Wallace-Homestead Book Company, Des Moines, IA.

1996 *White Ironstone: A Collector's Guide.* Antique Trader Books, Dubuque, IA.

TRANSFER PRINT PATTERNS:

Sussman, Lynne

1979 Spode/Copeland Transfer-Printed Patterns Found at 20 Hudson's Bay Company Sites. *Canadian Historic Sites: Occasional Papers in Archaeology and History, No. 22*. National Historic Parks and Sites Branch, Ottawa, Canada.

Williams, Petra

1978 *Staffordshire Romantic Transfer Patterns: Cup Plates and Early Victorian China*. Fountain House East, Jeffersontown, KY.

1981 *Flow Blue China*. Fountain House East, Jeffersontown, KY.

1988 *Flow Blue China II*. Fountain House East, Jeffersontown, KY.

1993 *Flow Blue China and Mulberry Ware: Similarity and Value Guide*. Fountain House East, Jeffersontown, KY.

Williams, Petra, and Marguerite R. Weber

1986 *Staffordshire II Romantic Transfer Patterns: Cup Plates and Early Victorian China*. Fountain House East, Jeffersontown, KY.

ALCOHOLIC-BEVERAGE BOTTLES:

Barnett, R. E.

1991 *Western Whiskey Bottles*. Maverick Publications, Bend, OR.

Thomas, John L.

1977 *Whiskey Bottles of the Old West.* Maverick Publications, Bend, OR.

Wilson, Bill, and Betty Wilson

1968 *Spirits Bottles of the Old West*. Henington Publishing Company, Wolfe City, TX.

BITTERS:

Ring, Carlyn

1980 *For Bitters Only*. The Nimrod Press Inc., Boston, MA.

Watson, Richard

1965 *Bitters Bottles*. Thomas Nelson & Sons, New York, NY.

1968 *Supplement to Bitters Bottles*. Thomas Nelson & Sons, Camden, NJ.

Wilson, Bill, and Betty Wilson

1969 *Western Bitters*. Northwestern Printing Company, Santa Rosa, CA.

BOTTLE MARKS:

Toulouse, Julian Harrison

1971 *Bottle Makers and Their Marks*. Thomas Nelson Inc., New York, NY.

2001 *Bottle Makers and Their Marks.* Reprint by The Blackburn Press, Caldewell, NJ.

CANNING JARS:

Creswick, Alice M.
1973 *The Red Book of Fruit Jars No.2.* Private Printing, Grand Rapids, MI.

Leybourne, Douglas M. Jr.
1997 *The Collector's Guide to Old Fruit Jars, Red Book 8*. Privately published, North Muskegon, MI.

Rodrigues, Arleta
1971 *Fruit Jars: Canister to Kerr*. James Publications, Castro Valley, CA.

Toulouse, Julian Harrison
1969 *Fruit Jars*. Thomas Nelson & Sons, Camden, NJ.

FOOD/SODA-WATER BOTTLES:

Markota, Peck, and Audie Markota
1994 *Western Blob Top Soda and Mineral Water Bottles*. Second Edition. Private Printing, Sacramento, CA.

Zumwalt, Betty
1980 *Ketchup, Pickles, Sauces: 19th Century Food in Glass*. Mark West Publishers, Fulton, CA.

MANUFACTURING TECHNIQUES/BOTTLE TYPES:

Jones, Olive, and Catherine Sullivan
1985 *The Parks Glass Glossary: for the Description of Containers, Tableware, Flat Glass and Closures*. Parks Canada, Hull, Quebec, Canada.

Lindsey, Bill
2007 *Historic Bottle Glass Identification and Information Website*, Society for Historical Archaeology <https://www.sha.org/bottle/>. Accessed 1 March 2020.

Putnam, Hazel Elizabeth
1965 *Bottle Identification*. Privately printed, Jamestown, CA.

PATENT/PROPRIETARY MEDICINES:

Baldwin, Joseph K.
1973 *A Collector's Guide to Patent and Proprietary Medicine Bottles of the Nineteenth-Century*. Nelson Inc., Nashville, TN.

Fike, Richard E.
1987 *The Bottle Book: A Comprehensive Guide to Historic, Embossed Medicine Bottles*. Gibbs M. Smith, Salt Lake City, UT.

Wilson, Bill, and Betty Wilson
1971 *19th Century Medicine in Glass*. 19th Century Hobby & Publishing Co., Amador City, CA.

PRESSED GLASS:

Lee, Ruth Webb
1946 *Ruth Webb Lee's Handbook of Early American Pressed Glass Patterns*. Sixteenth printing. Ruth Webb Lee, Northboro, MA.

1960 *Early American Pressed Glass*. Thirty-sixth edition. Lee Publications, Wellesley Hills, MA.

1985 *Victorian Glass Handbook: Pattern Glass and Specialties of the Nineteenth Century (1830's–1880's).* Charles E. Tuttle Company, Rutland, VT.

