CALIFORNIA STATE UNIVERSITY, NORTHRIDGE

CALIFORNIA'S FIRST FUEL CRISIS
AND EUCALYPTUS PLANTINGS

A thesis submitted in partial satisfaction of the requirements for the degree of Master of Arts in Geography

by
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DEDICATION

To my loving husband, Ronald A. Groenendaal,
from a very appreciative wife.
ACKNOWLEDGMENTS

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Gayle M. Groenendaal
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ABSTRACT

CALIFORNIA'S FIRST FUEL CRISIS
AND EUCALYPTUS PLANTINGS

by

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MASTER OF ARTS IN GEOGRAPHY

The following work contains research on the development of California's first fuel crisis, a shortage of fuel wood. To understand what caused the shortage of fuel wood in California, data gathered from the existing literature describing the landscape are analyzed for timber resources before 1849 and a comparison is made to the resulting landscape after the gold rush of that date. The large population influx during the gold rush placed further strain on the timber resources. Within ten years of the arrival of the first miners to California, all timber resources were threatened. Concerned citizens began to experiment with different tree types to find one that would be suitable to reforest California. One genus, Eucalyptus, seemed to have the necessary traits. Endorsed by the leading scientists and influential citizens, people began to plant eucalyptus, mainly E. globulus, in forest plantations. Remnants of this crisis are still very visible features of California's landscape today.
CHAPTER ONE

INTRODUCTION

This thesis examines the cultural and physical factors which led to a serious shortage of wood for timber and especially for fuel in the late nineteenth century in California and responses to that crisis, in particular, the widespread planting of eucalyptus trees. It has gained breath due to concepts and definitions of geography by several historical geographers. Emmanuel de Martonne defined geography as the study of the "distribution on the surface of the earth of physical, biological and human phenomena, the causes of this distribution, and the local relationships of these phenomena." He further points out that if the "geologist must be a chemist, physicist, and zoologist, and if the physicist himself can not do without mathematics, the horizon of the geographer is especially vast and extends at the same time toward the physical, biological and social sciences."  

Especially important to this thesis is the principle of causality, originating in Alexander von Humboldt's work, which subsequently led to the creation of botanical geography. The principle of causality cautions the researcher to "never be content with the examination of phenomenon without trying to go back to the causes that determines its extent and without investigating its
consequences." Paul Claval adds the third important concept to the methodology of the following work. He states that "logical structures are organized to the general philosophy of the time." He was summarizing the work of John Kirkland Wright in which Wright warned the historian that myths are just as important as facts in explaining events of history. The truth of Wright’s hypothesis became very apparent in the research leading to the writing of this thesis. What are known today as facts or scientific truths have no effect except in the generation they are perceived; they have no bearing on the historical development because very simply -- they were perceived and understood after the historical event took place.

The fourth and most intriguing theory that influenced this work was that of Johann Heinrich von Thünen. Thünen worked with two main theories: 1) the Economic Man, and 2) Location Theory. It was the latter that influenced the construction of this thesis. Thünen worked with two main subdivisions of the Location Theory, the location of crops and the intensity of farming. His theory on the location of crops is the only part of his theory that applies to this study.

The most famous of his postulates was the Location of Crops due to transportation costs. Thünen pointed out that his model was of the "Ideal" state and could only be seen
dimly in reality. In the transportation model he used distance from the market place, transportation costs of hauling the crop to the market place, bulk of the crop and the crop prices to determine a ratio that would separate crops into the most economically efficient patterns of belts around the market.

Thünen identified six zones: 1) perishable, high yield crops, such as vegetables and fresh milk; 2) forest land, producing firewood and lumber; 3) valuable grain crops; 4) crops mixed with pasture and fallow land; 5) the three-field system, one-third of the land in crops, one third laying fallow and one-third in pasture land; and in 6) extensive grazing activities.7

Asmus Petersen's 1944 edition of Thünen stated that Thünen's view that the forest, in spite of its extensive character, occupied a near-market location and that inside of the wooded zone the extensive fuelwood production took place not in the outer circle but in the inner circle, was a fundamental fact. Forest economy is, under the presuppositions of the isolated state, closer to the market than the grain zone. Transportation costs are much greater than for grains, and production costs per freight unit are smaller. This close-to-market location asserts itself in the real world when transportation conditions are as bad as in the isolated state and when one cannot substitute coal or lignite for fuelwood.8
This thesis did not attempt a land-zone analysis, but a study of the historical records revealed California was an isolated state in the first two decades following the gold rush. Forests near the markets were first destroyed and then replanted in close proximity to the central cities because of the transportation costs. The cost of transporting firewood was discussed time and again by the leading scientists and city fathers. To supply the central cities with cheap fuel, forest plantings had to be within a reasonable distance. The lack of roads, railways or canals during the gold rush pushed the transportation costs to astronomical heights. Fortunes were amassed in the early years of California by those who invested in transportation systems and monopolized the arteries connecting the cities to one another and to the eastern United States.

This thesis, then, is offered in the true spirit of geographical philosophy -- a multidisciplinary approach used to analyze in historical context the underlying causes which explain why eucalyptus trees were planted in such abundance in California between the years of 1870 and 1880; what historical events lead to these plantings; and what consequences resulted from these plantings.

California was settled in an era before the profound environmental repercussions of the Industrial Revolution occurring in Western Europe and the Eastern United States were fully realized -- a technical revolution that
drastically affected both western culture and the natural environment more than any previous historical happening. Society was in a transition from an agrarian to an industrial economy, placing new and different demands on the natural resources. Cottage industry in Europe and in the United States had given way to large factories. To fire the new steam engines which drove the new factories, coal had replaced wood as the main fuel. Europe had already stripped her forests and switched to coal by the 1770s. The United States did not switch to coal as the main fuel until a hundred years later, using wind, water, and wood for energy until that time. Because of the circumstances under which California was populated during the gold rush of 1849, it moved rapidly into an industrial economy -- much faster than Europe or the eastern States, due to the ability to import the latest technology into the new state.

Another factor was the character of the settlers. California was settled by adventurers and entrepreneurs, many who became wealthy either from finding the gold they sought or by establishing businesses that supplied the miners and their needs. They were not held to old customs nor capital constraints involving updating old technology; they could and did import the latest technical advances and soon led the country in innovative industry. Under such an onslaught of people and their new technology, several
environmental crises were soon felt by the new Californians. This thesis examines one such crisis: the shortage of timber for firewood.

California Territory was certainly not the only region facing this energy crisis. The Eastern States were also beginning to feel the depletion of forest resources, and Europe had already stripped her native forests by the previous century. What made California unique was how rapidly the new inhabitants depleted and despoiled this renewable energy source. Within ten years after the first wave of emigrants settled in the northern regions reports of an impending fuel shortage were being published.

As firewood and timber became scarce people awakened to the crisis. Alternative fuel sources were limited to coal or peat. Although coal was discovered on Mt. Diablo and several other places, it was not sufficient to supply the populace. Peat was used in very isolated areas but again was not sufficient to export to the cities and was of little importance. The only timely solution to the problem was to find a replacement timber tree.

People began to experiment, albeit in an ad hoc way, to discover a tree, preferably a hard wood, to replace the native oaks that had been cut for fuel. They experimented with trees from the east coast, such as catalpa, hawthorn, elm, ash, and locust, and with new species that had been imported as ornamentals including acacias, podocarpus,
lagunaria, araucaria, and eucalyptus.

What was needed was a good utility tree, one that would meet several needs of the rapidly growing population. The ideal tree should be fast growing, have a straight growth habit, and the wood should be dense enough to burn hot. But timber was also needed. Therefore, the ideal tree should have a straight grain for good lumber. Through their experiments several promising trees began to stand out.

One genus, the *Eucalyptus*, seemed to have very desirable traits. Especially promising was the rapid growth of one species, *E. globulus*, with an annual rate of twenty feet. However, rapid growth alone was not the deciding factor, for willow and locust also grew rapidly. Reports from Europe and Africa of the medicinal qualities of *E. globulus* were published in the newspapers and horticultural magazines claiming that the tree could rid an area of the bad "miasma" which caused malaria fever. It was also observed and reported in the press that eucalyptus had the unique ability to pass through wild fires seemingly unharmed. For the most part *E. globulus* grew straight and tall with few side limbs. Reports from Australia claimed that the lumber was of good quality and very durable, although it was not used as a primary source of lumber in its native home. The tree adapted itself well to different climates found in California and most impressive was its
tolerance for drought and marginal land. The people felt they had found the proper tree to alleviate their problems.

*Eucalyptus* are native to Australia, Tasmania, New Guinea, Timor and one of the Moluccan Islands. The genus *Eucalyptus* contains over 600 species, many which hybridize freely when geographical barriers are removed, such as in California. The mature wood of most the genus is hard and the color of the wood ranges from white to brown. One characteristic of the genus is the juvenile leaves which differ considerably from the mature leaves. As the tree grows the round juvenile leaves become successively longer and more slender, the prevailing shape being either a lance or a slightly curved sickle. In the leaves are oil glands that when crushed give a characteristic odor, much like citrus. This astringent odor was partly responsible for the theory that *eucalyptus* cleared the air of the bad miasma that caused malaria. The taxonomic classification of eucalyptus is based on the morphology of the stamens. This classification is currently under going revision.

The species most widely planted in California was *Eucalyptus globulus* (blue gum) which accounted for nearly 98 per cent of the forest plantations. *Eucalyptus camaldulensis* (red gum) was also planted in plantations, especially in the Central Valley because of it tolerance to arid and alkaline conditions.
The first part of this thesis describes the Californian landscape during the Spanish and later Mexican era before the arrival of the miners. Such an overview of the landscape must be a cursory one. However, the author feels that to better understand the fuel shortage that was created in California shortly after the gold rush it is necessary to sketch the landscape prior to, during, and after this population influx. In this way the areas that were severely despoiled are contrasted against what is known before and after this historic event. It is a sincere effort to explain why the fuel crisis led to large plantings of exotic trees; i.e., eucalyptus, to combat the fuel crisis. No attempt is made to give detailed examples. Instead, a general overview is drawn from the journals and records of the period, with an emphasis on the flora of the areas. The Spanish, even with low populations (total population - 5,616 in 184512), had severely reduced the firewood resource in several areas before the gold rush of 1849, although they were not in critical need of fuel.

Chapter Two gives a brief overview of the European discovery and subsequent explorations of California, because the diaries kept by the Franciscan Fathers and the military personnel constitute the first written impressions of the landscape of California. The Spanish land tenure system in California is briefly described since it had a
direct influence on the developing patterns of the landscape, which in part accounted for vegetational changes, both spatially and in composition. When the Franciscans chose their mission sites, they selected the best sites in the territory they explored. The pioneers brought here by the lure of gold settled in these same areas a century later. These locations, then, because of continued population stress, rapidly faced shortages of available timber. As a result, experiments with exotic tree types were carried out in these regions to alleviate the crisis. Obviously, not all timber resources in the state had been decimated, however, accessibility and transportation were factors in developing a closer timber resource.

Chapters Three and Four describe the California landscape of Southern and Northern California. The descriptions were obtained by researching the extant Spanish diaries, sixty-four diseños, or pictorial maps that accompanied petitions to the Mexican government to secure private land grants, and then contrasted with journals of a later period; viz., Richard Henry Dana's work, Two Years Before the Mast (1836), and William H. Brewer's Up and Down California, 1860-1864.

Diseños became part of official petitions after 1828 and were used as a basis to substantiate the claims in American courts later in the century. The habit of many of
the surveyors/artists of depicting the vegetation on the
maps is of enormous utility in reconstructing the
landscape. The three main types of vegetation depicted on
the diseños were pasture, woodlands and "chamisal" or
chaparral. On some diseños pine trees were differentiated
from oak trees by the use of a different map symbol; some
maps differentiated between "robles" (oaks) and "encinal"
(live-oaks). Chaparral was usually just written on the map
over the area that it covered. Unfortunately, many of the
diseños depict no vegetation; only physical features were
noted. Only general vegetation patterns can be determined
from the diseños as the maps are not drawn to scale, and
some of the artist/surveyors were more detailed than
others. But it must be emphasized that the landscape
scenario is very general. To reconstruct a historical
landscape from journals and diaries can at best give only a
tantalizing but distorted glimpse of a bygone environment.

The next section describes the gold rush and the
cultural changes that resulted. This short section is
included to compare the two cultural perceptions of the
landscape: the Spanish and their pastoral landuse and the
American/European perception of using the landscape for
profit and speculation. The Spanish/Mexican settlers had
modified the landscape, but the American/European settlers
dramatically altered the environment and in many instance
destroyed the land. Larger populations, exploitation, and
the use of higher technology by the American/European settlers changed the face of the land in twenty short years, and contrasts greatly against the slight modifications made by the Spanish in eighty years.

The last section discusses the timber shortage and the steps taken to remedy the situation, including the decision to plant eucalyptus trees in forest plantings. Included in this section are descriptions of the eucalyptus plantings made by leading citizens of California in Northern and Southern California. Quantitative measures of the plantings and use of the wood are given where possible. Unfortunately, many of the plantings as well as the consumption rates of the wood have gone unrecorded. The earliest records for fuel consumptions are dated around 1880. The early eucalyptus information was found by researching the journals, horticultural magazines, and newspapers between the years 1850 - 1900. Archives to house materials used for this study were not established until well after the period discussed, therefore the records are fragmented and incomplete.

The concluding chapter discusses the past, present, and future of eucalyptus as a renewable fuel source. The genus *Eucalyptus* is used world wide to provide fuel and timber. Although California switched to a new fuel base after 1900, interest has surged since 1973, the year of the world fuel crisis. Foresters and farmers are again experimenting with
this versatile tree with the hopes of using it as an alternative fuel source. Several countries are developing tissue culturing and cloning of the different species of eucalyptus to produce a "super" tree, a tree that can be grown and harvested as easily as wheat, to meet the growing demands for wood pulp, fuel and hardwood timber.
Chapter One References


2. Ibid.

3. Ibid, pp. 11 & 16.

4. Ibid, p. 16.


6. Ibid.


CHAPTER TWO
SPANISH EXPLORATION AND SETTLEMENT

California was discovered by the Portuguese navigator, Juan Rodriguez Cabrillo, enlisted in the service of the court of Spain. Antonio de Mendoza, Viceroy of Mexico, commissioned Cabrillo to explore the western coast as far north as possible. The object seemed to be exploration with the hopes of finding new sources of gold and silver, and perhaps, a port of entry into "Quivira," the fabled country of the Seven Cities of Gold.¹ Cabrillo sailed with his two ships into the bay of San Diego which he named San Miguel and formally claimed Alta (Upper) California for the King of Spain in September, 1542.² He sailed from the bay on September 27, 1542 to continue his explorations, sailing past San Pedro which they described as the valley of smokes. Cabrillo explored the Channel Islands using San Miguel Island as a base; he explored the coast northward as far as 40° N latitude before turning back.³ On November 16, 1542, Cabrillo anchored in a great bay which he named Los Pinos which is generally identified as Drake's Bay. Twice Cabrillo's ships sailed by the Golden Gate, but did not discovered it. Cabrillo turned back to winter on San Miguel Island, and died on January 3, 1543 as the result of a previously broken arm.⁴ Cabrillo's successor, the Levantine pilot Bartolome Ferrer, continued
the explorations and returned to Mexico in April 1543. The Spaniards had found no gold nor anything considered valuable and the voyage was soon forgotten.5

Alta California remained a peripheral area which Spain claimed, but did not attempt to settle, although it was of importance to the Spanish vessels plying the seas between their South American and Mexican holdings and the Philippines and the China Sea. By 1570 regular voyages were made from Peru or Mexico to Manila.6 Because of the arduous eastward voyage, sometimes lasting six months, crews suffered greatly from scurvy, exhaustion, and starvation.7 This, coupled with the favorable accounts given by captains of the Manila Galleons (Francisco Gali reported in 1584 of being "upon the coast of New Spain, under 37°30', we passed by a very high and fair land with many trees")8 it was recommended to the Crown to consider establishing a provisions base along the Californian Coast between 42° and 37° N latitude.9 To verify the reports the crown sent Sebastain Vizcaino to explore the coast with the purpose of finding a suitable region to locate a permanent settlement.

Vizcaino's account of his 1602 exploration voyage reported an extensive oak forest three leagues in length and half a league in width growing near the harbor at San Diego. Growing beneath the oaks were fragrant shrubs.10 Vizcaino sailed north and again landed, this time at
Monterey Bay. He characterized the area as having fertile soil, good pasture through which a well wooded river, named by him the Rio de Carmelo, flowed.\textsuperscript{11} Mass was celebrated beneath one of the large spreading oaks that reached the tidewater.\textsuperscript{12} Vizcaino's description of Monterey later determined, site unseen, the location of the capital of Spanish California. Vizcaino gave a favorable account of Alta California, however politic strife and intrigue in the Spanish Court caused delay in settling the area.

California remained unsettled for two hundred and fifty years serving the Manila Galleons only in an impromptu manner as a landfall as they sought fresh meat, water, wood, and a safe anchorage to make necessary repairs after their long hazardous journey across the Pacific.\textsuperscript{14}

The Crown maintained only a passive interest in Alta California until the possible encroachment of other countries forced Spain to take direct action in settling Alta California.\textsuperscript{15} Henry J. Bruman, in Early California: Perception and Reality, summarized the events which awakened Spain from her lethargic attitude concerning California:

1. Russia's activity in Alaska and her gradual expansion toward the southwest as far as Fort Ross and Bodega Bay.
2. The scientific exploring expeditions of England, France, and Russia in the northeast Pacific.
3. The territorial claims of England from central California northward, based on New Albion, the westward expansion of the Hudson's Bay Company, and the discoveries of Captain James Cook.
4. The expansive activities of the newly
independent United States, including the explorations of Lewis and Clark to the mouth of the Columbia River and the settlement of Fort Astoria to promote the hunting of sea otters.\textsuperscript{16}

Although the Spanish court feared the British might find the Northwest Passage and harass their Pacific trading fleet, a much more realistic threat of occupation of California came from the Russians who had explored the northwestern coast in pursuit of the fur trade.\textsuperscript{17} To stem the actions of the foreign governments, King Carlos III sent directives to New Spain in 1768 to take immediate precautionary measures to curb the Russian threat by fortifying and occupying Alta California as far north as Monterey. Jose de Galvez, visitador general -- the highest authority in New Spain -- took personal command of the enterprise. To insure the success of the expedition he divided his forces into four groups -- two to sail to San Diego and two to travel overland up the Baja Peninsula.\textsuperscript{18} The two vessels, the San Carlos, under the command of Vicente Villa and the San Antonio, captained by Juan Perez, sailed at different times from San Blas to rendezvous with the two land expeditions led by Captains Gaspar de Portol\textsuperscript{\textregistered} and Javier Rivera y Moncada who had also staggered their departures.\textsuperscript{19}

After many hardships the four expeditions were reunited at San Diego the first of July, 1769.\textsuperscript{20} Scurvy had killed and debilitated the sailors to such an extent that
the San Carlos was sent back to San Blas for reinforcements. The first land expedition under the leadership of Rivera had lost men and Christian Indians due to starvation and desertion. The second land expedition had lost no lives but many of the civilized Indians had deserted. Due to this manpower shortage, the remaining forces were divided into three groups; one to sail on the San Carlos for help; one to remain in San Diego under the leadership of Rivera and the President of the new California missions, Father Junipero Serra, to found a mission and presidio; and the third under the leadership of Portolá to continue north in search of Monterey Bay as described by Vizcaino.21 (Map 1).

The Spanish system of colonizing was very rigid and very definite tenets were followed. First, the sword and the cross traveled together into new areas of settlement; for good or ill, the religious and the military were intertwined. The sites chosen for settlement had to meet certain requirements: the area had to have an adequate supply of water, good soil, available timber, and had to be accessible to a main route that would unite the missions. Since part of the reason to settle an area was also to harvest souls for the church, the region had to have a suitable number of neophytes to convert.22 This first colonization expedition carefully chose sites for missions and presidios which were the antecedent of many modern
MAP 1
Spanish Exploration of California 1542—1776

- Cabrillo (1542)
- Vizcaino (1602)
- Portola (1769)
- Fages (1772)
California cities.

Three types of land tenure were established during the Spanish colonization. These systems influenced both the landscape and the settlement patterns in California for at least the next one hundred years.

First were lands granted to the missions and private parties. The mission grants were to provide self-sufficiency to the fathers and the neophytes that they converted. Technically under Spanish law neither the missions, churches, nor religious orders owned any land; the mission was the custodian over the land during the colonization of the region until the Indians were trained in religious principles. In theory the land was to pass to the Indians after they had been "civilized." They would then establish settlements to help spread religion and civilization to their heathen brothers. Twenty-one missions were founded and the mission lands accounted for two-thirds of the occupied land. The "mission" era lasted in California from 1769 to 1833 when the Secularization Act was passed, which restored the mission lands to the public domain. But instead of the Indians benefiting the missions rapidly disintegrated, scattering the partly civilized neophytes who were reduced to a state of poverty. The mission lands were quickly claimed by private individuals, usually government officials as a reward for their service.
The mission holdings were immense. Mission San Fernando included fifty square leagues (nearly 350 square miles); Mission San Diego claimed forty-seven square leagues; Mission Santa Barbara claimed twenty-eight square leagues (approximately 122,000 acres); and Mission San Gabriel extended one league west to Arroyo Seco, three leagues south and to the east and southeast held sway over 20 square leagues of land. Grants to the other missions were of similar size. Theorically the mission grants could cover all the land between the missions. All together the missions claimed millions of acres of the best land along the coast of California, as well as the water and timber rights on adjoining land.25

Besides the mission grants there were also private land grants. During the mission era the Spanish were very circumspect in issuing land grants, but after secularization over seven hundred large grants were issued between 1833 and the American occupation fourteen years later. One of the earliest grants was that to Manuel Nieto, consisting of 300,000 acres - the largest grant issued.26 The Spanish, later Mexican, land grants were to lay the foundations of the "rancho era" which lasted in northern California until the gold rush in 1849, but survived in southern California until the devastating drought of 1863-66. The rancho became the economic and cultural base in California for nearly a century.27
The presidio was the second type of tenure practiced by the Spanish. The presidio, or fort, housed the military, their craftsmen and servants. The military were the protectors of the missionaries, subduing hostile natives and guarding the borders against foreign intrusion. The military acted as the secular authority until civil governments could be established. The first two presidios were established in San Diego and Monterey, the northern and southern extremes of the new territory. Later San Francisco and Santa Barbara were established. In return for protection, the missions and later the pueblos supplied the presidios with food and other necessities.28

The pueblo was the third type of land tenure. It was the civic center for the ranchos and missions. The land given to each pueblo was not as extensive as the land given in private grants or to the missions. The normal holding for a pueblo was approximately four square leagues (17,500 acres) with the boundaries generally located one league distant from the center of the town, "North, South, East and West from the center of the church door." The pueblos normally had a central plaza, a church, and one or more public buildings with the remaining land subdivided among the settlers for their homes, orchards and gardens. Land was held in common around the pueblo for use as pasture.29

The Spanish introduced many new cultural features to
the Indians, including a greatly increased use of wood. Prior to Spanish contact the Indians had inadequate cutting tools. Most were made from shell and bone and were not capable of cutting trees or dressing them. The reason the early Spanish explorers found trees growing along riparian areas in the more semi-arid regions was that the Indians rarely cut wood for fuel, they gathered it. Also, they made little use of wood for housing, boat making or tools. In the following chapters evidence will be presented that makes it evident that the Spanish themselves depleted this resource in several areas before the arrival of other Europeans.

The "civilized" amenities were introduced to the Indians; craftsmen were brought from Spain and Mexico to tutor the neophytes in the use and manufacture of tools, carts, furniture, and large scale buildings. The Spanish colonists, even in areas with timber, mainly built with adobe and stone. However, even these structures used a considerable amount of rough timber for frames and braces. Log palisades protected the early missions and presidios against attack from hostile natives. All farming implements were made of wood, as well as carts, furniture, and many church ornaments. The working and building with wood was an innovation introduced to the Indians of California. The "active" utilization of wood as opposed to the "passive" use -- collection of branches and driftwood
for fuel or use as combs or knives -- dates to the arrival of the Spanish. Therefore, the resulting consumption of timber dates also to their arrival.
Chapter Two References


2. Ibid, p. 75.


7. Ibid, p. 16.


24 Cleland, pp. 23-32; Hornbeck, p. 58.
28 Ibid, p. 5; Hornbeck, pp. 42-43.
CHAPTER THREE

NATURAL VEGETATION OF SOUTHERN CALIFORNIA

This chapter examines the natural vegetation of Southern California and the indications of modification to it during the Spanish and Mexican period. While not explicitly stated in the literature studied, it became apparent that the Spanish and Mexicans perceived the landscape very differently than the later emigrants of the gold rush. The Spanish and Mexican cultures were pastoral with only subsistence agriculture and very little industry, mainly of a cottage nature. The landscape reflected this culture, and while affected, it was not destroyed.

Southern California had the most successful missions and ranchos with most of the population concentrated in the area around Los Angeles. The population remained low with few emigrants until the 1830s when a few American/European men settled in the Los Angeles area and married into established Mexican families (Map 2). Although more ambitious than their Mexican neighbors, the Americans and Europeans did not have much influence on the existing culture. However, men such as William Wolfskill and Benjamin Wilson began planting large vineyards and Abel Sterns led the illegal trading with American hide ships. Whereas the Mexicans had been content with subsistence
MAP 2
Population 1790—1845

1790
Total: 906

1830
Total: 3,851

1845
Total: 5,616

1880
Total: 1,616

Persons:
- less than 150
- 150—300
- 301—600
- 601—900
- More than 900
agriculture and cattle raising, the American/European settlers perceived the land as a profit making investment. However, this segment of the population remained small and had little impact on the landscape until after the gold rush.

The gold rush affected Southern California's landscape very little initially, although it did provide a closer market for cattle and sheep which stimulated the economy. Southern California was not populated by the gold rushers until after 1866 when people began to spread southward across the land seeking homesteads. The large ranchos which had lost thousands of head of cattle during the three year drought beginning in 1863 were heavily indebted; faced with increasing pressure by the homesteaders, the rancho owners began to subdivide their holdings. Real estate developers, taking advantage of the situation, began to promote new towns to draw people into Southern California. The perception of the landscape changed and modifications to the area were reflected by these changes in culture and land use. The following account describes the landscape in Southern California from the time the Spanish arrived until 1862.

San Diego Area

The Spaniards reached San Diego in 1769 with a small
party to begin the immense task of colonizing California from San Diego to Monterey. The colonists were members of the Franciscan Order, military personnel, volunteer Indians from Baja California, and sailors from two ships that met the land forces at San Diego. Lieutenant Pedro Fages, one of the military leaders who left San Diego to accompany Portolá in the expedition northward to find Monterey Bay, kept a diary describing the countryside and the Indians with whom they came in contact. His descriptions of the countryside are used extensively in the following two chapters.

Fages wrote that the mission of San Diego was founded on a hill by a stream which flowed through a long spacious canyon wooded with willows, alders, vines, and roses. There was sufficient water for humans and animals but not for irrigation of the crops. The region north of the mission consisted of rolling, well grassed hills devoid of undergrowth, dissected by canyons wooded with alders and willows. Along the coast were many small estuaries, swamps, and marshes overgrown with reeds and cattails. He described the landscape of the area:

"The land produces, through not in abundance, acorns, wild grapes, some asparagus, and a kind of berry (called gabarneda in Catalonia) on the bushes of the rose of Castile, which are really seed pods, and have a very pleasant flavor after they have been roasted for a short time in a slow fire."1

Father Junipero Serra, the President of the new
missions, wrote highly of the site chosen for the San Diego Mission: "Land here is plentiful and good, and a river goes with it. Although not long ago it had flowing water, at present -- this being the driest part of the year -- there is no water running in it." Serra also noted that there were "trees in abundance" and spoke of the many "vines grown by nature and without human help." He remarked on the roses of Castile being a dominant feature of the landscape. What pleased him most about the site however, was the large population of "gentiles" or "neophytes."

As promising as the site sounded the mission had to be moved further up the canyon to a better water supply after the second crop failed due to the lack of irrigation water. Fray Fermin de Lasuen, appointed superior of San Diego Mission in 1777, found that the acid soil was as unresponsive as the Indians. The mission was to remain one of the poorest in Alta California.

A later account of the area was made by Richard Henry Dana who stayed in San Diego for four months curing hides for the trading ship Alert in 1835-36. He discovered a ruinous presidio manned by twelve half-clothed and half-starved looking soldiers without even muskets to defend the military post. He thought that the mission was striking in appearance -- built in typical fashion in a hollow square with the church at one end, while the
remaining rooms used for living quarters and domestic crafts formed the other three wings of the building. Outside of the mission were twenty or thirty straw huts in which the half-naked Indians lived.7

Dana wrote that wood was very scarce in the vicinity of San Diego. What trees were seen were seldom more than five or six feet high and the highest he saw was only twelve feet high. He mentioned that it was necessary to clear the underbrush before he could reach the trees. He found he had "a good deal of cutting to do for a very little wood."8 He remarked:

In town, the inhabitants burn the small wood which grows in thickets, and for which they send out Indians in large numbers, every few days. Fortunately, the climate is so fine that they have no need of a fire in their houses, and only use it for cooking.9

The next historical evidence giving a description of the landscape is from the diseños filed with grant petitions (Map 3). There are several diseños of the San Diego area, such as the one described below.

The diseño of Rancho Santa Margarita, drawn by Jasper O'Farrel in 1841, accompanied the petition presented by Dons Pio and Andres Pico. This grant, combined with their other holdings, gave the Pico brothers one of the largest land holdings in California; the Rancho Santa Margarita tract alone comprised 133,000 acres of which Camp Pendleton Marine Corps Base now occupies 125,000 acres. The diseño depicted four good sized river valleys and one creek along
MAP 3
Disenos of California

San Diego
1. Rancho Santa Margarita

Los Angeles
2. Rancho of Manuel Nieto
3. Rancho San Antonio

Santa Barbara
4. Rancho Tepusquet

San Luis Obispo
5. Rancho Bolsa del Chamisal
6. Rancho Pecho y Islai
7. Rancho Canada de los Osos
8. Rancho Corral de Peidra
9. Rancho Huerhuero
10. Rancho Atascadero

Salinas Valley
11. Rancho Posa de los Ositos
12. Rancho San Vicente
13. Rancho Rincon de las Punta del Monte
14. Rancho y Llanito de los Correos
15. Bolsa de los Escarpines
16. Rancho Los Carneros
17. Rancho Aromitas y Agua Caliente
18. Rancho San Andres
19. Rancho El Pescadero

San Francisco
20. Rancho San Miguel
21. Rancho San Pablo
22. Rancho Arroya de la Alameda
23. Rancho Huichicha
24. Rancho los Gallinas

Sacramento
25. Map of Central Valley
26. New Helvetia Rancho
the coast between Santa Margarita Canyon and San Mateo to the north. Santa Margarita, Los Flores and San Mateo canyons were drawn with scattered trees up the valley from the coast. San Onofre canyon was depicted with a grove of trees around the mouth of the creek and thicker woodlands are shown up valley than the other canyons.\textsuperscript{10}

Fages traveled along the coast in 1769 and described these canyons: Santa Margarita, he wrote, was a "spacious, cheerful canyon, well wooded and well supplied with fresh water;" located at the mouth of the canyon was a fair-sized pond of brackish water.\textsuperscript{11} He described Los Flores Canyon as having plenty of water in numerous pools while the entire locality abounded in rose bushes.\textsuperscript{12} Fages spoke of the area in general as being good pasture land.

