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December 2012

CALIFORNIA'S FRUIT COCKTAIL: A HISTORY OF INDUSTRIAL FOOD
PRODUCTION, THE STATE, AND THE ENVIRONMENT IN NORTHERN
CALIFORNIA

A Dissertation

Presented to

The Faculty of the Department of History

University of Houston

In Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

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ABSTRACT

In the twentieth century, canned food became ubiquitous in the United States. As Americans moved to new environments, such as cities, food became more difficult to grow or catch, and people became dependant on food markets. Innovations in transportation, processing, and packaging met demands for a stable urban food supply, and regions specializing in food processing emerged. California became the fruit and salad bowl of the nation as its citizens committed farmland to produce, and food-processing facilities across the region dried, canned, and packed the state's harvest. By the 1920s, the northern California fruit canning industry became the national leader of the canned fruit market.

The history of northern California's canned fruit industry reveals the growth of agro-industrial space and the degree to which industry, agriculture, and cities struggled to gain control over the rich resources in the San Francisco Bay Area, Sacramento-San Joaquin Delta, and Central Valley as California became a dominant political and economic force in the United States. Regional production networks emerged that were essential in supporting the fruit canning industry that included grower organizations, canning organizations, suppliers, growers, and government agencies. The canneries were vital to the region's economy and influenced the use of resources. Fruit canners supplied millions of jobs and contributed to the booster-created image of California as a source of vitality through their marketing campaigns.

Despite the canneries' many supportive networks, northern California was a contested space in which other networks, which included those of miners, farmers, growers, environmentalists, the federal government, and urban developers, sought to use

or market the region's resources. Canneries were among the most important forces shaping the landscape as they influenced land-use choices, dumped enormous volumes of waste, and used prodigious amounts of water. Visions of resource use held by supporters of agriculture and canneries often conflicted with other groups in California.

The history of fruit canneries in California presents a view of industrialization not often found in narratives about the process in the East. It also reveals how food tied together consumers and a food producing regions, and how both sides influenced each other through that bond.

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LIST OF COMMON ABBREVIATIONS

B.O.D.	Biological Oxygen Demand
Calpak	California Packing Corporation
CFCA	California Fruit Canners Association
CLC	Canners League of California
CVRWQCB	Central Valley Regional Water Quality Control Board
FDA	Food Drug Administration
Libby	Libby, McNeill & Libby
TG	Turlock Cooperative Growers
NCA	National Canners Association
SFWPCB	San Francisco Pollution Quality Control Board
TVG	Tri Valley Growers
TVPA	Tri/Valley Packing Association
USDA	United States Department of Agriculture

INTRODUCTION

My mother always taught me to keep a few canned goods in case of an emergency. One event drove her lesson home and allowed me to see a particular food in a new light. On September 13, 2008, I was a graduate student living in Montrose, an older neighborhood with lush gardens and shady tree-covered streets near downtown Houston. On that day, Hurricane Ike roared across the shores of Texas and into the nation's fourth largest city. As a native Houstonian, I did what I could to prepare, but I was not overly concerned. After all, I had lived through hurricanes my entire life, and Houston was about fifty miles inland from the Gulf of Mexico and storm damage was usually minimal. So, I gathered a few odds and ends, filled some containers and the bathtub with water, and sat through the storm. One of the most beautiful elements of Houston's landscape turned out to be a liability as Ike passed through. The hurricane fiercely shook the big beautiful trees that cover the city. The winds detached limbs and ripped entire trees from the earth that, in turn, pulled down power lines. Most Houstonians lost electricity immediately after the storm, and many people had their power restored in a few days or a week. Some waited much longer. I waited seventeen days for electricity to return to my home.

Those post-Ike days changed my outlook on material goods and resources. Rising temperatures and the absence of air-conditioning forced me to leave the doors open inviting into my home the mosquitoes that proliferated in the flooded city after the storm. In the evening, I read assigned books by headlamp with the perfume of citronella candles wafting by. As the days stretched on without power, my food stocks decreased, and I reached deeper into the cabinet. At the back, I found canned fruit cocktail. I had eaten

fruit cocktail before but was never really a fan of the squashy fruit in its syrupy medium. I kept it around because my mother had instilled in me to the value of storing a week's worth of canned goods in the pantry at all times, and fruit cocktail was better than other processed food alternatives. I served myself the fruit cocktail without expecting much, but after weeks of peanut butter sandwiches, it was ambrosia. The experience reminded me of the long rafting trips on the Rio Grande with my family when I was a child, and how even Spam, another product I never ate at home, tasted good after a week of limited food options. There in my sweltering apartment with the flicker of citronella candles dancing on the walls, I began to think about the role that food played in our lives. Had others relished canned fruit the way I had that night?

As an historian and a consumer, I contemplated other questions. Early research revealed the dominance of California in the fruit canning industry, and I was eager to learn how it emerged as the national leader. What was the impact of national consumer demands on the economies and environments of food-producing regions in northern California? Where did the fruit come from? Who grew the fruit and put it in cans? Who insured there were no insecticides, residues, or antibiotics in canned peaches? How did canned foods reach the grocer? And what was the history behind fruit cocktail? Why did it include peaches, pears, pineapples, grapes, and cherries? Why were there so few cherries?

Most Americans today cannot answer these questions about fruit cocktail or the majority of the other foods they eat. Throughout the late nineteenth and early twentieth century, people produced less of their own food and the distance agricultural products traveled from the field to consumers' tables grew longer, drastically obfuscating the

origins and stories behind the food Americans eat.¹ Industrially produced goods increasingly filled their daily diets. The growth of food processing in the United States is a result of several larger trends that accelerated after the Civil War. Western expansion, industrialization, urbanization, and modernization touched the lives of all Americans, and the history of food processing is a way to understand how during the late nineteenth and twentieth centuries these forces altered a fundamental connection between humans and nature, food production. California's fruit canners were a vital part of the American industrial food system, and their story reveals how Americans' eating habits affected food marketing and distribution by connecting urban and rural areas, changed business and government relationships resulting in an associative state, and changed the way many groups -- growers, canners, consumers, and cities -- used the resources of northern California.

Northern California's industry led the nation in canned fruit production by the 1920s because it centered upon a single large company, California Packing, which emerged as a majority producer, and a strong trade association, the Canners League of California, which connected the canners in marketing and production decisions. In the first three decades of the twentieth century, California's fruit canners succeeded because they forged intricate and far-reaching networks of production that captured trade associations, university scientists, banks, trucking companies, scavenger companies, lug box makers, can manufacturers, and cannery supply manufactures. Regulatory agencies became part of the network by assisting with market expansion and domination. The networks altered how Californians used land in the cities and the fields, managed the

¹ Ann Vileisis, *Kitchen Literacy: How We Lost Knowledge of Where Food Comes from and Why We Need to Get It Back* (Washington: Island Press/Shearwater Books, 2008).

flow and health of waterways, and disposed of waste. Business consolidations were common during the late nineteenth and early twentieth century. However, the northern Californias' deciduous fruit canners created much larger organizations and held much more influence over the national industry than any other state or company.

Geography and environment were essential factors in the success of the California fruit canners. The abundantly fertile soil and temperate climate of northern California provided an ideal environment for deciduous fruits. Peaches and pears brought by Spanish missionaries did well in the Central Valley and in the valleys around San José. The geography also included gold, and its discovery facilitated the state's entrance into the United States while drawing thousands of people. Among the many hopeful people drawn to California were a large number of entrepreneurs. When food shortages emerged, ambitious capitalists, such as the earliest canners, used that fertile soil and temperate climate to seize opportunities. On the other hand, geography also presented obstacles. The Rocky Mountains separated the canners from markets in the eastern United States and Europe making transportation costs expensive. The canners and growers also encountered problems from their environment in the form of periodic floods, droughts, insect infestations, and plant disease. To overcome obstacles, especially in production surpluses, transportation, and marketing, the canners joined forces through corporate combinations and a trade association instead of competing with each other.

The production network provided integral support for the canneries in many ways as the manufacture of canned goods became a regional enterprise with national and international markets. While some parts of the network supplied raw materials, others were more pivotal in organizing the industry. A trade organization, the Canners League

of California, oversaw distribution and lobbied for government support at the turn of the century. It eventually proved vital at times of crisis, such as the botulism scares in the 1920s, organizing committees to increase production or solve problems, distributing information useful to canners and consumers, and compiling statistics for the industry. Local universities played fundamental roles in California's canning industry through their research into new food products and by training thousands of food scientists to work in the canneries or for government agencies.

The history of these fruit canners also reveals the dramatic ways that production transformed the environment of northern California and the way in which Californians understood this environment. As noted above, integral to the canners success was the climate of northern California as it suited deciduous fruit and grape production. Over time the canners' successfully marketed specific varieties of fresh fruit, sometimes in response to consumer demands and because of the complications of manufacturing such as the removal of the peach pit. These marketing patterns, in turn, changed land use patterns in Santa Clara County and the Central Valley as more growers planted peaches, pears, and grapes. Canneries used copious amounts of water in their operations, which placed them in the middle of the heated fight for California's limited water resources. Orchards and canneries produced huge quantities of organic waste every year during the harvest, altering the region's riparian ecology and creating a pungent nuisance that was tolerated because of the jobs and profits canneries contributed to local economies. The Sacramento-San Joaquin Delta connects the San Francisco Bay Area to the rivers of the Central Valley and contains vital wetlands for the Pacific Flyway. The changing uses of land and water encouraged by agricultural industries, such as fruit canning, dramatically

changed the habitat of this important avian migratory route. The canners' demands encouraged single-crop land use that decreased biodiversity, required large amounts of water for irrigation, necessitated fertilizers, and invited plant disease and pests which growers often treated with chemicals that worked their way through the soil into underground water sources or washed away into rivers.

The California's fruit canning industry's history also illuminates the function of the associative state model. Federal and state governments rarely regulated the processed foods industries until the early twentieth century, and even then, federal regulation remained relatively weak when it came to canned fruits and vegetables. State regulations often mimicked federal regulation, but not all states actively enforced the rules against influential food processing industries. To both supplement and control government activity, trade associations, such as Canners League of California, monitored the quality of food production by using educational and coercive strategies. California's canning industry, for example, engaged in self-regulation until a botulism outbreak in the 1920s. However, even then the industry used the power of the state to force the creation of an industry-based monitoring group that might otherwise have been illegal under anti-monopoly laws. In an almost symbiotic relationship, California's fruit canners assiduously used, and sometimes manipulated, the assistance of government agencies in marketing and crisis resolution to increase their hold on national and international markets.

While this dissertation is largely chronological, each of the chapters addresses a theme central to the history of the history of the fruit canners. The first four chapters discuss the period before 1940. The first chapter explains the creation of the industrial

food network in America and how it reached California, and it explains how the state's resources were ripe to take advantage of the opportunity to develop into an industry. Chapter two explains how the fruit earliest fruit canners developed alongside the fruit industry and the chaotic conditions that emerged from the early relationships between canners, growers, and early fruit markets. In response, canners created production networks to overcome the problems of the first three decades of the twentieth century. Companies began to consolidate at the end of the nineteenth century forming a large corporation that set the tone for the development of the twentieth century. Pieces of the network came together quickly after 1900 as industry growth accelerated rapidly. Chapter three analyzes the canners' relationships to growers, labor, and urban governments and economies as cannery operations became more concentrated in northern California cities. Overlapping production networks aided the canners in developing those relationships, but also led to coercive situations as other people bristled at the canners' growing influence. Chapter four covers public health concerns regarding processed foods, such as the botulism scare. It considers how rising interest in public health by the state resulted in regulation, sometimes self-regulation, and illustrates how the state became more deeply involved in the canners' production networks.

The last three chapters primarily examine the mature fruit canning industry from the 1940s to the 1960s. Chapter five introduces an essential element of military history by revealing how the canners' efforts to address the needs of America's soldiers, sailors, and marines changed the industry. The chapter begins with World War I and ends with the Cold War, analyzing how each effort to meet the unique demands of each conflict led to technological and business innovations in the canneries. Chapter six addresses the

challenges California's canners faced after the war to keep up with the rapid expansion of agricultural and food processing businesses that favored large, national companies and innovative new products. As companies got larger, resistance to national products and processed food began to emerge at the heart of California's fruit canning industry.

Chapter seven examines the cannery waste problem. The large amounts of organic waste generated during the harvest season had existed from the first days of fruit canning in California, but it became a more pressing problem after World War II. The concentration of canneries in cities meant a concentration of waste as well. With new demands on urban resources, the growth of new business sectors, and the rise of environmentalism limited the canners' political and economic influence and their ability to dump their waste in the region's waterways.

Just as many fruits made up fruit cocktail, many groups contributed to the formation of commercial canneries in California and their production networks. This dissertation explores the emergence and expansion of commercial fruit canneries in Northern California, from the San Francisco Bay area through the Sacramento-San Joaquin Delta and down the San Joaquin River into the Central Valley. The state's canning industry created complex production networks that integrated growers, suppliers, distributors, government agencies, and university researchers. All of these groups worked to facilitate the preservation and transportation of the fruits of Northern California's orchards to national and international markets. It is an inherently Western story. The region did not sit on the periphery of American industrialization, but instead, in particular sectors such as food production, was the driving force of economic, cultural, and environmental change in the United States. By 1920, California dominated the

American canned fruit industry. The impacts of these networks were far-reaching; they changed the nature of corporate organization, the manner in which government and business interacted, the way people used arable land and other valuable resources, and the type of foods that Americans eat. Yet, after World War II, a mature industry faced new challenges within the consumer society that had facilitated its growth. New demands on water and urban resources, changing consumer tastes, and a nascent environmentalism grounded, in part, in newfound affluence highlighted the limits of those essential networks. In the end, the history of northern California reveals the larger story of the industrialization of the food supply, the blurring of rural-urban boundaries in modern food processing, the growing power of large business organizations and their frequent partnerships with big government, and the increased distance between consumers and the environment that produces their material goods.

CHAPTER 1 – CREATING THE INDUSTRIAL FOOD SYSTEM IN AMERICA

Fruit cocktail is one of the most recognizable foods in America. Most people have eaten it, maybe in green Jell-O at a family event, as part of lunch in a school cafeteria, or perhaps in a C-ration during military service. Despite this ubiquity, few know the history behind the cans of peaches, pears, grapes, pineapples, and maraschino cherries languishing in sugary sweet syrup. As a product, a can of fruit cocktail encapsulates the development of a modern industrial food supply. The most prominent items on the label are the corporate logo and the name of the food. While simple symbols, they represent years of effort by cannery executives and other businessmen for trademark protection. With the Del Monte Shield, for example, California Packing Corporation, now known as Del Monte, tried to convey an idealized vision of California and its produce. The industry standardized the name “fruit cocktail,” and canners, the United States Department of Agriculture (USDA), and the Food and Drug Administration (FDA) agreed on the product’s specific contents to give consumers a consistent, reliable, and safe product. Consumers also find on labels a list of ingredients and nutritional details, the result of FDA victories to protect and inform consumers. The fruits in the cocktail are primary crops of California, except for the pineapple tidbits, but the use of pineapple demonstrates the expansion and strength of investments by Californian businessmen in Hawaii. The metal can itself evolved over decades of trial and error and industrial research. Today consumers enjoy the sanitary can and its ridges that confirm a canmaker did not solder the lid closed by hand. Instead, a machine sealed the can by crimping the lid tightly around it, making the closure more consistent, faster, and cleaner.

The ridges allow the can to expand or contract depending on its subsequent environments, giving producers greater flexibility in international markets. Fruit cocktail was born in a research lab at the University of California, Berkeley, as an experiment designed to help fruit processors use raw materials more efficiently. Fruit cocktail, like other processed foods, was a collaborative effort of business, government agencies, and university researchers. The last vital element of the mix was the consumer. For mothers, soldiers, students, or miners, processed foods filled a vital need as Americans produced less of their own food and increasingly traveled to foreign lands to seek new fortunes or fight the nation's wars.

The way people eat reveals much about a society. Contemporary food studies seek to understand "the relationships between food and the human experience."² Done well, these studies allow us to examine politics, economic change, power structures, and connections to the environment.³ Eating exclusively native flora and fauna requires an extensive knowledge of one's environment.⁴ Historians and anthropologists have argued that sustaining a population required an understanding of abundance and scarcity, and the ability to operate within those parameters or to alter them. The penalty for exceeding the

² Jeff Miller, *Food Studies: An Introduction to Research Methods* (Oxford ; New York: Berg Publishers, 2010), 3.

³ *Ibid.*, 1–7; Warren James Belasco, *Food: The Key Concepts*, *The Key Concepts* (Oxford ; New York: Berg, 2008), 1–3; Vileisis, *Kitchen Literacy*; Robert Chester III and Nicolaas Mink, eds., "Having Our Cake and Eating It Too: Food's Place in Environmental History, a Forum," *Environmental History* 14, no. 2 (April 2009): 309–311; Laura McEnaney, *Civil Defense Begins at Home: Militarization Meets Everyday Life in the Fifties, Politics and Society in Twentieth-century America* (Princeton, N.J: Princeton University Press, 2000); Jane Dusselier, "Understandings of Food as Culture," *Environmental History* 14, no. 2 (April 2009): 331–339; Nancy Shoemaker, "Food and the Intimate Environment," *Environmental History* 14, no. 2 (April 2009): 339–344.

⁴ William Cronon, *Nature's Metropolis: Chicago and the Great West*, 1st ed. (New York: W. W. Norton, 1991); William Cronon, *Changes in the Land: Indians, Colonists, and the Ecology of New England*, 1st rev. ed., 20th-anniversary ed. (New York: Hill and Wang, 2003); Kent G. Lightfoot, *California Indians and Their Environment: An Introduction*, *California natural history guides* 96 (Berkeley: University of California Press, 2009).

limits of an environment was severe.⁵ The age of European migration to the Western hemisphere that began in the late fifteenth century dramatically displaced populations and the number of people living in foreign environments grew exponentially. Environmental historians have argued that these migrants shaped their new environments to meet their needs and create a more familiar setting by importing animal and plant species that allowed them to eat familiar food.⁶

Finding, producing, and storing food has been one of the most time-consuming tasks throughout human history. Although humans need food regularly to survive, in most climates nature provides much of her bounty only at certain times of the year. It takes extensive knowledge of the local environment to be able to survive as a hunter-gatherer. Agriculture helped solve this problem to a degree by producing more food more regularly, but to take full advantage of the agricultural abundance, people developed food preservation methods.⁷ Like agriculture, food preservation depended on climate. The heat of the Mediterranean made it possible for Sicilian fishers to dry their catch and distribute it throughout Europe. Cod fishermen in the Northern Atlantic

⁵ Donald Worster, *Dust Bowl: The Southern Plains in the 1930s* (New York: Oxford University Press, 1979).

⁶ Alfred W. Crosby, *The Columbian Exchange: Biological and Cultural Consequences of 1492*, 30th anniversary ed. (Westport, Conn: Praeger, 2003); Alfred W. Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900-1900*, 2nd ed., new ed., Studies in environment and history (Cambridge: Cambridge University Press, 2004); Thomas R. Dunlap, *Nature and the English Diaspora: Environment and History in the United States, Canada, Australia, and New Zealand*, Studies in environment and history (Cambridge, U.K: Cambridge University Press, 1999); David J Weber, *The Spanish Frontier in North America*, Yale Western Americana series (New Haven: Yale University Press, 1992); William W. Dunmire, *Gardens of New Spain: How Mediterranean Plants and Foods Changed America*, 1st ed. (Austin: University of Texas Press, 2004).

⁷ Sue Shephard, *Pickled, Potted, and Canned: How the Art and Science of Food Preserving Changed the World* (New York: Simon & Schuster, 2000).

experienced a less advantageous climate, and alternatively filled their hulls with salt, allowing the fish to dry as the fishermen returned to Europe.⁸

Although not always understood as such, preventing food from spoiling was essentially a battle against bacteria. Left unchecked, these microorganisms could eat food faster than humans could consume it. Food preservation has been part of humanity's long struggle to conquer nature, to control and force it to bend to its needs. William and J.R. McNeill explain that humanity's greatest evolutionary gift was its ability to arrange environments to best suit the chances of survival.⁹ The history of food production illustrates this challenge. Over centuries, farmers found many different ways to force the land to produce to its limit, but processing and preserving techniques made it possible to stretch food long past the harvest and eliminate some of the waste attributed to decay.

Large-scale food processing also is not new to modernity; it has been around for thousands of years. Supplying armies required huge amounts of dried, salted, pickled, and cured meats, vegetables, and grains. Sources from ancient China explain that soldiers in first century C.E. went off to fight with dried grains and meats in their bags. Roman soldiers ate dried elk while on the march. In the fifteenth century, Polish soldiers fighting for Ladislaus Jagiellon had dried fish for rations. Biscuits and baked grains were essential for European navies because they were compact and stored for a long time. Bakers competed to create the longest lasting and most reliable biscuit to garner valuable

⁸ Kenneth Pomeranz and Steven Topik, eds., *The World That Trade Created: Society, Culture, and the World Economy, 1400 to the Present*, 2nd ed. (Armonk, N.Y: M.E. Sharpe, 2006); Mark Kurlansky, *Salt: A World History* (New York: Penguin Books, 2003); Shephard, *Pickled, Potted, and Canned*.

⁹ Robert McNeill and William H. McNeill, *The Human Web: A Bird's-Eye View of World History*, 1ST ed. (W. W. Norton & Company, 2003).

military contracts. Obtaining and preparing food for rations was a vital part of military planning.¹⁰

Another solution to feeding displaced people emerged in the late eighteenth century in response to the age of imperialism. Frenchman Nicolas Appert (1749-1841) was one of the earliest food scientists, even though he did not use the term himself. Gaining experience in the kitchens of French aristocracy, he eventually opened his own confectionary in an expensive Parisian shopping district. At the same time, he continued to experiment with ways to preserve food. Eventually, he created a new procedure for food preservation that all modern canners use today. He wanted to provide products that preserved the flavor and texture of foods he had prepared. Appert's method required heating food at high temperatures and then sealing it in an airtight container. Tested with the French military stationed in distant unfamiliar lands, the food remained fresh and tasty after months of travel across the world. An added benefit of canned food was that it provided a taste of home. For example, Appert experimented with beef stew, offering a nutritious and familiar food for Frenchmen living on the edges of the empire. Canned food provided a new source of nutrition for those who did not produce their own and gave some level of comfort in a foreign environment.¹¹ British entrepreneurs quickly borrowed Appert's method of canning and improved upon his idea by replacing glass jars with tin cans. Thick glass was expensive to produce until the mid-twentieth century. Tin was less expensive and more durable making preserved foods easier to transport and

¹⁰ Shephard, *Pickled, Potted, and Canned*, 28–61, 200–212.
Ibid., 226–254.¹¹

store. This new product caught on quickly in a world of industrialization and imperialism as Europeans traveled the globe.¹²

The modern food processing industry is more extensive and intensive than anything that existed before it because of industrialization. The food processing industries that developed in America during the late nineteenth century, however, added new layers of modernity: large business organizations, advanced machinery, scientific research, and government intervention. Anthropologist Jacky Goody argues that mechanization, the rise of retail and wholesaling systems, and transportation advances were pivotal to the building of industrial food systems.¹³ Beginning in England in the eighteenth century, industrialization rapidly spread through the Western world, fundamentally contributing to changes in all aspects of human existence, including landscapes, types of work, socioeconomic systems, gender roles, agriculture, and diet.¹⁴ Industrialization drew people to cities and affected food production in several ways. Changes in production, such as the creation of factories, and new forms of business organization made vitally important tasks more efficient. Later, railroads, dedicated machines, and electricity provided technologies that increased the output of food processors. In the nineteenth century, food-processing industries emerged across the United States. The largest coordinated industry in America in the nineteenth century was meatpacking. It first became a huge industry in Cincinnati, also known as “porkopolis,” and subsequently the Chicago Stockyards centralized many markets for meat. On other

¹² Vileisis, *Kitchen Literacy; Shephard, Pickled, Potted, and Canned; Stuart Thorne, The History of Food Preservation* (Totowa, N.J: Barnes & Noble Books, 1986).

¹³ Jack Goody, “Industrial Food: Towards the Development of a World Cuisine,” in *Food and Culture*, ed. Carole Counihan and Penny Van Esterik, 1st ed. (New York: Routledge, 1997), 338–355.

¹⁴ Harvey A. Levenstein, *Revolution at the Table: The Transformation of the American Diet*, California studies in food and culture 7 (Berkeley: University of California Press, 2003). In addition to change in economics and infrastructure, Harvey Levenstein suggests that between 1880 and 1930 “economic, social, and ideological forces” (viii) drastically altered the way urbanites ate.

fronts, fisheries on both coasts dried, salted, and canned millions of tons of fish.

Processed fruits and vegetables began to show up on retail shelves in America in the early 1800s but still did not constitute a large part of the food processing industry at the end of the century.¹⁵

Food Processing and the Environment

In the nineteenth century, many Americans found themselves living in environments where it was difficult to grow their own food. Food processing, particularly packaged foods, grew to fill holes in the market. Some people moved to unfamiliar places and had little local knowledge of their environment. It is not surprising that canned food became an important product during the Gold Rush of 1849. It later helped feed the miners of the Comstock Lode and Klondike Gold Rush. As Historian Kathryn Morse explains, canned food gave people sustenance, and it also brought familiarity to those living and working or traveling in foreign environments. Canned food helped make it possible to survive without knowledge of the local environment or dependence on it. Morse reports that Pork and Beans were a familiar taste in the Klondike Gold Rush; it reminded miners of home.¹⁶ Overland travelers during the era of western expansion brought processed food with them, including canned vegetables and crackers.¹⁷

Industrialization contributed to greater urbanization, which in turn, supported further industrialization. The resulting confluence of people, energy, and technology in

¹⁵ Dried fruit was the first preserved food product on the market.

¹⁶ Kathryn Taylor Morse, *The Nature of Gold: An Environmental History of the Klondike Gold Rush* (Seattle: University of Washington Press, 2003).

¹⁷ Reginald Horsman, *Feast or Famine: Food and Drink in American Westward Expansion* (Columbia: University of Missouri Press, 2008).

physically restricted space created many social and environmental changes, which included changing the way Americans obtained what they ate. Many Americans and new immigrants resided in increasingly crowded cities where they lacked the space and time to raise fruits and vegetables or tend livestock.

By 1920, the majority of Americans lived in the nation's cities. Urban grocers offered processed foods for hungry consumers. Over time, supermarkets replaced general stores and more and more prepared products filled the shelves.¹⁸ Californians had changed the way they ate as the forty-niners became permanent settlers and San Francisco and other cities blossomed. Agriculture, which began with farming and ranching before the gold rush, soon turned to fruits and vegetables, which were much harder to ship long distances or store for extensive periods. California's fruit canning industry helped solve this problem and became part of the rapidly growing industrial food networks in the state and nation. Moreover, the earliest commercial canners in California even tried to sell in other markets in nearby developing Western states, Eastern urban markets, and British markets. From early experiments canning in small agricultural outbuildings or kitchens to specially built factories, California canners expanded production through increased mechanization and used research to find solutions to accelerate processes. Some very small canning operations existed in sheds and kitchens, but the industry quickly became one of large and mid-sized companies and over time, smaller companies were unable to compete in the new world of modern industrial food.

Food Processing and the Environment

An examination of the history of fruit canning in Northern California provides insights into the many ways the industry affected a region that played a central role in the

¹⁸ Laura Shapiro, *Something from the Oven: Reinventing Dinner in 1950s America* (Penguin Books, 2005).

national food industry. California's canneries were some of the largest contributors to America's canned food supply, a leadership position they maintained throughout the twentieth century by meeting the demands of American consumers. Throughout this time, the industry employed thousands directly and indirectly. Contributing more than economic return to the Golden State, the canning industry brought significant environmental changes to the region.

California encapsulates the great diversity in people and geography of the American West in a much smaller space. From Native American settlement to the various migrations that defined the Golden State, an increasingly diverse collection of people settled in Northern California in the mid nineteenth and early twentieth centuries. As they moved into cities, mountains, and valleys, they transformed the environment to meet their changing needs. Some cut down trees in densely forested lands, others tried to grow crops in arid areas, and a few more sought to capture the fruit of the sea along the Pacific coastline. The areas of California that had the most economically lucrative resources were not the only ones that underwent the conversion. Landscapes considered wastelands, such as deserts and wetlands, became places people thought required transformation to become more profitable or they cities and companies employed them as disposal spaces for other activities. California's diverse landscapes provided many disparate opportunities.

Water, mountains, and valleys defined and differentiated the landscape of the San Francisco Bay and Sacramento-San Joaquin Delta region in Northern California. The mountains are fundamental to the weather patterns and water cycles of the region. In winter, snow collects along their ridges. During spring, billions of melted snowflakes

join and drain into mountain streams that become rivers in the valleys. Flowing along with rain and melting snow in mountain water is precious topsoil collected in rivulets and streams from as high as 14,000 feet, pulled for miles down mountainsides into rivers, and eventually deposited within the delta during seasonal floods. It provides rich soil and replenishes the region.¹⁹ The rivers flow together in the Delta and escape to the Pacific Ocean through San Francisco Bay. The mountains and valleys are also geographic markers. Generations of Californians identified themselves based on the valley in which they lived. The omnipresent mountains offered constant reminders of one's place in the world. It is not surprising that the best-known brand produced by California's canneries was Del Monte, which is Spanish for "of the mountain." The brand paid homage to the magnificent geological formations and connected it to the health and luxury associated with California's landscapes.

Many of those landscapes, of course, straddle a fault line that defines much of its geography. A birds-eye tour of California from North to South reveals rainforests in the North that flow into the bountiful Sacramento-San Joaquin Delta marking the end of Northern California. The Sacramento River feeds into the Delta from the North. Connecting into the Delta from the south is the San Joaquin River, part of the broad Central Valley that stretches from Northern California to Death Valley. Along the northern coast are redwood forests and cliffs that abut the Pacific Ocean. The ocean provides food and creates the mild climate of central coastal California from San Francisco to San Diego as ocean breezes blew into the central coast mountain range. Only a short distance from the coast, the Central Valley is warmer and more arid. The

¹⁹ Lightfoot, *California Indians and their environment*; Ann Foley Scheuring, ed., *A Guidebook to California Agriculture* (Berkeley ; Calif: University of California Press, 1983); Philip L. Fradkin, *The Seven States of California: a Natural and Human History*, 1st ed. (New York: H. Holt and Co, 1995).

drier valleys in Southern California required extensive irrigation to produce their legendary abundance of citrus fruits and vegetables, and the Central Valley required similar systems. Given its aridity, the transformation of the Imperial Valley into an agricultural region was a modern miracle according to California's boosters.²⁰

California includes some of the extreme landscapes of the West and the United States. Found there are some of America's highest peaks and lowest valleys. The cold of the Sierra peaks stands in contrast to the heat of the Mojave. The fertility of the delta region opposes the sterility of Death Valley. From this environmental variance come California's natural advantages.²¹ The structure and location of the mountain ranges in California bring an abundance of good soil and mountain water to the Central Valley, although they also prevent rain from dispersing evenly across the state and contribute to the aridity of the Great Basin in Nevada. In a region of aridity, mountains prevent rainclouds from drifting past the Sierra Nevada Mountains and make many wetter parts of California extremely valuable.²² California's rich landscape had much to provide those who settled there over the centuries, if they knew how to use the state's bountiful resources.

The canneries were part of a larger process in which Americans imprinted their perception of land use on the geography of Northern California. Historian Andrew Isenberg argues that Americans in California throughout the nineteenth century sought to

²⁰ Fradkin, *The seven states of California*.

²¹ Steven Stoll, *The Fruits of Natural Advantage: Making the Industrial Countryside in California* (Berkeley: University of California Press, 1998); Andrew C. Isenberg, *Mining California: An Ecological History*, 1st ed. (New York: Hill and Wang, 2005). Stoll analyzes the growth of the fruit industry in California and argues that orchard capitalists shaped the landscape of California while taking advantage of the climate and fertility of California to build an industry. Isenberg provides several examples of how the introduction of the capitalist mentality altered the power structure of resource use in California along with dramatically shaping the landscape.

²² The American West as a whole has more acreage of aridity than the rest of the United States

impose a “rational economic order” on the landscape.²³ Networks of production assisted the cause providing capital and infrastructure that transferred the wealth created from production from one location to another. In Northern California, canneries used capital gained from the Gold Rush to produce goods they sold to miners of the Comstock Lode in Nevada.²⁴ This particular order was one Americans were transferring to all reaches of American territory. Across Alaska, Hawaii, the continental United States, and parts of the Caribbean and the Pacific, Americans tried to force whatever production was possible from the environment.²⁵ California canners expanded their interests to Alaska and Hawaii by 1916 and the Philippines by 1930.

The notion of contested space is a common theme in environmental history. Many Northern Californians sought to realize their vision for the best use of the resources of the region. Contested resource use in Northern California is not a new story. Connie Chiang’s *Shaping the Shoreline*, argues that Chinese fishermen, the sardine fishing and canning industry, and the local tourist industry competed for space on the Monterey shoreline. She explains how developing byproducts, such as reduction, was seen by those seeking to develop tourism to be a nuisance rather than a clever use of waste.²⁶ Other times, farmers and miners battled over spaces and resources to produce. Hydraulic mining emerged from the Gold Rush and made it easier to extract gold and minerals from the mountains, but required huge volumes of water and resulted in massive amounts of rock and silt that clogged up streams and destroyed river patterns. This destroyed

²³ Isenberg, *Mining California*, 19–21.

²⁴ Arthur I. Judge, ed., *A History of the Canning Industry by Its Most Prominent Men* (Baltimore: The Canning Trade, 1914).

²⁵ Richard P. Tucker, *Insatiable Appetite: The United States and the Ecological Degradation of the Tropical World*, Concise rev. ed. (Lanham: Rowman & Littlefield Publishers, 2007).

²⁶ Connie Y. Chiang, *Shaping the Shoreline: Fisheries and Tourism on the Monterey Coast* (Seattle: University of Washington Press, 2008).

farmers' access to water. During the late nineteenth century in California, there was a contest in the fields and the courts over water rights. Eventually, hydraulic mining declined from legal pressures and the decline in gold mining. As the mining industry declined and wheat farmers emerged as the key economic industry of the state, more frequently farmers won the contest over water rights.²⁷ California's ranchers too played a large part in the battle over water rights. Some historians argue that the role of Miller & Lux was pivotal to defining water law in California.²⁸

There also was a persistent struggle between grower and nature, as described by historian Steven Stoll. The growers of California constantly reorganized the landscape of California to make it more suitable for production. They increased irrigation and reorganized fields to suit particular crops. During a particularly bad nineteenth-century outbreak of citrus scale, a bug that attaches to and attacks branches and trunks, the USDA imported ladybeetles to fight the bug without chemicals. After World War II, growers increasingly sought chemical solutions to "pests" that stood in the way of their goals to produce large amounts of perfect fruit.²⁹ Tools, such as, chemicals, competing species, irrigation, and fertilizer, helped growers remake the land. This transformation of the lands, whether they were forests or wetlands into orchards pitted man against nature.

Cities influenced land use far beyond their boundaries, and historians have provided examples in many of the largest cities in America.³⁰ William Cronon discusses

²⁷ Isenberg, *Mining California*.

²⁸ David Igler, *Industrial Cowboys Miller & Lux and the Transformation of the Far West, 1850-1920* (Berkeley: University of California Press, 2001).

²⁹ Stoll, *The Fruits of Natural Advantage*, 103–106; Edmund Russell, *War and Nature: Fighting Humans and Insects with Chemicals from World War I to Silent Spring*, *Studies in environment and history* (Cambridge: Cambridge University Press, 2001).

³⁰ Janine Schipper, *Disappearing Desert: The Growth of Phoenix and the Culture of Sprawl* (Norman: University of Oklahoma Press, 2008); Michael F Logan, *Desert Cities: The Environmental History of Phoenix and Tucson, History of the Urban Environment* (Pittsburgh, Pa: University of Pittsburgh Press,

the idea of an urban hinterland expansively in *Nature's Metropolis* when he illustrates how the draw of natural resources to manufacturing and processing centers in Chicago affected environments as far away as the Great Lakes. He also explains that this process was part of the broader forces of rising consumerism, industrialization, and urbanization in America. Rather than identify certain types of bread or flour with localities and celebrating the diversity of taste, consumers expected every loaf to be the same. The drive for efficiency in processing food combined with consumer expectations for consistency encouraged food processors to standardize the incoming agricultural product, be it pork or grain, and the outgoing foodstuff. This in itself was a struggle with nature to create standardization and predictability. Changes in grain storage and processing altered, and standardized, the varieties of wheat crops grown in the Midwest thus removing the importance of origination from the grains provided by farmers.³¹ Kathleen Brosnan provides an expansion of this idea in a Western city, Denver, that she argues was responsible for the development of the region around it including the urban growth patterns. The ability of Denver's boosters to establish economic and legal control over

2006); William L Kahrl, *Water and Power: The Conflict Over Los Angeles' Water Supply in the Owens Valley* (Berkeley: University of California Press, 1982); Robert W Righter, *The Battle Over Hetch Hetchy: America's Most Controversial Dam and the Birth of Modern Environmentalism* (New York: Oxford University Press, 2005); Gerard T Koeppe, *Water for Gotham: A History* (Princeton, N.J: Princeton University Press, 2000); *Transforming New Orleans and Its Environs: Centuries of Change* (Pittsburgh: University of Pittsburgh Press, 2000); Craig E Colten, *An Unnatural Metropolis: Wrestling New Orleans from Nature*, Louisiana pbk. ed. (Baton Rouge: Louisiana State University Press, 2006); *Energy Metropolis: An Environmental History of Houston and the Gulf Coast* (Pittsburgh, Pa: University of Pittsburgh Press, 2007); Joel A Tarr, *The Search for the Ultimate Sink: Urban Pollution in Historical Perspective*, 1st ed. (Akron, Ohio: University of Akron Press, 1996); Sarah S Elkind, *Bay Cities and Water Politics: The Battle for Resources in Boston and Oakland, Development of Western Resources* (Lawrence: University Press of Kansas, 1998).

³¹ Cronon, *Nature's Metropolis*.

the region made the city the most powerful city in the state. Similar patterns of urban and urban/rural relationships emerged in Northern California around the fruit industry.³²

The history of the modern food-processing networks illustrates the major change in resource use and production that occurred across the United States in the early twentieth century. Canneries consolidated labor and production into very few locations. This centralization facilitated higher production, but it also concentrated waste and resource use, which was a key component in the changing relationship between humans and their environments. To increase production, cannery companies merged, streamlined canning procedures, and standardized products. As their efficiency increased, they were able to produce more canned goods and thus needed more raw materials. They purchased so much fruit from Northern California growers that they influenced the types of crops planted in the area. In this way, urban markets on the East Coast affected the environment of Northern California. The canneries became increasingly more precise and mechanized throughout the twentieth century. As a market developed for canned fruit, growers and food processors in Northern California began to grow specific varieties for canning, such as planting clingstone peaches rather than freestone peaches, instead of using canning as a backup for the fresh fruit industry. The number and size of canneries increased, and they organized trade associations. Government agencies and trade organizations opened labs and hired scientists to determine the best way to grow fruit for canning, define what the standards for canned fruit were, and decide how to most efficiently produce canned fruit. Unlike the reality of nature, canned fruit needed to be

³² Kathleen A. Brosnan, *Uniting Mountain & Plain: Cities, Law, and Environmental Change Along the Front Range*, 1st ed. (Albuquerque: University of New Mexico Press, 2002).

perfect to convince consumers it was a product of nature.³³ Growers had to produce in spite of nature. They had to overcome fresh fruit shortages due to drought and plant disease and produce an entire season's pack whenever the fruit was ripe. As peaches approached ripeness, a race against decay commenced; canners and packers had to process the fruit before it was lost. Canneries sought ways to overcome the restrictions and challenges of working in this environment by producing canned goods -- that ignored nature's cycles.

As markets for canned goods emerged, canning became a way to stabilize the unpredictable production quantities of the fruit industry in California. Unlike grains, fruits (especially deciduous fruits) have a short life span and require delicate treatment. Fruit marketing led consumers to expect flawless specimens at the market. Even with advances in packaging materials and refrigerated cars, this status was difficult to achieve. Additionally, not every pear or peach was of a high enough quality to fetch a high price at the grocers when it came off the tree. Canned fruit became an outlet for certain grades of fruit because consumer-perceived deficiencies could be hidden through peeling, cutting, and sweeteners.

Fruit cocktail presented all the leading deciduous fruit crops of Northern California, with the addition of Hawaiian pineapple. Pineapples were not a California crop, but their inclusion illustrates the region's early economic Pacific ties and the importance of San Francisco as trade center, port, and leader in the California canning

³³ Kendra Smith-Howard & Stoll both discuss the concept of "perfect" food products as part of modern agricultural development

industry.³⁴ The Hawaiian and California fruit industries sometimes competed for markets, but they shared an important capital base in San Francisco. Thus, it is an example of how far San Francisco's hinterlands extended.³⁵

Historians studying California's past often argue that land in Northern California ended up in the hands of those that used it most profitably until the twentieth century. In the mid-twentieth century, environmental philosophies began to change and environmentalists formed another group that contested resources use in California. From the late nineteenth century, canneries had gained quite a bit of control over the landscape of Northern California and exercised great influence within the West's agricultural industries. However, as federal funding increased opportunities around the San Francisco Bay, particularly related to developing universities and the military, farmland gave way to urban development. During World War II, federal funding fueled rapid urbanization of the Bay Area and threatened the very existence of the food production industry that had been so important to the area. The growth of industry in the Bay Area provided another use for land, housing. Miles of idyllic orchards were lost to what Malvina Reynolds has called "little boxes on the hillside" in her song inspired by suburban development in Northern California.³⁶

Water is an essential element in fruit canning for cleaning and preparation. Canneries also create huge quantities of watery waste. Initially, canners dumped the wastewater into rivers, but when this method caused fish kills, they turned to the most

³⁴ Hawaiian pineapple, Alaskan salmon, and tuna from American Samoa and the Philippines were all important parts of the larger canned food industry controlled by canneries that began in Northern California.

³⁵ Baby food and animal food were also important industries for lower grades of produce, but they will not be discussed in this dissertation because they became their own industries.

³⁶ Malvina Reynolds, *Little Boxes*, CD, *Ear to the Ground* (Smithsonian Folkways Recordings, 2000). Reynolds wrote songs and was an activist for social and environmental causes during the 1960s and 1970s.

prevalent form of sewage processing systems in the United States, municipal systems, when possible. After a few decades, the constantly increasing tonnage of industrial canning waste combined with drastic increases in municipal sewage overwhelmed municipal systems forcing canners to find other outlets for their waste. Over the twentieth century, cannery waste also underwent intense examination to determine whether it was of an acceptable level of purity to release into California's waterways.

