

A Peripheral Mediterranean: The Early «Fruit Industry» in Chile (1910-1940)

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Everyone knows that the principal sources of California's colossal wealth are its large fruit plantations and immense canneries. Every year this state sends millions of boxes of canned fruit and vegetables to different parts of the world, thus generating huge profits to the producers, providing the working class with a livelihood, and paying the government millions of dollars in export taxes. Why, then, if Providence has given us better elements and natural advantages, couldn't we successfully compete and form an inexhaustible source of wealth from this industry? (Espínola, 1916: 478).

1. INTRODUCTION

In 1916, when Juan Nicolás Rubio discussed the commercial prospects of fruit growing in Chile with José Manuel Espínola, an agronomy professor at the Instituto Agronómico and also editor of *La Agricultura Práctica*, he expressed a common view. Agrarian experts and enterprising agriculturists were well informed of the spectacular development of the California fruit industry, and saw it as model that they could emulate. They believed that the fruit sector could compete with success in international markets, especially those in

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the industrialized economies of northern Europe and the United States, which they expected to supply by taking advantage of Chile's location in the opposite hemisphere. Although exaggerated, given the economic development gap between Chile and the major fruit-exporting countries, such confidence and expectations were not totally unfounded. In fact, the idea of creating a «South-American California» rested not only on the fact that Chile had exceptional conditions for growing a wide variety of fruits and specialty crops, but also on the rapid growth of the fruit sector in the early twentieth century.

This article analyzes the development of Chile's early «fruit industry», focusing not only on its achievements but also identifying its main problems, and thus providing an explanation for its failure to become the competitive export sector that Chilean growers envisioned as a «South American California». First, the article provides an overview of the institutional aspects of the new community of fruit growers and sketches out the surprisingly large and diverse Chilean fruit belt, tracing also the expansion of fruit production until 1935. It then examines the farming practices that growers employed to cultivate commercial crops, thus illustrating with great detail at the crop field level how horticulturalists dealt with the practicalities of fruit growing, and to what degree they had advanced, or failed, in creating a modern fruit industry. Finally, the paper discusses some of the critical issues that Chilean agriculturists faced as newcomers in the domestic and international fruit markets, namely, scarcity of capital to shift to standardization and monoculture, limited availability of proper packing materials, and, especially, inadequate terrestrial and maritime transportation for perishable products. In so doing, this article uses information from a variety of newly-found sources, including reports of individual orchards by specialized agricultural publications, comprehensive market reports by foreign fruit trade experts, and field studies and theses by graduating agronomists at the Instituto Agronómico, Chile's first university college of agriculture. These sources and approach allow us to develop a new perspective for the study of the agrarian history of Chile.

In fact, by focusing on the fruit-growing sector that Chilean growers created several decades before the contemporary neoliberal agribusiness, we can discuss the possibilities that existed for agricultural modernization in Chile's under-developed economy. According to conventional histories of rural Chile in the export-led period (c. 1850-1930), economic modernization did not reach the countryside, where the traditional hacienda of powerful *hacendados* and quiescent peasants remained virtually unchanged (Bauer, 1975; Bengoa, 1988)¹. Moreover, the agricultural sector's backwardness and inefficiency were insurmountable obstacles to economic growth and social change (Pinto Santa

1. For a revisionist interpretation of Chilean rural history in the export-led period, ROBLES ORTIZ (2007 and 2009b).

Cruz, 1959; Ortega, 2005). Yet, in contrast to general accounts, analyzing the early Chilean fruit sector in light of the experience of other Mediterranean agrarian systems in the world market provides new insights to explain the trajectory of Chilean agriculture in the now old liberal era of export-led growth. From that perspective, as this article argues, agricultural modernization also depended on the broader context, that is, the structural characteristics of early-twentieth century Chile's society and economy. The belated emergence of Chile as a fruit exporter was the result of the obstacles that agriculturists faced in their attempts to create a competitive fruit industry. Chilean growers –who for the most part were not traditional large landowners– operated in a «peripheral» Mediterranean agriculture, geographically and in terms of economic development. Far away from the large international markets, they needed an infrastructure to grow and, above all, to export high-quality fruits. Yet, the country's general low level of economic development meant that the fruit sector had limited availability of scientific horticultural knowledge, a well-trained labor force, appropriate packing methods, and transportation facilities. Under such circumstances, the would-be «South American California» unsurprisingly fell short of meeting the expectations that Juan Nicolás Rubio and other enterprising growers harbored at the beginning of the twentieth century.

2. THE FRUIT BELT: STRUCTURE AND GROWTH

By the time Mr. Rubio interviewed Profesor Espínola there were important developments in the agrarian sphere in Chile. The commercial fruit sector was expanding and, in addition to the traditionally important exports of dried fruit and nuts, growers had begun sending small shipments of fresh fruit to both neighboring countries and distant markets in the US and Europe². A sector of agriculturists was giving shape to an incipient but scientifically informed fruit-growing culture, distinguishing themselves within the landowning upper class by their professional education, typically as agronomists trained at the university-like Instituto Agronómico. Moreover, some had become knowledgeable of the international fruit trade and industry, and in a few cases even conducted field research in California. In so doing, growers sought not only to develop an internationally competitive fruit sector but, ultimately, modernize Chilean agriculture. Thus, they were carrying out projects aimed at developing horticulture and publicizing their agricultural modernization program. In 1915 and 1916 they joined efforts with state agricultural agencies and the Agronomy Society of Chile to organize two successful horticultural exhibitions at the Quinta Normal, the state experimental station. These events were privileged ven-

2. «La industria de la fruta en Chile. Su notable progreso», *La Agricultura Práctica (LAP)*, 31 March 1917, pp. 1285-92.

ues for publicly celebrating the emerging fruit-growing culture that was taking hold in Chile³. Through the exhibitions growers also entered the public sphere and assumed an active role in the then heated debate about Chile's pressing «agrarian question». Among other goals, they sought to accelerate the creation of specialized orchards, increase exports of high-quality fruit, and stimulate the formation of cooperatives and associations of fruit producers. In tune with advocates of social reform, they also conceived of developing fruit growing as a transformation of the rural society itself. As José Pedro Alessandri, president of the Agronomy Society of Chile, explained to an audience that included the President of the Republic, the *Exposición de Frutas y Legumbres* they were inaugurating was

A program full of ideals which will bring us the subdivision of land ownership [and] will transform the ignorant and defenseless peon of our countryside into a partner in this immense task of intensive farming, making him the owner of small farms on which he and his family will apply their persevering efforts, thus becoming an agent of social betterment⁴.

Chilean growers had also begun to form their own associations, which, differing from traditional institutions like the decades-old *Sociedad Nacional de Agricultura* (SNA), were exclusively focused on the fruit industry. In 1914 a group of prominent members of the landowning upper class established the *Sociedad Chilena de Productores de Frutas*. Although it was formally a private company, its stated goals transcended the role of a business association. Indeed, the Sociedad Chilena was conceived as an organization «to promote the exportation of fruit and the establishing of hygienic wholesale fruit markets in the principal cities of the country», as well as «to conduct research through a professional staff in all areas of fruit growing» (Ministerio de Relaciones Exteriores, 1914: 30-31). The state agricultural agencies were also taking part in the efforts at advancing fruit growing. The work of the Ministry of Foreign Relations' Division of Trade best reflected the state's increasing involvement in the fruit sector's development. Through its head office in Santiago and the consulates in Europe and San Francisco, it channeled commercial information thought to be useful for «opening fruit markets» to Chilean producers, and pioneered the effort to import California fruit expertise and technology into Chile. The state agricultural experts' confidence in the imminent expansion of the Chilean fruit sector was evident. As the head of the Trade Department stated in a report published shortly before the outbreak of the War, «The world's best fruit is produced, or can absolutely be produced, in Chile». For this reason, he went on, «if its production reached some day that of Cali-

3. «La industria de la fruta», *LAP*, 31 March 1917, p. 1,285.

4. *La Agricultura Práctica*, 28 March 1916, p. 531. José Pedro Alessandri was also a senator for Aconcagua, and brother to future president of Chile, Arturo Alessandri Palma (1920-1925).

fornia, the fruit industry alone might replace the nitrate industry, which is fatally destined to disappear» (Ministerio de Relaciones Exteriores, 1914: 3).