Discussion

There seems to have been a change in the landscape around the San Diego area during the Spanish/Mexican period. Fages and the early explorers spoke of abundant wood and timber in the region, yet Dana found wood very scarce sixty-six years later. Since several of the early Spanish writers spoke of "abundant" wood the discrepancy might stem from their definition of abundant, although the oak forest described by Vizcaíno seems to have totally disappeared. The explorers, with the exception of the native Indians traveling with them, were from Spain or
Majorca, areas that had few trees and suffered from acidity; therefore, the riparian growth may have seemed to be abundant to them whereas Dana and the Alert sailors came from the eastern United States which still had sufficient native forests and the areas appeared to be devoid of timber to them. It also appears that while Fages spoke of no undergrowth or chaparral covering the hills and riparian areas, Dana wrote several times of the heavy undergrowth that infested the area; however this is not to imply that chaparral was not in the area when the Spaniards first surveyed the region, more likely, the chaparral covered areas were not mentioned because it is normally found on steep hill sides and slopes that would be unsuitable for agriculture and the Spaniards found enough land to farm without these shrub covered hillsides. The Spaniards did not pass through shrubs or brush that caused them great difficulty in travel until they crossed the Santa Lucia Mountains above Santa Barbara; therefore, they may not have mentioned it until it caused them problems. The only truly conclusive statement that can be made around the San Diego area is that all available and easily accessible riparian timber had been cut before Dana arrived in 1836.

Los Angeles Area

Portolà's expedition passed east and north of the Los
Angeles Basin, crossing the Puente Hills through La Habra Canyon into the San Gabriel Valley which they named San Miguel. San Gabriel Valley was traversed with difficulty through fields of head high dry grass. The region was well watered by small streams with many poplars, willows, blackberries, and grape vines growing along the channels and up into the canyons. The Los Angeles River was a dry stream when they crossed it, but showed signs of high flood waters in the recent past. The travelers crossed the dry river bed after passing through a canyon well wooded with poplars and alders. They crossed into the San Fernando Valley which Father Juan Crespi described as follows:

We saw a very pleasant and spacious valley. We descended to it and stopped close to the watering place, which is a very large pool. Near it we found a large village of heathen, very friendly and docile; they offered us their seeds in baskets and other things made of rushes. There were so many that if more of them had come with arms it would have caused us some suspicion, for we counted more that two hundred men, women, and children....We gave to this plain the name of Valley of Santa Catalina de Bononia de los Encinos. It is nearly three leagues wide and more than eight long. It has on its hills and in its valleys many live oaks and walnuts, though small.

The expedition passed north out of the valley over high barren hills. They finally reached a small pleasant valley with a copious supply of water, wooded with many poplars and oaks of great size -- Castaic.

The Spaniards were so impressed with the "San Miguel Valley" that they returned in 1771 and established the
mission of San Gabriel which soon proved their expectations of the region. Over the period that the missions was operating, it became the most successful mission. To the west of the mission site there were great forests of oaks. The mission claimed jurisdiction over the San Gabriel and the Santa Ana rivers and over all of the cut wood and timber in the mountains from which the rivers flowed. The mission was situated on a slope with numerous streams making irrigation of the crops possible; from the onset this mission prospered.

The Mission of San Fernando Rey was established in 1797. Father Vicente de Santa Maria wrote of the site:

We found the place quite suitable for a mission, because it has much water, much humid land and also limestone; for we came upon a party of gentiles who were finishing a kiln for burning lime which they had already heaped up. Stone for the foundations is nearby. There is pine timber in the direction of west-northwest of said locality, not very far away; also pastures are to be found and patches very suitable for cattle; but there is a lack of firewood; for the place has no more than is found in the arroyo, which is about one league long. There we found willows, poplars, alders, and a few live-oaks, at a distance of a quarter or a half league from the mission, if it should be founded there.

Dana landed at San Pedro Harbor in 1836, and described the coastal area as entirely bare of trees and even shrubs, filled with herds of cattle, in the center of which was the Pueblo de los Angeles, according to his information the largest city in California. He was informed that thirty or so miles to the north lay the two wealthiest missions in
California -- San Fernando and San Gabriel (Dana did not travel inland to the pueblo nor did he personally see the missions).20

Several diseños of the Los Angeles area are extant; two will be discussed here -- the Rancho of Manuel Nieto granted in 1784 and Rancho San Antonio issued in 1837.

The Rancho of Manuel Nieto was the largest and one of the earliest land grants in California. The original grant was later divided among his children into five large tracts of land, Ranchos Santa Gertrudis, Los Coyotes, Las Bolsas, Los Alamitos and Los Cerritos. The diseño of this property was drawn by Abel Sterns in 1834.21 Sterns drew scattered trees across the Los Angeles Basin; two groves of trees were shown at the northern reaches of the San Gabriel River and another grove was depicted along the west fork of the Los Coyotes Creek with a large estuary shown at the mouth of the same creek. Two estuaries and large marshy areas were found on the Los Bolsa section of the grant with trees clustered around the northern end of the marshes.22 The open areas were left blank with no notation, but in Robert Cleland's *Cattle on a Thousand Hills*, he noted that wild mustard grew in such profusion on the Nietos and other neighboring ranchos that it required "a run of two or three days through the mustard" to round up the cattle.23

The diseño of Rancho San Antonio issued to Antonio
Maria Lugo in 1837 was also drawn by Sterns. The rancho lay in the region between the Los Angeles River and the San Gabriel River just north of their confluence (in this era the two rivers merged). Above the confluence, trees and shrub vegetation were drawn; scattered groves of trees were shown west of "Camino de Los Angeles a San Pedro," the road to San Pedro, now Alameda Street.24

Harris Newmark arrived in Los Angeles in 1853 and later wrote that the pueblo was barren of trees, so barren that when the schoolmaster planted three locust trees by the church he had to fight with the waterman to obtain water for them.25 Newmark said the oaks and sycamores were scarce and scattered "here and there, while the willows were present in almost jungle profuseness (sic)."26

Willows were found especially along river banks and had been planted along the borders of lanes and around ranchos for living fences and fuel.27 He remembered:

Wild mustard charmingly variegated the landscape and chaparral obscured many of the hills and rising ground. In winter, the ground was thickly covered with burr-clover and the poetically-named alfilaria. Hills and meadows were covered in season with a great variety of wild flowers.28

Early pioneer Leonard J. Rose described the San Gabriel Valley in 1860 as having very few native trees growing in the lower areas of the valley:

...an occasional isolated oak, or a cluster of sycamores or cottonwoods flanking the bank of a creek. On the elevated and undulating section immediately contiguous to the stretch of water-bearing land, in the direction of the mountains, there was a beautiful,
heavily wooded strip, varying in width from one and a half to two and a half miles.... There were acres upon acres of massive oaks, shady nooks, wild flowers, and babbling brooks, small game in great abundance, and occasional deer astray from its mountain home. The land was of the most fertile, with just sufficient slope to irrigate nicely.29

In 1862, Rose bought 1,300 acres on the eastern boundaries of the San Pasqual grant which he named Sunny Slope. This had been part of the lands of the San Gabriel Mission. His son wrote in later years of his childhood home:

On it were about 300 acres of stately oaks and sycamores, bush oaks, sumacs, manzanitas with their dark-red, highly polished, crooked trunks, and elders with their profusion of saffron blooms or purple berries; thickets of luscious wild blackberries and gooseberries; acres of wild roses; many trailing vines of wild clematis and chilicothe in their clinging, graceful growth, climbing high among the branches of the trees.30

In December of 1860, William H. Brewer, principal assistant with the Whitney Geological Survey of California, arrived in Los Angeles to begin the first extensive geological and botanical survey of the Coast Ranges. Besides keeping a comprehensive field journal, Brewer wrote long, detailed, serially numbered letters which he sent home with the idea of eventually publishing them.31 Brewer's letters make up a detailed description of the landscape of California during the years that he worked with the Survey, 1860-64:

Brewer considered the Los Angeles area a potential
paradise, only lacking sufficient water to bring it into bloom. Immediately after arriving, he climbed a hill behind the town of Los Angeles which gave him an overview of the region:

Over the level plain to the southwest lies the Pacific, blue in the distance; to the north are the mountains of the Sierra Santa Monica; to the south, beneath us lies the picturesque town with its flat roofs, the fertile plain and vineyards stretching away to a great distance; to the east, in the distance, are some mountains without name, their sides abrupt and broken, while still above them stand the snow covered peaks of San Bernardino. The effect of the pepper, fig, olive and palm trees in the foreground, with the snow in the distance, is very unusual.32

Brewer's survey party was invited to make their camp on land belonging to Benjamin Davis "Benito" Wilson at the mouth of San Gabriel Canyon. Brewer wrote home that the ranch was situated on a "beautiful plain, hemmed in on all sides by mountains, except for one narrow opening to the sea" nearly thirty miles south.33 Wilson's ranch was part of the old Mission San Gabriel holdings. The old mission was near the ranch; therefore, at the first opportunity, Brewer visited the once glorious edifice. He was saddened by the "extensive ruins of adobe buildings, now the abode of myriads of ground squirrels;" by "long lines of tuna, or prickly-pear hedges, now all ruined," which told of ancient enclosures and vineyards; and by the general decay and ruin of the padres's labors that had once "wrought this lovely valley into a veritable paradise" which now lay deserted and crumbling before him.34
Brewer climbed many mountains behind and around the Los Angeles area to take barometric measurements and botanical samples. He found chaparral on all of the mountains -- his first encounter with this vegetation type. He described the land from Los Angeles to the Temescal Range about eighty miles east as being either plains or valleys with "high, steep, rugged, barren mountains on one or both sides, nowhere covered with timber or of an agriculture purpose." 35

On leaving Los Angeles Brewer's party followed basically the same route that Portolà's expedition traveled nearly one hundred years earlier, crossing into the San Fernando Valley on their way north. The valley was still partly grasslands with the northern areas desert for want of water. The Mission of San Fernando had fallen into ruins and its holdings divided into ranchos. 36

Discussion

The vegetation of the Los Angeles region seems to have been a grassland broken by small copses of trees, mainly along streams, rivers, and in marshy areas. This is substantiated by the fossil record from the La Brea tar pits. 37 However, it is certain that the grassland composition changed drastically with the coming of the missionaries. Wild mustard is not a native plant in the America's; according to Charlotte Clark's Edible and Useful
Plants in California, the missionaries spread the seeds along the trails from one mission to another to mark the route. Cattle ate the maturing plants and spread the seeds over the hills and plains forming head high thickets. The copses of oaks, sycamores, and alders were cut for lumber and fuel until the predominant riparian tree was the willow. The willow, because of its rapid growth, became the usual tree in the region to plant along roads and boundaries in areas that could be irrigated; in drier areas the "tuna" cactus was planted. Again, the missionaries helped in the spread of this cactus, which had been used in the earlier missions of Baja California for food and fences.

The large forest of oaks described by Fages in the San Gabriel valley were slowly disappearing. The tree lined slopes witnessed by the Spaniards seemed to have given way to a "desert appearance" described by Brewer in 1862 as consisting of land thickly covered with a growth of chaparral, cactus, elders, sagebrush, and large weeds. Many of the oaks survived until 1860 as witnessed by Rose's statements, however the oaks were increasingly being destroyed for firewood. Rose cut oaks on his land and sold it to provide extra income. Newmark noted:

No tree was spared, and I have known magnificent oaks to be wantonly felled and used for fuel. Valuable timber was often destroyed by squatters guilty of a form of trespassing that gave much trouble.
The literature reveals a series of changes in the vegetative landscape: the modifications to the aboriginal landscape that the Spanish made by planting fruit trees and vineyards; then, after secularization much of the mission's irrigation systems decayed and the land reverted to open range used by the ranchos; and finally the arrival of other American/European men in the area, who once more began planting vineyards, fruit orchards, and cultivating land for grains and vegetables. The American/European settlers began to fence their lands against the destruction of the cattle (this fencing led to bitter controversy between the ranchers and farmers). The successive groups used the available timber for fuel and building, until by the late 1860's all neighboring and easily accessible timber had been removed so that lumber had to be imported from Northern California or Oregon for building purposes and timber for fuel was becoming scarce.

Santa Barbara Area

The Santa Barbara region was very alluring to the Spaniards because the area was heavily populated by the Chumash Indians and the land they inhabited was very appealing. Fray Crespi wrote that the grass was a yard higher than a man on horseback. He also noted:

...all about are large tablelands with big tall live-oaks (I have never seen larger), and many
sycamores as well. We have come across rose-patches in such great amounts that the plains here were full of them in many spots.\(^46\)

The area surrounding Pueblo de la Carpinteria was sketched with high hills which Crespi described as bold, rough and steep; "white-colored here and there, as though from white earth or stone, and, where not whitish, well covered with dry grass."\(^47\) Fages wrote of the excellent stream with willows growing along the banks which flowed from the canyon behind the Indian villages.\(^48\) Fages summarized the area in these words:

> In the mountains there are seen many pines like those of Spain, mollares, and oaks, and live-oaks upon slopes and in certain spots on level ground. On the rivers and streams there are many white and black poplars, willows, alders, elm, small poplar, some laurels and canes. The soil is very good; it is black, well-grassed, and mellow; and the fields are thickly dotted with shrubs. Almost every half-league one encounters a stream more or less sizable -- besides headwaters and springs of excellent water.\(^49\)

Northwest of the fertile Santa Barbara area near Point Concepción, the Spanish explorers encountered a desolate region around El Bullito Creek extending to Los Pedernales. The hills were high and barren; there was no forest nor scattered trees. The explorers discovered that the Indians of El Bullito Creek, Canada del Cojo, and Espada Creek were "exceedingly poor, and so hungry that they can hardly subsist, as they are without canoes, live on rough ground, and have a scarcity of firewood."\(^50\)

Nearly a century later the Alert docked at Santa
Barbara, affording Dana a view of the area. He wrote: "The mission is a large and deserted-looking place, the out-buildings going to ruin, and everything giving one the impression of decayed granduer (sic)." The village consisted of perhaps a hundred adobe houses. The mission and village were situated "on a low plain, but a little above the level of the sea, covered with grass, though entirely without trees." Dana wrote, "The only thing which diminishes its beauty is that the hills have no large trees upon them..." He reported the trees had been burned in a "great fire which swept them off," a "dozen years" before his arrival and they had not grown back. The Alert sailed for San Pedro and as they sailed down the coast Dana remarked that the coastal lands were "level or moderately uneven, and, for the most part, sandy and treeless." The diseños provide additional information for the Santa Barbara area. That for Rancho Tepusquet claimed by Thomas Olivera in 1837 is typical. The area covered by the diseño lay at the confluence of the Cuyama and Sisquoc Rivers where the united streams become the Santa Maria River. The drawing depicted low hills covered by grass with oaks drawn in Tepusquet Canyon.

Brewer arrived in the Santa Barbara area in 1861 and wrote after his botanical survey of the Santa Barbara/Carpinteria area that he had found more timber
along the streams and in the valleys than he had seen further south. The mountains he climbed were covered in dense chaparral, but the strip which ran parallel to the coast, from one to six miles wide, was of very green, grassy slopes covered in a profusion of wild flowers. Brewer wrote of the area:

This fertile, lovely strip is well watered by frequent streams that come down from the mountains at intervals of every two or three miles, and is all occupied, either by rancheros under old Spanish grants or by recent wandering worthless American 'squatters'.

Discussion
A recent study by Jan Timbrook, et al., has developed a description of the Santa Barbara landscape. As mentioned earlier, the landscape as seen by Portolà's expedition had already been modified by the Indians. Timbrook's detailed study provides evidence suggesting the Chumash Indians greatly modified their territory (roughly from the mouth of the Santa Clara River in Ventura County north to the Santa Maria River near the border of Santa Barbara and San Luis Obispo Counties, west to the steep slopes of the Santa Ynez Mountains) by deliberately burning the grasslands to stimulate the growth of food plants. This deliberate burning was carried out frequently enough to keep the coastal sage and chaparral to a minimum in the region. The Spaniards disapproved of the heathen practice of burning the grasslands because of their need for grain
which also burned when the grasslands were fired. In 1793, in response to numerous complaints, Governor Jose Joaquin de Arrillaga proclaimed it illegal to wantonly burn the grasslands although Dana reported devastating fire scars in 1836. With the suppression of burning, coastal sage and possibly chaparral began to invade the grasslands, greatly changing the landscape as seen by the earlier explorers.

Timbrook states that the pollen record indicates that chaparral and coastal sage scrub have only dominated the local landscape for the last 2300 years, replacing coniferous forest and oak woodland, suggesting perhaps this vegetation change was also human induced.

Brewer noted that the Santa Barbara area had been isolated from the rest of California due to the high mountain ranges that encircled the region. The lack of adequate roads over these physical barriers (a new road had been completed immediately before his visit and he was in Santa Barbara when the first Overland Stage arrived there) prevented commercial wagons from moving along the coast through Santa Barbara. This lack of communication with the outside world had preserved much of the "Spanish" culture and had kept the population of the area low. The lower population evidently had not placed excessive stress on the timber reserves. The lack of roads had made it impossible to export their timber overland to other areas,
while the infrequency of ships calling at Santa Barbara made this mode of exporting impractical.64

It would seem that sufficient timber had regrown in the area between Dana's visit in 1836 and Brewer's survey in 1861 to be noticeable by Brewer, or that Dana's estimation of the timber resources were based on a cursory inspection. In any event, it is evident that the landscape in the Santa Barbara area has undergone several changes due to human intervention.

San Luis Obispo Area

As Portolà's expedition moved northward toward Monterey Bay, it crossed the Santa Ynez River, finding it to be a good river flowing through a beautiful valley containing many willows. Large bears were spotted in the valley giving it the name of Osos Valley. San Antonio Creek (not to be confused with the San Antonio River) was reached by traveling over level ground overgrown with wild rosemary dotted with trees of "delicate perfume."65 The descent to the coast crossed large sand dunes, skirting marshes and estuaries. Fages wrote of their camp in Price Canyon as being well-wooded with white and live-oaks, alders and other trees. He noted the abundance of firewood in the area.66 Moving north up the coast they discovered Morro Creek and Bay. The region was described as being well forested with good pasture on the level plains. The
immense estuary was considered a potential harbor. Once again they moved inland, traveling up Ellysley's Creek, ascending what would later be called Dawson's Grade, into the densely wooded (willows, poplars, and other trees) canyon of Santa Rosa.\textsuperscript{67} Thus, they entered the Sierra de Santa Lucia.

Fages later wrote a prediction that the mission established in San Luis Obispo in 1771 and Mission San Gabriel would soon be able to provide subsistence for the other missions eliminating the need to ship supplies from San Blas.\textsuperscript{68} The prediction was correct for both missions but Mission San Luis Obispo never became as populous or as active as San Gabriel because of the isolation of the site. Trading ships did not stop frequently enough to allow the mission to trade its excess for other goods and therefore prosper as much as San Gabriel and San Fernando which had access to coastal trade.

Several diseños of the San Luis Obispo region survive. The diseños of value here are of Rancho Cañada de los Osos, Rancho Pecho y Islai, Rancho Corral de Piedra, Rancho Huerhuero, Rancho Bolsa del Chamisal, and Rancho Atascadero y Asuncion. All these diseños were drawn by anonymous surveyors between the years of 1839 and 1844.\textsuperscript{69}

Rancho Cañada de los Osos was part of Mission San Luis Obispo's former holdings. It was granted in 1842, and covered the Los Osos Valley to the estuary of Morro Bay.
The only vegetation depicted on the diseño was around the mouth of the creek that emptied into Morro Bay at Morro Rock. It looks to be heavy brush or reeds but as there is no written notation the exact nature of the vegetation is not clear. Present day Clark Valley was called Alder Valley then, which is suggestive, but not conclusive.70

Rancho Pecho y Islai was granted in 1843, and extended from Point Buchon nearly to Point San Luis. Montaña de Oro State Park now occupies approximately the northern one fifth of the tract. Most of the area was depicted as pasture.71

Rancho Corral de Piedra consisting of 31,000 acres was granted in 1840 to Jose Maria Villivacencio. The tract was located between the present towns of San Luis Obispo and Arroyo Grande, east of Pismo Beach and Highway 101. The hills located in the southeast corner of the diseño were shown as covered with oaks and brush. Pine trees were shown in the northeastern sector of the map; other trees were shown in profusion along stream beds in Arroyo Grande.72

Rancho Bolso del Chamisal was granted to Francisco Quijada in 1837. The diseño depicted part of the Santa Maria Valley north of Oso Flaco Lake and Arroyo Grande. The hills surrounding Arroyo Grande were shown as grass covered. The Arroyo itself was shown with heavy tree cover up canyon. The hills south of the Arroyo were described as
being covered with live-oaks in the Tar Springs Creek area. In the southwest section of the diseño Oso Flaco estuary was denoted as being impassable. The hills to the southeast of Oso Flaco were described as covered with "chamisal" - chaparral. 73

Rancho Atascadero y Asuncion was petitioned for in 1839. The present city of Atascadero is located on the former lands of this grant with Highway 101 bisecting the original holding. The foothills west of the present highway were depicted as covered with pines and chaparral, "lomas con pinos y chamisal." 74 The foothills trending northeast into the higher mountains were noted as covered with pines, "lomas con pinos." 75 "Sierras" were drawn along the western boundary of the diseño but no notations pertaining to vegetation were made. East of the present highway, "Sierras" were also drawn and to the east of these mountains was the notation "chamisal y monte" -- forests and chaparral. Several areas of pasture lands were noted in the center of the diseño separated by hills depicted as being covered with pines and chaparral. 76

Rancho Huerhuero was granted to Don Jose Mariano Bonilla in 1842. He had originally been granted one square league of land, but petitioned later for an additional three leagues stating that his present holding did not have sufficient water on it for his cattle. The diseño studied was of his petitioned land, and covered more than the asked
for three leagues. The diseño depicted the area west of Rancho Santa Margarita to Estrella Valley to the northeast. The land for the most part was noted as being "lomas montuosas," -- hills covered with trees and shrubs. 77

The Geological Survey arrived in the San Luis Obispo area in May of 1861. Brewer camped on Francis Zida Branch's Rancho Santa Manuela two miles from San Luis Obispo. Brewer surveyed the area and reported:

San Luis Obispo town lies in a beautiful, green, grassy valley, about nine miles from the sea. A ridge of the Coast Range lies to the north, a continuous ridge, about 3,000 feet high, with a single pass through it near town. The pass is about 1,500 or 1,800 feet high. This valley is more like a plain, from four to six miles wide and fifteen or twenty long, running northwest to the ocean. A range of hills lies to the south separating it from the sea in that direction. 78

Brewer noted that the hills surrounding San Luis Obispo were covered with wild oats about a foot or a foot and a half high, "green as the greenest meadow;" and as he climbed the foothills into the mountains he struck a "low chaparral" around two thousand feet above sea level. 79
The plains were bare of trees, "nothing relieved the eye; the senses tired with the level scene;" the profusion of flowers, beautiful elsewhere, "tired us with their abundance and their sameness;" and the air was filled with "gray dust, sometimes shutting out the sight of the hills like drifting snow." 80
Discussion

The San Luis Obispo area as described by the Spaniards in 1769, as depicted on the dise;os three-quarters of a century later, and by Brewer are not consistent. The Spaniards spoke of a "well-forested" area, yet the descriptions given by the dise;os and Brewer do not show trees or forests in any abundance in the Osos Valley. In fact, Brewer wrote of the level "scene" and treeless plains. Evidently the Spaniards had cut the available trees for fuel and timber, some remaining trees are described in the side canyons and pines and oaks are described in the Atascadero region. Timber did not seem to be plentiful in the area, although pines and some oaks were found both in historic times and are presently found in the Atascadero area. Better timber is found in the Sierra Santa Lucia, but transporting the timber would have been difficult because of the steep terrain and lack of roads.

Cattle and sheep were introduced in the area after the founding of the mission in 1771. The grazing of animals prevented new tree growth. Cattle and sheep also helped in the spread of the oats that were described by Brewer as covering the hills when he was there.

The "wild oats" described by Brewer are introduced; in the description that he gave of the Monterey area he wrote that the oats covering the hills and pastures had been
introduced by the missionary fathers, but he does not identify the species to which he was referring.\textsuperscript{82}

Brewer found the area the most "Spanish" of any of the areas he visited in California; therefore the most backward in his way of thinking.\textsuperscript{83} The area as a whole has historically been one of low population; it has only been since the middle of the present century that this region has been subjected to heavy urban population pressures that are causing destruction of the early Spanish pastoral landscape.

**SUMMARY**

While Southern California during the Spanish/American period had the largest concentration of settlers, the population remained low with little outside migration. However, this low population caused changes in the plant composition and depleted fuel resources in some areas, such as San Diego, Los Angeles, and San Luis Obispo. After the gold rush in Northern California, people began to migrate southward seeking homesteads which placed an even greater strain on the natural fuel supplies. Before describing the action taken to alleviate this fuel shortage, the next chapter will describe the landscape of Northern California during the Spanish/Mexican period. Although settled at the same time, Northern California's landscape underwent more
radical changes during the gold rush because it was so sparsely populated by the Spanish/American settlers that many areas were virgin except for some modifications made by the Native Americans. Southern California at the end of this period was already in short supply of fuel, although the north was not.
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CHAPTER FOUR
NATIVE VEGETATION OF NORTHERN CALIFORNIA

During the Spanish/Mexican period the population of Alta California had grown very slowly from 906 persons in 1790 with 60 per cent of this population residing in the south, mainly at Santa Barbara, to 5,616 in 1845. When Monterey became the only legal port of entry to foreign trade, it doubled in population between 1825 and 1830. By 1830 the population of California (3,851 persons) was equally divided between Northern and Southern California, however by 1845 the concentration of population had again shifted southward with Los Angeles the largest settlement. The population centers in Northern California during this era were Monterey, San Jose, and San Francisco. This low population had little effect on the vegetation except for composition changes. Much of the area was virgin territory when the miners arrived in 1849. The following account describes this landscape before the gold rush.

Salinas Valley and Monterey Area

In the autumn of 1769, Portolà's band of explorers entered the Salinas Valley near present day King City after wandering in the Santa Lucia Mountains. The explorers had tried to follow the coast north to be sure that they did
not pass Monterey Bay; however, when the mountains plunging into the sea closed coastal access they were forced to turn inland and followed a very narrow canyon (probably Wagner Creek) into the mountains, that was difficult to traverse due to the heavy brush. They discovered a river that they named the Rio de las Truchas (San Antonio River) which they followed for two days. Fages described the river valley as being wooded on both sides with white and live-oaks of great height and girth.\(^2\) They traveled along the San Antonio River to its junction with the Salinas River. Fages wrote that the area where the two rivers merged was on a plain of good soil "luxuriant with foliage," abounding with rosemary, live-oaks, and other unspecified trees.\(^3\)

The explorers traveled northwest along the Salinas four leagues to camp near the present site of Metz where they found good water but sparse pasturage for their animals.\(^4\) The Salinas River at this point was lined with poplars and several good sized groves of live-oaks were scattered across the flood plain.\(^5\) Continuing towards the coast, staying close to the Salinas, they had problems finding good pasture until they camped at a site they named Real Blanco (near Camphora).\(^6\) They camped in a grove of live-oaks and Fages entered into his diary that the pasture was more abundant in this area.\(^7\)

The Spaniards followed the Salinas River to its mouth on the Monterey Bay, but could not agree among themselves
if they had at last reached the end of their search.\textsuperscript{8}

According to Vizcaino's account he had found Monterey Bay
at exactly 37° N latitude and their bearings were
36°30' N latitude. After deliberation among themselves,
they voted to travel north to 37° N to ensure themselves
that they were not mistaken. As a result, they found the
great bay of San Francisco and the "Golden Gate."\textsuperscript{9}

Forced to return to San Diego because of lack of provisions
they were still uncertain if they had found Monterey Bay.

In the spring of 1770, another expedition was launched;
as before, one group was sent by land and another group
sailed north to find the elusive bay. Father Serra, who
had sailed from San Diego, wrote in a letter to Father Juan
Andres that a few days after the expeditions had united at
Monterey that they "moved to a pretty plain about a rifle
shot from the beach, and there established the presidio and
the mission."\textsuperscript{10} According to Serra: "A little chapel and
altar were erected in that little valley, and under the
same live-oak, close to the beach, where, it is said, Mass
was celebrated at the beginning of last century," he too
said Mass. That same day, June 13, 1770, the ground was
blessed and the land formally claimed for Spain.\textsuperscript{11}

In a letter written to Father Francisco Palou dated the
same day as the founding of the mission, Serra requested
more missionaries to be sent to Monterey so that two more
missions could be founded. He was anxious to found the
mission of San Buenaventura on the Channel of Santa Barbara "a place that is much better than San Diego or Monterey, or any other place we have so far discovered." Already he was considering relocating the mission that he had just founded to the banks of the Carmel River, "two short leagues to the south." Serra wrote that the new location was a delightful spot; "thanks to its plentiful supply both of land and water" which gave promise of "abundant harvests."

Monterey, the site of the original presidio was the capital of Alta California, the home of the governor and civilian authorities. It was also the headquarters of the President of the Missions, first Father Serra and after his death Father Palou. Monterey became the only official Spanish port therefore making it the commercial center for all trade. It was to remain so until Mexican independence from Spain in 1821. After the Mexican Revolution no other ports were opened for trade with foreign vessels but illegal trading did take place between the American hide ships and the missions and villages. Monterey remained the capital until the United States annexed California and made the new city of Sacramento the capital.

To encourage settlement in northern California, it was decided in 1795 to build a pueblo either on the Alameda Coast, San Francisco peninsula or at Santa Cruz. The Alameda site was pronounced unsuitable for two reasons: 1)
the bed of the creek was too low to allow irrigation, and 2) "there was no wood, timber, stone, or pasturage except at a great distance." San Francisco was considered "the very worst place" because the peninsula afforded "neither lands, timber, wood nor water, nothing but sand and brambles and raging winds." The site chosen was at Santa Cruz, across the river from the mission. The pueblo was named Branciforte.

The diseños for this area are dated from 1831 to 1839. Five grants in the Salinas Valley are discussed, three in the Watsonville area, and one in the Monterey area.

The five diseños located in the Salinas Valley are of Ranchos Posa de los Ositos, San Vicente, Rincon de la Punta del Monte, Guadalupe y Llanito de los Correos and Bolsa de los Escarpines.

Rancho Posa de los Ositos was granted in 1839, and consisted of four square leagues southeast of present day King City; Highway 101 now traverses the land for ten miles from Greenfield to Jolon Junction. The land lay between Arroyo Seco and Pine Canyon on the south side of the Salinas River which was described as tableland. The diseño depicted trees along both arroyos and the Salinas River. However, no tree type was mentioned. Pine Canyon was called Arroyo del Pinos which is suggestive. Trees were drawn along the ridge line of the "Sierra Grande." Rancho San Vicente was granted in 1835. It was located
between Gonzales and Soledad along the Salinas River. The east and west boundaries were marked by large groves of trees (Punta del Monte de la Soledad and Punta del Monte de la Poza). The distance between the two groves was approximately a league and one-half. North of Punta de la Poza lay a smaller grove of trees. The Bajío Empastada or river bottom was depicted with a grove of trees in a bend of the river. The whole length of the river shown on the map was depicted with scattered trees.¹⁹

Rancho Rincon de la Punta del Monte was granted in 1836. The southern boundary of the property adjoined San Vicente, running from the Salinas River northeast to the hills; the northern boundary adjoined the Rancho Zanjones. The modern town of Gonzales is located within the boundaries of this rancho. A series of ponds and intermittent streams were located about half way between the Salinas River and the foothills. Trees were depicted in the southwestern corner of the property between the Salinas River and the "Camino de Llano." Groves of trees were drawn at the northwestern end of the series of ponds, in a bend of the Salinas River, and trees were drawn in the Sierra Grande.²⁰ None of the tree types were given. Therefore, the identification of the general tree type in this stretch of the Salinas River must be drawn from the earlier description of Fages.