In the discussion of industrial waste, many environmental historians focus on chemical and toxic wastes, while the difficulty of dealing with organic agricultural or food processing wastes has not received as much attention. When historians have analyzed the way people have managed non-synthetic or chemical waste, it has often been in reference to the Stockyards in Chicago.³⁷ Urban environmental historians also study organic wastes by following the history of waste disposal in cities.³⁸ Likewise, the beef and pork industries were changing the ways of the delivery, slaughter, and distribution, of these animals. The rise of railroads in America helped produce the world's largest stockyards in Chicago. Here herds were delivered and became part of a huge mass of animals that were slaughtered by assembly line methods. This allowed economy of scale that reduced the cost of meat processing, but also provided a large enough mass of animal pieces that cuts not normally purchased for consumption at a

³⁷ Louise Carroll Wade, *Chicago's Pride: The Stockyards, Packingtown, and Environs in the Nineteenth Century*, 1st pbk. ed. (Urbana: University of Illinois Press, 2003); Christine Meisner Rosen, "The Role of Pollution Regulation and Litigation in the Development of the U.S. Meatpacking Industry, 1865-1880," *Enterprise & Society* 8, no. 2 (June 2007): 297-347; Sylvia Hood Washington, *Packing Them in: An Archaeology of Environmental Racism in Chicago, 1865-1954* (Lanham: Lexington Books, 2005).

³⁸ Joel A. Tarr, "From City to Farm: Urban Wastes and the American Farmer," *Agricultural History* 49, no. 4 (October 1979): 598-612; Clay McShane, *The Horse in the City: Living Machines in the Nineteenth Century*, Animals, history, culture (Baltimore: The Johns Hopkins University Press, 2007); Tarr, *The Search for the Ultimate Sink*; Martin V Melosi, *The Sanitary City: Environmental Services in Urban America from Colonial Times to the Present*, Abridged ed. (Pittsburgh, Pa: the University of Pittsburgh Press, 2008); Martin V Melosi, *Effluent America: Cities, Industry, Energy, and the Environment* (Pittsburgh: University of Pittsburgh Press, 2001).

butcher shop could become part of an animal byproducts industry, thus reducing waste. However, historians have shown that despite the by-product industry the volume of waste from Chicago's Stockyards heavily contributed to the destruction of local water supplies and caused major health problems for the immigrant communities that surrounded the stockyards.³⁹

The history of California commercial canning provides perspective on the problem of organic industrial waste as part of the contested space of Northern California. In the mid-twentieth century Californians began passing legislation to protect the health of their environments and reduce the amount of waste in bays, streams, and rivers. This made it difficult for canneries to continue to dump their waste as they always had. The result was conflict between the canneries, the State of California, and cities. Because California was more aggressive than other states in regulating industry, one can examine the struggles between state and industry in an earlier period than in other states that were more accommodating to business.

The Role of the State in Growth of Food Processing Industries

American industrialization and urbanization lengthened the amount of time that food could travel from field to table. In the late nineteenth and twentieth century, the food supply network that began with the farmer and ended in the family kitchen added processors, brokers, grocers, and wholesalers. Over time, the link between producers to consumers transformed from simple, direct exchanges to a complex web so difficult to unravel that most consumers are not even aware of how many hands touch their food before they purchased. The dependency of most urban consumers left them with

³⁹ Washington, Packing Them in; Wade, Chicago's Pride.

uncertainty about the quality of food; there was little government protection before 1900. Over time, a number of mechanisms emerged that made consumers more secure in the suitability of their purchases; the state increasingly played a large role in developing these mechanisms.

During the last decades of the nineteenth century and throughout the twentieth century, the American state grew in size and authority. Philosophies of laissez-faire and individualism of the nineteenth century faded as industrialization, unfettered capitalism, and urbanization contributed to social turmoil and public health crises. While the federal government had assisted developing markets in the nineteenth century, it rarely regulated them or protected consumers. Following a strict constitutional interpretation, most politicians and lawmakers left the job of protection of citizens largely to the individual states. This situation proved a problematic aspect of federalism as businesses grew larger and routinely crossed state lines. Individual states rarely coordinated their regulation of industry, and did so ineffectively.

In its earliest formation, the United States Department of Agriculture (USDA) primarily worked to expand markets and assist farmers. During the era of westward expansion, when many people became homesteaders or farmers, it offered vital services, collecting and disseminating useful information on a variety of issues. Early fruit growers in California benefited from such efforts, but also drew on the related policies and services of the California Department of Agriculture. In time another federal initiative proved influential. The Morrill Land Grant Act of 1862 helped create land-grant universities that emphasized the study of agriculture. For example, the University of California was vital to the development of fruit agriculture and processing in

California. The Smith-Lever Act of 1914 added extension services that made information even more accessible to the farmer. The state at all levels supported agriculture and food processing.

In the age of Progressivism (approximately 1880-1920), some Americans grew tired enough of the excesses of capitalism to become activists. Some reformers feared large organizations, and preferred government control to the unrestricted activities of big business. Progressivism is a very broad term that encompasses many causes, strategies, and philosophies. Some progressives wanted to rid the United States of all alcoholic drinks. Others wanted to protect workers through labor laws and labor organizations. In the world of agriculture and food processing, two reform movements made substantial impacts: populism and pure foods. The Populist movement, which enjoyed its heyday in the 1890s, mostly involved farmers and agricultural concerns who sought government regulatory protection from railroad and food processing monopolies. However, Populists also wanted the federal government to step in between the individual and big business, a philosophy that matched the one possessed by many Progressive reformers as well.⁴⁰

The Pure Foods Movement finds its origins in the 1870s and involved many women who organized to protect their families from tainted foods. Agricultural chemists, such as Harvey Wiley, were also key supporters of the movement. Their efforts, along with those of others, culminated in the Pure Food and Drugs Act of 1906 and the subsequent creation of the Food and Drug Administration (FDA). The FDA sought to protect the food supply and insure purity through inspection of production systems. The

⁴⁰ Richard Hofstadter, *The Age of Reform; from Bryan to F.D.R.*, 1st ed. (New York: Knopf, 1955); Robert H. Wiebe, *The Search for Order, 1877-1920*, 1st ed., *The Making of America* (New York: Hill and Wang, 1967); Michael E. McGerr, *A Fierce Discontent: The Rise and Fall of the Progressive Movement in America, 1870-1920* (New York: Free Press, 2003).

agency tested chemicals to determine if they were too poisonous to use in food and promoted descriptive labeling of ingredients. Originally, the FDA was part of the USDA. However, there was an implicit contradiction in this partnership. The USDA's mandate was to expand agricultural markets and food production while the FDA regulated food production. Despite the potential conflict, the USDA also protected the food supply through inspection of food and agricultural facilities. Both agencies became increasingly involved in the canneries over the twentieth century to the benefit and frustration of cannery owners, particularly given its origins.⁴¹

The late nineteenth century birth of the fruit canning industry initially coincided with a period of relatively limited federal authority. This lack of oversight was often preferable for canners; yet, there were still areas where coordination and standardization would have been beneficial for them, especially those that owned the large canneries. In the void of federal regulations, the Canners League of California (CLC) emerged as a voluntary trade association that coordinated communication, considered the needs of the industry as a whole, and provided guidance. The CLC kept track of how many tons of fruit growers had for sale each year, the amount of canned fruit produced, and any legislation relevant to the industry. It made connections with local universities as well to help solve problems in the factory and field. CLC also served as the primary conduit for communication between the industry and the state. Historians have termed this style of relationship between business and government the associative state. Herbert Hoover, for

⁴¹ Oscar Edward Anderson, *The Health of a Nation*; Harvey W. Wiley and the Fight for Pure Food (Chicago: Univ. of Chicago Press, 1958); James Harvey Young, *Pure Food: Securing the Federal Food and Drugs Act of 1906* (Princeton, N.J: Princeton University Press, 1989); Lorine Swainston Goodwin, *The Pure Food, Drink, and Drug Crusaders, 1879-1914* (Jefferson, N.C: McFarland, 1999); Mitchell Okun, *Fair Play in the Marketplace: The First Battle for Pure Food and Drugs* (Dekalb, Ill: Northern Illinois University Press, 1986); Marc T. Law, "The Origins of State Pure Food Regulation," *The Journal of Economic History* 63, no. 4 (December 1, 2003): 1103–1130, (accessed May 24, 2012).

example, was a proponent of this style of governance because, he contended, it allowed industries to solve their own problems and thus minimized the role of government. However, as this dissertation illustrates, the associative state model was not strong enough to protect consumers.⁴²

At the state level, the California Board of Health held the responsibility for overseeing food production. In 1925, the state created the Cannery Inspection Board to regulate the sanitation of the canneries. Although funded by canneries, a state organization filled the gap left by federal legislation that failed to provide for ongoing inspection of canneries. During that time, the FDA and USDA lacked the authority and resources to check every processing facility. Although many businesses resisted regulation of their production facilities, canneries and canning trade organizations, such as the Canners League of California, had sought some form of state intervention since the turn of the century. Most canneries supported the Cannery Inspection Board because it provided an additional layer of legitimacy to their products. The concept behind the Cannery Board was that the cannery inspectors would identify and correct problems before the FDA discovered the problems. Although the Cannery Board monitored fish

⁴² Ellis Wayne Hawley, *The Great War and the Search for a Modern Order: A History of the American People and Their Institutions, 1917-1933*, St. Martin's Series in Twentieth Century United States History (New York: St. Martin's Press, 1979); Ellis Wayne Hawley, *Herbert Hoover as Secretary of Commerce: studies in New Era thought and practice*, Herbert Hoover Centennial Seminars 2 (Iowa City: University of Iowa Press, 1981); *Herbert Hoover and the Crisis of American Capitalism*, The American forum series (Cambridge, Mass: Schenkman Pub. Co.; distributed by General Learning Press [Morristown, N.J., 1973]; Louis Galambos, *Competition & Cooperation: the Emergence of a National Trade Association* (Baltimore: Johns Hopkins Press, 1966); David E. Hamilton, "Building the Associative State: The Department of Agriculture and American State-Building," *Agricultural History* 64, no. 2 (Spring 1990): 207–218, (accessed January 11, 2010).

and vegetable packing most heavily, the fruit canners also received the benefits of the regulation.⁴³

The Progressive era was just a beginning of federal government expansion. War also fueled new activities that enhanced federal authority. After the First World War, the USDA began to keep track of how much food America grew and produced. During World War II, laborers from Mexico became key workers in orchards during the lifetime of the USDA's Bracero program. After 1945, changing environmental philosophies across the nation resulted in the environmental movement and more focus on clean water and reduction of pollution. Labor organizations grew in power and in 1970 Congress passed the Occupational Safety and Health Act. New agencies and regulations affected the operations of the fruit canning industry in California and food processing industries throughout America. Thus, the expansion of the federal and state government in the twentieth century continued to prompt industrial change

The history of food processing is important because it occurred all across America, but the California canneries offer a unique western perspective on the national story, putting the associative state at the center of the narrative. Almost every region had a type of food processing facility. In much of the scholarship on food and agriculture, the emphasis of food production has been in analyzing production in the field, and the factory has been overlooked, except by labor historians. The fruit canning industry in Northern California dominated the canned fruit market making it a good case study because it is easier to localize and define than industries that cross many political borders. The majority of the fruit and canneries were located in a few valleys and counties. A few

⁴³ James Harvey Young, "Botulism and the Ripe Olive Scare of 1919-1920," *Bulletin of the History of Medicine* 50, no. 3 (1976): 372-391; Department of Public Health, "Historical Background Cannery Inspection" (State of California, 1952).

cities housed much of the industry, such as San José and Modesto. Thus, it is much easier to trace the origin of the fruit and find resources that encapsulate the entire industry. Analyzing an industry in one state also makes the impact of state level regulations and local history more clear. When dealing with a crop as widespread as corn or tomatoes in the United States, it is more difficult to discern the importance of locality to an industry.

In *Capitalism, Socialism, and Democracy*, Schumpeter puts forth the concept of creative destruction. Capitalism requires growth and vigorous renewal. Entrepreneurs push through existing markets with innovative techniques and products leaving older businesses in their wake. This opens a wave of economic activity that reaches businesses beyond the initial act of bold, brazen advance. Over time, this stabilizes and declines and another innovator emerges forcing competitors to change or close their doors.⁴⁴ This is the history of California's canning industry; they began as a needed innovation in the early decades of California's history and grew strong by taking the fruits of the orchards and sending them out across the world. The industry brought prosperity for some, but it contributed to a system of exploitation of environment and labor. When other heavy manufacturing and electronics industries grew in Northern California after World War II, the canning industry had to transform itself rapidly to survive.

⁴⁴ Joseph Alois Schumpeter, *Capitalism, Socialism, and Democracy*, 1st ed. (New York: Harper Perennial Modern Thought, 2008).

CHAPTER 2 – LEADERS OF THE PACK

In 1880, an elegant hotel opened on the shores of Monterey Bay in California. Exuding luxury, its builders drew on the beauty of the powerful Pacific Ocean that caressed the Coast Mountain Ranges and created California's dramatic coastline. The resort's management promoted the healing power and tranquility many people associated with ocean climes and the hotel provided all the amenities the privileged expected -- private beach access, superior service, extraordinary accommodations, and indoor pools. Adding to the resort's splendor, its creators built a scenic pathway through the redwoods and cypress trees, now famous as the Seventeen Mile Drive, which began and ended at the hotel entrance. Stunning ocean views offered spiritual and physical restoration or an afternoon of entertainment watching the sea lions. An incredible success in the end of the late nineteenth and early twentieth century, the hotel drew wealthy visitors to the coast for recreation and restoration. Its name, Del Monte, "of the mountain," became synonymous with luxury, health, and predictably excellent service.¹

The imagery of the salubrious mountains was so omnipresent in California and America that when several of the largest canneries in the state merged in 1899, they chose to name their common brand "Del Monte," claiming the purity, health, and luxury the name invoked, as the attributes that California canneries alone could provide. They packed the fruits of the orchards in the Bay Area, the Delta, and the great Central Valley into cans for consumption in places where such abundance was unavailable. The canneries' effort is but one example of how California businesses and boosters employed their state's environment to sell products, induce investments, and lure visitors and new

¹ Chiang, *Shaping the Shoreline*.

residents to California. By the twentieth century, branding was essential to consumer marketing, as the California Packing Corporation (Calpak) and Tri-Valley Packing Association (TVPA) discovered. Canners had merged or formed cooperatives to pool resources, and in California, the Canners League of California (CLC), the trade organization for canners, sought to maintain the image of all California brands.



Image 2-1 Del Monte Shield - Yellow Free Peaches Can Label from Author's Collection

The Del Monte Shield became one of the most recognizable food logos in modern America. Even today, it graces the labels of popular canned foods, such as peaches, pears, and fruit cocktail, and rarer ones such as white asparagus. Over decades this symbol came to represent quality, a standard of food production that consumers trusted when they purchased cans of peaches or pears. How did the Del Monte symbol earn this recognition and confidence?

The history of California's dominance of the American canned fruit market reveals a strategy of increasing organizational strength, often through corporate mergers or canner/grower cooperatives and the development of extensive, intricate production networks. Creating large corporations from the chaotic competition between many small or mid-size canneries was a strategic move designed to control production and marketing. Growers who felt at a disadvantage in negotiating with large corporations formed grower/canner cooperatives and canned the fruit from their orchards on their own. Through these forms of combination and cooperation, cannery executives overcame various disadvantages presented to the California industry, such as long distance transportation, to become national industry leaders.

The production networks included canneries, trade organizations, universities, and government agencies at the local, state, and federal level. As the production networks grew, so did the economic and political strength of the industry. The canneries, and their representative organization, the Cannerymen's League of California, made connections between the industry, growers, universities, and government agencies, and supported the rise of attendant industries -- box makers, can makers, sugar refiners, and others. As consumers' preferences crystallized and increased the canners' need for certain fruits, growers responded by filling their orchards with canning peaches and pears. The canning industry increasingly focused on how farmers grew their crops; higher quality raw materials resulted in a superior canned product. Standard sizing of raw materials increased production line efficiency as well. Through their interest in particular crops and fruit quality, canners asserted more and more control over the landscape of rural northern California. The state's canners developed these production networks, which

proved essential to their leadership of the nation's fruit canning industry, to control the chaos that once defined agricultural landscapes and markets.

The Chaotic Nineteenth Century Canning Industry

Looking back some 100 years, M. A. Clevenger, President of the Cannery League of California, explained that “the Gold Rush influenced the canning industry in two ways: ... by creating the circumstances under which canned foods were able to show their superiority to a then doubting public, and ... by opening up California, to become the greatest canning center in the world.”² In the mid-nineteenth century, entrepreneurs were testing what the fields of California could produce. Over time, irrigation projects unlocked the potential of the valleys facilitating almost unprecedented fruit yields in America. Boosters spread rumors of dramatic fruit profits drawing immigrants from overseas and migrants from the rest of the United States. The settling of California's fruit producing region, however, was more akin to a gigantic land grab by speculators and capitalist growers than the ongoing settlement of homesteaders.³

The Gold Rush had diverse and far-reaching effects on California. The population of San Francisco increased exponentially. Although the Gold Rush ended by the 1850s, the sleepy port town continued to grow. San Francisco had a population of about 800 in January of 1848 and 233,959 in 1880. By 1900, the population had reached 342,782.⁴ The city struggled with all the problems of a boomtown: rapid building,

² Notes from Speech Given by M.A. Clevenger on January 14, 1949. UC Davis Special Collections Food Processing Collection D-93 California League of Food Processors Box 1, Folder 1

³ Stoll, *The Fruits of Natural Advantage*.

⁴ James M. Parker, *The San Francisco Directory for the year 1852-1853* (San Francisco, CA: James M. Parker, 1852), 5; Campbell Gibson, *Population of the 100 Largest Cities and Other Urban Places in the United States: 1790 to 1990* (Washington, D.C.: U.S. Bureau of the Census, Population Division, June 1998), <http://www.census.gov/population/www/documentation/twps0027/twps0027.html>, (accessed September 29, 2012).

soaring rents, a high number of communicable diseases, and a food shortage. While the hide and tallow trade had been a large part of California's economy prior to the Gold Rush, agriculture had not played a significant role. The pueblos and missions provided enough food to feed the Spanish settlers and the Mexican ones that followed, but not much more than that. San Francisco boomed as the only port near the mines, but residents found it difficult to get food into both the city and mining regions. Fish were plentiful, but they had to obtain other food from elsewhere, often from the East where established food processors operated.⁵

The dream of striking it rich in the gold camps did more than lure hopeful argonauts, and it connected the state of California to the image of abundance into the Americans' minds. The widespread practice of "mining the miner" was one way in which many people survived, and in some cases became wealthy, during the rush. The gold rush turned San Francisco from a tiny, sleepy waterfront into the most important American port on the West Coast. San Francisco became the primary receiving point for manufactured goods shipped to California and the surrounding states until the completion of the transcontinental railroad in 1869. The rapid population expansion, development of infrastructure, and growth of support services for mining helped pave the way for other industries to develop. The city's merchants provided needed supplies and services, but they also sought to create familiarity in a foreign land by importing and eventually producing the food preferred by Americans.⁶ (see Appendix A for a detail of this region)

The gold trade also established the Delta region as an important transportation network and increased the regional population. Many of the newcomers turned to

⁵ Horsman, *Feast or Famine*, 171–221; Kevin Starr, *California: A History*, 1st ed., A Modern Library chronicles book 23 (New York: Modern Library, 2005), 71–100.

⁶ Isenberg, *Mining California*, 176–177.

farming. Arriving with the miners were Anglo-American farmers who rather than join the cattle industry brought large-scale agriculture to California in the form of wheat production. This hearty crop grew abundantly in the fertile soil of northern California and the Central Valley in particular, and it was able to survive the long shipping distances to get from California to Eastern markets. Farmers did not adopt large-scale wheat farming until the 1850s when the heady days of the gold rush had faded. The wheat bonanza itself diminished around 1880 as farmers discovered that wheat was not a sustainable crop in northern California. Within a few decades, crop yields declined because the method of wheat farming northern Californians used depleted the minerals in the soil.⁷

Deciduous fruits had been cultivated in northern California since the arrival of Spanish missionaries; however, they did not become an important nationally marketed crop because it was difficult for growers to transport them for long distances. California fruit remained at local markets. Refrigerated railroad cars began to solve this problem by preserving the fruit in transit. Growers formed associations to market their fruit together to reduce transportation costs. A “fruit boom” emerged in the 1860s that spread slowly from Santa Clara through the Delta, in towns such as Vacaville and Newcastle. Over time, orchards replaced wheat fields. Fruit paid better than wheat, and to feed the ever-growing consumer market they planted a variety of crops including pears, peaches, apricots, figs, almonds, walnuts, and grapes. While fruit growing eventually proved

⁷ David Vaught, *After the Gold Rush: Tarnished Dreams in the Sacramento Valley*, Johns Hopkins pbk. ed. (Baltimore: Johns Hopkins University Press, 2009); David Vaught, *Cultivating California: Growers, Specialty Crops, and Labor, 1875-1920* (Baltimore: Johns Hopkins University Press, 1999).

profitable, it also required substantial upfront expenditures and it took years for the first tree or vine plantings to bear fruit.⁸

The gold rush established a culture of intense capitalism as the newcomers to California sought to make it rich through mining, farming, or as mercantile. Historian Andrew Isenberg describes how Californians turned to other natural resources for their fortunes as gold mining increasingly became the province of large corporations that could afford the necessary capital investments. The economic environment created ideal conditions for the canning industry to emerge. People living in San Francisco and the mining camps of the Sierras or those who had followed the mining business to Nevada needed reliable sources of familiar foods like canned fruits.

Canning was a product of imperialism and industrialization. It provided a solution to feeding people in foreign environments with unpredictable food supplies, but it required a factory setting and precision to produce food safely and in high enough quantities to make a profit. California's climate and soil supported production of deciduous fruits; the many migrants provided a market and the entrepreneurs to launch a canning industry.

Early fruit processors, including vintners, driers, and canners, brought with them to California their own perspectives on how to utilize the land and exist within the environment of northern California. In coordination with the other groups living in the region, they helped shape the state in its formative years, employing the natural resources of California to their full advantage to obtain personal wealth. Fruit processors played a major part in the transformation of California's environment, culture, and government in which capitalism and its profits were priorities. Most of the forty-niners who moved to

⁸ Vaught, *After the Gold Rush*, 197–219.

California seeking fortune and economic opportunity were not Frederick Jackson Turner's homesteaders.⁹ The Americanization of California began with business-minded people who industrialized and urbanized landscape more rapidly than any prior group. The ample entrepreneurial spirit meant many people took chances in the chaotic, wild, and exiting early economy of the state. The fruit processing industry emerged from a combination of environmental abundance and entrepreneurial creativity supported by a pro-business political culture in California and the rest of the United States.

The canning industry in California developed fifty years after William Underwood opened America's first cannery in Boston in 1819. The demand for American canned foods grew slowly at first. Gail Borden's invention of condensed milk in the 1850s opened up new markets, and the need for canned food during the Civil War launched the industry into high production. Fortunately, in 1860 Isaac Solomon realized that adding calcium chloride to the water in which the cans were cooked increased the boiling point. Cannery managers heated the cans to higher temperatures more quickly, which killed more bacteria, preserved the texture of the food, and improved the quality of canned food.¹⁰ The canning industry east of the Rocky Mountains was diverse in locations and products. Baltimore processed oysters, fruits, and vegetables. The Midwest became lead packers of corn, peas, and tomatoes. Other eastern states produced large quantities of fruit but did not enter into canning with the same intensity as California.¹¹ This could be because northern California's thin-skinned deciduous fruit

⁹ Frederick J. Turner, *The Early Writings of Frederick Jackson Turner; with a list of all his works compiled* (United States, 1938), 41–68.

¹⁰ Vaught, *After the Gold Rush*, 197–218.

¹¹ William Moore, "A Brief History of the Canning Business In the Central West," in *A History of the Canning Industry by Its Most Prominent Men*, ed. Arthur I. Judge (Baltimore: The Canning Trade, 1914), 18–27; Hugh Orem, "Baltimore: Master of the Art of Canning," in *A History of the Canning Industry by Its Most Prominent Men*, ed. Arthur I. Judge (Baltimore: The Canning Trade, 1914), 8–11.

were more difficult to transport across the country, and thus canning was essential to making the state's orchards more profitable.

A history of California canneries presented at the National Cannery Association conference explains that Francis Cutting and Dan Provost were the first fruit canners in California. Provost owned Provost & Co of New York, a company that shipped goods to the booming port of San Francisco during the Gold Rush. Not a canner in the conventional sense, his company repackaged already processed goods from larger containers to smaller consumer sized containers.¹² In 1860, Francis Cutting perceiving a market for processed food began packing a small amount of fruits and vegetables in glass and tin. He purchased the tin from the East Coast and had it shipped to San Francisco where he had the tin cans made in his factory. By 1863, Cutting & Company was quite a success; the company was packing two-pound, five-pound, gallon, and five-gallon cans of fruits and vegetables and had a contract with the army.¹³ Cutting was probably the first to commercially can fresh fruit in California, but his monopoly was short lived. By 1868, J. Lusk Canning Company of Oakland began to can raspberries, corn, tomatoes, and peas.¹⁴ The Comstock Lode in Nevada and other mining projects in the West provided other markets and more canners, such as J. Lusk and A. Lusk, jumped into the canning business to fill the need.¹⁵ The California pack reached 10,000 cases of fruit and another 10,000 of jam and jelly by 1868. Between 1872 and 1880, several other major

¹² Isidor Jacobs, "The Rise and Progress of the Canning Industry in California," in *A History of the Canning Industry by Its Most Prominent Men*, ed. Judge, Arthur I. (Baltimore: The Canning Trade, 1914), 30.

¹³ *Ibid.*, 31.

¹⁴ *Ibid.*

¹⁵ *Ibid.*

canneries emerged in the San Francisco Bay area. For example, King-Morse Canning Co. of San Francisco began canning in 1873.¹⁶

The canning industry flourished in San Francisco, spread rapidly to other parts of the San Francisco Bay and Delta Region, and even reached Hawaii. Just south of San Francisco, Golden Gate Packing and San José Packing Company opened its doors in the 1870s in Santa Clara County. The county and San José, its largest city, remained important agricultural and canning centers into the first half of the twentieth century. Before canneries arrived, dried fruit, particularly prunes, was a profitable mainstay for San José. The San José driers' method of drying held a certain amount of financial risk. Driers picked the fruit, cut it, and laid it in the sun to dry. This low-tech means of food preservation is probably one of the oldest methods for preventing spoilage. One year, a deluge of storms hit San José and the entire crop was lost because in the flooding. While, this loss was not the only reason for the switch to canneries, it suggested that new technologies potentially offered some protection. Canning kept food longer in its semi-original state, and it was a faster way to process fruit. It also moved the process from the field to a factory setting, and changes in canning production switched the energy source from solar power and human labor to fossil fuels and human labor. A dried fruit market remained, but it declined with increased production of canned fruits.¹⁷

Its ascension to the role of fruit canning capital of California produced early signs of environmental distress in Santa Clara County. The Americans' settlement of the area and their adoption of horticulture as a primary industry between 1850s and 1870s drastically increased the amount of water needed for irrigation. Artesian wells provided

¹⁶ Ibid., 32.

¹⁷ Clyde Arbuckle, *Clyde Arbuckle's History of San José: The Culmination of a Lifetime of Research* (San José, Calif. (96 N. Almaden Blvd., San José 95110-2490): Smith & McKay Printing Co, 1986).

the original solution until agriculture scientists at the University of California, Berkeley persuaded them that ditch water offered nutrients. Californians dug irrigation ditches across the county to feed the growing need for water to support the increased number of orchards. Nevertheless, these did not satisfy the thirst of the agriculturalists, who once again turned to well water for irrigation, dramatically draining the underground supply. By pumping water up from underground reservoirs, San Joséans were depleting the water in aquifers and there was less mass to fill the cavernous spaces underground. The land began to sink. Within decades, subsidence was obvious in San José. In Alviso, which was closer to the San Francisco Bay, residents had to build a water wall to prevent the water from the Bay from flooding the town.¹⁸

To the east of San Francisco and the Santa Clara Valley, in the rich lands of the Sacramento-San Joaquin Delta and Central Valley, a fledging food processing industry emerged that would become another center for the fruit canning industry in the 1860s. In Sacramento, Hapgood, Hume, and Company started canning salmon from the Delta.¹⁹ Isidor Jacobs, President of the California Canneries Company reported that until a short time before the twentieth century, the salmon were so thick in the Sacramento and San Joaquin rivers that the fish caught on the paddles of paddlewheel boats and flipped out of the water into the air. The salmon industry in the Central Valley did not last long because overfishing and changes to rivers from irrigation and hydraulic mining. Within the San Joaquin Valley, with its population of 300,000, a different canning industry emerged, the fruit and vegetable canneries. In 1914, there were only ten canneries that packed

¹⁸ Edwin A. Beilharz, *San Jose, California's First City*, The American portrait series (Tulsa, OK: Continental Heritage Press, 1980), 76–80.

¹⁹ Find citation (can I use plaque?)

produce, but Jacobs predicted that the region would someday be the heart of the fruit canning industry in California. He was right.²⁰

The early California canning industry expanded quickly from its earliest days to the early 1900s, but production was still unpredictable and inconsistent. By the end of the decade, the industry was producing 145,000 cases annually, with twelve cans per case, an increase of 559 percent over Cutting's 1872 pack of 22,000 cans. This was a major feat because the canners still struggled with some major drawbacks in production. Cans had to be handmade, and tin still came to San Francisco from the East Coast by ship. Tin was twenty dollars a box and the price of solder and other materials for can making were about the same price. The method of production was still unsophisticated. Workers prepared everything by hand including cutting the fruit, filling the cans, sealing the fruit in the cans, and soldering them closed. The process was labor intensive and provided inconsistent results.²¹

Transportation was a constant problem for canners. California offered an excellent environment for growing, but the same mountains that kept the climate of the state moist and cool, made it difficult to move materials into and products out of the state. Although the transcontinental railroad was complete by 1870, railroad rates remained prohibitively expensive, and so canners continued to use ships until the end of the century. The industry was still not large enough to get special rates.²² The creation of the Panama Canal excited canners because it would make shipping much faster, lower

²⁰ Jacobs, "The Rise and Progress of the Canning Industry in California," 38.

²¹ Ibid., 32.

²² Ibid.

rates, and make it easier for laborers to get to the state and ease California's chronic labor shortage.²³

During the last three decades of the nineteenth century, the canned fruit and vegetable industry expanded substantially to meet consumer demand in California, and to feed markets in the surrounding states, in East Coast cities, and as far away as England. Competition between canners within the state and with canners on the East Coast remained fierce and the market was unpredictable. As it grew in the late nineteenth century, California's fruit cannery industry was chaotic. Some canneries opened and closed within one season, and there was little interest among many smaller canners to standardize products or control production, leading to overproduction and costly fruit gluts. These problems proved particularly disastrous for growers who could not stack their extra produce in a warehouse in the same way that the canners stacked extra cans away for another season. A crop that went to waste because the grower could not sell it constituted a huge financial loss that could potentially bankrupt the grower. In the face of these challenges, canners and growers began to adopt some of the ideas employed in other industries to bring order to production and the marketplace. For example, some canners began to consider combining companies. Growers wanted to gain some control over the sale of their fruit and formed grower/canner cooperatives. Trade associations also emerged to allow all canners to exchange information on common problems they faced.

²³ James Todd, "Panama Canal Aids Intercoastal Traffic in Canned Foods," *Western Canner & Packer*, November 1926.

Bringing Order through Combinations

In 1899, eighteen of California's pioneer canning companies combined to form the California Fruit Canners Association (CFCA). The merger created a company that represented seventy-five percent of the fruit canning capacity of the entire state. They formed a stock corporation with \$3,500,000 capital on paper, but there was little central coordination of CFCA operations. Rather than creating a centralized company, the CFCA was more an alliance of former competitors, and the original canners and canneries enjoyed surprising levels of independence for newly merged companies. Canneries continued to pack under existing brand names, but they did cooperate via packaging a common brand. Del Monte emerged as the organization's premier brand and member canneries contributed to its success by establishing a reputation of strong quality.²⁴

²⁴ William Braznell, *California's Finest: The History of the Del Monte Corporation and the Del Monte Brand* (San Francisco, Calif.: Del Monte Corp, 1982), 29–30; "Combine of The Canners," *San Francisco Chronicle (1869-Current File)*, July 18, 1889; "Canners' Trust is Incorporated," *San Francisco Chronicle (1869-Current File)*, July 1, 1899; "Fruit Canners' Organization," *Wall Street Journal (1889-1922)*, July 11, 1899.

Table 2.1 Companies that formed California Fruit Canners Association 1899²⁵

Company	Established
King-Morse Canning Company	1873
San José Fruit Packing Company	1875
Hunt Brothers Fruit Packing Company	1877
Rose City Packing Company	1882
Cutting Fruit Packing Company	1885
Sacramento Packing Company	1888
Courtland Canning Company	1890
Whittier Canning Company	1890
Fontana & Company	1890
Southern California Packing Company	1890
Oakland Preserving Company	1891
Marysville Packing Company	1892
A.F. Tenney Canning Company	1893
California Fruit Preserving Company	1895
Lincoln Fruit Packing Company	1895
Chico Canning Company	1895
Sutter Canning and Packing Company	1895
Moneta Canning Company	1895

In 1916, six more canneries joined the CFCA and created a new organization, the California Packing Corporation (Calpak), that combined the resources of most of California's biggest fruit canners. The new company extended CFCA's initial holdings and crossed state lines; Calpak included the Oregon Packing Company, the Hawaii Preserving Company, and several salmon fishing and canning operations in Alaska. Calpak was also a more centralized organization than CFCA. This centralization enabled the canneries to make more efficient use of the many resources they had under their control. Libby, McNeil, Libby (Libby) remained as the only other large packer in the state that could compete directly with Calpak. Also operating in the oligopoly of Calpak and Libby, were medium and small canneries. The medium and small canneries had little impact on the direction and regulation of the industry, and this remaining twenty-five percent of the fruit canning industry was outraged at the size of the new corporation.

²⁵ Braznell, *California's Finest*, 163.

Although the CFCA and Calpak refused to call their organizations trusts, these other canning interests disagreed arguing that the corporation was just “‘a rose by another name.’”²⁶ By combining so many canning companies, Calpak gained vital advantages, specifically the ability to produce on a large scale and a pool of strong-willed, talented, and well-connected company leaders. Many of the pioneers of the California fruit and vegetable canning industry joined to form Calpak at the turn of the century: San José Fruit Packing Company, Cutting Fruit Packing Company, Oakland Preserving Company, J.K. Armsby Company, Central California Canneries, and Griffin & Skelley, to name a few. They brought to Calpak a large store of hard-earned industry knowledge and a sense of entrepreneurship defined by the strong spirit of innovation.²⁷

The second largest canning company in northern California was Libby, McNeill, Libby, which began opening canneries in California in the early twentieth century to pack fruits and vegetables. The company started in the mid-nineteenth century as a meatpacking business located in Chicago’s famous Stockyards. Libby transitioned over the years from fresh meat slaughter to meat canning, and Swift & Company acquired it when Libby’s original owners passed away. Libby then expanded into milk, fruit, and vegetable canning across the United States at the turn of the century. Like Calpak, the company also invested in Hawaiian pineapple canning. With so much capital and food processing industry experience within Libby, it was no surprise that its first ventures in California were successful. The company brought the expertise, Swift’s capital and market connections, an accepted brand name, and distribution facilities. Beginning in the northern California, Libby built factories to process fruits and vegetables, such as in

²⁶ Ibid., 30; “Canners’ Trust is Incorporated.”

²⁷ Braznell, *California’s Finest*, 163; “Canners’ Trust is Incorporated”; “Combine of The Canners”; “Fruit Canners’ Organization.”

Sunnyvale in 1907. The size of the company allowed it to have large production rates that gave it advantages of efficiency in scale, and its organization was more a conventionally organized hierarchy with executives at the top and levels of management over departments.²⁸ In 1918, Libby became independent of Swift when the Chicago meatpacking companies came under scrutiny by the Federal Trade Commission (FTC). The FTC believed the meatpackers were gaining too much control over the meat industry, food processing, and industries associated with those practices. The 1920 Packers' Consent Decree curtailed the power of the meatpackers because it forbade the major meatpackers in Chicago from expanding into other food production industries.²⁹

Economic historians have analyzed the general pattern in the development of new industries during the nineteenth century that mirrors the fruit canners' history. New economic sectors began when one or two entrepreneurs introduced a innovative product or technique and soon attracted other businessmen who saw potential profit in their efforts. Initially, small companies competed for limited resources and customers, often creating instability, something businessmen loathed. As historians Louis Galambos and Joseph A. Pratt explain in *Rise of the Corporate Commonwealth*, business leaders sought to control variables in production and to avoid uncertainty within markets through combination and the creation of corporations. Within some industries, oligopolies

²⁸ *Libby, McNeill & Libby Annual Report -- 1920* (ProQuest Annual Reports, 1920); *Swift & Company Annual Report -- 1919* (ProQuest Annual Reports, 1919).

²⁹ Austin Clair Hoffman, *Large-scale Organization in the Food Industries*, Senate Committee 76th Congress 3rd Session, Investigation of Concentration of Economic Power (Washington: Temporary National Economic Committee, 1940), 15–20, University of Arkansas. The 1920 Packers' Consent Decree was an agreement among the five big meatpackers, Armour, Swift, Wilson, Morris, and Cudahy, to dispose of their holdings in public stockyards, railroad terminals, market newspapers, public cold-storage warehouses for products other than meat, and they also agreed to close their retail meat stores and stay out of wholesale distribution of products unrelated to meats. This agreement was the result of federal government indictments against the companies for illegal arrangements, but authorities were concerned that the reach of the meatpackers would extend so far that it would disrupt the entire national food distribution and production web. The Consent Decree was signed by the packers in order to prevent federal prosecution for operating a monopoly and other forms of collusion.

formed in which the largest companies or strongest business leaders controlled the industry and wielded significant amounts of economic and political power. Systems of vertical and horizontal integration reduced competition, lowered the price of supplies, and stabilized unknown variables in production.³⁰ Tycoons, such as Cornelius Vanderbilt in shipping and railroads, Andrew Carnegie in steel, and John D. Rockefeller in oil, mastered these techniques, creating bigger combinations than Americans had ever seen before. This strategic organization led to scientific management techniques, offered the advantages of the large-scale production, increased production efficiency, and concentrated much of the power and wealth of American industry in the hands of a few while forcing many small business owners out of the marketplace.³¹

Austin C. Hoffman, a principal agricultural economist with the USDA Bureau of Agricultural Economics, addressed the development and impact of large-scale organizations in the food industries and provided perspective on the situation of California's canners in relation to the rest of the nation. Hoffman explained that by 1900, the meatpacking industry had gained notoriety for collusion and cartels. His report also revealed the extent to which large organizations dominated much of the food processing industries following the meatpackers' model.³² The trend in the early twentieth century for American food industries was toward large-scale organization because it allowed companies to share the higher capital costs of production, especially after the switch to mechanization within each industry. The economist argued that the concentration of

³⁰ Vertical integration is the process of one business acquiring its competitors, such as Rockefeller's strategy with Standard Oil. Horizontal integration is when a company acquires all the businesses that produce the materials required to make their product, such as Carnegie's steel or Henry Ford's River Rouge plant.

³¹ Louis Galambos and Joseph A. Pratt, *The Rise of the Corporate Commonwealth: U.S. Business and Public Policy in the Twentieth Century* (New York: Basic Books, 1988); Schumpeter, *Capitalism, Socialism, and Democracy*.

³² Hoffman, *Large-scale Organization in the Food Industries*.

business hurt small firms that could produce at the same scale. Consequently, given the demands of mechanization, their production costs were higher per unit. In an effort to stay competitive, they tried to reduce labor costs, often relying on extra hours by employees and owners for low pay. Despite this impact, Hoffman concluded that consolidation was positive for consumers because it brought the price of processed food down overall.³³

Both the Calpak and Libby expanded their investments in fruit canning by investing in Hawaiian pineapple canning, which had been developing for decades, but the distribution and investment of California canners furthered the industry's reach.³⁴ The Hawaiian Islands were a stop for explorers and whalers traveling from Asia and Siberia to North America for years before sugar plantations became a dominant aspect of the Hawaiian economy in 1840s as American investors in the islands prospered. With this success, entrepreneurs turned to other commodities.³⁵ In the 1880s, John Ackerman and Wademar Muller founded Hawaii's first pineapple cannery, Kona Fruit Preserving Company. Although it lasted only a few years, it inspired other entrepreneurs. The McKinley Tariff caused a decline in the Hawaiian sugar market and some investors thought that canning pineapple would diversify Hawaiian agriculture.

³³ Ibid., 157–160. In 1938, Congress created the Temporary National Economic Committee to study the concentration of economic power in the United States due to concern for the decline in small business owners, high prices, and the national economic impacts of the Great Depression. One of the many industries Congress examined was the food processing industries.

³⁴ Capital from San Francisco was an important shaping force all along the Pacific Coast. Some investors from San Francisco were also part of Alaskan salmon fishing and canning. Richard A. Hawkins, *A Pacific Industry: The History of Pineapple Canning in Hawaii* (Tauris Academic Studies, 2011); Diane Newell, *The Development of the Pacific Salmon-Canning Industry: A Grown Man's Game* (McGill-Queens, 1989); Jacobs, "The Rise and Progress of the Canning Industry in California."

³⁵ Frank J. Taylor, *From Land and Sea: The Story of Castle & Cooke of Hawaii* (San Francisco: Chronicle Books, 1976); Hawkins, *A Pacific Industry*.

Fresh pineapple was popular in San Francisco, but it was difficult to ship the fruit much farther, and canning was a solution to this problem. Hawaiian Fruit & Packing Company began to invest heavily in canning after 1895. Dole emerged as a competitor at the turn of the century, and by 1905, Dole's increased production led to a pineapple glut as consumers, unaccustomed to the fruit, bought it only as a novelty. Pineapple growers responded with a national marketing campaign in the United States that increased consumer recognition and desire for the product. Between 1909 and 1912, the demand for pineapple more than tripled, but the production of pineapple had devastating environmental outcomes. The industry moved from Oahu to Kauai because overproduction caused such high levels of manganese in the soil that pineapple production deteriorated rapidly. On Kauai, the industry continued to prosper. The success of the Hawaiian pineapple canning industry, especially after 1909, convinced California canners, Libby and California Fruit Canners Association to invest more heavily in the Hawaiian pineapple canning industry.³⁶

The consolidations of the early twentieth century in California's fruit processing industry resulted in two very large firms, Calpak and Libby, that dominated canning in the American West. They also were the two largest canning companies in the nation by the time Hoffman wrote his report. While consolidation occurred on the East Coast, for example, many larger independent firms remained. Western canning companies developed in different pattern than on the East providing them with unique opportunities and challenges.³⁷ Consequently, as Calpak grew larger and gained more influence, its management was able to set industry-wide standards. Calpak began to push for

³⁶ Jacobs, "The Rise and Progress of the Canning Industry in California," 38–39.