Unfortunately, although those expectations reflected not only the potential but also the growth of the fruit sector prior to World War I, during the so-called Nitrate Era (1880-1930), only the latter came true⁵. Until recent decades, the trajectory of Chile's fruit sector certainly went down a path very different from that of California and other successful regions of Mediterranean-type agriculture. As grain prices fell through the 1880-1920 period, a number of regions shifted from extensive cereal production to intensive fruit and specialty crops, which constituted an important part of their modernization and growth. Since the 1890s California emerged as a leading fruit-producing state in the US, and as a powerful competitor in the international market for Mediterranean horticultural crops. In 1929, the share of intensive crops in the value of the output per capita reached almost four-fifths (Olmstead and Rhode, 2008: 226; Rhode, 1998)⁶. Similarly, horticultural production expanded in new areas, particularly Australia, Brazil, the West Indies, and several countries in North Africa. Across the Mediterranean basin, the organization of fruit production underwent a process of modernization leading to the diffusion of «highly specialized, capital-intensive monoculture» (Morilla, Olmstead, and Rhode, 1999; Tortella, 2000: 65-67). In short, the expansion of intensive horticulture was an important aspect of the development of Mediterranean-type agrarian systems. In the long-term, what differentiated them was not the type of evolution, but the fact that the shift to intensive crops took place at different points in time and with varying degrees of success in the world market. In Chile, although the fruit sector expanded, especially after the turn of the nineteenth century, it remained a secondary component in the agricultural economy. The share of fruit crops in the total value of agricultural output was modest before 1930, and Chile did certainly not become a significant competitor in the international market until the last quarter of the twentieth century. Even so, the early fruit industry constitutes a significant, if little studied, dimension of agricultural development⁷.

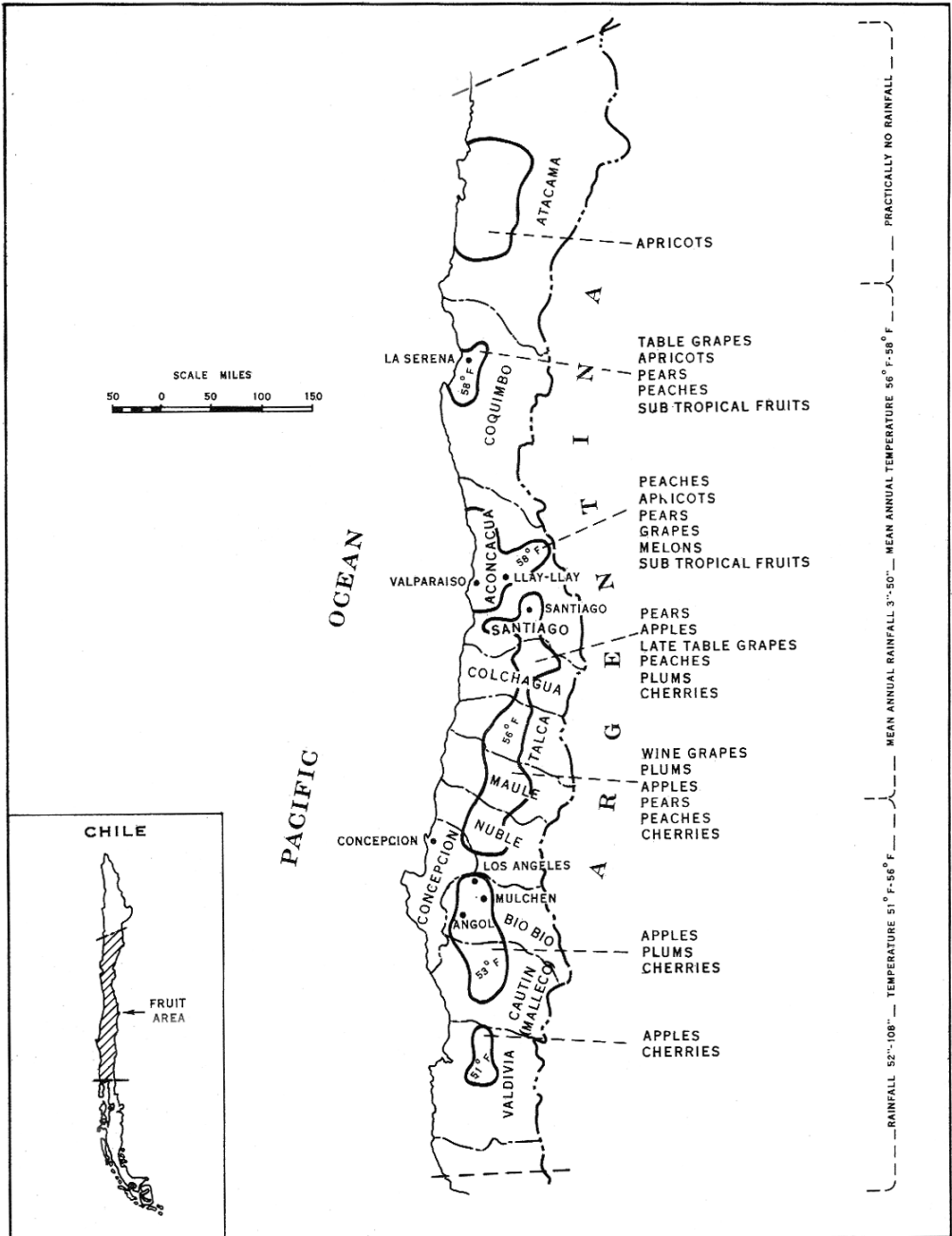
In fact, although Chilean agriculturists undertook fruit production as a commercially important activity only in the last two decades of the nineteenth century, by World War I they had created a sizeable fruit belt. It comprised relatively specialized areas scattered for about 800 miles throughout Chile's agricultural regions. Accordingly, production

5. «Nitrate Era» refers to the period during which the «nitrate industry» was by far Chile's main export sector. The nitrate area was in the provinces of Tarapacá and Antofagasta, which Chile took from Peru and Bolivia in the War of the Pacific (1878-1883), MONTEON (1982).

6. For California, also STOLL (1998) and VAUGHT (1999).

7. For the early fruit sector's institutional aspects, CORREA VERGARA (1938, II: 215-251); on fruit-growing, BENGUA (1990: 76-77, and 80-82).

MAP 1
Chile: Central Valley Fruit-Producing Districts



U. S. DEPARTMENT OF AGRICULTURE

NEG. 2 OFFICE OF FOREIGN AGRICULTURAL RELATIONS

Source: Motz (1942: 2).

ranged from semi-tropical fruits and raisins in the semi-arid Norte Chico region, to cider apples in the region surrounding the southern city of Valdivia. In the north, the Huasco and Elqui valleys were noted for raisins of exceptional quality (Wright, 1904: 367). Farther south, several valleys located between Santiago and Valparaíso were excellent horticultural areas, especially for grapes and stone fruits, because they enjoyed a warm temperate climate, rich soils, and irrigation from the Aconcagua River. The Llay-Llay valley constituted a good example of these fruit pockets' exceptional characteristics. The USDA fruit expert Fred Motz described it as one of the «most beautiful, impressive, and productive valleys of the whole Chile». It was about five miles long and four miles wide; sloping westward toward the sea, its floor flat contained about 12,400 acres of well irrigated, alluvial fertile soil, «all of which is under cultivation». Some 750 acres were planted with fruit trees, other 250 acres with honeydew melons, and the rest dedicated to alfalfa and general farm crops. Too warm for apples, Llay Llay's climate and soils were ideal for other specialized crops; «Some of the finest vineyards of table grapes in the whole of South America are found in this small valley» (Motz, 1942: 12-13).

Central Chile featured important fruit-producing districts that prospered around growing cities and towns. The province of Santiago was noted because of the scope and variety of fruit crops grown to supply Chile's largest urban market. In 1912, there were 1,257 hectares dedicated to orchards in Santiago, which had the largest share of Chile's total area planted with fruits. The area surrounding the city of San Fernando was renowned for its small, but high-yielding, apple orchards. In Curicó, large apple areas, with abundant irrigation but poor soils and low yields, extended east to the city. Farther south, Linares, Ñuble and Concepción had large wine grape areas and some 500 hectares of apples and pears in «widely scattered» orchards where packing and grading facilities were «limited and inadequate» (Motz, 1942: 43).

Commercial fruit growing had also taken hold in the Frontier, a region historically characterized by the cultivation of wheat. The provinces of Bío-Bío, Malleco, and Cautín included the country's largest apple-growing areas, which were noted for their high-quality production (Fitzsimmonds, 1958: 20). According to Motz, the «heart of the apple industry» was a «rather backward» country, which bore «a close resemblance to the southern part of Ohio». Along the Bío Bío River, soils were «volcanic, and finely pulverized»; there was a sharp contrast between the «rolling hills planted with cereal crops or sparsely covered with trees», and the flats among the valleys. Some orchards were located «on perfectly flat land» whereas others «some 15 or 20 miles away» were «in narrow valleys set between high mountains». In the Malleco province, the country resembled «certain parts of California, especially the Napa Valley». The area's rich soils were «especially well adapted for apple production», and while the hills were bare of vegetation, the floors of the val-

leys were planted to grapes and other general farm crops». Malleco, in particular, had become an important fruit growing area. In the 1920s, its capital, Angol, was the center of the fruit trade in southern Chile, from where fruit was shipped by rail to Santiago and Valparaíso. The government established a state-owned packing-house, while agriculturists had formed one the first growers' cooperatives, and an American missionary school played a significant role in stimulating fruit growing, since the men in charge were «graduates of agricultural colleges in the United States» (Motz, 1942: 17).