One of the earliest grants given in the Salinas Valley
was to Navy Lieutenant Juan Malarin in 1833. Later he asked for an extension to the lands that he already held. In 1834 he filed the diseño for Rancho Guadalupe y Llanito de los Correos consisting of two square leagues of land. Malarin's property was situated on the west side of the Salinas River (Rio de Monterey) opposite the present towns of Chualar and Gonzales. The tableland, one and one half miles to two miles wide between the river and the Sierra Arida, was depicted with groves of trees. Two groves were drawn in the southwest sector of the diseño; one grove was located in the northwest sector with scattered trees drawn immediately south of this grove near the river. The tree types were not noted on the map or in the legend, although they are drawn with full heads, looking very much like oaks trees.21

Salvador Espinosa, in applying for Rancho Bolsa de los Escarpines in 1837, stated that he had occupied the land for fourteen years. The accompanying diseño portrayed no vegetation on the map. However, Espinosa made the comment in his petition that the land was good only for grazing and "not arable land dependent upon the seasons."22

Three of the diseños of the Watsonville area are of Ranchos San Andres, Aromitas y Agua Caliente, and Los Carneros. Rancho San Andres was located north of the Pajaro River and west of the present city of Watsonville. Half of the four square leagues granted were considered
"unusable." The lower hills were depicted with "chemisal," or chaparral. In the northwest, "Palos Colorados," or redwood trees, were drawn and labeled. The river lands are marked and labeled "ensinal," or live-oaks.23

Rancho Aromitas y Agua Caliente, containing 8,600 acres, was located south of the Pajaro River in the northwest corner of present San Benito County. The river banks and hills near the river are shown with trees. The symbols resembled those used on other diseños as oak trees although they are not labeled, nor is there a legend.24

Rancho Los Carneros was small tract of land four miles west of the Mission San Juan Bautista, located along the Monterey County line at the present junction of Highway 101 and Tarpey Road in the canyon traversed by the highway. The land was depicted as very hilly covered with "stick figure" trees. This probably represented chaparral, as the full heads used to depict oaks are missing.25

Brewer and his geological party traveled over basically the same route taken by Portolá's expedition nearly one hundred years previously. During the months of May and June, Brewer examined the Salinas Valley moving northwestward to Monterey, although Brewer entered the Salinas by a different route than that used by Portolá. Brewer came over the San Luis Pass into the Santa Margarita Valley through the foothills to Atascadero and into the Salinas Valley. Fages wrote that on the return trip to San
Diego they had found an easier route but since it was "now" so well known he would not describe it. This route was probably the route now followed by Highway 101 which was the "new" road followed by Brewer in 1861.

Brewer noted that the Santa Lucia Mountains were steep, rocky and "black with chaparral," and were "3,500 to 4,000 feet high." Descending the San Luis Pass he described an expansive vista including the foothills and the Salinas Valley which was "much less verdant" than he had expected. "There are more trees but less grass," he wrote. He further observed:

The soil is already dry and parched, the grass already as dry as hay, except along streams, the hills brown as a stubble field. But scattered over these hills and in these valleys are trees every few rods -- great oaks, often of immense size, ten, twelve, eighteen, and more feet in circumference, but not high; their wide-spreading branches making heads often a hundred feet in diameter -- of the deepest green foliage -- while from every branch hangs a trailing lichen, often several feet long and delicate as lace.

As Brewer's survey group traveled northwest down the valley, they left the foothills and moved out onto the Salinas Plain. The ground became dry, parched, dusty and covered with scanty grass. The trees were a belt of timber twenty to a hundred rods wide that "stood out as a band of the liveliest green in this waste." As discomforting as the heat and dust was, the desiccating, forceful winds were even more trying. The wind, heat, dust, and lack of water was punishing for both men and mules. The valley was
not heavily populated, the ranchos being 18-20 miles apart with the ranch house found near available water. Most of the livestock in the valley were sheep and cattle.³⁰

When Brewer reached Monterey he was invited to visit El Pescadero Ranch. Brewer described the log cabin built on the beach for protection against robbers and stated that behind the cabin were "hills covered with tall dark pines."³¹ The site is now the Pebble Beach Golf Course.³²

Discussion:

The Spaniards traveling with Portolà found good pasture in most areas of the Salinas Valley except for a few leagues south of Camphor near Metz. There was riparian vegetation along the Salinas River composed of live-oaks, poplars, and probably sycamores and alders, although they are not mentioned by name. Scattered live-oaks were described in most of the valley on the river plain.

The diseños studied show both riparian vegetation and trees located along the tableland. However Brewer's writings of the Salinas Valley in 1861, reveal subtle changes. He wrote that the only trees to be seen were found in a belt along the river. Timber still existed along the river but the live-oak groves had disappeared. Except in the southernmost part of the valley, the oaks were reduced to insignificant numbers by the time of Brewer's visit.³³ The Spaniards, in October of 1769 had
found pasture in most areas, but Brewer's party in June of 1861 had trouble finding sufficient pasture for their animals the length of the Salinas Valley. It would appear that after the introduction of sheep and cattle in the valley the land had been overgrazed.

Even though the winter rains of 1861 were very heavy, Brewer had trouble finding sufficient good water in June. In 1769 the Spaniards had not had this problem in October, the driest month of the year. The drop in the water level of the Salinas could be accounted for by increased consumption by people and livestock, the decrease of ground cover leading to a faster runoff of rainwater with little or no percolation into the watertable, or both.

San Francisco and the Bay Area

Dana was one of the earliest writers to note the contrast between northern and southern California. He wrote that the land northward of Point Conception was "better wooded," had "a richer appearance," and was "better supplied with water" than the land to the south. The land south of Point Conception had "little wood," and the country had a "naked, level appearance," although he thought the land was fertile. "In fact," he wrote, "as I afterwards discovered, Point Conception may be made the dividing-line between two different faces of the country." 34
The Spaniards discovered San Francisco Bay while trying to find Vizcaino's Monterey Bay. The expedition moved north along the west coast of the peninsula until they reached land's end. Fages wrote that the Sierras between Monterey and the end of the peninsula were "rather bare of trees," however, the mountain range they could see across the bay extending inland was very high and on the slopes many trees of a "great variety" were growing. In the bay were several islands covered with trees. From their vantage point the Spaniards spotted a large number of elk which they thought were buffalos.

Dana sailed into the San Francisco Bay for the first time on a winter day in 1835. He was struck by the "vast solitude" of the bay where only one other ship, a Russian vessel, lay at anchor. During their stay of several weeks not another sail was sighted. The Alert traded for hides with the remote missions of Santa Clara and San Jose that sent their hides on launches manned by Indians. The Alert's anchorage was located between "a small island, called Yerba Buena, and a gravel beach in a little bight or cove of the same name, formed by two small projecting points". He gave a careful description of the surrounding area:

Beyond, to the westward of the landing-place, were dreary sand-hills, with little grass to be seen, and few trees, and beyond them higher hills, steep and barren, their sides gullied by the rains. Some five or six miles beyond the landing-place, to the right, was a ruinous presidio, and some three or four miles to the
left was the Mission of Dolores, as ruinous as the presidio, almost deserted, with but few Indians attached to it, and but little property in cattle. Over a region far beyond our sight there were no other human habitations, except that an enterprising Yankee, years in advance of his time, had put up, on the rising ground above the landing, a shanty of rough boards, where he carried on a very small retail trade between the hide ships and the Indians. Vast banks of fog, invading us from the North Pacific, drove in through the entrance, and covered the whole bay; and when they disappeared we saw a few well-wooded slopes on the east, and the vast stretch of the bay to the southward, where we were told lay the Missions of Santa Clara and San Jose, and still longer stretches to the northward and northeastward, where we understood smaller bays spread out, and large rivers poured in their tributes of waters. There were no settlements on these bays or rivers, and the few ranchos and missions were remote and widely separated. Not only the neighborhood of our anchorage, but the entire region of the great bay was a solitude. On the whole coast of California there was not a lighthouse, a beacon, or a buoy; and the charts were made up from old and disconnected surveys by British, Russian, and Mexican voyagers. Birds of prey and passage swooped and dived about us, wild beasts ranged through the oak groves, and as we slowly floated out of the harbor with the tide, herds of deer came to the water's edge, on the northerly side of the entrance, to gaze at the strange spectacle.37

When the Alert sailed from San Francisco Bay, Dana wrote:

If California ever becomes a prosperous country, this bay will be the center of its prosperity. The abundance of wood and water; the extreme fertility of its shores; the excellence of its climate, which is as near to being perfect as any in the world; and its facilities for navigation, affording the best anchoring grounds in the whole western coast of America -- all fit it for a place of great importance.38

Charles Hopper set out in May 1841, for California, with a party of thirty men, one woman and one child, from Jackson County, Missouri. Mr. Hopper reached Yerba Buena in the fall of that same year. In an interview with the
Pacific Rural Press in 1874, he remembered Yerba Buena as being a "miserable place -- nothing but a lot of sand-hills, a trading port of the Hudson Bay Company." At that time there was only one hut that served as a tavern, but had scanty provisions to offer for travelers.  

The earliest map of Yerba Buena, later to be renamed San Francisco, was drawn in 1839. The map showed San Francisco from California Street to Pacific Street and from Monterey Street to Dupont Street. The area between Sacramento and California Streets and west of Dupont Street are depicted with scattered groves of trees.  

Rancho San Miguel occupied the center of the San Francisco peninsula. The area shown on the diseño for this rancho began just south of the present San Mateo County line north to the ocean, and from the El Camino Real to the Presidio Reservation. The area thus described was shown as being covered by chaparral. No trees were drawn on the diseño.  

Several diseños exist that cover land on the eastern shore, or, "Contra Costa," of the Bay. One was Rancho San Pablo with its north and eastern boundaries along the Arroyo de Pinole. The western boundary was the Bay. The map portrayed the intricate nature of the sloughs and estuaries along the coast and depicted mountains in the east. Two pine symbols were shown along the mountain ridges, indicating trees but the area covered was not
Another map was drawn for Jose Jesus Vallejo when he was granted Rancho Arroya de la Alameda in 1842. The land was bounded to the north by Arroyo del Alto, south by Arroyo de la Alameda, east by the principle ridge of the coastal hills, and west by the Bay. The diseño depicted riparian trees along the creeks that culminated in a large estuary. The tract included Mount Eden and present day Union City.

A description given of the Contra Costa area on the eve of the gold rush is supplied by Reverend (later Bishop) William Taylor who arrived in California in 1849. In the course of his duties, he made many journeys around the San Francisco Bay area. Climbing into the hills behind Oakland he described what he saw.

Looking eastward I see a dense forest of huge redwood timber; doubtless the veritable cedars of Lebanon. West and north, hills and mountains stretch to the uttermost line of the ken of vision, and the scene, in its barrenness and sterility of appearance, is only relieved here and there by a small oasis, and by the herds of cattle feeding on the dry grass. Southward the whole valley, for fifty miles, is filled with fog.

There are some sketchy descriptions of the northern side of the Bay. The only early records are the diseños; although an auxiliary mission was established at Sonoma, no record of the landscape has survived. A diseño of Rancho Huichica was drawn by Jasper O'Farrell. The southern boundary was the San Francisco Bay, the whole tract being
in present Napa and Sonoma Counties. The western region of the tract was depicted as heavily wooded with scattered trees across the map to the eastern boundary. Three streams flowed south to the Bay with riparian trees.\(^45\)

Rancho los Gallinas was located on the western shore of San Pedro Bay on the San Pedro Peninsula (north across the Bay from San Francisco), and was part of the Mission San Rafael's original holdings. The map depicted scattered trees in the valleys with pine trees in the mountainous western section.\(^46\)

Discussion

The San Francisco Peninsula as part of the coast range was mainly covered with grass with some scattered trees found along stream beds and in sheltered areas. Chaparral covered the higher slopes, but there were no forests.

Across the Bay, the flat lands dipping into the bay were marshy, riddled with sloughs and creeks with trees growing along the creeks and reeds or "tule" growing in the marshy areas. The foothills were oak woodland and grass. The higher slopes inland were covered with redwoods and pines.

Napa and Sonoma Valleys were oak woodlands and grass with pines and other trees on the encircling mountains. The San Pedro peninsula on the west was grass covered slopes grading into chaparral covered hills that gave way to pines, firs, laurels and other trees at higher
Although the Spanish did establish a presidio and a mission at Yerba Buena and two north of the Bay (Mission San Rafael and Sonoma), it was just before secularization and the areas were not populous. During the 1840s, several grants were issued in the area, but they were petitioned just before the gold rush, therefore, the settlers did not have time to destroy much of the natural vegetation. Until the gold rush of 1849, the area was less populated than the area of Los Angeles.

**Sacramento Area**

The Sacramento Valley was not discovered by the Spanish on their initial expedition in 1769 but soon after Pedro Fages saw the valley from the hills above Contra Costa and he cut across the lower end of the San Joaquin in 1772 searching for runaway Indians. Fages reported an immense plain covered with "tulares" and a great lake on his excursion into the valley. In 1776, Juan Bautista de Anza covered basically the same territory that Fages and Crespi had explored in Contra Costa except his group traveled as far east as Mount Diablo and came back to Monterey by way of the Livermore Valley, making a wider circuit than their predecessors. Until Governor Arrillaga ordered a survey of the eastern lands in 1806,
the country was basically unexplored; but was known in a
vague way by reports of the soldiers that had crossed the
Coast Ranges in search of "cimarrones" - runaway Indians.49

In compliance with Arrillaga’s orders, several
expeditions left from various missions to explore the
valley for suitable mission sites. One extant journal was
kept by Father Zalvidea who accompanied an expedition sent
out by the Mission Santa Barbara. Bancroft concluded that
the party explored the region around Tulare Lake and
possibly Buenavista. The area described by the journal was
said to be "tolerably good land, oak-covered hills, swamps,
and a broad plain with some grass with a yellow flower"
with a pine covered mountain range in the immediate
vicinity.50

Another diary was kept by Father Pedro Muñoz who
accompanied an expedition from Monterey under Alférez
Moraga. It is evident that Moraga had made at least one
and possibly more previous expeditions to the Central
Valley. Muñoz mentions that they found the San Joaquin
River which Moraga had named on a previous expedition.
Moraga crossed the Coast Ranges near the present county
line between Fresno and Merced Counties and traveled
northward. Much of the land they crossed reaching the
Merced was described as being alkaline. Along the river
were thick tules and black willows. They found oaks and
willows on Bear Creek in the area they named Mariposa which still carries that name. North between the Tuolumne River and the Stanislaus River they passed through a very large oak grove or forest.\(^{51}\)

For several years thereafter, the government considered founding a mission along the Merced. In 1810, Moraga returned to the Central Valley with this view; however, the land did not seem as suitable as it had in the earlier expeditions, so all plans for missions in the Valley were abandoned.\(^{52}\)

The first map of the Central Valley was drawn by John Bidwell in 1844 at the request of Governor Micheltorena. The map depicted forty-seven ranchos. The settled area was along the Sacramento, the American, and the San Joaquin Rivers. The delta area was the most densely populated. The delta was drawn in great detail with the tule lands noted, but no trees were shown on the map.\(^{53}\)

Also useful is the diseño by Jean Jacques Vioget of John A. Sutter's New Helvetia Rancho, established in 1839 as the first permanent settlement in the Sacramento Valley. The map covers eleven square leagues of land from Sutter Buttes to the American River, and depicts heavy riparian vegetation along the Sacramento River and Los Plumas Creek. Scattered trees are shown west of Las Plumas Creek.\(^{54}\)

William H. Brewer traveled the Central Valley several
times during his botanical and geological survey in 1862 and 1863. He described the Sacramento Valley as a fertile plain with "majestic oaks scattered across the land." He took the steamer Gem up the Sacramento River to Red Bluff, and described the scenery in a letter home: "We caught distant views of the mountains, but generally we saw only the river and its banks, which were more or less covered with trees -- willows, cottonwoods, oaks, and sycamores -- with wild grapevines trailing from them."56

Brewer spoke of the despoiling of this river by the filling of all the tributary rivers with sediment washed down by hydraulic mining. He wrote:

Previous to 1848 the river was noted for the purity of its waters, flowing from the mountains as clear as crystal; but since the discovery of gold, the "washing," render it as muddy and turbid as is the Ohio at spring flood -- in fact it is perfectly "riley," discoloring even the waters of the great bay into which it empties.57

The river had so filled with sediment that at one point where the river depth had been fifty feet in 1849, young willows were growing in 1862. The winter floods of the year before had raised the bed of the river six to seven feet causing the raging waters to escape the natural levees and flood the whole valley destroying cities, crops and rural homes.58

Brewer visited the New Idria quicksilver mine in the Panoche Canyon area in July of 1861, affording him his first glimpse of the southern end of the Central Valley or
the San Joaquin. Brewer climbed to the summit of the mountain in which the mine was located and gazed out across "chain after chain of mountains, most barren and desolate." The mountains were "gray and dry rocks or soil, furrowed by ancient streams into innumerable canyons, now perfectly dry, without a tree, scarcely a shrub or other vegetation -- none, absolutely, could be seen." Beyond the mountain chains lay the San Joaquin, or Tulare Valley wide and dreary "without trees, save a green belt along the river -- all the rest dry and brown."59

During his travels Brewer kept a temperature record of the areas he visited. He noted the daily extremes on his journey to New Idria. The daily temperature ranged as high as 150°F (sic) but dropped to 46°F during the night, a daily range of over 100 degrees. He observed: "With this daily change in temperature no wonder that the plants of this state are so peculiar!"60

Discussion

The Sacramento Valley, although discovered by the Spanish in 1772, remained unoccupied by Europeans until John Augustus Sutter settled there in 1839. Several explorations of the Central Valley were undertaken by the Spaniards with the view of establishing missions in the interior, the most serious attempt being made in 1806 when Governor Arrillaga ordered his survey. The area around
Visalia was deemed suitable for a mission in 1806; later it was pronounced as not as suitable as previously reported.

The landscape descriptions of the valley are sketchy at best. The eastern and western foothills in the southern end of the Central Valley were labeled "barren." The lands around Tulare Lake were described as "tolerably good land, oak-covered hills, swamps, and a broad plain." Nearly all of the river plain was described as alkaline. Fages briefly described the Sacramento Valley area as an oak-covered plains with tules growing in the delta.

Brewer's description is consistent with the Spaniards; however, certain despoilage was reported by Brewer; i.e., the silt content of the rivers due to hydraulic mining which was replacing placer mining. Ironically, the Sacramento Valley, which was the last of the areas discussed here to be settled, was the first to be despoiled by the gold rush.

**SUMMARY**

Northern California's landscape remained nearly unspoiled through the Spanish/Mexican period except around Monterey where the native grasses had given way to exotic oats, and the Salinas Valley which had been overgrazed. The oak trees also seem to have been destroyed in the Salinas Valley by 1861. San Francisco and the Bay area
were so sparsely populated that little ecological damage is recorded. The Sacramento Valley was settled ten years prior to the gold rush by only a handful of settlers and the Sierra Nevada foothills were virgin. During the gold rush the population of Monterey declined while San Francisco, the Bay area, the Sacramento Valley and the Sierra foothills rose by 385 per cent. These areas were soon radically changed.

Growth in population alone did not account fully for the damage done to the environment. It was the new settler's perception of exploiting the land for mineral and agricultural wealth combined with their use of new technology that brought about the destruction. The new population brought a new culture to California, one that will briefly be described in the next chapter.
Chapter Four References


3. Ibid. pp. 54-55.

4. Ibid. p. 56.

5. Ibid.

6. Ibid.

7. Ibid. p. 60.


11. Ibid. p. 169.

12. Ibid.

13. Ibid. p. 171.

14. Ibid.


17. Ibid.


Ibid. Map 63.

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Dana. p. 230.

Ibid. p. 379.

Ibid. p. 238.


Ibid. Map 42.

Ibid. Map 20.
43 Ibid. Map 41.


46 Ibid. Map 28.


48 Ibid.


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56 Ibid. p. 296.

57 Ibid. p. 295.

58 Ibid.

59 Ibid. p. 139.

60 Ibid. p. 138.

CHAPTER FIVE
THE GOLD RUSH

The previous chapters have attempted to describe the landscape of California before the invasion of immigrants brought by the lure of gold. Even with low populations, the Spaniards had brought changes to the vegetative landscape. The gold rush not only brought more radical physical changes in the landscape but initiated many social changes as well. Robert Cleland likened the surge of people into California during the gold rush to "a turbulent springtime flood" that "obliterated the old order, the old culture, the old customs and way of life." This Chapter examines some of the social repercussions brought about by the gold rush that led to further degradation of the landscape; in particular, the depletion of the local fuel supplies that inaugurated the experimentation to find new trees to alleviate the crisis.

The Spanish padres that explored the area had found peaceful Indian tribes pursuing a hunting and gathering life-style that had been unchanged for millennia. After California passed from the Spanish to the Mexican government, very few Mexicans moved north to settle in the area. Land grants containing thousands of acres were made by both the Spanish and Mexican Governments. Some of the grantees chose to settle on the grants, while others were
content to administer their grants from abroad. The Spanish and Mexican settlers who did come to California remained along the coast, leaving the interior virtually unexplored and inhabited only by the Native Americans. The population before the gold rush enjoyed a pastoral culture; moving with a slow tempo to barely perceptible seasonal variations. Thus, California after the gold finds changed dramatically from an unknown and forgotten land to a bustling, booming state in a scant two years.

As previously mentioned, California was settled in an era before the profound environmental repercussions of the Industrial Revolution in Western Europe and the eastern United States were fully realized. The eastern part of the United States had been colonized by a slow continuous wave of pioneers gradually venturing into new territories that could sustain the needs of a low population without undue stress on the environment, but California was occupied virtually overnight by a large diverse group of people seeking gold. The new Californians imported the latest technology and developed some of their own to extract gold, harvest timber, and till the land. Under such an onslaught of people and technology, several environmental crises were soon felt by the settlers.

Gold Fever
James W. Marshall discovered gold on January 24, 1848 on the south fork of the American River at Coloma in the Sacramento Valley. Although he and John Sutter, the owner of the land where gold was found, tried to keep the find a secret, it soon spread by word of mouth to the village of Yerba Buena. In early May of 1848, Sam Brannan, a leader of Mormon settlers and laborer for Sutter, stood in the streets of the village, swinging his hat in one hand and flashing a quinine bottle of gold dust in the other crying, "Gold! Gold! Gold from the American River!" His cry was heard around the world.

Gold fever swept California. Although many rejected the first reports of gold, eventually everyone was caught-up in the surge to the gold fields. One writer described the malady after being convinced by a returning miner, who had shown him his well-filled bag of gold.

I looked for a moment; a frenzy seized my soul; unbidden my legs performed some entirely new movements of polka steps -- I took several -- houses were too small for me to stay in; I was soon in the street in search of necessary outfits; piles of gold rose up before me at every step; castles of marble, dazzling the eye with their rich appliances; thousands of slaves bowing to my beck and call; myriads of fair virgins contending with each other for my love -- were among the fancies of my fevered imagination. The Rothschilds, Girards, and Astors appeared to me but poor people; in short, I had a very violent attack of the gold fever.

As people moved towards the gold fields, settlements throughout the territory were deserted, and homes, farms,
and stores were abandoned. Thomas Oliver Larkin, the American consul to Mexico, bitterly lamented the depopulation of his beloved Monterey, where buildings fell into disrepair and stores closed down. He wrote of the local scarcity of supplies; "Every bowl, tray, and warming pan has gone to the mines. Everything in short that has a scoop in it and will hold sand and water."  

Within a few months, news of California gold had found its way to every part of the globe. Exaggeration of the riches was so prevalent that one writer remarked; "A grain of gold taken from the mine became a pennyweight at Panama, an ounce in New York and Boston, and a pound at London". Horace Greeley wrote in the New York Tribune, "It is coming - nay, at hand, there is no doubt of it. We are on the brink of the Age of Gold!" As the news and excitement spread, so did the discontent of many people; men who felt the lure of gold had more to offer them than their present position; men of position who felt the need of excitement; young men seeking both wealth and adventure; but for whatever their reasons, men began to make the long trek to California; some abandoning their homes and hearths, just as the people of Monterey had abandoned theirs, to go in search of gold.

The most exciting, colorful, dynamic era of American history was beginning, recorded in songs, ballads, and fiction by many of America's foremost authors. Artists
portrayed the color and scenes of the time -- an era that even today is considered the "Golden Era." Joaquin Miller, who became one of California's most prominent literary figures, rapsodized:

California alone was broader in those days than all the storied world of ancient times. The best part of a year was consumed in reaching these shores. Peril and privation began when the journey began. And so it was that cowards did not start, and the weak and faint fell by the way... Of such metal were the men who not only conquered an area of the earth larger than all the world of ancient times, but pierced the earth to the heart and wrung from her the precious secrets of her bosom. Not a gorge, not a gulch, not a peak was left unexplored.9

Miller described the phenomenon of the arriving placer miner:

There was a world of wildflowers, birds in abundance, glorious oak trees, grass. Then the placer miner came, washing up the buttercups by the roots; soiling cool, clear trout streams. The fishes turned on their sides and died. The oak trees fell in a single season. The birds disappeared. For the first year after the pick-axe struck in the grass roots of this region you would have said, 'a cyclone has struck California!'10

Reverend Taylor reported the feeling of impermanence that prevailed in the State in his book California Life Illustrated. He described San Francisco in September of 1849:

When we reached the summit of the hill above Clark's Point, we stopped and took a view of the city of tents. Not a brick house in the place, and but few wooden ones, and not a wharf or pier in the harbor, but for a few old adobe houses, it would have been easy to imagine that the whole city was pitched the evening before for the accommodation of a vast caravan for the night; for the city now contained a population of about twenty thousand, and I felt oppressed with the fear
that under the influence of the gold attraction of the mountains, those tents might all be struck some morning, and the city suddenly leave its moorings for parts unknown.\textsuperscript{11}

The statistics of the gold rush are staggering. By July of 1851, 800 ships lay idle in the bay of San Francisco, some were later hauled ashore and used as storehouses, others were scrapped for the lumber, and many lay in the harbor until they rotted and sank.\textsuperscript{12} The crews had abandoned the ships along with their passengers to look for gold.

Population:

It has been estimated that there were only 26,000 persons (including the native population of Indians) in the territory of California at the beginning of 1849. Before midsummer, the number had reached 50,000, and by the end of the year the number reported by the U.S. census was 92,597, although several historians believe that the true number was easily over 100,000.\textsuperscript{13} The population increased by 387 per cent between 1849 and 1870, then increased at a slower but still substantial rate of 57 per cent, during the next ten years (Map 4).\textsuperscript{14} But it was not so much the increase in population as the settlement patterns and the economic activities of the gold rushers that affected the regions.
MAP 4
Population Density 1860—1880
Most of the immigrants were young males between 20 and 30 years of age.\(^{15}\) (Women numbered only 8 per cent of the total population in 1850.\(^{16}\)) From the very beginning these would-be miners produced the most colorful international society the American continent has ever known, as contingents from Australia, Chile, China, France, Great Britain, Germany, Mexico, Peru, Spain, and the Hawaiian Islands mixed with the Americans from the eastern United States, overrunning the natives in their rush to the gold fields. These men, removed from the restraints of their home societies, many of them suddenly wealthy from a lucky find in the fields, evolved a lively society of their own; based not on home or church, but on gambling, dueling, and other forms of ostentatious living.\(^{17}\)

**Settlement Patterns**

Several circumstances combined to play a major role in compounding the settlement patterns in northern California. The first was the initial gold find of 1848. Within nine months 80,000 miners passed through San Francisco and up the Sacramento River dispersing into the foothills of the Sierras.\(^{18}\) When the easily found placer gold disappeared disgruntled miners drifted back to the San Francisco or Sacramento areas to build new lives, new homes and new businesses. Then a second gold rush occurred in 1859, this time in Nevada Territory, drawing still more
people. Again San Francisco and Sacramento served as the gateways to the gold fields as all shipments of supplies and movement of the adventurers moved through these towns to the mines, and the gold and silver bullion returned by the same wagon roads to San Francisco. As the mines played out and hope for quick riches faded, the men again returned to the San Francisco and Sacramento areas. After the first flurry of the gold rush, a different group of settlers began to appear. These settlers were looking for agricultural land and a climate without the harsh eastern winters. By 1870 the focus of settlement had shifted from mining to agriculture. The new agriculturalists settled mainly in northern California, since the large Hispanic land grants had already been broken up in that region. Emigrants did not move into southern California in any great numbers until after the devastating drought of 1863-1866 that led to the break up of the large ranchos. Los Angeles and the surrounding valleys became the target for large numbers of settlers after 1870 when land developers promoted tracts of land for sale to eastern investors. As a result, the settlement of the earliest pioneers were concentrated in comparatively small geographical areas.

Topographic barriers of large rugged mountains discouraged settlement in many areas, and the interior valleys were subject to long periods of drought. Although
fertile, these valleys remained largely unsettled until the 1880s when new crop types which were drought resistant and extensive irrigation projects were developed. California has few permanent streams that could water crops and cattle. Therefore, the new settlers had little choice of where they could maintain agriculture. The heaviest populated areas in the 1860s were around the San Francisco Bay and the Sacramento Valley.\(^{21}\)

Miller explained the changes that took place as society moved from mining to an agrarian culture:

> Then a woman came. Then the baby. Then a neat little cottage blossomed on the hillside, with some morning-glories growing about the door. Then another woman came. This one planted a rosebush. The next year a man from New York planted some fruit trees. The second year they bloomed and actually bore fruit. Then the birds came back. The miners had now disappeared underground. The plough turned the soil above their heads and cows stood ruminating under the few remaining oaks.\(^{22}\)

It made no difference if the immigrants came to California for gold or land; they stayed and began the serious business of building a state. They sent for their families or married women who had been imported to the state by marriage brokers.\(^{23}\) The social norms were still freer than those of the east coast, but the immigrants began to enforce law and order, good government, and a creative approach to business. The foundations laid one hundred and twenty-four years ago built California into one of the most progressive, wealthiest states in the Union.
Economic Disruption

Inflation and deflation soon became another fact of life for the growing state. There was an air of uncertainty coupled with an attitude of impermanence that pervaded the market place. Merchants could only guess what to expect in supply and demand. Prices for both luxuries and essentials were fantastic, especially in an age when money in the eastern United States had five times the purchasing power. Copies of eastern newspapers were grabbed up at $1.00 apiece.\textsuperscript{24} A loaf of bread, which cost 4 to 5 cents on the Atlantic seaboard, sold for 50 to 75 cents in San Francisco.\textsuperscript{25} Eggs were $9.00 a dozen, milk a $1.25 a quart, lumber $400 per thousand feet and tacks to nail flapping canvas tents sold for as much as $192.00 per pound.\textsuperscript{26} The merchants that stayed in the gold fields made their fortunes in the camps selling their goods. Bags of gold dust were piled in heaps in the San Francisco mercantiles.\textsuperscript{27}

Reverend Taylor was astounded at the prices. Even simple items such as firewood, which was selling for $40.00 per cord, produced a major economic crisis for him. He described the dilemma of procuring firewood for his family:

The sand hills back of where I lived had been thickly covered with evergreen scrub oaks, but they had all been cut off, clean as newly mown meadow. I, however, took my ax and went to work on a stump, and soon found, to my agreeable surprise, that more than half the tree was under ground [sic]; that the great
roots spread out horizontally just under the surface; so I had a good supply of wood at the simple cost of cutting, and loading it on my wheelbarrow and rolling it home. I had made a rare discovery, but, like the darkey who first struck the rich gold lead in "Negro Hill," I soon had plenty of men to share my fortune. 28

Housing prices were exorbitant, if proper housing could be found. A shanty built of canvas rented for $500.00 a month in San Francisco in 1849. Reverend Taylor faced another dilemma, how to house his family. With the price of lumber being so high, he would, he wrote, "take my ax and wedge, and go to the Redwoods, fifteen miles distant across the bay, and get out lumber for a house, and build it myself." After arriving in the redwood forest above Oakland he found that cutting lumber was not an easy task, "It was difficult to find a tree with straight grain and easy to split; but the trees were so large, many of them measuring twelve feet in diameter, that when a good one was opened it yielded almost a yardfull of lumber." 29 He cut four redwoods before he found the necessary tree. He left the rest to decay where they were felled, with so many trees available it did not seem to him wasteful.