McCain, Mollie Helen
1982 *The Collector's Encyclopedia of Pattern Glass*. Collector's Books, Paducah, KY.

Metz, Alice Hulett
1958 *Early American Pattern Glass*. Spencer-Walker Press, Columbus, OH.

2000 *Much More Early American Pattern Glass*. Collector Books, Paducah, KY.

OTHER/SMALL FINDS REFERENCES

Barnes, Frank C.
1968 *Cartridges of the World*, edited by John T. Amber. Follet Publishing Co., Chicago, IL.

1989 *Cartridges of the World*, edited by John T. Amber. DBI Books, Inc., Northbrook, IL.

Busch, Jane
1981 An Introduction to the Tin Can. *Historical Archaeology* 15(1):95–104.

Herskovitz, Robert M.
1978 *Fort Bowie Material Culture.* University of Arizona Press, Tucson, AZ.

Kresge, S.S. Co.
1913 *Kresge's Katalog of 5-cent & 10-cent Merchandise*. Reprinted 1975 by Random House, New York.

Luscomb, Sally C.
1992 *The Collector's Encyclopedia of Buttons.* Schiffer Publishing, West Chester, PA.

Martells, Jack
1976 *The Beer Can Collector's Bible*. Ballantine Books, New York, NY.

Miller, George L., with contributions by Patricia Samford, Ellen Shlasko, and Andrew Madsen
2000 Telling Time for Archaeologists. *Northeast Historical Archaeology* 29:1–22.

Montgomery Ward & Co.
1895 *Montgomery Ward & Co. Catalog and Buyers Guide* No. 57, Spring and Summer 1895. Reprinted 1969 by Dover Publications, Inc., New York, NY.

Nelson, Lee H.
1968 *Nail Chronology as an Aid to Dating Old Buildings*. American Association for State and Local History Technical Leaflet, 48.

Rock, James T.

1981 *Tin Cans: Notes and Comments*. Submitted to the USDA Forest Service, Klamath National Forest, Yreka, CA.

1984 Cans in the Countryside. *Historical Archaeology* 18(2):97–111.

1984 Evaporated Milk: Its Archaeological Contexts. *Northwest Anthropological Research Notes* 18(1):108–116.

1987 *A Brief Commentary on Cans*. Report for the USDA Forest Service, Klamath National Forest, Yreka, CA.

1993 *Can Chronology*. Coyote Press, Salinas, CA.

Russell and Erwin Manufacturing Company

1865 *Illustrated Catalogue of American Hardware of the Russell and Erwin Manufacturing Company*. Reprinted 1980 by the Association for Preservation Technology, Washington, D.C.

Sears, Roebuck and Co.

1897 *1897 Sears, Roebuck* Catalogue. Reprinted 1968 by Chelsea House, New York, NY.

1902 *1902 Sears, Roebuck Catalogue.* Reprinted 1986 by Bounty Books, New York, NY.

Weinstock, Lubin & Co.

1891 *The Weinstock Lubin Company Catalog*. Reprinted 1975 by the Sacramento American Revolution Bicentennial Committee, Sacramento, CA.

Woshner, Mike

1999 *India-Rubber and Gutta-Percha in the Civil War Era: An Illustrated History of Rubber and Pre-Plastic Antiques and Militaria*. O'Donnell Publications, Alexandria, VA.

APPENDIX E

CCIH RULES FOR LABOR CAMPS

APPENDIX E
CCIH'S "RULES FOR LABOR CAMPS"

The *Rules for Labor Camps* bulletin was written by the California Commission of Immigration and Housing (CCIH) in 1920, providing guidance to "owners and operators of labor camps" on the requirements for camp design, layout, and sanitation as stipulated in newly written labor camp sanitation act. The 19 rules were intended to improve the living conditions of laborers, in particular hygiene and sleeping quarter conditions, which up until this point, had often been untenable:

> During the nineteenth century and into the early twentieth century, sanitary conditions at typical work camps were appalling, creating disease-infested living quarters for men. As the twentieth century got underway, reform movements began both in urban environments and in rural camps, focusing on upgrading and creating enclosed sewage facilities and transporting water (Bell 1987:57-62). [Maniery 1999:161-163]

For the historical archaeologist especially, the CCHI's bulletin provides a starting point from which to approach the physical layout of an early 20th century work camp when planning excavation strategies. In addition, the guidelines present the opportunity for research questions directed at interpreting improvements (or lack thereof) in the quality of living at a camp, as reflected in the adherence to these regulations. The text is presented verbatim below (CCIH 1920:1-4).