TABLE 1

Production of Fruit and Nuts in Chile, 1910-1936 (5-year averages in qqm)

	1910/14	1915/19	1920/24	1925/29	1935-36
Almonds	918	1.598	2.679	1.245	2.075
Apples	<i>97.450</i>	74.175			255.040
Dried cherries	1.189	3.371	1.928	1.159	
Dried peaches	11.960	17.102	20.943	17.434	20.530
Figs	12.765	13.611	16.255	8.069	4.112
Grapes		33.216	56.813	60.976	246.491
Olives	4.537	7.024	11.836	6.107	5.476
Oranges		12.585			25.581
Peaches		50.813			137.212
Pears		<i>27.078</i>			21.831
Plums		<i>2.611</i>			20.062
Prunes	1.890	2.759	2.669	2.688	
Raisins	7.682	7.748	11.561	8.166	
Walnuts	23.058	21.391	24.133	14.103	8.655

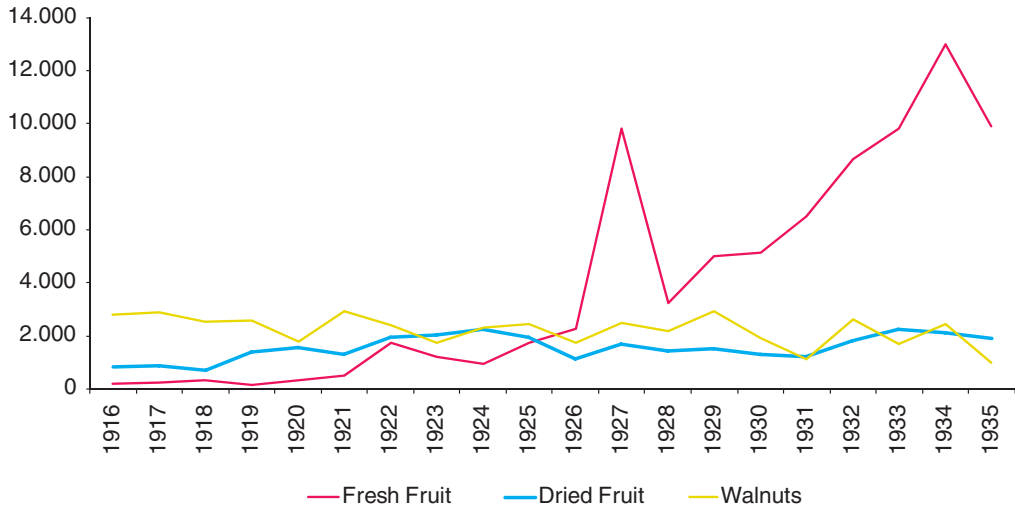
(Cursive indicates one-year figures).

Source: Anuario Estadístico & Dirección General de Estadística (1938).

The fruit sector rapidly expanded in the first three decades of the twentieth century (Table 1). The production of fruit crops increased from 1905/09 to 1920/24, but the records for 1926, the only year in the 1925/29 period for which information is available, show a general decrease. That was not the result of an exceptionally bad year for fruit production, but rather for gathering fruit statistics, since no records at all continued to be kept until the 1935-36 agricultural census. This census included the first nation-wide survey of fruit production, and provided important information to estimate the development of the fresh fruit sector before 1935-36. Thus, in addition to reporting on a number of other fruit crops not included in previous agricultural statistics, the census showed that the production of the largest crops had a remarkable growth in the two decades after 1915: table grape output multiplied by seven, while the output of apples and peaches tripled. By World War I,

the fruit sector supplied dried and fresh fruit not only for direct consumption, but also for processing in canneries and other food industries as well as for export. However, the fruit industry was far from emerging as a significant export sector.

FIGURE 1
Fruits and Walnuts Exports, 1916-1935 (metric tons)

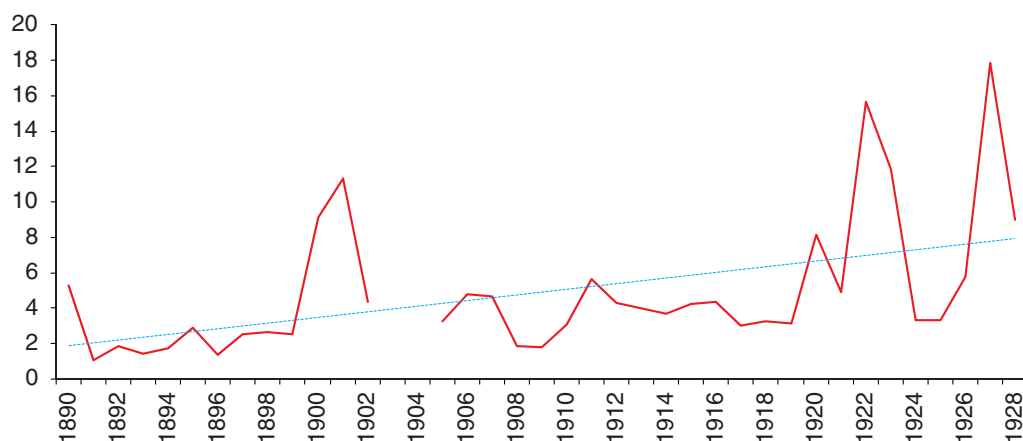


Source: Anuario Estadístico & Dirección General de Estadística (1938).

Intensification is an important aspect of agricultural modernization whereby the relative importance of extensive grain cultivation diminishes and that of intensive products, such as horticultural crops or vineyards increases. In Chile, unlike other Mediterranean-type agrarian systems, cereals, and particularly wheat, by far the largest single crop, continued to be the most important items in the agricultural output. In fact, in 1905/09 the value of fruit crops represented 2.2 percent of the total value; by 1925 it had increased to only 13.7 percent⁸. Agricultural intensification in Chile, then, fell short of that of California, where the share of intensive crops in the value of total output climbed from less than 4 percent in 1879 to almost 80 percent in 1929. Chile also lagged behind Spain, another country where by 1930 cereals had the largest share of the output, but that had achieved a greater degree of diversification, as the share of other crops such as vines and olives was close to or above 10% of the value of the total agricultural output (Rhode, 1998: 775; Simpson, 1995: 183).

8. In addition to fruit crops, in these estimates the total value of the agricultural output was calculated considering wheat, barley, oats, maize, beans, lentils, garbanzo beans, peas, potatoes, alfalfa and clover (ROBLES ORTIZ, 2003: 51).

FIGURE 2
Fruit Exports Share of Agricultural Exports, 1890-1928 (percentage)



Source: Anuario Estadístico & Dirección General de Estadística (1938).

At the same time, before 1930 the growth of intensive crops was restricted by growers' difficulties to compete with success in the international markets. Although fruit exports increased from the 1910s, the share of fruit exports in the total value of Chile's agricultural exports was modest. As Figure 1 shows, the most consistent growth was that of fresh fruit exports, while traditional items like dried fruit and walnuts remained stable between 1916 and 1935. Yet the increase in fresh fruit exports in the 1930s is overstated due to under-reporting in official statistics for the 1910s and 1920s. Moreover, as shown in Figure 2, the value of both fresh and dried fruit exports was a secondary component of the total value of Chile's agricultural exports, which included only a few products (wheat, barley, beans, chickpeas, lentils and oats). As we will see, the difficulty that Chilean growers faced to increase exports of fresh fruit and specialty crops was largely due to the limited availability of transportation for perishable produce to major, distant consumption centers.

Marketing issues were not the only factor preventing Chilean fruit growers from replicating the California model. In the first decades of the twentieth century, the structure of the fruit sector became an issue among agrarian analysts who sought to increase exports by advocating a full specialization of fruit farms. Specialization, which contemporary analysts understood as a general shift to the cultivation of select export varieties, would not only bring about an increase in productivity and quality, but would also contribute to solve the problem of capital scarcity that prevented growers from further modernizing the activity (Ministerio de Relaciones Exteriores, 1914: 13). Yet, by 1920 horticultural crops were grown at commercial orchards that were neither individual nor specialized agri-

cultural farms, but parts of different kinds of properties that also produced cereals, legumes, fodder crops and even included vineyards. This was still so in the late 1950s, right before the implementation of the agrarian reforms and, after 1973, counter-reform, that transformed Chilean agriculture and facilitated the emergence of its contemporary successful export fruit sector. However, already in the first decades of the twentieth century, there were properties on which fruit growing was either the principal or even the only activity. We may look inside these orchards to gain a closer view of the fruit-growing labor process, and further discuss the issue of specialization in fruit production.