By 1854 the easy gold of the placer mines had disappeared. The majority of the gold seekers averaged earnings of a hundred dollars per month — relatively small return considering the conditions of extreme hardship and the cost of living in the mining towns. 30 There were, of course, those who struck it rich. But as the placer gold
became scarce, new methods of extracting the gold from the earth were tried, but these new methods required heavy outlay of capital. The first method used was hydraulic mining, which soon gave way to tunnel mining.

The mines of California and Nevada used a tremendous amount of timber although annual use statistics were not gathered until around 1905. The 1905 figures show that 15,282,500 cubic feet of round timber and 164,956,000 cubic feet of sawed timber was used in precious metal mines (most precious metal mines were in the west). The value of this timber was estimated at $4,405,690. Hardwood was preferred for mine timbers, oak being the favored wood, but the mines used nearby resources because of transportation costs. The timber used in California and Nevada was mainly pine, with fir and redwood used to a lesser degree. One of the few reports of the timber used for mining is found in Mark Twain's Roughing It:

Virginia [City, Nevada] was a busy city of streets and houses above ground. Under it was another busy city, down in the bowels of the earth, where a great population of men thronged in and out among an intricate maze of tunnels and drifts, flitting hither and thither under a winking sparkle of lights, and over their heads towered a vast web of interlocking timbers that held the walls of the gutted Comstock apart. These timbers were as large as a man's body, and the framework stretched upwards so far that no eye could pierce to its top through the closing gloom. It was like peering up through the clean-picked ribs and bones of some colossal skeleton... One can imagine that, but he cannot well imagine what that forest of timbers cost, from the time they were felled in the pineries beyond Washoe Lake, hauled up and around Mount Davidson at atrocious rates of freightage, then squared, let down into the deep maw of the mine and built up there.
Twenty ample fortunes would not timber one of the greatest of those silver mines. The Spanish proverb says it requires a gold mine to "run" a silver one, and it is true.32

SUMMARY

The lure of gold brought men of many nations to California. After the easily found placer gold gave out and new techniques, such as hydraulic and tunnel mining, were used to mine gold. Many of the men were not really miners at heart and when all chances of quick riches faded they turned to different trades and industries. The forests were rapidly being destroyed to timber mines, build flumes, and to fuel smelters and steam engines. People had destroyed the available timber for fuel around the cities and towns.

New settlers arrived in the state drawn by land and a better climate. The roaring culture of the gold rush gradually gave way to law and order and good government. By 1870 the economic focus had shifted from mining to agriculture. Several men arrived in the state that were to direct the destiny of California during these formative years. Many of these same men were responsible for responding to the fuel shortage by the introduction and promotion of eucalyptus trees. This destruction and the response to it, is the topic of the following chapters.
Chapter Five References


16. Ibid.


Miller, p. 286.

Taylor, pp. 207-216.


Rolle, p. 209.

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CHAPTER SIX

THE TIMBER PROBLEM

Introduction

In the preceding chapters the destruction and change in California's vegetative landscape has been described. The Spanish, with low population densities, no industry, and little commerce, had used the riparian and accessible timber resources to such an extent that, after less than a hundred years of settlement, Dana and Brewer found very little native timber in some areas. The effect of the immigrant influx lured by the gold rush on the remaining timber resources of California was vastly greater.

The major entry to the gold producing areas was through San Francisco and Sacramento. San Francisco had been a small settlement with few inhabitants in 1848, built in an area of stunted oak woodland and grassy sand hills. Sacramento was established as a direct consequence of the gold rush along the confluence of the Sacramento and the American Rivers in the tule covered delta. Many of the early boomtowns were located in the foothills in regions that had for millennia been populated by Native Americans with small populations. These boomtowns were located in the scattered oaks and grasslands of the Sierra foothills. Within a year, 80,000 gold seekers had passed through or settled in these areas. Tent cities were established to
house the new settlers. Urban infrastructures were insufficient or totally lacking: there were no sewage systems, water lines, roads, mail service, transportation facilities, or fuel supplies. Since none of the tent cities were located in areas of extensive forests, the scattered oaks were soon gone.

As the Bay area and the Valley became more and more populated, the need for timber and timber products grew. Lumber was needed for building more permanent structures, including sidewalks, fuel for heating, cooking and steam production for industry. Everything was built of wood: carriages, wagons, stages, sleds, farm implements, tools for mining, timber for weirs and sluices for the gold recovery, and later timber for the mine shafts. The list could go on and on.

Timber was abundant in some areas, too much so for some early settlers. Their first thought was of food production and how to clear the land cheaply and easily. In the early 1850's many forests were fired simply to get rid of the trees. As the timber receded and the need for more timber increased, areas of timber that were formerly considered inaccessible were exploited using ox teams and "skid" roads. One innovation was the Saw-Mill railroad described in the Pacific Rural Press:

Among the many industrial contrivances to which California has given rise, that represented by the engraving [on the front page] is not the least noteworthy. It is a railway constructed down the side
of a steep mountain, for the purpose of lowering logs to a mill, to be sawed into boards. The mountain, which is on the Cosumnes river, is so steep that to roll a log down its sides would break it into fragments. The railway was constructed at an exact angle of 45 degrees, and was 2,000 feet in length. It was built in 1852. This is but one of many works of like magnitude and difficulty erected in California.\(^3\)

The very size of the lumber, its location in rugged isolated sites, and its distance from the greatest consuming centers led to innovative but wasteful techniques using great sluices to carry the cut timber to large rivers or, as in the Humboldt region, to the ocean, to be picked up by ships laying off shore.\(^4\) Many logs were never recovered. The Blue Ridge Company built the first flume in California bringing timber from the Sierras to Red Bluff over a distance of 44 miles. It had trestles that were 2,100 feet and 1,800 feet in length built from 60 to 120 feet high. The Sierra Flume and Lumber Company operated 150 miles of V-flumes, part of which was the Chico flume. The Chico flume was 45 miles long and carried lumber into the Chico lumber yard. The flumes were very expensive to engineer and build, costing $1,000 to $2,500 a mile.\(^5\)

Innovations such as these caused rapid exploitation of areas that had been previously considered inaccessible. Many times the areas were clear cut with the snags left to rot or burn. The thin soils of the exposed land were rapidly eroded, leaving large areas barren and despoiled. This destructiveness led John Muir and others to organize
and try to enforce conservation practices in the timber industry.\textsuperscript{6}

In addition to timber, fuel wood was in greater demand in the populated centers such as San Francisco and Sacramento. The need for fuel was already felt in parts of California by 1855, as witnessed by a notice to trespassers by John A. Sutter of Sacramento, published in the \textit{California Farmer} on May 24th, warning those who cut timber and cordwood would be subject to punishment.\textsuperscript{7} As settlers spread over the land, fuel became more precious and harder to obtain.

\section*{Destruction of Timber in California}

The newspapers and horticultural magazines of the 1850s, 60s, and 70s provide material that describe the destruction of the timber resources in California. The earliest article found, entitled "The Scarcity of Timber," appeared in the \textit{California Culturist} in July 1859, and dealt with the scarcity of timber in the Los Angeles area. In part it read:

In many portions of the southern [sic], there are groves of timber covering tracts, miles in extent, but all of it young, appearing to have sprung up within the last quarter of a century. Upon asking an explanation, we were informed by an intelligent American who has resided in the country between thirty and forty years, that, in former times, extensive fires, during the dry season, were very common, destroying everything in their way. These fires were caused by travelers, who left their camp fires in the morning in such a state as to catch and spread. Thus all old timber was killed and none permitted to grow up to supply its place. The
feed for stock was also consumed and the ruin of the
country seemed inevitable until the authorities enacted
rigid laws on the subject, and affixed severe penalties
to their violation.\textsuperscript{8}

A year later two other articles were published that
spoke of impending timber problems. One, entitled
"Destruction of the Forest," originally appeared in the
San Andreas Independent and was reprinted in the California
Farmer in May, 1860. In part it read:

But two or three years ago, all the hills
immediately surrounding our mountain towns, were
overgrown with magnificent oaks and ornamental
manzanitas. Most of the once proud oaks have been
wasted: the American with his span of mules, carried
away the larger branches in cordwood; then came the
hyena pack-trains of Asia, cutting up the smallest
branches, thinning the chaparral, and laying waste all
that is ornamental. The huge trunks are generally left
to decay where they fell. Our people have been sadly
extravagant in this matter; and they may be sure that
the day is not far distant, when this immense waste of
timber will be unavailingly regretted. Wood is now six
dollars a cord. In two years it will be eight
dollars.\textsuperscript{9}

The other article appeared in the California Culturist,
July, 1860 and stated:

Not the least in importance among the many
subjects interesting to agriculturists, as also to many
others of our population, is that of the question —
where are we to obtain our supply of firewood in the
future? Taking, for example, that portion of the
country known as the Bay district, we find the supply
already almost exhausted. The trees which formerly
stood on the hills of Contra Costra and Alameda,
visible from the bay, are to be seen no more. The
magnificent oak groves of Oakland and the Encinal have
been so thinned and mutilated to furnish a supply of
fuel, that the residents of those vicinities have
awakened to the fact that in order to retain a shelter
from the strong summer winds, they must abstain from
destroying their trees.
Farmers cannot afford to pay the price which is demanded for coal; but as that will before long be as cheap as wood, or, as we should say, wood will be as expensive as coal, it is extremely desirable that we should "take time by the forelock," and devise some plan for remedying the evil.\textsuperscript{10}

In the Transactions of the California State Agricultural Society, during The Years 1864 and 1865, Albert A. Kellogg, one of the botanists to the board and later one of the founders of the California Academy of Sciences, made a very emotional appeal about the benefits of forests to humanity before giving descriptions of the state's trees and shrubs. He had daily witnessed the "vandalism" of the pioneers on the forestlands of California. Kellogg wrote of a "self-ruined mill" which stood as "the death's head and cross bones of a piratical and suicidal policy" that represented the reckless destructive cutting of the forests and dismantling of the hills which converted the "cooling streams of plenty into a dry and parched land," and made "the ambrosial meadows a desert." He noted the shortsighted policies used by the water companies, "who ought to know at least their immediate interests," instead they were "clearing away or allowing to be destroyed every vestige of protection to their water -- a course that will inevitably prove their utter ruin."\textsuperscript{11}

Another strong appeal was made by C. F. Reed, the President of the State Board of Agriculture in California,
in his report to the same Board in 1869.

The subject of a plentiful supply of lumber and wood, for the various purposes of life, is one that we cannot much longer neglect. Whoever takes the trouble to look this subject fully in the face, and reflects upon the future of California, must feel, as we do, that something should be done, and that immediately, looking to the substitution of new forests in the place of the old ones in our State, now so rapidly being consumed and destroyed.\(^{12}\)

Reed noted that it had only been twenty years since the consumption of timber and lumber had commenced in California and yet he had the "opinion of good judges, the best lumber dealers in the State, that at least one-third of all our accessible timber of value" had already been "consumed and destroyed!" He warned that if the lumber consumption was to continue at the "same rate in the future as in the past, it would require only forty years" to exhaust the "entire present supply." Using population data he stated that the natural increase in population from 1850 to 1860 was 35.59 per cent, but the consumption of timber had increased 63.09 per cent for the same period. "Upon this basis and rule, the whole available lumber of our State will be consumed and destroyed in twenty years, instead of forty," he reasoned.

Reed pointed out to the Board that they must take into consideration "the fact that we are now just entering upon an era of active public improvements, all requiring the use of heavy timber and lumber." He enumerated the
improvements that needed to be made in California:

The building of railroads, bridges, warehouses, wharves, factories, bulkheads and the timbering of mines, will probably consume ten times as much lumber within the next twenty years as has been consumed for these purposes in the past twenty. The building and equipping of railroads may be considered a new and special element in the increased consumption of lumber, as this business in our State has really just commenced.13

Reed discussed the fuel crisis that was facing the state. He noted with the increasing populations in the agricultural counties of the state, that it was "very doubtful" whether, under the prevailing timber management, that those counties could supply their own demands for fuel for the next ten years. He illustrated his point by reminding the Board that within a twenty mile radius of the cities of Marysville, Stockton, and Sacramento there was only a two year supply of fuel wood left. The price of cord wood had already risen to $10.00 a cord, and was very likely to go higher within the year. He pointed out how "expensive and oppressive it would be to undertake to supply the cities of the State with wood from the distant mountains." "And yet, what other resource will be left, a very few years hence?" he asked. Industry, manufacturing and railways would be lost to the State without fuel to generate steam for this commerce, he argued. Reed gave statistics illustrating his view showing that one steam engine required one and one-half cords of wood to travel twenty-five miles. With only 700 miles of track laid in
California, more lines needed to be added and the transcontinental line completed so that the State could attain her potential; but where was the firewood needed for fuel for this enterprise?

Reed concluded his report with the statement describing the "useless and criminal destruction of timber" which had been "reckless and improvident" and had been "indulged in to an unprecedented extent." He described the worst of the destruction:

Thousands upon thousands of the noblest and most valuable of our forest trees in the Sierra Nevada districts have been destroyed without scarcely an object or a purpose, certainly with no adequate benefit to the destroyer or to any one else. This practice cannot be condemned in too severe terms; it cannot be punished with too severe penalties.\(^{14}\)

Reed's appeal to the State Board of Agriculture did not go unheeded. The Board offered a premium of $50.00 to be awarded to the best forest plantation to be planted in 1870. Mr. E. T. Aiken was one of the contenders for the premium. He wrote to the Board of the local conditions in Sacramento County:

Since the writer became a resident of this county, there was a fine growth of oak and sycamore timber bordering the Sacramento from the city to its mouth, which, it would be safe to say, would yield from one thousand two hundred to two thousand cords of wood for every half mile, on either side. The oak trees were generally straight and handsome; many of them would make two rail cuts of twelve feet each in length, with several cords of wood left in the top. This fine growth of timber which once graced our river, tempered the atmosphere, and gave protection to the adjoining plains from the sweeping winds, has entirely disappeared -- the woodchopper's axe has stripped the river farms of nearly all the hard wood timber, and the
owners are now obliged to rely upon the growth of willows for firewood. One of the greatest disadvantages which the farmers of our plain lands labor under is the want of timber lands and forest trees.\textsuperscript{15}

Cries of outrage came from many citizens as they watched "timber skinners," illegal squatters, denude valuable timber from government land.\textsuperscript{16} The timber skinners moved into virgin timber and began to cut the best redwoods for lumber and ties, with the remainder cut into cordwood. They peeled the chestnut oak for the tan bark and cut the rest for stove wood. One report came from Watsonville:

It is customary to speak of the redwood resources of California as inexhaustible, but any one visiting the eastern slopes of the coast mountains will find them almost denuded of timber fit for milling purposes. In the section to which I allude, viz.: Santa Cruz and Santa Clara counties, shingle mills have cut out the best of the timber left as too inaccessible by the sawmills, and in many locations even all that was fit for split stuff has been worked off. Where fire has not swept the land is covered with wastage of the redwood or of oak that have been peeled for their bark. A large portion of this land is government land, from which the government has received no return for timber cut, and which, as matters now stand, will never become improved.\textsuperscript{17}

Not only was government land stripped by the timber skinners, but in many cases they squatted on land owned by others and proceeded to cut the timber. Newmark, as well as Brewer, spoke of this "evil".\textsuperscript{18} There were no officials that could move against this depredation, and in some instances, it took years to remove the squatters from
the land. Rose cited a case that occurred on his land. The irresponsible actions taken by these loggers laid thousands of acres to waste. After cutting the best timber, the squatters, careless in habit, would leave open fires unattended that often set forest fires.

Lack of roads and good transportation into heavily timbered areas also caused the destruction of readily available timber, most often the riparian forest. This was true in the Central Valley:

There is a limited amount of timber along King's River; but the fuel supply of the valley is dependent on the floodwood [sic] from the river banks. For a hundred miles along the upper course of the river, in the mountains, it is an almost continuous forest. There is some of the finest timber in the State -- the largest tree in the world, called General Grant, formerly known as the Big Tree of Tulare -- is in sight from where I write. But it is 30 miles away, 6,000 feet above us, and over some of the wildest mountain country ever seen.

Bancroft described the timber land in California in detail in his History of California. Using statistics given in the U.S. Agriculture Report of 1875, he stated the area covered by forest in California was very small in proportion to its overall size -- 478,000 acres in forest in contrast to 11,400,000 total acreage for the state, an average of 4.1 per cent of forested land. He noted that the "valuable timber belts were confined to the humid coast and mountain regions in central and northern parts, from 37° latitude to the Oregon border" while the "interior
valleys and the south are comparatively bare, relieved by clumps along the streams, and occasionally by a scanty vegetation on the less arid north side of the hills."

He also described the waste that was prevalent:

Under all these inroads, favored by the small value of land in early days, there has been a great waste of forest resources, and in spots accessible for shipping and near settlements, as in Santa Cruz and San Mateo, and in the mining belt, there is little timber left, large districts being entirely denuded. Before the U.S. occupation, forest fires regularly devastated large sections owing to the custom, among Indians especially, of thus gathering insects and other articles of food. This is one of the evident checks to forests in the valleys. Subsequently shepherds and hunters were in the habit of firing large tracts to promote the growth of pastures. Sheep in particular have kept down the renewal of forests by eating the shoots.

**International Timber Shortage**

The timber problem was not unique to California, it was an international problem. By the end of the medieval period in Europe the dense forests had disappeared under the pressures placed on them by the woodcutters to supply timber for building, ships, firewood, tanning and charcoal for iron works. As a result strict control of the forests passed from the hands of the individual to the ruling class. In Great Britain the aristocracy set aside areas as Royal Forests and began to demand heavy payment for the cutting of wood. Forest management was the first conservation practice to take place in Britain. By the Elizabethan era a number of edicts had been passed
which restricted felling and provided for regeneration by the leaving of saplings.  

Albert A. Kellogg had warned his audience in his notice to the Agricultural Society in 1865 that the destruction of forests had significance that was evident in Europe:

To-day [sic], by the wanton destruction of their woodlands, lie in ruins a great part of France, Spain, Italy, and especially Greece. In the days when Homer sang they had the climate of Germany, and Germany that of Sweden; and when there was a real "Caesar" in France, olives could only grow south of forty-seven degrees; three hundred years after, as far north as the Loire, and now in Paris. All they seem to lack to make it a complete burning desert is a few more lumbermen and a little more energetic imitation of American enterprise.

Shifting cultivation, overgrazing, and clear cutting have been major forms of destruction of the world's forests. These destructive land use forms have not only destroyed the forests, but have also ruined watersheds and wasted agricultural lands. The ancient countries of the Mediterranean, Africa, China and India had lost their forests by the nineteenth century, resulting in the loss of their best agricultural lands, while countries in Central and South America are now rapidly destroying their forests which once covered vast areas and are discovering that cut over forest land quickly becomes wasteland.

National Statistics

Statistics for timber consumption are not available for California for this period. However, inference can be made
from the national statistics first compiled at the turn of the twentieth century. Conservationists began gathering data in the late 1870s to provide the government statistical evidence of the destruction of the forests in hopes of establishing a forest conservation program. The establishment of the U.S. Forest Service was a direct outcome of their efforts.

The timber situation of the nineteenth century was not exaggerated. Before other building materials and fuel sources were found and utilized in this century, over half of the population of the United States lived in wooden houses and two-thirds of the population used wood for fuel. The annual consumption rate of 18,000,000,000 board feet for 1880 rose to 40,000,000,000 board feet by 1919. A report to the Select Committee on Reforestation to the Sixty-seventh Congress in 1929 bore out early predictions. It was estimated that the continental United States originally contained 822,000,000 acres of forested land. "The expansion of settlement and cultivation and the operations of timber-using industries have reduced this vast area to 138,000,000 acres of virgin forest." The toll of burned, logged-off barren land was estimated to be 81,000,000 acres, while 250,000,000 acres which had been cut over once or more bore "culled or second growth stumpage, or small trees of no present merchantable value". Nelson Courtlandt Brown summed up the timber
problem that was facing the nation in the following sentence: "We are using our forests three times as fast as they grow."31

Solutions to the Timber Problem

As early as 1858, Colonel James L. L. Warren was featuring articles in the California Farmer on planting trees for the future needs of the people. He introduced one article as follows:

The following excellent article we clip from the Germantown (Pa.) Telegraph. It contains many valuable hints worthy of notice, and those who look over our State, can see how many thousands of acres might be improved in the vicinity of farms, that would add to their beauty and value. The day is not far distant when firewood will be wanted, and such labor now will pay.32

The article referred to, entitled "Planting Trees" gave a description of the silviculture of Great Britain and European countries that were in the habit of setting out forest trees, "to supply the places of those which have been consumed to supply material for fires, and artistic and mechanical purposes."33

Frederick Starr, in an 1865 Department of Agriculture report, predicted a timber famine within 30 years and advocated the immediate undertaking of carefully planned research on how to manage forests and how to establish plantations, especially of the hardwood trees.34 This
paper helped give impetus to the forestry movement that would eventually see the founding of the U.S. Forest Service.

By 1868, the problem had become so acute in the United States that a number of states enacted laws to encourage planting forest trees by offering bounties or by granting tax reductions or exemptions. Arbor Day was first declared and celebrated in Nebraska in 1872, at the instigation of J. Sterling Morton, later Secretary of Agriculture. Several railroad companies planted trees for ties and timber in the Great Plains and in California. But the biggest push towards planting forest trees was The Timber Culture Act, passed by Congress in 1873. People who received free land for homesteading were required to plant forty acres of each 160-acre claim in trees. The forty acres were later reduced to ten.

After 1868, tree planting in the United States became a patriotic duty. Articles appeared urging the planting of trees to stave off the impending timber famine. Public concern was alerted to the impending crisis. California began to heed the call with the rest of the nation and commenced planting trees.

Individuals began to experiment with trees recommended by the leading scientists. The earliest article found that recommended particular tree types was by Robert E. C. Stearns in 1871 entitled, "On the Economic Value of
Certain Australian Trees and their Cultivation in California. Stern introduced the article with the following:

When we consider the fact of the great number of farms in California that are nearly or wholly destitute of wood, and the great and continuous expense entailed by our system of fencing, the importance to the farmer of dedicating a portion of his land to the cultivation of forest trees, from which he can obtain fuel and fencing materials is too palpable to admit of debate.

The article by Sterns investigated the rapid growth of the Australian trees -- acacias and eucalyptus. He wrote of Eucalyptus globulus:

Of the Eucalypti, E. globulus is very common in California, and easily cultivated: it is the Blue Gum of Victoria and Tasmania. This tree is of extremely rapid growth and attains a height of 400 feet, furnishing a first-class wood; shipbuilders get keels of this timber 120 feet long; besides this they use it extensively for planking and many other parts of the ship, and it is considered to be generally superior to American Rock Elm.

In the same article testimony supporting the eucalyptus was given by several experts. Professor Henry N. Bolander spoke of the tempering affect trees had on the climate of Sacramento and Stockton and Dr. Stout testified to the hardiness of the eucalyptus and their resistance to attack by parasites. In another article Dr. Hans Hermann Behr reported on the fireproof properties of the eucalyptus, calling attention to a tree that was standing on the grounds of the old German hospital on Brannan Street in San Francisco that had passed through the fire of August 1876.
unharmed. In the same news release Dr. Albert Kellogg stated that eucalyptus shingles were used on houses in Australia and added that it was impossible to fire a roof made of this material. Dr. William H. Gibbon further suggested that Californians would be wise in following the Australian's example, as it would be an "important means of checking a conflagration."^{42}

This type of endorsement of *E. globulus* helped farmers determine the trees to plant on their farms. Although Stearn's article and other publications made mention was made of several types of trees, many growers were already aware of the promise of *E. globulus* and the other tree types were not as well known. The scientific community approved of the eucalyptus and this approval persuaded farmers to risk the necessary investment of labor and money to plant this tree to combat the timber famine.

In 1875 a small brochure was published by Bailey & Co., "Forest Tree Culturists," which addressed the farmers and land owners of California and stated their expert recommendation of eucalyptus as the tree for forest culture:

> The vast tracts of country in the San Joaquin and other valleys of California, destitute of timber, and the necessity and great advantage to farmers and land owners of having plantations or belts of timber and avenues on their properties has induced us to make a specialty of raising forest trees. For this we have chosen the Eucalyptus or Blue Gum of Tasmania and the Iron Bark Gum and other varieties of Australian forest trees. Their rapid growth and value for fuel and other purposes gives them no equal for forest culture.^{43}
The California Horticulturist commented on the situation in the following article in August of 1876.

In California everything is done on a large scale if at all. Grape vines are planted by the hundreds of thousands, and wheat fields extend to thousands of acres, and the groves of forest trees are what in the East would be called extensive forests.

Of late Californians have commenced the planting of forest trees, and this, too, upon the same extended scale which marks all their operations. The Blue Gum tree at present being a general favorite....

SUMMARY

The new immigrants to California, along with their use of new technology, stripped the land of timber. The Spanish had effected the riparian forest, but the Americans began to exploit areas previously inaccessible by using saw-mill railroads and flumes. Areas around cities were soon stripped of their fuel resources, raising concern for future fuel needs. While California was not unique in having a shortage of timber, it was unique in how rapidly this resource was depleted.

Experiments with different tree types, introduced from the east coast or other nations as ornamentals, began to bear fruit. One genus, *Eucalyptus*, showed promise as an all around utility tree. Scientists and the press endorsed this genus, especially *E. globulus*. The next two chapters will follow the history of this tree from its introduction as an ornamental through the plantation plantings that remain as landscape remnants of this period. Included in
the history of the genus are brief mention of the men and women who did much to promote this tree.
Chapter Six References


2 Wright, p. 695.


7 California Farmer, "Notice," May 24, 1844, p. 163.


14 Ibid.
15 Transactions of the California State Agricultural Society During the Years 1870 and 1871, Sacramento: T. A. Springer, State Printer; 1872, pp. 133-34.
22 Bancroft, Vol. VII, Footnote 7 pp. 75-76.
23 Ibid, pp. 77-78.
26 Ibid, p. 36.


Brown, p. 6.


Ibid.


Sparhawk, p. 704.


California Horticulturist, "Tree Planting in California," August 1876, p. 245.
CHAPTER SEVEN
ORNAMENTAL INTRODUCTION OF EUCALYPTUS

Introduction

California had lured a very international population to the gold fields. Many found California to their liking and settled permanently. Their new wealth was used to buy land and build homes, and soon gardens and orchards were planted around them. People imported plants that they were familiar with from their native lands to decorate their homes and gardens. When the alarm was sounded for future fuel needs, they relied on their previous experience with different trees to meet this challenge. A means of dealing with the crisis was already at hand, since the rapid growing eucalyptus had already been introduced, although as an ornamental.

Many men and women rose to prominence through their contributions to the State's growing body of knowledge of horticulture. The following history of eucalyptus is interwoven with the history of horticulture and agriculture, for many of the same people who promoted eucalyptus also promoted horticulture and agriculture in the State.

Ornamental Horticulture
"The landscape of California has been changed through the agency of man more extensively and more rapidly than perhaps any other in the world. Native Amerindian tribes had a small impact in some areas, but for the most part, this transformed landscape is the work, conscious, subconscious and accidental, of Western man." Thomas A. Brown, *A List of California Nurseries and their Catalogues: 1850 - 1900.*

Brown's research, following that of Henry M. Butterfield at the University of California, Berkeley, has traced most of the exotic plants introduced in California through nursery catalogues, horticultural journals, newspaper advertisements and privately published broadsides. Brown closed his introduction:

As I walk the streets of Berkeley, or travel in any other part of the state, for that matter, it strikes me more and more forcefully how much has been changed by man after 1850, and how much of that change was accomplished by 1900. Virtually 95% of the plants I see in cities are introduced species; as the research based on these early catalogues continues, I am continually astounded at how early so many of these plants spread throughout the state to create the landscape we see today.

It has been suggested that the Spanish caused changes in the landscape, including heavy use and destruction of the riparian timber. The Spanish also caused changes in the flora composition by the introduction of plants such as oats and wild mustard. However, as great as these changes were, they primarily affected restricted regions around the missions and ranchos. The Spanish introduced relatively few plant species to the State; the majority of these were fruit trees, vegetables and cereal grains.
The ornamental plants were also utilitarian, such as the tuna cactus, oleander and willows which were used as living hedges to keep sheep and cattle out of orchards and living areas. Only a few very small ornamental gardens are mentioned in the surviving records.\(^5\)

Spanish and later Mexican policy discouraged outside trade. To enforce this policy, Monterey was made the only official port and ships from other nations arriving in California were subject to arrest of their crews and confiscation of their cargos. Supplies from Mexico were sent to the missions on an irregular basis, and consisted of articles the colony could not produce, such as gunpowder, cast iron implements, fine cloth, chocolate and tobacco. Few living plants survived the rigorous sea voyages.\(^6\)

A number of the early American immigrants to California were interested in orchards and agriculture, including William Wolfskill who arrived in 1831, John Bidwell in 1841, and Captain Joseph Aram in 1846.\(^7\) These pioneers became Mexican citizens, and were granted large tracts of land. Following the gold rush, the first nurserymen arrived and established nurseries. A. P. Smith, the first nurseryman, established his nursery on the American River about two and one-half miles above Sacramento in 1848.\(^8\) Colonel James L. L. F. Warren of Sacramento, William C. Walker of San Francisco and Louis Prevost of San Jose
arrived shortly thereafter. The wealth from the mines was used to buy luxuries and refinements. Soon opulent homes were built and gardens were planted.⁹

The international contingent that was attracted to California by the gold rush brought knowledge of plants grown in their native countries. They imported plants they were familiar with because they knew the proper cultivation and propagation techniques.

The role of the estate owner and home gardener also played an important part in developing ornamental horticulture. For example, the C. V. Gillespie family arrived in California in 1848 from Canton, China. Mrs. Gillespie was the first to grow Australian acacias from seed. By 1853, she had four kinds of acacias growing in her garden.¹⁰ She was typical of many of the women and men who experimented with a wealth of plants.

