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Keywords: wine history, agricultural commodity chains, farm organization, California agriculture.

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Wine production in Europe today is dominated by small family vineyards and co-operative wineries, while in the New World viticulture and viniculture is highly concentrated and vertically integrated. This paper argues that in California these organisational differences have historical explanations. Technological change radically altered the nature of the world's wine industry before 1919, and in particular allowed the commercial production of drinkable table wines in geographical regions which previously had been considered too difficult. New production technologies also provided the opportunity for greater economies of scale and vertical integration. As technological change endangered existing rents, growers, wine-makers, and merchants lobbied governments to introduce laws and create new institutions that regulated markets in their favour. In Europe the political influence of the hundreds of thousands of small growers forced their governments to intervene in markets to protect their interests and restrict the economic power of merchants. By contrast, in California the potential electoral vote of the growers was much smaller, and the large distances between the best land for vines and the major urban markets encouraged San Francisco's merchants to integrate horizontally and vertically. Attempts by grape-growers and wine-makers to oppose this move and deal directly with the East Coast merchants, thereby excluding the local merchants, failed.

Despite a number of early attempts such as by the French Huguenots in Florida or the British settlers in Virginia, wine-making was commercially irrelevant virtually everywhere in the New World until the mid-nineteenth century. The major problems facing the industry included the very low population densities in the future areas of specialized viticulture; the huge distances between these areas and population centres; the complexity of choosing the correct European vines to the very different conditions in the New World; and the universally poor quality of the wines produced. Despite some contemporaries' hopes during the second half of the nineteenth century, especially during the wine shocks caused by powdery mildew and phylloxera, that they would be able to supply Europe with cheap beverage wines, the reality was that the New World wine industry in this period remained one of import substitution. Tariffs allowed wine production to grow rapidly in the New World in the thirty or forty years prior to 1914, by which time Argentina had become the world's seventh largest producer, Chile the ninth, the United States the tenth, and Australia, the eighteenth.

The very different factor endowments of the New World implied that the wine industry developed its own style and characteristics. In particular, growers had to adapt to very different factor endowments as, unlike their European counterparts, they were blessed with potentially large areas of cheap land suitable for the vine, but an acute shortage of labour. Wages for unskilled labour in France in 1910 for example were only 75 per cent of those found in Argentina, 52 per cent of levels in Australia, and 42 per cent in the United States.[1] Capital markets were weak for wine producers everywhere, although by the late nineteenth century these favoured the New World capitalists more than the small scale European producers. New World producers also faced the additional problem in that they needed to create a mass market for wines as many inhabitants, especially in the United States and Australia, were traditionally not wine drinkers. In this respect they faced similar marketing problems as those European producers who tried to sell their wines in distant, non-producer countries such as Britain. While per capita wine consumption in Argentina in 1914 was not so different from levels found in countries such as Spain and Portugal, in the United States it remained considerably lower and little more than in Britain. This was not because wine producing technologies and marketing methods were superior in Argentina, but rather because a considerably higher percentage of their population and therefore potential consumers originated from wine drinking nations.

This paper considers three inter-related problems which the industry needed to resolve in the 1880s. Production was still essentially small scale and using grape growing and wine-making techniques which were more suited to northern Europe, and which resulted in the production of poor quality wines which did not keep for long. Second, while many growers were ignorant of the subtleties of grape and wine-making, most of their potential consumers were also unacquainted with how good wines should taste. The task of improving production technologies, and educating drinkers was inter-related.[2] Finally, production in California was located at a considerable distance from the main

[1] (Williamson 1995), pp.178-81. Figures are for unskilled urban building workers.
[2] The situation was repeated after Prohibition. See especially (Lapsley 1996).

markets on the East Coast. Wine drinkers on the East Coast had been traditionally been served by European imports, and a distribution network was already established, and East Coast bottlers looked to California for bulk wine which they then sold under their own brands. They tried to resist attempts by Californian producers to control the commodity chain for themselves. After a brief long-run survey of the industry, the paper is organized in three sections. The first shows that despite very different factor endowments, small growers predominated in California just as they did in Europe; the second considers technological transfer from Europe and the developments in grape and wine production; and the final section shows how the problems of marketing and the fight against fraud and adulteration, which led to a struggle between the wine-makers and San Francisco's merchants for control of the industry, and the creation of the world's largest, vertically integrated wine company, the California Wine Association.

1. Californian wine in the nineteenth century

The early history of wine in the United States was very different on the East coast to that of the West. The attempts to plant European vines (*Vitis vinifera*) on the East coast failed, sometimes because of the excessively harsh winters for the cold-sensitive European vine; on other occasions because of endemic cryptogrammic diseases, such as downy and powdery mildew, anthracnose, black rot, etc., which thrived in areas of high humidity; and sometimes because of the native root louse, phylloxera.[3] From the late eighteenth century a number of new vines appeared east of the Rockies, which were either domestications of native American species (*V.labrusca* and *V.rotundifolia*), or naturally occurring hybrids between American and European varieties, such as Concord or Catawba. These varieties were often resistant to the fungus diseases and could withstand the harsh winters, but produced a strong disagreeable 'foxy' flavour in the wine. Some of the *labrusca* hybrids were also not very resistant to phylloxera. As the grapes were naturally low in sugar and high in acidity, sugar and water were added, although by the second half of the nineteenth century merchants could also blend these wines with those produced in California.

[3] (Amerine 1981), pp.1-3, on which this paragraph is based.

Viticulture was introduced into Baja California by the missions, the first of which was founded in San Diego in 1769, although the earliest reference to the planting of grapes dates from 1779, at San Juan Capistrano mission.[4] The grape used was the Mission, a European vine which produced a dry wine of poor quality, but an acceptable sweet one. After the missions were secularized in 1833, the vineyards became neglected and abandoned. Although privately owned vineyards began to appear as early as 1818, the size of the industry was kept small by California's very limited population, just 14,000 inhabitants on the eve of the gold rush. By 1852 it had jumped to a quarter of a million, and as powdery mildew hit Europe's vineyards, the *California Farmer* declared in 1855 that 'California may become the vineyard of the world', and the California Horticulture Society noted that the State possessed ten million acres of potential vineyards, and that in Europe the wine industry employed directly and indirectly five million people.[5] Viticulture grew rapidly, so that while the United States imported about thirty-eight times more wine than it produced in 1840, by 1886 the amount of domestic wines consumed was nearly four times as great as the wine imported.[6] California wine output quadrupled between 1866/9 and 1883/6, doubling again by 1898/01, and once more a decade later in 1909/12 (Table 1 and Figure 1). On the eve of the First World War output stood at 2.16 million hectolitres, of which 44 per cent was dessert wine (wines which had been fortified with brandy), and 56 per cent ordinary beverage wines.[7] By 1913, California had 134 thousand hectares of grapes, 69 thousand of which were for wine, 45 thousand for raisins, and 20 thousand for table grapes. It was estimated that 15,000 heads of families were directly engaged in viticulture, with many more being employed in wine-making and ancillary industries.[8] The United States, or essentially California, had gone from producing virtually no wine to producing as much as a country such as Germany. Although the increase in production was reasonably constant and faster than population growth, the industry experienced some very sharp cyclical fluctuations in its prosperity.