3. CHILEAN ORCHARDS: NEITHER SPECIALIZED NOR STANDARDIZED

In the early twentieth century, most growers extended fruit crops over almost all a property's best cultivable land, seeking to obtain as high as possible a profit from labor-intensive crops that involved a long gestation period and required expensive inputs (MOTZ, 1942: 8). As a result, Chilean growers typically cultivated several fruit and specialty crops, often including a large number of varieties⁹. In addition, they also interspersed specialty and traditional crops among the fruit trees. By persisting in this practice, however, Chilean growers were putting themselves behind fruit producers in other regions of Mediterranean agriculture. While from the late-nineteenth century some fruit-producing areas in the Mediterranean basin were gradually shifting to monoculture and the elimination of interspersed crops, in Chile growers planted cover crops to compensate for the high prices of land suitable for orchards, especially near large cities, and shortage of capital (Morilla, Olmstead and Rhode, 1999: 317)¹⁰. Growers cultivated traditional crops along with fruits also for a technical reason; they knew that those cover crops helped improve the quality of fruit (MOTZ, 1942: 9). Under those circumstances, it is hardly surprising that even on «modern» orchards, fruits and nuts were raised along with other crops. At chacra Las Lilas, for instance, cereals, legumes, and vegetables were usually cultivated on the tracts laying between tree lines; in the case of vegetables, the method was to plant «four lines of potatoes, four of onions, two of artichokes, etc.». This was a common practice, since «the only

9. An example of this type of fruit farms was Las Lilas, a 75-hectare orchard located in Santiago's periphery, co-owned by an agronomist who had been commissioned by the government to study the fruit industry in the United States. In 1915, the orchard occupied 58 hectares and its main exploitation were 9,809 peach trees of 45 different varieties. Cherries were the second most important single crop, with 2,351 trees of 18 varieties; there were also 862 orange trees of 7 varieties, and 525 pear trees of 21 varieties. In addition, Las Lilas had 300 avocado trees, 283 apple trees, and small numbers of persimmon, olive, walnut, chestnut, almond, fig, apricot, quinze, qumkwat, lime, lemon, grapefruit, and plum trees («Chacra Las Lilas», in *La Agricultura Práctica*, 27 Aug. 1915, pp. 151-153).

10. «A lack of capital is a limiting factor and prevents the industry from realizing its full possibilities» (MOTZ, 1942: 11).

trees that are kept without associated crops are citrus, to avoid damages that they may suffer with the irrigation that is necessary to apply to those other plants»¹¹. Likewise, on the model orchards that Juan Nicolás Rubio developed around the city Rancagua, 310 hectares of peaches were grown in association with artichokes or asparagus, another 32 hectares were planted with peach trees and grapevines, and yet another 12 with orange trees and strawberries. In addition, peach and apple trees were cultivated along with beans, peas, lima beans, onions, and tomatoes. Remarkably, at least in this case, those associated crops were high quality vegetables, for they were either dried or canned at Rubio's canneries (Espínola, 1916: 481-2).

The excess of trees was another problem that militated against specialization of early twentieth century orchards. Most orchards were organized on the «square plan», and extended over level land that could be easily irrigated. Yet, seeking to exploit orchards as intensively as possible, growers tended to plant trees in excess, which was detrimental to the growth of trees, and caused several problems for production. This situation can be illustrated with the case of an «industrial orchard» that agronomist Alejandro Rodríguez administered in La Florida. The farm had 16 hectares of fruit crops, including one hectare of Yellow Newton apple trees, known in Chile as *Reineta Bunster*. These high-quality trees were bought from El Vergel, the renowned nursery in Angol owned by Manuel Bunster, one of the wealthiest landowners in the Frontier. The trees had been «especially recommended by Mr. Bunster as one of the best export varieties» because they produced apples «that endured well long trips». Yet, according to Rodríguez, who had been hired to improve the orchard, the planting left much to be desired. Trees stood at «five meters on and between lines», which was «a serious error» because they «grow too tall and branches get tangled, which makes plowing, spraying, and picking fruit very difficult» (Rodríguez, 1923). Apparently, the practice of planting as many trees as possible remained in place as a standard feature of Chilean orchards well into the twentieth century. In the late 1930s, experts from state agricultural boards distributed instructional brochures providing growers with detailed directions on planting distances for the different fruit crops (Opazo, 1928: 63-66). Their recommendations were «frequently ignored», because there was «a tendency to make as full use as possible» of the available tillable land. The problem, however, was «not as serious as in Argentina», because «much of the soil upon which orchards are established is loose, sandy, or gravelly, and rather low in organic matter and fertility», so that «such large vigorous trees are not produced in Chile» (Motz, 1942: 40-41).

Most sources only occasionally inform us about how fruit growing tasks were actually conducted, but available evidence suggests that on early-twentieth-century orchards cul-

11. «Chacra Las Lilas», *La Agricultura Práctica*, August 27, 1915, p. 153.

tural operations applied to the soil were rather simple. Typically, the soil received a sequence that consisted of four basic operations: plowing, raking, cross-plowing, and a second raking (Soto, 1927: 12; Conejeros, 1930: 10). Some growers conducted a «more or less continuous cultivation», whereby they plowed during the winter and spring, «cultivated throughout the summer to keep down weeds and grass», and continued doing so until shortly before the harvest. In contrast, others cultivated only what was strictly necessary, and left the orchard «in sod for indefinite periods»; even more, an orchard could remain «in grass or weeds for 2, 3, or 4 years», to be cultivated again for 1 or 2 years (Motz, 1942: 19-21). Agronomist Rodríguez provides us with a more detailed view of fruit farming practices at an apple orchard in La Florida. First the ground was plowed with an «American plow number 18 pulled by horses, and raked over at the beginning of winter». In August, the field was cross-plowed with an «American iron plow no. 19», and raked «with iron and wooden rakes». Since the plow did not reach close enough to the trunk, it was also necessary to dig over with a hoe an area of roughly one square meter «to get rid of weeds and butterfly larvae that lodge there». He determined that it was necessary to cultivate the soil again at the beginning of spring, «when irrigations by infiltration are finished and the first weeds are coming up»; however, he also observed that this decision went against the notion, apparently common among farmers, that «too much work is both uneconomical and impractical». In view of this, Rodríguez pointed out the advantages of the additional operations, by noting that more cultural operations meant a lesser number of irrigations and a drastic reduction of weeds. He further illustrated the kind of rudimentary practices growers employed by explaining that their objection made sense only if «the work was done with oxen, because of the animals' slow pace and the considerable damage horns caused to fruit, especially to Bunster apple trees that tend to lay down the ground» (Rodríguez, 1923: 10-11, 27).

Weeding seems to have been a particularly demanding task, which further suggests that soil operations were not appropriately performed, or were done too infrequently. In his report, agronomist Rodríguez noted that before he took over at La Florida orchard, weeding was done with a cultivator designed for work in vineyards «only twice in the season». The result was «virtually negligible», and meant «the neglecting [of] one the most important cultural operations». Therefore, he corrected this by starting weeding two days after the first irrigation, and using a Syracuse 17-spring rake drawn by a horse; lowering the instrument's springs to a maximum proved most effective, for it did a «splendid job» removing all weeds, and leaving «the soil loosened, soft, and level». The issue was this task's impact on production costs. If weeding was properly performed, a rake was enough and the cost was \$7 per hectare; if it was not periodically done, however, «weeds grow back making it necessary to use the plow, which would cost \$16 per hectare». The use of different weeding implements as determined by need could also be seen at Las Lilas,

where weeding was also a frequent issue. It required the use of a «Planet cultivator if weeds are still short, a 4 and 6-spike American cultivator if they grow tall, and an American plow if the ground is covered by tangled weeds» (Rodríguez, 1923: 28)¹². As the previous example suggests, cultural operations applied to the soil were frequently done with instruments originally manufactured for vineyards, such as Avery compact plows and Planet cultivators. Occasionally, growers themselves also modified or crafted more suitable implements. By 1910, the use of specialized, modern orchard implements was taking hold, however; their diffusion can be glimpsed by noting that some hardware-importing companies specialized in the distribution of tools and implements for fruit crops, such as special plows and tilling instruments, pruning and grafting tools, fertilizer spreaders, pulverizers for pesticides. That was the case, for instance, of Raab, Bellet and Co., and Bisquertt House, which both won prizes at the fruit exhibition held by the Agronomic Society of Chile in 1916¹³.