³⁷ Hoffman, *Large-scale Organization in the Food Industries*, 51–57.

standardization of products, terms, and quantities as part of an overall increase in quality and to improve the reputation of California fruit nationally. In turn, standardization and other quality adjustments often made it more difficult for smaller canners to compete if they did not possess adequate capital to purchase new equipment or labels.

Connecting Pieces of the Production Network

Robert I. Bentley and his brother Charles became prominent figures in Calpak during the early 20th century and encouraged industry organization. The brothers were local Californians who grew up working in fruit canneries in Oakland and San José, purchased Sacramento Packing with financing from San José Packing after they graduated from college, and eventually became executives at California Packing.³⁸ In the capacity, they balanced increasing their company's market position with outreach to other canners in an effort to improve the quality and professionalism across the entire industry. By helping competitors, Calpak enhanced the image of the industry overall. Calpak gained great influence over industry members who had not joined as well as associated governmental agencies. Calpak executives, such as the Bentleys, and other managers or owners of leading canneries across the country, frequently met in small groups to discuss the canning industry, and these small meetings eventually led to powerful trade organizations.³⁹

Lasting canning trade associations began in the early twentieth century, but canners had tried to form associations before that with less successful. Some canners had

³⁸ "R.I. Bentley Passes," *Western Canner & Packer*, March 1932; "R.I. Bentley," *Del Monte Shield*, October 1959.

³⁹ Braznell, *California's Finest*; Edward S. Judge, "A History of the First National Association: The National Association of Canned Food Packers," in *A History of the Canning Industry by Its Most Prominent Men*, ed. Judge, Arthur I. (Baltimore: The Canning Trade, 1914), 59–67.

tried to organize as early as 1885, the California Canned Goods Association (CCGA) to perform tasks beneficial to the industry, such as establishing standards. Led by canners, such as Isidor Jacobs of A. Lusk & Co. and P.D. Code of Code-Elfelt, Co, both San Francisco-based operators, the CCGA lasted only two years, but its impact proved much more permanent because it raised awareness of the need of industry-wide cooperation. Particularly, the canners realized a need to protect the reputation of their state and their share of the national market. At this time, some Eastern competitors used “California” in their brand names and label descriptions, attempting to fool consumers about the origins of their production. At the time, frustrated California canners and growers had little recourse.⁴⁰ The California Fruit Canners, organized in 1899, however, gave the state’s industry greater influence. In a later incident, for example, W.W. Roberts & Co. in Baltimore began labeling locally grown and canned produce as California products to take advantage of the state’s agricultural reputation. The California Fruit Canners pressed their suit and won as a U. S. Circuit Court restrained the Baltimore canner from falsely advertising its fruit.⁴¹

At the turn of the century, the nebulous fruit canning industry had reason to hope its ever-increasing success would continue. However, as an industry, it was unorganized as there was little coordination or communication between canners, and there was no group that represented the entire industry to the government or consumers. Growers swiftly turned land into orchards as opportunities in the fruit market exceeded those of wheat production. Accelerated urbanization in California and across the country increased markets for canned goods of all kinds. Canned fruit became less a novelty and

⁴⁰ Jacobs, “The Rise and Progress of the Canning Industry in California,” 33–34.

⁴¹ “Big Victory for California Canners”, December 19, 1900; “Victory Won by California Fruit”, March 14, 1901; “Baltimore Fruit-packers Enjoined.,” *The Washington Post* (1877-1922), March 14, 1901.

more a grocery staple. Cannery still had many hurdles to overcome, including fruit gluts and high freight rates. Organization became vital to finding solutions to these common concerns. The Cannery's League of California provided the industry with a means for coordination and represented the industry before government while asserting the economic power of the California fruit canners in the national canning industry. Formed in 1905 by owners of the most successful canneries in the region, the Cannery's League of California allowed canners to share information about production, marketing, and research. Although not all canners were willing or able to join Calpak because of the fees, many wanted some cooperation within the industry to help maximize profit.

In the early decades of fruit canning in California, the major problems were crop failure, crop and cannery overproduction, and an unpredictable market. Cannery could manage every detail of their cannery, but many forces existed beyond the factory they could not direct. Thus, they sought mechanisms to control as many externalities as possible. The result was formation of production networks in which canner/grower organizations and food processing industry organizations were vital means for coordination of resources, government lobbying, and information dissemination.⁴²

The Cannery League of California (CLC), provided another vehicle of coordination and often served as a spokesperson for all canners. The CLC management resolved issues for and among canners, such as pest infestations and pricing disputes. The trade association also provided a key link between canners and the world outside the factory. The CLC worked with the National Cannery Association (NCA), which sought to provide a means for coordinating the entire industry. The power of California as a

⁴² Howard Rowley, "When the Cannery League of California Started", 1929, Box 1, Folder 1, California League of Food Processors; Jacobs, "The Rise and Progress of the Canning Industry in California," 35.

food producing state is apparent in the increasingly important role the President of the CLC played in NCA business. These many production groups also coordinated deals with can makers, growers, sugar producers, labor organizations, and city councils forming extensive production networks that by which the canning industry weaved itself into the mesh of northern California society.⁴³

According to Howard Rowley, editor of the *California Fruit News*, the idea for the Cannerymen's League began with some informal meetings between leading cannerymen such as Walter M. Field of Los Gatos, Charles Bentley of California Fruit Packers, and Mansfield Lovell of Hunt Brothers Packing Company. The result was a simple constitution, organization name, and list of cannerymen to invite to a convention. The first formal meeting took place on January 12, 1905 in the Merchants Exchange Building. Rowley remembers at least thirty firms in attendance that day; they elected Lozelle F. Graham President of J.H. Flickinger Company of San José the first president.⁴⁴

The early concerns of the CLC were transportation and standards. Similar to growers and farmers across the United States, the California cannerymen worried about getting the best possible shipping rates. Even after the turn of the century, cannerymen continued to utilize cargo ships because train rates over the mountains were prohibitive. The CLC acted on behalf of the canning industry to resolve rate disputes between cannerymen and railroad, shipping, and trucking companies. Their method was to meet with the transportation companies as matters arose in either a meeting or a more formal hearing. This helped the cannerymen because they could negotiate with the transportation companies on a larger scale, increasing their negotiating leverage. It also proved very useful during

⁴³ Judge, "A History of the First National Association: The National Association of Canned Food Packers," 68–69.

⁴⁴ Rowley, "When the Cannerymen's League of California Started."

the busy packing season when canners needed to move materials and products quickly.⁴⁵

The cost of transportation for canners in California was a fundamental consideration in the profitability of their operations. Shipping was more expensive for canners in California than canners on the East coast. As with all agricultural products grown in California in the early twentieth century, negotiating freight rates was a factor that could unite all members of an industry.⁴⁶

Product standardization was also a constant topic and major goal of CLC and Calpak.⁴⁷ Interestingly enough, in the initial discussions of standardization, critics of the practice felt that the variation in fruit was too much to overcome. Fruits reflected the character of the different places and soils in which they grew.⁴⁸ The League worked with agricultural scientists at the University of California helped overcome this barrier to standardization by discovering techniques that produced more consistently sized and ripe fruit. The growers adopted particular varieties that grew best in their region and followed orchard management practices. Thinning, for example, would decrease the amount of fruit produced and allowed the trees to produce bigger fruit. Frank Dixon became Director of Experimental Agriculture of the Canners League in 1922. He became a nationally recognized expert in plant breeding. The CLC provided the outcome of their experiments with plant varieties free of charge to members. Dixon and his assistants also

⁴⁵ "Facts and Figures with regard to the Canners League of California", June 1, 1936, Box 1, Folder 1, California League of Food Processors.

⁴⁶ Stoll, *The Fruits of Natural Advantage*. Stoll discusses this problem thoroughly with fresh fruit industries in California.

⁴⁷ "Canners' League of California 1917 Annual Meeting Notes", 1917, Box 61: Folder 2, University of California - Davis, Special Collections; "Canners' League of California 1918 Annual Meeting Notes", 1918, Box 61: Folder 2, University of California - Davis, Special Collections; "Fifteenth Annual Meeting of the Canners' League of California", 1919, Box 61: Folder 2, University of California - Davis, Special Collections; "Annual Meeting of the Canners' League of California 1920", 1920, Box 61: Folder 10, University of California - Davis, Special Collections.

⁴⁸ "Canners' League of California 1917 Annual Meeting Notes."

helped collect samples of members produce and organize an annual cutting bee. The cutting bee was a big annual event where growers and canners showed samples of their products.⁴⁹

During World War I, the CLC increased its involvement in the industry by working as an intermediary between the government and canners. After the war, the league continued to increase its responsibilities by addressing the public health aspect of canning during the botulism scare of the early 1920s. By the end of the 1920s, the CLC helped develop marketing orders and negotiate grading issues between growers and canners, particularly for clingstone peach growers.⁵⁰ The League was available to all canners and became a vital part of canners' production networks by the Second World War. Despite the CLC's central role in the industry, it was not universally accepted. Some canners simply could not afford the membership fees and others doubted that the CLC services merited those fees.⁵¹

Around the turn of the twentieth century, canneries in other states had also organized trade organizations, notably the Baltimore Canned Goods Exchange formed in 1882, the Western Canners Association formed in Chicago in 1884, and the Tri-State Packers Association, formed in Delaware in 1904.⁵² In time, state trade associations sought the same form of organization at a national level. The National Canners

⁴⁹ "Facts and Figures with regard to the Canners League of California."

⁵⁰ This issue is discussed more fully in Chapter Two. See CLC Archives Box 37 folders 30 and 31 for notes on the initial peach situation.

⁵¹ "Canners' League of California 1917 Annual Meeting Notes"; "Canners' League of California 1918 Annual Meeting Notes"; "Fifteenth Annual Meeting of the Canners' League of California"; "Annual Meeting of the Canners' League of California 1920"; "Annual Meeting of the Canners' League of California 1921", 1921, Box 61: Folder 10, University of California - Davis, Special Collections; "Annual Meeting of the Canners' League of California 1922", 1922, Box 55: Folder 62, University of California - Davis, Special Collections; "Minutes of the Annual Meeting of the Canners' League of California 1925", 1922, Box 56: Folder 1, University of California - Davis, Special Collections.

⁵² The Canning Trade, *Almanac of the Canning Industry for 1923* (Baltimore: Canning Allied Industries, 1923); The Canning Trade, *Almanac of the Canning Industry for 1932* (Baltimore: Canning Allied Industries, 1932).

Association emerged in 1907 as a means for canners to collaborate marketing and research, and California canners were part of the organizations development from the very beginning..⁵³ There were few fruit canners with national connections at this point.⁵⁴ Consumers had not accepted canned goods in the late nineteenth and early years of the twentieth century as quickly as the canners had hoped. When given a choice, average consumers, households preferred fresh or dried foods; homemakers did not yet trust the canned goods manufacturers to be honest about the products they sold. Canned meat, fruits, and vegetables found their greatest acceptance in more extreme conditions, in military bases and mining camps or on long journeys and scientific expeditions.⁵⁵ (see Canned food consumption tables in Appendix D)

Canned food had filled a gap in the military diet for decades. Industrial consumers, such as bakers, restaurants, state institutions, and schools, had already converted to canned products. The fruit canning industry had developed a relationship with them and could count on continued purchases among these customers. Thus, at the turn of the twentieth century, the canners saw an increased share of the household consumer market as the best way to boost the sale of their products. To succeed, they needed to convince the consumers to not only trust the brand, but to eat more canned fruit. Trade organizations, such as CLC and NCA, greatly benefitted canners in solving these problems. They possessed more resources than individual canners, allowing these

⁵³ Judge, "A History of the First National Association: The National Association of Canned Food Packers."

⁵⁴ Hoffman, *Large-scale Organization in the Food Industries*.

⁵⁵ Judge, "A History of the First National Association: The National Association of Canned Food Packers," 68–76; Vileisis, *Kitchen Literacy*, 74–84, 115–125, 149–172; Laura Shapiro, *Perfection Salad: Women and Cooking at the Turn of the Century*, California series in food and culture no. 24 (Berkeley: University of California Press, 2008), 182–204.

organizations to launch marketing campaigns that changed the image of canned fruit products.

As with many new products at the turn of the century, canners had to inform consumers how to use canned goods; trade organizations, such as the National Canners Association and Canners League of California, often performed this educational function in addition to other duties. Canned fruits were still unfamiliar to many Americans. Although, canners had produced canned foods in America in some fashion since about the 1820s, it was not widely available and did not have the best reputation. Immigration also brought many new consumers to America's shores who were unfamiliar with both American foodways and industrial food. Nor had every American had exposure to pineapples, pears, peaches, grapes, or cherries. Educating consumers about pineapples and canned fruit was an expensive, time-consuming task, but it was vital to the success of the industry. Consumer education of new products was common during this period in American history. During the late nineteenth and early twentieth century, thousands of new goods entered the market and manufacturers had to find ways to educate consumers on how to use the products.⁵⁶ NCA coordinated campaigns to teach consumers how to distinguish between the different products, how to cook them, and where to purchase them.

To boost consumer confidence, the National Canners Association hired women from the emerging home economics movement to demonstrate and vouch for their products. The term "Home Economics" emerged in the late 1890s, and its advocates argued that applying science and technology to the home could free some women from

⁵⁶ Roland Marchand, *Advertising the American Dream: Making Way for Modernity, 1920-1940* (Berkeley: University of California Press, 1985); Vileisis, *Kitchen Literacy*, 74-84, 115 - 125, 149-172; Shapiro, *Perfection Salad*, 182-204.

the drudgery of household management. The NCA created its Home Economics Division in 1927 and developed many duties by World War II. Ruth Atwater, who had helped develop the division from its beginning, later explained that its main purpose was to respond to the rising consumer movement of the early twentieth century. At first, the division focused on students in home economics programs in colleges and schools to train those who would work in school and institutional cafeterias, extensions programs, and high schools. This strategy created connections and relationships facilitating two-way communication. Cannery representatives gave women studying in the schools information from on proper procedures on how to use new home technology and products. In turn, the representatives learned about women's encounters with the products from the students and teachers in these programs. In 1935, the NCA launched a test kitchen where division employees created recipes and tested products. Atwater argued that the first priority of the Home Economics Division was to connect the canners to the consumer and provide a conduit for communication. Members of the Home Economics Division produced leaflets and recipe books for a variety of occasions, gave talks, and answered consumer concerns about canned food. Moreover, they relayed the consumers' questions and comments to the NCA.⁵⁷

Cookbooks and manuals also allowed canners to illustrate the possibilities that canned fruits offered, and Calpak prepared several versions of these items. The cookbooks contained simple recipes for the most common occasions. During the Prohibition years, for example, the cookbooks included a section on how to make "mocktails" and fruit beverages from canned fruit products. The cookbooks also had a

⁵⁷ Shapiro, *Perfection Salad*, 182–204; Ruth Atwater, "The Relation of the Consumer Movement to the Canning Industry" (presented at the Annual Meeting of the Cannery League of California, San Francisco, CA, March 6, 1941).

page or two that displayed the full line of canned fruit products in case consumers' grocer was missing any items they desired. The *Del Monte Fruit Book* explained why the Del Monte brand was the best, often by describing the beauty and health of the California climate from which the fruit came. Calpak even made sure its products premiered in other publishers' cookbooks as well. In 1918, the Merchants of San Francisco published *The Bride's CookBook*, which they made available free to brides. It contained a few recipes for all occasions focusing on products made by popular producers in northern California, such as Del Monte and Ghirardelli, the chocolate company.

Del Monte, however, had a 32-page special section in the 160-page book with serving suggestions and recipes for many of its products. Some recipes featured the canned fruits; others used leftovers. The recipes for Apricot Charlotte Russe recipe and Apricot Bread Pudding added Frozen Apricots to stale bread and cake and turned them into new desserts.⁵⁸ No other company had this much space in the cookbook. This suggests that Del Monte had a much higher budget to spend on advertising and that it needed to use it to convince women to use their products.

While canners made great strides in building consumer confidence through their voluntary trade association and outreach programs, they also benefited from the assistance of federal and state agencies or institutions, particularly the University of California, a land grant university. Between the 1880s and World War II, new forms of business and government relationships emerged across America to stabilize the chaotic economy that developed during industrialization. Reformers, businessmen, farmers, and

⁵⁸ Edgar William Briggs and Pacific Coast Publishing Co, *The Bride's Cook Book* (San Francisco, Cal: Pacific Coast Pub. Co, 1918); California Packing Corporation, *Del Monte Fruit Book: A Picked Collection of Recipes Covering the Best and Most Practical Service of Canned Fruits for Every Occasion* (San Francisco, California: California Packing Corporation, 1924).

workers supported these new relations and bonds because the economic, social, and environmental costs of a laissez-faire economy had become intolerable for many by the end of the nineteenth century. Some newly created government agencies, such as the Interstate Commerce Commission, performed strictly regulatory functions with respect to the businesses under their jurisdiction. Other government agencies had more promotional roles, and often encouraged industries to form trade associations and otherwise assisted businesses in achieving their goals. Government bureaucracies also grew to facilitate and serve large companies. Additional large, non-corporate business organizations also emerged that frequently performed quasi-governmental functions to assist industries and often to prevent the growth of government.⁵⁹

The associative state emerged during the late nineteenth century as a way to temper the chaotic economy created by industrialization and the growth of large corporations without utilizing many strong regulatory agencies. Underlying this form of government-business relationship was the idea that industries or companies could be more efficient and interact better with the national economy if they worked together voluntarily, increased communication, and supported research in science and technology. The role of the government was to provide support to industry without creating overly complex and rigid regulation. Thus, government agencies, such as the Department of Agriculture, reached out to industries and encouraged the creation of trade associations and other formal and informal groups to disseminate information and undertake research

⁵⁹ Alfred D. Chandler and Louis Galambos, "The Development of Large-Scale Economic Organizations in Modern America," *The Journal of Economic History* 30, no. 1 (March 1, 1970): 201–217, (accessed May 24, 2012); Galambos and Pratt, *The Rise of the Corporate Commonwealth*.

that would improve the efficiency of the agricultural and food processing industries.⁶⁰

Some companies used the trade associations to standardize products and informally police the quality of products to prevent government interference.⁶¹

The associative state played a central role in the production networks that propelled the fruit processors in California to the top of their markets in the United States by the 1930s. The canners received assistance from both federal and state government agencies that helped them to increase the quality and variety of their products and to find new markets for those products.⁶² Historian David Hamilton argues that the United States Department of Agriculture (USDA) played a vital role in the formation of the associative state because the scientists working in the growing number of specialized departments, such as the Bureau of Chemistry, were influential in forming early associations related to their fields and training scientists to work for corporations and trade associations. For example, Harvey Washington Wiley, Chief Chemist of the USDA, a Pure Foods Movement activist, and in 1906, the first commissioner of what became the Food and Drugs Administration, helped form the Association of Official Agricultural Chemists and later worked for the Good Housekeeping Institute. Land-grant institutions, agricultural experiment stations, and extension programs created more opportunities for USDA and university-based and university trained scientists to collect and disseminate information to food industries and consumers.⁶³

⁶⁰ Hamilton, "Building the Associative State"; David M. Hart, "Herbert Hoover's Last Laugh: The Enduring Significance of the 'Associative State' in the United States," *Journal of Policy History* 10, no. 04 (1998): 419–444.

⁶¹ Chapter three deals with this particular role of trade associations more thoroughly.

⁶² Hamilton, "Building the Associative State"; Hart, "Herbert Hoover's Last Laugh."

⁶³ Hamilton, "Building the Associative State"; R. Douglas Hurt, *American Agriculture: A Brief History*, 1st ed. (Ames: Iowa State University Press, 1994), 190–220; Wayne David Rasmussen and Gladys L. Baker, *The Department of Agriculture*, Praeger library of U.S. Government departments and agencies, no. 32 (New York: Praeger, 1972), 3–87; Clayton A. Coppin, *The Politics of Purity: Harvey Washington Wiley*

The University of California opened its doors in the city of Berkeley in 1869 with ten faculty members and forty students. The state legislature established the school to take advantage of the federal Morrill Land Grant Act, a law that assisted the individual states in establishing colleges that taught agriculture and the mechanical arts without excluding more traditional curricula in science and the classical studies. The University of California soon played a vital role in the agricultural and food processing industries in the state. Born in Germany, raised in the United States, and educated at European universities, Eugene Hilgard became a professor of agriculture at Berkeley in 1875 and over the next three decades, elevated the quality of instruction and research there. He insisted on the intellectual importance of the college and believed that with proper nurturing the college could make many scientific as well as technical contributions to the state's agricultural enterprises. He was actively involved in national discussions about agricultural science and still managed to keep in touch with the needs of local farmers.⁶⁴ Hilgard recruited and promoted other scientists in fulfilling his mission. Food scientist and California native William Vere Cruess earned his B.S. in Chemistry at the university and joined the faculty in 1911. He helped resolve some of the most disruptive issues that confronted the young California food processing industries in the early twentieth century. For example, the early 1920s was a very difficult time for California grape growers; when Prohibition closed all but a few of the state's wineries, the underlying grape industry was threatened. Under Cruess's direction, Berkeley changed the Division of Viticulture to the Division of Viticulture and Fruit Products, and created a Fruit Products

and the Origins of Federal Food Policy (Ann Arbor: University of Michigan Press, 1999); Anderson, *The Health of a Nation; Harvey W. Wiley and the Fight for Pure Food*.

⁶⁴ Patricia A. Pelfrey, *A Brief History of the University of California*, 2nd ed. (Berkeley, CA: University of California Press, 2004); Ann Foley Scheuring, *Abundant Harvest: the History of the University of California, Davis* (Davis, CA: UC Davis History Project, 2001), 3–9; Starr, *California*, 108.

Lab. Within the Fruit Products Laboratory research continued in making concentrated grape juice -- not the grape juice one would drink today, but a version sold in bulk from which people legally fermented homemade wine. The lab also experimented with other fruit juices and by-product development. The experiments with grapes and grape products, along with other factors, helped to keep the vineyards open until the repeal of Prohibition.⁶⁵

Many new products emerged from this period of intense research, which overlapped with a surge of interest in fruit production among California's farmers. During the 1920s, there was a dramatic increase in the number of orchards planted.⁶⁶ These plantings contributed to cycles of overproduction and underproduction that were frustrating and sometimes devastating for canners, fruit dryers, and growers. In years with a glut of peaches or pears, growers could not sell all of their fruit because canners worried about producing more canned fruit than they could sell. Warehouse space, to store unsold cans, was expensive. The next year, the situation sometimes reversed itself as growers thinned their orchards more thoroughly, producing less fruit, and leaving canners without enough fruit to fill their production needs.

The fruit canning industry changed significantly in the first two decades of the twentieth century. Canners increasingly focused on production efficiency and scientific management as canneries became larger and more mechanized. Owners and managers sought to increase efficiency and reduce waste. To do these things, they added

⁶⁵ Kathleen A. Brosnan, "'Vin d'Etat': Consumers, Land, and the State in Napa Valley," in *The Golden Grape: Wine, Society, and Globalization: Multidisciplinary Perspectives on the Wine Industry* (Palgrave Macmillan, 2007), 25–28.

⁶⁶ California Crop and Livestock Reporting Service and USDA Agricultural Marketing Service, *California Fruit and Nut Crops: Acreage, Production, Utilization, Value 1909-1955*, Special Publications 261 (Sacramento, California, 1956).

machinery for jobs such as peach pitting or can filling. The more mechanized a plant became, the greater the need for more consistently shaped and sized fruit as machines processed it without human assistance. Standardization of canned products and grading of raw materials were contentious topics among canners and growers. Growers were anxious to make sure they sold as much of their crops as possible in this new climate, but not all peaches were of the same quality. Thus, the canners, along with food scientists in the fruit products lab, searched for products that utilized the lower grades of fruit and provided more items for canners to sell. The product “fruits for salad” already existed, but these larger slices of fruits still demanded higher grades of fruit.⁶⁷

Probably the most widely adopted product to come out of the Fruit Products Laboratory was fruit cocktail. Cruess created this delicious combination of diced peaches, diced pears, grapes, pineapple chunks, and maraschino cherry in the lab as an experiment in fruit by-product use and grape use. H.E. Gray, a small cannery in San José, produced it a few years later with success and other canners quickly adopted it. Lower grades usually tasted like higher grades, though the fruit did not have the size or appearance of higher grades. Dicing was a way to use misshapen peaches and pears. The addition of heavy sugar syrup to fill the can hid the lack of flavor that may have been an issue with a few fruits.⁶⁸

Cruess took the knowledge he gained working with food processors and passed it on in many ways. Teaching allowed him to disseminate the information he gained

⁶⁷ Sherman Leonard, “Dr. William V. Cruess - His Contribution to the Canning Industry”, n.d., 4, Box 6: Folder 62, University of California - Davis, Special Collections; W. V. Cruess, *Commercial Fruit and Vegetable Products; a Textbook for Student, Investigator and Manufacturer*, 2d ed., McGraw-Hill publications in the agricultural sciences; L. J. Cole, consulting editor (New York and London: McGraw-Hill book company, inc, 1938), 168–172.

⁶⁸ Leonard, “Dr. William V. Cruess - His Contribution to the Canning Industry,” 4; Cruess, *Commercial Fruit and Vegetable Products; a Textbook for Student, Investigator and Manufacturer*, 168–172.

working in his lab and with industry. He wrote a definitive textbook titled *Commercial Fruit and Vegetable Products* first published in 1924 and updated four times by 1958.⁶⁹ His classes included lessons on the production and scientific analysis of canned goods. One detailed lecture, for example, took students through a number of experiments in determining the quality -- or lack thereof -- of a product.⁷⁰ Cruess was an active writer, publishing in academic journals, USDA bulletins, extensions newsletters, and circulars. A colleague who summarized Cruess's publications through 1960 counted five books and another 895 publications (of various forms).⁷¹ Through his many publications for extension programs and USDA bulletins, Cruess sought to educate the public and as the industry by explaining the various methods of canning and preservation. Home economics teachers, home canners, and extension agents wrote to him for advice, and his correspondence is thick with personalized answers to their questions. A food scientist, he was also a food activist, spreading the gospel of food safety, the need for a stable food supply, and the importance of reducing waste in the food supply system.⁷²

The Giannini Foundation of Agricultural Economics was another avenue of intersection between agribusinesses, food processors, and the university. Amedeo Peter Giannini, a San José native and successful produce dealer in Santa Clara County, established the Bank of Italy in San Francisco in 1904. The bank helped many middle class depositors, such as growers and small businessmen, operate in northern California

⁶⁹ Cruess, *Commercial Fruit and Vegetable Products; a Textbook for Student, Investigator and Manufacturer*.

⁷⁰ "Manuscripts & Printed Material", 1965 1915, Box 1, Folder 48 Through Box 7, Folder 11, William V. Cruess Collection, University of California - Davis, Special Collections.

⁷¹ Leonard, "Dr. William V. Cruess - His Contribution to the Canning Industry," 1-4.

⁷² "Awards & Certificates", 1965 1925, Box 9, Folder 6 Through Box 11, William V. Cruess Collection, University of California - Davis, Special Collections; "Manuscripts & Printed Material"; "Correspondence", 1965 1915, Box 1, Folders 1-48, William V. Cruess Collection, University of California - Davis, Special Collections.

by providing credit. Founded in 1931 with a \$1.5 million gift in honor of Giannini and housed at the University, the foundation used the research capabilities of the university to solve local problems and provide growers and farmers with knowledge they could use in production. Although the intended beneficiaries of this research were small initially, the research was often applicable in many other regions. The foundation's researchers produced studies published in top-ranking agricultural journals over a wide variety of topics including fruit and nut production in wartime, the demand for various types of deciduous fruits, transportation costs, and the cost of waste reduction. The work of the Giannini researchers remained relevant for decades. For example, during the 1930s the foundation studied what variables affected the prices of raw fruits. The researchers' analysis was important for growers associations and canners as they tried to make annual negotiations more predictable.⁷³

The California Department of Agriculture and California Crop and Livestock Reporting Service also provided data for the canners. However, it focused more on the production of raw material than its processing. Canners needed agricultural scientists to improve the predictability of the crop and data to estimate the size of future crops. They also needed peaches and pears that were uniform in size, quality, and ripeness. The grower also wanted many of these things because it meant that he or she could reduce the amount of fruit that canners would not buy. Canners sympathized with the plight of the grower to varying degrees. Some cannery executives rarely visited the field or worked

⁷³ Daniel A. Sumner, "Giannini Economics and Agricultural Supply in California", May 3, 2006; H.J. Stover, *An Analysis of the Prices Received for Canned Peaches by Canners in California -- Seasons 1922-23 through 1934-35*, Giannini Foundation of Agricultural Economics, June 1935; Trimble R. Hedges and Warren R. Bailey, *Appraisal of California Agricultural Capacity Attainable in 1955*, Giannini Foundation of Agricultural Economics, June 1952; R.L. Adams, *Seasonal Labor Needs for California Crops in Alameda*, Giannini Foundation of Agricultural Economics, October 1936. Based on a review of all the Giannini Reports which are located in the Bioscience Library at the University of California - Berkeley

from afar. Others lived in the same town or valley as the growers from whom they were buying. Thus, not all canners measured success by profit alone, but also through people's relationships. Canners with more personally connections to growers were more likely to include growers' concerns in their decision-making processes.⁷⁴

Canneries relied on peripheral industries to supply them with materials other than fruit. Services and machinery businesses, such as lug box suppliers, canning equipment suppliers, and cold warehouses, became part of the cannery production networks. In turn, the growth of the canneries provided more business for other companies that were dependent, in part or in whole, on the canneries. Peripheral supply industries grew to meet the increasing needs of the canneries and growers creating even more jobs in cities. The jobs and income provided by the peripheral industries counted as part of the economic benefit of the canneries and fruit producers of the region.⁷⁵ The introduction to the 1926 city directory for San José boasted of having the largest orchard and canning supply factories in the United States. The author of this statement was probably referring primarily to Food Machinery Corporation (FMC). The Food Machinery Corporation began as a merger between two agricultural supply companies, one which had developed pesticide sprayers and another that invented equipment to help process drying prunes and filling cans. Mergers continued and Sprague-Sells became part of the company. Sprague-Sells specialized in boilers, retorts, peelers, and peach pitting machines. FMC

⁷⁴ California Crop and Livestock Reporting Service and USDA Agricultural Marketing Service, *California Fruit and Nut Crops: 1909-1955*. The California Crop and Livestock Service began publishing reports in 1938. Prior to that the Agricultural Adjustment Administration had prepared a sweeping survey with historical information in 1936. Chapter two explores this concept more fully.

⁷⁵ "Our Fruit Canning Industry," *San Francisco Chronicle (1869-Current File)*, April 18, 1908; "OUR CANNING INDUSTRIES," *San Francisco Chronicle (1869-Current File)*, April 12, 1906; "Canners are Prosperous," *San Francisco Chronicle (1869-Current File)*, April 10, 1907; "Fruit Canners are Prosperous," *San Francisco Chronicle (1869-Current File)*, April 17, 1908; "How Canning of California Products has Grown into a Worldwide Industry," *San Francisco Chronicle (1869-Current File)*, January 1, 1904.

and Sprague supplied much of the equipment used in the canneries along the Sacramento-San Joaquin Delta. FMC continued to expand its food machinery business until a change of focus in World War II when they began to specialize in chemicals and amphibious military vehicles.⁷⁶

As the number of orchards in California increased, manufactures designed specialized farming equipment to harvest the fields and process the fruit. Manufacturers built tractors that better handled curvaceous, hilly orchards making planting and maintenance more efficient. While the first steam-powered tractors emerged on the market in 1850, the gasoline-powered tractor in 1905 by the Hart-Parr company (later John Deere) was far superior. Tractor sales increased in the 1910s and 1920s across the country according to newspaper reports.⁷⁷ One newspaper article about tractors in California reported more than 15,000 in the state by 1920. Tractor demonstrations were at distances that were possible from the Bay Area, Delta, and Central Valley. The demonstrations encouraged more growers throughout the region to adopt the new technology. Tractor dealers bought advertisements in local newspapers illustrating various models and directing growers to the demonstration to see the machinery in action. Tractor companies and agricultural extension offices held demonstrations at local high schools and by agricultural extension offices teaching the eager adopters how to use and service them. Farmers initially had to be convinced that the tractors would not destroy

⁷⁶ Sprague Canning Machinery Co., "General Catalogue of Canning Machinery and Canner's Supplies" (Sprague Canning Machinery Company, 1903), University of California Berkeley; Justo P. Zavalla, *The Canning of Fruits and Vegetables, Based on the Methods in Use in California, with Notes on the Control of the Microorganisms Effecting Spoilage*, 1st ed. (New York: John Wiley & sons, inc.; [etc., etc.], 1916); *Directory of San Jose City and Santa Clara County*, vol. 1930 (San Francisco: R.L. Polk of California, 1930), 16; *Growing Orbit: The Story of FMC Corporation*. (Chicago: FMC Corporation, 1992), 31–40; "Manufacturing Canning Equipment," *Western Canner & Packer*, December 1927.

⁷⁷ Edward L Schapsmeier, *Encyclopedia of American Agricultural History* (Westport, Conn: Greenwood Press, 1975), 348.

their carefully tended orchards. Once they were, they adopted mechanization rapidly switching from horsepower to gasoline power adding more dependency of the entire chain of production on fossil fuels.⁷⁸ The canning industry celebrated more productivity from growers but also had concerns about mechanization. The canners wanted to avoid excess bruising the delicate skin of deciduous fruits by any one, grower, or canner.

Sugar was as vital to fruit canning as the fruit itself. Cruess' textbook, *Commercial Fruit and Vegetable Products*, explains that sugar filled spaces between fruits, added flavor, and helped heat saturate through the product during cooking. Without a conductor to help evenly spread the heat, fruit did not heat evenly in the can leaving the possibility for bacteria to survive. Canneries purchased huge quantities of sugar to make their syrups. Before World War II, workers made a mix called canners' syrup in the cannery syrup room. In the syrup room, employees created a highly concentrated mix of sugar and water. Then, they diluted it to the proper strength for the various products – heavy syrup or light syrup. Cannery executives and food scientists determined the strength of sugar in the syrups. In the mid-twentieth century, sugar manufacturers began making canning grade syrups in their refineries, a development which altered the technology and labor needs of the syrup room. At the turn of the century, canners defined the exact ratios that distinguished heavy and light syrups, and

⁷⁸ "Brisk Business in Small Tractors," *The Sacramento Bee* (Sacramento, CA, February 28, 1920), sec. California Country Life; "Small Tractor Big Factor in Fruit Growing," *The Sacramento Bee* (Sacramento, CA, March 13, 1920), sec. California Country Life; "15,000 Tractors Work on California Farms," *The Sacramento Bee* (Sacramento, CA, January 31, 1920), sec. California Country Life, 000; "Many Tractors for Vacaville Orchards," *The Sacramento Bee* (Sacramento, CA, January 24, 1920), sec. California Country Life; "50 Are Enrolled For Napa Tractor Course," *The Sacramento Bee* (Sacramento, CA, February 28, 1920), sec. California Country Life; "Tractor Demonstration To Be Held At Sacramento," *The Sacramento Bee* (Sacramento, CA, January 25, 1919), sec. California Country Life; "University Plans Tractor Demonstration," *The Sacramento Bee* (Sacramento, CA, January 25, 1919), sec. California Country Life; "132 Taking Course In Tractor Work at Elk Grove School," *The Sacramento Bee* (Sacramento, CA, January 11, 1919), sec. California Country Life.

they almost universally preferred beet sugar or cane sugar because they tasted sweeter than corn syrup. Initially, the beet sugar industry was less reliable in producing a consistent product and earned a reputation for being undependable. Over time, beet sugar manufacturing improved and it became cheaper than cane sugar, and canners switched back to purchasing beet sugar again.⁷⁹

California canners were so dependent on sugar they lent their political power to support sugar producers faced with challenges from corn syrup producers. The California canners came down on the side of local California beet sugar processors and cane sugar, especially from Hawaii, when the sugar manufacturers fought the USDA to prevent corn syrup manufacturers from being able to call their product sugar on food labels in the 1930s. This support reveals several important aspects about the California fruit processors increasing political and economic power. First, fruit canners had a strong enough network they sought to protect part of it with their influence. Second, although difficult to uncover financial connections between the fruit canners and the beet growers or Hawaiian sugar growers, given the amount of cross-investment by Californians in Hawaiian pineapple it is possible that some canners also invested in sugar production. Finally, by protecting the sugar cane and sugar beet processors, the California fruit canning industry also challenged the rising power of corn farmers in the United States.

⁷⁹ Cruess, *Commercial Fruit and Vegetable Products; a Textbook for Student, Investigator and Manufacturer*. There was some competition between the cane sugar refiners, beet sugar refiners, corn sugar or syrup makers, and chemical companies who were trying to develop artificial sweeteners. All wanted to claim the coveted term “sugar” for their products to increase customer recognition. While these products were all sweet, they did have different chemical combinations that distinguished them. This became a very important issue as government agencies increasingly enforced labeling rules.

As fruit canners also often processed vegetables, such as asparagus, they also competed against the corn market indirectly.⁸⁰

Concurrent with the canning industry, can manufacturing companies made technological advance and increasingly chose to consolidate their operations.⁸¹ In the nineteenth century, canmakers made their cans by hand in the canneries. After they cut the material from tin plate purchased from East Coast companies, canmakers soldered each piece together one by one to make a can. After assembling the body of the can, they placed a lid on each can containing a hole large enough to push ingredients through. A good canmaker finished 150 cans a day. Canners filled each can in the preparation room, sent it for cooking, and then returned it to the canmaker who soldered the hole in the can closed. This laborious process was expensive; canmaking was a specialty craft.⁸² Making cans by hand was also proved problematic with respect to standardization and food safety. Not all canmakers were equally adept at creating a perfect can, and some cans had holes or places where the solder was not thick enough. Careless soldering led to burnt fruit in the can, black spots in the syrup, or acid and solder getting into the can. Making a can was a delicate balance of quantities of tinplate and solder. Too much wasted material or not enough led to instability that made it difficult for the cans to be

⁸⁰ Sylvia Kempton, "Memo to File Re: Status of Corn Sugar", May 6, 1938, Box 5, Folder 43, California League of Food Processors; "USDA Press Release re: Corn Sugar", n.d., Box 5, Folder 53, California League of Food Processors; "Canners League of California Memo to file Re: Corn Sugar and Glucose 4/17/1930", April 17, 1930, Box 5, Folder 53, California League of Food Processors.

⁸¹ My research did not uncover direct ownership ties between the canneries in California and large can manufacturers. However, the can manufacturers had a flexible pricing scheme so they could work with each canneries needs.

⁸² W.H. Stevenson, "Cans and Can-Making Machinery," in *A History of the Canning Industry by Its Most Prominent Men*, ed. Judge, Arthur I. (Baltimore: The Canning Trade, 1914), 92–93. The canmakers formed a union, the Canmakers' Mutual Protective Association, to fight the canners installing can making machinery. They waged a publicity war proclaiming that machinery made cans used acids that would poison the food and even took the canners to court. The efficiency of machine made cans cut costs so dramatically, however, that the machines quickly took the place of canmakers.

stored or shipped. Finally, an inadequate solder around the edges left room for bacteria to enter the cans causing spoilage and creating the possibility for human illness.⁸³

As canners increased their output, they needed larger quantities of high quality cans and sought to make the canmaking process more cost efficient. One of the first steps was automation of the process. Canmaking machines designed by cannery workers or managers emerged in the 1850s, advertised in canning trade journals, and sold by manufacturers, such as Sprague. Some machines cut tin plate the same size every time, such as the machine designed by William Numsen & Son to manufacture the tops and bottoms of the cans. By 1880, the Merriam company's Joker, a dedicated machine, produced 1,500 cans a day and needed only one man and one boy to operate it. In the 1890s, The Norton Brothers of Chicago introduced the first machinery system that both made a can from tinplate and counted the number of cans produced. A huge advance in can design was the "sanitary can." The double-seamed "sanitary can" was first used in Europe and was on display in the 1893 Columbian Exposition in Chicago, and within the next twenty years became the can design used by all large commercial canners. The sanitary can was expensive, but Charles M. Ams found a way to attach the rubber to the tin cylinder in such a way that reduced the amount of rubber required and subsequently the cost of making the can. By 1903, the Max Ams Machine Company manufactured equipment to produce the "sanitary can." As the Ams Machine entered the tin can market, it eliminated the need for solder. Canners across the United States adopted the

⁸³ Ibid.; Zavalla, *The Canning of Fruits and Vegetables, Based on the Methods in Use in California, with Notes on the Control of the Microorganisms Effecting Spoilage*, 169–173; *Commercial Fruit and Vegetable Products; a Textbook for Student, Investigator and Manufacturer*, 4–36; Sprague Canning Machinery Co., "General Catalogue of Canning Machinery and Canner's Supplies"; Diana Twede, "The Birth of Modern Packaging: Cartons, Cans and Bottles," *Journal of Historical Research in Marketing* 4, no. 2 (2012): 269–274.