Estate owners often hired nurserymen to design and establish gardens and private nurseries. Commodore Stockton hired Bernard S. Fox to established a nursery in 1852 on his ranch north of Mission Santa Clara. Fox later started his own nursery which became famous for its fruit trees and ornamentals.¹¹ Stephen Nolan got his start in the nursery business working on George Potter's estate near Oakland. Nolan established his own nursery in Oakland in 1860, and became famous for his variety of eucalyptus and other ornamental trees.¹²
The College of Agriculture at Berkeley became active in plant experimentations around 1875. When Dr. Eugene Hilgard replaced Professor E. S. Carr as the head of the College, he began the planting of many ornamentals on campus. About 500 species of ornamental plants had been planted by 1875, mostly eucalyptus and acacias. By 1888 the University grounds had a very extensive list of exotic plants which the College of Agriculture had begun to distribute by 1883 and continued to do so until 1908.

Before 1900 the distinction between horticulturist, agriculturist and forester were blurred. The nurserymen supplied crop seeds, forestry stock, and ornamental seeds and plants. The farmer and estate owner planted crops, forest trees, and ornamentals. Even the city dweller took pride in his garden which often contained vegetables, flowers and trees.

Eucalyptus Introduction

The introduction of Eucalyptus to California was part of a much more wide-spread phenomenon. A Frenchman, Prosper Ramel, traveled to Australia as a trader in 1854, where he visited the Botanical Gardens in Melbourne. He saw his first Tasmanian blue gum in the gardens and was so taken by the phenomenal vigor of this species of tree that he became determined to promote this tree in the old world. He saw it covering the mountains of Algeria, making
marshes salubrious and chasing away fever.\textsuperscript{15} He was aided to this end by Ferdinand von Mueller, the most famous of all the early Australian botanists (the first to classify and systematize the genus \textit{Eucalyptus}).\textsuperscript{16} Between 1855 and 1857, they enthusiastically promoted the culture of the blue gum on a large scale overseas.\textsuperscript{17} Research done on the eucalyptus in France and the Mediterranean countries gave rise to the theory that eucalyptus, especially \textit{Eucalyptus globulus}, could purify the air and eliminate malaria. Medicinal properties were attributed to the oil, leaves, seed pods and bark of the tree. \textit{Eucalyptus globulus} became known as the fever tree or "miracle" tree.\textsuperscript{19}

\textit{Eucalyptus globulus} is a fast growing hardwood tree, obtaining a growth of twenty feet per year. The wood is dense and burns well.\textsuperscript{20} A plantation of \textit{E. globulus} can be harvested on an average of every seven years for firewood without harm to the tree, as it readily root-sprouts.\textsuperscript{21} \textit{E. globulus} grows well in a variety of soils, including many poor soils, and can survive with a minimum of rainfall. However, it cannot tolerate freezing weather for any length of time.\textsuperscript{22} These facts, taken together with the supposed medicinal uses, made it a very valuable tree. It is little wonder that people, not only in California, but also in China, Brazil, Ethiopia, India, Portugal, Spain, South Africa and many small island groups began to forest their countries with eucalyptus trees.\textsuperscript{23}
Introduction to California

There is considerable confusion about just who was responsible for introducing eucalyptus to California. Two turn-of-the-century writers, Alfred J. McClatchie and C. H. Sellers, identified William C. Walker as introducing fourteen species of eucalyptus in 1856. Abbot Kinney, another writer on eucalyptus, credited C. L. Reimer with introducing fourteen species in January of 1856. Other writers have claimed Bishop William Taylor introduced the genus.

The late Charles Shinn, whose father, James Shinn, owned the Shinn Nursery in Niles, California, wrote to the Oakland Tribune in 1936 that Colonel James L. L. F. Warren, editor and owner of the California Farmer, "widely advertised and distributed seeds, especially E. globulus as early as 1856." This is verified by a statement by Warren himself in an editorial in the California Farmer in 1876.

R. W. Washburn, owner of the Shell Mound Nursery of Alameda, was the first tradesman to list the genus for sale in his one page catalog for 1856. Very little is known of Washburn, but some information can be gleaned from the California Farmer between the years 1858-1860. According to the Farmer, "R. W. Washburn of the Shell Mound, made a handsome display of fruit," at the first State
Horticultural Society meeting in 1858. Washburn's advertisement of March 23, 1860 stated that Shell Mound had been awarded the First Premium for the best nursery by the Alameda County Agricultural Society; twelve Premiums by the California Horticultural Society in 1859; and two diplomas by the Sonoma and Contra Costa Agricultural Societies. By February 1861, however, Mr. L. A. Gould was listed as the proprietor of Shell Mound, and neither the nursery nor Washburn is mentioned in later years in the California Horticulturist or in the Pacific Rural Press.

However, recently discovered material makes it clear that eucalyptus were introduced into California as an ornamental by clipper ship Captain Robert H. Waterman in 1853. In his biography of Waterman, David A. Weir reported that Waterman had a dream when he retired from the sea and that dream was to plant a "heap o' trees." On retirement, Waterman set forth to accomplish his dream.

Waterman bought an undivided half interest in a twelve-mile square tract of land in Solano County's Suisun Valley in 1850 with another sea captain, A. A. Ritchie. The Captain laid out the cities of Fairfield and Cordelia, which he named for his wife. He hired Josiah Allison, founder of Oak Tree Farms and horticultural expert, to help him landscape his towns and his own ranch home.

Waterman commissioned his ex-first mate, Jim Douglas,
to bring him some eucalyptus seeds on his next voyage to Australia. In 1853, recorded Weir, Douglas brought the Captain a bag of blue gum seed, and from these seeds came the stands of eucalyptus that are still growing around the Captain's home and along many of the roads of the Suisun Valley. Waterman reportedly gave eucalyptus seeds to the new settlers of Fairfield and to his friends in other areas. This was the first record identifying the genus *Eucalyptus* with sailing vessels and tied them to the trade that had to bring them from the Australian continent to the California coast.

William C. Walker, owner of the Golden Gate Nursery in San Francisco from 1849-1865, has been given the credit for the introduction of eucalyptus by most of the earlier writers. While he may not have introduced the genus, he certainly played a major role in popularizing it, listing numerous species in stock in his nursery catalog dated 1858-59. The Golden Gate Nursery occupied three acres and had over 30,000 plants for sale by 1858. Walker established a seed supply from M. Guilfoyle's Double Bay Exotic Nurseries located near Sydney, Australia. William R. Guilfoyle, the son of M. Guilfoyle and the founder of the Melbourne Botanical Garden, traveled widely in the Pacific Islands to collect seeds. Many of these ornamentals were cultivated by Guilfoyle and those that showed promise were shipped to Walker in San
Francisco. In this way Walker secured many rare ornamentals that he later became famous for introducing. Colonel Warren of the California Farmer considered the Golden Gate Nursery in 1856 to have "the largest and most choice collections of plants in the state...[and was] very liberal in introducing in the country many new and rare plants of great value."  

Walker first used the term *Eucalyptus* in his advertisement of June 26, 1857, but no individual species were listed. On page 24 of his handwritten master catalog dated 1858-59, he listed:

- **Eucalyptus Resinifera** (Aus.) splendid weeping forest tree 60 ft. $10.00
- **Eucalyptus argentea** argentea foliage 20 ft. $10.00
- **Eucalyptus angustifolia** dwarf 5 ft. $5.00

*Eucalyptus resinifera* is a well-known species and is found in California. *Eucalyptus angustifolia* is now *Eucalyptus amygdalina* var. *angustifolia* and was widely planted in the Central Valley in the early 1870's because it was believed to be more frost resistant than *Eucalyptus globulus*. *Eucalyptus argentea* has never been recognized as a valid species, nor has it ever been identified with a species that was planted in the early years of California.

In the same catalogue, Walker listed the seeds that had just arrived from his Australian supplier. Included in the
seed list were several new species of eucalyptus:

Eucalyptus robust
Eucalyptus sp. Iron Bark 70 ft.
Eucalyptus Blue Gum
Eucalyptus sp. Longifolia
Eucalyptus nigra Van Dieman Land
Eucalyptus globosa Van Dieman Land

Walker continued to advertise in the Farmer until the early 1860s. He was mentioned in the State Horticultural Society meeting for 1858 as an exhibitor with "a fine collection of flowers."42

Stephen Nolan, who established Oakland’s Bellevue Nursery in 1860, was an active promoter of eucalyptus and had the most extensive offerings of different species.43 Nolan imported seed from Australia in 1860 and planted them in 1861. By 1871, his nursery catalog listed 34 different species (Appendix A).44 The January 23, 1875 issue of the Pacific Rural Press, described many of the trees that were found in the nursery at that time, but of particular interest was the following passage:

We were especially pleased with the great variety and fine specimens of Australian gums, and with one among them just suited for the crests of those apparently barren hills away in the distance. The eyes of our friend lighted with enthusiasm of Nature’s poet as he pictured the day when that landscape would be relieved and the whole country fertilized by these magnificent trees...45

Near Alameda, another importer was working. This was Annie Taylor, wife of Bishop William Taylor. Bishop Taylor left San Francisco in May of 1862 to do missionary work in
Australia. In his autobiography, The Story of My Life, Taylor hand wrote a note on the flyleaf of the book:

There were no Eucalyptus in California in 1849. I sent seed from Australia to my wife in California in 1863. Her seed sowing made such a marvelous growth that a horticulturist neighbor of ours wrote me to send him a pound of seed -- the smallest of all seeds, and the nurseries, thus seeded, dotted the whole country with great forests of evergreens, the most prominent land marks [sic] of the Pacific Coast.\(^4^6\)

Many people have taken Bishop Taylor's statement to mean that he introduced the eucalyptus to California, but this is contradicted in a brochure written by his son, William, and distributed at the Bishop's funeral. According to the brochure, the eucalyptus trees were widespread in California when Bishop Taylor left for Australia, and it was their popularity that led him to send the seed to his wife.\(^4^7\)

Annie Taylor gave many of the seeds to James T. Stratton, the Surveyor-General of California. Stratton planted the blue gums to such an extent that by 1870 he had the largest commercial eucalyptus planting in the state.\(^4^8\)

The Early Ornamental Plantings

Until 1870 eucalyptus had been used mainly as an ornamental and, as such, many of the early pioneers of California had planted them to a limited extent. Many of these early plantings still remain in California, the trees
now being 120 years old or older (Appendix B).

Captain Joseph A. Aram established a nursery on Milpitas Road in San Jose (Santa Clara County) in 1856. Aram's nursery which occupied thirty-two acres, contained seventy-five thousand trees of various kinds, many of them exotic, mostly fruit trees. He planted groves of *Eucalyptus globulus* and *Eucalyptus camaldulensis* in the late 1850s. Henry Butterfield described one blue gum which could still be found on the bank of Coyote Creek near San Jose in 1935, as being 95 inches in diameter, breast height, and about 105 feet in height.

Another early planter was General Henry M. Naglee, born in 1815 in Tennessee. A West Point graduate, he fought in the Mexican War, several Indian skirmishes, and in the Civil War. He purchased 150 acres of land in California in 1852, and afterwards bought larger tracts of land near San Jose. In 1865, after marrying, he made San Jose his home. Although, he specialized in vineyards, with brandy as the farm's speciality, he also raised about sixty acres of mixed trees. Naglee's eucalyptus were described in an article written by the Honorable Angus MacKay, commissioner of Queensland. MacKay made a tour of many private gardens in California during 1876 including Naglee's. He mentioned several eucalyptus species growing in Naglee's grove: "I saw red and blue gum trees fully fifteen inches through and near fifty feet in height." He also reported seeing two or
three *Eucalyptus pilularis* in Naglee’s forest.\(^5\)

MacKay also included information about *Eucalyptus siderophloia* growing in Soquel, California. He also mentioned that several *Eucalyptus saligna* had been planted at Santa Clara as well as a couple of *Eucalyptus resinifera*.\(^4\)

The first supply of seed to reach southern California was sent in 1863 by Reverend Taylor. The seeds were divided among the large land holders of the area: Verdugo, Workman, Banning, Sanchez, and Wolfskill.\(^5\)

William Wolfskill was a well-known rancher and farmer in the Los Angeles area. He had arrived in Southern California in 1831 as a beaver trapper, and received a land grant in 1836. By 1838, he had established vineyards of 4,000 vines. In 1865, when Rancho Santa Anita was subdivided, he bought the largest interest which contained the heart of the rancho. He immediately moved into the adobe house that had been built by Hugo Reid, one of the rancho’s previous owners. That same year he planted his eucalyptus seed around the adobe. He died in 1866, without seeing the results of his plantings.\(^6\)

Luis, Wolfskill’s son, sold Rancho Santa Anita to Harris Newmark in 1872. Newmark’s autobiography, *Sixty Years in Southern California, 1853–1913*, includes the following passage:

> When we bought the Santa Anita, there were five eucalyptus or blue gum trees growing near the house. I
understood at the time that these had been planted by
William Wolfskill from seed sent to him by a friend in
Australia; and that they were the first eucalyptus
trees cultivated in Southern California. 57

Newmark refers to the Hugo Reid Adobe, since this was the only house on the property at that time. The old eucalyptus trees around the adobe house were cut down in the late 1940s and early 1950s, so that the adobe could be repaired and renovated. The Wolfskill Gum that grows in front of the Queen Anne Cottage could not have been one of the original trees, but one that was probably planted by Lucky Baldwin in the 1880s. It is likely that it is an offspring of the original trees. 58

Thirteen hundred acres of Rancho Santa Anita were bought by Leonard J. Rose for a little more than a dollar an acre. This was called La Presa (the dam) because in the early days of the San Gabriel mission the padres had built a dam to irrigate some of their lands. 59 Rose named his estate Sunnyslope and developed it into an experimental farm, with grapes, citrus fruits, and prize-winning trotting horses. The brandy that he developed became a national best seller; his efforts did much to earn for Southern California the reputation of being the land of gardens. 60 Rose's son, Leonard Jr., later wrote about the beginning of the Sunnyslope farm:

A conveniently located space of about an acre in extent was selected as a site for the house, to be built later. Three pepper trees, three eucalypti, and a weeping willow were planted in appropriate places
around the outline of the grounds. One of the eucalypti grew to tremendous size, and, if still standing, is seventy years old. When last I saw it, in 1919, it was the largest of the species I have ever seen, fully one hundred feet in height and seven or eight feet in diameter.  

One of the eucalyptus trees that Rose planted in 1865 was described in an article in The California Horticulturist as being over 75 feet tall in 1872.  

One of the most incredible young men to arrive in Los Angeles was Phineas Banning of Delaware. He disembarked at San Pedro in 1851. By 1852, he and David Alexander had established a stage and freight business with the main line running between San Pedro and Los Angeles. Dr. Joseph Widney wrote in the Centennial History of Los Angeles County, in 1876:

The writer vividly recollects standing in front of the U.S. Hotel, in 1868, one night of a steamer's arrival, and hearing the rival stages of Banning and Tomlinson come up Main Street, racing to get in first, horses on the gallop, and in the darkness a man on each stage blowing a horn to warn people in the street to clear the track.

Banning not only drove his horses, but was one of the driving forces behind the development of southern California. He and three associates (J. G. Downey, Don Benito Wilson and William Sanford) bought twenty-four hundred acres along San Pedro Bay in 1854 from the Dominguez Estate for a dollar and ten cents an acre. He built warehouses and a wharf, and in 1858 opened the tract
as the town of Wilmington, named for his birthplace in Delaware. 65

Banning built his Greek revival house a mile from the port and wharves that he had developed. Victoria Padilla wrote of the Banning residence in her book, *Southern California Gardens:*

A superior extant example of a house and garden dating from the 'sixties was built in 1864. Fully restored, this attractive twenty-acre estate at 401 East M Street in Wilmington has become a public park. Banning planted his gardens with native and exotic shrubs, flowers and trees, among them the fine old eucalyptus trees that still border the entrance avenue. They were grown from seeds given Banning by a missionary returning from Australia and are believed to be among the first of this variety of eucalyptus in California. 66

At one time there was a mile long avenue of blue gums that marched from his home to the San Pedro Bay, but it is believed by Mrs. Nancy Call, Banning's great-great granddaughter, that this avenue was planted by Joseph Banning, one of Phineas' sons. Mrs. Call told of her father's generation:

The children of my father's era would join hands to see how many children it took to circle the largest blue gum. We lost 14 of the old trees in 1980 to rains and wind. 67

**SUMMARY**

When it became evident that the fuel and timber resources were disappearing at an alarming rate, the people relied on their collective horticultural knowledge to
combat this crisis. Many trees had been introduced to the State as ornamentals, among them were eucalyptus trees. *Eucalyptus globulus* began to gain favor because of its rapid growth and the theory introduced from Europe that it was a cure for malaria. The press began to publicize the genus by reporting on individual trees grown in orchards by prominent citizens. The scientists had also publicly endorsed it, therefore it was just a matter of time before large commercial plantings were made.

The next Chapter will follow the transition of the status of the eucalyptus from an ornamental to a commercial forestry tree. Forestry was in an embryotic stage, therefore planting trees on a large scale was considered an agricultural practice. The agricultural journals did much to promote these large plantings by carrying articles describing the propagation, cultivation, and utilizations of the tree.
Chapter Seven References


2 Ibid, p. viii.

3 See Chapter Two.

4 Brown, p. i.


6 Ibid, p. ii.


8 Ibid; Brown, Thomas A. p. 46.

9 Butterfield, p. 1.

10 Ibid, p. 2.

11 Ibid, p. 3.

12 Brown, Thomas A. p. 32.

13 *Pacific Rural Press*, "Agricultural Matters at the University," Vol. IX, No. 9, February 27, 1875, Front Page.

14 Butterfield, p. 3.


19 Stearns, p. 238.


22 McClatchie, p. 29.

23 Penfold and Willis, pp. 98-100; Stearns, "On the Economic Value..."; p. 238.


27 Oakland Tribune, "Oakland Had Part," Editorial Section, May 31, 1936, p. 1; See Also: Metcalf Collection, Correspondence from Charles Shinn to Mr. Saunders, dated February 14, 1923, uncatalogued, Univ. of Calif., Berkeley: Bancroft Library.

Both Eucalyptus sideroxylon and Eucalyptus leucoxylon are species that are called "iron bark" and both species are present in California. It is likely that Walker referred to one of these species. Eucalyptus robusta is very common in California as well as Eucalyptus longifolia while Eucalyptus nigra is rare. H. M. Butterfield thought that Eucalyptus globosa might possibly be Eucalyptus globulus, and the blue gum is Eucalyptus...
E. globulus accounts for nearly 99 per cent of the eucalyptus that were planted in California in the early years, and today would still represent nearly 98 per cent of the planted eucalyptus.


Ibid; See Also: Metcalf, Woodbridge, "Big Eucalyptus Trees," manuscript, Metcalf Collection, uncatalogued, University of California, Berkeley: Bancroft Library, dated April 15, 1935, p. 2; Calhoun, Jack, "A Shaggy Tree Story -- The Doughty Eucalyptus," newspaper clipping in Metcalf collection, San Jose, California, November 12, 1956.

53 California Farmer, "Home Correspondence," Vol. 45, No. 4, April 20, 1876, Front Page.

54 Ibid.


61 Rose, p. 53.

62 Ibid.


65 Krythe, pp. 66, 82-83, 92.

66 Padilla, p. 51.

67 Personal Communication, Mrs. Nancy Call, August 10, 1982.
CHAPTER EIGHT
THE COMMERCIAL EUCALYPTUS PLANTINGS

Introduction

Interwoven with the history of commercial plantings of eucalyptus is the history of agriculture in California. The Spanish had never farmed on a large scale, and what they did raise was mainly vegetables. The new immigrants had no previous knowledge of how or what to grow in California. Soils, temperature ranges, water sources, crop varieties, all were unknown. Undaunted, people experimented. The accumulating body of knowledge was often published in Colonel Warren's California Farmer. The first article published in California calling attention to the depletion of firewood was published by him and the choice of eucalyptus trees to stave off the fuel crisis was in large part due to Colonel Warren and his agricultural journal.

The Beginning of Agriculture

Men came from all parts of the world to California lured by the news of gold and wealth, many stayed to found a state. One such man was James Lloyd La Fayette Warren, named by several historians as the Father of California
Agriculture. Warren arrived in Sacramento in 1849 as the business manager of the ship Sweden's mining company, a fairly well-financed venture backed by several merchants and bankers of Boston and New York. Warren was well prepared for his ultimate career in California. Born in Brighton, Massachusetts on August 12, 1805, he served an apprenticeship as a clerk in Boston and later established a dry goods business. Early in his career he developed an interest in gardening and experimentation with different varieties of exotic plants. His passion culminated in a nursery specializing in a variety of crop, ornamental, and fruiting plants. This, coupled with uncanny business judgement in their marketing, gave him a combination of skills which were to be fully developed later in California.

Scurvy was rampant among the miners in the boomtowns, due to their dependence on stale imported food. Warren saw the need, and began to specialize in fruit trees, vegetables, and general agricultural implements. By 1852, he had established a large nursery in Sacramento after sending for the nursery stock of his Nonantum Nursery in Massachusetts, which was shipped around the Horn. In 1853 he published the first known California nursery catalogue. He listed fruit and ornamental trees, grape vines, shrubs and herbaceous plants, roses, dahlias, and greenhouse plants. He also had a seed catalogue listing
flower, vegetable and field seeds. In 1853, Warren moved his business to San Francisco and renamed it Warren & Son, including his son, John Quincy Adams Warren, who was to manage the firm's eastern connections from an office in Boston. On January 5, 1854, Warren launched yet another enterprise. On that date, the first issue of the California Farmer and Journal of Useful Sciences appeared. For nearly twenty years, it was the major agricultural journal in California; Pacific Rural Press and California Horticulturist did not appear until 1870.

Warren launched an ambitious one-man agricultural lobby to establish a state supported agricultural program. He sent free copies of the California Farmer to a large selection of influential people in the state. Warren publicly campaigned against the "ignorant impression that only a few of the valley lands of California could be profitably cultivated;" he denounced the continuance of importing food that cost the state twenty-five million dollars annually. He strongly felt that advanced and scientific agriculture were the "truest measure and the surest bulwark of an advanced civilization." Moreover, he felt that California's needs were even greater than those of other American communities because of the general ignorance of her agricultural potentials and possibilities; therefore, California was in need of agricultural
encouragement and the dissemination of knowledge gained from experiments with different types of crops. Not merely the few varieties of staples that were being produced at this time, but also new experimental crops, such as rice, cotton, tea, coffee, sugar, and silk and its manufacture were promoted for planting on reclaimed tule lands. Through his efforts the Act to Incorporate the State Agricultural Society, and Appropriate Money for its Support was signed by Governor Bigler on May 13, 1854.\textsuperscript{11}

Warren continued to be an important and useful leader speaking through the editorial column of the Farmer until the 1870's, when the journal began to suffer from the editor's advancing age and the competition of the Pacific Rural Press and other journals. One of Warren's greatest services to the development of agriculture in California was the introduction and promotion of new crops. His offices served as a clearinghouse for the exchange of information, specimens, and seeds, not merely within California, but with other parts of the United States, South America and the Orient.\textsuperscript{12} This began as early as 1852, when he prepared and shipped samples of several California grains to various American agricultural societies and to the United States Patent Office. Over the ensuing years, many of Warren's guesses and information on crops were wrong; his advice to the customers of his nursery and seed business in the early fifties was
consistently overly optimistic and he received frequent complaints of failure from all over the region.\textsuperscript{13} He copied much of his agricultural and horticultural information from the pages of the eastern journals, describing their successful experimentation with crops that were suited to eastern soils and climates but which proved to be failures in California. However, under unfamiliar conditions in which the whole State was a kind of vast experimental laboratory, the only way to proceed was by trial and error. That was the only way that agriculture could advance in the State at that time and Warren's constant encouragement of experimentation was extremely important.\textsuperscript{14}

It was through the pages of the \textit{Farmer} that the people of California began to hear of eucalyptus trees, and their potential as a rapid firewood producer. Eucalyptus were already known in the east when Warren was active in horticulture in Massachusetts. Several species of eucalyptus were listed in the \textit{American Flower Garden Directory} published in 1845. They were described as fast growing trees that would soon outgrow the greenhouse in which they had to be raised.\textsuperscript{15} It is probable that Warren was aware of eucalyptus before he came to California. In 1936 the \textit{Oakland Tribune} stated that Warren was sending eucalyptus seeds to different farmers by 1856.\textsuperscript{16} In 1876 Warren made the following statement in a
rebuttal to an article in the *Alta California*:

The *Alta* seems to claim great credit for its teachings about the Eucalypti, we can inform that Journal, that the *California Farmer* was urging the value of the Eucalypti some Ten Years before the *Alta* ever knew or spoke of these trees, as we imported and distributed the seed, and worked to introduce the tree into this State nearly twenty years ago....One of the largest Eucalypti trees in our city, we planted ourselves in 1859, which now is an immense tree.¹⁷

Warren was the first editor of any Californian paper to promote forestry and tree planting. Forestry was not considered separate from agriculture and a column devoted to tree planting was present in many of his journals. In the early years (1850-1870) he did not single out eucalyptus as the only forest tree to plant; he also promoted trees such as locust, elm, catalpa, and others that seemed suited to the California climate and soil.¹⁸

Warren’s achievements were monumental. Besides those achievements that have already been enumerated, he imported and sponsored the first steam driven plow; he introduced the first mechanized grain combine; he demonstrated mechanized windmills and other innovative mechanized farm implements. He also promoted the first State Fair and the first flower show ever held in California and helped found the first horticultural society.¹⁹ He was truly the Father of Agriculture in California.

**Forest Plantings**

To promote commercial planting of forest trees, the
California State Agricultural Society in 1870 offered a premium of $50.00 for the largest quantity of useful trees to be planted during the year. There were three contestants, Mr. James T. Stratton, of Alameda County, Mr. E. T. Aiken and Thomas Edwards, both of Sacramento County. Mr. Aiken made a statement to the Society in his petition that embodied the feelings of the time:

Here is an industry that is second to none in the whole list of agricultural productions. The rapid disappearance of the forest trees all over our State, especially in localities bordering upon our rivers and sloughs, has for several years excited the attention of all who claim a home in California and feel an interest in the future welfare of our State.\textsuperscript{20}

Aiken described the many benefits that would be derived from plantings trees in the state:

There is nothing to protect the growing grain, the young vineyards, or the newly planted orchard from the fierce northerly winds which visit us almost periodically, and generally come at a most critical time for the farmer, and in two days time blow his hope of a good harvest for the season into despair.\textsuperscript{21}

Aiken felt that "these evils" could be easily avoided by planting forest trees along the boundaries of the land. Such plantings would not only supply the needed fuel, but would also serve as windbreaks to shelter the crops and orchards. He advised that the trees should be cultivated, well mulched and planted in the correct direction to give protection from the wind.
The First Commercial Eucalyptus Planting

James Stratton demonstrated to the Board of Directors of the California State Agricultural Society that he had planted fifty-three and one-half acres of *Eucalyptus globulus* and three thousand *Eucalyptus camaldulensis* trees. The following is part of the statement that Stratton made to the Board of Directors of the Society concerning his forest planting.

The seed from which the above trees were grown was gathered in December, 1868, from trees about seven years old, at my own residence, in Brooklyn, Alameda County, and was sown in a frame under glass, on the fifteenth of April 1869, where the plants remained until they were about three inches high -- in the middle of June following -- when they were transplanted into boxes three feet square, six inches deep, and one hundred in a box. They were well attended to by a careful gardener until November following, when they were carefully cut out, so as to leave attached to each tree a ball of earth three and one-half inches square and six inches deep, in which condition they were planted in their permanent location.

The land on which they were planted included a variety of soil about one half being nearly level, with a stiff, dark loam of good quality, and the other half a heavy adobe, somewhat saline in places and slightly rolling. The whole had been under continuous cultivation, in cereals, during the past seventeen years, and had become somewhat impoverished by continual use. The land was prepared by being plowed in the usual manner, as soon as it had become moistened by the Fall rains, and the soil was thoroughly pulverized to a depth of fifteen inches, in lines or strips two feet wide and eight feet apart from center to center, each way; the task of planting ending about the first of February, 1870.

After they were planted they were well plowed, hoed, and cultivated, and are now in splendid growing condition, generally about four and one-half feet high, although many of them have attained hight [sic] of eight feet.

The expense of the enterprise has thus far been
about fifty-five dollars per acre of six hundred and fifty trees, exclusive of the land; and it is expected that they will have cost one hundred and fifty dollars per acre before any revenue can be derived from them, which will probably be in about seven years.

The eucalypti are considered very useful forest trees in Australia, where they are indigenous; the variety globulus being used extensively for piling (as they are free from the attacks of the toredo), and for flooring, as it is a beautiful white color and wears perfectly smooth. I have no doubt that it will be found useful for many other purposes.²²

Through the pages of The California Horticulturist and The Pacific Rural Press, Stratton's premium winning forest can be followed over the years. The California Horticulturist carries this article in 1874.

Two miles north of Hayward are two remarkable groves of the Eucalyptus or Australian Gum-tree. They belong to J. T. Stratton, the present Surveyor-General, who resides in Oakland. One grove contains about sixty acres, the other ninety; the whole comprising about 130,000 trees, big and little. The trees are only four years old, yet many of them are from forty to fifty feet high and a foot in diameter, and are planted in regular rows like an orchard, though closer together; in fact, the rows are too close for the general thrift, and the proprietor is about to cut away every other tree, which will afford firewood enough to pay for all expenditure heretofore. When Gen. Stratton was setting out the trees, the neighboring farmers laughed at him, and advised him to desist and attend to his surveying, as he would be dead long before the timber would amount to anything; but the laugh is now on the other side. Five years hence the available timber will be immensely valuable for manufacturing and for firewood... No doubt General Stratton's foresight in planting these extensive and beautiful groves will produce not only cords of wood but cords of money; for, if cut down and sold now, at the age of only four years, the young forest would bring many thousands of dollars.²³

A few months later, Pacific Rural Press published an article praising the eucalyptus, but warned against using
seed from California trees. This engendered a quick response from Stratton, defending their use. Because of the light these articles shed on the attitudes of the times, they are quoted at length below.

The Pacific Rural Press article, dated July 25th, stated:

We would take this occasion to put the public on their guard against planting seed from the Eucalyptus grown in California. They will not germinate. The tree produces seed in abundance here. We have at the present time some of them in the office of the Press. They are all right as far as appearance goes; but those who are well posted in the matter, and could make money from the sale of them were they so disposed, declare that they are valueless. Use none but imported seed.24

This article was promptly answered by Stratton in the August 8th issue of the Rural Press:

In an article on the eucalyptus tree in your issue of the 25th ult., you caution your patrons against purchasing California grown seed, that it is valueless and will not germinate.

Your informant must have had a very limited experience and has led you to publish an erroneous statement which I know you will hasten to correct.

I have three blue gum trees at my residence in Oakland, now not more than twelve years old from the seed, one of which has borne only such cones as those now on exhibition in your office, which contain no seed, I suppose for want of impregnation -- but the other two trees are the parents of at least 150,000 of the trees in my eucalyptus forest at Hayward's [sic], besides about 50,000 more trees distributed through this State; and are groaning with indignation at the article referred to, and will give me no peace of mind until they at least are placed right on the record, as they believe that I can safely back their family numerically against any other two families of that age in the vegetable world.

My experience teaches me that not only will
California seed germinate, but that it is much superior to the imported, and that at least three times as much of it will grow, probably due to the fact that it is fresher, and that its vitality has not been destroyed or injured by the trying ordeal of the ocean transit through the tropics as has the imported.