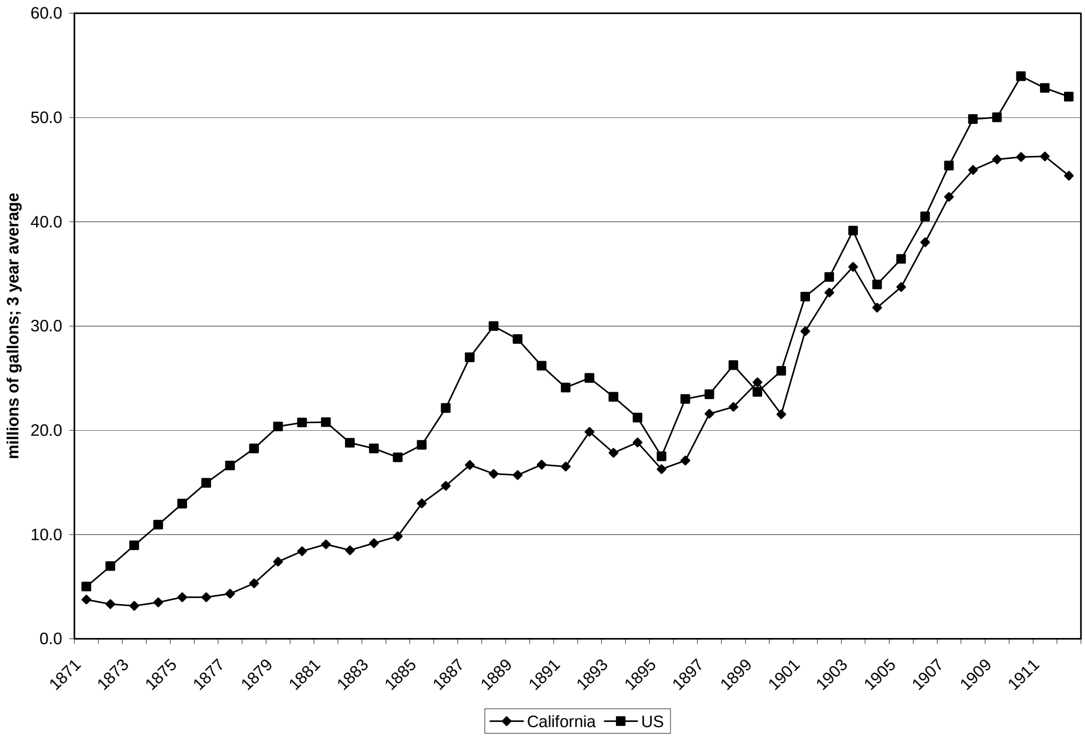
[4](Pinney 1989), p.238, who also argues that viticulture probably was not practiced before this date.
[5] (Leggett 1941), p.68, and (Pinney 1989) (1989, p.262).
[6] (Peninou, Unzelman, and Anderson 1998) pp.255-6 and (Crampton 1888), p.184.
[7] Beverage wines are often referred to in the literature as 'dry', and fortified wines as 'sweet'.
[8] (California and Board of State Viticultural Commissioners 1914), pp.2 and 4.

Table 1
Production of wine in California[9]

	Area of vines hectares	Wine production 000s hectolitres	Yields Hectolitres / hectare
1880	14,575	297	20
1890	36,539	621	17
1900	34,818	1,052	30
1910	58,704	1,751	30

Figure 1

US and California wine production, 1871-1912[10]



[9] Area of vines, (Sullivan 1998), p.48. These estimates exclude the area for table grapes and raisin. Figures are very approximate. See also (Peninou, Unzelman, and Anderson 1998). Production: five year averages; (California. State Board of Agricultural 1912), p.191 and (California. State Agricultural Society 1915), p.139.

[10](United States. Dept. of 1916), p.701, (California. State Board of Agricultural 1912), pp.191 and 199 and (California. State Agricultural Society 1915), pp.139 and 142.

2. Viticulture in a land abundant and labour scarce economy

In the nineteenth century most European vineyards were small in size and scattered around fairly heavily populated villages. Vines were usually worked by their owners and the use of wage labour was rare except for the harvest. The growth of large-scale viticulture in the Midi (and Algeria) provides an important exception, but the heavy demand for skilled, seasonal wage labour reinforced the economic viability of the small family farm, rather than eliminating it.[11] The problem facing growers in the New World were very different, as not only were population densities considerably lower than in Europe, but the local population was unaccustomed to viticulture and wine-making. Furthermore viticulture was risky, and the four or five year delay after planting before the first harvest discouraged the commercial production of grapes. In California the main centre of production was originally around Los Angeles where the Mission grape was found, a grape suited for the production of fortified sweet wines in the hot southern climate, especially when wine-making skills were poor, but not for fine wines. However, the major market was considerably further north in San Francisco, and this geographical separation created considerable marketing problems for growers. The population of Los Angeles, which increased from just 1,610 inhabitants in 1850 to 11,183 as late as 1880, was very small compared to San Francisco, which saw its population increase from 34,776 to 233,959 between the same dates.[12]

As the population increased rapidly, so too did the demand for wines. Imported wine from Europe was very expensive, especially before the transport improvements of the second half of the century. Instead, a number of attempts were made by merchants to increase the supply of local wine by attracting growers who would plant vines. Perhaps the first was the firm Kohler & Frohling which dominated the Los Angeles wine trade in the mid 1850s, and which bought and crushed grapes produced on some 142 hectares of vineyards each year.[13] To increase local wine supplies further, Kohler and Frohling, together with two other promoters, established a co-operative at Anaheim, some 32 kilometres south of Los Angeles. The co-operative allocated fifty plots of eight hectares

[11] (Simpson forthcoming)
[12] (Carter et al. 2006), vol.1, p.110.
[13] Although others grew the grapes and often owned the winery, it was Kohler & Frohling's workers who were responsible for the harvest and making the wine. (Pinney 1989), pp.254-6, for a description of their wine making activities. See also (Carosso 1951)

for settlers, and set aside more land for housing, schools and other public uses. Between 1857 and 1859, the society paid $20,000 for 22,789 days of field work in the preparation of the vineyards, fencing and digging irrigation ditches. The vine-growers were from Germany, and they continued to live and work in San Francisco while the preparatory work was being carried out. They were a diverse group, but with little or no practical knowledge of grape growing. Once the vineyards were established, the co-operative was ended and soon there were 47 individual winemaking properties, although the colony maintained a strong communal spirit. A further 600 hectares were added in the early 1870s to meet the needs of the rising population, with most of it being planted with vines. Initially Kohler and Frohling purchased almost exclusively all the wine, and output jumped from 11 thousand hectolitres in 1864 to 47 thousand in 1884. This however was the last good harvest before a mysterious new vine disease, subsequently named Pierce's disease, killed virtually all the vines, forcing the growers to switch to walnuts and oranges instead.[14]

The rapid growth of San Francisco following the gold rush also encouraged merchants to search for local supplies of wine, the most important perhaps being the Italian-Swiss Colony. This was originally conceived as a grape growing co-operative, ostensibly to solve unemployment problems among Italian and Italian-Swiss in the city.[15] Its founder was Andrea Sbarboro, a native of Genova and he proposed to pay the workers part of their wages in company shares, making them partners in the project. In 1881 some 600 hectares of land were bought north of Sonoma in a village named after the Piedmont wine town of Asti. As a co-operative, the scheme failed as the workers rejected their shares and insisted on receiving full wages, so the business was run as a joint stock company, but with a strong paternalistic tendency.[16] The Italian-Swiss Colony prospered at wine making, and integrated forward into distribution, selling its chianti type wine in raffia covered bottles imported from Italy, under its 'Tipo' label. The driving force behind the Colony was a Piedmontese chemist, Pietro Rossi, who was one of the first to establish a laboratory in a Californian winery to control wine quality. Although the Italian-Swiss Colony lost its independence as a marketing agency in 1898 when it was

[14] (Carosso 1951), pp.60-7 and (Pinney 1989), pp.285-94.
[15] (Palmer 1965), p.251-75.
[16] (Pinney 1989), p.328.

forced to sell half its stock to the California Wine Association, it continued to prosper, and by 1911 had an annual output of 225 thousand hectolitres from eight different wineries.[17]

There were also a number of very large private estates. One of the first was Agoston Haraszthy's Buena Vista vineyard, where in the late 1850s cellars were dug over 70 metres into the hillsides, and by the early 1860s there were over 160 hectares of vines. Haraszthy believed it to be the largest vineyard in the United States, although he was forced to look for outside capital and the whole project failed shortly afterwards.[18] The Buena Vista was relatively modest compared to Leland Stanford's Vina Ranch located between Red Bluff and Chico, which had 1,450 hectares under vines by 1887, although all the 64 thousand hectolitres of wine produced in 1890 had to be distilled because of its poor quality.[19] Stanford's original purpose was to produce a cheap light dry wine, but the land was too fertile and climate too hot, and instead it specialised in the production of brandy and sweet wines, with the brandies winning a high reputation.[20] Other large vineyards included the Italian Vineyard Company, that had 800 hectares of vines in a single field near Cucamonga in the early 1890s, and the Riverside Vineyard Company with 1,000 hectares of vines.[21]

The labour requirements for planting new vineyards, constructing wineries and cellars, and building roads were immense. New investment came in waves at times of high wine prices during the short periods of rapid expansion. For example, between 1877 and 1887, California's production jumped from 150 thousand hectolitres to 579 thousand, and in Napa alone the number of wineries increased in ten years from 49 (in 1881) to 166 (in 1891).[22] In 1889 Edward Roberts estimated that the 5,000 vineyards or so in California employed some 30,000 to 40,000 men in 'cultivating, picking, storing, pressing bottling and in otherwise caring for the crop and preparing the wine for the

[17] Rossi was behind the rival California Wine-Makers' Corporation which failed that year. Rossi became a director of the CWA. See below.
[18] (Pinney 1989), p.277.
[19] (Pinney 1989) pp.321-5. The Vina Ranch became part of the endowment of Stanford University and was eventually sold and the vines were uprooted.
[20] (Husmann 1899) p.561.
[21] (Husmann 1903), p. 417.
[22] (Heintz 1977), pp.16 and 18.

consumers'.[23] Until the last decade or so of the nineteenth century, a significant part of this labour force was provided by Chinese.