“sanitary can,” especially California’s fruit canners. Other dedicated machines tested the quality of cans using air and water; they had the capacity to examine 65,000 cans a day by 1914.⁸⁴

As can-making machinery developed, so did can-making factories allowing canners to remove this process from the canneries completely. At the end of the nineteenth century, many can manufacturing companies were in or near canning regions. Canmaking machinery was expensive and the cost of purchasing the machinery required capital that smaller canners lacked. Canmakers produced cans at a low cost and passed on the savings to canners. In 1901, many can-making companies in Baltimore combined to form the American Can Company. Over time, the American Can Company acquired many factories resulting in what some called the “tin can trust.” Its closest rival was the Continental Can Company which was begun by Edwin Norton and T.G. Cranwell in 1904. Norton had sold his previous canmaking company to American Can Company. Shortly after, Norton sold out of the company and signed a contract to stay out of the canning business for 15 years or within 3,000 miles of Chicago, but the contract he signed said nothing about his son, Cranwell, entering the business. American Can eclipsed Continental Can, which in turn overshadowed every other can manufacturer. By 1916, American Can was sued for restraint of trade. The court found that although American Can had a monopoly there would be no public benefit to dissolving the

⁸⁴ Zavalla, *The Canning of Fruits and Vegetables, Based on the Methods in Use in California, with Notes on the Control of the Microorganisms Effecting Spoilage*; Stevenson, “Cans and Can-Making Machinery”; Twede, “The birth of modern packaging”; Cruess, *Commercial Fruit and Vegetable Products; a Textbook for Student, Investigator and Manufacturer*, 35–36; George W. Cobb, “The Development of the Sanitary Can,” in *A History of the Canning Industry by Its Most Prominent Men*, ed. Arthur I. Judge (Baltimore: The Canning Trade, 1914), 94–96; Can Manufacturers Institute, “A History of the Metal Can and Its Service to Man” (Can Manufacturers Institute, 1960), 1–11.

company because it would increase prices due to the economies of scale on which the company operated.⁸⁵

The can manufacturing companies and fruit canners shared several connections. First, the presence of an American Can Company plant indicated a high volume of canning in a region. American Can factories were involved in increasing the production of canned goods, which in turn increased the demand for their cans. American Can Company issued information about canned food recipes, had a home economics department, and also provided reference manuals to canners. The plants provided more jobs connected with the growing canning industry. San José had a few small can manufacturers by the 1890s, and by 1914 a large American Can Company factory was operating in the city replacing local canmakers. By 1930, this factory produced a 250 million cans a year for the region. The 40 canneries in Santa Clara County alone were producing 3 million cases of canned goods annually, with a minimum of 12 cans per case.⁸⁶

Bankers played a vital role in the development of the fruit canning industry. Canners, similar to growers, often needed financing to purchase equipment and materials until they sold the year's pack. This was especially true for the medium and small canners. Amedeo Peter Giannini had operated the San Francisco-based Bank of Italy on the concept that the small deposits of Californians could create large concentrations of capital. His bank had branches throughout the Bay Area and down the coast to San Diego. The Bank of Italy, which in 1928 merged with and became known as the Bank of

⁸⁵ Stevenson, "Cans and Can-Making Machinery"; Twede, "The birth of modern packaging."

⁸⁶ American Can Company, *Canned Food Manual; Prepared for the United States Navy* (New York, N.Y., 1943); American Can Company, *The Canned Food Reference Manual*, 3d ed. (New York, 1947); American Can Company, Home Economics Dept, *80 tested canned food recipes*. (New York: American Can Co., n.d.). San Jose City Directories 1881-1976.

America, helped finance smaller canners' operational needs. By the first few decades of the early twentieth century, Calpak was beginning to process fruits and vegetables for much of the year, compared to most packers that only operated during the harvest months. Calpak had more even cash flow throughout the year and was less dependent on outside financing. On other fronts, the Berkeley Bank of Cooperatives began providing loans to assist the needs of the many agricultural cooperatives in California in 1935. It provided lines of credit for Turlock Cooperative Growers and Tri-Valley Packing Association shortly after their startup that enabled them to survive their first years as cooperatives.⁸⁷

Calpak and Libby's influence over growers in the region left many growers feeling powerless during negotiations for annual harvests. In response, they began to form grower cooperatives that canned their own harvests. Grower/canner cooperatives, such as Turlock Cooperative Growers and Tri-Valley Packing Association, began in 1929 and 1932 respectively. Turlock Cooperative Growers began as a marketing organization for peaches, but by 1932, it was canning members harvests at the TVPA's San José plant by leasing part of the plant. The next year, they leased space at a cannery in Oakland, and by 1934, they purchased a plant in Modesto from a company that had failed.⁸⁸

Tri-Valley was a grower/canner cooperative located in Modesto that sought an equal division of the profits for growers based on their contribution of raw materials and a more beneficial financial return for growers. The cooperative sought to connect growers in the Santa Clara Valley, Central Valley, and Sacramento Valley. Tri-Valley

⁸⁷ Starr, *California*, 187–188; Tri/Valley Growers, "Tri/Valley Growers 50 years of survival and growth 1932 - 1982" (Tri/Valley Growers, n.d.), CSUS Special Collections; "The 1930s," *Rural Cooperatives*, February 1999, 8.

⁸⁸ Tri/Valley Growers, "Tri/Valley Growers 50 years of survival and growth 1932 - 1982," 8.

Packing Association was the second grower/canner cooperative formed by George Pfarr. Born in Ohio, Pfarr became a teacher in Stanislaus County in 1904 where grew interested in peach growing. By 1921, he owned twenty-two acres of peaches, and was an officer in California Cooperative Canneries (CCC), which failed during the 1920s. When CCC went under, Pfarr lost his orchards. The CCC failed because they worked as a grower cooperative that sold directly to Armour, which had canning facilities in Modesto. Armour left California canning because of the Consent Decree and the CCC did not make it on its own. Pfarr began Tri-Valley with a different philosophy than other cooperatives. First, he acquired three closed canneries from Armour so TVPA could do its own canning and distribution. He implemented a single pool approach because he believed that the cooperative should act as a partnership among members and individual members should profit only if the cooperative succeeded as a whole. This approach increased the loyalty to the cooperative. He argued that a reason the CCC failed is because they had multiple pools (for different fruits) and that caused internal fighting.⁸⁹

Conclusion

Canneries played a central role in the industrialization of agricultural spaces, which had previously included fields and outbuildings. Developing much like traditional factories, the canneries were a link between the increasingly industrialized orchard and consumers. Between 1870 and 1890, more complex technology allowed canners to mechanize different aspects of production. For example, can-making machines replaced workers. The machines could turn out hundreds of uniform cans in an hour compared to the dozen or so a good canmaker could assemble. Uniformity in the cans was essential to

⁸⁹ Tri/Valley Growers, "Tri/Valley Growers 50 years of survival and growth 1932 - 1982."

safeguarding the product inside. Moving assembly lines shifted the cans from station to station within the cannery, eliminating the jobs of men and boys who once pushed carts of fruits and cans around the factory. The workstation approach itself embodied the principles of scientific management. Men and women learned simple tasks they repeated perfectly hundreds of times a day during the packing season.

Although the canners managed to make canning more efficient, they still operated according to the whims of Mother Nature. Every year, they had to wait for peaches to ripen, hoping a frost, drought, or pest invasion did not reduce yields and drive up peach prices. While they managed to conquer nature to a degree by preserving much of the harvest and delivering an increasingly standardized product to consumers, they still could not completely control the amount or quality of fruit produced. Droughts, floods, insects, and plant disease could destroy entire crops. Likewise, an overabundance of fresh fruit could alter the entire negotiation process between the grower and canner. In order to safeguard against the ups and downs of business, the canners and growers formed larger organizations to safeguard themselves from fluctuations in production and the market.

Canneries were a combination of agriculture and industry and shared the legacy of years of experimentation with cooperation and combination. They developed their own hybrids of these approaches to maximize profit potential. Calpak presents an example of the model taken by many manufacturers, such as the steel industry or timber industry. Tri-Valley Packing Association was representative of the agricultural cooperative model that evolved from Populism. The emergence of the corporate powerhouse, Calpak, during the nascent period of California's fruit and vegetable canning industry dramatically reduced the other canners' ability to buy raw materials and

sell their canned products. Overall, the canning industry became less chaotic in the early twentieth century because of the consolidations and creation of cooperatives.⁹⁰

Canners began to share information, resources, and marketing strategies to reduce existing fluctuations in the market by forming national, state and local level trade organizations. Associations, such as the Cannery League and NCA, provided a means for information exchange and tools for resource sharing.⁹¹ Other institutions became vital parts of the network as well, including universities, USDA research centers, and the state agricultural department. Middlemen were also professionalizing and, in coordination with grocers, changing the way Americans bought food. Transportation networks also improved making it easier to ship products to market. Finally, peripheral suppliers, such as the can-making companies, grew in coordination with the cannery industry and helped improve production in the canneries.

Sixty years after the father of California fruit canning, Francis Cutting, launched his small canning operation, the state's well-organized industry dominated the American canned fruit market because of cooperation among the canners, and the creation of strong networks of production. The canning industry and its production networks had a substantial impact on the region beyond resolving the problems of California's canners. They profoundly altered the environment and labor organization of the region. Calpak dominated the industry and networks, asserting its own goals and agendas, which in the 1920s and 1930s included standardization of products and agricultural materials.

⁹⁰ Braznell, *California's Finest*; Hurt, *American Agriculture*. The National Grange was a farmers' organization that began in the mid-nineteenth century to represent the needs of farmers in state and national politics. The Populist Party, also known as the People's Party of America, was highly influenced by the Grange groups.

⁹¹ Robert H. Wiebe, *Businessmen and Reform: a Study of the Progressive Movement* (Cambridge, Mass: Harvard University Press, 1962).

CHAPTER 3 –BEHIND “SUNSHINE, FRUIT, AND FLOWERS”¹

The Santa Clara Valley²

*God Touched the earth in kindness, and lo, it dimpled where
It felt His mighty finger, and a valley nestled there,
And He told the angel artist to paint a sky more blue,
Than ever dainty violet or airy bluebell knew,
And to stretch it o’er that valley, as a promise from its God
That peace and plenty there should spring, like flowers from its sod,
And He set the mighty mountains to guard that happy vale
Where the autumns kiss the springtimes and the summers never fail.*

*Then the birds came singing to where the valley smiled.
And all the suns came shining, by all its peace beguiled;
And from the hidden canyons the brooklets sparkled down
To cheer the future’s exiles from the city or the town’
And the gray earth loved its flowers, as the flowers love the sun
And the glory of the daytime into even’s glory run:
And the live oak wore its banners green through all the year unfurled
And so was Santa Clara’s vale first given to the world.*

*And then man came from out the East, and lo, the valley smiled,
And she took him to her bosom, and she loved him as her child.
She blessed him with her orchards, and she cheered him with her vine:
She fed him with her bounty, and she gladdened him with wine.
He builded there an alter and a happy home, I ween:
And his temple unto learning on gray Hamilton was seen.
Ah, blest was he by nature past man’s allotment here,
In that rarest, fairest valley; in that home of peace and cheer.*

- A.J. Waterhouse

The imagery and language used in *The Santa Clara Valley* by A.J. Waterhouse, a California newspaper editor and poet, is representative of much of the booster literature about the Santa Clara Valley; and the agricultural cities around the San Francisco Bay-

¹ *Santa Clara County and its resources: historical, descriptive, statistical: a souvenir of the San Jose Mercury: 1895.* ([San Jose: San Jose Mercury Pub. & Print. Co., Smith & Eaton), 1895).

² This poem appears in booster literature in the 1890s after the establishment of fruit orchards in Santa Clara County. It is reprinted in *Ibid.*

Delta and throughout the Central Valley. While the poem invokes visions of an idyllic existence, it masks a more complicated and often harsher reality. The blessed orchards of Santa Clara, San Joaquin, and Stanislaus counties were part of a agro-industrial landscape, a built environment in northern California where growers, canners, laborers fought nature and sometimes each other to scrape their livelihoods from the soil. Many environmental historians observe that a dichotomy exists in American minds between built spaces and nature.³ Agricultural spaces tend to fall into the category of nature while cities occupy spaces constructed by humans. However, the use of the land on which farms, orchards, and fields exist was also result of local politics and economies. As the fruit canning industry became more organized through corporate mergers, grower/canner cooperatives, and trade associations, the industry as a whole gained more power within northern California to influence people, spaces, and resources. The economic and political power of the fruit canning industry and its production networks shaped cities, agricultural land, and workers' lives.

The Cannery and the City

The growing power of the canneries' production networks was most visible in cities where the fruit canning industry consolidated. San José, Oakland, and Modesto had higher concentrations of canneries than other cities did, and the operations located within

³ *Uncommon Ground: Toward Reinventing Nature*, 1st ed. (New York: W.W. Norton & Co, 1995); Robert Gottlieb, *Forcing the Spring: The Transformation of the American Environmental Movement*, Rev. and updated ed. (Washington, DC: Island Press, 2005); Anne Whiston Spirn, *The Granite Garden: Urban Nature and Human Design* (New York: Basic Books, 1984); Adam Ward Rome, *The Bulldozer in the Countryside: Suburban Sprawl and the Rise of American Environmentalism*, Studies in environment and history (Cambridge: Cambridge University Press, 2001); Melosi, *Effluent America*; McShane, *The Horse in the City*; Tarr, "From City to Farm: Urban Wastes and the American Farmer"; Joel A Tarr, *Devastation and Renewal: An Environmental History of Pittsburgh and Its Region* (Pittsburgh, Pa: University of Pittsburgh Press, 2003); Colten, *Transforming New Orleans and Its Environs*. The other side of the argument holds true as well, cities are full of "nature" or non-human elements that are often overlooked until they become a nuisance or are needed, such as a park or tourist attraction.

them were significantly larger than other canneries in California. Smaller canneries were scattered across the valleys, often in combination with nearby orchards and packing facilities, but these operations, even when taken together, rarely produced the same quantity of products as the large urban canneries nor exerted the same degree of power over the industry. Given their tremendous production capacity and their prominence in local economies, these large urban-based canneries exercised significant influence over the municipal governments in San José, Oakland, and Modesto as well.

There were many advantages to building a cannery in a city in the late nineteenth and early twentieth century. Transportation was a decisive factor in determining a cannery's location. The raw fruit that went into the canneries and packages of canned goods that emerged were quite heavy. Companies decreased shipping costs by finding a location near a railroad or port. The transcontinental railroad was complete by 1870; however, cannery owners often continued to rely on ocean transport for long-distance hauling for many years because it remained more affordable. During the fruit-canning season, which ran from March through October, the canneries hired thousands of workers and urban centers tended to provide a more reliable labor force.

In addition to reliable transportation and a steady supply of seasonal workers, canneries also required a large, consistent supply of water and an economical way to dispose of the many tons of waste produced during the canning season. Cities provided the necessary services through their municipal water and waste systems. It cost less for canneries to connect to existing water systems than to create their own. While northern California possessed more rivers than the rest of the state and water was less scarce there, water remained a highly sought after resource. The seasonal pack required a huge

volume of water for washing away the detritus from the fruit preparation process and operating machinery such as boilers and retorts.⁴ Cities constructed water systems that provided clean drinking water and enough pressure for fire hydrants. Fire was another major concern in quickly growing cities because wooden buildings outnumbered those made with brick or stone. In fact, fire was a constant worry in canneries before brick and concrete became more affordable and thus the industry's construction norm.⁵

Cities effectively became part of the production networks of the fruit canning industry. In addition to municipalities providing necessary water and waste systems and other utilities, urban areas offered a concentration of workers, roads, and railroad stops. The large urban canneries provided employment to many, albeit seasonal, laborers and increased businesses and commerce in cities by attracting supporting companies. Cities such as Modesto, with less diversified economies and a greater reliance on agriculture and food processing for jobs, often developed almost symbiotic relations with the canneries. However, cities with other industries were less reliant on the cannery industry. With access to the Bay and transportation networks, Oakland and San José had many more options for economic development.

Canneries also contributed to the economic and political power of cities, thus affecting the interurban relationships in the region. San José, south of San Francisco, was one of California's first cities, and its early roots as a Spanish farming settlement gave

⁴ Cruess, *Commercial Fruit and Vegetable Products; a Textbook for Student, Investigator and Manufacturer*; Zavalla, *The Canning of Fruits and Vegetables, Based on the Methods in Use in California, with Notes on the Control of the Microorganisms Effecting Spoilage*.

⁵ "Fire Partially Destroyes Cannery," *San Francisco Chronicle (1869-Current File)*, July 29, 1903; "Panic Follows Cannery Roofs Fall," *San Francisco Chronicle (1869-Current File)*, September 16, 1906; "Many Injured in Factory Panic," *Los Angeles Times (1886-1922)*, August 25, 1907; "Fruit Canneries at Fresno are Burned," *San Francisco Chronicle (1869-Current File)*, May 26, 1909; "Heavy Loss in Cannery Fire," *San Francisco Chronicle (1869-Current File)*, September 13, 1907; "Heavy Loss by Cannery Fire," *San Francisco Chronicle (1869-Current File)*, June 24, 1909.

it some structure that helped it grow into a city in the Gold Rush era. Oakland's location and the fact that it hosted a railroad terminus connecting it to the Transcontinental Railroad were vital in its growth. Other cities grew as their boosters attracted and maintained agricultural industries. Modesto, for example, was a small agricultural town that grew with the coming of the canneries. City leaders supported the location of food processors, and, in time they drew more food processors to their city by making urban planning decisions that benefitted canners. The increased number of canneries, increase jobs and diversified the economy to include food processing in addition to traditional agriculture. Modesto's influence and size grew in the Central Valley throughout the twentieth century. In northern California, San Francisco was undoubtedly the leading city, but the relative power and position of the smaller cities in the area changed as they took advantage the economic returns from food processors.

The Impact of the California Canning Industry in the Orchards: The Clingstone Peach Situation

As the industry grew, California canners supplied an increasingly larger market for certain fruits, particularly peach and pear crops. While the fresh fruit industry remained prosperous, canneries purchased over seventy percent of pear harvests and almost all of the clingstone peach harvest.⁶ As growers often planted peaches in the Central Valley, the demands of the canneries altered the valley's agricultural landscape. Before California's canned fruit became a market leader in the first decades of the twentieth century, prunes, apricots and grapes were the most important fruit crops in northern California. Growers sold grapes as fresh table grapes, to wineries, or to fruit

⁶California Crop and Livestock Reporting Service and USDA Agricultural Marketing Service, *California Fruit and Nut Crops: 1909-1955*.

dryers. Prune and apricot growers were most prominent in the Santa Clara Valley and north of Sacramento, and the growers could sell their harvests to canners or dryers. As the canning industry grew, growers planted canning fruits, such as clingstone peaches and Bartlett pears, more often.⁷

When selling their fruit harvest, the power that growers had to negotiate a price often depended on the type and variety of his fruit. For example, pears could be canned, dried, or sold fresh, giving pear growers more options when it came time to sell; more options mean greater leverage. Apricots and freestone peaches also fell into this category. In contrast, growers of clingstone peaches had few options. By the 1920s, clingstone peaches became the primary canning crop. Clingstone peaches are a distinctive set of peach varieties because their pit adheres more tightly to the flesh of the peach and the fruit retains its flavor and consistency better than a freestone peach, which was the other major type of peach grown commercially in California. Freestone peach pits easily detach from the flesh and sometime have a red flush of color around the flesh near the pit. Freestone peaches sold fresh or dried while clingstone peaches were primarily canned. Canners did use both the freestone and clingstone peach varieties because of the variance in their growing cycles extended the harvest and the cannery's production time. The statewide harvest season for the clingstone peach lasts from June to August, and the freestone peach harvest begins in the end of May and lasts until October. While canners took advantage of the longer harvest of freestone peach varieties by canning them, clingstone varieties were, by far, the primary varieties used in commercial canning. In consequence, in the first decades of the twentieth century, clingstone peach

⁷ Ibid.

orchards heavily outnumbered the number of freestone peaches.⁸ The clingstone peach growers' dependence on canners reduced the growers' ability to negotiate the price of their harvest each year. (see maps 2.1, 2.2, 2.3 and Charts 2.1-2.8 for comparative utilization of primary fruit canning crops)

Growers began to pool (combine harvests for marketing purposes) their crops as early as the 1890s to increase their advantage in negotiations. Some growers also signed long-term contracts with canners to insure that they could dispose of as much of their crops as possible and enjoy some stability from year to year. Theoretically, if growers knew in advance how much they could sell at the beginning of any growing season, they could manage their orchards better to produce the appropriate amount of peaches without producing too many or too few. However, market conditions and weather varied from year to year. Signing contracts reduced uncertainty for growers, but this could also be a double-edged sword.⁹

Before 1916, for example, some growers in Sutter County, a major peach growing county in the Central Valley, signed contracts at a rate of \$25 per ton of peaches with various canners. After the United States entered World War I, inflation caused these growers to lose money at this price because it was lower than the grower's cost of production, but growers remained obligated to the canners by virtue of the contracts. In response, some peach growers created Sutter Growers, a bargaining association, to enhance their bargaining power. When the growers joined together, they represented a significantly larger amount of acreage increasing their negotiating power. Even though

⁸ W.V. Cruess and G.L. Marsh, *Utilization of California Fruits* (Berkeley, CA: University of California Agricultural Experiment Station, October 1941); California Crop and Livestock Reporting Service and USDA Agricultural Marketing Service, *California Fruit and Nut Crops: 1909-1955*.

⁹ Frank A. Konynenburg, *A Home & A Price: 75 years of History with the California Peach Canning Association* (Lafayette, CA: California Canning Peach Association, 1997), 5.

clingstone peach growers had few outlets for their harvest, in large enough numbers they could threaten long-term production of canned peaches. Sutter Growers persuaded the canners to raise the price an additional ten dollars a ton, which more closely matched the actual cost of production. At the same time, growers who had not signed long-term contracts negotiated prices of sixty to sixty-five dollars a ton and reaped large profits.¹⁰ Sutter Growers was able to help represent peach growers by combining the strength of one of the largest peach growing counties in California.

Peach growing became a much more successful business during World War I because of increases in canning production. This success prompted a rush in peach orchard planting in the early 1920s. During that decade, the acreage of clingstone peaches increased by seventy-five percent, and on average, commercial canners canned ninety-four percent of the peaches harvested.¹¹ (see table 2.1) The dramatic swell in peach production caused chaos in the clingstone peach market because canners were effectively the only purchasers. The counties that produced the most clingstone peaches were Sutter, San Joaquin, and Stanislaus. Sutter County is part of the northern section of the Central Valley North of Sacramento, and San Joaquin and Stanislaus Counties are in the middle of the Central Valley and include the cities of Modesto and Stockton, respectively, as their county seats. Producing less than half of the clingstones of those three counties, were Merced and Tulare Counties, both located in the lower part of the

¹⁰ Ibid., 6–7; Donald McMillen, “An Analysis of the Marketing Control Program Used in the California Canning Cling Peach Industry” (Dissertation, Berkeley, CA: University of California, Berkeley, 1942), 70–71.

¹¹ California Crop and Livestock Reporting Service and USDA Agricultural Marketing Service, *California Fruit and Nut Crops: 1909-1955*.

Central Valley.¹² (see appendix A for political and geographical maps of the state and Map 2.1 for peach orchard distribution)

Even though the organized growers of Sutter County negotiated successfully with the canners during the war, the head of the Sutter County Growers, Dr. Edward Moulton, recognized that the growers of one county could not break the dominance of highly organized canners, such as Calpak and Libby, alone. He and Sutter Growers joined a nascent statewide campaign to organize peach growers into an association to increase their bargaining power. The campaign resulted in the creation of the California Canning Peach Growers (CCPG) in January 1922. The organization began with 261 members, who in turn represented 25% of the clingstone harvest. The CCPG's members signed a membership document for a fifteen-year commitment, called a Marketing Agreement. Growers could withdraw if they wanted to do so without penalty. They also were able to specify their preferred canners and storehouses. Throughout the 1920s, CCPG served its members by taking title of their harvests and creating a large pool of peaches. The CCPG then negotiated with canners for better prices. The arrangement also eliminated the difficult process of negotiation for individual growers. The CCPG split the profits between members. While canners undoubtedly still sought the best possible price from their perspective, they also appreciate the fact that the CCP provided more stable delivery. Even with this level of organization in place problems with overproduction continued, and under the basic principles of supply and demand, such surpluses usually worked to the advantage of the purchasers, the canners.¹³

¹² Cruess, *Commercial Fruit and Vegetable Products; a Textbook for Student, Investigator and Manufacturer*; Ann Foley Scheuring, *A Guidebook to California Agriculture*.

¹³ McMillen, "An Analysis of the Marketing Control Program Used in the California Canning Cling Peach Industry," 71–72; Konynenburg, *A Home & A Price: 75 years of History with the California Peach*

The problem of chaotic and unpredictable peach production came to a boiling point at the end of the 1920s. The number of peach growers had increased so rapidly by 1920 that there were peach gluts during the decade. By 1926, the clingstone peach production reaching market saturation. Growers produced 232,000 tons of peaches in 1925 and 331,000 tons of peaches in 1926, a 43% increase. Cannery, eager to make a profit, packed almost the entire harvest that year. The 1926 pack of canned clingstone peaches was 13,275,000 cases, four million more than the previous year.¹⁴ Cannery mistakenly believed that they would sell the entire production line and could keep packing high levels of canned peaches until the middle of 1927 when the reality of the situation set in. The 1926 pack was not selling quickly enough and cannery accepted they were going to have a lot of that year's pack left just as they were gearing up for another large pack. Word spread that cannery would have to curtail canned peach production.¹⁵

The resulting glut of canned clingstone peaches created difficulties for growers negotiating the 1927 clingstone peach harvest. As usual, growers grew as many peaches as they could and wanted to avoid selling them for less than the cost of production. Likewise, cannery realized that in the prior season they had produced more canned clingstone peaches than they could sell. The surplus stock was difficult to sell at prices that would cover the cost of canning the peaches. Years of high production had saturated existing markets for canned clingstone peaches. Cannery needed to sell their entire stock of canned goods because keeping too many in warehouses was expensive and tied up

Canning Association, 9–12. In February 1922, the U.S. Congress passed the Capper-Volstead Act, which provided agricultural cooperatives with certain exemptions from federal anti-trust laws and allowed them to operate without fear of reprisal for supposedly monopolistic activities.

¹⁴ J.R., "1926 Successful Year for Western Cannery," *Western Canner & Packer*, December 1926.

¹⁵ "Big Peach Production Being Distributed," *Western Canner & Packer*, January 1927; "Must Curtail Production," *Western Canner & Packer*, August 1927.

canners' capital, which reduced their ability to prepare and buy supplies for the next canning season.¹⁶

The dramatic increases of the clingstone peach pack each year combined with a huge pack in 1926 created a standoff between growers and canners in 1927. The price canners received from distributors for canned peaches by 1927 was the lowest it had been since before World War I, and in 1927, canners still had half the carryover in their warehouses. Canners tried to sell their entire stock of canned products from year to year. The industry term for unsold cans was carryover. Given the large amount of carryover from 1926 to 1927, canners did not want to can a large amount of peaches; they hoped to avoid another carryover. That year, there was a standoff between the growers and canners, when canners announced a rate of \$30 a ton for clingstones.¹⁷ Clingstone peach growers resisted the low prices canners offered. As the CCPG negotiated as a pool for its members, another pool of growers known as the Independent Pool emerged. The two pools and growers not associated with either pool tried to negotiate separate agreements with the canners, but in many ways their competition undercut the position of all growers and did nothing to solve the persistent problem of overproduction. Finally, the Independent Pool and the CCPG met in the summer of 1927 began discussions about basic policies to restrict production. Some clingstone growers preferred to allow the fruit to rot rather than sell for what they viewed as inadequate prices. In Sutter County, clingstone growers let an estimated 27,000 to 40,000 tons of Tuscan peaches, the earliest ripening variety, fall to the ground unharvested.

¹⁶ McMillen, "An Analysis of the Marketing Control Program Used in the California Canning Cling Peach Industry," 67–68, 72.

¹⁷ "The Canning Peach Situation," *Western Canner & Packer*, August 1927.

After such a dramatic standoff, and in time for the peak canning season, growers and canners finally reached a settlement that priced peaches at a sliding scale of \$20 and \$35 per ton based on the total size of the 1927 pack. Growers received \$35 per ton up to 8 million cases of peaches, \$32.50 for 8 to 8 ½ million cases, \$30 for 8 ½ to 9 million, etcetera, to \$20 a ton if the pack exceeded 11 million cases.¹⁸ The voluntary acceptance of this price scale made official through riders attached to the growers' contracts with the canners. The rider stipulated that canners would accept nothing less than the grade of Number 1 peaches, according to United States Department of Agriculture grades for peaches, which was fruit that was at least 2 3/8 inches in diameter. This was the first act of voluntary supply-restriction by clingstone peach growers.¹⁹

According to Bertram H. Crocheron, Director of the Agricultural Extension Service at the University of California, the solution to the problem was more complex than simply negotiations of the price of peaches. It involved resolving the problem of peach overproduction, increasing the market for canned peaches through promotion and quality control, and decreasing production costs of canning peaches. Canners also recognized the need to increase demand as they predicted double the production of 1926 in 1930 based on fruit acreage reports. Canners increased national marketing campaigns. The *Western Canner & Packer* urged growers to participate in a national advertising campaign as well arguing that canners and growers needed to work together to resolve these issues.²⁰

¹⁸ McMillen, "An Analysis of the Marketing Control Program Used in the California Canning Cling Peach Industry," 75–76; "California Peach War Settled," *Western Canner & Packer*, September 1927.

¹⁹ McMillen, "An Analysis of the Marketing Control Program Used in the California Canning Cling Peach Industry," 75–76; Konynenburg, *A Home & A Price: 75 years of History with the California Peach Canning Association*, 16–17.

²⁰ "California Peach War Settled."

The reduced production of canned clingstone peaches in 1927 helped canners to overcome their supply problems.²¹ However, the settlement did not resolve the frustration brewing among the peach growers. By the end of 1927, growers were threatening civil suits against the canners for the lost fruit and discussing forming grower/canner cooperatives among themselves to can their own fruit and cut out the canners in the future. Some growers even asked the Interstate Commerce Commission to investigate the operations of the canners, while other growers targeted the CLC and its clingstone growers, arguing they should face prosecution for trying to conduct a monopoly.²²

Even in the face of this tension, groups of canners and growers continued to try to resolve the peach overproduction issues over the next few years using voluntary marketing agreements. In 1928, Governor C.C. Young appointed a Crop Survey Committee to compile a report on the 1928 crop. Serving on the committee were representatives from the CCPG, Calpak, the F.E. Booth Company, an independent clingstone grower, and representatives from the State Director of Agriculture and Division of Marketing.²³ The fact that the Governor's office stepped in to address the conflicts between the clingstone peach industry and clingstone peach canners reveals the degree of animosity the situation had created, as well as the growing importance of the peach industry in California agriculture. It also reveals the growing power of the State of California and an increased willingness to step in to settle conflicting business interests.

²¹ "Smaller Pack Strengthens Market," *Western Canner & Packer*, November 1927.

²² Konynenburg, *A Home & A Price: 75 years of History with the California Peach Canning Association*, 16–17.

²³ "Peach Crop Survey Now Being Made," *Western Canner & Packer*, May 1928.

In 1928, the collaborative efforts between canners and growers came to fruition. A committee of canners and growers agreed on a price of \$25 a ton for clingstones, which most canners and growers voluntary. Based on the Peach Crop Survey and a report by the California Department of Agriculture the expected harvest of 1928 was 395,000 tons of clingstones, an increase of 322,000 tons in 1927. Canners expected to produce 602,000 tons of canned cling peaches in 1928. The production in 1927 was 492,000 tons and 541,000 tons in 1926. As was the case in 1927, canners only accepted No.1 clingstone peaches.²⁴ The early simple cooperation between canners and growers was a step to creating a reciprocal and less antagonistic relationship.

Although committee members agreed that crop control was the most expedient way to reduce overproduction, the committee discussed other methods as well. Some of the ideas they debated involved ways to better utilize the entire peach crop through advertising campaigns, new canned product development, and standardizing canned fruits and fresh fruits to improve quality.²⁵ Some clingstone peach growers in Sutter County also met separately from the committee and consider similar methods to better utilize the peach crop, such as standardization and advertising. Unfortunately, nothing really came of these meetings. Many clingstone growers were still so angry about the peach overproduction situation they convened separately in Sacramento in February and sent a committee to report to the Governor. The report argued that the peach growers were vital to California's economy, and they only advocated for increased consumption as a solution to the persistent problems rather than crop control. To increase consumption they suggested a standardization of the canners' pack and the placement of

²⁴ "1928 Peach Pack to Be Controlled," *Western Canner & Packer*, July 1928.

²⁵ McMillen, "An Analysis of the Marketing Control Program Used in the California Canning Cling Peach Industry," 84.

an official State of California Trademark, required by the state to insure consumers that California clingstones were a high quality product.²⁶ Though there was much discussion on the subject between canners and growers, these ideas did not gain traction. The CCPG did not support the idea but did not reveal why. The Canners League of California stated that its members could not commit themselves to such a plan, even though they were working on developing their own standardization scheme. Perhaps the difficulty the CLC faced in trying to get its own canners to commit to standards made them aware of the potential for failure of the ideas. Alternatively, perhaps, both groups wanted to retain some room for negotiation in the years to come.²⁷

The problems of overproduction continued through the next few years as canners and growers negotiated over ever increasing peach harvests. The result of 1927 and 1928 peach situations was more cooperation between the canners and peach growers.²⁸ Through these difficult times the two parts of canned clingstone peach production became intensely aware of the positive and negative aspects of their relationship to each other and the need to work together to increase production and profit margins for everyone. Voluntary industry wide market orders, as canners and growers called them, became a more common tool to facilitate this relationship. Advertising by both groups also increased. In addition, canners used their resources at the National Canners Association laboratory and the University of California Fruit Laboratory to develop new canned products to utilize the peaches, such as crushed peaches, fruit cocktail, and fruit nectar.²⁹

²⁶ Ibid., 86.

²⁷ Ibid., 88.

²⁸ Ibid., 88–126.

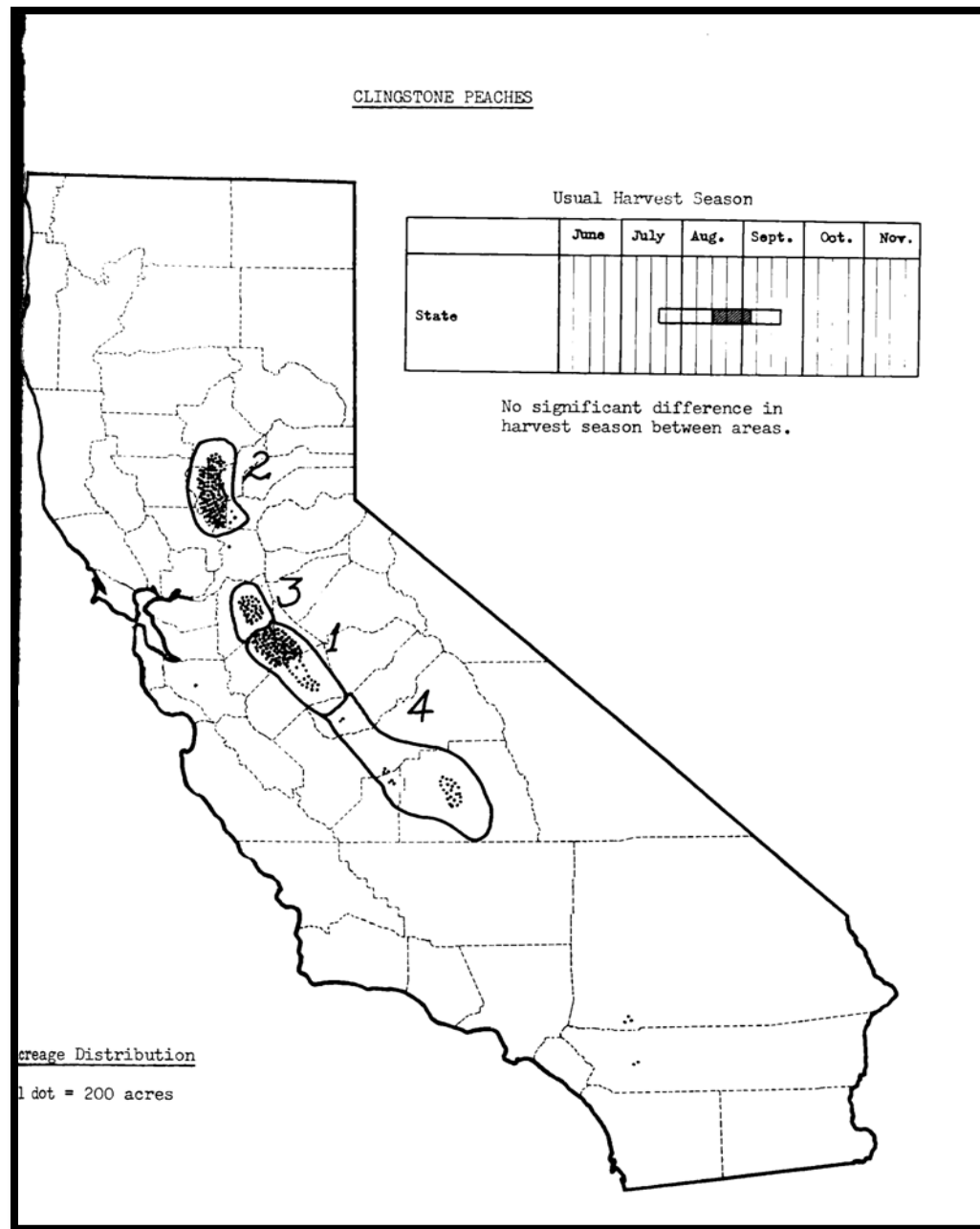
²⁹ Cruess and Marsh, *Utilization of California Fruits*.

The New Deal's Agricultural Adjustment Administration policies, which went into effect in May 1933, initiated external solutions. Clingstone peaches were not a basic agricultural commodity according to the act, but they did fall under the Marketing Agreement provisions of the act. While canners and growers still dealt with overproduction in the 1930s, more growers had accepted the concept of crop control. For the last five years of the 1920s, canners had insisted on the purchase of only No. 1 peaches. Thus, growers began to thin their orchards in anticipation of this requirement. This means that growers would take peach buds and small fruit from the orchards before they became full-grown peaches to reduce the harvest. In addition, the devastating effects of the Great Depression made everyone, from canners to growers, more willing to adopt new ideas. Nonetheless, in 1933 discussions between canners and growers, clear divisions emerged within the canning industry. The large canners, Calpak and Libby, favored pack limitation to increase market prices. Smaller canners resisted the pack restrictions because the reduction would affect them much more severely than large canners. On the other hand, growers argued that the prices for peaches were still too low. In response, smaller canners argued that the price for cannery labor was rising and they had to cover their costs. Smaller canners were afraid that the marketing agreements were a way for the larger canners to push them out of business.³⁰ Larger canners had more flexibility in price negotiations than smaller canners because they often had more access to capital and financing. If the larger canners set the price higher than small canners could afford, they would be unable to purchase enough fruit to can to cover their annual operating costs. Over five years, little had changed in regards to the essential problems

³⁰ McMillen, "An Analysis of the Marketing Control Program Used in the California Canning Cling Peach Industry," 131-134.

between the clingstone growers and canners, but the AAA had legitimized the marketing agreements. Although earlier marketing orders were voluntary in name, they were coercive in practice. Clingstone peach growers and canners that did not comply could face the strong possibility that they would lose their investment in orchards or cannery facilities if they could not sell their products. Additionally, despite the various cooperatives, large canners, such as Calpak, were better represented at the bargaining table, and with their influence over the CLC, their actions approached monopolistic price setting.

Market Orders persisted, as did crop control efforts, through the decades. Methods improved at predicting the harvest sizes and cannery markets that helped both sides to negotiate better and make more profit. However, the problem of large canners and grower organizations having more influence than small canners and independent growers continued. The peach situation of the late 1920s illustrates how the fruit canning industry encouraged the rise and development of the clingstone peach growing industry, and also how the reaction and organization of the clingstone growers forced canners to increase advertising and product development.