In all, according to Fred Motz, the weakest aspect in fruit growing was not soil cultural operations, but the poor tending of fruit trees. Chilean growers paid too much attention to «farming the land upon which orchards are planted, instead of feeding the trees and encouraging them to bear annual crops» (Motz, 1942: 41)¹⁴. In regards to thinning, for instance, «most growers do not understand the benefits of thinning and are opposed to the practice», and «every grower, more or less, follows his own ideas and cuts when and where he thinks the cuts will prove most effective». A remarkable case that gave credence to Motz's opinion, and probably explained it altogether, was that of Quechereguas, a large plantation he visited as part of his field research trip. This orchard had 300 acres planted to apples and 300 to prunes, and was then considered to be «the best» and «most important orchard in the central apple-producing district». Pruning was not done in accordance with «approved practices» since «when the trees are making good growth, pruning is confined to cutting back terminal growth with no thinning out». The result was that «many of the young trees are badly formed», which, in any case, was «a characteristic of South American fruit trees» (Motz, 1942: 16, 41). Motz also asserted that there was «no particular style of pruning that may be described as peculiar to the country». Yet, evidence suggests that growers preferred lower-headed trees, and were well aware of this system's advantages. Mr. Rubio, for instance, explained that at his plantations, trees were kept lower-

12. «Chacra Las Lilas», *La Agricultura Práctica*, 27 Aug. 1915, p. 157.

13. «La industria de la fruta en Chile. Su notable progreso», *La Agricultura Práctica*, 31 March 1917, pp. 1285-1292.

14. After the founding of the Instituto Agronómico in 1874, the number of orchards administered or supervised by an agronomist increased, which contributed to improving fruit-growing practices. As of 1902, 209 agronomists and 10 agricultural engineers had graduated from the Instituto, while other 1,400 students had audited courses at that university-ranked institution (SCHNEIDER, 1904: 145).

headed (less than 50 cms.), because this method «offer[ed] the greatest advantages for pruning, picking the fruit, treating diseases, and preventing breaking» of overbearing branches (Rodríguez, 1923: 8-10)¹⁵.

Chilean growers also had to fight several plagues that regularly affected horticultural crops in Central Chile. The most common diseases were gummosis and brown rot on citrus; leaf curls, Coryneum blight, powdery mildew, and black spot, which affected stone fruits; scab, codling moth, red spider, canker, mildew, and sousap disease in apples and pears; and black rot, crown gall, and phylloxera in grapes. Diseases were not difficult to keep in check, since «most growers in Chile are equipped with spray outfits» and the «larger orchardists» used «power equipment of standard North American makes, the results of spraying, on the whole, are effective» (Motz, 1942: 42). Evidence from individual cases confirms that growers, or the agronomists in charge of orchards, knew how to deal with pests using both homemade and industrial pesticides. As a result of growers' interaction with state agricultural services' personnel, modern implements and imported pesticides were normal elements in the operation of orchards around Santiago in the early 1920s. In La Florida, when agronomist Rodríguez took over, infestation with woolly apple aphid was «alarming», even though the owner had treated it with a homemade mix of a tobacco infusion and soda, just as the Plant Pathology Station staff recommended. Yet the applications had not been systematically carried out and results were very poor. By adding kerosene, Rodríguez obtained a more effective mix, which was tried in late April, «when *pulgones* start coming down». This time, however, pesticide was not sprayed, but applied by hand with brushes, a work several boys carried on with the help of stepladders. The procedure saved pesticide but labor costs were high so, the agronomist reflected, next time it would be better to do it «immediately after harvest is over, when wages may be lower, and before *pulgones* attack roots». Although in late September workers sprayed the ground next to the trunks with a solution of carbon sulfur, the *pulgón* reappeared in November. Mr. Rodríguez tried another spraying, this time with a pesticide imported from Switzerland which was said to have been «used with great success in several European countries» (Rodríguez, 1923: 13-17).

Although case evidence seems to confirm Motz's favorable opinion regarding Chilean growers' fruit disease control practices, it presents only one aspect of a more complex reality. As his examples suggest, Motz focused on large orchards, and thus most likely paid less attention to the situation of smaller growers. The same can be said of agricultural newspapers like *La Agricultura Práctica*, whose principal role was to divulgate the ex-

15. «Chacra Las Lilas», *La Agricultura Práctica*, 27 Aug. 1915, p. 157.

ample of diligent agriculturists. For many growers, however, disease control was a serious problem, especially in areas far from the reach of state agricultural agencies. In those cases, the results were not only low yields but also, and more importantly from a commercial point of view, fruit that could hardly compete in foreign markets where strong competition and more demanding consumers' preferences would quickly discard poor quality produce.

The fruit harvest was carried out by a labor force made up primarily of women and children. Like in the case of such traditional crops as wheat, the harvest of fruits was the work of wage-earners, that is, laborers that were paid a daily wage or *jornal*, often calculated by the number of baskets or boxes a person filled up in a workday. As a result, picking fruit was an opportunity to earn higher wages than those paid throughout the year in other tasks. Thus, the harvest attracted all sorts of rural workers, that is, *minifundistas* or precarious small owners, *inquilinos* or resident workers on haciendas and, especially, masses of *peones* who came from both within the hacienda and the outside (the so-called *afuerinos*), and moved along the central valley following the harvests in seek of temporary employment¹⁶. Mr. Motz noted that «all members of the family» participated, and «even small babies» joined in the activities. Impressed by the fruit pickers' gender and age diversity, he recalled the harvest as «a sort of holiday affair». Yet, to the eyes of the American specialist the work atmosphere could hardly resemble the demanding pace at which fruit harvesting operations were carried out in California. Fruit pickers worked in groups, but «roam[ed] about from place to place without any particular order or system». Moreover, pickers worked «by the day from sunup till sundown», and they were «never in any particular rush». In this fashion, although «primitive», the operations were «nonetheless colorful». Typically, a foreman «dressed in a bright poncho» presided over «from the back of his pony». Small boys «with a pad on their shoulders» carried boxes from the pickers to various concentration points. The fruit was then «loaded onto wagons», «heavy lumbering affairs», that had to be «pulled through the dusty, sandy soil by the ever-patient, plodding oxen» up to the packing-house. Overall, Mr. Motz judged, «in Chile, as in Argentina, harvesting operations are carefully carried out».

Actually, harvesting fruit was neither as picturesque, nor as unsystematic as it looked to the foreign expert. There existed an orderly sequence of tasks at both the field and the warehouse. Furthermore, in fruit growing prevailed a gender labor division whereby

16. Agricultural statistics do not permit us to estimate the number of workers permanently employed in the fruit sector, but a defining element of the agrarian expansion that Chile underwent from the 1880s to 1930 was the gradual reduction in the number of agricultural workers, from 412,568 in 1885 to 353,808 in 1930. Despite this, the agricultural sector expanded in terms of cultivated area and production, and also saw a remarkable increase in labor productivity (ROBLES ORTIZ, 2009a)

men's and women's tasks were clearly differentiated throughout the production process. At La Florida's apple orchard, the harvest commenced in late February, and lasted for at least a couple of weeks because not all apple varieties ripened at the same time, which made necessary several pickings. Apples were picked by two gangs, one of men and another of women. Men went around carrying a ladder and the proverbial wicker basket, and picked apples «from the ground and the trees». Women received the full baskets and put apples in larger baskets; then, they separated damaged from good apples, filled wooden bins, and loaded them onto the cart that carried produce to the warehouse. Agronomist Rodríguez's complaints about workers' performance further reflected the existing gender-based labor division. Whereas his detailed report contains no criticism against the presumably more careful female laborers, he strongly criticized «uncaring» male workers. Men determined apples' ripeness by the ease to detach the fruit, but this was «not the ideal procedure». «Not all fruit ripens at the same time», some «can be easily picked, other cannot, and in many cases it is necessary to give it several twists». As a result, fruit was «often...roughly twisted», and thus «removed along with whole fruit-bearing twigs». In light of that, the «bothersome training» of a «stubborn personnel with which it is necessary to deal in our countryside» was unavoidable (Rodríguez, 1923: 17-19, 38).