The Chinese, at least initially, had a reputation as being cheap, hard working, and quick to learn, and by the late 1880s had come to dominate the State's wine labour market. Controversy had surrounded the use of Chinese labour from the beginning, but it was widely recognized that some form of cheap labour was required if California was going to develop its huge agricultural potential. Both Haraszthy and Stanford used large quantities of Chinese on their huge estates. However, the passing of the Chinese Exclusion Act of 1882, which both restricted the entry of new Chinese and prohibited the naturalization of those that had arrived, together with the growing hostility towards them, effectively ended the flow of new immigrants, and the Chinese population in California dropped from 75 thousand in 1880 to 46 thousand by 1900.[24] The problem was especially acute on the large estates, and one contemporary suggested that growers were in the same predicament as the cotton planters had been after Civil War, and believed that many of the vineyards would also end up being subdivided and worked as small farms.[25] By the late 1880s Chinese labour had become scarce, and no longer considered cheap, and growers looked to a new group of immigrants – the Italians, who sometimes also brought vine growing skills with them. Between 1890 and 1910 California's Italian population quadrupled from 15 thousand to over 60 thousand.

From the start, California's large vineyards and wineries were designed to save on labour costs. To facilitate cultivation, vines were often located on the plain, and planted in long straight rows. The rich soils had the potential advantage of producing higher yields than on the hillsides, a fact which growers exploited as the price differential between the shy and heavy bearers was not sufficient in most areas to encourage the production of fine wines. With about 2,500 to the hectare, vineyards were extensively planted compared to most of those found in Europe, and the two wide rows of between 2.1 and 2.4 metres each, allowed a horse to plough with two or three furrows in both directions. By the end of the century this had changed so that in most modern vineyards the vines were being planted with one row about 1.8 metres wide, and the other diagonal

[23] (Roberts 1889), cited in (Heintz 1977), p.36.
[24] (Heintz 1977), p.50.
[25] (Hilgard 1884), p.5.

row 3 metres, permitting the use of double plough teams on the wider row.[26] The rapidly growing farm implements business of California led to new specialized equipment being produced for the vine, including gang ploughs with up to four shares to stir the middle of the row. A variety of methods of training the vines were adapted, but not those that which obstructed cultivation such as were in 'vogue in Germany, France and other countries'.[27] According to the historian Vincent Carosso, viticulture in California actually used less labour per hectare than 'many other crops'.[28] By the turn of the century a single man was able to work a good, well-cultivated vineyard in full production of eight hectares, with hired labour needed only for the harvest.

The early 1880s saw a rapid increase in the construction of commercial wineries, using designs to save on the use of labour. They were cut deep into the hillsides and grapes were taken by horses and wagons to the top floor for crushing. Where this was not possible, grapes were moved by an elevator. Gravity brought the juice to the fermenting vats, and finally to the bottom of the winery to mature.[29] Hand pumps were labour intensive, and wine-makers started investing large sums at the turn of the century to introduce gasoline and then electricity generators. Pumping was crucial, not just to move wine from one barrel to another, but also to pump cool water through copper tubes to reduce the temperature of the fermenting must.[30]

Yet although California had a number of very large vineyards, the vast majority of them were small, family farms, and many growers used part of their land and labour for other activities.[31] George Husmann in his *Grape culture and wine making in California* (1888) noted that:

> We have thousands, perhaps the large majority of our wine growers, however, who are comparatively poor men, many of whom have to plant their vineyards, nay, even clear the land for them with their own hands, make their first wine in a wooden shanty with a rough lever press, and work their way up by slow degrees to that competence which they hope to gain by the sweat of their brow. Of these, many bring but a scanty knowledge to their task ….[32]

[26] (Husmann 1896), p.194. See also Charles Krug in RBSVC for 1887, p.45. The density of vines was still almost double what it would be in 1970. James Lapsley, private communication.
[27] (Husmann 1896), p.219.
[28] (Carosso 1951), p.19.
[29] (Heintz 1999), p.102.
[30] (Heintz 1999), p.211
[31] (Pinney 1989), p.337.
[32] (Husmann 1888), p.iii.

Table 2

Vineyards and wineries in Napa and Sonoma, 1891[33]

Size of holdings in hectares	Number of holdings	Total area of vines in hectares	% of all vines in this category	Number of wineries	% of holdings with winery	Hectares per winery
0 – 4	398	1252.6	7.7	26	6.5	48
4 – 8	445	2947.0	18.2	56	12.6	53
8 -16	311	3843.7	23.7	88	28.3	44
16 – 25	100	2134.4	13.2	32	32.0	67
25 +	120	6033.6	37.2	82	68.3	74
Total	1374	16211.3	100.0	284	20.7	57

In 1889 there were an estimated 65,000 hectares of vines and 5,000 growers producing grapes for both wine and the table, giving an average holding of 13 hectares.[34] When wine production alone is considered then the detailed survey of 1891 shows that there were approximately 2,750 growers with more than two hectares (five acres) of vines covering an area of thirty five thousand hectares.[35] For Napa and Sonoma, which at this time accounted for 46 per cent of the area of California's vines destined to wine production, the average holding was 12 hectares, slightly less than the State average of 13 hectares. In these two counties, there were 531 holdings larger than eight hectares, but these accounted for three-quarters of all the vines, and the largest 220 with more than 16 hectares occupied half the total area (Table 2). In total, there were 41 vineyards with more than 50 hectares (125 acres) representing a fifth of the total area, and 85 per cent of

[33] (California. Board of State Viticultural Commissioners 1891). My calculations.
[34] (Roberts 1889), p.199. The figure includes vines for table grapes and raisin. (Sullivan 1998) gives a figure of 36,500 hectares for vines at this time.
[35] (California. Board of State Viticultural Commissioners 1891) The figures in this source are approximate with the size of many vineyards being rounded to 10, 15, 20 acres, etc. Only on occasions are holdings given as having young vines not yet in production (which have been excluded from Table 2). Clearly some growers switched between producing grapes for the table or for wine according to market prices.

them had their own wineries.[36] At the other extreme, 61 per cent of holdings accounted for 26 per cent of the vines, but only one in ten had their own wineries. If growers with less than two hectares are included, then the extremes in property ownership are even greater. In Sonoma for example, there were 9,068 hectares of vineyards cultivated in 815 holdings of over two hectares, but these statistics exclude 'at least five hundred acres of small vineyards of less than five acres (two hectares), planted for family use'.[37]

The advantages of the family grape producing farm – low monitoring and supervision costs associated with labour, and the absence of incentives for land abuse – was accompanied by the growers' limited ability to take advantage of the growing economies of scale in wine-production and their weakness in selling their produce. When production was simply for local consumption, these problems were unimportant for family growers. However, the rapid growth in California's wine production after 1880 was not based on the expansion of rural, local markets, but rather with urban demand, especially in distant markets of New York, Chicago, and New Orleans (see below). The different advantages associated with the small family grape producer and large wine-making facilities were appreciated by Percy T. Morgan, the manager of the California Wine Association which, as we shall see, was the world's largest wine company at this time. Morgan, while noting in 1902 that merchants at that time were organizing 'great vineyard companies with ample capital for the laying out and the planting of vast tracts of wines grapes' went to on to note:

> But it is not from these great tracts that the larger portion of the tonnage for wine purposes will be derived. It is from the small vineyardist, cultivating from ten to fifty acres (four to twenty hectares); cultivating and looking after his lands individually, and thereby obtaining from 30% to 50% more tonnage to the acre than is possible from the great vineyard tracts, that the very remunerative results will accrue.[38]

Morgan exaggerated the competiveness of the small farm, perhaps in part because his organisation would benefit most from an increase in the supply of grapes, but also because the support of grape producers, as numerically by far the largest sector of the industry, helped justify the CWA's demands for import protection and Federal legislation

[36] Tulveay Vineyard is excluded as no information is provided concerning whether it had wine-making facilities or not.
[37] (De Turk 1890) p.45.
[38] (Morgan 1902), p.95, which reproduces an earlier article in the *Sacramento Bee*.

to control adulteration and fraud. However there was no doubting that by the turn of the twentieth century the production of ordinary, standard wines (as oppose to fine wines) were best and most economically made in very large wineries.[39] Change was happening fast, and although the 1891 survey reports over 600 wineries, Edward Adams wrote a few years later that there were only between 200 and 300 wine-makers that were ‘equipped with the plant necessary to produce good wine on any commercial scale’.[40] The *Pacific Wine and Spirits Review* also noted that if previously nearly every vineyard had had its own fermenting house and storage cellar, by 1900 most growers sold their grapes to wine-makers, ‘except to a limited extent in some of the older districts’.[41] By contrast the production of fine wines, as authors such as Husmann and Bioletti insisted, were best made in smaller cellars, ‘under the constant, watchful supervision of the proprietor, who must himself be an expert connoisseur in wines and must know just how to handle the product at every stage during, as well as after, its manufacture’.[42] However these accounted for perhaps five per cent of the State’s production at the most. As economies of scale appeared in wine-making, new forms of organisation were required both to supply the grapes to wineries and to sell the much greater quantities of wine produced (section 4).