Map 3.1 Clingstone Peach Orchard Distribution, Data from California Fruit and Nut Crops:
1909-1951

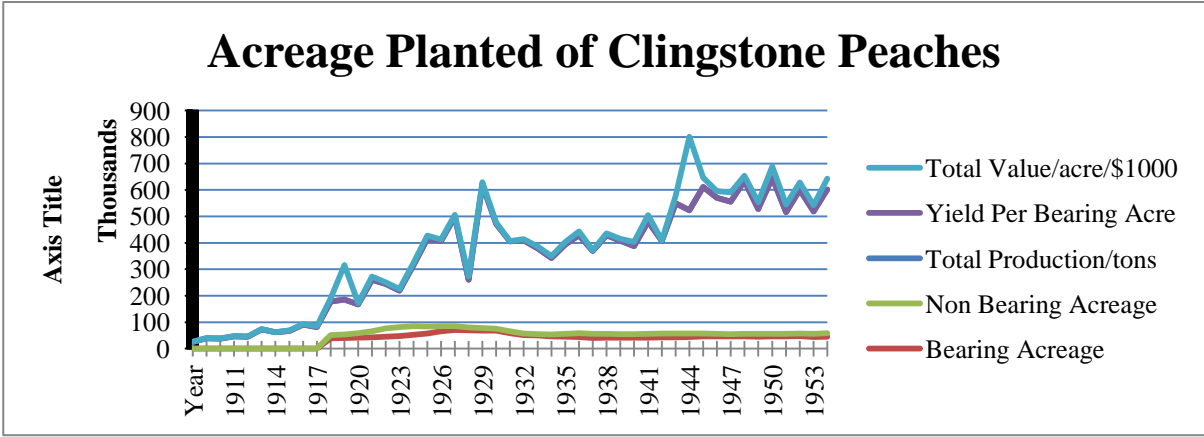


Table 3.1 Acreage Planted of Clingstone Peaches, Data from California Fruit and Nut Crops: 1909-1951

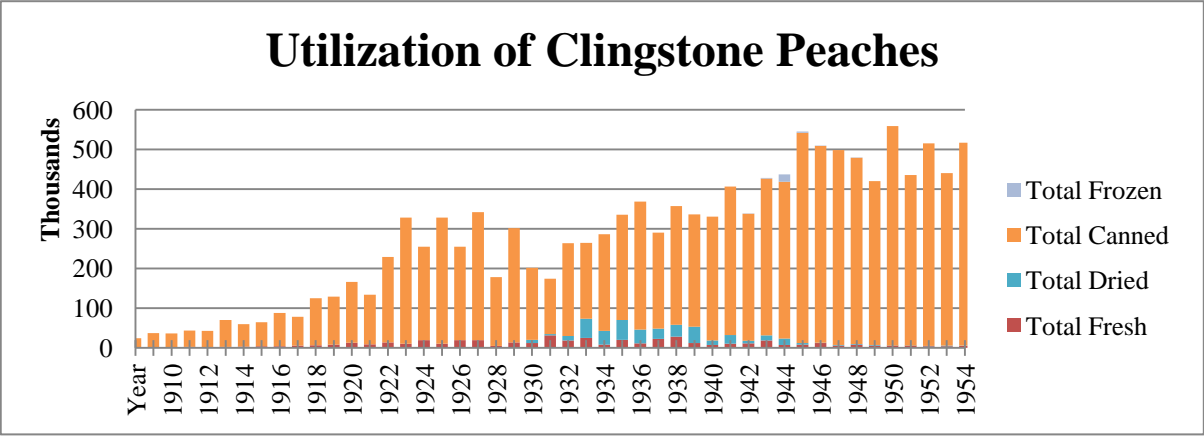
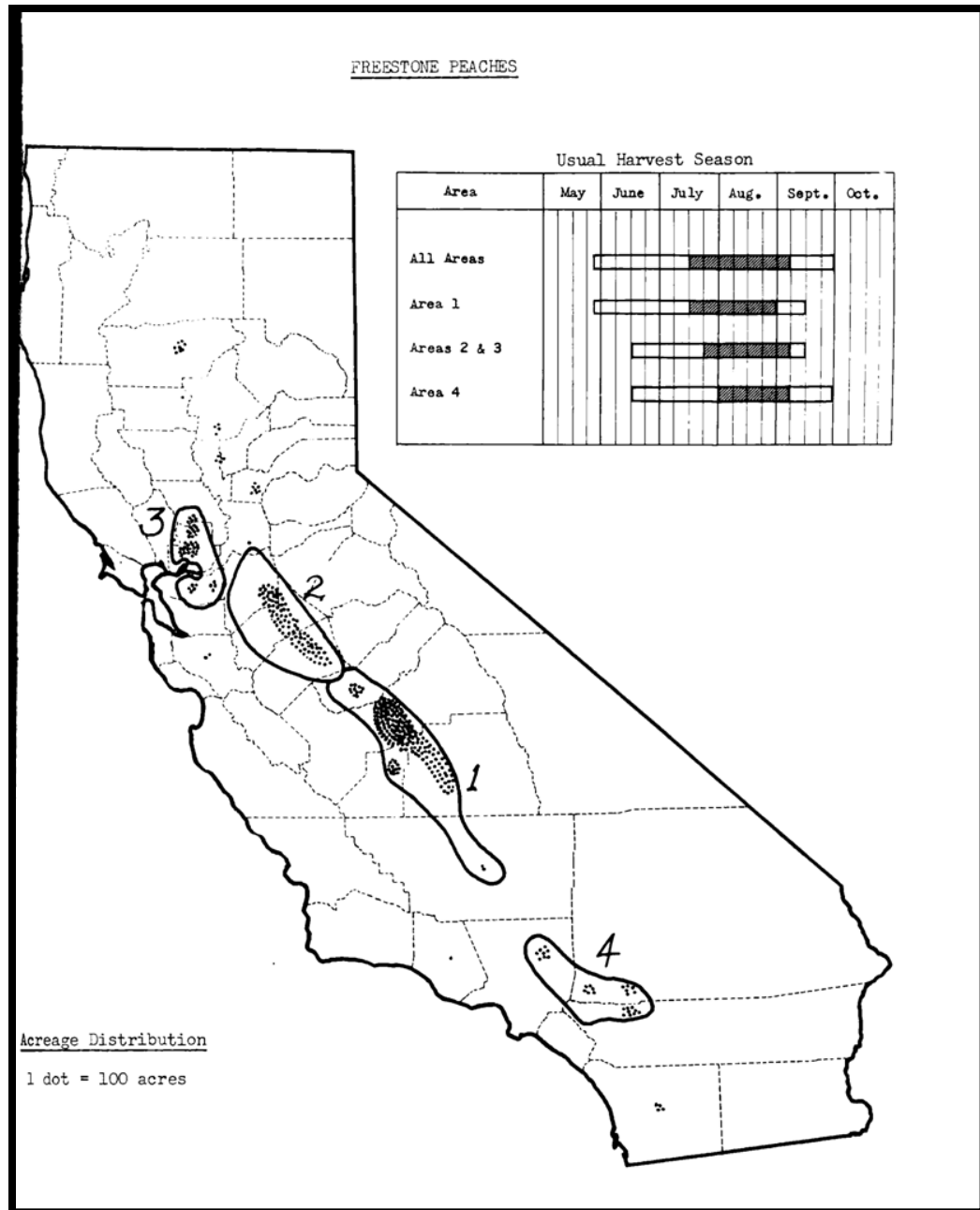


Table 3.2 Utilization of Clingstone Peaches, Data from California Fruit and Nut Crops: 1909-1951



**Map 3.2 Freestone Peach Orchard Distribution, Data from California Fruit and Nut Crops:
1909-1951**

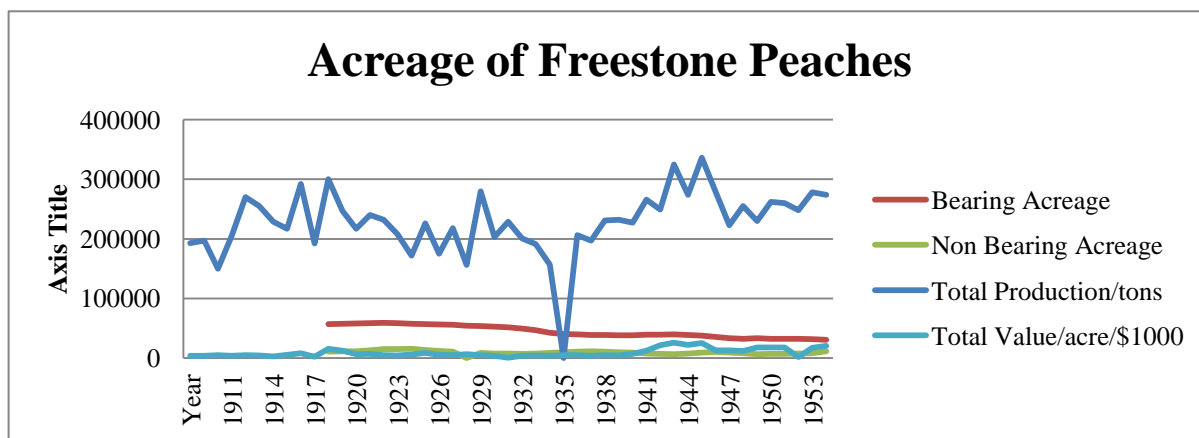


Table 3.3 Acreage of Freestone Peaches, Data from California Fruit and Nut Crops: 1909-1951

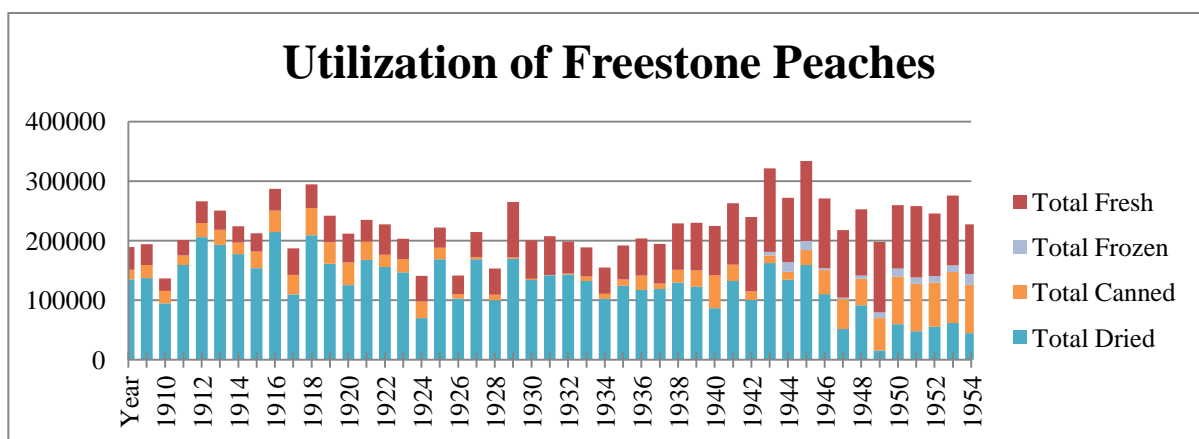


Table 3.4 Freestone Peach Utilization, Data from California Fruit and Nut Crops: 1909-1951

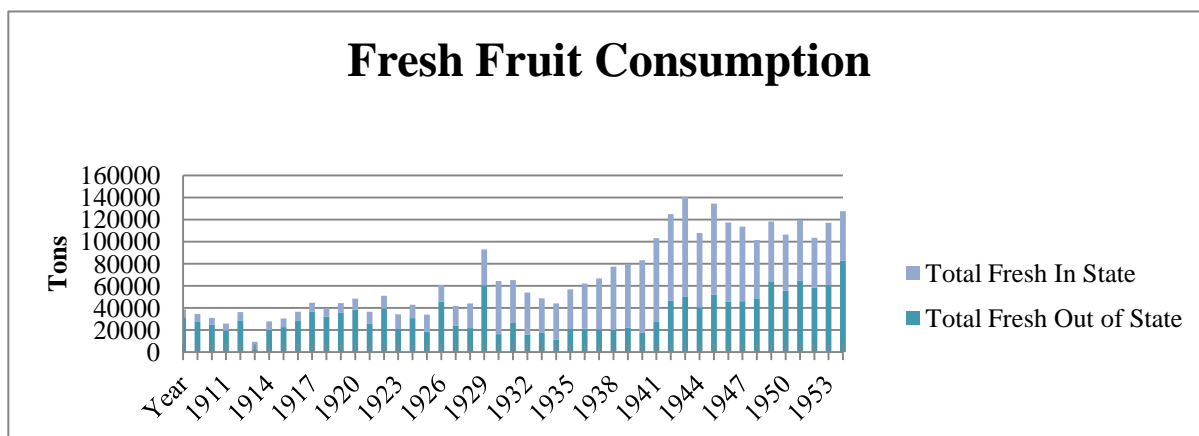
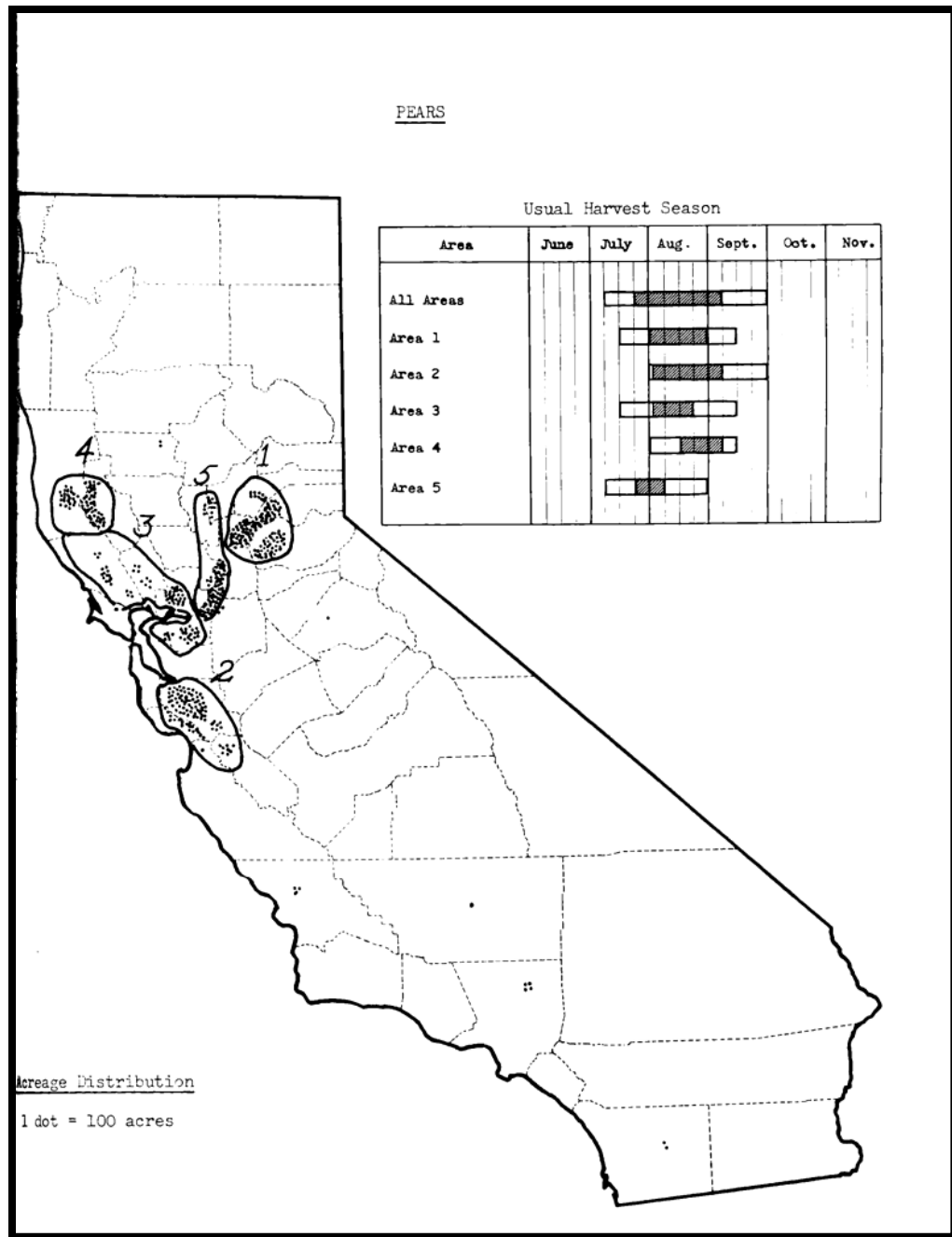


Table 3.5 Freestone Peach Fresh Fruit Consumption, Data from California Fruit and Nut Crops: 1909-1951



Map 3.3 Pear Orchard Distribution, Data from California Fruit and Nut Crops: 1909-1951

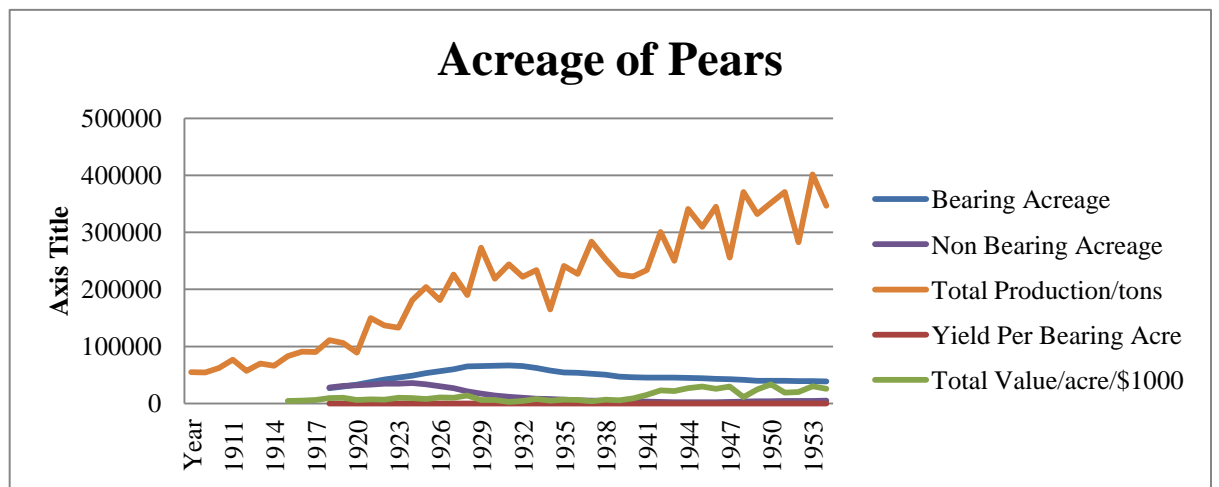


Table 3.6 Acreage of Pears, Data from California Fruit and Nut Crops: 1909-1951

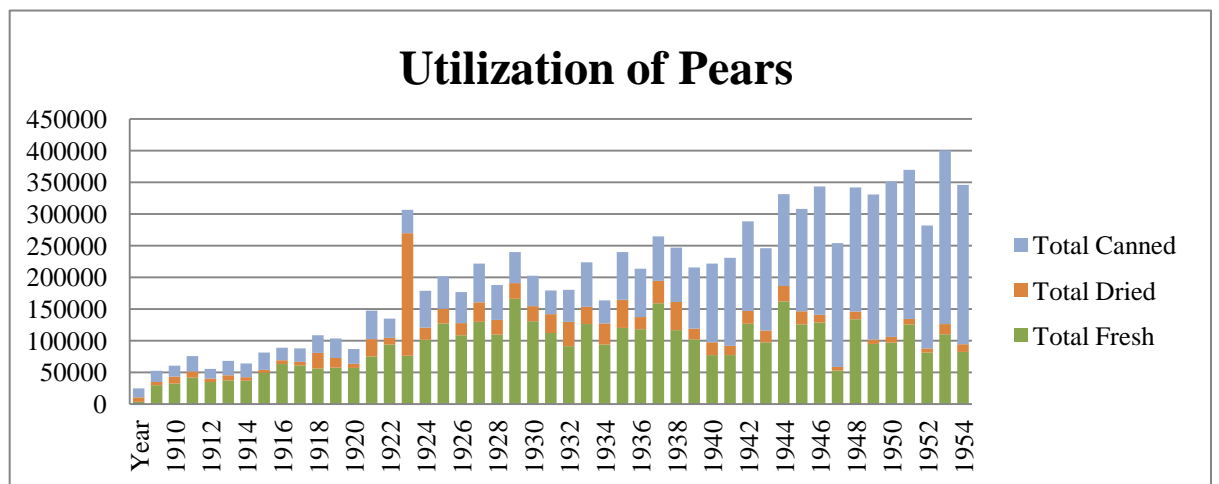


Table 3.7 Utilization of Pears, Data from California Fruit and Nut Crops: 1909-1951

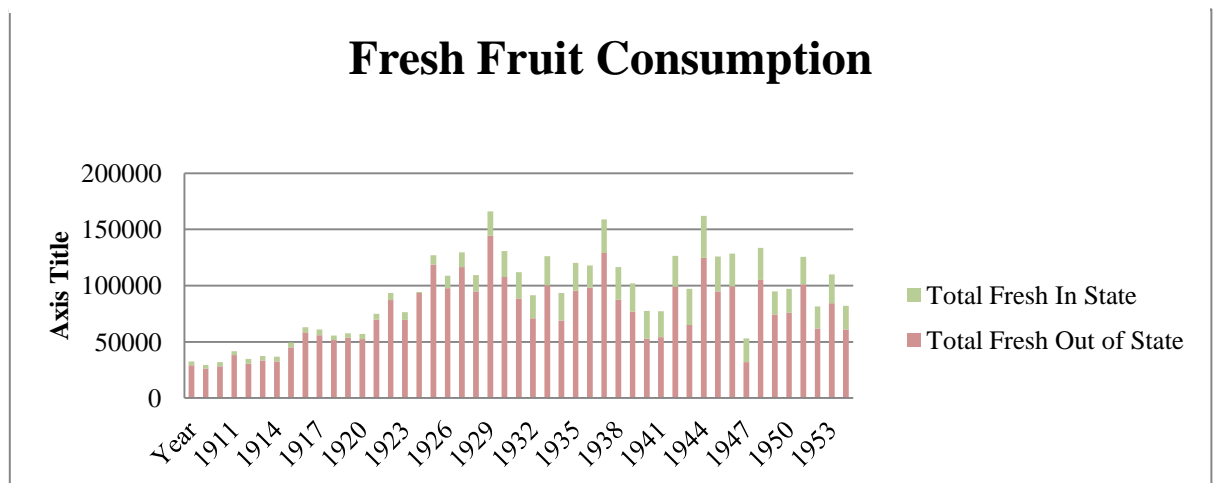


Table 3.8 Pear Fresh Fruit Consumption, Data from California Fruit and Nut Crops: 1909-1951

Canners and Cannery Workers

Canneries also exerted power in northern California's labor market. Canneries hired thousands of employees during the peak packing season from San Francisco through the Delta to Modesto. Because of the fast deterioration of deciduous fruit, canners had to make sure they packed all of the purchased fruit as quickly as possible to prevent any losses. They used mostly unskilled seasonal labor to achieve the annual pack. Many northern Californians worked in the canneries at some point in their lives and the huge amount of labor required at the canneries meant a seasonal influx of income for people living in the region. Some worked in the canners when they needed extra money, for example many students worked in canneries during the summer.

Working conditions varied between canneries, but there were some general similarities. Cannery workers worked long hours during the packing season, between ten and twelve hours a day on average.³¹ The California Bureau of Labor reported that cannery workers complained that with the rush of the packing season, sometimes employers refused to allow meal breaks. In an extreme case in 1913, workers revealed to the commission that managers had locked them in the cannery until the allotted produce was processed.³²

Gender was a key consideration in defining a laborers' place in the cannery. During the packing season, there were often at least twice as many women as men

³¹ *Labor Conditions in the Canning Industry*, Special Reports (Sacramento, CA: Bureau of Labor Statistics, State of California, 1913); *Nineteenth Biennial Report for the Fiscal Years from July 1, 1904 to June 30, 1906*, State Board of Health (Sacramento, CA: Appendix to the Journals of the State and Assembly of the 37th Session of the Legislature of the State of California, 1907); *Seventeenth Biennial Report for the years 1914-1916*, Bureau of Labor Statistics, Appendix for 42nd Session Volume II (Sacramento, CA: Journals of the State and Assembly of the Legislature of the State of California, 1917); *Twenty-Second Biennial Report for the years 1925 and 1926*, Bureau of Labor Statistics, Appendix for 48th Session Volume II (Sacramento, CA: Journals of the State and Assembly of the Legislature of the State of California, 1927).

³² *Labor Conditions in the Canning Industry*, 26.

working on the canning lines. In a 1913 survey, women working in canneries ranged from sixty to seventy-five percent of all employees. The average amount of time women spent working in the canneries was 18.4 weeks in the city and 14.2 weeks in the country.³³ Women held tedious repetitive jobs of cleaning and preparing fruit, quality control on the lines, and placing fruit in the cans. Among the preparation and canning positions, there was a hierarchy of workers based on how many seasons they had worked in the canneries. Faster, more experienced workers generally made more money. Women also worked in the cannery offices as secretaries and as floor supervisors in the preparation and canning rooms overseeing the productivity of the lines. Some female workers became quality control specialists, sampling the canned products for consistency. However, the specialists were all still lower level management positions that ultimately reported to male management. Male laborers usually held jobs requiring heavy labor, such as transporting boxes, or operating heavy machinery, such as the syrup machines or retorts. As there were fewer of these slots, there were fewer men on the cannery floor. Management at the canneries was almost exclusively a male privilege.³⁴ Until California's legislature passed child labor legislation in 1905, women brought their children with them to the canneries, and children assisted their mothers on the line or doing other odd jobs. The 1905 child labor law required children under sixteen to attend

³³ Ibid., 7, 9–10, 22.

³⁴ Zavalla, *The Canning of Fruits and Vegetables, Based on the Methods in Use in California, with Notes on the Control of the Microorganisms Effecting Spoilage*; Vicki Ruíz, *Cannery Women, Cannery Lives: Mexican Women, Unionization, and the California Food Processing Industry, 1930-1950*, 1st ed. (Albuquerque: University of New Mexico Press, 1987), 24.

school, required employers to keep track of any children working in their factories, and prohibited children from working during school hours.³⁵

Pay rates also reflected the gender division in the cannery. A piece rate system was commonly used for workers on preparation and canning lines, most of whom were women, while men and boys received hourly wages, unless they were working on canning or production lines. In canneries, paying by piece rate meant that the canner set a price for a unit of a completed task, for example bucket of peeled, pitted peaches. The benefit of piece rates for canners was that they could hire broadly and indiscriminately during the busy packing season and employees would be paid based on what they completed rather than the time they spent. The piece rate system was beneficial for the canners because they needed to have fewer supervisors to force everyone to work at their maximum level to “earn” their pay rate. If an inexperienced worker were slower at the job, she received less pay than a worker that was fast and produced more. The piece rate system incentivized employee productivity. This could be beneficial to employees because industrious workers earned higher wages. However, labor reformers had concerns about the piece rate system because it provided little stability or predictability in wages. The system also made it easier for preferential treatment to occur on the job. For example, favored employees could get better equipment or fruit that was easier, faster to prepare.

Between 1906 and 1908, most of the men working in canneries in Oakland made between nine and fifteen dollars a week working ten hours a day on average. Women made between six to nine dollars a week for about the same number of hours. Pay rates

³⁵ Martin Brown, Jens Christiansen, and Peter Philips, “The Decline of Child Labor in the U.S. Fruit and Vegetable Canning Industry: Law or Economics?,” *The Business History Review* 66, no. 4 (Winter 1992): 723–770; *Labor Conditions in the Canning Industry*.

were a bit higher in San José. Ninety-seven percent of women made from nine to twelve dollars an hour, while fifty-three percent of men made over twelve dollars a week. By 1916, wages had not increased significantly. Ninety-two percent of men working in canneries made over ten dollars a week. Ninety-six percent of women made less than eighteen dollars a week, and sixty-two percent of women made less than eleven dollars a week.³⁶

During the Progressive Era, labor reform activists worried about the health of workers in the canneries, in addition to the number of hours worked for low wages. The California Industrial Welfare Commission had begun to monitor the wages and piece rates of women in all canneries in 1915 to ensure canners were following minimum wage and piece rate laws. However, the commission also compiled reports about working conditions in the canneries that provide another perspective on how the canneries worked when studied in comparison to cannery operation manuals and trade organization articles. The primary concerns in the Industrial Welfare Commission reports were child labor conditions, sanitation, adult hours worked, and wages. There were extensive guidelines about factory sanitation methods to provide for the personal health of workers that detail what employee restroom facilities should contain. They also specified that each cannery should have enough gender-specific facilities for the employees of the factory. The reports suggested that canners needed to attend to workers' health issues because it related it to product quality. The employee health aspect of labor welfare is not unique to the food industry, but it is a vital public health concern as unhealthy employees can

³⁶ *Nineteenth Biennial Report for the Fiscal Years from July 1, 1904 to June 30, 1906*, 100–103, 116–117.

spread bacteria to the food in the cannery.³⁷ There is no indication if this report actually compelled food processors to invest in healthy employees.

The Industrial Welfare Commission was a regulatory agency; however, it was also supportive of the cannery industry and did not act aggressively to reform the conditions of cannery workers in regards to workplace or wages. In 1921, as the fruit canners moved from wartime to peacetime production levels, CLC company notes explain that the commission changed how it audited canners payrolls to help canners reduce labor costs. The result was a twenty percent reduction in labor costs for female cannery workers. Although the records do not indicate how canners saved the money, one can surmise that it came from reducing cannery workers wages or reducing the opportunity for them to earn higher wages.³⁸

While the commission did track the sanitary conditions within canneries, they did not report on the housing conditions of rural cannery workers.³⁹ In urban locations, canneries had less cause to worry about providing for the care of workers outside working hours, as they did to in rural areas. People living in San José or Oakland often took seasonal cannery work to make ends meet, but then returned to their own homes in the evenings and turned to other employment options during the rest of the year.⁴⁰ In more rural areas, migrant agricultural workers who traveled a longer distance to work in different fields during the harvest or in canneries and then moved on to other locations,

³⁷ *Labor Conditions in the Canning Industry*.

³⁸ "Canners League of California, 1921", n.d., Box 1, Folder 1, California League of Food Processors Collection.

³⁹ *The Regulation of the Fruit and Vegetable Canning Industry of California* (Sacramento, CA: Industrial Welfare Commission State of California, May 1917).

⁴⁰ Stella Adoa Baptista, "Stella Adoa Baptista: Recollections on Life in the Canneries," Transcript, February 13, 2004, Regional Oral History Office, Bancroft Library; Marguerite Clausen, "On the Waterfront: An Oral History of Richmond, California," Transcript, 1985, Regional Oral History Office, Bancroft Library.

presented different challenges. In rural areas, the lives of cannery workers were much different. Sometimes canners provided housing, but it varied in quality. Some canners even provided childcare and healthcare for their employees. Larger canneries had nurses on staff for employees to use. While, the documents do not describe how often the employees would or could take advantage of the free healthcare services, it would have been in the best interest of the canners to keep their employees healthy. Some canners, hired women to provide child care services for cannery workers. The childcare services even sometimes included basic schooling in math and reading.⁴¹

The 1930s were a decade of heavy organization of agricultural laborers and cannery workers, spurred in part by the Great Depression. Although the history of agricultural labor in California in the early twentieth century was one of low wages, discriminatory hiring practices, and living conditions at near poverty levels, unionization of these workers traditionally had been difficult.⁴² Cannery workers were also seasonal workers connected to the harvest, but because some canneries concentrated in urban areas, the workers could more easily connect enough to each other as workers to organize. Despite this, few cannery worker organizations were very active until the 1930s.⁴³

⁴¹ Braznell, *California's Finest*, 69. The opening of the Panama Canal was a celebrated occasion for canners according to the news updates in the *Western Canner and Packer*.

⁴² The following provide more extensive discussions of the difficulties of California's agricultural laborers. Carey McWilliams, *Factories in the Field: The Story of Migratory Farm Labor in California* (Berkeley, Calif: University of California Press, 2000); Cletus Daniel, *Bitter Harvest: A History of California Farmworkers, 1870-1941* (Ithaca: Cornell University Press, 1981); Stoll, *The Fruits of Natural Advantage*, 124–154; Douglas Cazaux Sackman, *Orange Empire: California and the Fruits of Eden* (Berkeley: University of California Press, 2005); Camille Guerin-Gonzales, *Mexican workers and American dreams: immigration, repatriation, and California farm labor, 1900-1939*, Class and culture (New Brunswick: Rutgers University Press, 1994).

⁴³ Kenneth Cameron Jr., "Association Bargaining in the California Canning Industry" (M.A. Economics, Berkeley, CA: University of California, Berkeley, 1949).

In 1930, the communist-led Agricultural Workers' Industrial Union (AWIU) began to try to organize agricultural workers. While the AWIU did not originally seek to engage cannery labor in their struggles, a strike by cannery workers in San José encouraged them to include cannery labor in their movement. The cannery workers in San José had formed the American Liberty Union in response to a twenty percent cut in wages. The AWIU took over the small union and changed its name to the Cannery and Agricultural Workers Industrial Union (CAWIU). The CAWIU organized a massive strike, which canners met with violent reaction by calling in scabs protected by local police. Canners met with violence every effort of the workers to protest. After just a few days, the CAWIU and cannery workers gave up and went back to work. This failure proved a demoralizing event for cannery laborers.⁴⁴

Cannery workers had more success in the next six years. By 1937, the American Federation of Labor had generally unionized the cannery industry. In response to the growing unionization of canneries, canners formed a bargaining association, California Processors and Growers, Inc. (CPG), in December 1936. The earliest members represented the largest cannery companies in northern California. CPG's fifty-six initial members represented ninety-three percent of the fruit canning industry. The CPG represented most of the larger canners, and was an entity separate even from the Canners League of California, which handled almost all other fruit canning industry coordination. The creation of these two large organizations did not end the struggles between the cannery workers and cannery management, but cannery laborers did finally gain enough traction to level the playing field somewhat in worker/management negotiations.⁴⁵

⁴⁴ Daniel, *Bitter Harvest: A History of California Farmworkers, 1870-1941*, 127–128.

⁴⁵ Cameron Jr., "Association Bargaining in the California Canning Industry."

By 1939, employment in the fruit and vegetable canning industry was the second highest in the state behind petroleum refining. The average wage reported by the Division of Labor was \$19.50 per week. By contrast, the average petroleum-refining wage was \$36. The wages for fruit and vegetable labor were among the lowest of the groups reported. The canners were part of a group with men's clothing manufacture, fish canning, and cotton, wool, and silk goods manufacture.⁴⁶ Even after the cannery workers had organized and affiliated with the AFL, they still had a long way to go to achieve wages that were more competitive with other industries.

Economic historians Martin Brown and Peter Phillips explain that by the 1940s the hourly wage system replaced the piece rate system because of the mechanization of the cannery. In the 1920s and 1930s canning companies that could afford to mechanize processes did. Cannery machines provided more consistent products faster. New technologies, such as peach pitting machines, required a worker with more experience. The timing of working on a conveyor belt system also required employees with more skill to work as a team, which is something that was not encouraged with employees that worked on a piece rate system.⁴⁷

Through increased labor organization by cannery workers and the mechanization of canneries by canners, the working conditions of canneries changed. By the 1940s, cannery workers had the ability to bargain for better wages, and they flexed the power of their new organization through strikes when necessary. More canneries were

⁴⁶ *Labor in California Biennial Statistical Report to the Legislature, 1939-1940*, Department of Industrial Relations, Division of Labor Statistics and Law Enforcement, Appendix for 50th Session Volume II (Sacramento, CA: Journals of the State and Assembly of the Legislature of the State of California, 1941).

⁴⁷ Martin Brown and Peter Phillips, "The Decline of the Piece-Rate System in California Canning: Technological Innovation, Labor Management, and Union Pressure, 1890-1947," *The Business History Review* 60, no. 4 (Winter 1986): 564-604.

mechanizing which changed the way workers worked in the cannery, particularly women on the preparation and cutting lines. Mechanization also helped to eliminate children from the canneries as much as child labor laws because they simply could not do the work required on machines.⁴⁸ Canneries and their workers had to change together in order to continue their mutually supportive relationship.

Conclusion

Historians often separate the city from agriculture, but the history of the canning industry proves how vital California's cities were to the canneries. Canneries also became increasingly powerful in San José and Modesto. They supplied jobs and helped support the growers by providing another outlet for the crops. Canners also had support industries, such as can makers, box makers, and sugar manufacturers that depended on the canneries and added to the industry's economic strength and created more jobs within cities. A culture emerged in these cities centered on agricultural production and fruit canneries. Most citizens of San José or Modesto were part of the canneries' production networks in some way even if it was just to recognize their environment by the blooming of peach and pear trees and the frenzied activities of the harvest. Canning was in the air, along with the smells, sounds, pollens, seeds, and insects that followed the fruit canning industry.

Despite the increasing sophistication of the fruit industry and the ascendance of their products to the top of the national fruit market, dark problems lurked unattended.

⁴⁸ Brown, Christiansen, and Philips, "The Decline of Child Labor in the U.S. Fruit and Vegetable Canning Industry: Law or Economics?"

One of the most glaring was cannery labor. Labor activists documented the daily routines of cannery workers in the early twentieth century who sought to reveal the problems the workers faced. Cannery laborers began to organize to gain power to negotiate in the early twentieth century, but were less successful than other industries. The problems of laborers largely lingered until the 1930s when labor organization in canneries began to pick up pace.

Canneries were factories, but because they worked so closely with growers, they were also agro-industrial spaces that blurred the line between agriculture and industry. As canneries mechanized, they became more like traditional factories and less like agricultural outbuildings in which early canneries emerged. However, food-producing factories never lost their close connection to agriculture because growers produced the raw materials they used deteriorated so rapidly.

California canners also affected the environment of California in many ways, including their influence over use of agricultural land. By providing a market for specific varieties of fruits, the canners encouraged increased planting of certain fruits, such as clingstone peaches and Bartlett pears. The clingstone peach situation illustrates the difficulties of adopting crop and production controls in both the canned peach and peach growing industries. It also illustrates the strengthening of the relationship between the two groups as each one becomes part of the others production network.

While the literature and imagery of California's boosters and artists, such as A.H. Waterhouse, presents a beautiful agricultural world, it covers up the hard work and sacrifice of the people who manufactured the idyllic landscape of Santa Clara Valley. As one delves more deeply into the history of the region, it becomes apparent that human

struggle was the norm, yet Waterhouse for one does not include any people in this poem. Many groups of people, urban administration, cannery workers, agricultural workers, cannery management, growers, the CLC, the CCPG, and the State of California, worked together to change the landscape of California. Because of the combined strength economic strength of the canners and their production networks, California canners were able to influence the cities, lands, and people of northern California.

CHAPTER 4 – A DISEASE OF CIVILIZATION

Botulism occurs when humans ingest a dangerous toxin, botulin, created by the bacteria *Clostridium botulinum*. The bacteria are thermophilic (heat loving) and anaerobic (survives without oxygen), and they thrive in high moisture, low acid environments, which exist within a sealed canned foods. In fact, canned food provides a perfect environment for *botulinum*. The bacteria release botulin when they reproduce in these conditions. The symptoms of botulism include nausea and paralysis, often of the face, throat, and respiratory system. Tragically, victims are often unable to communicate as they suffer. Death from botulism can be quite swift. Botulism received its name because scientists initially thought badly preserved sausage created the poison; however, *Clostridium botulinum* can grow in many low acid foods, such as preserved vegetables and meats. *Botulinum* was very dangerous bacteria for canners not to be able to control in an era when the production of canned foods was rapidly expanding.¹ In 1919, California canners were leaders in their industry and shipped canned foods across the United States and the world. That year nineteen people in three states died from olives canned in California resulting in a media frenzy that tainted the image of the entire California canning industry.

Dr. Ernest Dickson was a leading specialist on the study of *Clostridium Botulinum*, the bacteria that produces the toxin causing botulism poisoning. He identified the cause of botulism poisoning and found that canned food provided a nourishing environment for it to flourish. Botulism poisoning was a threat to both commercial and

¹ Botulus is Latin for sausage University of Notre Dame Online Latin Dictionary accessed 9.19.11
<http://www.archives.nd.edu/cgi-bin/lookup.pl?stem=bot&ending=>

home canners. Although cases were rare in commercially canned foods, botulism poisoning struck fear into people. From 1919 to 1924, public health officials in the United States attributed botulism outbreaks to canned food from California more frequently. As a result, the fruit and vegetable canners of northern California collaborated in a research project of the deadly food borne bacteria undertaken at Stanford and the University of California, Berkeley. The collaborators began the project to protect the canning industry, but the data and guidelines that emerged from the study were vital in understanding and battling botulism in canneries and home kitchens. Because of the project's research and guidelines, people across California put procedures in place to track botulism, warn the home canner how to avoid the disease, created procedures that almost eliminated botulism from commercially canned foods, and helped develop anti-toxins to overcome the effects of botulism. The botulism scare of the 1920s illustrates the power of the canning industry to solve problems during a crisis, and the weakness of the production networks and the associative state to enforce public safety and health concerns.

Food preservation removes water and prevents contact with air to kill bacteria. The battle with bacteria stretches back for millennia, and over time, humans developed many strategies for extending the life of food in the environment in which they lived. For example, covering fruit, vegetables, and meat in oil prevented contact with air. Pickling food placed it in a highly acidic solution that would kill most bacteria, creating items such as sauerkraut and relishes. Drying meats and vegetables proved popular depending on climate. High humidity prevented the meat or vegetables from drying completely. Salting fish was common in areas near the sea or ocean along trade routes where

merchants distributed salt. However, all of these methods changed the texture of the food drastically. Canned food was a breakthrough in food preservation because it provided a way to maintain moisture in food without pickling it, covering it in oil, or turning it into jerky. Most importantly, canning occurred in a factory and did not require dependence on the environment. It did not matter if the climate was humid or dry. Canning provided people access to foods that would have been very difficult to attain before, such as supplying beef soup for the officers of the French Navy on a long ocean voyage. Canning food was a wonderful invention for an industrial age when cities and countries were expanding, but like most technological advances, it came with risks.²

California Foods and the Law before the Botulism Research Project

The State of California began to pass laws regarding food adulteration as early as 1852 when the Gold Rush was transforming northern California. That year, the state legislature passed two laws authorizing the appointment of a Flour Inspector and Gauger of Wines and Liquors for the Port of San Francisco, whose primary duties were to certify quality and quantity claims made by those selling these items. The Inspector and Guager's mark ensured consumers they would receive the same grade and volume of flour or wine for which they paid. This kind of law was essential to public safety in the chaos of Gold Rush San Francisco where the transient population's food supply depended, almost solely, on what arrived at the docks. Within a year, the state legislature appointed more flour inspectors to ports farther in the San Joaquin – Sacramento Delta and Central Valley. Over the next few decades, the few laws pertaining to food

² Shephard, *Pickled, Potted, and Canned*; Thorne, *The History of Food Preservation*, 13–41, 133–155.

production focused on alcohol, in part making sure processors did not adulterate it with poisonous substances and sold the product advertised.³

Still, there was no coordinated effort or agency to monitor the safety of food production in California, and there was no direct oversight over canneries. The logical agency to take on the task was the Board of Public Health; at that time, however, infectious disease and epidemic were the primary concerns of the agency. There were many competing priorities for a small and weak state government. In fact, there were more laws passed about squirrel eradication than food safety during the 1860s to 1880s. In addition to the many diseases arriving through the Port of San Francisco and over the Sierra Nevada mountains, the squirrels of California carried Pneumonic Plague. This realization led to statewide efforts to destroy as many squirrels as possible. After squirrel eradication, sanitation was the next priority concern for public health officials. Migration and tourism increased in California at the turn of the century. Impromptu camps became a sanitation dilemma all over the state. Faced with these many pressing problems, the Board of Public Health generally stayed out of the food processing industry's production until the botulism scare.⁴

Lax or no oversight of food production was common throughout America during this time. The fields of epidemiology and public health were still in formative stages and scientists were discovering characteristics of different species of bacteria. As knowledge

³ "An Act to Provide for the appointment of a Gauger for the Port of San Francisco," *Statutes of California*, May 3, 1852; "An Act to Provide for the Inspection of Flour," *Statutes of California*, 1852, <http://192.234.213.35/clerkarchive/>, (accessed May 5, 2011); "An Act Amendatory of an Act entitled 'An Act to provide for the Inspection of Flour,' passed May third, one thousand eight hundred fifty-two," *Statutes of California*, May 18, 1853.

⁴ "Report of the Permanent Secretary to the State Board of Health" (California State Printing Office, 1879), Senate and Assembly Journals, San Jose State Library; "Eleventh Biennial Report of the State Board of Health of California for Fiscal Years from June 30, 1888 to June 30, 1890", 1891, Senate and Assembly Journals, San Jose State Library.

increased, so did regulation for public health. Public health advocates and scientists focused on the most common and most deadly transmitted diseases: malaria, influenza, cholera, and tuberculosis. The persistence of devastating epidemic disease in American cities meant that the low mortality rate of foodborne illness, such as botulism, made it a secondary priority. The California Public Health Department did not even require doctors to report deaths attributed to food poisoning to public health departments until 1920.⁵ A report of diagnostic treatments at the state laboratory for the July to December of 1924 lists that of the 23,114 tests run, 9 were to test for botulism and none of the tests were positive. In contrast, scientists ran 11,500 tests for syphilis, a quarter of which were positive, and 9,179 for diphtheria, of which a third were positive.⁶

Another group of scientists that studied food production, food and agricultural scientists, focused on problems that interfered with production rather than foodborne illness. For example, agricultural scientists in California studied phylloxera, a fast spreading plant disease that crippled the grape and wine industry of California. Until the 1920s, they remained more concerned with insects and bacteria that harmed crops and cattle than those passed on to consumers eating processed foods.⁷

Additionally, a central problem in understanding foodborne illness was in identifying the source. Diagnosing a type of food poisoning was difficult and even harder to attribute to a single food the patient had eaten. Before the 1920s, doctors often gave the diagnosis of ptomaine poisoning for any food sickness. A group of scientists in

⁵ "Botulism a Reportable Disease in California," *Public Health Reports (1896-1970)* 35, no. 17 (April 23, 1920): 997, (accessed November 6, 2012).