The packinghouse was also a gendered work space where women performed carefulness-requiring tasks, and the labor process was organized according to well-established practices in the fruit trade. At the orchard under the administration of agronomist Rodríguez, two gangs carried on the grading and packing from early March. Working at «tables covered with rugs, to avoid damaging apples», the first team separated the good from blemished apples, and graded good apples in three size categories, with 72 to 100 apples in a first-quality box, 113 to 125 in a second-quality one, and 130 to 160 in a third-quality box. Covered with straw to protect them from dew, baskets with blemished apples remained on the field overnight. The next morning, both gangs classified them into «dry blemished», which were only superficially infested with codling moth, and «wet blemished», or actually infested. Then, the second gang, which was composed of only women, shortened the stems and wrapped apples in satin paper. Finally, «using the Italian system», they filled «standard» wooden boxes that had the approval of the *Dirección de Servicios Agrícolas* and were sold by a local company. «This classification was adopted because it is the same one that prevails in fruit trading» (Rodríguez, 1923: 20-22). The adoption of international fruit-sorting criteria was but one of the many aspects that Chilean growers needed to address in order to meet the requirements of highly competitive international fruit markets. Indeed, they still had a long way to go in their efforts at reaching distant foreign markets.

4. A LONG SHOT. FROM ORCHARDS TO MARKETS

By World War I, Chilean growers had to overcome a number of problems if they wanted to be successful in international markets. The crucial issue was developing a competitive fruit supply, for which they needed to reduce plantations' diversity and concentrate on fruit varieties approved by consumers in markets about which they knew little. Specialization was also critical to increase the output of quality produce and thus provide a steady supply throughout the season, which would make Chilean producers reliable partners for international fruit traders. Yet, none of these changes would be easy to effect in a society in which fruit crops had long not been commercially relevant and transportation for perishable products was virtually non-existent.

4.1. «Museums of Fruit Varieties»

Plantations' excessive tree diversity was an obstacle to the standardization of orchards, and one of the issues that most concerned agricultural experts. Agronomist Rodríguez noted that growers did not know which varieties they should concentrate on because they had not studied the markets and consumers' preferences. «As of late», he observed, «some efforts» at determining which fruit varieties were best for export had been made; yet, it turned out that «many of them did not even exist in the country, or are so difficult to grow», that agriculturists gave up and embarked on cultivating other crops «which seemed to be a safer investment» (Rodríguez, 1923: 2-5). There existed many fruit orchards where conditions of production were not in accordance to the requirements of the foreign markets. Apple orchards in southern Chile were a case in point. As concluded in an agronomy study, in setting up plantations agriculturists followed no other criterion than «personal taste», and the «expectation of selling their products in the local market». The result was such that on some orchards plantings looked like «veritable museums of varieties», which, in addition, had several other fruit trees. Analyzing the situation of peach orchards, in 1925 agronomist Alfonso Lazcano complained that «there is much left to be done; actually, everything, to produce fruit that may compete abroad»; and openly blamed agriculturists by asserting that «everyone plants whatever pleases him, and in whatever form» (Lazcano, 1925: 24-25; Muñoz, 1921: 3).

The standardization of plantations, however, was not a minor change in crops that took at least five years in bearing fruit, since it required re-grafting trees with selected «export varieties». In the case of apples, the second largest single fruit crop, standardization faced an important obstacle: nurseries were «just starting to produce apple trees of export varieties», and therefore, «farmers have not had the opportunity to purchase

seedlings of appropriate quality» (Lazcano, 1925: 24-25; Dirección General de Estadística, 1938: 94-97). The problem was not so serious for large growers, who had their own nurseries, where they not only cultivated seedlings, but also tested new varieties, tried new grafting methods, etc. (Espínola, 1916: 482). In addition, state agronomists carried on «extension campaigns» aimed at inducing landowners into shifting to varieties more appropriate for export, such as the «acid-tasting and colorful Delicious», instead of the «yellowish and not so acid Huidobros and Reinetas». The newly established *Servicio de Arboricultura Frutal* campaigned among growers to promote re-grafting, and in 1925 it commissioned a team of experts to conduct «massive work in the south» (Lazcano, 1925: 25). Yet, as late as 1936, Huidobros and Reinetas were the most diffused varieties, with about 100,000 bearing trees, or 21 percent of the total (Dirección General de Estadística, 1938: 66-69).

In planting those varieties, growers had not given up to the alleged lack of export varieties seedlings. Instead, they had chosen to cultivate rapid-growth varieties that proved most suitable for the home market. According to agronomist Alejandro Rodríguez, the Huidobro was «one of the few varieties that are not attacked by the *pulgón lanígero*», its yields were «usually large», and its consumption was «widely diffused in the country». American fruit expert Fred Motz concurred, pointing out the Huidobro's «versatility and cropping habits», for the tree was a «good bearer» and the fruit itself, «being a large heavy apple, is capable of producing considerable tonnage». Given these characteristics, Huidobro apples were the best choice, and it was thus unsurprising that local markets were «fairly well supplied throughout the greater part of the year with home-grown offerings of apples». The bad news was that for export the Huidobro was merely a «green, unattractive apple», which «outside of Chile and a few neighboring countries it is virtually unknown». No wonder, «exports to European markets have not been very successful because of its appearance» (Motz, 1942: 21).

The diffusion of export varieties demanded a sizeable investment that many growers could not afford, or saw as a risk they did not want to take. Understanding that situation, agronomist Rodríguez wrote in 1923 that the formation of cooperatives was «the only means to bring the industry out of the 'homemade nature' it has now» (Rodríguez, 1923: 3). Some fifteen years later, however, Motz observed a slightly changed state of affairs. Several apple varieties better suited for foreign markets were grown in Chile, but at a modest scale. In some cases Chilean producers obtained fruit that «compared favorably with some from the best producing districts in the Pacific Northwest», but they were not as extensively planted «because of their late bearing habits». In short, as Motz categorically asserted, «capital is not plentiful, and many growers prefer to plant varieties that will give quick returns» (Motz, 1942: 19-21). Yet, by 1940 a number of growers were replacing old

varieties with «apple trees of better known sorts, such as Delicious, Johnatan, and King David», which were «planted between the Huidobros». This trend was associated with the establishing of the *Asociación de Productores de Manzanas y Peras de Chile*, a cooperative of growers of apples and pears whose members produced about 80 percent of these crops' total output (Motz, 1942: 21).

4.2. Inadequate Packing Methods and Materials

Inadequate packing was another significant problem that militated against the expansion of fruit exports. Some growers had introduced standard fruit-packing equipment but they had not been equally successful in implementing appropriate procedures, which were indispensable for a newcomer like Chilean fruit to meet the requirements of international markets. In many cases the primary fruit-sorting facility was merely a makeshift shed on the field (the proverbial *ramada*), but the number of warehouses for fresh fruit increased with the expansion of the fruit industry in the early twentieth century. In the late 1930s, «many of the larger orchards» had their own packing houses equipped «with modern sizing machinery and the usual accessories». Thus, Motz noted that Chile had «ample storage facilities to take care of its immediate requirements». As was the case of commercial orchards, the bulk of storage space was concentrated in Santiago and Valparaíso, and only «a few small houses» were located in the interior. Santiago plants had a combined capacity of about 100,000 boxes and Valparaíso warehouses could store about 450,000 boxes; these facilities largely varied in size, however, for their capacity ranged «from 4,000 to 200,000 boxes» (Motz, 1942: 44).

While storing capacity was in keeping with fruit industry's needs, packing practices fell short of standards for export fruit, a problem which shows that growers neglected a crucial aspect in fruit-growing: the training of labor. Motz visited several large orchards, and reported that, in general, «the packing of apples leaves much to be desired», because even though the «box pack» was the standard method, workers were not sufficiently trained «to put up a high-class pack». Instead, the fruit was «loosely wrapped» and the pack was «loose and slack». In addition, although packers claimed that they reduced the temperature of the fruit «from 66° to 72° F [18 to 22° C] to 32° to 36° [0 to 2.2°C] in just 48 hours», such rapid reduction was «probably seldom accomplished, owing to the methods used in stacking the boxes». In fact, «in those storages visited by the writer», boxes were stacked «as tight as possible, [with] no allowance being made for air circulation and quick refrigeration» (Motz, 1942: 46). Deficient packing could be seen even in the best fruit-growing areas. In the Llay Llay valley, for instance, well-to-do growers produced honeydew melons using seed imported from Rocky Ford, Colorado, in order to keep the seeds pure and

prevent crossing and degeneration. Yet, these «export melons» were packed in crates containing 5 to 12, and often 8 melons each, «under ordinary stowage» and thus frequently arrived to New York «in poor condition and require[d] repacking». Fortunately for growers, despite their apparent lack of interest in training labor, workers seemed quite capable of packing fruit. Thus, Motz commented with optimism that «On the whole, however, the results could be much worse. The Chilean is a conscientious worker and anxious to learn, and certain defects that are more or less conspicuous today should be overcome as experience points the way» (Motz, 1942: 44).