3 Learning to grow grapes and make wine

When the early settlers turned to viticulture in the Los Angeles region in the 1850s and 1860s, they found an adequate supply of fertile land, a disease free environment, and the Mission grape, which was cheap and easily to cultivate. Wine production could not have been easier, as George Husmann noted in 1883:

> The very ease of the pursuit, which allowed any one, even with the simplest culture and the most common treatment, to raise a fair crop and make a drinkable wine, has led many, in fact a large majority, to embark in grape growing who knew but little about it, and did not try to learn more.[43]

[39] (Bioletti 1909), p.384.
[40] (Adams 1899), p.520.
[41] (*Pacific Wine & Spirits Review*)(December, 1906), p.43.
[42] (Husmann 1899), p.559.
[43] (Husmann 1883), p.iv.

Husmann continued, however, by noting that ‘easy as are grape culture and wine making here, there is a vast field for improvement; and nowhere else perhaps are rational knowledge and proper skills more needed’.[44] The task of producing a good wine in a hot climate that could be sold in distant markets was considerable, and involved more than simply changing the primitive methods of crushing grapes, or the lack of proper cellars. Growers such as Antoine Delmas, Charles Lefranc and Emile Dresel brought large quantities of cuttings in an attempt to find a more suitable grape variety than the Mission. The most publicized journey however was that which the Hungarian immigrant Agoston Haraszthy made in 1861, and who claimed to have collected in Europe 1,400 different grape varieties – perhaps 300 was more likely - and had 100,000 cuttings and rooted vines sent to his Buena Vista vineyard and winery at Sonoma.[45] Growers’ resistance to change in those areas already planted was, as a number of writers noted, eroded by the spread of phylloxera that destroyed large numbers of Mission vines, which otherwise might have remained in production. The relative importance of the Mission variety also declined as growers started new vineyards using other varieties. According to Agoston Haraszthy’s son, Arpad, if the Mission variety accounted for about 80 per cent of California’s vine stock as late as 1880, by 1890 an estimated 90 per cent of the state’s wine grapes were of ‘the best foreign varieties’.[46] However the transformation had only just started, as growers had now not only to match the right grape varieties with the soil and climatic conditions on each individual vineyard, a process that had evolved over centuries in Europe, but also to discover the best phylloxera resistant American rootstock for the European vines. As Professor (later Dean) Eugene W Hilgard of the University of California’s College of Agriculture noted in 1884, ‘among the most important and at the same time most difficult questions still to be settled for California viticulture, is the special adaptation of grape-varieties to local climates and soils, and to desirable blends;

[44] (Husmann 1883), p.iv.
[45] (Pinney 1989), p.279. The vineyard failed because the vines were too close, the unsuccessful attempts at producing sparkling wines, and the appearance of phylloxera. (Amerine 1981), p.9. Agoston Haraszthy was proclaimed by the state the ‘father’ of California viticulture in 1946 but Thomas Pinney, amongst others, has challenged some of his supposed successes, showing that he was not the first to bring superior grape varieties to California (Jean Louis Vignes and the firm Kohler & Frohling had played an important role in doing this prior to Haraszthy), or to have introduced the Zinfandel grape. (Pinney 1989), (pp. 263 and 184) and (Sullivan 2003), especially chapter six.
[46] Haraszthy, cited in (Carosso 1951), p.132.

and before these points are settled, many heavy losses and disappointments will be sustained.'[47] As we have seen for Europe, there were economic incentives for growers to prefer grape varieties that were high yielding, rather than those that produced fine wines.

If the growing of grapes in a hot climate was easier than in cooler regions such as Champagne or Burgundy, wine-making presented considerably more problems. These difficulties were compounded by the fact that wine-makers in Europe were only just beginning to resolve the problems themselves. The first obstacle in California was the lack of practical knowledge about wine-making. As most Europeans – and all Germans – picked their grapes as late as possible, many Californian wine-makers initially did the same. Late picking maximizes the grape's sugar content, an important consideration in northern Europe, but hardly a problem in the Los Angeles region, or indeed anywhere else in the state. Instead in hot climates growers needed to pick grapes early, to preserve their acidity, which would help to preserve the wine. Growers also had to learn not to mix ripe with unripe grapes, to exclude mouldy or rotten grapes, to choose an adequate sized vessel for fermentation, to clean and disinfect all the utensils, etc. Initially in California, as in Argentina, a large number of wine-makers invested heavily in equipment without fully understanding the basic problems involved in wine production.

One of the problems of making wines in hot climates was that the high sugar content and low in acidity of the grapes caused the fermentation to stick, with the remaining unfermented sugar making the wine unstable. The development of viticulture in the cooler coastal regions around San Francisco made it much easier, at least in theory, to produce dry wines. Indeed, as the hot and dry summers allowed the grapes to mature sufficiently, winemaking was easier than in Missouri and the Eastern States, or in central and northern Europe.[48] George Husmann's wines produced on the Talcoa Vineyard in Napa, were fully fermented after six days, and cleared enough to be sold to merchants six weeks later for maturing, and then shipped 'as far East as Connecticut, when not more than a year old, and arrive in perfect condition'.[49] Yet many wine growers were not so successful, and Eugene Hilgard, in his famous article in the *San Francisco Examiner* of August 8 1889, blamed the serious overproduction of the time on the poor quality of

[47] (Hilgard 1884), p.3.
[48] (Husmann 1883), p.284.
[49] (Husmann 1883), p.284.

wines being produced. According to Hilgard, the reasons for the poor wines included: (1) the wrong choice of grape varieties, (2) growers cultivating too large an area so that grapes were not harvested at the correct moment, (3) grapes not properly sorted prior to crushing, (4) fermentation tanks that were kept too full so that there was no room for a protective cover of carbon dioxide, (5) the use of excessively large fermentation tanks and hot grapes, and (6) improper handling of the fermentation and subsequent activities.[50] The solution for Hilgard was the development of scientific winemaking, and this could only be achieved through the construction of large industrial wineries.

Charles Wetmore, a leading member of the Board of State Viticultural Commissioners, strongly disagreed with Hilgard on the need for larger wineries and in particular the separation of grape-growing activities from wine-production. He believed that small wineries could produce fine wines, and that if grape growers stopped making their own wines, their economic incentives would be to use grape varieties that maximised output, rather than quality.[51] Wetmore was right in the very long run, as today small wineries have access to both the human capital and technologies necessary to make fine wines. However, under the conditions of the late nineteenth century, when skilled oenologists and laboratories in wineries were very scarce, Hilgard was undoubtedly correct. In fact, the advantages of large wineries resulted more from improving the wine quality by using scientific production methods, than from the lower unit costs associated with the production process itself.[52]

The California wine industry switched from boom to bust on a number of occasions. After a period of rapid growth, which saw the number of vines increasing by 50 per cent just between 1873 and 1876, the industry plunged into depression because of the difficulties associated with marketing outside California.[53] In Napa, savings banks refused to make loans on vineyard property as they considered that vines did not increase the land's value, and elsewhere farm animals were allowed to wander in the vineyards

[50] Cited in (Amerine 1981), pp.11-12. See also (Husmann 1883), p.288 for a similar list of complaints.
[51] (Wetmore 1885), p.27. The Board of State Viticultural Commissioners and the University clashed over resources and research priorities frequently during the 1880s. (Carosso 1951), pp.141-3, and (Pinney 1989), chapter 13.
[52] (Simpson forthcoming).
[53] (Carosso 1951), pp.74 ad 95.