TO OWNERS AND OPERATORS OF LABOR CAMPS

> In order to advise owners and operators of labor camps of the requirements fixed by the labor camp sanitation act, and the Commission of Immigration and Housing in the application of that act, this bulletin of information has been issued. Owners and operators of labor camps are hereby notified that the requirements set forth herein constitute the minimum of requirements which must be provided, and the Commission will expect to find that these rules have been complied with.
>
> Camps should be located on well-drained ground.
>
> An adequate supply of pure drinking water must be provided (Statutes 1915). Barrels or tanks containing water should be cleaned out at frequent intervals. Water should be drawn from barrels or tanks by a faucet. Whenever possible, drinking fountains should be installed.
>
> Sleeping quarters (tents or houses) should be arranged in rows with adequate spaces between.
>
> Toilets should be at least 75 feet from sleeping quarters. The openings of the toilet structures must be either battened or screened and the structure made

as fly-proof as possible by automatic drop-seat covers. Lime or ashes should be sprinkled in the pit every day.

Toilet must not be located over streams or canals.

Wherever possible, stables and corrals should be located at least 600 feet from the living quarters. The direction of the prevailing winds should be considered when the location for corrals and stables is chosen. Manure should be disposed of daily either by hauling it into the field and spreading it in thin layers on the land, or by placing it in fly-proof composting pits, or by burning.

Bunkhouses, tents or other sleeping quarters must be provided. Sleeping quarters should have between four and five hundred cubic feet of air space for each occupant. Sleeping quarters (houses or tents) must be in good structural condition. Tents or houses which are in bad repair cannot be used as sleeping quarters. Whenever practicable, sleeping quarters should be screened so as to keep out mosquitoes and flies.

Whenever a camp is located on damp ground or when a camp operates in winter, floors must be provided in tents or houses used as sleeping quarters.

Bunks or beds must be furnished to all employees. The bunks or beds must be of steel, canvas or other sanitary material. They must be so constructed as to afford reasonable comfort to the occupants. Where straw is used, a container or tick should be provided.

Tents or houses used as cooking or dining quarters must have all openings screened and doors should have spring hinges to close automatically.

All drainage from kitchen sinks must be run through a covered drain to a covered cesspool or septic tank or otherwise disposed of in such a way as not to become offensive or unsanitary.

Garbage and refuse must be kept in fly-proof, covered containers and disposed of at intervals by incineration or by burying or by feeding to hogs. Hogs should not be allowed to roam at large in camp. They should be kept in pens at least 200 yards from living quarters (wherever location will permit). The direction of the prevailing winds should be considered when the location for hog pens is chosen.

There must be an adequate number of toilets, affording one seat for every fifteen persons. There must be separate toilets for men and women, marked “Men,” “Women.”

In all ranches (hop, fruit or berry), where people work in the fields throughout the day, there should be a few portable toilets. The openings of the toilet structures must be either battened or screened and the structure made as fly-proof as possible by automatic drop-seat covers. Lime or ashes should be sprinkled in the pit every day.

Bathing facilities must be provided at all camps. The use of showers is advised, as they are more sanitary and also cheaper to construct and will accommodate more people. One shower head for every fifteen people should be provided.

Interior of dining and sleeping quarters, bathrooms and toilets must be kept in a clean and sanitary manner. The grounds around the camp must be kept free from filth and accumulation of rubbish, etc.

At every camp the owner, superintendent or overseer, shall appoint a responsible person to assist in keeping the camp clean.

Section 6 of the act regulating sanitation and ventilation in labor camps reads:

> It shall be the duty of any person, firm or corporation or agent or officer of a firm or corporation employing persons to work in or at camps to which the provisions of this act apply and the superintendent or overseer in charge of this work in or at such camps to carry out the provisions of this act. At every such camp such owner, superintendent, or overseer shall appoint a responsible person to assist in keeping the camp clean.

Section 8 of the act regulating sanitation and ventilation in labor camps reads:

> Any person, firm, corporation, agent or officer of a firm or corporation, or any superintendent or overseer in charge of the work in or at any camp coming under the provision so f this act, who shall violate or fail to comply with the provision of this act, is guilty of a misdemeanor, and shall upon conviction thereof, be punished by a fine of not more than two hundred dollars, or by imprisonment of not more than sixty days, or by both such fine and imprisonment. (Statutes of 1913, page 328; amended 1915, page 497 and 1919, page 244.)

Irene Gallues Giosi and Ernest Giosi removing bread from a Basque oven built in 1927 at Wheeler Sheep Camp, Tahoe National Forest, 1941. The oven was used to bake fresh bread and stews for shepherds. (Courtesy of the Gallues family collection.)

Cover photographs:
Irrigation on a twenty-acre colony in Fresno County, ca. 1890. Courtesy of the Fresno County Free Library, Heritage Center.
Koenig Vineyard and Winery, Anaheim, ca. 1885. Courtesy of the Anaheim Public Library.

California Department of Transportation
A Historical Context and Methodology for Evaluating Agricultural Properties in California
Division of Environmental Analysis, California Department of Transportation,
Sacramento, CA, 95814

Caltrans

Prepared by
The California Department of Transportation
Sacramento, California
2023