⁶ "Twenty-Ninth Biennial Report of the State Board of Health of California for the Fiscal Years from July 1, 1924 to June 30, 1926" (California State Printing Office, 1927), Senate and Assembly Journals, San Jose State Library.

⁷ Gladys Baker, *Century of Service* (Washington]: Centennial Committee, U.S. Dept of Agriculture: [for sale by the Superintendent of Documents, U.S. Govt. Print. Off, 1963]; Stoll, *The Fruits of Natural Advantage*, 94–123.

Germany developed the theory of ptomaines in the 1870s and 1880s. They defined ptomaines as chemical bodies that formed during putrefaction and could take many forms. Thus, they were difficult for anyone to recognize except for those trained to identify the more than sixty categories of ptomaine.⁸ After the research on foodborne illnesses of the 1920s appeared in medical journals, scientists no longer used this diagnosis, but when it was in vogue, consumers came to relate the word *ptomaine* with devastating illness and a high probability of death. Unfortunately, when doctors diagnosed most food illness outbreaks as ptomaine poisoning, they failed to identify the real culprits: *Salmonella*, *Escherichia Coli*, and *Clostridium botulinum*.⁹

Given the lack of oversight of processed food and understanding of food borne illness, consumer distrust of foods was among one of the most pressing problems of the canning industry. The association of canned foods with ptomaine poisoning created marketing challenges for canners across the United States. Also, newspaper stories of incidents of badly canned foods, such as the tainted and inferior canned beef scandal of the Spanish-American War, in which the United States Army received cans of beef containing embalming fluid and ruined meat, horrified potential consumers.¹⁰ Also, the quick rise of the commercial food processing in America had distanced producer from consumer, making it harder for consumers to know where their food came from.¹¹

Before the twentieth century, consumers had little recourse if a product made them sick.

As the prevailing philosophy of government during much of the 19th century was *laissez-*

⁸Edwin LeFevre, "Ptomaines and Ptomaine Poisoning," *Popular Science*, April 1912.

⁹ Bill Bynum, "Discarded Diagnoses," *The Lancet* 357 (March 31, 2001): 1050; W.D. Bigelow, "The Work Conducted by the Commercial Canners of the Country," *Annals of the American Academy of Political and Social Science* 74, The World's Food (November 1917): 157-163.

¹⁰ Philip J. Hilts, *Protecting America's Health: The FDA, Business, and One Hundred Years of Regulation* (New York: Alfred A. Knopf, 2003), 28-39.

¹¹ Vileisis, *Kitchen Literacy*.

faire regulations on food production were few and those that existed were municipal, county, or state level laws. Consumers could go to court to seek compensation for damages, but lacking regulation or common law, *Caveat emptor*, or “let the buyer aware,” was often the philosophy used in courts. As the marketplace became more sophisticated with the increase of manufactured goods traded between states and countries in the late nineteenth century, legislators and consumer activists became more aware of the shortcomings of the existing system. They fought for federal laws to protect consumers using goods manufactured outside their state.¹²

As early as the 1870s, consumer advocates and regulatory agencies began to use scientific findings to support the regulation of food to create a pure food supply, but it was unclear if food protection was a public health or a consumer protection problem. Prevailing philosophies of the role of government regulation at the time placed less importance on consumer protection than public health.¹³ More information was needed to determine how widespread processed food problems were and if the cause of the problem lay with consumer or producer. At the turn of the century, food processors began to support research of foodborne illnesses and develop technology and medical procedures to overcome them. Food science and public health were emerging specializations in universities, which drew scientists with expertise in bacteriology. Food scientists provided data to define standards of product quality, and public health officials created minimum requirements of food safety for regulation.¹⁴

¹² Kermit Hall and David Scott Clark, eds., *The Oxford companion to American law* (New York: Oxford University Press, 2002), 154–157.

¹³ Okun, *Fair Play in the Marketplace*.

¹⁴ Karl F. Meyer, “Medical Research and Public Health, an oral history conducted 1961-1962 by Edna Tartaul Daniel” (Regional Oral History Office, The Bancroft Library, University of California, Berkeley, 1976), <http://bancroft.berkeley.edu/ROHO/collections/cite.html>, (accessed July 11, 2011).

A pure food movement began in the 1880s in industrializing states, such as Illinois, New York, and New Jersey. At first, the primary concern was tainted or watered down milk, and the movement soon began to address other concerns, such as tainted beef and highly adulterated processed foods and drugs. Pure food crusaders gained significant support during the Spanish-American war when soldiers reported that the meat rations provided to the army by Swift and Armour were, at best, extremely poor and often even poisonous. Many soldiers did not try the canned meat; others who ate the meat often began to vomit right away and often developed a variety of symptoms indicating food poisoning shortly afterwards. Even the adventurous Theodore Roosevelt could not bring himself to eat the rations that he described as “slimey, stringey, and coarse.” The negligence of the meatpackers towards American troops outraged the public. Roosevelt, a leading progressive, became involved with the pure foods movement because of his war experiences and supported it during his administration as governor of New York.¹⁵

State governments began to pass laws regulating the processing or sale of food as early as the 1880s. As Mitchell Okun explains in his study of early anti-adulteration laws for New York dairies, urbanization and industrialization increased concerns over the food supply because people could no longer trust the integrity of local entrepreneurs, and they did not even know who produced their milk. In America, some of the first manufactured foods state governments regulated were dairy products. The New York state legislature passed anti-adulteration laws as early as 1881. Okun argues these early state laws such as those passed in New York helped spark discussion about the purity of food that led to a

¹⁵ Hilts, *Protecting America's Health*, 38.

national debate.¹⁶ In the 1880s, the Pure Foods Movement emerged to express the concerns of Progressive reformers, such as state chemists and women's groups.

Other historians explain that activism of state chemists was vital in the Pure Foods movement. States throughout America were creating posts for state chemists, who played an important role proving the level of the problem of food adulteration in the United States.¹⁷ State chemists and analysts had the equipment and training to provide evidence of food adulteration or presence of poisonous substances, allowing them to refute the claims corporations made about their products without having to get product composition from the companies. Harvey Wiley, an ardent champion of the Pure Foods Movement, depended on the data provided by state chemists, such as the California State Analyst, to back up his claims of the outrageous degree of adulterated food in America's food supply. A chemist at the USDA, Wiley began his career researching sugar production and comparing the differences between corn, sorghum, cane, and beet sugar. Given the rising importance of sweeteners to the industrial food supply, his research, combined with his outgoing personality, propelled him quickly up the ladder to a top position in the agriculture agency in DC. Even though a member of the Republican Party, he was a reformer at heart. During his career, he became increasingly aware of the dangers of adulterated food and became passionate about the need to protect consumers.¹⁸

One of the first important steps in California toward including food safety among other public health concerns came in 1885. The legislature created a position for a State

¹⁶ Ibid., 3–55.

¹⁷ Goodwin, *The Pure Food, Drink, and Drug Crusaders, 1879-1914*; Okun, *Fair Play in the Marketplace*; Coppin, *The Politics of Purity*.

¹⁸ Hilts, *Protecting America's Health*, 11–18.

Analyst, a chemist who would determine the chemical makeup of substances submitted to him. The materials submitted to the analyst's office ranged from suspicious foods, to wine, to soil, to minerals. An official state analyst or chemist added scientific authority to allegations of fraud and provided a way to enforce more precise definitions of purity for food and other products. As one can imagine, the existing mineral industry and growing agricultural industries of California also found this service very beneficial. Although the analyst position served more than the food processing industry, the ability to analyze the chemical composition of materials meant that future regulations could have stricter definitions of composition. It put into place an important check against food manufacturers because now regulators, inspectors, and consumers no longer had to depend on the producer for an explanation of what the product contained.¹⁹

There was no federal regulation for processed foods at the turn of the century. While, the USDA had been vital to food production in America since its creation in 1862, its mandate was to promote agricultural markets and disseminate knowledge. Thus, the USDA had an interest, if not a direct mandate, to protect markets by making sure agricultural products would not hurt consumers. However, during the late nineteenth and early twentieth century, the USDA interpreted its mandate narrowly. The agency showed little concern for food processors or food safety and instead focused almost exclusively on increasing farmers' yield.²⁰ The USDA encouraged market growth and was not primarily a regulatory agency.

¹⁹ "An Act to provide for analyzing the minerals, mineral waters, and other liquids and the medicinal plants of the State of California, and of food and drugs, to prevent the adulteration of the same.", March 9, 1885.

²⁰ Lisa Mae Robinson, "Regulating What We Eat: Mary Engle Pennington and the Food Research Laboratory," *Agricultural History* 64, no. 2 (Spring 1990): 143–153, (accessed January 11, 2010); James Harvey Young, "Food and Drug Regulation under the USDA, 1906-1940," *Agricultural History* 64, no. 2 (Spring 1990): 134–142, (accessed January 11, 2010); Baker, *Century of Service*.

Public sentiment favored regulation of the food processing industry. The Progressive movement had succeeded in altering how Americans thought about the role of government. In 1905, Upton Sinclair revealed this regulatory gap to the public through vivid and frank explanations of the workings of Chicago's Stockyards, revealing the concerns of Pure Foods activists. The Pure Food and Drug Act of 1906 created the Food and Drug Administration to verify and regulate the purity of foods and drugs. Even after the 1906 Pure Food and Drugs Act took effect, defining the extent of authority of the pure food laws was difficult and conflicted with the USDA's mission to increase markets for agricultural goods. The USDA housed the early food and drug agency.²¹

The FDA also had limited resources initially and could not fully exercise its power. It focused on the worst food cases and drugs. Consumer distrust of processed food and the absence of government action to calm peoples' fears convinced the canners to take care of what they could on their own. Canners created trade associations to pool resources for research and consumer education at the end of the nineteenth century. The Canners' League of California formed in 1905, and the National Canners' Association emerged in its present form in 1907. In the 1910s, the National Canners' Association ran an aggressive marketing campaign to teach the public about canned food. The program

²¹ Hilts, *Protecting America's Health*; Upton Sinclair, *The Jungle*, Paperback., Enriched Classics (New York, N.Y.: Simon & Schuster, 2009); Young, *Pure Food*; Young, "Food and Drug Regulation under the USDA, 1906-1940"; Robinson, "Regulating What We Eat." To enforce the federal food and drug regulation, labeling became the central method used by the federal government to control the safety of the food supply. The concept behind food labels was that the government could protect consumers and encourage food processors to produce pure food if all the ingredients for a product were on the label. Thus, consumers could identify potentially harmful chemicals and avoid the product. This assumed consumers knew which chemicals were harmful. Unfortunately, the effect on humans of ingesting the existing substances and the many new formulations entering American markets at the time was not well known, which is why the FDA spent so much time on drugs rather than food safety initially, and why it was placed within the USDA Bureau of Chemistry. California fruit canners feared that some labels requirements would lead consumers to think their products were less natural. Specifically, they were concerned with the perception of maraschino cherries.

focused on how to distinguish grades of canned goods, so consumers would be aware that they could purchase different quality levels of products. For example, the canning industry deemed “Fancy Fruits” perfect enough to display or serve at a dinner party. “Seconds,” on the other hand, were edible, but they had discoloration or irregularities. They were best in pies or other recipes where the fruit was less visible.²²

The campaign also warned consumers not to buy bulging or pierced cans as those conditions pointed to possible degradations of the food product. This sort of education was necessary during a time when many women, the primary purchasers in the consumer market, were new to purchasing processed food items and the world of industrial food production. Laura Shapiro, a scholar studying women and cooking in twentieth century America, explains that the many women in the market were immigrants or migrants from rural areas who had previously lived off the land or purchased ingredients for their daily meals locally from producers they knew. The newly emerging ways of buying food in America were difficult for many to navigate at first.²³

Firms at the turn of the century cultivated reputations for guaranteed purity because consumer confidence increased their sales. Branding and labeling became more important as corporations attempted to avoid food scares and scandal that might undermine consumers’ trust in their products. One incident might create negative connotations and force a complete rebranding of a product, which was very expensive. California canners courted food reviewers to promote California brands and educate consumers on how to use their product. Writers of women’s magazines and leading

²² Cruess, *Commercial Fruit and Vegetable Products; a Textbook for Student, Investigator and Manufacturer*, 76–77.

²³ Meyer, “Medical Research and Public Health, an oral history conducted 1961-1962 by Edna Tartaul Daniel”; Judge, “A History of the First National Association: The National Association of Canned Food Packers,” 68–76; Shapiro, *Perfection Salad*.

figures of the newly formed discipline of home economics exerted considerable influence by reaching the large and expanding women's domestic market. Writers published reviews and printed recipes in women's magazines. Home economics leaders gave lectures across the country promoting nutrition and food fads.²⁴ Home economists and spokeswomen for brands became an important marketing tool for canners because they could help create consumer confidence in brands.

Even after the 1906 law went into effect, state regulation of adulterated food continued to be vital. For the first ten years, the FDA's focus was food additives or adulteration not foodborne illness. During the food poisoning outbreaks, food and drug inspectors could only seize food that showed signs of putrification. This was extremely problematic during the California canned food botulism scares of the 1920s because the bacteria and toxin that cause botulism can exist within apparently perfectly preserved food. No decay was necessary for the bacteria to thrive.²⁵ Additionally, the power of the 1906 Act only extended to food crossing state lines, not to food sold within the state.²⁶ The limitations of the FDA required that the state public health departments cover the gap in federal regulation of the food supply even when the food was going to be crossing state lines, as was the case with much of California canned food products. The many variations of food safety law made it difficult for processors looking to build nationwide markets to meet all the various requirements. The National Canners' Association launched a campaign to get states to create pure food laws similar to the federal laws to

²⁴ Atwater, "The Relation of the Consumer Movement to the Canning Industry"; Vileisis, *Kitchen Literacy*; Shapiro, *Perfection Salad*.

²⁵ Young, "Food and Drug Regulation under the USDA, 1906-1940."

²⁶ Robinson, *Regulating the Food We Eat* Robinson, "Regulating What We Eat."

make it easier for canners to sell their goods nationally.²⁷ By the turn of the century, California had begun to pass a number of laws regulating agriculture and food production. California's Pure Foods Act came into effect in 1907 but focused on agricultural products and specifically decay, not processing or foodborne illness.²⁸ Therefore, by the end of the 1910s, food safety regulation was in place, but it remained ineffective in covering all the aspects of food safety. Regulators did not focus on foodborne illness because adulteration received the most of the attention.

In California's fruit and vegetable canneries, the most urgent food safety issues were bacteria brought in with fruits and vegetables and in-cannery contamination. Adulteration in the fruit processing industry occurred when processors used dyes to produce consumer-preferred colors or flavors in jams, jellies, and syrups. Maraschino cherries, for example, required producers to alter cherries from their original state to achieve the desired results: manufacturers bleached, dyed red, and then flavored the cherries. While most fruit and vegetable canneries in California stayed away from chemicals, other than lye, adulteration practices allowed some food producers throughout the United States to employ methods that masked their use of lower quality products or inadequate processes.²⁹

Rather than chemical substitution in the canneries, fruit and vegetable canners placed the burden of creating perfect fruit on the grower. The canners used Canners League of California standards for each type of fruit they accepted and enforced the standards rigorously when growers delivered fruit to the cannery. The abundance of fruit

²⁷ Judge, "A History of the First National Association: The National Association of Canned Food Packers."

²⁸ *Nineteenth Biennial Report for the Fiscal Years from July 1, 1904 to June 30, 1906.*

²⁹ Cruess, *Commercial Fruit and Vegetable Products; a Textbook for Student, Investigator and Manufacturer.*

grown in northern California allowed the canners to be more exacting in their selection of raw materials even if it meant there were growers who did not sell all of their fruits and vegetables. Thus, the pressure to produce more and better quality peaches, pears, tomatoes, and asparagus, was pushed to growers, who increasingly relied on the advice of agricultural scientists. Thus because the FDA focused on adulteration, the fruit and vegetable canneries were largely ignored until a problem occurred.³⁰ These huge discrepancies became very apparent by the 1920s.

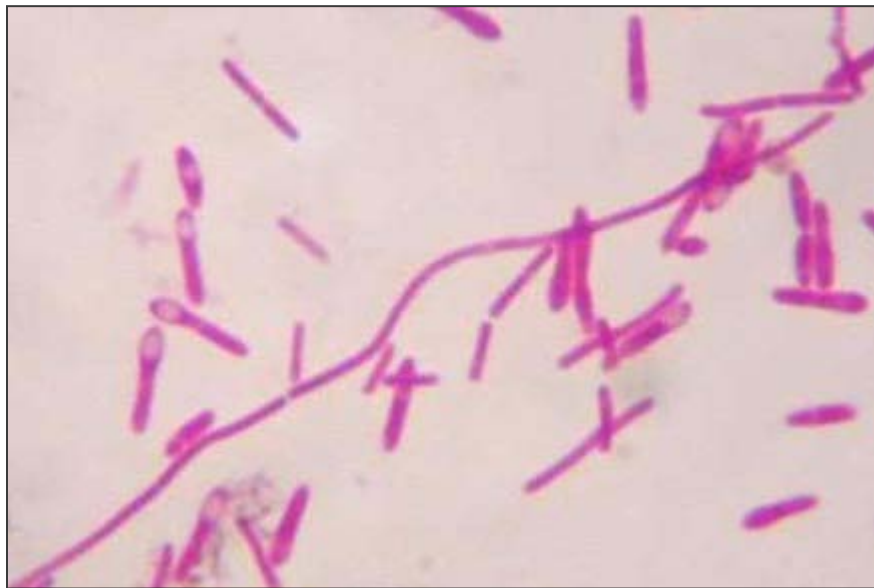


Image 4.1 – *Clostridium botulinum* the bacteria that causes botulism poisoning³¹

1919 Botulism Scare & California's Research Project

California canners' need to understand the causes of botulism became acute by 1919. In that year, fourteen people became ill and seven died in Ohio from a case of

³⁰ "California Canned Fruit Standardization Act", 1925; Hiltz, *Protecting America's Health*; Cruess, *Commercial Fruit and Vegetable Products; a Textbook for Student, Investigator and Manufacturer*, 75–88.

³¹ Image taken from University of Wisconsin-Madison Department of Bacteriology Textbook of Bacteriology <http://textbookofbacteriology.net/themicrobialworld/Botulism.html> (accessed 11.5.12)

canned California ripe black olives infected with botulism toxin, and twelve others died in Michigan and Montana. California ripe olives packed in glass became a common food in America in the late nineteenth century; people served them at dinner parties as appetizers and in salads. Usually, consumers had to be concerned that the olives were not completely ripe, cured, or bitter rather than if they were deadly. Canned spinach from California was also a popular product because of its high nutritional value. Mothers served it to their children as an easy to prepare vegetable. While Sinclair had alerted Americans to the lax procedures in meatpacking, consumers did not suspect vegetables, especially because canners packed them in glass jars so consumers could view the contents.

Between 1919 and 1921, public health officials in several states attributed almost forty botulism outbreaks to canned olives and spinach from California. The once booming ripe olive industry declined by ninety-five percent, and the reputation of California canned products became so bad that public health officials in Michigan deemed all canned foods from California unsafe and banned them from the state. The ban cost California canners at least \$70,000 a week. Panicked, canners in California sought assistance from the National Canners' Association and Food and Drug Administration officials to form a research team to determine the best way to eradicate botulism from canned food and produce a guide to canning common products safely to distribute to all canners.³²

³²Young, *Pure Food*; Young, "Botulism and the Ripe Olive Scare of 1919-1920"; Meyer, "Medical Research and Public Health, an oral history conducted 1961-1962 by Edna Tartaul Daniel"; Judith M. Taylor, *The Olive in California: History of an Immigrant Tree* (Berkeley, Calif: Ten Speed Press, 2000),. Ibid.

In 1920, a group of cannery executives met with Dr. Karl F. Meyer, pathologist at the University of California, and Dr. Ernest Dickson, professor at the Stanford Medical School. Leaders of the growing canned food industry in California feared that the negative publicity from the olive and spinach scares would taint the image of all California canned products. The bad publicity, loss of revenue, and inability to diagnose the problem on their own encouraged them to seek solutions from outside the industry. The group of canning executives that met with Meyer and Dickson included national industry leaders such as Robert Bentley, General Manager of the California Packing Corporation, and George Bailey from the National Cannery Association. Meyer's account of the meeting describes most of the heads of the leading canneries in California were also in the room. Also at the meeting was Dr. Willard Bigelow, Chief Chemist of the National Cannery Research Lab in Washington D.C. and former chemist for the USDA. When Wiley left the Bureau, the NCA hired Bigelow to conduct their research laboratory.³³

The result of the meeting was the creation of the California Botulism Commission, which the canners asked Meyer and Dickson to lead. They were well suited to the task before them. Meyer had played a vital role in the public health of California since his arrival in the state in 1913. He was a research scientist at the George Williams Hooper Foundation for Medical Research and a Professor at University of California-Berkeley. Because of his strong interest in public health and preventative medicine, he immersed himself in the health needs of California. Meyer had extensively researched bovine tuberculosis and pneumonic plague. During the Influenza Pandemic of 1918, he

³³ Meyer, "Medical Research and Public Health, an oral history conducted 1961-1962 by Edna Tartaul Daniel"; "Two Patients Recover from Food Poison," *San Francisco Chronicle*, October 25, 1920.

helped with containment on Angel Island, a small island in the San Francisco Bay. The indefatigable Meyer was quite dedicated to public health.³⁴

Dickson had been following cases of botulism in California since 1913, and as early as 1915, he published the details about the connection between of *Clostridium botulinum* and botulism in journals such as the *Journal of the American Medical Association* and *California State Journal of Medicine*. His monograph *Botulism: the Rockefeller Institute published a Clinical and Experimental Study* for Medical Research in 1918.³⁵ Dickson was the specialist in *Clostridium botulinum*, and Meyer was the public health specialist. Meyer understood how to take Dickson's findings and apply them as regulation and to procedure. Dickson and Meyer divided the work into various projects based on their expertise. Meyer worked from the University of California – Berkeley with the Hooper Foundation. Dickson worked from the Stanford Medical School.³⁶

Calpak, the National Cannery Association, and the Cannery League of California supported an initial funding package of \$30,000 a year for two years. The California Botulism Commission was an expensive investment, and it was not the only research team working on foodborne supported by the canning industry. In 1917, the National Cannery Association had funded a comprehensive study of ptomaine poisoning and bacteriology of foods at Harvard Medical School headed by Dr. Milton J. Rosenau. Rosenau specialized in bacteriology and preventative medicine and had an impressive

³⁴ Meyer, "Medical Research and Public Health, an oral history conducted 1961-1962 by Edna Tartaul Daniel," 78–95.

³⁵ "Dr. Ernest Dickson, Stanford Professor," *The New York Times*, August 25, 1939; Earl Chapin May, *The Canning Clan; a Pageant of Pioneering Americans* (New York: The Macmillan Company, 1937), 318–320.

³⁶ Meyer, "Medical Research and Public Health, an oral history conducted 1961-1962 by Edna Tartaul Daniel."

background of study at prestigious institutions such as Hygiensiche Institute, Institute Pasteur, and Harvard University. He had worked for the United States Public Health and Marine Hospital and was then a professor at Harvard Medical School. Working with colleagues at the University of Chicago, he determined that “ptomaine poisoning” was a misnomer and did not accurately diagnose food poisoning. Also consulting with Rosenau was Bigelow. Thus, by the time of the botulism scare the NCA already had in place a model for studying food borne illness.³⁷

Meyer and Dickson were successful in discovering how to control the spread of botulism. They found that *Clostridium botulinum* was an anaerobic thermophilic bacterium, meaning it thrived in a very warm, oxygen-free environment. It produced a very potent toxin. In fact, a colony living in a can could produce a lethal dose of the toxin even though the meat or vegetables in the can were preserved. Fortunately, heat destroyed the toxin, but *Clostridium botulinum* could survive temperatures that would kill most bacteria. The fact that *Clostridium botulinum* could live without air made canned food a perfect environment for them. The bacteria’s tolerance of extremely high temperatures, made it very difficult to kill them during the canning process, if one was not aware of their weakness. Meyer deemed botulism a “disease of civilization” because commercial canning and the society that supported and utilized it had created a perfect environment for a species of bacteria to produce a deadly chemical when in its normal environment it would not have been harmful to humans.³⁸

³⁷ Ibid.; Department of Public Health, “Historical Background Cannery Inspection”; Frank Gorrell, “History of Botulism Commission in California”, 1939, Box 3, Folder 1, California League of Food Processors; Judge, “A History of the First National Association: The National Association of Canned Food Packers”; May, *The Canning Clan; a Pageant of Pioneering Americans*, 318–320; Young, “Botulism and the Ripe Olive Scare of 1919-1920.”

³⁸ Meyer, “Medical Research and Public Health, an oral history conducted 1961-1962 by Edna Tartaul Daniel.”

The first project for the cannery lab was to understand the causes of botulism, and the second was to determine how to prevent it from spreading through canned vegetables. Another important food scientist in California, William Cruess, explained that the work of Dickson and Meyer, in addition to the work of Dr. James Esty of the Western Branch of the National Canners' Laboratory, established "safe" temperatures for cooking.³⁹ It was a delicate balance to find a safe cooking temperature that would not destroy the quality of the product. Cannerymen spent much time in the nineteenth century working out this balance to prevent vegetables and fruits from becoming too gelatinous and not retaining their original texture. Per the request of the National Canners Association, they created a reference manual, which they called "the cookbook," for common canned products that was distributed nationwide that detailed cooking times, temperatures, and proper filling weights. Having a scientifically tested procedure that could kill organisms in the can was a huge advance for the cannerymen. The burden of action then fell on production engineers and managers to implement the procedures at the cannery.⁴⁰

In 1920 through 1922, public health officials linked more outbreaks to California canned spinach and olives, and at least twenty more people died across the United States. The deaths from botulism continued because cannerymen did not always strictly follow the procedures outlined by the cookbook. Olive cannerymen preferred to pack in glass, and the jars could not withstand the same heat exposure as cans without exploding. Meyer asked the olive cannerymen, via the Cannerymen's League of California, to stop using glass voluntarily, but they refused. In response, the State of California passed a law regulating the cooking

³⁹ Cruess, *Commercial Fruit and Vegetable Products; a Textbook for Student, Investigator and Manufacturer*.

⁴⁰ Meyer, "Medical Research and Public Health, an oral history conducted 1961-1962 by Edna Tartaul Daniel."

procedures of olives that required cooking the canned products for 40 minutes at 240 degrees. Despite the obvious problem with glass jars, the olive canners still did not abandon the glass jars.⁴¹ Spinach canners were packing cans of spinach too densely, thus the heat did not distribute evenly in the center of the cans. Again, the State of California passed a law specifying procedure, and this time it specified the weight of vegetable matter that could go into each can.⁴² Unfortunately, understaffed state food and drug inspectors of the Department of Public Health could not monitor all the canners frequently. In larger cities like San José or Oakland, canneries often clustered together, but canneries in small towns were located throughout the region.⁴³

At first, Dickson, Meyer, the Canners' League of California, and the National Canners Association encouraged canners to participate in the new production guidelines voluntarily by following the cookbook. However, some canners felt that their years, sometimes decades, of experience were more valuable than the scientists' recommendations.⁴⁴ Voluntary cooperation failed. In 1924, public health officials across the country attributed more botulism deaths California olives. At a meeting of olive canners in 1924, Meyer gave a scathing address blaming the canners for the outbreak. Canners could have prevented this outbreak, he argued, had they been following the guidelines provided by the California Botulism Commission.⁴⁵

⁴¹Ibid., Young, "Botulism and the Ripe Olive Scare of 1919-1920."

⁴²Young, "Botulism and the Ripe Olive Scare of 1919-1920."

⁴³Meyer, "Medical Research and Public Health, an oral history conducted 1961-1962 by Edna Tartaul Daniel."

⁴⁴Ibid.

⁴⁵Ibid.

Creation of the Cannery Inspection Board

In 1925, the State of California passed the Cannery Inspection Act creating a division of inspection for canning facilities under the Department of Public Health. A fee of \$10 from each canner financed the inspection division, but private donations funded the cannery research. The minimum requirements of the act were quite simple. All canned food products required a cook time of forty minutes at two hundred forty degrees. Every retort had to have a thermometer and operators had to record every change in temperature during the cooking process for each batch. All cans had to have a marker indicating in which batch and retort they were cooked. The California Department of Public Health inspectors had to oversee the entire pack before they would sign off on all products for release.⁴⁶

The creators of the act sought to solve several problems. First, the law made the cookbook specifications the legal standards, allowing the state to prosecute canners who did not use the cookbook times and temperatures, and preventing another needless outbreak as had occurred in 1924. The law also required measurement of cook times, with those times made available to state inspectors. The laws also placed inspectors in canneries during much of the packing process. Having state-mandated temperatures was important for prosecution to prove that canners were cooking the product to the correct temperatures. However, having the inspectors sign off on all products released was more than just regulation. This extra safeguard probably ensured that someone was checking the temperature logs, but it was also an important factor in providing peace of mind for consumers of California canned foods. From then forward, canners could claim that their

⁴⁶ “Cannery Inspection Act,” *Statutes of California*, May 23, 1925; Department of Public Health, “Historical Background Cannery Inspection.”

products were state inspected, which helped to counter the bad public image created during the botulism scare of the 1920s, while also reinforcing the high quality level of the products. Finally, the simple solution of marking each can to easily trace it back to its retort meant that in the case of future outbreaks, an entire batch could be recalled.

Historians have argued that changes in regulation and increased technology in other food processing industries, such as the beef industry, hurt the smaller processors who could not afford new equipment or match the new standards.⁴⁷ It is very difficult to get quantitative data to prove this was also the case with the fruit canneries in northern California. The first six decades of the fruit canning industry were tumultuous for the industry. Perhaps more than a hundred small canneries opened and closed their doors after a season or two. While the required use of certain gauges or retorts probably pushed some very small canners out of business because they could not afford the equipment, the high turnover rate among canneries was about more than regulation. In part, this was the nature of the industry. There were the dominating canners, such as Libby and Calpak, and many smaller canners. Sometimes, small temporary canneries opened because growers had an excess of fruit; few of these small canners records remain, so it is difficult to know their stories.⁴⁸

In 1933, the California legislature amended the act so that the fee for the inspection reflected production totals. This meant that those who packed most, paid most, an important concession during the Great Depression. The fees paid for the inspection and the continued research of the cannery laboratory. California was the only

⁴⁷ Jimmy M. Skaggs, *Prime Cut: Livestock Raising and Meatpacking in the United States, 1607-1983*, 1st ed. (College Station: Texas A&M University Press, 1986), 90–129; Hoffman, *Large-scale Organization in the Food Industries*.

⁴⁸ “California League of Canners Membership Data Cards”, n.d., Box 71, Folder 4, California League of Food Processors.

state where the canners paid for much of their own investigation and did extensive self-policing. Most states paid for inspection from the general tax fund.⁴⁹ Additionally, the update to the Act created the Cannery Inspection Board with six members; the Board included the Director of the Board of Public Health, one scientist appointed by the Director, and four members appointed by the director who had substantial investment in the canning industry. The cannery representatives often included one representative from fruit and vegetable canneries, one fish canner, one olive canner, and one pet food canner.⁵⁰ Usually the representative came from one of the largest canneries. Over time, each of these smaller industries -- fish, fruit and vegetable, and dog food -- had their own advisory committees. The committees met one week prior to the Cannery Inspection Board meeting to prepare a report for the Board.⁵¹

The Cannery Inspection Board regulated any facility that used a retort, an industrial-sized pressure cooker that allowed canneries to control very high levels of heat.⁵² The high heat requirement to destroy *Clostridium Botulinum* could also ruin the texture of the food in the cans if not carefully applied. Pressure cookers meant canneries could cook at higher temperatures for shorter periods. The requirement to cover all pressure cookers meant that the Board got involved in a variety of food processing facilities beyond the original fruit and vegetable canneries. In one instance, the cannery researchers and inspectors worked extensively with fisheries to improve their products. In the 1920s and early 1930s, there were quality control and food safety problems with canned fish because of the way fishermen brought them in on the boat. Fishermen

⁴⁹ Meyer, "Medical Research and Public Health, an oral history conducted 1961-1962 by Edna Tartaul Daniel."

⁵⁰"Cannery Inspection Act."

⁵¹ Department of Public Health, "Historical Background Cannery Inspection."

⁵²"Cannery Inspection Act."

crushed the fish as they crammed them into unrefrigerated storage units below the deck. This poor handling and lack of temperature regulation increased the rate of decay in the canned product. Meyer believed that it was just as important for cannery inspectors to make sure the food going into the can was good as it was to inspect the canning sterilization process. If the food that went into the can was bad, it did not matter how thoroughly the sanitization process for the cannery was. On one occasion, Meyer condemned \$800,000 of fish that arrived at the canneries too decayed for food production. This got the attention of the fisheries. He went to the docks to find out how the fishermen were handling the fish. He and his laboratory workers devised a better refrigeration system that froze the fish on the boat that drastically improved overall product quality.⁵³ This foray into food science to solve public health concerns is another example of the close relationship between food safety regulation and product and market protection in California.

Whereas regulation was vital, changes in technology were also an essential part of solving food safety problems. Increased mechanization and advances in technology in the factory also helped control botulism. The cookbook was useful, but better retorts, standardizing use of temperature gauges, advances in retorts, and cans were very important. During this time, canneries throughout the United States also adopted the sanitary can. In the nineteenth century, canners used jars and tin cans. Cans were often made in the factory. Craftsmen worked on site cutting and soldering each can. This laborious process began to disappear as can making equipment became more prevalent. Eventually, canners began to purchase cans from can-making companies, who specialized

⁵³ Meyer, "Medical Research and Public Health, an oral history conducted 1961-1962 by Edna Tartaul Daniel."

in the most efficient production of tin cans that would be easy to assemble, but also close securely. It was not uncommon for hand-soldered cans to have small holes that allowed the entry of air and bacteria into the can. The sanitary can emerged as a solution in 1903 and sealed through a double seal at the top of the can. This process did not require solder and machines sealed each can, ensuring consistency and speed. It also reduced labor costs. Can makers could guarantee that their cans had an extremely low failure rate, with only one in one thousand cans ineffective.⁵⁴

After overcoming the problem of botulism and decay, sanitation was the next problem for the canneries in producing high quality, safe products. This was a nationwide problem for food processors. The 1938 Food Drugs and Cosmetic Act increased FDA authority by adding oversight of factory sanitation to their authority.⁵⁵ In the 1940s, federal inspectors noticed that the amount of dirt and rat hair in canned food was increasing, and the FDA wanted a national crackdown. In response, the Cannery Inspection Board assumed responsibility for the sanitation inspections rather than have the California Department of Public Health or federal inspectors come into the canneries. Meyer had also begun to be concerned about the amount of dirt and rat hair that his inspectors found in cans and encouraged the Cannery Inspection Board in its efforts to increase factory sanitation. The board formed a team of sanitary inspectors to go to the canneries to make sure the lighting was adequate to illuminate all parts of the factory, even the corners. Often low lighting made it difficult for workers to see the debris, and they missed it during clean up. The inspectors also checked problem areas where debris could accumulate and emphasized that every part of the factory be swept or hosed down

⁵⁴ Cruess, *Commercial Fruit and Vegetable Products; a Textbook for Student, Investigator and Manufacturer*, 39–51; Stevenson, “Cans and Can-Making Machinery.”

⁵⁵ Young, “Food and Drug Regulation under the USDA, 1906-1940.”

regularly. Often bits of fruit, vegetable, or fish matter ended up in the corners of factories and attracted mice or other pests. The presence of vermin in the canneries increased the amount of dust, feces, and fur in the air, which settled in the cans during processing.⁵⁶

Because the Cannery Inspection Board had authority and responsibility to regulate the commercial canning of the state, it became involved in the home-canning initiative during World War II. Rationing and mobilization caused pressure for canned goods, so they were reserved for the troops. Consumers were encouraged to can their own food. The sheer number of people home canning for the first time again increased the potential for botulism outbreaks.⁵⁷ Meyer continued to work on the canned food and botulism problem even after the research project ended as a consultant for the Cannery Inspection Board. He regularly placed the public's well-being ahead of the needs of the canning industry. He regularly passed on the information about botulism to home canners by personal letter and later through the Cannery Inspection Board, as did William Cruess, a food scientist who consulted on the cannery procedures for destroying botulism.⁵⁸ This action was especially important during World War II. The USDA and extension services provided brochures and education on home canning during the war because so many families took it up to store the bounty of their victory gardens.

Meyer wrote a letter to the Institute for Homemakers explaining that except for the botulism scare of the early 1920s, most botulism cases came from home-canned food. Sterilization was of paramount importance for home canners, and he discouraged the use

⁵⁶ Meyer, "Medical Research and Public Health, an oral history conducted 1961-1962 by Edna Tartaul Daniel."

⁵⁷ Karl F. Meyer, "Historical Background Cannery Inspection State of California Department of Public Health", n.d., California State Library; Meyer, "Medical Research and Public Health, an oral history conducted 1961-1962 by Edna Tartaul Daniel." California League of Food Processors Archives

⁵⁸ Karl Meyer's Papers, held by the Bancroft Library, are full of brochures and pamphlets issued by can and glass makers for home canners. He sent letters to the manufacturers when he felt the material was inaccurate. He also responded to numerous letters of inquiry from consumers about botulism.

of the cold-pack method, which did not require boiling food before putting it in the can. He also encouraged the use of pressure-cookers, which allowed home canners to cook to higher temperatures than standard boiling water. Constant vigilance was extremely important when checking each home canned jar for any sign of decay, and he cautioned home canners to throw out anything that seemed suspicious. Busy cooks could understand and follow these basic directives to create safe canned food without having to learn the science behind them.⁵⁹

Was the 1920s crisis a fluke or a pattern? Decades after the crisis passed, researchers at the United States Public Health Service published a report examining cases of botulism reported to public health authorities from 1899 to 1969. An overwhelming majority of the cases came from California. This reflected the fact that beginning in 1870s, the Golden State began to become the salad and fruit bowl of America. The sheer volume of produce grown in the state contributed to the high numbers of botulism. However, the cases of botulism were primarily from home-canned food. The work of home extension agents and USDA bulletins provided education in safe home canning procedures.

The less obvious reason for the high botulism rates was environmental. *Clostridium botulinum*, the bacteria that secretes the deadly toxin that causes botulism in humans, lives in the soil. As farmers remove vegetables from the soil, the bacteria stay on the vegetables. Because *Clostridium botulinum* thrives in the environment of the can, the modern method of canning created a perfect environment for it to grow. As it grows, it releases one of the most deadly toxins known to man. The acidity of fruits and

⁵⁹ Karl F. Meyer, "Letter to Homemakers Institute", January 28, 1936, Box 3, Folder 1, California League of Food Processors.

vinegars will kill *Clostridium botulinum* in a can. This is why people had not reported canned condiments and fruits as causes of botulism. However, canned olives, spinach, beans, and asparagus are more susceptible to host the bacteria, and the fact that California was a leading vegetable producer contributed to this high number of cases of botulism in the state. However, Wisconsin was producing huge quantities of canned peas, and Iowa produced tons of canned corn a year. Why did they not have the same problem with botulism? The answer was in the soil.⁶⁰

As early as 1920, scientists, such as Dickson, began to make the correlation that the bacteria came from soil. By 1922, Meyer had taken soil samples to test spores and discovered different spores in U.S. regions.⁶¹ There are six strands of *Clostridium botulinum* in the United States, and scientists labeled them A through F. The most commonly reported cases are from A, B, E, and F. *Clostridium botulinum* does not grow well in all soil; it needs a particular environment, like most species. Type A thrives in soil west of the Mississippi. Of the cases of the Type A strand, seventy percent were in California, Washington, Oregon, and New Mexico alone. A full forty-three percent were in California. The Type B strand outbreaks were primarily along the East Coast, and Type E was only in Alaska and the Great Lakes region. Thus, the soil of California was both blessing and curse, while it was part of an ecological system able to support growing large quantities of fruits and vegetables, it was also an excellent home for this deadly

⁶⁰ Eugene Gangarosa, "Botulism in the United States, 1899-1967," *The Journal of Infectious Diseases* 119, no. 3 (March 1969): 308-311, (accessed March 1, 2011). U.S. Department of Health, Education, and Welfare, *Botulism in the United States: Review of Cases, 1899-1969 and Handbook for Epidemiologists, Clinicians, and Laboratory Workers* (U.S Public Health, 1970). The statistical data for these reports for 1899-1949 comes from a report prepared by Karl F. Meyer and B. Eddie.

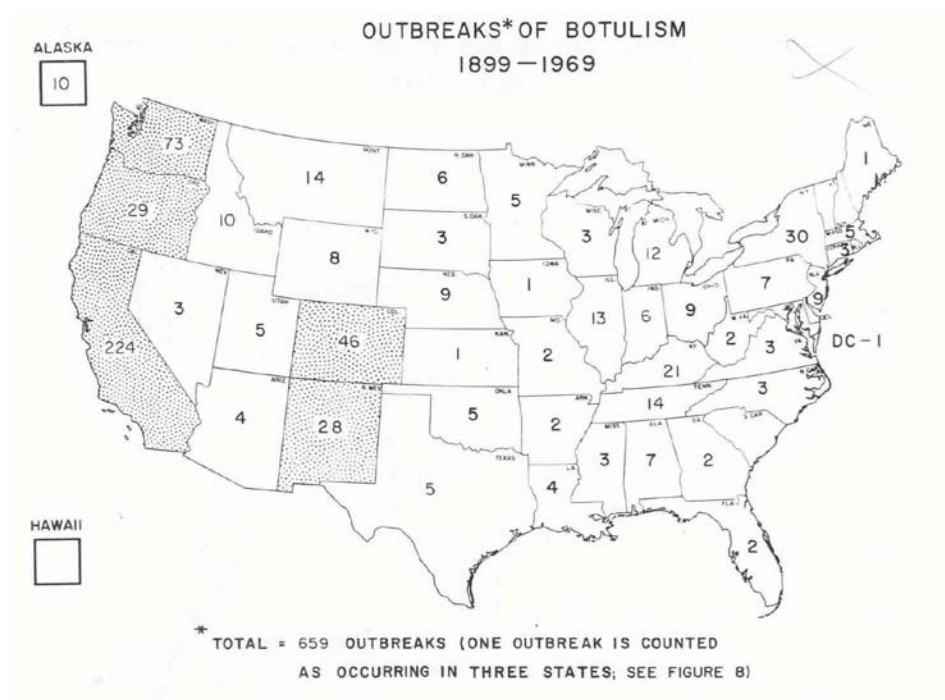
⁶¹ "Annual Meeting of the Canners' League of California 1920."

strain of bacteria. For California to have a successful canning industry, it had to find a way to make the inside of the can completely inhospitable to *Clostridium botulinum*.⁶²

⁶² Gangarosa, "Botulism in the United States, 1899-1967." U.S. Department of Health, Education, and Welfare, *Botulism in the United States: Review of Cases, 1899-1969 and Handbook for Epidemiologists, Clinicians, and Laboratory Workers*.