before the vines were pulled up and sold for firewood.[54] The recession was ended by phylloxera in France which led to a sharp increase in wine prices, and prosperity was reinforced by tariffs in 1874 and then again in 1883. Imports fell from 372 thousand hectolitres in 1873 to 129 thousand in 1885.[55] Between 1877 and 1887, the area of vines in Sonoma Country increased from 2,800 to 8,780 hectares, while in Napa the increase was from 1,360 to 5,840 hectares. For Eugene Hilgard in 1884, only the appearance of phylloxera in California itself, and the impact of the Exclusion Act were obstacles to future growth.[56] The boom lasted until 1886, when a large and inferior crop caused prices to collapse, and supply then remained strong in successive harvests because of the excessive plantings in the early 1880s.[57] Although wine production had undoubtedly improved in California, a significant amount of cheap and adulterated wines were present in the major markets, and the price differential between quality and quantity wines was reduced. Charles Wetmore noted in 1894 that 'the man who gets ten tons of grapes to the acre gets 10 cents for wine; the man, who on a steep hillside, gets two tons and a half, gets 12 cents; and the 12-cent wine is mixed with the 10-cent'.[58] Some growers responded to low prices by grafting high-yield, low-quality varieties on their better vines, while others carried out only the minimum operations necessary, leading to disease running 'unchecked in vineyards'. Over 12,000 hectares of vines were uprooted in the early 1890s.[59] The problems affected the whole industry, but especially those that had invested vast sums in their asset specific wine-making installation, as George Husmann noted in the 1896 edition of his book:

> It was very clear to them that their immense storage houses, casks and machinery, and all the capital it had cost to build up their trade, would be wholly unremunerative if the vineyards died out, and they would be in worse plight than the producers, who had at least their lands, to cultivate in some other crops.[60]

The wine crisis resulting from the panic of 1886 continued well into the 1890s as the economy suffered a severe downturn of 1893. As the established banks refused to lend on

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[54] H.W.Crabb, quoted in (Husmann 1883), p.171 and (Hilgard 1884), p.1.
[55] (California. State Board of Agricultural 1912) p.199.
[56] (Hilgard 1884), pp.4-5.
[57] (Carosso 1951), p.134.
[58] (Wetmore 1894) p.35, cited in (Pinney 1989), p.355.
[59] (Wetmore 1894), cited in Pinney (1989), pp.355-6.
[60] (Husmann 1896), p.260.

wine, an attempt was made to create a grape-growers' and wine merchants' bank, but this failed because of its inability to raise finance, but also because of the growing distrust between the two sides of the industry.[61] As the wine makers responded to the crisis by cutting prices and reducing purchases, the growers blamed them as the main cause of their economic plight. Professor Hilgard, as others, proposed district co-operatives for labelling, bottling and marketing wine, and criticized the wine-makers and merchants for emphasis on 'pretty bottles and beautiful labels', rather than attempting to improve quality.[62] The presence of large quantities of bad wines produced by poor production techniques, and the supposedly widespread fraud and adulteration of California's wines, and the 1893 depression, were considered as major causes of the problems facing the sector, just as they would be in the Midi in the following decade. These problems were resolved in California however, in a very different manner to the Midi.

4 Markets, vertical coordination and the fight against adulteration

There were four major economic groups found in the wine trade in the late nineteenth century: the Californian grape producers, the wine-makers, San Francisco shippers and the East Coast bottlers and distributors. The development of new markets after 1880 created incentives to expand production, but new coordination arrangements were required between the different links if an adequate return on the high levels of capital investment now required was to be achieved. In particular, commercial growers needed a market for their grapes; wine-makers a supply of grapes to benefit from the potential economies of scale associated with the new wine-making equipment and a ready market for the wine; and the local merchants found it necessary to maintain their competitive position and stop out of State merchants dealing directly with local producers. These problems were not dissimilar to those found in Europe at this time, but they were solved in very different ways. Given the weak bargaining power of economic agents in the Californian wine-industry to obtain concessions from government to create new institutions to protect small producers such as happened in Europe, attempts were made

[61] (Carosso 1951), p.136.
[62] (Carosso 1951), p.137.

to integrate ownership and achieve a high degree of vertical control for the industry from grape production through to market distribution.

The great boom in viticulture between 1880 and 1885 was sandwiched between two periods of depression between 1875 and 1875, and 1886 and 1895. As elsewhere in the wine world, periods of shortage saw prices increase rapidly and left merchants without stock, while at times of overproduction, growers found it difficult to sell, and lacked the facilities to adequately store the wine. The relatively high percentage of growers that had no wine-making facilities (around four-fifths in 1891) made them particularly vulnerable, and the *Pacific Rural Press* in 1894 claimed they depended on 'three or four firms of San Francisco' for their livelihood. This grower's newspaper argued that 'a large percentage' of the approximately fifty million dollars invested in the wine industry belonged to the 'growers and producers', so that the merchants proposal to buy wines after the 1893 harvest at five or six cents per gallon gave a return on capital of just 'two and one-half per cent', leaving growers nothing for 'labor and expenses'. Despite these low prices, the *Pacific Rural Press* claimed there was 'no overproduction of wine in this State, unless it be in the "brick vineyards" of San Francisco', and concluded that:

> The weaker growers have been forced out of existence, while the stronger have as a matter of self-protection been forced to become distributors of their own wine, and as they do not use salicylic acid or aniline dies, which analysis shows some of the dealers are doing, they are building up a trade that the dealers cannot take from them with their cut prices'. [63]

The proposed solution by the growers and wine-makers was a combine which would allow them to pool their products, and give them absolute control over the production and marketing. The original idea was to contract for the output of growers for a term of years, with prices increasing over time, and with the contracts becoming binding when seventy five percent of the total acreage of wine grapes had been secured (see appendix for details).[64] Thanks to the agreement of the several hundred larger growers, this quantity representing dry wine production was achieved, and California Wine-Makers Corporation (CWMC) was established in 1894. Within a few months the price of ordinary wine

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[63] (*Pacific Rural Press*) (June 9 1894, p.438).

[64] The price of grapes and wine was expected to increase by between 80 and 100 per cent, depending on the grape variety, and whether production was from bottom or hill land. See Appendix.

increased from 6 cents to 12½ cents per gallon, in part because the CWMC was allowed good credit facilities, and in part by the small harvest of 1894.[65] To sell the wine, the CWMC entered into a five year agreement with the California Wine Association (CWA), an organisation also created in 1894 by the leading West Coast wine dealers (see below). Post-contractual opportunistic behaviour quickly appeared when harvests returned to normality and lower prices followed. By the summer of 1897 a ‘wine war’ had broken out between the two rival organisations, caused by the fact that the CWA refused to pay the prices demanded by the CWMA, and the CWMA in violation of the contract, sold large quantities of wine directly to the New York house of A. Marshall & Co. Although the CWMC perhaps controlled 80 per cent of the state’s wine-producers by 1897, the CWA had 80 per cent of the wine produced,[66] and the legal defeat for failing to honour the initial agreement, saw the CWMC effectively disappear in 1899.[67] Attempts were made almost immediately by Henry J Crocker, the ex president of the CWMC to start a new organisation. He circulated over 1400 letters to the State’s grape-growers, and noted that:

> I propose to make an attempt to assure to the grape growers a fixed price annually for his product, and thus remove him from the uncertainties of a fluctuating market.
> The average price of grapes for the past ten years has been $10.50 per ton. With absolute control I feel such confidence in my ability to increase this value that I will pay you cash on delivery $14 per ton for all the standard varieties and $12 per ton for Missions and Malvasias.
> Contracts will be made separately with each individual grape grower, and, should I secure enough contacts to make the project feasible, I feel assured that the capital which was interested in the success of the wine makers will gladly come forward in the grape growers’ interest, and the result will be a benefit to the various branches of the industry. If I fail to secure the contracts I will be compelled to drop the project.[68]

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[65] (*Pacific Rural Press*) March 30 1895, p.199. The *Pacific Rural Press* (May 1895, p.324) noted: ‘the first pro rate distribution for the deliveries during the month of April has just been made, and makes our wine makers feel once more that they are not owned, body and soul, by a few wholesale dealers, who paid about what they pleased to those who were in sore need of money, and ruined the prices outside, but cutting each other’s throats, regardless of what became of the “goose that laid the golden egg”’. The 1895 harvest was also small, ‘but the quality of the product was the best for many years’. (*Pacific Rural Press*), Oct. 26 1895, p.271. See also (Adams 1899), pp.517-24.