I have also tested the wood of different kinds of the eucalyptus, and find that the blue gum, the most rapid growing variety will decay in the ground in two years, as will also the viminalis, a quite rapid grower also, but they make most excellent fuel. The jarrah referred to in your article is a very durable variety, but not more so than the red gum or the iron bark. I have had a plank of the latter variety deposited in the ground for three years, and it does not yet show the slightest indications of decaying in the heart, though the sap decayed a year ago. These durable varieties (I have six of them in my forest) are very slow growing, and it will require about seven years from the seed to make a good fence post. The locust will, in good ground, grow quite as rapidly, but the great advantage in planting eucalyptus is that it will thrive in the driest locality where the temperature does not fall below 30° Fah., where the surface can be kept pulverized and free from weeds for two years — after which they will take care of themselves.25

Three years later the Pacific Rural Press ran an extensive article describing General Stratton's plantation:

General Stratton, of Alameda County, the well-known planter of blue gum forest, gives us some points on the results of cutting the trees for firewood and for other purposes. He has cut seven-year-old trees which were 90 feet high, and taking out a good telegraph pole from the trunk, has worked up the remainder into firewood, gaining very profitable results from the trees. He has experimented with cutting the trunks for railway ties, facing them when green. These ties were dried in the sun and checked so badly that they were unfit for the purpose. Further experiments will be made with seasoning more slowly in the shade and in other ways to discover whether this tendency to check can be overcome.

Of more satisfactory results were some experiments made to discover how much firewood can be taken from an acre. An acre of six-year-old trees were felled and corded in March and the result was 14 cords of wood which sold on the ground for $9.00 per cord. Suckers started in June and grew 25 feet in one year. General Stratton thinks that three years growth of these
off-shoots will yield as much firewood as from the original six-year-old trees.

A point of encouragement for those who think of seeding Eucalyptus for firewood on unproductive land may be drawn from Gen. Stratton's experience. He has trees growing thriftily on poor high land which has disappointed all who attempted to crop it with grain, etc. Though the growth is not so rapid, it bids fair to be profitable, and the inference would be that the slowly-grown timber will be superior. The gum tree forests upon the hills above Oakland and Berkeley are becoming features of the landscape, and this land is much of the unproductive class.28

Although General Stratton was the first to plant large groves of eucalyptus for commercial purposes, he was soon followed by others (Map 5). It was his efforts, experiments and the communication of his results in the leading agricultural, horticultural and farm journals, that convinced others to begin to plant eucalyptus on a large scale. He had reacted positively in a time of stress and used foresight and ingenuity to combat the timber famine that was predicted. His influence in planting trees is described in the following:

Mr. G. [sic] T. Stratton of Brooklyn has sold, besides other orders, 60,000 Eucalyptus trees this season to two individuals. G. P. Jones will transplant 35,000 on his land northwest of Berkeley and E. C. Sessions, 25,000 on the low hills back of Brooklyn -- all in Alameda County. Mr. Stratton may well be proud of his leading influence in the introduction of the Australian Gum trees.27

Other Commercial Plantings

The rapid growth of the eucalypti began to excite farmers. It seemed practical after all to plant forest trees that would mature in one's lifetime, and could be
MAP 5
Historical Distribution of Eucalyptus in California

Eucalyptus globulus
Eucalyptus camaldulensis
harvested in only seven years for firewood. Soon the Pacific Rural Press, the California Horticulturist and the California Culturist ran articles in nearly every edition describing the new plantings.

Rivalry between growers was common, each challenging the other's stock, crop or trees. Liberty Perham of Hayward stated that he had a blue gum tree that measured 27 feet 6 inches in height and 14 inches in circumference which was not yet two years old which he thought "knocks the socks off Mr. Buck's blue gum about seven feet six inches."28 This statement answered a challenge raised by Mr. J. Begg of San Felipe, who bragged that Mr. William Buck's blue gum trees were twenty feet in height, and were three and four inches in diameter and stated "if that can be beat in this state or anywhere else on this terrestrial globe, that he would like to know where."29

Eucalyptus seed was soon in short supply. Readers wrote to the Pacific Rural Press seeking information on seed supplies. The answer to one such request is given below:

San Francisco nurserymen hold the seed of the stringy bark; iron bark, etc. at $25.00 per pound. There is very little seed of the eucalyptus globulus on hand, and dealers ask as much as $32.50 for it. More of the regular Tasmanian blue gum -- eucalyptus globulus, is expected soon, and may be had upon arrival at a much lower figure. The seed can be planted as soon as the weather is warm enough to ensure germination.30
Even the United State Government became involved with planting eucalyptus on a large scale as witnessed by the following article:

The growth of the Eucalyptus is declared to be almost fabulously rapid; but even this term fails to convey an adequate idea of the rate at which the interest in this tree has grown in the public mind. And as popular manias are represented at Washington -- with some other failings of the American people -- we find that the Eucalyptus tree has taken root there. A firm in San Francisco recently received an order from Government for a large quantity of the seed of this tree. A portion of the order has already been filled, from an invoice received a few days since per ship "Tarter." For the balance Uncle Sam will be compelled to wait awhile; until San Francisco can catch another "Tarter," or some other ship from Australia.

The avowed object of Government in ordering this seed, is to plant the Eucalyptus in places where miasma prevails to an extent that almost unfits them for dwelling places for man, but where it is necessary that we should maintain military posts. In this far sighted provision for the health of our soldiers, Government has acted considerately, and we think wisely; for although the prevailing estimate of the power of the Eucalyptus in dispelling fever has itself become almost a fever, its claims in this respect are admitted by those whose heads are not turned by anything sensational. Whatever may be the effect of the Eucalyptus trees on the health of the posts where Government plants them, the country will receive a large return in valuable timber; the value increasing as the time of the return is deferred.31

Articles of this nature prevailed in the press; although, the "mania" for planting eucalyptus was openly discussed, it was also encouraged by the press and scientific communities. The large commercial plantings for the most part were made by men of wealth and standing within their communities. This also gave the plantings more social acceptance and emphasized to the rest of the
community the importance of planting trees.

The critical shortage of wood for fuel was clearly a major factor contributing to the popularity of these plantations. The following will examine some of the groves that were planted in California to provide for a future source of fuel.

NORTHERN CALIFORNIA

San Francisco and Bay Area

Bancroft mentioned a grove planted in Castro Valley in his History of California as being the first "grove of blue gums planted for timber." Bancroft stated the grove was planted in 1869 on 10 acres with nearly 1,000 trees to the acre. He described the development of the grove: "The trees were thinned seven years later to 100 trees per acre and yielded over $900.00 net for fuel and telegraph poles. A rental for grain would not have produced so much." It is probable that he was referring to Stratton's grove, although the reference may be to George Baxter's grove that was planted later.

Several eucalyptus groves were planted soon after Stratton's grove. They were smaller in size and did not receive the same publicity. However, they were still in existence forty years later when Louis Margolin, the Forest
Examiner for the Forest Service, traveled the State measuring the groves for potential cord wood supplies. One was planted by E. O. Webb of Alameda County. Webb planted about five acres of trees in 1870 between San Lorenzo and Hayward. Nearby was the Linda Vista Grove which Margolin though was the best grove in the State; it was located a mile and a quarter from the Mission San Jose and consisted of about three acres. Both groves were planted in *E. globulus*.34

Many of the early nurserymen were located in San Francisco. Their handiwork was soon seen in the city, as the sand hills and barren slopes gave way to forests and beautiful gardens and parks. The city was in need of a nearby supply of firewood, as all fuel had to be imported. It was estimated that 120,000 sixty pound sacks of charcoal (3,600 tons), worth $65,000, were burned in San Francisco in 1881.35 People began to plant trees to supply their own fuel, windbreaks, and for aesthetic relief from the barren hills surrounding San Francisco.

The first large commercial grove that can be documented on the San Francisco Peninsula was planted by a Mr. Howard in 1879 (Photo 1). Howard, a large landowner, lived in Hillsborough adjacent to San Mateo. The sixty-five acre blue gum grove was called the Peninsula or Island Grove, and occupied a rocky knoll emerging from San Francisco Bay connected to the mainland by tide-flats (Photo 2).
Photo 1. Portion of the peninsula grove of *Eucalyptus globulus* planted in 1879, belonging to Mr. Howard. Located at the end of Peninsula Avenue, Burlingame, San Mateo, California. (Metcalf Photo Files, Forestry Library, University of California, Berkeley.)
Photo 2. View of the “island” or “coyote” grove of eucalyptus on peninsula into San Francisco Bay near San Mateo and Burlingame. (Metcalf Photo Files, Forestry Library, University of California, Berkeley.)
The grove was measured in 1921 by Woodbridge Metcalf, Forester for the University of California, Berkeley. Firewood was still being harvested from the grove at that time and selling for $3.50 a cord.36

Another planter of the San Francisco Peninsula, Adolph Sutro, left his grove to the City of San Francisco. Coming to San Francisco in 1850, he joined the rush to the Comstock Lode in 1860. There he established a stamping mill in Dayton, Nevada and later designed and built the famous "Sutro Tunnel" that cooled and prevented flooding of the lower reaches of the deep mines beneath Virginia City. He returned to San Francisco in 1880 a very wealthy man,37 and bought the San Miguel Rancho, now known as Sutro Heights, Mount Sutro, and Sutro Forest.38 Sutro hired George R. Bailey, the Oakland eucalyptus expert, to design and plant his forest. He began planting Sutro Forest in eucalyptus in 1880 and continued planting trees until his death in 1896.39 Sutro Forest furnished 2,000 eucalyptus pilings for the San Francisco wharves and slips in 1910-1911. The pilings varied from 60 to 115 feet in length and cost the Harbor Commissioners 20 to 30 cents a linear foot. The largest pilings came to $34.00 each; the 60 footers to $12.00 each. It was estimated that the pilings would last 20 to 40 years.40

Besides planting Sutro Forest, Sutro encouraged the planting of the Presidio and Mount Davidson, which were
largely planted by school children on Arbor Days. When the eucalyptus seedling supply gave out, the children planted cypress and pine seedlings. Sutro, when Mayor of the city, along with Joaquin Miller, author and poet, and General Mariano Vallejo, early Spanish settler and founder of Vallejo, California, were instrumental in the planting of Yerba Buena Island in eucalyptus as a celebration of Arbor Day in 1886. The barren Yerba Buena Island was the same island where Dana had cut wood for the Alert in the winter of 1835. Three thousand people sailed to the island on a hot November day to plant the island.

The attributes of the eucalyptus filled the pages of the early press reaching its zenith when the Central and Pacific Railroads made public its intentions in January of 1877 to plant eucalyptus along the entire line of both roads. The railroad companies saw great advantages in these plantings: they felt this would ensure a constant fuel supply, and timber suitable for repairing the roads. The fall of rain would be increased by the trees and the climate modified, thereby increasing the population in outlying regions and the trees would absorb malarial poisons along the lines.

The Pacific Rural Press informed the public:

It is the intention of the companies to set them [eucalyptus] out along the entire line of both roads, where the trees can be grown to advantage. They will also be planted along the various branch roads as far as practicable. Already about one-half of the road through Alameda county has been set out with the
Eucalyptus globulus, and the work is being pushed as rapidly as the young trees are supplied from the Oakland nurseries.45

Eucalyptus plantings were becoming so common in Northern California by the end of the 1880s that Dr. Hermann Behr of the California Academy of Sciences in San Francisco was led to say that the Peninsula south of San Francisco was more Australian than California.46

Sacramento and Central Valley

The earliest known grove in the Sacramento Valley was planted in 1870. It consisted of about five acres located at Elmira in Solano County. The grove, planted in E. globulus, was owned by Reverend Jewett of Vacaville when Margolin examined it.47

Spurred on by the continuous urgings of the press and the prevailing literature on eucalyptus, farmers responded by planting blue gums.

Mr. Learned has been experimenting for three or four years upon the Eucalyptus, in order to prove whether it will flourish in the black adobe of San Joaquin County without irrigation. In December of 1871, he obtained some seed of the variety mentioned above, and for the first season he irrigated them. Since then they have not had a particle of water other than from natural causes. His trees are nearly three years old, and some measure six inches in diameter at the base, having attained a height of thirty-five feet. He maintains that he has established the proposition that these trees will grow without irrigation in San Joaquin Valley generally, notwithstanding the difference of soil.48

In January 1875, an article appeared in the Pacific
W. H. Mathews has, on the ranch of J. H. Bayers, about ten miles south of the town of Colusa, on the west bank of the Sacramento River, about 50,000 Eucalyptus-trees [sic] of the Victoria angustifolia, or narrow-leaved iron-barked variety, which he intends planting on the ground in orchard form about ten feet apart, during the next sixty days. The reason for planting Iron-barks instead of Blue-gums, is that the former resist the severe frosts of the State better than the latter.

Mr. Mathews has come down to San Francisco to purchase 50,000 more trees of the same variety, which he also intends planting this spring. He says he will plant the last-named 50,000 trees on a piece of rich never-broken land, containing about 100 acres, raising Cotton the first year between the rows of trees, and Sugar Beets the second year, as in two years the trees will probably throw too much shade for successful Cotton culture.

He has raised 50,000 trees to a height of from two to eight inches from two and a half pounds of seed, gathered from trees grown in Oakland. This certainly proves that California seeds will germinate as well as imported. In fact he used equal quantities of imported and California, and found the result so much in favor of that grown here that he used only those trees grown from California seed. Mr. Mathews has 225 acres of land in places within a radius of six or eight miles, on which he intends planting Eucalyptus-trees. He is a young man, and can afford to wait for his trees to attain a very respectable size before there will be any necessity for cutting them down for sale.49

The rapid growth of the blue gums excited farmers and more trees were planted. Anson Goodspeed planted blue gums in 1878 that grew to a height of 40 feet in two years, and others grew to a height of 22 feet in 18 months on his land north of Healdsburg. His trees responded well to watering
and the Pacific Rural Press suggested that the trees should be planted in the fall to take advantage of the winter rains.\textsuperscript{50} The article concluded with the following paragraph:

> We cannot too strongly urge upon our farmers the importance of planting out these valuable trees. Every farmer should put out at least an acre of eucalyptus trees this present winter. They are rapid growers and said to make excellent fence posts and good fuel. Ten dollars worth of young trees, would plant an acre; $20 would be sufficient to erect a windmill to irrigate them with, and in three years more then [sic] enough fire-wood can be taken to supply any farm house.\textsuperscript{51}

It was this type of experimentation and advertisement of the results that promoted the eucalyptus as a commercial tree. The idea of planting eucalyptus in large forests spread quickly over the state.

**Salinas Valley Area**

Monterey, once capital of the State, underwent great changes after the gold rush. The seat of Government, after several shifts, settled in Sacramento. The area lost population. Then the City of Salinas was founded in 1872 and took the County Seat away from Monterey, reducing it to a seaside resort.\textsuperscript{52}

The lower Salinas Valley rapidly developed into a prominent wheat-producing area in the late 1860s and early 1870s. The southern end of the valley remained cattle and sheep country. Spanish land grants and cloudy land titles
retarded the development of much of the valley until after 1880. The building of the railroad down the Salinas Valley from northern California to Los Angeles spurred growth in the 1880s.

Large commercial plantings of eucalyptus did not take place in the Salinas Valley until after the turn of the century. However, windbreaks were planted as early as 1874. These windbreaks, planted perpendicular to the direction of the wind along the property lines, helped alleviate crop damage and were harvested for fuel as well. The Salinas Valley illustrates a marginal area that was made inhabitable by the use of eucalyptus trees, since overgrazing by sheep and cattle had retarded the growth of oaks, sycamores and alders along the river banks, causing a shortage of fuel which probably did as much to exclude development as the Spanish grants.

SOUTHERN CALIFORNIA

Santa Barbara Area

In 1870, a man settled in Santa Barbara who would do more to publicize eucalyptus than any man of this era. This was Ellwood Cooper, a wealthy gentleman retiring from diplomatic service. In 1872 he purchased a pocket ranch (2,000 acres) from Colonel W. W. Hollister called the Dos Pueblos Ranch, twelve miles west of Santa Barbara, where he
began to experiment with eucalyptus. Dos Pueblos was covered with chaparral and a few oaks when Cooper bought it, but within a few years it became a show place featuring many species of eucalyptus. Cooper wrote to James McClatchie in 1900 about his interest in eucalyptus.

There were Blue Gum trees growing in the State during my first visit in 1868. I saw a few specimens in private gardens from ten to twenty feet high; was attracted to their beauty; so that when I located in Santa Barbara in 1870, I at once conceived the idea of forest planting.

Taking advantage of a previous acquaintance with Thomas Adamson, Jr., the United States Consul-general in Melbourne, Australia, Cooper asked him for seeds of different species, and asked Adamson to send him books and information on the genus. Adamson sent Cooper the seeds he requested and informed him that Ferdinand von Mueller, Director of the Melbourne Botanical Gardens and Australia's foremost botanist, had delivered some lectures on eucalyptus. The lectures had been printed, but all copies had been sent to London. However, the Baron was willing to send one of his originals, provided Cooper would have it published in America and send the Baron fifty copies. Cooper agreed and thus obtained the needed information. Using von Mueller's propagation and culture notes, Cooper planted the seedlings that sprouted from the seeds that Adamson had sent him.

In 1876, Cooper was asked to give a lecture to the
college of Santa Barbara, of which he was president. He combined his interest in eucalyptus and the need to promote forestry in his lecture. The lecture was so well received that he was asked to publish it. The result was his book, *Forest Culture and Eucalyptus Trees*. Cooper's book made an emotional appeal to forest the slopes of California with eucalyptus trees to counterbalance the destruction of the hardwood forests on the eastern seaboard. His speech was published along with Baron von Mueller's lectures, thus keeping his promise to have the material published in America. In the book, Cooper wrote of his own plantation:

> At my home I have growing 50,000 trees. The oldest were transplanted three years ago. A tree three years and two months from the seed, transplanted two years and ten months ago is nine and a half inches in diameter and forty-two feet and six inches high.

Cooper's plantings were described by every major eucalyptus authority. The trees were measured, documented and their habits recorded by Kinney, Sellers, McClatchie and Ingham. In 1900, McClatchie wrote in his book on eucalyptus:

> The country is especially indebted to Hon. Ellwood Cooper for calling attention to the merits of the Eucalypts. For many years he was very active in bringing the genus to the attention of the citizens of California. During the intervening quarter century Mr. Cooper has continued the extensive planting of Eucalypts. He has set them in canyons and on steep hillsides, has utilized them for a forest cover, for windbreaks, for shade on avenues, for sources of timber and wood, as well as for ornament, thus furnishing the country an object lesson of what the tree will do for an appreciative planter. He now has about 200 acres of his ranch north of Santa Barbara covered with forests
of these trees. Here is the best place in America to see a large variety of Eucalypts grown as forest trees. Several varieties to be seen only as botanical or ornamental specimens elsewhere can be seen here growing by the acre. Mr. Cooper's groves have been and will continue to be valuable sources of information as to the behavior, when growing forests, of several species not yet generally planted in America.  

In 1883, the State Legislature created the Board of Horticulture. Cooper was made a member and served for twenty-four years. Through this office he promoted the eucalyptus for many years, by distributing free seeds around the state and enthusiastically pushing their planting.

Many of the best specimens of the different species of eucalypts still grace the landscape in the Santa Barbara area, both on the remnant of Cooper's ranch and along the highways and streets. One old *Eucalyptus camaldulensis* on the Cooper ranch was over 150 feet tall with a circumference of 21 feet in 1976.

Los Angeles Area

Harris Newmark wrote in his autobiography of the first extensive planting of eucalyptus near the city of Los Angeles:

Sometime early in 1875, the Forest Grove Association started the first extensive tract of eucalyptus trees seen in Los Angeles, and in a decade or two the eucalyptus had become a familiar object; one tree, belonging to Howard & Smith, florists at the corner of Olive and Ninth streets, attaining, after a growth of nineteen years, a height of one hundred and thirty-four feet.*
Ludwig Salvatore, in his book, Los Angeles in the Sunny Seventies: A Flower from the Golden Land, mentioned the Forest Grove planting:

The largest forest is on the Anaheim branch of the Southern Pacific at a point where it crosses the San Gabriel River, about twelve miles from Los Angeles, where 190,000 trees have been set out. This forest belongs to the Forest Grove Association of which Judge [R. M.] Widney is president. In December ten pounds of seed were brought down from San Francisco, and the seeds planted in a nursery. When two months old, the shoots were transplanted into a box and set two inches apart. By April, the young plants had a height of 9 or 10 inches, and at that time they were set out in the ground ten feet apart. Within a year they were from 9 to 12 feet high.6a

Dr. Joseph Widney noted the Forest Grove planting in his historical sketch of Los Angeles County. Unfortunately, he did not elaborate, only mentioning that it was planted in the spring of 1875.69

Another planter in Los Angeles was Remi Nadeau, a French Canadian, who arrived in Los Angeles in 1861. Nadeau launched one of the most successful transportation companies in California. He became famous for his "twenty-mule teams" which transported borax from Death Valley to Los Angeles. During his ownership the transportation company grew until Nadeau owned 65 teams of 22 mules per team and owned and operated 65 way-stations located from Los Angeles to the Mexican border, Nevada, and
Arizona. Lesser known but equally important were his agricultural experiments. At one time he had the largest vineyard, 3,600 acres near Huntington Park, and the largest barley fields in California, 30,000 acres, planted in part to feed his mules. He also introduced sugar beets to Southern California. He had 2,800 acres planted near Florence, later called Nadeau Station, now part of Los Angeles. The sugar processing was very crude. Harris Newmark described the product as "bad at best, and the more sugar one put in coffee, the blacker the coffee became."

In 1875, Nadeau planted 115 acres of eucalyptus trees at his ranch near Florence. Bancroft stated that he planted 100,000 trees on this acreage. G. B. Lull, State Forester measured and described Nadeau's forest and published the results in A Handbook for Eucalyptus Planters. Nadeau's grove and the Widney Grove (Forest Grove Association) were the first extensive eucalyptus plantings near Los Angeles. Nadeau's grove was planted entirely in E. globulus.

A slightly earlier grove, however, had been planted some distance from Los Angeles in the new city of Wilmington. The grove was planted by Don Benito Wilson who had arrived in the Los Angeles area in 1841. Wilson was one of the leading citizens of the small pueblo; twice he was elected State Senator for Southern California, served
as mayor of Los Angeles and served as sheriff of the pueblo. He bought land with Banning and helped found the town of Wilmington,\(^7\) and spend his later years as a horticulturist. The April issue of 1874 of The Pacific Rural Press remarked on the tree planting in the area that was begun by Wilson: "This year there have been planted in the Wilmington district 100,000 trees of different varieties, chiefly eucalyptus and almond."\(^7\) A year later another article appeared in the Pacific Rural Press giving the progress of the planting: "The eucalyptus trees at B. D. Wilson's park, Wilmington, are only one year old from the seed, and have attained a height [sic] ranging from eight to fifteen feet, and a very luxuriant growth of branches and foliage."\(^7\)

Other large plantings soon followed. The California Horticulturist, August, 1876 ran the following article:

On the Laguna ranch, seven miles from Los Angeles, Mr. H. H. Spencer contracted with Col. R. S. Baker, to plant 75,000 Blue Gum (or Eucalyptus) trees in a field of 100 acres. Mr. Spencer secured a large quantity of seed from Australia, and planted it in boxes at his place on Hill Street. As soon as the plants began to shoot he transferred them to other boxes, placing them in exact and equal distant rows, with a view to transplanting them in the ground as he is now doing. Mr. Spencer invented a machine by which the tree is lifted from the box, with all the earth surrounding it, and injected as it were into a hole made by a similar machine in the ground where it is to grow.

Mr. Spencer's contract with Colonel Baker requires him to plant 75,000 trees. The ground was first plowed and then rolled. Five wells were sunk, one at each corner of the field and a large one in the center. These are supplied with force pumps by which the water is raised into tanks. A fine quality of water is struck in each of these wells at a distance of about
three feet from the surface. The grove is laid out with drives from the entrance, facing the county road, to each of the wells on the boundaries, and these are connected with avenues converging to the large central well. An open circle, about 120 feet in diameter, is left at this well, where the Colonel intends to lay out arbors and grounds for picnics, etc.

The trees are planted in rows running parallel with the county road. They are laid out in quincunxial rows, each quincunx of trees occupying a square of 12 feet. Thus a line 252 feet in length, marked out every 12 feet, is stretched and fastened to pegs. Men with spades then dig out a gutter of earth and sink a cross cut two inches from the line. This marks the exact spot where the tree is to be planted. Men then come along armed with the planting machines. They first take out a plug of earth about six inches deep and an inch and a half in width, with one of the machines which is without a tree; then they insert a planter containing a tree into the hole, push down the cylinder with the thumb, and, presto! the tree is adjusted in its place. Then follows a man with a heavy cast iron pounder, opened in the center and rounded at the end to a convex shape. The tree passes through the central aperture, the pounder is pressed to the earth, and when withdrawn the dirt is closely packed around the plant and left in the shape of a bowl. Then a man comes along with water and fills the bowl. Some time afterward dry sand is spread over the moisture surrounding the plant, and it is thus preserved from insects, which will not remain in dry sand, while the process of evaporation is retarded by this surface layer. We timed the men while they were planting a line of trees, and found that it took them just one minute and a half. At this rate they can plant 6,300 trees a day -- that is, a gang of men consisting of seventeen, engaged immediately and incidentally in the work. The average is about 6,000 trees per day for such a force, so that from the time of getting fairly at work it would take about 13 days to plant the 75,000 trees contracted for. There are portions of the field where the process of planting is not so easy as that we have described. At some points the earth is baked almost hard to a considerable depth. Here auger holes are bored by men with the Champion posthole auger, to a depth of about two feet, where moist soil is met. This hole is filled with water from carts that are kept constantly moving between the tanks and the holes. The water soon softens the walls of the holes and disappears. They are then filled with a fine loam, and in this the trees are planted. This portion of the work is slower than any other, but a large gang of men
are employed with augers, and rapid progress is being made. Trees which had been planted but one week were getting along vigorously. ⁷⁹

The owner of this extensive enterprise was Colonel Robert S. Baker, a forty-niner who stayed in California and made his fortune in Kern County raising sheep. He later married the widow of Abel Stearns, né Arcadia Bandini, and settled in the Los Angeles area. ⁸⁰ Baker bought Rancho San Vincente which comprised the whole Santa Monica district and consisted of 30,000 acres. In 1875, Baker formed a partnership with U. S. Senator, John P. Jones. Together they subdivided a portion of the San Vincente Rancho along the coast to found the town of Santa Monica. The "town" lots were auctioned off on July 16, 1875. A large crowd attended the auction, coming from San Francisco and the east coast. ⁸¹ The streets of Santa Monica were planted in eucalyptus by another pioneer eucalyptus promoter, Abbot Kinney. ⁸²

Baker became interested in many business ventures in the Los Angeles region over the years. He was a railroader, banker, and developer. In 1887 he built the Arcadia Hotel in Santa Monica named for his wife. ⁸³ In 1895 the Jones and Baker estate donated three hundred acres, along with an additional three hundred acres donated by the Wolfskill Tract, to build the Veteran's Hospital in Sawtelle. ⁸⁴ The grounds are planted in eucalyptus trees.
San Diego

The San Diego Presidio grant was called the Rancho de la Nacion. The Kimball brothers, Frank, Warren, and Levi, renamed it the National Ranch when they bought it in 1868. They laid out the town of National City in 1871. The Kimballs were developers who were interested in building their city into a railroad and shipping empire. They began planting eucalyptus trees in 1875 and over the following decade they planted thousands of trees. They wanted timber for ships, wharfs, railroad ties, and fuel (Photo 3). They were also interested in the potash business and planted eucalyptus to burn to produce potash. They wished National City to become the nation’s capital for ceramics, glass, soap, fertilizer and munitions, all which were dependent on potash.

The potash business was America’s foremost chemical industry prior to the Civil War. It required three to five acres of well-timbered land to produce one ton of potassium carbonate. Wood ashes were leached with water, and the resulting solution was then evaporated in iron pots to obtain “potash.”

During the last quarter of the nineteenth century the Kimball brothers were leading eucalyptus planters in the San Diego area. By 1882 Frank Kimball was operating kilns fired with eucalyptus wood to make brick for the proposed
Photo 3. Eucalyptus cordwood cut from average bottomland in *Eucalyptus globulus* grove in San Diego County. Grove produced 13.3 cords per acre or 34.1 trees per cord—4.8” D.B.H. 53’ high, stacked 3 3/4 cu. ft. (Metcalf Photo Files, Forestry Library, University of California, Berkeley.)
new railway stops in National City. Warren C. Kimball, his
brother, planted thousands of eucalyptus along the
Sweetwater River in 1884-85.\textsuperscript{89}

In 1906, the Kimball Brothers, acting with the Santa Fe
Railroad in which they had an interest, bought Rancho San
Dieguito, one of the twenty-nine Spanish land grants
awarded to Juan Maria Osuna, the first Alcalde of San Diego
in 1845. The grant consisted of 8,796.23 acres. The
Kimballs in conjunction with the Santa Fe Railroad
continued their eucalyptus plantings. By 1914, 3,000 acres
of land had been planted in several species of eucalyptus.
The land was later subdivided and sold. It became known as
Rancho Santa Fe.\textsuperscript{90} This was the largest single grove
planted in commercial eucalyptus.

San Luis Obispo Area

The San Luis Obispo area, like the Salinas Valley, did
not attract large immigrant populations during or
immediately after the gold rush. The population for the
county was 500 in 1852 and rose to 9,150 by 1880, due in
part to the discovery of copper in 1863 and quicksilver in
1871 in the Cambria area. Bancroft attributed the low
population to the lingering mission influence and the rocky
barriers that surrounded the area, isolating the community
from the rest of the state. The dominating industries
remained dairy and stock raising.\textsuperscript{91}
The first known commercial eucalyptus grove in the area was planted in 1891 at Callender, a railway station near Arroyo Grande. The ten acre grove was planted with blue gums by N. O. Munger, a native of Waterloo, Iowa, who had settled at Arroyo Grande. The grove had been carefully cultivated and was in good condition when Woodbridge Metcalf examined it in 1910. The trees were 70-80 feet high and were 8-10 inches in diameter. Firewood had been harvested several times.\textsuperscript{92}

In 1880 a pioneer arrived in the new city of Pasadena who was to have a profound and lasting affect on the landscape of San Luis Obispo County. This was Theodore Parker Lukens. Lukens became a close friend of John Muir and Gifford Pinchot, and became the first Forest Service Agent in Southern California. He became one of the staunchest conservationists of the State. Working with Muir, he was instrumental in establishing the Sierra Club, especially in Southern California. He became locally known as "Johnny Pineseed," for his work replanting pine seedlings in the San Bernardino Mountains. Lukens, working with the Forest and Water Association of Los Angeles County (the Board of Directors included Lukens, Abbot Kinney, William G. Kerckhoff, and Charles Silent) obtained funds to seed Henninger Flat to use it as a nursery for pine seedlings to reforest the mountains.\textsuperscript{93}

In November of 1904, he traveled to Arroyo Grande on
the Nipomo Mesa during an inspection trip for the Forest Service. He was so impressed by the area that in 1908, he and several Iowa investors bought 8,000 acres at the north end of the mesa. They formed the Los Berros Forest Company, planted thousands of eucalyptus seedlings on the land and promoted the development of forest plantings in the area. \(^9^4\) At one time over forty square miles were planted in eucalyptus trees. \(^9^5\) Many of these original plantings still stand.

The market for firewood and fence posts soon became glutted. Also the development of the oil and natural gas fields of Southern California were providing a less labor intense fuel and cities began to switch to this source. Worse perhaps, for the whole industry, was H. D. Tiemann’s report from the Forest Laboratory at Berkeley, which published data showing that eucalyptus timber was difficult and expensive to mill, checked and warped too badly and therefore, was not satisfactory for lumber. \(^9^6\) The industry collapsed.