Table 4.1 Outbreaks of Botulism Attributed to Commercially Processed or Home Processed Foods, 1899-1969⁶³

Source of Food	1899	1900-1909	1910-1919	1920-1929	1930-1939	1940-1949	1950-1959	1960-1969	Total
Home Processed	1	1	48	77	135	120	50	42	474
Commercially Processed	0	1	14	26	6	1	3	10	61
Unknown	0	0	8	13	13	13	50	26	123
Total	1	2	70	116	154	134	103	78	658



Map 4.1 Map of Outbreaks of Botulism in United States, 1899-1969⁶⁴

⁶³ U.S. Department of Health, Education, and Welfare, *Botulism in the United States: Review of Cases, 1899-1969 and Handbook for Epidemiologists, Clinicians, and Laboratory Workers*, 17.

⁶⁴ Karl Meyer, *Fifty years of botulism in the United States and Canada*, by K. F. Meyer and B. Eddie. (San Francisco: George Williams Hooper Foundation, 1950), 23.

Table 4.2 Food Products Causing Botulism Outbreaks, 1899-1969⁶⁵

Botulinum toxin type	Vegetables	Fruits	Beef	Pork	Poultry	Fish Products	Milk Products	Condiments	Other	Total
A	93	22	3	2	1	5	2	12	3	143
B	22	4	1	1	2	2	2	2		36
E	1					16				17
F			1							1
Total	118	26	5	3	3	23	4	14	3	199

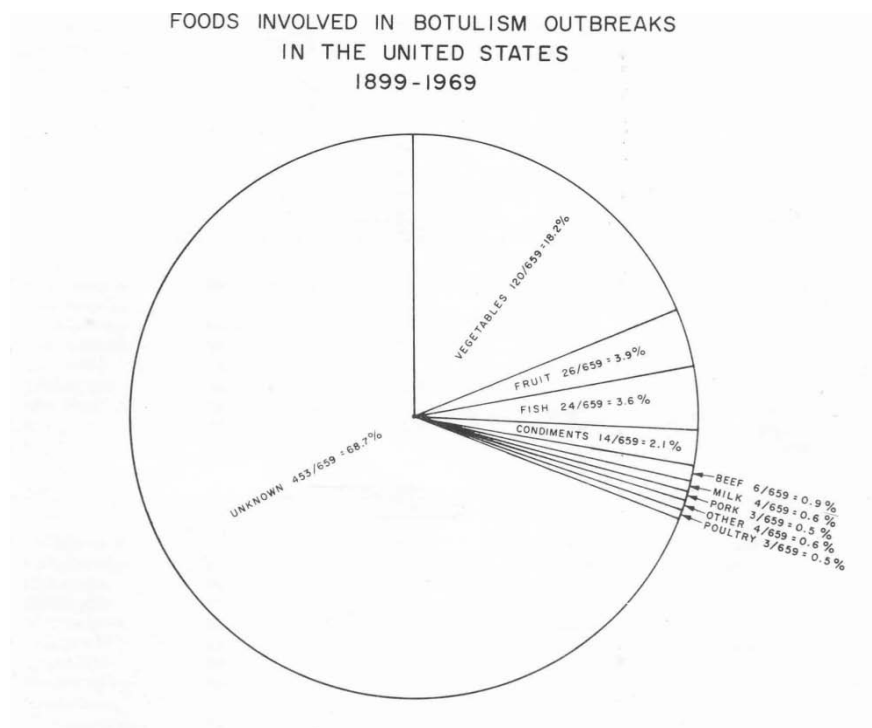


Image 4.2 Outbreaks of Botulism Sorted by Cause, 1899-1969⁶⁶

⁶⁵ U.S. Department of Health, Education, and Welfare, *Botulism in the United States: Review of Cases, 1899-1969 and Handbook for Epidemiologists, Clinicians, and Laboratory Workers*, 17.

⁶⁶ Meyer, *Fifty years of botulism in the United States and Canada*, by K. F. Meyer and B. Eddie., 25.

Conclusion

The crisis period for botulism was short, but its effects were long lasting. After the 1920s, most of the reported cases of botulism were from people canning at home, not commercial canners. The Botulism Commission in California found a solution for canners and helped form a network between the FDA, the State of California, canners, and university scientists that lasted for decades. The Cannery Act of 1924 required constant inspection of canned products and created the Cannery Inspection Board to coordinate between public health scientists and canners that the FDA could not provide.

The formation of the Cannery Inspection Board is intriguing for two reasons. First, the creation of cannery laboratories and the formation of the board emerged when the industry, state, and canneries were just beginning to form networks of production and regulation. The major trade organizations that exist today came into existence at about the same time the first food regulations passed. They coordinated information for marketing and exchanged information on processing. American canners created enormous quantities of food with little knowledge of why their products went bad or how to research outbreaks of food poisoning effectively. They knew how important brand recognition was and fought to maintain a higher level of quality to maintain market dominance. Regulation and marketing were inevitably inseparable. Even though canners balked at some of the regulations, especially labeling requirements, the most influential companies in the industry, Calpak and the CLC, fought for regulation to prove their commitment to purity to consumers.

Second, the formation of the Cannery Inspection Board reveals the role of the State of California in the increasingly complex food processing regulation in the early twentieth century. State-level cannery regulation was part of a national trend to provide a more dependable product and increase consumer confidence. It closed the gaps left by federal regulation and controlled processed food sold inside California. The Cannery Labs and Cannery Inspection Board were created to overcome the problem of botulism, which was a public health concern and detrimental to canners' reputations. In the process, they played a vital role in overall product improvement beyond the elimination of botulism.

The fact that Calpak, the corporation that dominated the California canning industry, was willing to enter into such open relationships with competing canneries and the State of California is intriguing and counterintuitive. *Public Health Reports* and various scientific journals published the data resulting from this collaboration rather than Calpak using it for exclusive advantage.⁶⁷ California's system of cannery regulation had a high degree of industry, government, and scientific cooperation. The research from the lab, with which Meyer consulted with for many years, helped the canning companies improve their products and ensured public health. The inspection ensured that the quality of California canned goods was high enough that federal agencies would not confiscate them or that they would not cause any more botulism outbreaks. In the United States, there were only twenty deaths from botulism caused by commercially canned foods

⁶⁷ "Botulism a Reportable Disease in California"; Chase Armstrong, R. V. Story, and Ernest Scott, "Botulism from Eating Canned Ripe Olives," *Public Health Reports (1896-1970)* 34, no. 51 (December 19, 1919): 2877-2905, (accessed November 6, 2012).

between 1930 and 1970.⁶⁸ The system was a success given the huge volume of food processed in California. Production engineers in the canneries used the scientific discoveries of the cannery labs to find technical and production solutions to problems of decay after they found a solution for botulism. In return, the scientists at the cannery lab and food scientists at University of California, Berkeley, such as Cruess, gained valuable knowledge through the work with the canneries.⁶⁹

Meyer once remarked that education was the primary function of the cannery laboratory he supervised. The USDA emphasis on science and education led to an increase of agricultural science study in land grant universities, experiment stations, and extensions. Agricultural science became part of a larger national trend linking science and industry. The disciplines of biology and chemistry spun off specializations beneficial to public health, but it was still rare to see a combination of non-agricultural scientist and industry, particularly working on a public health problem. Meyer explained that although his work with the canneries produced more information on foodborne illness and decay prevention than his time in the lab, other scientists at Berkeley did not have much respect for applied science.⁷⁰ He encouraged cooperation between the canners, the university, and the Department of Public Health.⁷¹ This alliance is part of an interesting period in which science began to come out of the lab and into the factory. This openness and collaboration was still somewhat new for canneries. Until the turn of the century, they tended to keep all production processes and recipes secret in order to improve their

⁶⁸ U.S. Department of Health, Education, and Welfare, *Botulism in the United States: Review of Cases, 1899-1969 and Handbook for Epidemiologists, Clinicians, and Laboratory Workers*.

⁶⁹ Meyer, "Medical Research and Public Health, an oral history conducted 1961-1962 by Edna Tartaul Daniel."

⁷⁰ Ibid.

⁷¹ Ibid.

market position. As one canner explained, at the turn of the century, canners began to realize there were not too many differences in canning methods and that they were guarding the same secrets.⁷² Collaboration and education sharing was a better approach for this particular industry.

By 1948, the duties of the Cannery Inspection Board had grown to include tasks that most other states covered as general public health services. Born from a crisis, the Board succeeded in limiting the outbreaks of botulism from commercial canneries after the 1924 Cannery Act despite constant increases in production. Part of the reason for the success was the strong leadership that guided the Cannery Inspection Board. Meyer continued to provide many years of dedicated service on the Cannery Inspection Board and assisting with cannery research. The Canners' League of California worked hard to ensure compliance and collaboration with the Board from all its canners. During this time, the league also had very strong leaders, such as M. A. Clevenger and Preston McKinney. It is important to remember that Calpak was so large that it was a dominating part of the industry, and its leadership supported the Cannery Inspection Board.

This particular combination of industry, university, and government also worked because it was mutually beneficial. The State of California strongly supported agriculture, and consumer fear of the agricultural and food products of the state was not acceptable because they also had a public health responsibility. The Cannery Inspection Board satisfied both of these needs, and the canners paid for most of it. Scientists, like Meyer, devoted a great amount of time to this, but they received a ton of data in return. Finally, the canners got a solution to the botulism crisis and improved products.

⁷² Judge, "A History of the First National Association: The National Association of Canned Food Packers."

The creation of the Cannery Inspection Board is an example of the shortcomings of the associative state model used frequently by California's canners. While the canning industry formed an agency to prevent future interference after the botulism scare, this voluntary alliance was incapable of forcing the canners to follow the cookbook and findings of the Botulism Commission. The state of California had to create enforceable legislation to require compliance from all canners.

The existence of the Cannery Inspection Board was also a great marketing tool. Canners had a level of scrutiny that the FDA could not have provided, and were able to use this to validate the safety of their products. All of the pieces of this relationship worked together to ensure that California canners could continue to advertise that their goods were wholesome, safe, and full of the vitality of California, just as they wanted to provide validity to their marketing campaigns.

CHAPTER 5 – THE FRUIT FRONT

*We can march without shoes,
We can fight without guns,
We can fly without wings
To flap over the Huns.
We can sing without bands,
Parade without banners,
But no modern army
Can eat without canners.¹*

- Lieutenant Colonel William R. Grove of the Quartermaster Corps

Appert's method of modern canning emerged in the eighteenth century in a time of imperial expansion and war across much of the world. Within a century after Appert introduced his new procedure to the world, canned food had become a staple with explorers and militaries often replacing the standard dried foods these groups had depended upon for centuries.² Many technological innovations in the industry made production easier and faster in that hundred years, but nothing compared to the advancements by the California canners during the next century, between 1900 and 1970, many of them in response to the needs of the American military. Canners played a vital role in supplying American troops in every war after the Civil War. By the Cold War, canners were primary suppliers. New technologies and packaging materials emerged in response to the shortages of materials and labor during war. A period of adjustment followed each war, during which the industry transitioned from overproduction to a peacetime economy, but the wars also brought permanent changes to the industry. The

¹ C.H. Bentley, "The Tin Can in War," *Del Monte Activities*, July 1918. Partial reprint of an address given by Lieutenant Colonel William R. Grove of the Quartermaster Corps to the National Canners Association.

² Shephard, *Pickled, Potted, and Canned*.

needs of wartime supply made California's fruit canning industry more efficient and organized during peacetime.

The emerging field of food science also contributed to creating the modern army. Thus far, the role of food and supply logistics during war has been lost among biographies of heroes, the intricacies of international politics, and cutting-edge weapons technology. Often the most necessary common things in life are easy to forget about until they are gone, such as clean air, adequate food, and drinkable water. Yet, all of these things become priceless in wartime. One key element of the study of the history of wartime logistics is food science. In American history, war has been a catalyst for innovation in the food industry. Frozen foods, freeze-drying, and canning trace their roots back to experiments in feeding the military. Another key element in provisioning troops is the art of getting sustenance to the front line. It depends vitally on the geography on which the battle is taking place. Reaching the trenches of World War I, setting up food stations on captured Pacific Island, or following soldiers from the beaches of Normandy to Germany each presented unique environmental challenges; feeding thousands or millions of men of varied backgrounds in these different environments was not easy, especially while the enemy targeted supply lines.

Historians deem World War I the first modern war because of the extent of technology employed; railroads, telegraphs, tanks, U-Boats, airplanes, machine guns, and radios, all contributed to better coordinated and more destructive military operations on new and larger scales. Transportation technology added a new dimension to this war. Railroad travel allowed much faster troop and supply movement. U-Boats were one of the most dangerous new weapons of the war. Their covert hunting of English and trans-

Atlantic ships killed sailors and civilians and made any ocean crossing a dangerous venture. Despite this, Americans sent supplies to their allies long before their entry into the war in the spring of 1917, with the treacherous shipping situation making every inch of storage space on ships vital.³

Nations also sought to feed their new modern armies more dependably and economically while preventing disruptions of the domestic economy. In particular, they did not want to increase inflation on consumer goods.⁴ While the U.S. military did not utilize canned fruit as much in World War I as it would in later conflicts, the war played a vital role in the changing relationship between the industry and the federal government. Canners' involvement in World War I also strengthened newly formed production networks in the industry. Thus, it is important to understand the system's advantages and disadvantages because people's memory of the war food planning arrangement affected planning in World War II.

When the United States entered World War I in April 1917, President Woodrow Wilson called on Herbert Hoover to organize and lead the United States Food Administration (USFA). Hoover, who had made his own fortune as a mining engineer and financier, was living in London when the War began in 1914. He had proved his dedication to public service and his abilities as a strategist and humanitarian when he coordinated relief efforts to supply food to German-occupied Belgium. Hoover's strategy at the USFA was to outline a few achievable goals, and then relentlessly hammer away at the necessity to accomplish them by appealing to Americans' sense of mercy for starving Europeans and their devotion to democracy. The USFA focused on reducing domestic

³ James Joll, *The Origins of the First World War*, Origins of modern wars (London: Longman, 1984).

⁴ Tom G. Hall, "Wilson and the Food Crisis: Agricultural Price Control during World War I," *Agricultural History* 47, no. 1 (January 1973): 25–46, (accessed August 29, 2012).

consumption, especially of wheat, sugar, and fats, while also increasing production of these same items. Relying on cooperation between business, government and the voluntary assistance from Americans the USFA was generally successful. It also captured the essence of Hoover's economic and political philosophy.⁵

In World War I, the military took a large step forward in the national coordination of supplying the nutritional and sanitary needs of its soldiers. The military had attempted to do this previously, but increased communications and transportation networks provided more opportunity for centralized ordering and dispersal of supplies. Two main divisions were responsible for procuring food for the United States military, the Quartermaster Corps, which provided food for the Army, and the Navy Pay Corps. The Quartermaster Corps usually divided purchasing between thirteen depots around the country. This meant that it was possible for the military to purchase so many supplies in one area that it dramatically affected civilian prices and caused shortages. In World War I, the War Department wanted to combine purchases to facilitate ordering, prevent inflating civilian food prices, and create more centralized control over ordering. The Council of National Defense became the central agency for purchasing military supplies, and it worked with the National Cannery Association to coordinate the needs of the army. Fruits and vegetables were one of the priority items on the list of necessary foods for the military. Thus, just as the California fruit processors (canners and dryers) were on the verge of leading the nation's industry, they stepped in to help the mobilization effort by supplying a large quantity of processed fruits. The procedure for army ordering worked

⁵ William Clinton Mullendore and Ralph Haswell Lutz, *History of the United States Food Administration, 1917-1919*, Hoover library on war, revolution, and peace. Publication ; no. 18; Hoover Institution on War, Revolution, and Peace. Publication no.18 (Stanford University, Calif., Stanford university press; London, H. Milford, Oxford university press, 1941, n.d.), 3-43.

as follows. The Quartermaster General requested food from the Food Administration. Then, the Food Administration went to the trade association or group coordinating the commodity requested. When the Food Administration needed canned or dried fruit, they went to the NCA, which then went to the Cannery League of California (CLC). From there, the local association, the CLC, divided the order among food processors according to the production capacity of the facility. The Food Purchase Board set the prices for food products, eliminating the price negotiations inherent in the peacetime processor/broker relationship.⁶

In World War I, the growth of food science and advances in food processing techniques provided the Quartermaster Corps with more options for rations. There were three types of rations before and during World War I - garrison ration, field ration, and travel ration. The garrison ration fed soldiers at a base or army facility and included fresh meats, bread, fruits, and vegetables. Standards stated that thirty percent of the preserved fruit should be prunes, which was a boon to California's prune market centered in Santa Clara County. Soldiers ate field rations during active campaigns. Garrison and field rations encouraged the use of fresh, local ingredients when possible. The travel ration consisted of all processed canned items, such as canned meat, beans, tomatoes, hard bread, and coffee. The Quartermaster Corp also created a special trench ration to meet the conditions of trench warfare. A trench ration consisted of a tube of meat (corned beef or bacon), hard bread (crackers), sugar, coffee, and cigarettes for twenty-five men for one day. The military tried methods of obtaining fresh fruits and vegetables overseas with some success. Various groups, including the Quartermaster Corps and Red Cross,

⁶ John C. Fisher and Carol Fisher, *Food in the American Military: A History*, Kindle. (Jefferson, N.C.: McFarland, 2011), location 1859–1874.

began producing food in France closer to the lines to supply fresh vegetables, bread, and coffee. Some lucky soldiers in the trenches ate fresh tomatoes and fruits, but such repast was not common. Front line soldiers should only have eaten the trench ration for a few days at most. However, due to the difficulties of moving soldiers in and out of the trenches, some soldiers ate the trench rations for weeks, and the rations became unpopular. The military depended more on dried fruit in this war because it had to use every bit of space on ships to its maximum potential.⁷ Canned fruit took up too much precious cargo space on ships crossing the Atlantic. The field rations created by the Quartermaster Corps during the Great War left much room for improvement. Fortunately, groups such as the Red Cross and Salvation Army were getting as close to the front lines as possible and supplying coffee and donuts, which were a big treat for soldiers.⁸

On June 8, 1917, at a Chamber of Commerce meeting called by Colonel John T. Knight of the Quartermaster Corps stationed at Fort Mason, more than 200 representatives of the California canning industry pledged their full support to the United States military for the duration of the war. They included canners of vegetables, fruits, olives, preserves, beans, dairy, and fish. Knight needed to know how much support he could receive from the emerging national leader in the canning industry as he began to synchronize the military needs with production. The canners organized a statewide committee with representatives from the various types of canneries and regions of

⁷ Ibid., location 1888–1916.

⁸ Ibid., location 1217, 1874–1919.

California. It was the first time there had ever been this degree of communication, much less coordination by the canners of the state.⁹

More than organization emerged from the meeting. Questions about the fundamental relationship between the agricultural and food processing industries and the government emerged. Some canners expressed fear that the federal government would seize crops or compel canners and growers to operate at a loss. In a *Western Canner & Packer* article describing the meeting, the unidentified author makes his thoughts clear that canners and growers were not going to be able produce at maximum efficiency if they did not receive what they thought was a fair return on their products. He also called for the trade associations of America to be vitally involved in the food coordination during the war, so much so that they controlled much of the producers' activity at the state level, once again revealing the strong attachment of the associative state model by canners in California at this time.¹⁰

The larger fruit processors of California, especially fruit dryers, remodeled or expanded their production lines in anticipation of wartime needs before and during the 1917 harvest and packing season. California Packing Corporation's sales were sixty percent higher in July of 1917 than the previous year and it still had fifty million dollars worth of orders to fill that year. In 1917, California fruit canners produced 7,835,000 cases of canned fruit, up 1.2 million cases from 1916. The American Can Company built a new plant in Oakland.¹¹ The expansion in production capacity during the war proved

⁹ "The California Packers and the United States Government to Co-operate Closely," *Western Canner & Packer*, June 1917.

¹⁰ Ibid.

¹¹ "California Dried Fruit Packing Houses," *Western Canner & Packer*, July 1917; "Canned Foods Market," *Western Canner & Packer*, July 1917; "California Canneries," *Western Canner & Packer*, July 1917; "California Canneries," *Western Canner & Packer*, August 1917; "California Dried Fruit Packing

beneficial to the fruit processors because it allowed them to handle the surge of fruit from the dramatic increase in orchards in the 1920s. Orchard lands growing fruits that were canned or dried expanded rapidly in the decade after World War I, in part because of the higher production capability created during the war.¹²

Table 5.1 Acreages of Fruit Crops Planted in Bay Area and Central Valley¹³

	Sweet Cherries	Figs	Grapes	Clingstone Peaches	Freestone Peaches	Pears	Prunes
1919	7,370	19,077	291,560	39,770	56,750	26,770	106,880
1929	12,010	44,960	565,654	69,250	53,970	64,760	172,340

The federal government's control over the American food supply receded after the war but did not completely vanish. After its creation in 1922, the USDA Bureau of Economics completed surveys of food and croplands to better ascertain the production capacity of the United States, assuming a role that had once been limited to local agencies. These surveys provide some of the first cohesive estimates of crop acreages in California. It cannot be understated the degree to which voluntary cooperation was emphasized during the war. However, there was also coercion because industry leaders working with the USFA could informally blackball retailers and processors that did not cooperate from future orders. Yet, no entrenched formal system existed and dismantling

Houses," *Western Canner & Packer*, February 1918; "Resume of the 1917 Trade," *Western Canner & Packer*, February 1918.

¹² California Crop and Livestock Reporting Service and USDA Agricultural Marketing Service, *California Fruit and Nut Crops: 1909-1955*, 23, 29, 34, 74, 77, 81, 100. The rapid build up of agricultural equipment in World War I has been covered by agricultural historians. Sadly, their efforts in the war contributed to economic hardship afterwards. See Deborah Kay Fitzgerald, *Every Farm a Factory: The Industrial Ideal in American Agriculture*, Kindle., Yale agrarian studies series (New Haven: Yale University Press, 2003). For a thorough analysis of the effects of World War I on farming in America.

¹³ California Crop and Livestock Reporting Service and USDA Agricultural Marketing Service, *California Fruit and Nut Crops: 1909-1955*, 23, 29, 34, 74, 77, 81, 100.

the process after the war did not take long. World War I preparations and mobilization were also of a shorter duration than World War II. In this system, the military would relay its needs to the USFA that would work with trade associations to fill the orders. The federal government did not directly manage the companies themselves. This system worked well in a world in which laissez-faire philosophies were still largely accepted. Although the Progressive movement was strong by the war, it had not instilled the same sense of the role of the federal government that existed after the New Deal. World War I allowed canners to make connections and increase their production networks to expand in the 1920s and 1930s, but the far-reaching impact of the New Deal made the very different approach to wartime food supply in World War II possible.

World War II

The interwar period was a time of prosperity and tragedy as the boom of the 1920s ended in the Great Depression. The New Deal greatly expanded the reach of the federal government in agriculture through the Agricultural Adjustment Act. Americans were still getting used to this new relationship with the federal government when another war began in Europe. Germany, led by Adolph Hitler's Nazi Party, began its plan to expand the German state in 1938 by invading Austria. The advance of the Nazis continued in Europe and by September 1939, the invasion of Poland forced the British and Russians into another war. World War II was another war of empires that took place across the globe. The main theaters were in Europe and the Pacific, and within these regions were multiple fronts. The United States supplied its allies with food and weapons until the end of 1941. The debate about entering the war was a major part of American politics, and preparations for war began before American officially declared its

intentions. On December 7, 1941, the Japanese launched a surprise attack on Pearl Harbor and Americans joined the war. Mobilization began at a frantic pace in 1942. Every American felt the effect of World War II whether through the service of a loved one, rationing, volunteerism, war bonds purchases, or employment in one of the many factories producing goods and arms for the military. Although the United States did not enter the war until the end of 1941, the Lend-Lease program that provided food and supplies for the Allies pulled American farmers into the war years before the assault. Food processors across the nation took part in mobilization through government orders of food products, rationing, labor laws, or by the requirement to set prices on certain goods. As in World War I, the military depended heavily on food processors to supply components of soldiers' daily food rations.¹⁴ Rationing on the home front encouraged innovation in the manufacture of products and the use of new materials. In California, creativity in the face of adversity pushed growers and canners' abilities to the limit as they sought to fulfill government orders and maintain their markets. The canning industry's production networks had advanced significantly by 1941. They had created standardized products and procedures. The canners trade industries were very strong and California fruit canners were at the top of the national fruit canning industry. This organization helped canners produce more goods, but they also lost some flexibility with the push for standardization.

The canning industry began to prepare for World War II in early 1941. On March 6, Robert Paulus, President of the National Canners Association, spoke to the members of the Canners League at the annual Del Monte meeting. World War I and the Great

¹⁴ Robert C. Paulus, "CLC Bulletin 2441-A Address by Mr. Robert C. Paulus at Del Monte Meeting", March 6, 1941, Box 49: Folder 14, California League of Food Processors Collection.

Depression were still vivid in the minds of canners in northern California as he addressed their common concerns, such as food shortages, post-war depression, inflation, failure of capitalism, and a controlled economy. He praised the canners and the NCA for increased organization after the first war and expressed optimism that it would be valuable during the future. He also explained that the war clause used by canners after 1939 would help protect them in sales contracts by releasing them from obligations in a crisis.¹⁵ The NCA also worked with the state associations to gather information for various government agencies that were also preparing for war by trying to quantify America's food supply and agricultural capabilities. The NCA had even gone so far as to appoint a representative, John Baxter a canner in Maine, to work with the Quartermaster Corps. The corps had been preparing as well. At the 1941 NCA annual meeting in Chicago, the Coordinator of Defense Purchases and the Quartermaster Corps representatives held a special session to explain military purchasing procedures. The food supply organization for the Second World War was more intense and focused than it had been in twenty-four years earlier. As many of the participants in WWII mobilization remembered the Great War, they sought to be more prepared and overcome any problems that had occurred previously.¹⁶

During the Great War, feeding soldiers became a focus of scientists and military strategists, and the science of feeding soldiers advanced even further in the Second World War because food science and understanding of nutritional needs had advanced between the wars. Universities, such as the University of California, Berkeley created food labs

¹⁵ The war clause was language inserted into canners contracts with distributors or brokers allowing them to get out of a contract in time of war. This prevented them from getting in a situation where their contractual obligations conflicted with wartime production.

¹⁶ Paulus, "CLC Bulletin 2441-A Address by Mr. Robert C. Paulus at Del Monte Meeting."

and food science as a research specialty emerged. Their research and teaching was vital in training food scientists to work for government agencies and the military. Food scientists and nutritionists provided nutritional guidelines for meals that soldiers would find easy to carry, nutritious, and generally palatable. In fall 1920, the army created the Quartermaster Corps Subsistence School at the Chicago Quartermaster Depot. The school began as a way to standardize procurement and maintenance of supplies for the army. It also became the army's food science laboratory. At first, they produced cookbooks, and then they began to experiment with new rations. The biggest challenge was creating a ration for soldiers on the front line.¹⁷

During World War II, the QMC created a variety of rations appropriate to the different tasks soldiers performed. In 1936, the Quartermaster Subsistence School moved to Philadelphia and established a formal laboratory, the Quartermaster Subsistence Research Laboratory. Once the United States entered the war, Berkeley contributed its best food technology professors to the military effort. Both Emil Mrak and William V. Cruess worked with the Quartermaster lab. William Cruess even gained membership into its Guinea Pig Club.¹⁸ However, the Corps still depended on corporate research labs before and during the early part of the war. In 1937, food scientists at Hershey created a lightweight, high calorie emergency ration (600 calories in each of the three bars) that would withstand high temperatures, called the D-Ration or Logan Bar; yet, by design, it did not taste good enough to tempt soldiers to eat it until ordered to do so by their

¹⁷ Fisher and Fisher, *Food in the American Military*, location 2121 – 2124.

¹⁸ Ibid., location 2113–2120; “Awards & Certificates.” The Guinea Pig Club was part of the Quartermaster Corps Subsistence Research Laboratory where humans, from Generals to stenographers, tested army developed rations. They ate new food combinations, and tested food that had been in storage for longevity. The club met at noon and had lunch prepared by the lab.

commanding officer.¹⁹ Canned fruits were in the B-ration, which was a garrison or base ration that did not use any fresh food, only canned and dehydrated. The C-ration, created in 1940 as a combat ration, initially included dried fruit. Eventually, the Quartermaster Corps added canned fruit to the ration, which soldiers appreciated.²⁰ The Quartermaster Corps attempted to be responsive to the needs and desires of the soldiers it served. One of their studies showed a marked difference between the food preferences of women and men in the army, to accommodate the women's preferences was an increase a fifty percent increase in fruit cocktail and apples, and a one hundred percent increase in pears, which took the place of decreased bacon and veal supplies. In other cases, they experimented with entrees, sweets, and preferred beverages.²¹

The improved transportability of food was one of the highest research priorities for food scientists and the Quartermaster Corps. Although canned food had many benefits for military use, dried food was lighter and took up less space. As the rations shipped around the world, reducing the space and weight of food reduced the amount of energy and ships required. World War II utilized more petroleum allowing troops to move more materials faster, but there was still not a drop to spare.²² Research in cans was ongoing to reduce the amount of tin required for each can and to make sure the food arrived in edible condition. In some climates, the cans rusted and deteriorated quickly.

¹⁹ Fisher and Fisher, *Food in the American Military*, location 2326.

²⁰ Ibid., location 2113–2120, 2328–2615.

²¹ Ibid., location 2445.

²² Daniel Yergin, *The Prize: The Epic Quest for Oil, Money & Power*, Free Press trade pbk. ed. (New York: Free Press, 2008).

After experimentation in the field, the military required the canners coat cans for the military with a special material that prevented rust.²³

The Fruit Products Lab at the University of California, Berkeley, among other departments, sought to find a way to meet the needs of the military during the conflict. Cruess and his colleagues took up the research of dried vegetables again at the request of the military, particularly potatoes, carrots, onions, and beets. The university researchers had abandoned dehydrating vegetables in the 1920s to focus on fruit dehydration. They believed that dried vegetables were inferior to canned vegetables. Nutrients in vegetables diminished during the drying process. They did not believe the vegetables would sell in the consumer market. The military's need for lighter materials led to revival of the dehydrated vegetable research.²⁴

Cruess also became involved in the study of freezing food. His lab had experimented with it before the war, but the consumer market was so small that it was not a priority. There were not enough freezers in homes to warrant the development of a distribution system and requirement for grocers to put in display freezers.²⁵ Food scientists at other labs were working to advance frozen food technology particularly for the transfer of fresh meat from the United States to the European and Pacific fronts.²⁶

There were several federal agencies involved in mobilization and military supply, and at times, their orders conflicted. The War Production Board was in charge of procuring materials and industrial production. The War Manpower Commission was

²³ Brigadier General Carl A. Hardigg, "The Army's Food Needs," *The Food Packer*, March 1944; "Minutes of Meeting of Canners League Committee on Procoating of Cans February 25, 1944", February 25, 1944, Box 62: Folder 14, California League of Food Processors Collection.

²⁴ "Dehydration Conference Called at University," *The Food Packer*, January 1944.

²⁵ Shapiro, *Something from the Oven*.

²⁶ Hardigg, "The Army's Food Needs"; "Minutes of Meeting of Canners League Committee on Procoating of Cans February 25, 1944."

responsible for recruiting labor for war production, providing training as needed and tracking labor statistics. The Office of Price Administration (OPA) determined the prices for commodities, controlled the rationing program, and consequently required a detailed knowledge of all the food produced in the United States. Cannerymen, wholesalers, the National Cannerymen Association, and USDA reported production figures and stock numbers to the OPA. From this data, the agency set ration points for each canned fruit or vegetable item according to the amount in stock to make sure that stocks of product sold. Thus, if there was a large supply of canned peaches, the ration points could decrease from eighteen ration points to eight to reduce the older supplies. The OPA determined how much food of the total supply was available for civilian rationing from the following breakdown: seventy-five percent for civilians, thirteen percent for U.S. Armed Forces, ten percent for allies, and two percent for neighboring countries in exchange for materials for war production.²⁷ The War Food Administration was part of the Agricultural Adjustment Agency to meet the agricultural needs of the nation at war. The Joint Army-Navy Procurement program ordered supplies for all divisions of the military. The groups had one great goal, but many different agendas. Food processors and growers had to learn to navigate the labyrinth of commissions and boards, and they depended heavily on local trade associations to do so. The archival collection of the CLC contains many memos and questions during this period of its history about how to get peaches and pears from the orchard to the troops.

The story of canning fruit cocktail in World War II reveals the difficulties canners faced as they negotiated between the various war agencies, the FDA, and the USDA because it encapsulated all the problems surrounding tin, sugar, and fruit shortages.

²⁷ Colonel Bryan Houston, "A Reappraisal of Rationing," *The Food Packer*, March 1944.

Sacrifice was common on the home front as defense needs held high priority in obtaining materials made scarce by the disruption of trade routes during the war. While popular culture has focused on household ration books, industries endured rationing as well. Supplies on the fruit front also dwindled just as production needs soared. For canners, sugar and tin rationing presented the greatest challenge. However, they also had trouble obtaining machinery, fuel, and vehicles at times because the military presence in the Bay Area was absorbing so many materials and products. Tins were the most common packaging for canned products because they were sturdy and easy to make. Tin was a highly prized material during World War II because supplies to the United States were scarce during the war while at the same time more materials needed preparing for soldiers. Thus, as the supply decreased, the need increased. The War Production Board issued the Tinplate Conservation Order in 1942 (M-81) that listed and limited how canners could use tin. Certain items had no limitations, such as peaches and pears. Others were restricted. For example, M-81 eliminated packing fruit in eight ounce or other small sized cans.²⁸

M-81 also restricted the amount of pineapple that canners could repack into fruit cocktail to ten percent. Usually, Hawaiian pineapple canners shipped industrial sized cans of pineapple tidbits to California. Then, California fruit canneries unpacked the pineapple and mixed it in the proper ratio to make the version of fruit cocktail according to the standards of the California League of Canners. The regulatory limitation of pineapple, in addition to reduced deliveries, left canners restricted to producing only ten percent of their normal pack of fruit cocktail. Canners were very upset about this

²⁸ "Fruit Cocktail Meeting May 1, 1942", May 1, 1942, Box 62: Folder 10, California League of Food Processors Collection.

development. Fruit cocktail had become one of their best-selling products prior to the war, and because it utilized lower grades of fruit, it offered the canners a high profit margin.²⁹

Sugar was as essential to California's fruit canners as fruit itself, and the OPA rationed it during the war. Japan's capture of the Philippines greatly reduced America's sugar supplies. As the industry learned of sugar rationing, canners first scrambled to find ways to produce the goods needed by the military. By March 1942, canners' ration of sugar was ninety percent of what they used in 1941.³⁰ An easy solution to account for the lesser amount of available sugar would be to discontinue packing fruit syrups with a high brix count.³¹ However, the military wanted to pack as many calories in a can as possible and ordered heavy syrup for its orders. Fortunately, the military eased some of the pressure on the canners when it agreed to accept whatever the canneries offered to civilians.³² However, canners still faced many other new choices. They could produce many more cans of peaches in syrup with a low brix than if they used a higher brix from the same amount of sugar. Thus, they had potential to make more money by using very light syrup. Another option was to split the pack between medium and low brix level syrup and eliminate the standard heavy canned syrup products. While there were endless possibilities for problems solving, the multitude of options also jeopardized the

²⁹ Ibid.

³⁰ "Sales of Sugar for Week will be Suspended," *Modesto Bee*, March 21, 1942; Office of War Information, Office of Price Administration, "Advance Release: For WEDNESDAY MORNING Papers, July 22, 1942", July 22, 1942, Box 62: Folder 9, California League of Food Processors Collection.

³¹ Brix is the measurement of concentration of sugar in sugar syrup. This standard measurement was used within the industry, by the FDA, and by the USDA to ensure that canners were packing consistently with the labels they used.

³² Frank A. Van Konyenburg, *A Home & a Price: 75 Years of History with the California Canning Peach Association* (Lafayette, CA: California Canning Peach Association, 1997), 42–44; Sylvia Kempton, "Minutes of Fruit Cocktail Meeting August 11, 1942", August 11, 1942, Box 62: Folder 10, California League of Food Processors Collection.

standardization processes the CLC and NCA had spent decades developing. In the case of some products, certain options also failed to meet the USDA and FDA standards.³³

The standard for fruit cocktail was just going through the FDA during this time and it did not offer any real middle ground. A nagging question and negotiation point for fruit canners was how to navigate through the various government and industry standards and still fulfill their military contracts. They wondered if they should seek wartime dispensation from the USDA and the FDA to pack an alternate version of fruit cocktail without pineapple or reduced sugar. The alternative was to drop one of their most popular items. When apricots became scarce later, the problem became even more complicated.³⁴ Some canners wanted to do substitutions. Others thought selling the products as “fruits for salad” rather than fruit cocktail might avoid the issue, as there were no government specifications for such a product yet. In response to these ideas, the FDA replied that in cases where there was no federal standard, the trade industry standard, meaning the CLC standard in the case of canned fruits, would hold. Every year, the circumstances were different. Some fruits came up short, such as pineapple or apricot. Other times, the government altered the sugar ration. Military orders changed. The discussion of how to pack fruit cocktail did not go away until the war ended. In the end, some canners frustrated with the problem decided to pack only diced peaches and pears because there were no limitations on such products. Given all the rationing consumers faced, canners were certain that they could sell all these packs.³⁵

³³ “Fruit Cocktail Meeting May 1, 1942”; Kempton, “Minutes of Fruit Cocktail Meeting August 11, 1942”; “Syrup Clause and Table Syrup Notes (1941-1943)”, n.d., Box 7, Folder 52, California League of Food Processors Collection.

³⁴ Sylvia Kempton, “Minutes of Fruits for Salad Meeting August 14, 1942”, August 14, 1942, Box 62: Folder 10, California League of Food Processors Collection; Kempton, “Minutes of Fruit Cocktail Meeting August 11, 1942.”

³⁵ Kempton, “Minutes of Fruits for Salad Meeting August 14, 1942.”

The process of figuring out how to pack fruit cocktail and what to say on the label took many months of negotiation.³⁶ Canners had to meet USDA standards to qualify under War Department specifications. They needed FDA approval to use the term “Fruit Cocktail.” Food labeling laws were very strictly monitored. Under those laws, some food names, such as fruit cocktail, became standardized for consumer protection. The California fruit canners did not want their premiere product to disappear from shelves for the duration of the war, and so they hoped for a fruit cocktail label even if they had to explain the lack of pineapple on the can itself. The dominant canners, such as Calpak, and the trade associations also recognized that maintaining high product standards worked to their long-term advantage. However, smaller canners had more to lose from being inflexible.

In response to the tin shortage, food processors also experimented with new types of packaging. A new process for lining steel cans with tin developed that drastically reduced their need for tin. Glass jars, once abandoned because of their fragility and cost, became popular again. Cellophane emerged during the war as a packaging material with myriad uses. One example provided in the *Food Packer* explained that broccoli wrapped in Pliofilm kept significantly longer than unwrapped broccoli, which increased its competitiveness with canned and frozen broccoli.³⁷

Rationing also affected negotiations between canners and growers as the Office of Price Administration set limits on the prices of orchard crops. The OPA provided four different formulas for growers to use to calculate the price of their crops. In 1942, these formulas provided prices that were lower than what growers were accustomed to

³⁶ Van Konynenburg, *A Home & a Price*, 42. Western Canner and Packer, CLC notes

³⁷ “What is the Future Outlook for Processed Foods?,” *The Food Packer*, February 15, 1944.

receiving. The previous year, growers received fifty dollars a ton for clingstone peaches. The California Canning Peach Association (CCPA) went to the USDA and asked department representatives to talk to the OPA on the growers' behalf. As a result of this intervention, the OPA allowed a price of fifty-seven dollars a ton for clingstone peaches. When the CCPA negotiated with canners, in turn, it received a price of sixty dollars per ton. Later the OPA changed its stance again, reducing the allowance to fifty-five dollars per ton. However, with the agreement between the CCPA and canners in place, the canners had to absorb the five dollars difference within their own costs rather than only pay the growers fifty-five dollars per ton. The extra money worked out for the growers because they had thinned their orchards earlier in the year to make sure their trees only produced #1 peaches, the highest grade. As they anticipated, because of sugar and tin shortages, canneries could only accept and pack #1 peaches in 1942. Through the 1930s, the growers and canners had made price negotiations and production planning more predictable by using Market Orders.³⁸ However, during the war, the difficulties in coordinating with war agencies prevented growers and canners from making market orders. From 1943 to 1945 were the only years that growers and canners did not use market orders. By 1944, growers set aside seventy percent of the peach harvest was set aside for military use, from that year's harvest 395,000 tons were canned, 10,000 tons went to dehydrators, and 6,000 tons went for freezing.³⁹

According to a Tri Valley Packing Association (TVPA) history, rationing and price ceilings made it very difficult for the cooperative to pack as they normally did. It was very hard to predict the market. Conditions made it necessary for canners to pack

³⁸ Market Orders were a tool developed in the late 1920s for growers and canners to assist in annual negotiations.