[66] (Peninou and Unzelman 2000),p.79.

[67] The CWMC was required to pay $101,000 dollars to the CWA, although the final settlement was $8000. (*Pacific Rural Press*), May 13 1899, p.289. Sales of wine and other assets continued for several years.

[68] (*Pacific Rural Press*), July 8 1899, p.30.

Contracts were to be for seven years, and Crocker demanded a minimum of 80 per cent of the State's wine grapes. The *Pacific Rural Press* noted that these grape prices could only be achieved if merchants paid artificially high prices for their wine, and that, with the exception of raisins, no other combine had been able to attract 80 per cent of the crop.[69] Crocker's project also failed because of the diversity of the growers' interests. One problem was that of assessing grape quality, especially as many of the smaller producers were beginning to plant shy-bearing European varieties on the hills rather than plains which produced small quantities of quality wine. Another was that any organisation which monopolised grape production would naturally look to use the best wine making facilities available in the State. Technology was beginning to change rapidly in the wineries and those small growers that possessed older wine-making facilities feared as a result that their facilities would become redundant, and they would cease to be wine-makers.[70] Finally, many growers without winemaking facilities resented being locked into contracts so long, especially as in the short-term they were benefiting from the competition between three major buyers: the CWA, Lachman & Jacobi, and the Italian-Swiss Company.[71] It would not last.

In January 1904, Percy T. Morgan noted that the 'quality and general excellence' of California's wines were 'no longer in question' but that per capita wine consumption in the United States was less than a fiftieth of that in 'wine drinking countries like France and Italy'. He claimed that 'almost every rolling hill and fertile valley of California could be profitably covered with vines', so that the future of the industry was 'principally, if not entirely, dependent upon an expanding market.'[72] Morgan did not have to worry about foreign competition, as the rapid growth in the Californian wine industry between the late 1870s and 1880s had taken place against a background of wine shortages in France because of phylloxera, and high US import duties on foreign wines in 1874 and again in 1883. Exports of French wines to the United States declined from 236 thousand hectolitres in 1873 to 23 thousand in 1889, while California's production increased from 95 thousand to 587 thousand hectolitres, and exports out of the state rose from 19 to 310

[69] (*Pacific Rural Press*) August 12 1899, p. 111, and August 19 1899, p.114.
[70] Crocker assured producers that the grapes would be sent to the nearest winery. (*Pacific Rural Press*) August 19 1899, p.114.
[71] (*Pacific Rural Press*), August 18 1900, p.102.
[72] (Morgan 1904)

thousand hectolitres, between the two dates.[73] As Carlo Cipolla noted, the character of the Californian wine industry changed dramatically at this time, so that, while at the end on the seventies, two-thirds of Californian wine production was for the local market, the figure had dropped to only ten per cent by the end of the nineties.[74]

Yet by all accounts, the supremacy of California's wines in the domestic market had yet to be appreciated by the country's drinkers. California growers and merchants complained that their best wines were sold under foreign labels, and the poorer wines, together with those from every other wine producing state in the country, under the California brand. According to the *Pacific Wine & Spirits Review* (hereafter PWSR):

> Heretofore the greater part of California's best wines have gone to the Eastern markets in bulk and they have been sold to hotels, cafes and high-class bars, only to appear under French labels, while the commoner wines have gone into consumption as the products of California … In other words ….if California wines of the higher class had not largely masqueraded under foreign labels, the industry would have had a far greater development.[75]

The motives, as one writer at the end of the nineteenth century noted, were obvious:

> A bottle of wine, which as domestic, could be sold at a good profit for fifty cents, with no extra expense except the affixing of a new label, may bring, as imported, a dollar and a half, and the customer be just as well pleased and as well served. Labels of all known brands, with imitations of special corks, bottles, or other peculiarities, are kept constantly in stock in all cities, at trifling cost, to be used for this purpose.[76]

Another problem was the presence of adulteration in California itself, as producers turned to the chemist not to just to improve wine quality, but to cover their errors. According to the Report of the Commissioner of Agriculture in 1887, wine adulteration 'has increased in amount and in the skillfulness of its practitioners until at the present day it requires for its detection all the knowledge and resources which chemical science can bring to bear upon it, and even then a large part doubtless escapes detection'.[77] Adulteration was the consequence of poor wine-making techniques in general, although every wine-maker could experience problems in a 'difficult' year.

[73] (Cipolla 1975), p. 299 for French imports. Calculations refer to wine imports in casks; for California wine production and for out of State sales, (*Pacific Rural Press*) April 21 1900, p.246.
[74] (Cipolla 1975), p.303.
[75] (*Pacific Wine & Spirits Review*), December 1906, p.20.
[76] (Adams 1899), p.519.
[77] (Crampton 1888), p.207.

Yet there were also other interests at stake. When the CWMC signed a deal with A. Marshall & Co. of New York in 1897 for a million gallons of wine and an option on another one and half million, it excluded the powerful San Francisco merchants from the trade, and allowed a powerful outside merchant direct access to wine-makers. The response of the CWA was reduce its own wine prices, with the object of discouraging Marshall and other Eastern dealers, from competing directly with the large California wine houses for supplies.[78]

As elsewhere in the wine world, there were therefore considerable incentives for growers, wine-makers and merchants to try and control fraud, improve prices and exert greater control over the selling of their wines and the use of the 'California brand'. These concerns inevitably coincided with the low wine prices and glutted markets of the late 1880s and early 1890s, but the low population density and the distance between producer and consumer led to very different solutions in California compared to the Old Continent. The problems associated with wine adulteration were solved by three inter-connected strategies: horizontal consolidation and vertical integration; the Pure Food & Drugs Act of 1906; and the tax reform for brandy in 1891. We shall look at each in turn.

As early as 1862 Agoston Haraszthy had proposed that the California wine industry fund an agent in San Francisco to organize the sale of the state's wines, and vouch for their authenticity.[79] In 1872, a joint-stock association, the Napa Valley Wine Company was formed to promote the region's wine in the Eastern cities.[80] In San Francisco itself the Board of State Viticultural Commissioners sponsored in 1888 a permanent exhibition which allowed consumers to purchase local branded wines, and there were discussions to open similar ones in New York, Chicago and even London.[81] Yet the problems of controlling wine sales on the other side of the Continent only really began to be tackled when, in August 1894, seven of the state's largest wine firms created the California Wine Association (CWA), a corporation with a capital stock of $10 million.[82] All the assets of the seven wine houses were turned over to the Association, although wine would still be

[78] (*Pacific Rural Press*) June 5 1897, p. 353.
[79] Haraszthy (1862), p.xxi, cited in (Carosso 1951), p.54.
[80] (Carosso 1951), p.93 and (Heintz 1999), pp.97-8.
[81] RSBVC for 1889-90, pp.8-11.
[82] Carpy & Co., Kohler & Van Bergen, Dreyfus & Co., Kohler & Frohling, Lachmann Co., Napa Valley Wine Co., and Arpad Haraszthy & Co. Haraszthy withdrew shortly afterwards.

sold under some of their labels and trademarks. In 1900, the CWA acquired half interests in the three largest independent wine houses still remaining, and continued to buy up other wineries. The CWA quickly recovered from the loss of a considerable quantity of its stocks in the San Francisco fire of 1906, and in the same year work started on a huge wine complex called Winehaven on a 19 hectare site at Richmond, which had storage for some 378,500 hectolitres, or about 25 per cent of California's output, and wine manufacturing facilities for 140,000 hectolitres.[83] According to a recent history of the organisation, between 1894 and Prohibition (1919), the CWA would 'cultivate more vineyard acreage, crush more grapes annually, operate more wineries, make more wine, and have a greater wine storage capacity than any other wine concern in the world'.[84] This was horizontal consolidation and vertical integration – from grape growing to distribution – on a massive scale.