Due to his promotions of the Los Berros tracts, Lukens lost his job with the Forest Service and missed the opportunity to become the first State Forester; he retired a broke and unhappy man. \(^9^7\) Lukens work, however, had started the period known as the "Eucalyptus Boom" or "Eucalyptus Crusade." \(^9^8\) He had worked for twenty years to promote forestry, and in his later years that of
eucalyptus forests.

SUMMARY

Colonel Warren had publicized the fuel shortage in the State in his journal California Farmer by first publishing articles that spoke of the crisis and later publishing articles urging people to plant trees to remedy the situation. As early as 1856 he was promoting and distributing eucalyptus seeds, although he also promoted other trees as well. He helped popularize eucalyptus by his activities. It was only a matter of time before farmers heeded the call and began to plant small and large groves of trees for fuel and timber.

James T. Stratton was among the first to plant a large grove of eucalyptus trees and due to the publicity his groves received others soon followed his example. These early plantings (1870-1890) had primarily been to provide firewood, fence posts and to rid the land of malaria. The second period of heavy plantings, which occurred after 1900, when a group of men who were visionaries who saw California becoming forested with eucalyptus trees to provide the world with hardwood timber. Ellwood Cooper, T. P. Lukens, and Abbot Kinney, just to name a few, were among the visionaries. Around the turn of the century, oil and natural gas field begin to provide cheaper, cleaner fuel
and the cities began to use them. The final blow to the eucalyptus era was dealt by H. D. Tiemann’s report deeming eucalyptus unsuitable as a timber tree. The industry collapsed in California and for many years thereafter feelings ran high because of the money lost in eucalyptus speculations. It has only been in last few years that interest has again arisen in using eucalyptus in California as an alternative fuel source, as will be examined in the next chapter.
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CHAPTER NINE

PAST, PRESENT, AND FUTURE OF EUCALYPTUS

Past

After the discovery of California in 1542 by Juan Rodriguez Cabrillo, Alta California remained a peripheral region of the Spanish Empire until the intrusion of foreign interests, including the English, the Russians, and the United States, in the eighteenth century, searching for furs and hides. To stem the invasion of her holdings, Spain ordered Alta California to be colonized as far north as Monterey Bay in 1768. To accomplish the dictates of King Carlos III, the Visitador General of New Spain, Jose de Galvez, personally took command of the colonization effort. After many hardships, the expeditions were united at San Diego.

Due to the loss of personnel to scurvy, starvation and desertions, the original expeditions were regrouped into three units: one unit remained in San Diego to found a mission and a presidio, one unit sailed back to San Blas for reinforcements, and one unit traveled north in search of Monterey Bay as described by the Spanish explorer Vizcaíno. The group traveling north were under directives to keep diaries describing their activities as well as to record their observations about the landscape and peoples they discovered. Six diaries of this journey are extant.
The observations made by these explorers were used in this work to determine a baseline description of California's timber/fuel resource in key areas: San Diego, Los Angeles, Santa Barbara, San Luis Obispo, the Salinas Valley and Monterey region, and San Francisco.

The Spanish found abundant timber resources for fuel and building in all areas they settled except for two: the San Fernando Valley and the San Francisco area. The San Fernando Valley was described by Father Vincente de Santa Maria as having a lack for firewood. However, the mission established there was able to obtain fuel from the local canyons and timber from nearby mountains. San Francisco was described as barren sand hills. Mission Dolores, which was established at San Francisco, used chaparral for fuel, but had to import lumber from other areas.

To compare the Spanish impression of the landscape, diseños of the same areas were studied as well as historical accounts kept by early settlers and visitors. Changes in the landscape were noted, either in plant composition or timber resources. It is clear from these documents that riparian timber resources were depleted in the area of Los Angeles, San Diego and San Luis Obispo by 1860. Willow trees were being planted in the Los Angeles area for fuel and living fences. The Santa Barbara area had lost timber reserves due to forest fires and
utilization, but still had fuel sources in 1860. Those areas that were settled or known by the Spanish but which the Spanish had not affected to any degree were San Francisco, the Bay Area, and the Sacramento Valley. San Francisco was not heavily populated, although fuel supplies were very limited, and Sacramento, which was settled in 1837, had a limited supply of fuel. By 1860 San Francisco and the Sacramento Valley were in critical need of firewood.

The Spanish settlers were originally composed of missionaries, military personnel, and converted Indians from Mexico. The mission fathers came to Alta California to convert the Indians and civilized them. The military, who accompanied the missionaries to protect them from Indian hostilities and to prevent foreign intrusions along the coast of California, was very small. Each mission was assigned five soldiers for protection and the presidios had about the same size force available. Additionally, each mission housed two fathers, rarely more. The small population of converted Indians that came on the original expedition were divided among the new missions to supply the work force. People recruited or sent from Mexico to settle in the pueblos were often of a base nature, shiftless, troublemakers, or criminals exiled to California. By 1790 the total population was around 900.²
Since Spain and Mexico followed an exclusive trade policy, not allowing anyone to trade with their colonies but themselves, and their ships seldom called at the California ports, the settlers had little economic incentive to produce surplus trade goods. The Spanish colonists, therefore, practised subsistence farming with only enough excess to barter for articles not produced in the missions or pueblos. This type of land use affected only the immediate areas surrounding the settlements.

The gold rush of 1849 brought a large diverse young male population to California. These men perceived the region totally differently from the early Spanish settlers. The young men came to California to get rich. They exploited every resource of the land, either by mining the mineral wealth, harvesting forests, or obtaining large blocks of land for agricultural purposes, to achieve their goals. In turn the merchants, craftsmen, and transportation capitalists exploited the miners, farmers, and urban dwellers to obtain their riches. The latest technology was imported or invented to help exploit the various resources. The land was so badly used that concerned citizens such as John Muir and T. P. Lukens began conservation movements to halt wasteful, damaging exploitation.

One of the first resources affected was firewood near the populated areas. Available timber was destroyed, and
in many cases, just wasted by careless people. Concern for the fuel sources were voiced as early as 1858.

Fuel Consumption

Until the 1870s, wood, water, and wind provided the primary industrial fuels in America; coal became increasingly important in the eastern United States after this period to be supplanted by oil products, especially in the western United States, by the 1920s. Much of the firewood consumed in the United States was obtained from farmers' woodlots which often were of very little value for other purposes; the trees often were knotty, snarled and of no value as lumber sources. The consumption of firewood in 1880 by a national population of 50 million people was estimated to be 146 million cords of wood valued at approximately $322 million, making an average cord worth $2.21. The consumption of coal in 1880 amounted to 71,481,570 short tons, increasing to 415,842,698 short tons by 1908. The increase in the use of coal correlated to a direct decline in the use of firewood (86 million cords of wood used in 1908). A survey of fuel consumption for 1908 revealed that 81.4 per cent (70 million cords of wood) of firewood was consumed in the rural areas. The second largest consumer of firewood were towns and cities with a population range between 1,000 to 30,000 who used 14.7 per cent or 12,615,000 cords of wood. Cities with populations
over 30,000 used 1.9 per cent or 1,615,000 cords of wood and the remaining was used in mineral operations (2 per cent or 1,770,000 cords of wood).

In California, energy sources were greatly restricted due to high transportation costs. Although coal of poor quality was found in several counties of California, high grade coal (anthracite) had to be imported, which was not only costly, but dangerous, since sailing vessels often caught fire due to spontaneous combustion of coal dust. The Transcontinental Railroad was not completed until 1869 and the Panama Canal did not open until 1915, coal before this period had to be shipped around the Horn or from Australia. The shipping of coal by railway was prohibitively expensive, for good coal came from the Pennsylvania coal fields. Until the development of the petroleum industry in California, the only cheap fuel was firewood and low-grade coal. The most cost effective fuel for the State was firewood.

California did have a few coal mines, but the coal produced was low-grade brown coal. Brown coal was found in many counties near the sea and in several areas of the Sierra Nevadas: San Diego-1850, Contra Costa-1852, and Humboldt-1854. Brewer visited several of the coal mines in the course of his work for the Geological Survey and reported on the low quality of the coal he found. The coal fields of Mt. Diablo (Contra Costa County) provided
the best coal (half bituminous) found in California. Most of the Mt. Diablo coal was used in San Francisco. The combined outputs of the California mines was 120,000 tons in 1865 rising to 144,000 tons by 1881 and declining thereafter.6

Petroleum sources were discovered by the Spanish in 1769, but were never exploited except for tar which was used mainly as a roofing material. The Americans began to exploit petroleum resources as early as 1859. The largest oil field utilized by 1884 was in Ventura County, which produced 8,000,000 gallons which were shipped to Alameda for refining. Natural gas had accidently been discovered while drilling water wells, but was not utilized for heating or lighting to any great extent by 1890.7 The natural gas and oil industries rapidly expanded after 1890 and the State switched to these fuels soon thereafter. Only in remote rural areas was firewood used after 1920 and after World War II, even the rural areas were served by natural gas or gasoline.

California's Solution to the Fuel Crisis

Beginning in 1854 articles in newspapers, farm journals, and horticultural magazines featured stories on the fuel and timber shortages. The fuel shortage was investigated and solutions sought by leading California scientists. The most obvious solution was to replant those
trees harvested and to allocate a portion of each farm to woodlots to furnish fuel. This course of action was widely approved and adopted across the State. The types of tree which should be planted for fuel was also investigated and experiments were conducted by private individuals to determine the proper tree to plant. Many tree types were tried, including catalpa, elm, eucalyptus, locust and willow.

Eucalyptus gained favor as the universal tree for several reasons: 1) it grew very rapidly -- twenty feet per year, 2) it was a hardwood tree with a high fuel value, 3) it could be harvested every seven to ten years without replanting because it coppiced from the roots, 4) it was believed to be impermeable to forest fires, and 5) it was believed to rid areas of malaria. Members of the scientific community endorsed eucalyptus as a valuable tree. Many of their opinions were formed by research reported from France, Italy and Spain. They recommended that the tree should be planted to help stem the fuel/timber crisis. The farm journals, horticultural magazines, and newspapers ran numerous feature articles on eucalyptus describing the methods of planting, propagation, disease control, species descriptions, use for fuel, bee pasture, and timber. Persuaded by the scientific community and the press, influential men began to plant forest plantations. The first plantation was planted by James T.
Stratton in 1869. Other plantations soon followed. By 1912, over 50,000 acres had been planted in eucalyptus, mainly for fuel, fence posts, malaria control, and timber.

**International Use**

The firewood crisis was not unique to California; it was a national, as well as an international problem. Many countries, including France, India, Italy, and Spain, implemented forestry practices and planted eucalyptus as a fuel source before 1900. France, Spain, and Corsica had made extensive planting before 1870. The term "fever tree" was first used to describe *Eucalyptus globulus* in Spain where its efficacy in reducing marsh fever was noted. The French also promoted eucalyptus plantings in Algeria and Ethiopia. For example, eucalyptus was introduced to Ethiopia in 1895 by Mondon-Vidaillet, a French railway engineer consulting with the emperor, Menelik II, regarding a new railway from Djibouti in French Somalia via Dire Dawa to Addis Ababa. Menelik requested a list of trees that would be suitable for fuel for the capital city, Addis Ababa. Mondon-Vidaillet suggested several species, including *E. globulus*. In 1904, Menelik issued a general proclamation ordering the planting of eucalyptus trees. With the aid of the German Forestry expert Escherich, a eucalyptus forest was established in the immediate vicinity of the capital. The trees were
planted in great numbers throughout the Ethiopian plateau. The plantings were exempt from taxation and seedlings were distributed free or at a low cost to promote their planting.\textsuperscript{12} Several authors have stated that the planting of eucalyptus trees around the capital and other small towns and villages of Ethiopia is responsible for the growth of modern Ethiopia.\textsuperscript{13}

**Present**

For more than a hundred years eucalyptus has been planted around the world to combat timber shortages. Most of the plantings have been to provide fuel to countries that had depleted their native forests. Until recently fuel from forests led in wood consumption, while buildings, fences, crossties for railroads, mine timbers, pulp for paper making, and staves for cooperage were next in consumption.\textsuperscript{14} The modern use of eucalyptus is still mainly fuel in third world nations, while use as biomass and pulp wood is growing in the developed nations.\textsuperscript{15} Today, blue gum is grown on 492,000 acres in Spain, where it is used for fuel, pulp wood and mine props. Likewise in Portugal, where the blue gum is the most common species planted, there are 588,000 acres.\textsuperscript{16} France has embarked on a exciting new genetic study that has produced a frost tolerant eucalyptus. These new species are clones prepared from tissue culture of several hybrids such as E.
dalrympleana and E. delegatensis. The new hybrids were planted on 4,000 acres in the spring of 1983, with an additional 4,000 acres planted for pulp wood in the spring of 1984.17

Eucalyptus for Timber

The change of fuels after the turn of the century caused the market value of firewood to decrease. The young eucalyptus groves planted in California were thought not to be suitable for lumber products due to the checking and warping of the timber after it was cut. Mature eucalyptus timber has been used for a century in Australia for lumber, but, special milling processes had to be developed to keep the lumber from checking and warping. The American and European practise of "live sawing" could not be practised. (Live sawing simply means cutting a log with a series of parallel cuts without turning the log.) The Australians process eucalyptus timber by "saw around" or turning a log as it is cut. Each log is treated as an individual, to eliminate brittle heart wood, gum veins, gum pockets, or insect damage (all characteristic of eucalyptus timber). By using a combination of kiln drying and air drying, eucalyptus can be seasoned successfully and economically.18 However, these techniques were not known in California during the eucalyptus "boom," at the turn of the century. Therefore, with the need for firewood
declining and the proper techniques to mill the timber for lumber not known, the eucalyptus groves were either destroyed to make way for more valuable crops, or if on marginal land, forgotten and neglected. The once valuable tree became abused, scorned, and considered a nuisance to many. Agencies such as the California Native Plant Society and The Nature Conservancy instigated plans to remove them from parks and reserves.

The status of eucalyptus universally, however, has not been one of scorn. The genus has been planted worldwide for timber, essential oils, pulp and fiberboard, and fuel. They are the most valuable source of hardwood in the world. The volume of eucalyptus wood produced in the world between 1961 and 1973 was five times that of the Australian production. Many third world nations have depended on eucalyptus to provide fuel for their people since the 1800s and have forestry or reforestation programs still actively planting trees on marginal, desert, or cut-over forest lands. For examples, by 1973 the following countries were utilizing eucalyptus as a timber source: Sri Lanka-83,000 hectares, Libya-35,000 hectares, Morocco-178,000 hectares, Chili-50,000 hectares and Ecuador-45,000 hectares. Brazil, which has the largest planting of eucalyptus outside of Australia, has planted 200 million eucalyptus trees of some 200 species since it was introduced to that country in 1825.19
Future

Since 1980, interest in eucalyptus is resurging in the United States. The U.S. Forest Service, scientists, private organizations, and individuals are experimenting with hybrids, tissue culture and cloning to produce trees that will grow in adverse conditions and which can be harvested economically for biomass (fiber and chip wood). Eucalyptus is being investigated as an alternative fuel source to be used in small electrical co-generators, pulp wood and chip board manufacturing. Scientific breakthroughs in tissue culturing and cloning are producing trees that are frost resistant, faster and straighter growing which can be grown and harvested by new chipping and harvesting equipment to meet the world's wood production needs.

With the world population growing so rapidly, the need for wood products will increase. The eucalyptus has in the past provided many of the wood products needed and it is certain that with the new cloning techniques, frost resistant species, and new harvesting techniques, that it will continue to supply the world with a fast growing economical source of fiber and fuel and timber products.
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## APPENDIX A

Species listed in Nolan's Catalog

<table>
<thead>
<tr>
<th>Name in Catalog</th>
<th>Common Name*</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>E. acmenoides</em></td>
<td>White Mahogany Gum</td>
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<tr>
<td><em>E. amygdalina</em></td>
<td>Black Peppermint Gum</td>
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<tr>
<td><em>E. angustifolia</em></td>
<td><em>(E. amygdalina var. angustifolia)</em></td>
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<td><em>E. celpophylla</em></td>
<td>Marri Gum</td>
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<td><em>E. cordifolia</em></td>
<td><em>(? possibly cordata)</em></td>
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<tr>
<td><em>E. cornuta</em></td>
<td>YateTree</td>
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<tr>
<td><em>(E. corynocalyx)</em></td>
<td><em>E. ciodocalyx</em>, Sugar Gum</td>
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<tr>
<td><em>(E. eugeniiodes)</em></td>
<td><em>E. globoldea</em>, White Stringy bark</td>
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<tr>
<td><em>(E. flavis)</em></td>
<td><em>E. obliqua</em>, Messmate Stringybark</td>
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<tr>
<td><em>(E. gigantea)</em></td>
<td><em>E. delegans</em>, Alpine Ash</td>
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<td><em>E. lanceolata</em></td>
<td>(?)</td>
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<td><em>E. leucoxylon</em></td>
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<td>Spotted Gum</td>
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<td><em>E. marginata</em></td>
<td>Jarrah</td>
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<td><em>(E. montana)</em></td>
<td><em>E. moluccana</em> hybrid moorei x piperita</td>
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<td>Scrubby Gum</td>
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<td><em>(E. stuartiana)</em></td>
<td><em>E. bridgesiana</em>, Apple Box</td>
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<tr>
<td><em>E. tereticornis</em></td>
<td>Grey or Slaty Gum</td>
</tr>
<tr>
<td><em>E. viminalis</em></td>
<td>Manna Gum</td>
</tr>
</tbody>
</table>