The commercialization of Chilean fruit in conditions appropriate to compete in foreign markets faced another problem in the limited availability of proper packing materials. With few exceptions, growers produced their own boxes instead of purchasing packaging supplies from manufacturing companies. In this regard, export table grapes were a case in point, since according to a contemporary study the «most widely» used «poplar boxes» were «easy to make anywhere...by the producer himself». The situation of the Chilean grape industry contrasted with that of Argentina, since Mendoza and San Juan growers used «only two kinds of boxes» that were «in accordance with international requirements, chiefly those of the London's Covent Garden», which had «imposed the so-called BAP box made by the Buenos Aires to the Pacific Railroad Company». In addition, Chilean growers did not use other packing systems, such as cork dust-filled barrels in which Spanish growers shipped grapes to distant markets, even though Almería grapes were imported into southern Chile (Motz, 1942: 43-44). The Chilean government assumed an active role in the mid twenties, implementing initiatives aimed at facilitating growers' access to information on packing materials and fruit-grading categories. In 1922, it imported a plant for canning the fruits and vegetables produced at the state-owned experimental station, the Quinta Normal, but also to provide that service to growers who could not afford purchasing their own canning machinery. Quinta Normal's cannery also offered practical lessons on packing systems and materials, according to international standards. Peaches, for instance, were canned in five size-and-weight categories «following the American system», and packed in wooden boxes tailored after «the Californian Standard boxes» (Correa Vergara, 1938: 245; Muñoz, 1921: 29). In 1929 the government established mandatory quality controls at the main ports, to ensure that only duly classified and standardized fruit was embarked. According to agronomist Oscar Besoain, this one was a «timely measure» because prior to it shipments were not subject to any regulations and exporters sent the product «in whatever way, which was immensely affecting the serious businesses, and discrediting our market». In fact, Chilean fruit exporters knew that the markets they were targeting had high standards, and thus they cannot expect to make any significant progress if they did not meet them:

It is incredible how accustomed the yankee [sic] market is to accepting only those shipments whose packing is perfect and appearance flawless, in which grapes are very well selected, the box's content is uniform, weight is the same in all boxes (10 pounds), and the amount is what the market demands (Besoain, 1929: 41).

In sum, such packing problems as incorrect packing-house practices and use of inadequate materials indicate that Chilean agriculturists had a long way to go to become competitive exporters. Unfortunately for them, there were still more problems along the road from orchards and packinghouses to markets.

4.3. Lack of Shipping Infrastructure

In the first decades of the twentieth century, it was not easy to ship fresh fruit to the core areas of the country, let alone to distant regions. Railways illustrate the problem of Chile's paucity of transportation for fresh fruit and vegetables. Chilean railroads became the principal means of transportation for agricultural commodities. Yet, railways companies had a limited capacity for transporting perishable products within the country, and provided little transportation toward neighboring nations. According to US expert William R. Long, while some private railways used «roughly constructed iceboxes in which to haul perishable foods», as late as 1930 the state-owned *Ferrocarriles del Estado* was the only company that offered refrigeration service in properly equipped cars. State Railways' rolling stock was technically adequate, but rather small: only 31 refrigerated cars of American construction, each with a 30-ton capacity (Long, 1930: 30)¹⁷. This modest equipment provided long-distance transportation for a variety of commodities, but on a limited basis and not always under appropriate conditions. Trains including refrigerator cars ran as far as between Puerto Montt and Santiago and Valparaíso, over a distance of 1,265 kilometers; they also provided service at a number of small towns in the vicinity of large cities from which produce was regularly shipped to wholesale markets. Service seems to have been flawed, however, by deficient operation and lack of storage facilities. According to William Long, not only were the cars not refrigerated at all in the winter, but «even in the summer refrigeration is not well regulated». Besides, «no use has yet been made» of other systems, such as ventilated cars or «cars equipped with brine tanks». Moreover, there were «no refrigerating storage houses at any of the railway terminals», which, he pointed out, was «one of the great handicaps in shipping perishable food products in this country» (Long, 1930: 30). If under these circumstances it was difficult for growers to ship fruit within Chile, shipping to neighboring countries was not possible at all until as late as 1910.

17. In 1958 there were only about 20-30 refrigerated rail cars in Chile (FITZSIMMONDS, 1958: 4).

By 1930 the «Transandine Railway» was the only railway that linked Chile with Argentina, the only neighboring country to which Chilean growers could expect to export fresh fruits by surface. It connected Santiago and Valparaíso's rich agricultural hinterland and the fruit belt in the Aconcagua valley, with Mendoza but, more importantly, also allowed connection with Argentinian railroads and thus access to Buenos Aires, one of the markets Chilean growers sought to secure for their fruit, mainly apples. The characteristics and protracted construction of this railroad, however, provide another example of the obstacles that long limited the growth of fruit exports. From the city of Los Andes, the railway stretched for 71 kilometers in its Chilean section to cross the Andes through a 10,391-foot-long tunnel at 3,185 meters of altitude; then it went down another 179 kilometers to Mendoza. The project was started in 1888 with a concession granted to the «Chilean Transandine Railway Company», a British firm under whose administration freight service was not inaugurated until two decades later, in May 16, 1910. Hardly an impressive railroad, it featured a 1-meter-gauge, and 126 freight cars pulled by steam locomotives; the Chilean section was partially electrified only in 1927. Despite its limitations, the Transandino served as an instrument for increasing the trade of agricultural commodities between Chile and Argentina, especially in horticultural products; in the 1920s the overwhelming majority of the tonnage of agricultural products was made up of both dried and fresh fruit as well as vegetables (Long, 1930: 30).

Yet, evidence from growers suggests that a railway owned by British capitalists was not necessarily to the service of Chilean fruit exporters. In this regard, Juan Nicolás Rubio's interview with professor José Manuel Espínola in 1916 provides us with a glimpse into the sort of problems growers faced. Although probably war-related restrictions in maritime traffic and the on-going economic crisis in Chile may account for some exaggeration, «Don Nicolás», showed no hesitation in complaining that

The Argentine Republic consumes twice or three times as much as our production of canned fruit, but we do not even send one box because transportation costs and duties prevent even the most modest attempt. As an example, consider the following: To ship to Buenos Aires seven small boxes of canned fruit that are worth about \$100 pesos, we have to pay the 'misery' of \$254... This happens because of the infamous Trasandino. Shipping by steam is little less than \$96, plus the delay, risks and losses. If this happens [in our trade] with Argentina, with regard the other [Latin American] Republics the situation is surely the same or worse (Espínola, 1916: 482).

Although contemporary analysts and growers paid a great deal of attention to markets in neighboring countries, they considered them only a first step in the expansion of

fruit exports. The most important destinations for Chilean fruit, they believed, were to be the markets in Europe and, especially, the east coast of the United States, which they expected to be able to supply in the northern hemisphere's off season, thus taking advantage of Chile's location in the opposite hemisphere. By the mid 1910s, this had proven quite a challenge. As National Agricultural Society's agronomist Roberto Opazo observed on the eve of World War I, «the cause why the fruit industry has not developed is the lack of export markets» (Opazo, 1913: 36-37). To a large extent, this situation was the result of inadequate maritime transportation for fresh fruit, even though, as another reflection of Chile's growing integration into the world market, steamship companies had gradually expanded in the second half of the nineteenth century.

By 1900 a handful of steamship companies controlled the maritime traffic on the west coast of South America, regularly connecting Valparaíso with those countries that growers and analysts saw as potential markets for Chilean fruit. Yet, serious problems restricted maritime transportation in general, and the shipping of fresh fruits in particular. Port infrastructure was lacking in many aspects. According to Reginald Lloyd, editor of a comprehensive study on Chile, «with a few exceptions», the Chilean ports were «simply open roadsteads». In Valparaíso, «the chief port commercially on the west coast of South America», shipping operations were «mostly carried on in the open», and thus faced great difficulties during the winter and early spring bad weather months. Port improvement works were long discussed, but a major remodeling of the port of Valparaíso was not begun until 1912, in preparation for the increase in maritime traffic that was expected to follow the opening of the Panama Canal. It was hoped that the new facilities would allow the «rapid and all times safe handling of cargoes», and contribute to overcome the «disadvantages from which Valparaíso has frequently suffered» (Lloyd, 1915: 202-203). In addition to infrastructure problems, transportation was restricted by large steamship firms' control of the traffic and imposition of freight rates. That was the case «after a long tariff war» between the Pacific Navigation Steam Company (PNSC) and the Compañía Sud-Americana de Vapores (CSV), which, according to Lloyd, «mutually agreed a schedule of fares». Chilean sources, however, assert that the Sudamericana was forced to accept a traffic and tariff agreement imposed by PNSC, which severely restricted its operations (Lloyd, 1915: 208; Uribe, 1904).