By the 1890s it was claimed that there were rapid advances in improving the quality of California wines, in part because of the successful planting of better grape varieties in adequate locations, but also because winemaking was being conducted more scientifically.[85] Lachman noted in 1903 that, 'in the last eight years rapid progress has been made in the manufacture and maturing of wines, wine making having been conducted on more scientific lines', and the *Pacific Wine and Spirit Review* a few years noted the improvements in wine quality with the separation of the wine-making from the grape production.[86] Although neither of the comments is completely objective - Lachman was a director of the CWA's and its chief taster, and the PWSR was also dependent on the organization - it was claimed that the Association never produced a bad wine, although neither did it produce an outstanding one.[87] The general improvement in the reputation of California's wines also allowed small independent wineries to begin to specialize in fine wines for niche markets, with the smaller Napa wineries such as Inglenook, Charles Krug, Beringer and Salmina (Larkmead) consistently taking awards and bottling their best wines with labels displaying 'Napa' as their appellation.[88] The

[83] (Peninou and Unzelman 2000), p.104.
[84] (Peninou and Unzelman 2000), p.33.
[85] (Husmann 1896) (1896 ed.), p.258.
[86] (Lachman 1903), p.25 and (*Pacific Wine & Spirits Review*) (1906), December, p.43.
[87] Cited in (Amerine and Singleton 1976 ed.), p.286.
[88] (Lapsley 1996), pp.67-8 and (Heintz 1990)

Pacific Rural Press in 1901 claimed that fine wines accounted for five or ten per cent of the State's output.[89] However, while California's wine production increased by a factor of four between 1891/3 and 1911/4, dry table wines increased by just a third, and dessert wine production multiplied by a factor of nine.

In general the CWA brought greater stability to the market, and California probably suffered less during the turbulent 1900s than any other wine growing region in the world, even if the CWA failed to buy grapes in 1908. Indeed, as Figure 1 shows, growers appear sufficiently confident to have significantly increased output during this decade, and Percy Morgan, for many years the CWA's chairman, noted in 1917 that forward integration had help to create new markets for California's wines:

> Until the coming of the California Wine Association only a few wineries tried to deliver their original packages direct to the consumer and build up a following for their label. The large dealer almost always sold California wines in bulk to distant jobbers who either bottled them with a domestic or foreign label known to their particular localities, or sold them to retailers who pursued a similar course. Moreover, these distributors and retailers had neither the knowledge not the facilities to age and handle wines properly. Only a large firm with capital could select from millions of gallons, blend to standards, market under labels that could gain the confidence of the public, and stand back of the label whenever sold.[90]

A number of reasons can be cited for why horizontal consolidation and vertical integration on this massive scale was chosen as a means of controlling quality in the US market. In the first instance, the distance between California and its major markets (New York, New Orleans, and Chicago) was significant. It could be argued that the Midi or Algerian producers also faced problems of distance in France when they sold their wines in Paris and the industrial north, but in this case they were selling to consumers already accustomed to wine drinking. California, by contrast, had to create new markets, and in this case the comparison should be with selling French or Spanish wine to the reluctant wine drinkers in London, rather than Paris. A second point was the limited political influence of the sector in the United States, which in any case was desperately trying to fight Prohibition. While French politicians would ignore the demands of the growers at their peril, this was not true in California. A final point is the heavy capital investment

[89] (*Pacific Rural Press*), Dec.14, 1901, p.372.
[90] Percy Morgan, 1917, cited in (Peninou and Unzelman 2000), p.125. See also p.94.

and asset specific nature of this technology made wine-production one of many sectors that participated in the ‘Great Merger Movement’. It was in the mass-production industries, where no single firm had a clear-cut advantage over the rest, which suffered most during the depression of the 1890s in the United States. According to Naomi Lamoreaux, consolidations became common to escape price competition in certain types of industries, namely the ‘capital-intensive, mass-production industries in which firms were closely matched and in which expansion had been rapid on the eve of the Panic of 1893’.[91] This description matched that of the California wine industry at this time. Most of the large, capital-intensive wineries had been constructed only a few years earlier, and the possibilities of collusion in the wine market was very difficult. One important consideration in the case of the CWA was the need to establish its own distribution networks. Although the information of the United States is limited, retail wine prices fell much less in the major centres of consumption such as Paris or Buenos Aires than in the centres of wine-production. By integrating forwards and controlling distribution, wine-makers could both obtain higher prices and guarantee a market for their wines. This helped provide the market stability for the group to invest in brand names.

Yet although vertical integration helped the CWA to control quality, large quantities of California wines were still reportedly being sold under foreign labels, and poor quality wines of dubious origin, such as those that the *Pacific Wine and Spirits Review* dubbed as from Ohio’s ‘brick vineyards’, were sold under the California brand and damaged the state’s reputation. The Federal Pure Food and Drugs Act was therefore particularly welcomed by the CWA, although as this covered only inter-state trade, it was still possible to legally ship a barrel labelled ‘poison’ between two states, and then sell it as wine, if the destination state had not passed its own pure food law.[92]

What was considered a fraud and what was considered as legitimate remained very parochial as we have seen in this book. At the same time that the PWSR criticised Ohio’s ‘brick vineyards’, it also noted that ‘more than 2,000,000 bottles of genuine champagne are now annually produced in the United States’.[93] California wines that were described

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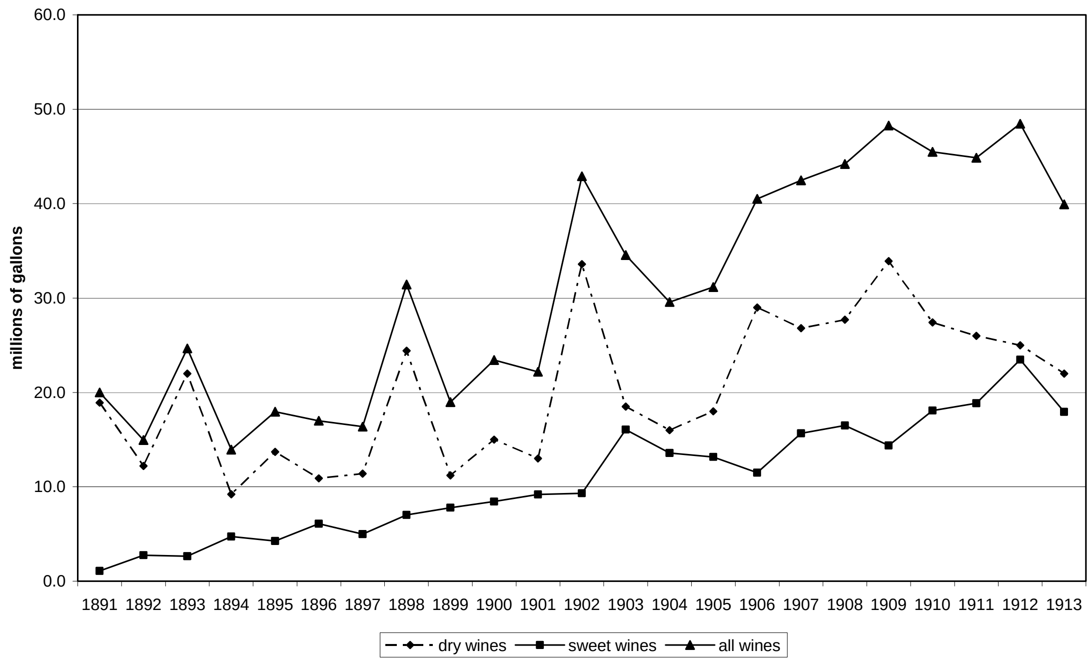
[91] (Lamoreaux 1985), pp.45 and 87.
[92] (*Pacific Wine & Spirits Review*), May 1907, p.14.
[93] (*Pacific Wine & Spirits Review*), May, 1907, p.39.

as a particular French type such as ‘Burgundy’ or ‘Champagne’, were rejected for the Paris Exposition of 1900.

Figure 2

California production of dry and dessert wines, 1891-1913[94]



The third major factor in improving quality was the legislation that allowed California’s wine makers to fortify their wines with domestic grape brandy and not pay the $1.10 a gallon tax on brandy. This made fortified wines the cheapest form of alcohol on the market, and allowed producers to profitably distil their unstable wines and produce sweet fortified wines.[95] It also implied that they did not have resolve the technical problems associated with making wines in a hot climate, and therefore was especially

[94] (California. State Board of Agricultural 1912), p.191 and (California. State Agricultural Society 1915), p.139.
[95] Seff and Cooney, in (Muscatine, Amerine, and Thompson 1984), p.418.

attractive to producers in the Central Valley. From 1891, there was a rapid growth in the production of dessert wines, and by 1913, they accounted for 45 per cent of all California's production (although not all was produced in the south), of which 46 per cent was classified as port, 31 per cent as sherry, 12 per cent as muscatel, and nine per cent angelica, a wine named after Los Angeles (Figure 2).[96]

Conclusion.