*Names in parenthesis are synonyms.
## APPENDIX B
### EUCALYPTUS HISTORY

<table>
<thead>
<tr>
<th>YEAR</th>
<th>COUNTY</th>
<th>TOWN</th>
<th>ACRES</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1853</td>
<td>Solano</td>
<td>Fairfield</td>
<td></td>
<td>Capt. Robert W. S. received seed from Australia.</td>
</tr>
<tr>
<td>1853</td>
<td>San Francisco</td>
<td>San Francisco</td>
<td></td>
<td>William C. Walker received seed of 14 species.</td>
</tr>
<tr>
<td>1855</td>
<td>San Francisco</td>
<td>San Francisco</td>
<td></td>
<td>Walker advertised in California Farmer.</td>
</tr>
<tr>
<td>1856</td>
<td>Los Angeles</td>
<td>Los Angeles</td>
<td></td>
<td>Walker advertised in California Farmer.</td>
</tr>
<tr>
<td>1856</td>
<td>Sacramento</td>
<td>Sacramento</td>
<td></td>
<td>Kinney stated C. L. Reimer introduced Eucalyptus.</td>
</tr>
<tr>
<td>1856</td>
<td>Alameda</td>
<td>Oakland</td>
<td></td>
<td>Warren distributed eucalyptus seeds.</td>
</tr>
<tr>
<td>1856</td>
<td>Alameda</td>
<td>Sacramento</td>
<td></td>
<td>R. W. Washburn advertised Eucalyptus in one page catalog.</td>
</tr>
<tr>
<td>1856</td>
<td>Alameda</td>
<td>Sacramento</td>
<td></td>
<td>A.P. Smith's Catalog does not list eucalyptus.</td>
</tr>
<tr>
<td>1856</td>
<td>Santa Clara</td>
<td>San Jose</td>
<td></td>
<td>Captain Joseph Aram planted eucalyptus in nursery.</td>
</tr>
<tr>
<td>1857</td>
<td>San Francisco</td>
<td>San Francisco</td>
<td></td>
<td>William C. Walker advertised genus eucalyptus.</td>
</tr>
<tr>
<td>1856</td>
<td>San Francisco</td>
<td>San Francisco</td>
<td></td>
<td>Walker's Catalog lists three eucalyptus species.</td>
</tr>
<tr>
<td>1856</td>
<td>San Francisco</td>
<td>San Francisco</td>
<td></td>
<td>Walker received seeds of five species from M. Guilfoyle.</td>
</tr>
<tr>
<td>1856</td>
<td>Alameda</td>
<td>Oakland</td>
<td></td>
<td>Nolan commissioned sea captain for Eucalyptus seeds.</td>
</tr>
<tr>
<td>1856</td>
<td>Alameda</td>
<td>Oakland</td>
<td></td>
<td>Eucalyptus planted near military academy.</td>
</tr>
<tr>
<td>1856</td>
<td>Alameda</td>
<td>Sacramento</td>
<td></td>
<td>Richmond Davis planted tree in his garden.</td>
</tr>
<tr>
<td>1856</td>
<td>Alameda</td>
<td>Alameda</td>
<td></td>
<td>Bishop Taylor sent his wife seeds from Australia.</td>
</tr>
<tr>
<td>1856</td>
<td>Alameda</td>
<td>Oakland</td>
<td></td>
<td>George Potter planted eucalyptus on his estate.</td>
</tr>
<tr>
<td>1856</td>
<td>Los Angeles</td>
<td>San Gabriel</td>
<td></td>
<td>Mr. Leonard J. Rose planted.</td>
</tr>
<tr>
<td>1856</td>
<td>Los Angeles</td>
<td>Wilmington</td>
<td></td>
<td>Phineas Bagley planted eucalyptus on his estate.</td>
</tr>
<tr>
<td>1856</td>
<td>Los Angeles</td>
<td>Santa Anita</td>
<td></td>
<td>William Wolfskill planted on Santa Anita Ranch.</td>
</tr>
<tr>
<td>1856</td>
<td>Alameda</td>
<td>Alameda</td>
<td></td>
<td>John Hall planted three eucalyptus trees at his home.</td>
</tr>
<tr>
<td>1856</td>
<td>Santa Clara</td>
<td>San Jose</td>
<td>60.0</td>
<td>General Naglee planted eucalyptus on his farm.</td>
</tr>
<tr>
<td>1856</td>
<td>Alameda</td>
<td>Hayward</td>
<td>150.0</td>
<td>James T. Stratton planted first commercial grove.</td>
</tr>
<tr>
<td>1856</td>
<td>Alameda</td>
<td>San Jose</td>
<td>3.0</td>
<td>Linda Vista Grove planted.</td>
</tr>
<tr>
<td>1856</td>
<td>Alameda</td>
<td>Berkeley</td>
<td></td>
<td>U.C. California, Berkeley the first eucalyptus are planted.</td>
</tr>
<tr>
<td>1856</td>
<td>Alameda</td>
<td>Oakland</td>
<td></td>
<td>William Nolan planted eucalyptus in nursery.</td>
</tr>
<tr>
<td>1856</td>
<td>Alameda</td>
<td>Alameda</td>
<td></td>
<td>Nolan listed 34 species of eucalyptus.</td>
</tr>
<tr>
<td>1857</td>
<td>San Joaquin</td>
<td>Stockton</td>
<td></td>
<td>Learned Grove-experimented with eucalyptus.</td>
</tr>
<tr>
<td>1857</td>
<td>Santa Clara</td>
<td>San Felipe</td>
<td></td>
<td>William Buck planted windbreak around 800 acre farm.</td>
</tr>
<tr>
<td>1857</td>
<td>Alameda</td>
<td>Alameda</td>
<td></td>
<td>Elwood Cooper planted 32 species on his ranch.</td>
</tr>
<tr>
<td>1857</td>
<td>Santa Barbara</td>
<td>Santa Barbara</td>
<td>200.0</td>
<td>Fair Grove &amp; Winery Grove planted.</td>
</tr>
<tr>
<td>1857</td>
<td>Alameda</td>
<td>Irvington</td>
<td></td>
<td>J. L. Kerby planted eucalyptus on his ranch.</td>
</tr>
<tr>
<td>1857</td>
<td>Los Angeles</td>
<td>Wilmington</td>
<td>84.0</td>
<td>Nurseries advertising eucalyptus.</td>
</tr>
<tr>
<td>1857</td>
<td>San Francisco</td>
<td>San Francisco</td>
<td></td>
<td>Bailey &amp; Co. East Oakland—400,000 seedlings.</td>
</tr>
<tr>
<td>1857</td>
<td>Yuba</td>
<td>Marysville</td>
<td></td>
<td>B. S. Fox, est. 1853-San Jose.</td>
</tr>
<tr>
<td>1857</td>
<td>Alameda</td>
<td>Hayward</td>
<td>5.0</td>
<td>M. King-Oakland, Shinn &amp; Co.</td>
</tr>
<tr>
<td>1857</td>
<td>Alameda</td>
<td>Hayward</td>
<td>5.0</td>
<td>Thomas A. Garey—Los Angeles</td>
</tr>
<tr>
<td>1857</td>
<td>Los Angeles</td>
<td>Santa Monica Heights</td>
<td>115.0</td>
<td>Pryal's Nursery-Oakland.</td>
</tr>
<tr>
<td>1857</td>
<td>San Diego</td>
<td>National City</td>
<td></td>
<td>John Rock-San Jose.</td>
</tr>
<tr>
<td>1857</td>
<td>Colusa</td>
<td>Colusa</td>
<td>225.0</td>
<td>W. H. &amp; B. Pepper-Petaluma.</td>
</tr>
<tr>
<td>1857</td>
<td>Solano</td>
<td>El Cerrito</td>
<td>5.0</td>
<td>S. Nolan-Oakland.</td>
</tr>
<tr>
<td>1857</td>
<td>Alameda</td>
<td>Hayward</td>
<td></td>
<td>Richard Corley-San Francisco.</td>
</tr>
<tr>
<td>1857</td>
<td>Alameda</td>
<td>Oakland</td>
<td></td>
<td>L. M. Newson-Oakland.</td>
</tr>
<tr>
<td>1857</td>
<td>Sonoma</td>
<td>Petaluma</td>
<td></td>
<td>James Harrison.</td>
</tr>
<tr>
<td>1857</td>
<td>Riverside</td>
<td>Riverside</td>
<td></td>
<td>Blue gum are planted around public schools.</td>
</tr>
<tr>
<td>1857</td>
<td>Santa Barbara</td>
<td>Santa Barbara</td>
<td></td>
<td>Webb Grove planted.</td>
</tr>
<tr>
<td>1857</td>
<td>Kern</td>
<td>Delano</td>
<td></td>
<td>Webb Grove planted.</td>
</tr>
<tr>
<td>1857</td>
<td>Los Angeles</td>
<td>Santa Monica</td>
<td></td>
<td>Malais experiment by Central Pacific R.R. began.</td>
</tr>
<tr>
<td>1857</td>
<td>Los Angeles</td>
<td>Florence</td>
<td></td>
<td>Forest Grove Association-Oakland.</td>
</tr>
<tr>
<td>1857</td>
<td>San Diego</td>
<td>National City</td>
<td></td>
<td>Nadeau Grove planted.</td>
</tr>
<tr>
<td>1857</td>
<td>Colusa</td>
<td>Colusa</td>
<td></td>
<td>Kimball Brothers began planting.</td>
</tr>
<tr>
<td>1857</td>
<td>Solano</td>
<td>Solano</td>
<td></td>
<td>Mathews Grove planted.</td>
</tr>
<tr>
<td>1857</td>
<td>Alameda</td>
<td>Alameda</td>
<td></td>
<td>Jewett Grove planted.</td>
</tr>
<tr>
<td>1857</td>
<td>Los Angeles</td>
<td>Santa Monica</td>
<td></td>
<td>George C. Baxter advertised eucalyptus.</td>
</tr>
<tr>
<td>1857</td>
<td>Los Angeles</td>
<td>Los Angeles</td>
<td>100.0</td>
<td>Abbott Kinney began street plantings.</td>
</tr>
<tr>
<td>1857</td>
<td>Sonoma</td>
<td>Petaluma</td>
<td></td>
<td>Laguna Ranch Grove planted.</td>
</tr>
<tr>
<td>1857</td>
<td>Riverside</td>
<td>Riverside</td>
<td></td>
<td>W. A. T. Stratton reported heavy plantings.</td>
</tr>
<tr>
<td>1857</td>
<td>Santa Barbara</td>
<td>Santa Barbara</td>
<td></td>
<td>Extensive street plantings are made.</td>
</tr>
<tr>
<td>1857</td>
<td>San Francisco</td>
<td>San Francisco</td>
<td></td>
<td>Cooper began campaign for eucalyptus plantings.</td>
</tr>
<tr>
<td>YEAR</td>
<td>COUNTY</td>
<td>TOWN</td>
<td>ACRES</td>
<td>COMMENTS</td>
</tr>
<tr>
<td>------</td>
<td>------------</td>
<td>-----------------</td>
<td>-------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1876</td>
<td>Los Angeles</td>
<td>Santa Monica</td>
<td></td>
<td>Kinney planted streets of Santa Monica with E. globulus.</td>
</tr>
<tr>
<td>1877</td>
<td>Statewide</td>
<td></td>
<td></td>
<td>Southern Pacific Railroad began planting.</td>
</tr>
<tr>
<td>1877</td>
<td>San Joaquin</td>
<td>Stockton</td>
<td></td>
<td>William B. West listed 8 species of eucalyptus in catalog.</td>
</tr>
<tr>
<td>1877</td>
<td>Alameda</td>
<td>Berkeley</td>
<td>1.0</td>
<td>U.C. Berkeley Grove of E. globulus planted.</td>
</tr>
<tr>
<td>1878</td>
<td>Placer</td>
<td>Newcastle</td>
<td></td>
<td>C. M. Silva &amp; Son advertised other varieties.</td>
</tr>
<tr>
<td>1878</td>
<td>Ventura</td>
<td>Santa Paula</td>
<td></td>
<td>Nathan W. Blanchard planted extensive windbreak.</td>
</tr>
<tr>
<td>1878</td>
<td>Sonoma</td>
<td>Healdsburg</td>
<td></td>
<td>Anson Goodspeed Grove planted.</td>
</tr>
<tr>
<td>1878</td>
<td>Los Angeles</td>
<td>Florence</td>
<td>80.0</td>
<td>Thatcher Grove planted.</td>
</tr>
<tr>
<td>1878</td>
<td>Alameda</td>
<td>Newark</td>
<td>7.0</td>
<td>Therefall Grove planted.</td>
</tr>
<tr>
<td>1878</td>
<td>Santa Clara</td>
<td>Stanford Univ.</td>
<td></td>
<td>Governor's Lane planted.</td>
</tr>
<tr>
<td>1879</td>
<td>San Mateo</td>
<td>San Mateo</td>
<td>65.0</td>
<td>Peninsula Grove planted.</td>
</tr>
<tr>
<td>1880</td>
<td>San Francisco</td>
<td>San Francisco</td>
<td></td>
<td>Sutro Forest planted.</td>
</tr>
<tr>
<td>1880</td>
<td>Sonoma</td>
<td>Live Oaks</td>
<td>1.8</td>
<td>First Meechan Grove planted.</td>
</tr>
<tr>
<td>1880</td>
<td>San Diego</td>
<td>El Cajon</td>
<td>5.0</td>
<td>McDonald Grove planted.</td>
</tr>
<tr>
<td>1880</td>
<td>Los Angeles</td>
<td>Nadeau</td>
<td>10.0</td>
<td>Pacific Car Line Grove planted.</td>
</tr>
<tr>
<td>1880</td>
<td>Sonoma</td>
<td>Stony Point</td>
<td>10.0</td>
<td>Second Meechan Grove planted.</td>
</tr>
<tr>
<td>1881</td>
<td>Alameda</td>
<td>Berkeley</td>
<td>80.0</td>
<td>Smith Grove planted.</td>
</tr>
<tr>
<td>1882</td>
<td>San Mateo</td>
<td>Burlingame</td>
<td></td>
<td>Buvy Grove planted.</td>
</tr>
<tr>
<td>1883</td>
<td>Orange</td>
<td>Garden Grove</td>
<td></td>
<td>Hill Grove planted.</td>
</tr>
<tr>
<td>1885</td>
<td>Alameda</td>
<td>Fruitvale</td>
<td>2.0</td>
<td>Coast Manufacturing Grove planted.</td>
</tr>
<tr>
<td>1885</td>
<td>Tulare</td>
<td>Tipton</td>
<td>40.0</td>
<td>Town Grove planted.</td>
</tr>
<tr>
<td>1886</td>
<td>San Francisco</td>
<td>Lake Merced</td>
<td></td>
<td>Green Grove planted.</td>
</tr>
<tr>
<td>1886</td>
<td>San Francisco</td>
<td>Yerba Buena Island</td>
<td></td>
<td>Three thousand people planted the island on Arbor Day.</td>
</tr>
<tr>
<td>1886</td>
<td>Los Angeles</td>
<td>Arcadia</td>
<td>20.0</td>
<td>Baldwin Grove planted.</td>
</tr>
<tr>
<td>1887</td>
<td>Santa Monica</td>
<td>Santa Monica</td>
<td></td>
<td>Santa Monica Forestry Station planted—50 species.</td>
</tr>
<tr>
<td>1887</td>
<td>Butte</td>
<td>Chico</td>
<td></td>
<td>Chico Forestry Station planted—50 species.</td>
</tr>
<tr>
<td>1888</td>
<td>Sonoma</td>
<td>Petaluma</td>
<td>200.0</td>
<td>Third Meechan Grove planted.</td>
</tr>
<tr>
<td>1888</td>
<td>Sonoma</td>
<td>Live Oaks</td>
<td></td>
<td>Mechen Long Belt—2 rows X 1½ miles long planted.</td>
</tr>
<tr>
<td>1889</td>
<td>Los Angeles</td>
<td>Los Angeles</td>
<td></td>
<td>Elysian Park planted—55 species.</td>
</tr>
<tr>
<td>1889</td>
<td>San Francisco</td>
<td>San Francisco</td>
<td></td>
<td>Presidio Grove planted.</td>
</tr>
<tr>
<td>1890</td>
<td>Contra Costa</td>
<td>Martinez</td>
<td></td>
<td>Muir Grove planted.</td>
</tr>
<tr>
<td>1890</td>
<td>San Diego</td>
<td>Escondido</td>
<td>8.0</td>
<td>Rockwell Grove planted.</td>
</tr>
<tr>
<td>1890</td>
<td>Ventura</td>
<td>Camarillo</td>
<td></td>
<td>Adolfo Camarillo planted &quot;tunnel&quot; along U.S. 101.</td>
</tr>
<tr>
<td>1891</td>
<td>San Luis Obispo</td>
<td>Callender</td>
<td>10.0</td>
<td>Munger Grove planted.</td>
</tr>
<tr>
<td>1891</td>
<td>San Bernardino</td>
<td>Del Rosa</td>
<td>20.0</td>
<td>Carpenter Grove planted.</td>
</tr>
<tr>
<td>1892</td>
<td>San Luis Obispo</td>
<td>Callender</td>
<td></td>
<td>Martin Windbreak of four rows planted.</td>
</tr>
<tr>
<td>1894</td>
<td>Los Angeles</td>
<td>Watts</td>
<td>4.0</td>
<td>Glass Grove planted.</td>
</tr>
<tr>
<td>1894</td>
<td>Los Angeles</td>
<td>La Mirada</td>
<td>4.0</td>
<td>Windermere Grove planted.</td>
</tr>
<tr>
<td>1894</td>
<td>Los Angeles</td>
<td>Lankershim</td>
<td>15.0</td>
<td>Davis Grove planted.</td>
</tr>
<tr>
<td>1894</td>
<td>San Diego</td>
<td>Olivenham</td>
<td>45.0</td>
<td>Olivenhan Plantation planted.</td>
</tr>
<tr>
<td>1894</td>
<td>Los Angeles</td>
<td>Compton</td>
<td>45.0</td>
<td>Micheaux Grove planted.</td>
</tr>
<tr>
<td>1895</td>
<td>San Mateo</td>
<td>San Mateo</td>
<td>2.0</td>
<td>Clark Grove planted.</td>
</tr>
<tr>
<td>1895</td>
<td>Los Angeles</td>
<td>Compton</td>
<td>5.0</td>
<td>Clark Grove planted.</td>
</tr>
<tr>
<td>1895</td>
<td>Ventura</td>
<td>El Rio</td>
<td>15.0</td>
<td>Power Grove planted.</td>
</tr>
<tr>
<td>1896</td>
<td>Santa Barbara</td>
<td>Santa Cruz Island</td>
<td></td>
<td>First eucalyptus trees are planted.</td>
</tr>
<tr>
<td>1896</td>
<td>Ventura</td>
<td>Haines</td>
<td></td>
<td>Limoneira Ranch planted.</td>
</tr>
<tr>
<td>1896</td>
<td>Sonoma</td>
<td>Live Oaks</td>
<td>28.0</td>
<td>Mecheon planted Fritsch Field.</td>
</tr>
<tr>
<td>1898</td>
<td>Los Angeles</td>
<td>Sunnyvale</td>
<td>20.0</td>
<td>Howland Grove planted.</td>
</tr>
<tr>
<td>1898</td>
<td>Los Angeles</td>
<td>Del Mar</td>
<td>4.0</td>
<td>Extensive windbreaks planted to protect citrus crops.</td>
</tr>
<tr>
<td>1900</td>
<td>Los Angeles</td>
<td>Gardena</td>
<td>80.0</td>
<td>Rosecrans Grove planted.</td>
</tr>
<tr>
<td>1900</td>
<td>Los Angeles</td>
<td>Santa Fe Springs</td>
<td>50.0</td>
<td>Gunn Grove planted.</td>
</tr>
<tr>
<td>1900</td>
<td>Los Angeles</td>
<td>Los Angeles</td>
<td>20.0</td>
<td>Elysian Park Grove of E. corynocalyx planted.</td>
</tr>
<tr>
<td>1900</td>
<td>Los Angeles</td>
<td>Long Beach</td>
<td>3,000.0</td>
<td>Elysian Park Grove of E. corynocalyx planted.</td>
</tr>
<tr>
<td>1900</td>
<td>San Diego</td>
<td>Del Mar</td>
<td>1,500.0</td>
<td>Bixby ranch planted.</td>
</tr>
<tr>
<td>1900</td>
<td>Los Angeles</td>
<td>Strawberry Park</td>
<td>61.0</td>
<td>Santa Fe R.R. began extensive plantings.</td>
</tr>
<tr>
<td>1900</td>
<td>Ventura</td>
<td>Ventura</td>
<td>7.0</td>
<td>Gordon Grove planted.</td>
</tr>
<tr>
<td>1901</td>
<td>Santa Barbara</td>
<td>Santa Barbara</td>
<td>5.0</td>
<td>Wilson Grove planted.</td>
</tr>
<tr>
<td>1901</td>
<td>Los Angeles</td>
<td>Nadeau</td>
<td>3.0</td>
<td>Sheridan Grove planted.</td>
</tr>
<tr>
<td>1901</td>
<td>Orange</td>
<td>Santa Ana</td>
<td>2.0</td>
<td>Montague Grove planted.</td>
</tr>
<tr>
<td>1901</td>
<td>Orange</td>
<td>Huntington Beach</td>
<td>1.0</td>
<td>Bailey Grove planted.</td>
</tr>
<tr>
<td>1902</td>
<td>Orange</td>
<td>Garden Grove</td>
<td>3.0</td>
<td>Courreges Grove planted.</td>
</tr>
<tr>
<td>1902</td>
<td>Los Angeles</td>
<td>Bairdstown</td>
<td>4.0</td>
<td>Knapp Grove planted.</td>
</tr>
<tr>
<td>1902</td>
<td>Los Angeles</td>
<td>Compton</td>
<td>4.0</td>
<td>Hunter Grove planted.</td>
</tr>
<tr>
<td>1902</td>
<td>San Bernardino</td>
<td>Bloomington</td>
<td></td>
<td>Walton Grove planted.</td>
</tr>
<tr>
<td>1903</td>
<td>Sanborn</td>
<td></td>
<td></td>
<td>Copely Grove planted.</td>
</tr>
<tr>
<td>1903</td>
<td>Santa Barbara</td>
<td>Santa Barbara</td>
<td>8.0</td>
<td>Porter Grove planted.</td>
</tr>
<tr>
<td>1903</td>
<td>Los Angeles</td>
<td>Los Angeles</td>
<td>40.0</td>
<td>Sexton Grove planted.</td>
</tr>
<tr>
<td>1903</td>
<td>Los Angeles</td>
<td>Los Angeles</td>
<td>30.0</td>
<td>Diamond Coal Co. Grove planted.</td>
</tr>
<tr>
<td>1903</td>
<td>Los Angeles</td>
<td>Compton</td>
<td>10.0</td>
<td>Lassing Grove planted.</td>
</tr>
<tr>
<td>1903</td>
<td>Los Angeles</td>
<td>Santa Fe Springs</td>
<td>80.0</td>
<td>Nichol Grove planted.</td>
</tr>
<tr>
<td>YEAR</td>
<td>COUNTY</td>
<td>TOWN</td>
<td>ACRES</td>
<td>COMMENTS</td>
</tr>
<tr>
<td>------</td>
<td>--------</td>
<td>------</td>
<td>-------</td>
<td>----------</td>
</tr>
<tr>
<td>1903</td>
<td>Santa Cruz</td>
<td>Watsonville</td>
<td>3.0</td>
<td>Thomas Windbreak planted.</td>
</tr>
<tr>
<td>1904</td>
<td>Humboldt</td>
<td>McKinleyville</td>
<td>3.0</td>
<td>Holman Grove planted.</td>
</tr>
<tr>
<td>1904</td>
<td>Orange</td>
<td>El Toro</td>
<td>1,000.0</td>
<td>Whiting Ranch Grove planted.</td>
</tr>
<tr>
<td>1904</td>
<td>Imperial</td>
<td>El Centro</td>
<td>5</td>
<td>Whiting Grove planted.</td>
</tr>
<tr>
<td>1904</td>
<td>Los Angeles</td>
<td>Los Angeles</td>
<td>50</td>
<td>Jackson Park Grove planted.</td>
</tr>
<tr>
<td>1904</td>
<td>Los Angeles</td>
<td>Los Angeles</td>
<td>80.0</td>
<td>Hazard Grove planted.</td>
</tr>
<tr>
<td>1904</td>
<td>Kings</td>
<td>Hanford</td>
<td>5.0</td>
<td>Vokowitch Brothers Grove planted.</td>
</tr>
<tr>
<td>1905</td>
<td>Orange</td>
<td>Garvanza Grove</td>
<td>60.0</td>
<td>Thompson Grove planted.</td>
</tr>
<tr>
<td>1905</td>
<td>San Bernardino</td>
<td>Ontario</td>
<td>50</td>
<td>Ontario Grove planted.</td>
</tr>
<tr>
<td>1905</td>
<td>Yolo</td>
<td>Dunsmuir</td>
<td>600.0</td>
<td>Yolo Hardwood Company planted.</td>
</tr>
<tr>
<td>1905</td>
<td>San Diego</td>
<td>Miramar</td>
<td>10</td>
<td>DeWitt Grove planted.</td>
</tr>
<tr>
<td>1905</td>
<td>Orange</td>
<td>San Diego</td>
<td>84.0</td>
<td>Scripps's Grove of E. corynocalyx planted.</td>
</tr>
<tr>
<td>1905</td>
<td>Los Angeles</td>
<td>Compton</td>
<td>40</td>
<td>Murphy Grove planted.</td>
</tr>
<tr>
<td>1905</td>
<td>Los Angeles</td>
<td>Bakersfield</td>
<td>4.0</td>
<td>Newton Grove planted.</td>
</tr>
<tr>
<td>1905</td>
<td>Alameda</td>
<td>Arden</td>
<td>60.0</td>
<td>Patterson Grove planted.</td>
</tr>
<tr>
<td>1906</td>
<td>San Luis Obispo</td>
<td>Pismo Beach</td>
<td>40</td>
<td>Forty-seven square miles planted.</td>
</tr>
<tr>
<td>1906</td>
<td>Sonoma</td>
<td>Sonoma</td>
<td>84.0</td>
<td>Jack London Grove planted.</td>
</tr>
<tr>
<td>1906</td>
<td>Los Angeles</td>
<td>Compton</td>
<td>50</td>
<td>Stewart Grove planted.</td>
</tr>
<tr>
<td>1906</td>
<td>San Benito</td>
<td>Chittenden</td>
<td>50</td>
<td>St. Francis Springs Grove planted.</td>
</tr>
<tr>
<td>1906</td>
<td>Los Angeles</td>
<td>Compton</td>
<td>40</td>
<td>Steele Grove planted.</td>
</tr>
<tr>
<td>1906</td>
<td>Humboldt</td>
<td>Arcata</td>
<td>20</td>
<td>Zantler Grove planted.</td>
</tr>
<tr>
<td>1906</td>
<td>Los Angeles</td>
<td>Bakersfield</td>
<td>1</td>
<td>Evans Grove planted.</td>
</tr>
<tr>
<td>1906</td>
<td>Kings</td>
<td>Hanford</td>
<td>50</td>
<td>Experimental Forestry Co. planted.</td>
</tr>
<tr>
<td>1906</td>
<td>Orange</td>
<td>Anahiem</td>
<td>20</td>
<td>Eaton Grove planted.</td>
</tr>
<tr>
<td>1906</td>
<td>San Luis Obispo</td>
<td>Callender</td>
<td>50</td>
<td>Wheeler Grove planted.</td>
</tr>
<tr>
<td>1907</td>
<td>Orange</td>
<td>Santa Ana</td>
<td>90</td>
<td>City of Santa Ana planted sewer farm.</td>
</tr>
<tr>
<td>1907</td>
<td>Riverside</td>
<td>Winchester</td>
<td>70</td>
<td>Hull Grove planted.</td>
</tr>
<tr>
<td>1907</td>
<td>Los Angeles</td>
<td>Palos Verdes</td>
<td>70</td>
<td>Rancho Los Cerritos planted.</td>
</tr>
<tr>
<td>1907</td>
<td>San Antonio</td>
<td>Summerland</td>
<td>40</td>
<td>Porter Grove planted.</td>
</tr>
<tr>
<td>1907</td>
<td>Monterey</td>
<td>Pleasent Valley</td>
<td>50</td>
<td>Bowman Grove planted.</td>
</tr>
<tr>
<td>1907</td>
<td>Santa Barbara</td>
<td>Santa Barbara</td>
<td>40</td>
<td>Peabody Grove planted.</td>
</tr>
<tr>
<td>1907</td>
<td>Los Angeles</td>
<td>Los Angeles</td>
<td>70</td>
<td>Angeles National Forest Groves planted.</td>
</tr>
<tr>
<td>1908</td>
<td>Fresno</td>
<td>Huntington Park</td>
<td>40</td>
<td>Rheingans Groves planted.</td>
</tr>
<tr>
<td>1908</td>
<td>Los Angeles</td>
<td>Downey</td>
<td>32</td>
<td>Hough Grove planted.</td>
</tr>
<tr>
<td>1908</td>
<td>Orange</td>
<td>Orange</td>
<td>32</td>
<td>Galbraith Grove planted.</td>
</tr>
<tr>
<td>1908</td>
<td>Santa Barbara</td>
<td>Montecito</td>
<td>5</td>
<td>Turton Grove planted.</td>
</tr>
<tr>
<td>1908</td>
<td>Orange</td>
<td>Orange</td>
<td>70</td>
<td>Way Grove planted.</td>
</tr>
<tr>
<td>1908</td>
<td>San Luis Obispo</td>
<td>Nipomo</td>
<td>1,000.0</td>
<td>Los Barros Forest Co. planted.</td>
</tr>
<tr>
<td>1908</td>
<td>Mendocino</td>
<td>Fort Bragg</td>
<td>50</td>
<td>Union Lumber Co. planted cut-over redwood lands.</td>
</tr>
<tr>
<td>1908</td>
<td>Los Angeles</td>
<td>Downey</td>
<td>15</td>
<td>Downey Grove planted.</td>
</tr>
<tr>
<td>1908</td>
<td>Lake</td>
<td>Clear Lake</td>
<td>15</td>
<td>Central Counties Land Co. Grove planted.</td>
</tr>
<tr>
<td>1908</td>
<td>Tulare</td>
<td>Pixley</td>
<td>5</td>
<td>Beeler Grove planted.</td>
</tr>
<tr>
<td>1908</td>
<td>San Diego</td>
<td>Del Mar</td>
<td>200</td>
<td>Bennett Grove planted.</td>
</tr>
<tr>
<td>1908</td>
<td>Los Angeles</td>
<td>Compton</td>
<td>40</td>
<td>Kellen Grove planted.</td>
</tr>
<tr>
<td>1908</td>
<td>San Antonio</td>
<td>Santa Inez Valley</td>
<td>125</td>
<td>Los Priets National Forest Grove planted.</td>
</tr>
<tr>
<td>1908</td>
<td>San Bernardino</td>
<td>Ontario</td>
<td>1</td>
<td>Ontario Power Co. Grove planted.</td>
</tr>
<tr>
<td>1908</td>
<td>Riverside</td>
<td>Riverside</td>
<td>1</td>
<td>Pacific Electric Co. Grove planted.</td>
</tr>
<tr>
<td>1908</td>
<td>Orange</td>
<td>Orange</td>
<td>80</td>
<td>Varrich Grove planted.</td>
</tr>
<tr>
<td>1909</td>
<td>San Luis Obispo</td>
<td>Morro Bay</td>
<td>70</td>
<td>Hayne Grove No. 1 planted.</td>
</tr>
<tr>
<td>1909</td>
<td>San Luis Obispo</td>
<td>Morro Bay</td>
<td>32</td>
<td>Hayne Grove No. 2 planted.</td>
</tr>
<tr>
<td>1909</td>
<td>San Luis Obispo</td>
<td>Los Barros</td>
<td>50</td>
<td>Fuller &amp; Berkeley Grove planted.</td>
</tr>
<tr>
<td>1909</td>
<td>Riverside</td>
<td>Murrietta</td>
<td>800</td>
<td>Murrieta Eucalyptus Co. planted.</td>
</tr>
<tr>
<td>1909</td>
<td>San Luis Obispo</td>
<td>Callender</td>
<td>20</td>
<td>Havener Grove planted.</td>
</tr>
<tr>
<td>1909</td>
<td>San Diego</td>
<td>Escondido</td>
<td>700</td>
<td>El Cajon Valley Co. planted.</td>
</tr>
<tr>
<td>1909</td>
<td>San Diego</td>
<td>Escondido</td>
<td>700</td>
<td>Eucalyptus Culture Co. planted.</td>
</tr>
<tr>
<td>1909</td>
<td>Butte</td>
<td>Biggs</td>
<td>1,000</td>
<td>Eucalyptus Forest Co. planted.</td>
</tr>
<tr>
<td>1909</td>
<td>Tulare</td>
<td>Pixley</td>
<td>4,200</td>
<td>Eucalyptus Timber Corp. planted.</td>
</tr>
<tr>
<td>1909</td>
<td>San Diego</td>
<td>El Cajon</td>
<td>150</td>
<td>Dare Grove planted.</td>
</tr>
<tr>
<td>1909</td>
<td>San Luis Obispo</td>
<td>Morro Bay</td>
<td>320</td>
<td>Bourne Grove planted.</td>
</tr>
<tr>
<td>1909</td>
<td>Los Angeles</td>
<td>Whittier</td>
<td>450</td>
<td>Breckinridge Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>San Diego</td>
<td>Whittier</td>
<td>114.5</td>
<td>Murphy Oil Co. planted.</td>
</tr>
<tr>
<td>YEAR</td>
<td>COUNTY</td>
<td>TOWN</td>
<td>ACRES</td>
<td>COMMENTS</td>
</tr>
<tr>
<td>------</td>
<td>--------------</td>
<td>--------------------</td>
<td>-------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1910</td>
<td>Los Angeles</td>
<td>Pasadena</td>
<td>13.0</td>
<td>Pasadena Sewer Farm planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Riverside</td>
<td>Perris</td>
<td>40.0</td>
<td>Pepper Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Riverside</td>
<td>Perris</td>
<td>240.0</td>
<td>Pratt Eucalyptus Co. planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Alameda</td>
<td>Oakland</td>
<td>3,000.0</td>
<td>Sykes Grove (Americo Eucalyptus Co.) planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Mendocino</td>
<td>Albion</td>
<td>20.0</td>
<td>Haveras (Mahogany Eucalyptus and Land Co.) planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Tulare</td>
<td>Tulare</td>
<td>1,000.0</td>
<td>Albion Lumber Co. Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Glenn</td>
<td>Willows</td>
<td>840.0</td>
<td>Tulare Forestry Station Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Los Angeles</td>
<td>Callender</td>
<td>320.0</td>
<td>Rosenfeld Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>San Luis Obispo</td>
<td>Callender</td>
<td>80.0</td>
<td>Stratton Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Riverside</td>
<td>Winchester</td>
<td>20.0</td>
<td>South Western Cooperation Land Co. planted.</td>
</tr>
<tr>
<td>1910</td>
<td>San Diego</td>
<td>Escondido</td>
<td>1,830.0</td>
<td>California Eucalyptus Timber — no trees were ever planted.</td>
</tr>
<tr>
<td>1910</td>
<td>San Diego</td>
<td>El Cajon</td>
<td>25.0</td>
<td>Eucalyptus Estates Co. — no trees were ever planted.</td>
</tr>
<tr>
<td>1910</td>
<td>San Diego</td>
<td>Escondido</td>
<td>173.0</td>
<td>Sacramento Valley Eucalyptus Co. — no trees were ever planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Riverside</td>
<td>Eleonore</td>
<td>1,000.0</td>
<td>The Forest Syndicate of San Francisco planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Riverside</td>
<td>Perris</td>
<td>5,000</td>
<td>Sacramento Valley Improvement Co. planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Solano</td>
<td>Elims</td>
<td>840.0</td>
<td>Sacramento Valley Timber and Land Co. planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Solano</td>
<td>Suisun City</td>
<td>1,280.0</td>
<td>United States Timber Co. planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Sonoma</td>
<td>Lawndale</td>
<td>183.0</td>
<td>North American Hardwood Timber Co. planted.</td>
</tr>
<tr>
<td>1910</td>
<td>San Luis Obispo</td>
<td>Callender</td>
<td>40.0</td>
<td>Forward Movement Syndicate planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Stanislaus</td>
<td></td>
<td>75.0</td>
<td>Bigger Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Yolo</td>
<td></td>
<td>840.0</td>
<td>Simpson Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>San Diego</td>
<td>El Cajon</td>
<td>25.0</td>
<td>U.C. Davis Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>San Diego</td>
<td>Escondido</td>
<td>173.0</td>
<td>Saddler Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>San Diego</td>
<td>El Cajon</td>
<td>25.0</td>
<td>Over Tract Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>San Diego</td>
<td>El Cajon</td>
<td>25.0</td>
<td>Parker Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Riverside</td>
<td>El Cajon</td>
<td>1,000.0</td>
<td>Pratt Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Riverside</td>
<td>El Cajon</td>
<td>1,000.0</td>
<td>McChlary Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Riverside</td>
<td>El Cajon</td>
<td>1,000.0</td>
<td>Marshall Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>San Benito</td>
<td>Chittenden</td>
<td>800.0</td>
<td>Forestry Cooperation Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Marin</td>
<td></td>
<td></td>
<td>Angel Island Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Los Angeles</td>
<td>Puente</td>
<td>50.0</td>
<td>Malcolm Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>San Luis Obispo</td>
<td>Callender</td>
<td>40.0</td>
<td>Lukens Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Ventura</td>
<td>Piru</td>
<td>140.0</td>
<td>Riggle Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Monterey</td>
<td>Prunedale</td>
<td>82.0</td>
<td>Rice Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Fresno</td>
<td>Fresno</td>
<td>3,000.0</td>
<td>Firth Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Santa Cruz</td>
<td>Watsonville</td>
<td>25.0</td>
<td>Hoppeli Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Santa Barbara</td>
<td>Lompoc</td>
<td>17.0</td>
<td>Yolo Eucalyptus Company planted.</td>
</tr>
<tr>
<td>1910</td>
<td>San Bernardino</td>
<td>San Bernardino</td>
<td>3,600.0</td>
<td>Hardenbrook Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>San Luis Obispo</td>
<td>Callender</td>
<td>40.0</td>
<td>Rutherford Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Fresno</td>
<td>Fresno</td>
<td>3,000.0</td>
<td>Eaton (of Chicago) Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>San Luis Obispo</td>
<td>Calaveras</td>
<td>40.0</td>
<td>Owners unknown.</td>
</tr>
<tr>
<td>1910</td>
<td>Yolo</td>
<td>Dunnigan</td>
<td>120.0</td>
<td>Yolo Eucalyptus Company planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Solano</td>
<td>Vacaville</td>
<td>180.0</td>
<td>McCracken Grove planted.</td>
</tr>
<tr>
<td>1910</td>
<td>Monterey</td>
<td>Elkhorn Slough</td>
<td>15.0</td>
<td>Johnson Grove planted.</td>
</tr>
<tr>
<td>1911</td>
<td>San Luis Obispo</td>
<td>Callender</td>
<td>40.0</td>
<td>Jamecon Grove planted.</td>
</tr>
<tr>
<td>1911</td>
<td>Alameda</td>
<td>Berkeley</td>
<td>9.0</td>
<td>East Bay Water Co. planted.</td>
</tr>
<tr>
<td>1911</td>
<td>San Luis Obispo</td>
<td>Guadalupe</td>
<td>20.0</td>
<td>Brintnell Grove planted.</td>
</tr>
<tr>
<td>1911</td>
<td>Riverside</td>
<td>Winchester</td>
<td>65.0</td>
<td>Bendixen Grove planted.</td>
</tr>
<tr>
<td>1911</td>
<td>San Bernadino</td>
<td>Del Rosa</td>
<td>95.0</td>
<td>Del Rosa Forestry Station planted.</td>
</tr>
<tr>
<td>1912</td>
<td>Riverside</td>
<td>Perris</td>
<td>15.0</td>
<td>Stone Grove planted.</td>
</tr>
<tr>
<td>1912</td>
<td>San Luis Obispo</td>
<td>Guadalupe</td>
<td>15.0</td>
<td>Brintnell Grove No. 2 planted.</td>
</tr>
<tr>
<td>1912</td>
<td>San Luis Obispo</td>
<td>Guadalupe</td>
<td>1,000.0</td>
<td>Brinnewall Grove No. 3 planted.</td>
</tr>
<tr>
<td>1912</td>
<td>Riverside</td>
<td>Perris</td>
<td>5.0</td>
<td>Sherman Grove planted.</td>
</tr>
<tr>
<td>1912</td>
<td>San Diego</td>
<td>Lake Isle</td>
<td>2,000.0</td>
<td>San Diego Eucalyptus Co. planted.</td>
</tr>
<tr>
<td>1913</td>
<td>Monterey</td>
<td>Monterey</td>
<td>300.0</td>
<td>Monterey Investment Co. planted.</td>
</tr>
<tr>
<td>1914</td>
<td>San Mateo</td>
<td>El Granada</td>
<td>320.0</td>
<td>Goldberg Grove.</td>
</tr>
<tr>
<td>1914</td>
<td>Ventura</td>
<td>Carmelito</td>
<td>10.0</td>
<td>Neil Windbreak planted.</td>
</tr>
<tr>
<td>1914</td>
<td>San Luis Obispo</td>
<td>Morro Bay</td>
<td>10.0</td>
<td>Helm Grove planted.</td>
</tr>
<tr>
<td>1914</td>
<td>Ventura</td>
<td>Carmelito</td>
<td>5.0</td>
<td>Ameil Grove planted.</td>
</tr>
<tr>
<td>1914</td>
<td>Humboldt</td>
<td>Arcata</td>
<td></td>
<td>Burchard Grove planted.</td>
</tr>
<tr>
<td>1914</td>
<td>Santa Barbara</td>
<td>Montecito</td>
<td></td>
<td>Gould Windbreak planted.</td>
</tr>
<tr>
<td>1917</td>
<td>Sonoma</td>
<td>San Rafael</td>
<td>1.0</td>
<td>Rose Land Co. planted.</td>
</tr>
<tr>
<td>1917</td>
<td>Los Angeles</td>
<td>San Marino</td>
<td></td>
<td>Huntington Gardens planted.</td>
</tr>
<tr>
<td>1929</td>
<td>Los Angeles</td>
<td>Los Angeles</td>
<td></td>
<td>U.C.L.A. planted groves on campus.</td>
</tr>
<tr>
<td>1930</td>
<td>Los Angeles</td>
<td>Los Angeles</td>
<td></td>
<td>Joseph R. Knowld State Park Grove planted.</td>
</tr>
<tr>
<td>1936</td>
<td>Alameda</td>
<td>Oakland</td>
<td></td>
<td>Corralitos Creek Project planted.</td>
</tr>
<tr>
<td>1937</td>
<td>Santa Cruz</td>
<td>Watsonville</td>
<td>120.0</td>
<td>Highway Department planted from Gaviota to Ventura</td>
</tr>
<tr>
<td>1940</td>
<td>Santa Barbara</td>
<td></td>
<td></td>
<td>Forty-five rows of trees set out at Huntington Gardens.</td>
</tr>
<tr>
<td>1942</td>
<td>Los Angeles</td>
<td>San Marino</td>
<td></td>
<td></td>
</tr>
<tr>
<td>YEAR</td>
<td>COUNTY</td>
<td>TOWN</td>
<td>ACRES</td>
<td>COMMENTS</td>
</tr>
<tr>
<td>------</td>
<td>------------</td>
<td>------------</td>
<td>-------</td>
<td>----------</td>
</tr>
<tr>
<td>1953</td>
<td>Alameda</td>
<td>San Jose</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1957</td>
<td>Yolo</td>
<td>Davis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1959</td>
<td>Los Angeles</td>
<td>Santa Anita</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1960</td>
<td>Alameda</td>
<td>San Jose</td>
<td>4.0</td>
<td>State Highway Department planted 5 miles of road.</td>
</tr>
<tr>
<td>1961</td>
<td>Shasta</td>
<td>Anderson</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1961</td>
<td>Contra Costa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1961</td>
<td>Mendocino</td>
<td>Ukiah</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1961</td>
<td>Del Norte</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1963</td>
<td>Mendocino</td>
<td>Albion River area</td>
<td>256.0</td>
<td></td>
</tr>
<tr>
<td>1966</td>
<td>Santa Clara</td>
<td>Ed. R. Levin Park</td>
<td>10.0</td>
<td></td>
</tr>
<tr>
<td>1979</td>
<td>Contra Costa</td>
<td>Concord</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>1983</td>
<td>Shasta</td>
<td>Anderson</td>
<td>1.5</td>
<td>Hackett Grove planted.</td>
</tr>
<tr>
<td>1983</td>
<td>Shasta</td>
<td>Anderson</td>
<td>1.5</td>
<td>Merrifield Grove planted.</td>
</tr>
<tr>
<td>1983</td>
<td>Shasta</td>
<td>Anderson</td>
<td>2.0</td>
<td>Short Grove planted.</td>
</tr>
<tr>
<td>1983</td>
<td>Shasta</td>
<td>Anderson</td>
<td>1.0</td>
<td>Tranerry Grove planted.</td>
</tr>
</tbody>
</table>