The lack of refrigerated cargo space in steamers was far more serious a problem. As late as World War I outbreak, none of the companies operating in the country offered refrigerated transportation service, most likely because of the small magnitude of Chile's international trade in fruit and other perishable commodities. The issue was of obvious relevance considering the distance between Chile and the target markets in Europe and the United States. In fact, contemporary analysts often pointed it out as the foremost ob-

stacle to the expansion of the fruit industry. As agronomist Roberto Opazo conceptualized the situation in 1913, «being so distant from the European market, and not having refrigerated containers», meant that growers «have not had the necessary stimulus». Besides, he added, «the need to invest larger amounts of capital» than in other crops, the several-year-long wait to obtain profits from fruit crops, and the lack of competent personnel «have discouraged agriculturists and contributed to the fact that we [actually] do not have this industry» (Opazo, 1913: 36-37).

Yet, by the time Opazo wrote that pessimistic note, growers' situation seemed just about to change for the better. In June 1913, the government had signed a contract with the «Austro-American Co.» to establish, starting in July 1914, a «subsidized route» to Argentina, Uruguay, Brazil, and Western Europe. As experts from the Foreign Relations Ministry's Trade Department explained, the company was «obliged to reserve freights for agricultural products at a convenient rate». In requesting so, government's goal was not only to provide shipping to Europe, but also to help fruit exporters regularly supply Chile's neighbors. More importantly, however, Chilean agrarian analysts and growers' greatest hope was the Panama Canal. They confidently believed that the Canal was going to solve transportation problems. The critical issue was not freight rates, but the more basic one of making steamship companies accept to ship the, presumably not very large, fruit cargoes at all. By facilitating the maritime traffic between the west coast of South America and the North Atlantic markets, Chilean experts thought that the Canal would stimulate the establishment of new steamship companies, thus intensifying competition among old and new firms, and forcing them all to not reject any cargoes. Furthermore, the lack of refrigerated transportation would be at last overcome since, the Ministry's experts hoped, «some of these [new] lines will bring special refrigerated chambers to transport fruits and other commodities that require them» (Ministerio de Relaciones Exteriores, 1914: 5-8). Similarly confident, Mr. Opazo believed that the Canal «will bring us ten days closer to the large fruit-consuming markets in Europe and New York, and it will be possible to ship in refrigerated containers all sorts of fruits at a remunerative price» (Opazo, 1913: 37).

Unfortunately for Chilean growers, the outbreak of WWI delayed the much-expected expansion of fruit exports. The war drastically reduced the world's maritime traffic, severely affecting a peripheral economy like Chile's. Since the number of steamers and the total available tonnage plummeted, freight rates soared not only for international but also national shipping. For instance, the annual average nominal freight rate for nitrate shipped from northern Chile to the United States rose from 18-26d. per ton in 1911-1913 to 160d. in 1918 (Véliz, 1961: 320-321). Under these circumstances, would-be fruit exporters could hardly increase the still modest level of their business. As the situation of

the shipping industry changed after the war, the last decade of the Nitrate Era saw a promising growth of fresh fruit exports. They rose from an average of merely 174 tons in the 1915/1919 period, to 4,416 tons in 1925/1929. More significant than these still modest export figures, Chilean growers had become able to reach the US market. Now having refrigerated liners providing service at Valparaíso, they began shipping table grapes, apples, and pears to the east coast. The «Grace Line» provided «direct and safe service», so that «fruit arrived in perfect condition and obtained general approval» (Besoain, 1929: 35, 40). At a long last New York was getting closer.

5. CONCLUSION

Like in other countries of Mediterranean-type agriculture, Chile witnessed the expansion of the horticultural sector in the late-nineteenth and, particularly, early-twentieth centuries. As a result, by 1940 fruit was commercially grown in a number of incipiently specialized areas scattered throughout the country's agricultural regions, above all, in Central Chile's fertile longitudinal valley. The expansion of fruit growing also played an important role in the transformation of rural society, bringing about the formation of a new sector of agriculturists and further contributing to the growth of the rural working class. As some landowners became growers concerned with transforming fruit growing into a new agricultural export sector, work at both orchards and the fruit canneries was performed by a wage-earning labor force composed of men and, especially, women and children. In short, the expansion of the fruit sector went along with the diffusion of capitalist relations in the Chilean countryside.

However, the «fruit industry» did not emerge as a significant agricultural export sector, and thus the Chilean experience differed from that of other countries or regions with Mediterranean-type agricultures. Given the increasing but limited possibilities that the internal demand offered, export markets were indispensable for the expansion and specialization of fruit growing in Chile. From the late-nineteenth century, increasing globalization and competition required that growers introduced a number of changes in production and commercialization methods if they wanted to succeed in supplying distant markets. Yet, Chilean growers faced important obstacles to develop a fruit industry capable of competing in the globalized fruit market.

Lack of capital to modernize an activity that demanded substantial investment led growers to develop orchards primarily geared for the home market and which were not yet specialized. Instead of evolving toward monoculture, still in the 1930s, growers cultivated not only several fruit crops, but a wide range of varieties even on the most ad-

vanced orchards. Further, seeking to fully exploit orchards' typically expensive land and trying to compensate for the long gestation period of fruit trees, early-twentieth-century growers frequently interspersed them with specialty crops, and even grains and fodder. In all, these particularities of the fruit industry in Chile made sense given the constraints to export, and thus reflected growers' strategy to secure a share of the domestic market.

Introducing scientific knowledge and technological innovations to make fruit-growing a competitive sector proved another critical problem in a country where agronomic institutions were still incipient. Although from the 1870s on, an increasing number of agronomists meant that more orchards were under the administration of agricultural experts, state agricultural boards specifically geared to provide assistance in fruit-growing did not come onto the scene until as late as 1925. Yet, the incorporation of expertise-supplying actors and institutions was, arguably, insufficient to encourage growers to correct inadequate fruit farming and packing practices, especially if commercial prospects were not inviting for would-be fruit exporters. In fact, by World War I the pioneering efforts some agriculturists at exporting fruit to the large markets in Europe and the United States further revealed the limitations of Chile's fruit sector. The home market fruit varieties that growers had traditionally cultivated were inappropriate for export, since consumers did not know, or did not approve of them. Shifting to «export varieties» was an expensive business that not only required capital, a rather scarce element according to both foreign observers and fruit growers themselves, but also expertise and biological inputs that were not available in Chile or that many could not afford.

Most significantly, it was extremely difficult for fruit exporters to succeed in an under-developed economy that posed formidable obstacles to the commercialization of fruit and horticultural products. Above all, lack of appropriate transportation for fresh fruit proved a decisive obstacle to the emergence of a fruit export sector. In a country where highways were «a thing of the future», as a foreign analyst asserted in 1940, Chilean railways were not up to the task of compensating for the poor transportation infrastructure. By 1930, railway companies still had a strikingly low number of refrigerated cars, and thus their capacity for safely shipping highly perishable goods was at best very limited. Maritime transportation to distant markets was not any better. Steamship companies operating on the west coast of South America expanded during the second half of the nineteenth century, but as late as World War I none of them offered refrigerated transportation. Chilean fruit exporters had to wait until after the War for the Panama Canal to be operative and the traffic re-established, to have liners featuring refrigerated containers that were able to ship fresh produce to New York.

In sum, the first decades of the twentieth century witnessed not only the formation of a virtually nation-wide fruit industry, but also the constraints growers faced to develop it into an export sector. Still, the early «fruit industry» set the foundations and the potential for catching up with the California model. «The envy of the average Chilean fruit grower is the market of 130 million people in the United States, all of whom are regarded as potential consumers of Chilean fruits. Instead of offering a market for American fruits, Chile is looking toward the United States as an outlet for its surpluses» (Motz, 1942: 46).

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APPENDIX

TABLE A.1
Fruit & Walnuts Exports, 1916-1935 (metric tons)

Year	Fresh Fruit	Dried Fruit	Walnuts	Year	Fresh Fruit	Dried Fruit	Walnuts
1916	211	810	2,800	1926	2,290	1,101	1,727
1917	235	871	2,868	1927	9,813	1,707	2,501
1918	316	705	2,539	1928	3,242	1,440	2,172
1919	160	1,392	2,571	1929	4,993	1,523	2,942
1920	324	1,544	1,783	1930	5,156	1,275	1,933
1921	506	1,306	2,943	1931	6,524	1,201	1,103
1922	1,754	1,950	2,390	1932	8,657	1,834	2,621
1923	1,233	2,045	1,737	1933	9,835	2,289	1,703
1924	930	2,281	2,320	1934	12,992	2,142	2,432
1925	1,742	1,967	2,459	1935	9,900	1,908	969

Source: Anuario Estadístico & Dirección General de Estadística (1938).