Just as in many other branches of California's agriculture, the wine industry prior to 1914 can be considered a success story. It is true that despite the rapid increase in production, annual consumption was just 2.12 litres per capita in the United States, and remained very low compared to other producer countries. Even though consumption in California itself perhaps increased from about 23 litres per capita in the 1880s and 1890s, to 40 litres in the mid-1900s, the figure was still less than the 60 litres found in Argentina or Chile.[97] However, the industry had made major strides in both improving quality and market organisation. At the College of Agriculture the work of individuals such as Eugene Hilgard and Frederic Bioletti was important to help growers tackle phylloxera and improve wine-making. On the eve of the First World War, California was part of the international scientific network that included research institutes in the Midi, Algeria and Australia. The difficulties associated with dry wine-making in hot countries were only beginning to be resolved by 1914, but by this date a winery with adequate facilities and the correct expertise was able to produce an acceptable beverage wine. Prohibition ended much of this research, and the considerable human capital that had accumulated in the state's vineyards and wineries over the previous quarter century was lost, contributing to the delay not just in California but the New World in general, to the development of suitable wines for the European markets.[98]

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[96]Angelica was fortified grape juice rather than a wine. Calculated from the (California. State Agricultural Society 1915), p.140.

[97] 1878/82 - 24 litres and 1888/92 - 22 litres. My calculation from (Cipolla 1975), Table 2. 1907 – 40 litres.. Figures are very approximate.

[98] It is true that grapes continued to be produced for grape juice, raisin, and table grapes, but different varieties were used.

What makes California very different to other wine regions in this period however was the major consolidation of the leading firms in the CWA, and the degree of vertical integration of wine-making and distribution. By integrating forward and establishing distribution channels in the main markets, the CWA could sell branded wines in bottles direct to retailers, and guarantee that they had not been adulterated. The fact that these wines were ordinary beverage wines rather than fine wines increases, rather than diminishes the achievement. As discussed elsewhere, high prices allowed the marketing of small quantities of carefully differentiated, high-quality fine wines such as champagne or claret through the traditional retail market in the British market.[99] The marketing problems associated with the creation of a mass-market for cheap wines were very different. The CWA appears to have had considerable success in producing a drinkable wine to sell among consumers who had originated from Europe's wine producing regions, but was less successful in creating new markets, especially outside the major centres of New York, Chicago or New Orleans. There is little doubt that the CWA used its market power to fix grape and wine prices, but the rapid growth in the industry between 1894 and 1914 also suggests that all sectors of the industry benefited to some degree. Indeed, given the alternative market conditions for growers prevailing in all wine countries in the 1900s, those of California seem to have done comparatively well. The years of greatest difficulties in California wine-industry date from the late 1880s and early 1890s, immediately prior to the founding of the CWA, rather than the 1900s.

The California model did have important implications, In particular, while the Federal Government was willing to keep prices high with import tariffs, and the Pure Food and Drugs Act provided the legislative framework to control adulteration, neither it, not the State legislature, were going to legislate as willing as the European governments were, because their growers lacked the political muscle of this in Europe. It was the CWA that negotiated on behalf of the industry, and while its own interest often coincided with the independent growers, they were not identical.

Californians had to relearn wine after ending of Prohibition in 1933, as there was a significant loss of knowledge concerning viticulture, wine-making, and the appreciation of fine wines. Large areas of premium varieties had either been uprooted, or grafted with

[99] (Simpson 2004).

poor quality heavy bearers for the table. Wines were made by untrained winemakers in unsanitary conditions, leading W.V.Cruess to note that ‘after Repeal, the outstanding characteristic of our wines was instability’.[100] Sweet wines outsold dry wine three to one following repeal, and, as consumers had very little experience of drinking wines, any judgement about wine quality was ‘practically impossible’.[101] In the words of James Lapsley, between the 1930s and 1980s ‘the public’s expectation of “wine” shifted from a fortified, often oxidizes or spoilt beverage, produced from indistinct grape varieties, to a table wine possessing distinct flavour attributes derived from varietal grapes and from processing’.[102]

These challenges were not dissimilar to those facing the industry in the 1880s, but the response was slightly different. The University of Davis to provide the scientific work, with a significant part of their research being directed towards understanding basic viticulture and viniculture practices associated with producing fine wines, rather than the vastly more important ordinary table and dessert wines. Local growers associations such as the Napa Valley Wine Technical Group provided practical help, and fine wine producers turned to varietal and geographical labelling to differentiate their wines from the cheaper ones that were sold using European place names (‘California claret’, etc.). I Instead of a highly integrated Californian firm such as the CWA that dominated the national wine market, out-of-state bottlers and distilleries moved into the area in early 1940s to purchase local wine-making businesses to guarantee supplies for the East Coast as the industry changed from the producer of ‘a bulk commodity’ to a business that was ‘predominately brand oriented’.[103]

[100] Cited in (Lapsley 1996), p.51.
[101] (Lapsley 1996), p.3.
[102] (Lapsley 1996), p.1.
[103] (Lapsley 1996) pp.95 and 110.

Appendix 1.

Proposed contract for growers offered by the California Wine-Makers Corporation

Five year price schedule

	GRAPES price per ton				WINE per gallon			
	1st year		3rd,4th, 5th year		Ist year		3rd,4th, 5th year	
Varieties of Grapes	from bottom land	from hill land	from bottom land	from hill land	from bottom land	from hill land	from bottom land	from hill land
Zinfandel Mataro Grenache Carigan Charbono Chasselas Grey Riesling Blaue Elbing Burger	$9.0	$11.0	$14.0	$18.0	9 cents	11 cents	14 cents	18 cents
Franken Riesling Johan Riesling Sauvignon Vert Colombar Pinor Folle Blanche Mondeuse Pfeffers Cabernet St.Macaire	$13.50	$16.0	$19.0	$23.0	13.5 cents	16 cents	19 cents	23 cents
Cabernet Sauvignon Cabernet Franc Merlot Verdot Semillon Sauvignon Blanc Malbec	$20.0	$25.0	$25.0	$35.0	20 cents	25 cents	25 cetns	35 cents
Misson Malvasia	$8.0	$8.0	$8.0	$8.0	8 cents	8 cents	8 cents	8 cents

Sound wines now in cellar at 10 cents per gallon, except those in the second and third categories, which will be values by expert arbitration and taken at that rate.
All grapes to be sound and to have at least 22 per cent sugar, and to be delivered at the wineries of the purchasers in the county. Any deficiency in sugar will be deducted as follows:

Fifty cents per ton less than schedule price for each degree of sugar bellow 22 degrees (Balling) and down to 20 degrees.

One dollar per ton for every degree of sugar less than 20 degrees (Balling).
All wines to be delivers at a railway terminal point.
Payments to be made as follows: one –third immediately after receipt of goods; one-third by three months acceptance, and one-third by six months acceptance.
All wines to contain at least 11 per cent alcohol (by volume).
All future wines to be accepted on or before December 31st of each year, and to be removed by the first day of March following. Should any wines remain in the hands of the seller March 1st, the purchaser will pay the owner of such wines one-quarter of a cent per gallon more for every month after March 1st such wine is stored.
All packages for shipment to be furnished by the seller and to be returned promptly by the purchaser, well rinsed and sulphured.
Pacific Rural Press, July 28 1894, p50.

Contract.
In consideration of $1, the receipt of which is herby acknowledged to --- paid by P.C.Rossi, --- hereby agree to sell to him or his assigns, at his or their option, at any time between this date and ---- next, the following viticultural products, viz., --- tons of grapes, --- gallons of wine, more or less, the particulars of which are enumerated below, at the prices and on the terms set forth in the printed schedule hereto annexed. If this option be exercised by the purchaser he must notify --- in writing of such exercise of it on or before the --- next, and the same shall thereupon become a sale binding on both parties.
The grapes above contracted for are the crop now growing on --- vineyard, called ---, at ---, of which --- acres are ---, and the quantity above names is the estimate product of said vines. If the product does not prove to be so – not to be responsible for any deficiency. If it exceeds the quantity names such excess is included in the sale.
The wine above referred to consists of about --- gallons.
This option is granted and accepted on condition that if it be exercised by the grantee he is to be deemed thereby to contract to buy from --- as --- hereby contract to sell him --- crop of the same premises for the years 1895, 1896, 1897 and 1898 on the same conditions herein set forth, and at the prices fixed for those years respectively in the printed schedule annexed hereto.
Witness --- hand this – day of ---, 1894.

Pacific Rural Press, June 23 1894, p406.

Grape and wine prices for the second year were roughly in between those for the first and third years. There is no evidence that these contracts were actually used. The increase in prices over five years required growers enjoying a monopoly on supply, and the detailed price schedule was too complicated to be used.

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