³⁹ Van Konyenburg, *A Home & a Price*, 42–45.

everything without any idea what they were going to sell. Usually, they only packed what they needed. For example, if there were a large supply of apricots from the previous year, the canners normally reduced the amount of apricots packed and focused on peaches. Orders and expected orders also changed as the OPA and military's needs changed. The canners were trying to cover costs, so they did not want to find themselves with a warehouse full of spinach or pears. They also could not afford the storage space for large quantities of canned products. Despite this, the canners could not ignore their military obligations out of their patriotic duty to the United States and the contracts they had signed. In 1944, TVPA sold forty-nine percent of its vegetable pack to the military and sixty-three percent of its fruit pack.⁴⁰

In the first four decades of the twentieth century, American consumers became increasingly more confident in a reliable commercially produced food supply. World War II interrupted this consumer dependence. Under the wartime rationing system, most families had forty-eight points to use on canned foods each month. The number of points assigned to each canned food changed depending on the amount of stock available in canneries. The government required canneries to report their supplies. Given the military demands on the domestic food supply, federal agencies also urged families to plant home gardens and can their own food to supplement their needs. The Office of War Information printed posters encouraging women to plant Victory Gardens. With large migrations to cities in the late nineteenth and early twentieth century, this family tradition self-sustenance had lost its centrality in American families. The OPA also encouraged home canning to keep fruits and vegetables well after the harvest. Victory Gardens were

⁴⁰ "Manager's Report on 1944 Operations to Date", October 14, 1944, World War II Panel 3, Tri/Valley Growers.

very popular. There were some twenty million by 1943.⁴¹ The OPA estimated that in 1943 families canned between 140 and 170 million cases (of 24 cans each) the majority of which were fruits and vegetables.⁴²

This quick popularization of home canning, however, led to an increased risk of foodborne illness. Parts of the canners' networks of production jumped into action to help encourage the safe practice of home canning. The War Food Administration and the California Department of Education created seventy-five communal canning stations throughout the state that supplied retorts and pressure cookers for home canners to process batches of vegetables and meats safely.⁴³ According to state law, all publically operating retorts fell under the authority of the Cannery Inspection Board (CIB). Thus, the CIB included the public canning facilities on its inspection schedules during the war.⁴⁴ Health authorities had concerns about home canned foods that home canners donated to local schools.⁴⁵

The University of California extension programs also played a vital role in the domestic food front during World War II. Extension publications taught families the basics of growing food and canning. With many men in the military and given traditional gender roles that placed the preparation of food in women's hands, women most often tended the Victory Gardens and canned their bounty. Extension workers trained in home

⁴¹ Houston, "A Reappraisal of Rationing."

⁴² Ibid.

⁴³ "Meeting of the Board of Directors and Executive Committee of the Cannery League of California, January 18, 1944", January 18, 1944, Box 62: Folder 14, California League of Food Processors Collection.

⁴⁴ Milton Duffy, "To State of California Department of Public Health", July 22, 1943, Box 3, Folder 4, California League of Food Processors Collection.

⁴⁵ Ibid.; Department of Public Health, "To Local Health Officers", July 6, 1943, Box 3, Folder 4, California League of Food Processors Collection; Department of Public Health, "To City, County, and District Superintendents of Schools", July 7, 1943, Box 3, Folder 4, California League of Food Processors Collection; Meyer, "Historical Background Cannery Inspection State of California Department of Public Health."

economics and food scientists, such as Cruess and his Berkeley colleagues, answered thousands of questions from women learning to can for the first time. Cruess, for example, worked on UC Extension Bulletin HD 417, which details procedures for safe home-canning. Extension agents, Berkeley, schools, and the Department of Public Health made this information widely available. Local agencies, such as extension programs and the Cannery Inspection Board, issued warnings over the radio about the danger of improperly cooked home-canned foods.

Despite advances in canning technology and the number of machines that took over tasks once performed by men and women in northern California, harvesting and processing fruit remained a labor-intensive business, especially during the harvest and pack. Inside the cannery before the war, management divided tasks by gender. Women had the tedious, repetitive job of preparing the fruit and stuffing the cans. Men lifted boxes of fresh fruit, operated and repaired machinery, and moved carts of canned fruit to and around the warehouse.⁴⁶ After Pearl Harbor, many male workers joined the military, creating a labor shortage in California canneries more acute than what occurred during the First World War. There are several reasons for this. First, the industry reached its full stride in the 1920s when it became the leader in U.S. canned fruit production in the United States. Thus, by World War II there simply were more canneries and cannery jobs responding to a higher consumer demand. Even though many men left during World War I, the impact was less drastic. Second, the scale of mobilization during World War II was much higher than in WWI. The combination of increased orders with a reduction

⁴⁶ Zavalla, *The Canning of Fruits and Vegetables, Based on the Methods in Use in California, with Notes on the Control of the Microorganisms Effecting Spoilage*; Ethel Vatter, "The California Canning Industry, 1910-1935: A Historical Survey" (Thesis, Berkeley: University of California, 1944); Ruíz, *Cannery Women, Cannery Lives*; Chiang, *Shaping the Shoreline*.

of male workers made the need for labor more acute, according to a manager's report from Tri Valley Packing Association. The cannery managers rarely had a full crew during the day and struggled to maintain even half a crew at night.⁴⁷

Canners addressed shortages in various ways. Some cannery workers received deferments from service because food production was a vital part of mobilization. According to a Tri/Valley Growers history, the successor of Tri Valley Packing Association, many wives of cannery employees who had joined the military worked in the canneries during the canning season. Canners also constructed temporary housing and restrooms for transient workers and paid the employees cash at the end of each day. Sailors arrived on buses from the Vernalis and Livermore bases to help at the canneries in the evenings. They too received cash at the end of the day. TVPA even purchased a bus to make sure they could move employees around as necessary. The company argued that there would have been no one to work the night shift if not for the service men working in the canneries. With two canneries in operation, TVPA had 4,395 employees, 2,976 of whom were adult civilians, 360 minors, and 1,059 service members in 1942.⁴⁸ Canners asked for dispensations to hire children under the legal working age for both the orchards and canneries, particularly girls aged sixteen to eighteen, but did not receive approval.⁴⁹ They also asked the Army for assistance during the pack, albeit without success.⁵⁰ Finally, canneries and growers appealed for volunteers in surrounding communities, and the community responded. In the 1942 canning season, only fifty percent of the experienced peach workforce and seventy percent of trained tomato processors were able

⁴⁷ "Manager's Report on 1944 Operations to Date."

⁴⁸ *Tri/Valley Growers: 50 years of survival and growth, 1932-1982* (S.l.: Tri/Valley Growers, 1982), 8;

"Manager's Report on 1944 Operations to Date."

⁴⁹ "Canners Pledge to Help Army," *Modesto Bee*, March 6, 1942.

⁵⁰ "Army Refuses Plea for Fruit Workers," *Modesto Bee*, August 24, 1942.

to return.⁵¹ In October 1942 an article in the *Modesto Bee* asked women to join the “Women’s Tomato Peeler’s Army” and help the canneries process the tomatoes “pouring in from the fields.” Highly valued by the military, canned tomatoes had become a popular consumer product and thus a major crop in California at mid-century. The article informs the women that there will not be any uniforms for them or movie stars to cheer them on but that they can save food needed to sustain those fighting across the oceans.⁵²

During the time when canneries needed mechanization most, equipment was hard to come by. The labor shortage hit canneries hard just as maintaining production levels was mandatory to meet military orders. Failure would mean hungry soldiers and a loss of future military support. With these things in mind, canners thought creatively to find ways to continue processing. Canneries did the best they could to start using machines to replace laborers. Unfortunately, war shortages made most mechanical items hard to come by. The War Production Board even asked canners to donate their typewriters to the war cause in 1942.⁵³ Some canneries began using more forklifts to make up for the lack of male laborers in the warehouses, but the older canneries had wood floors that could not handle the weight of the machines. Concrete floors would have helped this problem, but the military was using most of the building machinery and supplies in the area.⁵⁴

Orchards felt the labor shortage as keenly as the canneries and found creative ways to address the problem. Newspapers ran stories about communities taking to the

⁵¹ Walter Warren, “Labor Shortage Problem Faces State Canneries,” *Modesto Bee*, March 13, 1942.

⁵² “Women Volunteers are Needed to Aid Canneries,” *Modesto Bee*, October 3, 1942, sec. Editorial.

⁵³ Sylvia Kempton, “Canners League of California Executive Committee and Board of Directors Minutes, October 13, 1942”, October 13, 1942, Box 62: Folder 9, California League of Food Processors Collection.

⁵⁴ *Tri/Valley Growers*, 9.

fields during the harvest to make sure the precious crops were not wasted. Stores closed in the mornings in Modesto to help bring in the peach crop in 1942.⁵⁵ During the 1943 harvest, guest workers from Mexico picked clingstone peaches in the San Joaquin Valley under the federal Bracero Program. This agreement began a labor relationship that lasted until 1964 when the program ended, to the dismay of canners. An experimental program began in 1942 in which convicts from Folsom prison worked in pear orchards.⁵⁶ German prisoners of war picked peaches in Tulare in 1944 and were even paid wages.⁵⁷

Even those not familiar with the thousands of women who donned overalls and learned the skills to take over heavy manufacturing jobs usually recognize the “We Can Do It” slogan with the image of Rosie the Riveter, a brunette dressed in work clothes wearing a bandana rolling up her sleeves to get to work. Just as in munitions, shipbuilding, and airplane factories, women rolled up their sleeves and took over jobs in the canning industry previously held by men. Some volunteered to pick fruit, others pushed carts of fruit, and a few women moved into management positions.⁵⁸ Sylvia Kempton served as Secretary in the California League of Canners for decades. She started her career in the canning industry at Libby, McNeill, and Libby. In 1919, she joined the Canners League and helped bring organization to its head office in San Francisco. She was the Office Manager and secretary to Preston McKinney, President of the Canners League. Elected as Assistant Secretary to the CLC in 1933, she became Secretary a decade later. However, despite the obvious knowledge she had about the

⁵⁵ “Store Closing Is Voted Here to Aid Peach Men,” *Modesto Bee*, August 24, 1942; “Stores of City Will Close Again,” *Modesto Bee*, August 26, 1942; “Tired Clerks Swap Tales of Prowess As Peach Pickers,” *Modesto Bee*, August 26, 1942.

⁵⁶ “Folsom Convicts are Released to Help,” *Modesto Bee*, August 24, 1942.

⁵⁷ Van Konyenburg, *A Home & a Price*, 46–47; “Women Volunteers are Needed to Aid Canneries”; “Men, Women Are Needed by Canneries Here,” *Modesto Bee*, September 26, 1942, sec. Editorial.

⁵⁸ Vicki Ruiz documents the gender separation in the canneries in *Cannery Women*, *Cannery Lives* and the difficulty they faced in moving up and unionizing.

industry -- as is evident in the memorandums and notes to file she prepared -- she remained the Secretary. Outside the cannery industry, she was recognized as a leading businesswoman in the area. She was the first woman elected as Vice President of the California Republican Assembly and was President of the Business and Professional Women of San Francisco.⁵⁹ During the war, Kempton played a major role holding down the fruit front for the Cannery League.⁶⁰ Other women gained the opportunity to join Kempton in management roles because many male cannery executives became government advisors or served on war boards. For example, George Pfarr, founder of the Tri Valley Packing Association, worked with the Office of Production Management.⁶¹ The head of the Cannery League of California, Preston McKinney, served as the chief of canned food pricing for the OPA.⁶²

California Packing Corporation faced additional stress during the war because it had built the first fruit cannery outside the United States in a location that became a battleground. Calpak opened a plant in the Philippines in 1930 that had finally become a fully producing modern cannery ten years later. Located in Bugo on the island of Mindanao, the cannery was a subsidiary of Calpak called Philpak. By April 1942, the cannery and company property suffered from constant aerial bombing by the Japanese. The American employees left for safer ground, but a small contingent, including Assistant General Manager Norris Wordsworth, patrolled the company's property to reduce looting. In spring 1942, the allied forces began using the company airstrip.

⁵⁹ "Canners League of California Bulletin 6385", July 30, 1979, Box 1, Folder 1, California League of Food Processors Collection.

⁶⁰ Sylvia Kempton, "Meeting of the Board of Directors and Executive Committee of the Cannery League of California September 3, 1943", September 3, 1943, Box 62: Folder 11, California League of Food Processors Collection.

⁶¹ *Tri/Valley Growers*, 8-9.

⁶² Braznell, *California's Finest*.

General Douglas MacArthur traveled from the island of Corregidor to Mindanao by PT boat, but finished the final leg of his evacuation to Australia on B-17s from this airfield. The Japanese interned many American employees at Impalutao, Bukidnon, a former U.S. Army base. Those not with the main group tried to get back, and some perished in the effort. The Filipino employees of Philpak left when the islands surrendered to Japan, and many joined guerilla forces that fought the Japanese. After three years, the U.S. Army liberated the seventeen interned American Philpak employees. The facilities at Bugo were heavily damaged, but the fruit plantings, albeit overgrown, survived the war. The management group, including Neil Crawford, Norris Wadsworth, Howard Dennison, and Max White, returned to Philpak in 1946 after convalescence. By 1948, the facility was running again and produced one million cases of canned pineapple that year.⁶³

World War II had a much more dramatic impact on the future of the canneries than World War I. The level of industry organization that evolved between the first and second war allowed the canners to operate as efficiently with the government and buyers as they did. The influence of Hoover's philosophy of efficiency and collaboration inside the industry as seen in trade associations, market orders, research, and standardization was vital in allowing food processors to fill huge orders and adjust to a rapidly changing market. Despite the government orders, canners argued that they actually lost money during the war because of wartime inflation and the fact that they refused to lower the quality of their foods despite shortages and inflation. California Packing Corporation reported the following sales and earnings just before and during the war.

⁶³ Ibid., 99–102.

Table 5.2 California Packing Reported Sales and Earnings 1939-1946⁶⁴

	Sales	Net Income Before Dividend	Dividends
1939	52,724,422	2,408,202	995,956
1940	59,441,929	3,047,549	187,466
1941	61,175,583	2,621,699	1,077,552
1942	\$80,867,790	3,156,073	1,356,313
1943	\$91,350,067	3,239,187	1,356,313
1944	\$99, 475,483	3,110,880	1,597,582
1945	\$111,051,653	2,993,448	1,597,582
1946	\$111,775,638	2,634,649	1,597,582
1947	\$111,775,638	2,634,649	1,597,582

California peach growers too contended they did not prosper under the war's price controls.⁶⁵ TVPA's returns show that they were at least meeting expenses and even had some dividends to return to their members

The Cold War

As World War II ended, America stood on the verge of war that lasted for decades. The Cold War was different from any other war the nation had endured. It lasted more than forty years with no battles on the soil of the United States and the Soviet

⁶⁴ Ibid., 98; "Comparative Record of Operations," *Del Monte Shield*, May 1950.

⁶⁵ Van Konynenburg, *A Home & a Price*.

Union, although the war turned hot in other arenas such as Korea and Viet Nam. Both of the major powers in this conflict nurtured relations with strategic allies, often providing them with various forms of aid. One of the largest examples of American aid was the Marshall Plan. The United States launched the Marshall Plan in 1947 in an effort to rebuild Western European economies, ensure foreign markets for American goods, encourage the philosophies of democracy and capitalism, and ward off Soviet communism. In the Cold War, food was a weapon used by diplomats to build alliances. The relationship between the military and California fruit canners that began in World War I and grew stronger in World War II, continued into the Cold War era. Markets for canned goods increased because the need to feed a large and permanent standing U.S. military, a fixture of the Cold War. The wars in Korea and Vietnam also required large quantities of canned fruit to feed more generations of American soldiers and marines. During the Cold War, the threat of nuclear warfare increased the domestic market for canned goods.

Food was always a part of the culture of the Cold War, but it has received limited scholarly attention. After Americans dropped atomic bombs on Hiroshima and Nagasaki in August 1945, the concept of nuclear war and atomic energy entered into the popular culture of the United States and into the minds of Americans. Historians have argued that after the first shock of learning about the bomb, there was a period in which Americans were optimistic about the uses of nuclear power. The Atoms for Peace program promoted by President Dwight Eisenhower encouraged the development of peaceful uses of nuclear energy. Irradiation of food also became an area of research for food scientists who thought it would be the newest food preservation technique, even besting canned

food because it would preserve raw food in that state for years. Scientists were curious about the possibilities of using the new substances that came out of the atomic weapons production programs and began testing the effects of radiation and fallout on many substances.⁶⁶

The excitement about the possibilities of nuclear weapons waned during the 1950s, however. The federal government's stockpiling of nuclear weapons and warnings of a possible nuclear attack by the Soviets terrified citizens. Americans also began to learn the real dangers of nuclear material from the results of the biological effects of fallout from nuclear testing. Americans sought solutions for dealing with this new era in the world. Filmmakers drew on the fear of nuclear weapons and the poisonous substances associated with them as inspiration for dramas, such as *On the Beach*, and science fiction thrillers, such as *Godzilla* or *Them!*. Many families built fallout shelters to protect themselves in case of nuclear war.⁶⁷

Perry R. Stout, Chairman of the Department of Soils and Plant Nutrition for the USDA, gave a speech about the impact of atomic attack on agriculture at a conference at Berkeley in 1962 sponsored by the Giannini Foundation of Agricultural Economics. He argued that Americans were largely not prepared to revive agriculture after an atomic attack. With its high degree of efficiency, "mechanized agriculture of the United States,

⁶⁶ Paul S. Boyer, *By the Bomb's Early Light: American Thought and Culture at the Dawn of the Atomic Age*, 1st ed. (New York: Pantheon, 1985); Allan M. Winkler, *Life Under a Cloud: American Anxiety about the Atom* (New York: Oxford University Press, 1993); Kenneth D. Rose, *One Nation Underground: The Fallout Shelter in American Culture*, American history and culture (New York: New York University Press, 2004).

⁶⁷ There has been thorough examinations of the cultural aspect of the 1950s reaction to nuclear energy. Boyer, *By the bomb's early light*; Winkler, *Life under a cloud*; Laura McEnaney, *Civil Defense Begins at Home: Militarization meets Everyday Life in the Fifties*, Politics and society in twentieth-century America (Princeton, N.J: Princeton University Press, 2000); Thomas J. Kerr, *Civil Defense in the U.S.: Bandid for a Holocaust?*, Westview special studies in national security and defense policy (Boulder, CO: Westview Press, 1983); Guy Oakes, *The imaginary war: civil defense and American cold war culture* (New York: Oxford University Press, 1994).

being dependent upon supporting industrial base, has acquired a high degree of vulnerability.” He was not convinced that after nuclear attack, people could revive 1960s agricultural practice without “continuing supply of fuels, fertilizers, pesticides, and spare parts for machinery.” The concentration of food production in certain areas of the United States and particularly the focus of those concentrations on a particular food, such as dairy, beef, corn, or fruits, would make it more difficult to recover. The recovery of agriculture was so vital because of urban concentration in the United States.⁶⁸

Stout urged federal officials, particularly at the USDA, to change their focus from merely preventing nuclear attack to planning for life after the fact by first making plans for the food supply. He suggested the creation of a national food cache capable of supporting the nation for two years after an attack. Such a cache would provide the agricultural system to recover. The food cache, he added, should exist throughout the country so that all Americans would be able to walk to a distribution center. Although Stout was primarily trying to refocus the attention of nuclear attack from prevention to survival, he also argued that the food cache could serve as a deterrent to the Soviets when they realized how quickly Americans could recover. However, only the federal government had the money and power to put together such a system, but no officials seemed prepared to step forward. Stout also emphasized that most fallout shelters only provided Americans with two weeks of food, the Office of Civil Defense recommendation. Americans did not believe the shelters would help them survive, thus

⁶⁸ Perry Stout, “Agriculture Under Atomic Attack” (presented at the Symposium on the Future of California Agriculture, University of California - Berkeley, 1962).

they avoided building them. Stout encouraged those in the room to focus on the need to rethink how the agricultural community would operate after nuclear attack.⁶⁹

Stout's paper stands out in the program and in much of the literature on civil defense. The Federal Civil Defense Administration or Americans did not commonly accept his point of view. The support of a national civil defense program was inconsistent during the Cold War peaking and ebbing with changes in national and international politics. At the beginning of the 1950s, military and civil defense officials placed more emphasis on dispersing urban populations and providing counterattacks to incoming missiles. Although they discussed plans for shelters, there was no consensus on a national plan. The OCD encouraged citizens to build their own fallout shelters rather than construct a system of community shelters for all citizens. Plans proliferated and instructions for every aspect of building and stocking an individual shelter were available by food processors, manufacturers, and government agencies. To stock their shelters, some people canned their own food and others purchased canned and prepared food in bulk. Children in the Future Farmers of America or Future Homemakers of America learned how to prepare food for emergencies and calculate how much one needed to prepare for each member of the family.⁷⁰

By the end of the 1950s, the fallout shelter initiative mostly fell away. While the OCD did much to encourage and teach Americans what to do, the expense involved in building a family shelter was prohibitive. Some people with adequate funds simply found the concept abhorrent. They worried about how to deal with neighbors who were unprepared. They asked themselves if they would kill to protect their own supplies.

⁶⁹ Ibid.

⁷⁰ Rose, *One nation underground*; Kevin Rafferty, Jayne Loader, and Pierce Rafferty, *The Atomic Cafe*, videorecording (Docurama : Distributed by New Video, 2002).

Other Americans believed that it was a waste of time to try and that no one could survive the attack. Densely populated urban areas were particularly difficult to prepare. After the early initiative, local level OCD positions went vacant because people lost interest. The federal government made plans on how to care for Congress and other high-ranking leaders but was not interested in supporting the huge undertaking that housing and feeding the entire populace would involve. Additionally, war hawks in Congress wanted to destroy the OCD because they thought it was a waste of funds that were better spent on more aggressive weapons.⁷¹ During the Cuban Missile Crisis in 1962, during President John F. Kennedy's administration, there was a brief excitement over civil defense, but it dissipated once the crisis ended.⁷²

Although the San Francisco Bay Area urbanized quickly in the post-World War II era, much of the Central Valley and Delta remained rural and had different concerns about nuclear attack. Government officials and most citizens assumed that cities would be the focus of nuclear attacks. Thus, rural areas seemed to have less to fear from a direct hit. However, over time even farmers became concerned about civil defense and a nuclear strike. Various sources informed them they were the front line of recovery after nuclear attack because they had the moral obligation to take in those without shelter or food. The USDA reinforced the idea and issued a pamphlet in 1962 explaining the role of farmers in preparing for nuclear attack and, perhaps more importantly, how they should get back to work afterwards. The brochure told farmers to stock up on any farm items or supplies, such as machine parts and fuel that would be hard to obtain after an

⁷¹ Rafferty, Loader, and Rafferty, *The Atomic Cafe*; Rose, *One nation underground*; Boyer, *By the bomb's early light*; Winkler, *Life under a cloud*; Kerr, *Civil defense in the U.S.*; Oakes, *The imaginary war*; McEnaney, *Civil defense begins at home*.

⁷² Rose, *One nation underground*.

attack. However, Stout's dire predictions about the collapse of American agriculture for several years are missing from the comprehensive pamphlet. Instead, there are multiple designs for creating dairy buildings that reduced the affect of fallout and calculations to measure how long one could be outside after a nuclear blast.⁷³

Another aspect of Cold War food politics focused on testing how an atomic bomb affected canned foods. In early September 1955, the Cannerymen's League of California presented at their exhibit at the California State Fair photos of atomic testing in Nevada along with samples of canned foods used during the May 5, 1955 testing (Operation Cue). The cans had been stored in fiberboard boxes and located 5500 feet from the blast. The CLC announced that although the blast scorched the fibreboard boxes, the cans were unharmed and the food was ready to eat immediately after the blast – according to the test scientists. This advertising campaign was part of a push to encourage families to purchase California canned goods for use in fallout shelters. The remainder of the display exhibited the California Civil Defense Family Food Shelf, which allowed the public to visualize how much food constituted a three-day supply for an average family. Handouts listing the materials in the three-day supply were available and included recipes. The rest of the exhibit space was dedicated to the convenience and nutrition of canned fruits. Reprints of an article in *Good Housekeeping* endorsing the nutritional

⁷³ Jenny Barker-Devine, "'Mightier than Missiles': The Rhetoric of Civil Defense for Rural American Families, 1950-1970," *Agricultural History* 80, no. 4 (October 1, 2006): 415–435, (accessed September 6, 2012); United States. Agricultural Research Service, *Protection of food and agriculture against nuclear attack*. (Washington: [s.n.], 1962).

value of canned fruit were available. Members from the NCA and CLC staffed the booth to answer questions.⁷⁴

The nuclear age also involved canneries testing the effect of nuclear materials on canned goods. The irradiation of food excited food scientists, who recognized the possibilities of a breakthrough in food processing. The last major technological innovation in food preservation was canning, a process first developed in the late 18th century. Irradiated food promised to provide raw ingredients with the ability to stay fresh for years, presumably. University departments of food technology conducted experiments on the process with funding and equipment provided by food processing companies and the Quartermaster General. By 1954, the experiments had become part of a national program that included efforts by the USDA, Massachusetts Industry of Technology, Stanford, the FDA and the Atomic Energy Commission.⁷⁵ These groups argued that irradiated food products could become part of a new way of feeding the military. The ability to preserve food using radiation would provide more fresh food for soldiers, airman, and seaman. However, there also was a less explicit agenda of producing a new product for the mass market. Scientists at universities also undertook irradiation research because of the huge amounts of funding available for it. Despite the large amount of money and effort given to the research, decades passed before the researchers found success. Food tasters, often noncombat soldiers, reported that the food tasted funny, burnt. In addition, the scientists and food industry executives realized that

⁷⁴ "CLC Press Release August 31, 1955", August 31, 1955, Box 1, Folder 3, California League of Food Processors Collection; National Canners Association and Virginia Polytechnic Institute., *Those blasted canned foods: exhibit on nuclear tests in Nevada by the National Canners Association, Washington, D.C.* ([Washington, D.C.: National Canners Association, 1956); "Canned Foods and the Atomic Age," *Del Monte Shield*, May 1955; "Canned Foods Withstand the Atom Bomb," *Del Monte Shield*, August 1955.

⁷⁵ During the Cold War, this coalition approach was common and has been termed an Iron Triangle.

irradiated foods could be a breakthrough, but they would not be really much better than the consumer system of food supply that existed, especially given the growth of the frozen food industry. There were high hopes for military use because irradiation made the food lighter, but the unpalatability made it unusable. Ultimately, irradiated foods did not end up as a serious competitor to canned foods.⁷⁶

Conclusion

The American wars of the twentieth century challenged but ultimately strengthened California's fruit canning industry. Canned foods were, by design, foods of convenience making them perfect for emergencies or foreign environments. The analysis of the fruit canning industry during different wars illustrates how the pressures of supplying the military during wartime pushed the canners to reorganize themselves in order to work with government agencies. Each war experience led to greater federal involvement in the American food supply. Despite Hoover's emphasis on trade associations to coordinate supply, the pressures of World War I for food for American troops and allies increased federal involvement in America's food supply. For California's canners, this meant increased surveys of cropland and production.

Mobilization for World War II was much more expansive and invasive than the First World War. Fruit canners also played a larger role. While the organization in the industry between the wars was very useful, it was also detrimental, as the fruit cocktail example illustrates. Wartime shortages made it very difficult for the canners to meet the standards they had worked for decades to establish. Even when they were willing to bend

⁷⁶ James Spiller, "Radiant Cuisine: The Commercial Fate of Food Irradiation in the United States," *Technology and Culture* 45, no. 4 (October 2004): 740–763; Nicholas Buchanan, "The Atomic Meal: The Cold War and Irradiated Foods, 1945-1963," *History and Technology* 21, no. 2 (June 2005): 221–249.

on that issue, they still had to negotiate with the FDA about labeling practices. The year to year changes in orders and rationing in the war highlights the loss of flexibility because of the standardization of products within the industry and by the federal government.

The crisis of wartime led to the creation and adoption of new materials and production techniques. From World War II research, cellophane became more commonly used material for food processors. The development of frozen foods during the war combined with the increased use and production of plastic packaging set variables in place for the rise of the frozen foods industry after the war. The Cold War also contributed to new products, especially irradiated food. These advancements borne from military need became vital components of the postwar market. Today, manufacturers use cellophane and plastic wrapping on most food products. Freezing is an integral part of food storage in America. Food technologists view these packaging materials as advancements. However, these materials have an environmental downside. Cellophane and plastic wrapping are not recyclable, whereas cans and glass are. Thus, the new packaging has added to the American waste stream. Freezing and the increased use of refrigeration is another aspect of the electrified home that adds to the nation's ever-growing energy requirements.

During the extreme situations of World War II, a communal effort to produce canned fruit arose in the communities that housed concentrations of fruit processors. Volunteerism and community service were at a high during the war. Those on the home front not only contributed time to assist the canners and growers, but they maintained victory gardens as well. When rationing led to shortages at local schools, some people

even pitched in home-canned items to diversify the menu. This level of participation shows the patriotism exhibited during the war, but it also illustrates the importance of the fruit canning industry to the area. Surely, women working in the canneries were doing it in part to make sure soldiers had enough food, but there must have also been people who helped the growers and canners because they did not want one of the largest industries in the region to decline. Many people still remembered the difficulty and turbulence of the Great Depression and did not want to repeat it.

Canning executives served important posts during wartime which allowed them to spread their philosophies about how food processing management and the role of government in food production. The fact that many canning executives were recruited to work for wartime agencies is proof of the dominance of the California fruit canners in the canning industry in America. It also allowed the canners to make more connections at a national level. This became important during the expansion strategies of the 1950s.

Finally, the home front changed between the Second World War and the Cold War. As historians of nuclear history have shown, the seemingly relaxed veneer of the 1950s covered another kind of militarism and fear. Living under the fear of nuclear threat made people think more about survival and the reality of nuclear energy. Some food scientists believed that the experimentation on canned foods in atomic blasts and irradiation provided new potential for the food industry. Yet, as the scientific data about the effect of fallout and radiation on humans was in the public's mind, they too began to hesitate on what some initially thought was the best method of preservation since canning.

CHAPTER 6 – “KITCHENS OF THE NATION”¹

Modernization, efficiency, and an enchantment with new technologies had been the zeitgeist of the 1920s, and American food processors revived their dedication to them in the 1950s. *The Canning Age* ran an article on modernization in every issue providing examples of the newest cannery layouts and latest equipment. While the push for modernization and technological change in the industry often involved attempts to sell equipment, it also expressed a hope for a better future after the sacrifices and lean times of the Great Depression and the war years. Yet, despite such public expressions of confidence, canners and growers still feared the economy might return to recession or depression after the war, as did many Americans. After the tumult of war and years of unpredictability and government intervention, the canners once again sought order in their markets, canneries, and orchards.

Despite such desires, the 1950s constituted a new era with fresh challenges for the fruit canners. Consumption of canned fruit continued to increase as is indicated in Chart 5.1, and new product ideas held the promise of even more customers. Canned fruits finally had become a staple of the American diet. At the same time, war industries had contributed to the socioeconomic transformation of northern California, drawing many emigrants to the state and altering the economy. The state's population increased 53 percent between 1940 and 1950. Economic and social transitions in the state, in turn, radically altered resource use and sparked new contests over access to those resources. In many regions, orchard land had more economic value for homes and subdivisions than

¹ O'Connell & Associates, *Report on Problem of Disposal of Processing Waste and Presentation of the Facts Relating to the California Fruit and Vegetable Canning Industry*, October 7, 1948, 13.

for fruit production. Finally, more Californians began to value waterways as important sources of recreation and wildlife habitats in addition to rivers' traditional value as sources for navigation, drinking water, and industrial waste disposal, adding to already intense contests over water rights.

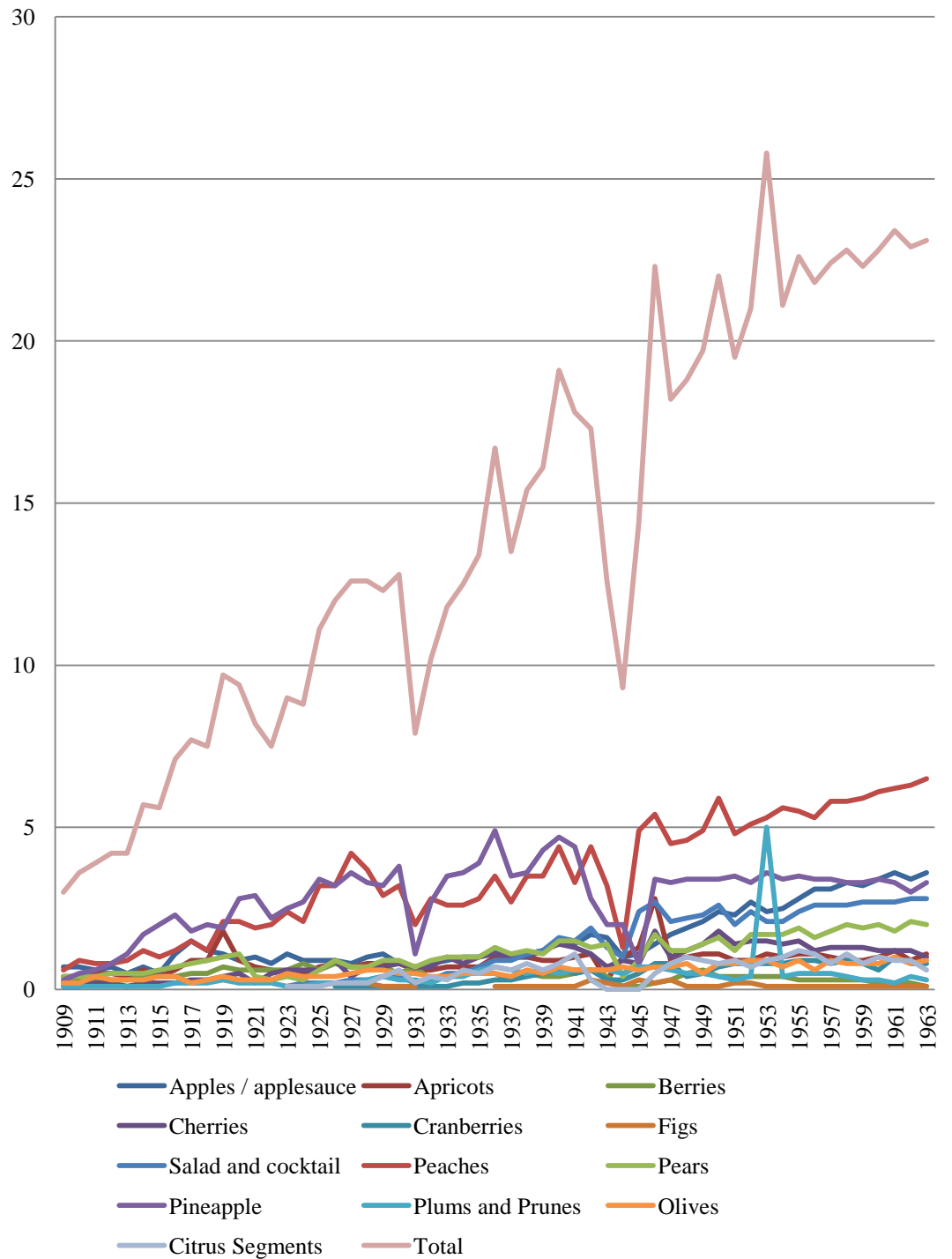
As canners adjusted to these trends, they reasserted their importance in postwar northern California. They often did so by describing their economic impact, but William O'Connell, a sanitary engineering consultant, went one step further by describing the canneries as the "kitchens of the nation" in a report advocating the commercial fruit canning industry's importance to California and its need for a large share of water rights. He explained that Americans had come to rely on processed foods prepared in California rather than take on the task of preparing them at home. Thus, canners required the share of resources allocated for kitchens across the nation.² His argument illustrated fundamental shifts in labor, energy, and resource usage that occurred in America by mid-century and directly affected food production. An expert on how industries employed resources, O'Connell participated in various political contests in California over water rights, sewage disposal, and industrial land use. However, it is uncertain that O'Connell fully understood the broad ramifications of postwar trends for the fruit canning industry when he made the above statement. During the 1950s and the early 1960s, California canners enjoyed the benefits of pre-war organization and focused on expansion in markets, mechanization, and product lines. These years were in many ways the heyday for California's canners because by the end of the 1960s consumers and environmentalists began to oppose the impacts of industrial food production on both the

² Ibid. O'Connell & Associates, *Report on Problem of Disposal of Processing Waste and Presentation of the Facts Relating to the California Fruit and Vegetable Canning Industry*, 13.

American diet and the environment. The two decades following World War II, were a time of mechanization, high production, and expansion, and while this brought success to the canning industry overall, it distanced some canners from their connection to the environment and economy of northern California.

Table 6.1 - Canned Fruit Per capita Consumption, 1909-1963

From Data in Appendix D (in lbs)



Transitions in the 1950s

The physical, economic, and social impact of rapid suburbanization after the war had an enormous impact on commercial fruit canning in northern California, driving changes in management, production, and even location. After the economic deprivation of the Great Depression and the domestic sacrifices of war years, the idea of a home and a yard for everyone pulled people in droves into small towns and suburban developments across America. Developers subdivided former farmland into lots and new methods of mass building quickly turned out cookie cutter neighborhoods.³ This phenomenon began in Levittown, New York, and quickly reached northern California as rows of new homes replaced orchards in California, especially around the San Francisco Bay and the city of Los Angeles.

As population increased rapidly in the northern California, especially in cities surrounding around the San Francisco Bay, the canning industry began moving farther away from the Bay Area that was once its center. Santa Clara County had been a highly concentrated food processing area through World War II, but as new industries, such as the shipbuilding, electronics, and aeronautics came to dominate the Bay Area, agriculture and food processing decreased during the 1950s. Food processors began to move east to the Central Valley, a drier, warmer climate, where land was less expensive. It took

³ Rome, *The Bulldozer in the Countryside*. Historian Adam Rome discusses the environmental consequences of rapid suburban building in *The Bulldozer in the Countryside* arguing that the design of new construction methods that began in Levittown, New York increased economies of scale. This made the dream of home ownership attainable to more Americans.

decades for Silicon Valley to emerge near San José and almost completely replace the orchard communities, but a new socioeconomic base took root in the area after the war.⁴

As San José became suburban, Oakland became more industrial. Industries begun during the war became part of the military-industrial complex that developed around the Bay area and provided new opportunities for the city and its residents. Migration from other states during the war changed the social makeup and culture of the city. After the war, employers laid off unskilled workers who had been essential to the industries, such as shipbuilding, during the conflict. The rapid expansion of the city's population during the war had created an urgent need for housing that remained unresolved. Temporary housing built by federal war agencies partially filled the need, but the housing crunch lasted much longer than the original builders had intended and people used the structures for many years. Cultural enclaves segregated the city and conflict increased between older and newer residents.⁵ Despite these developments, canneries remained because of Oakland's transportation advantages. Four Calpak canneries remained, plus one for Dole and four smaller operations.⁶ In San José and Oakland, the economy was changing rapidly and new companies required access to the many of the same resources as canners, such as water and an output source for pollution. The newer, more traditional industrial manufacturing companies hired many people and brought millions into the economy of

⁴ Yvonne Jacobson, *Passing Farms, Enduring Values: California's Santa Clara Valley*, 2nd ed. (Cupertino, CA: California History Center, De Anza College, 2001), 225–239; "Search for New Apricot Land," *Del Monte Shield*, September 1959; Starr, *California*, 238–270.

⁵ Marilyn S. Johnson, *The Second Gold Rush - Oakland and the East Bay in World War II* (Berkeley: University of California Press, 1996), 235–239, <http://EV7SU4GN4P.search.serialssolutions.com/?V=1.0&L=EV7SU4GN4P&S=JCs&C=TC0000242816&T=marc>, (accessed October 21, 2012); "The East Bay part 1," *Del Monte Shield*, July 1956; "The East Bay part 2," *Del Monte Shield*, August 1956; Roger W. Lotchin, *Fortress California 1910-1961: From Warfare to Welfare* (New York: Oxford University Press, 1992), 173–205.

⁶ R. L. Polk & Co, *Polk's Oakland (California) city directory* (Oakland, Calif. : R.L. Polk & Co., 1928), 171, <http://archive.org/details/polksOaklandcali1967rlpo>, (accessed October 21, 2012).

the region. It became difficult for the canning industry and agriculture to provide the same economic return. As a result, the priority of agriculture and food processing in resource use contest lowered consistently. Land prices rose too high for canners to afford to expand, even if they could find room in the increasingly dense cities to build.

Ironically, just as new suburban communities altered the landscape and socioeconomic profile of the Bay Area, often forcing out orchards and canneries, suburban communities across the United States provided a growing number of customers for the canning industry. Suburban homes pre-wired for electricity quickly dominated a domestic landscape ready to power new home appliances, especially in the kitchen. Once considered a luxury, refrigerators and freezers became standard equipment for most homes. Advertisements for new post-war houses showed rooms full of machines that helped women take care of tedious home tasks, such as laundry, dishes, carpet cleaning, and even cooking.⁷ The modern kitchen depended on electricity to run the many conveniences that changed the way families behaved, particularly in regards to cleaning and food preparation. The eating habits of Americans in the 1950s and 1960s also changed to reflect the modern kitchen.

In the 1950s, cannery companies sought to expand their markets by creating new products for the United States and increasing distribution in other countries. New mass media options amplified canners' message to consumers. Calpak president, Alfred Eames Jr., explained in an internal speech that the two things the company contributed to the canning industry were "uniform quality and mass-marketing."⁸ Calpak ran its first

⁷ Rome, *The Bulldozer in the Countryside*. The many problems with sewage systems is discussed more fully in the next chapter.

⁸ Alfred W. Eames Jr. and Richard G. Landis, "The Business of Feeding People: The Story of Del Monte Corporation" (The Newcomen Society, 1974), 8.

national advertisement in the April 17, 1917 issue of the *Saturday Evening Post*. The understated ad offered a simple introduction of the company to America. The New York City-based McCann-Erickson advertising agency selected the only text in this initial ad, “California’s finest canned fruits and vegetables are packed under the Del Monte brand.” Along with the text was a large image of the Del Monte Shield. The company was impressed enough with the strategy that it continued to use McCann-Erickson through the 1970s. Early advertisements emphasized the “grown in California” theme, but this slogan faded as the company expanded production into other states and countries, and, not surprisingly, patriotic themes became more prominent during wartime. However, the persistent emphasis of the advertising strategies encouraged consumers to associate the Del Monte brand and its trademark shield with consistent quality.⁹

Rigid middle class gender roles in post-war America also influenced advertising in the 1950s. Society’s expectation of women’s lives required a high degree of domesticity, even though thousands of women had been a vital part of the workforce during the war.¹⁰ A plethora of time-saving home appliances and gadgets helped contribute to the new standards for women’s role in the home, especially for the growing middle class. In the past, middle-class women had servants to help them with household chores. The introduction of home appliances were supposed to save so much time that women could do everything themselves. However, public knowledge of germ theory placed the responsibility for the family’s health with the mother, requiring new and

⁹ Ibid., 10–11; “It Began with a Page in the Post,” *Del Monte Shield*, January 1960; “New Del Monte Advertising Campaign Announced,” *Del Monte Shield*, October 1949.

¹⁰ Sara M. Evans, *Born for Liberty: A History of Women in America* (New York: Free Press, 1989), 229–234.

higher standards of cleanliness in the home.¹¹ The expectations of cleanliness rose as women had less help. Cooking also became a defining factor of a woman's identity in addition to the role of motherhood and social engagement. At the same time, more middle-class women were entering the workforce joining many working class women and had to juggle their jobs with society's idealized vision of womanhood.¹²

The food processing industry looked at the complex pressures on women in this era and launched massive marketing campaigns encouraging them to adopt more processed food products to save time and make cooking more convenient.¹³

Advertisements, radio shows, and cookbooks advised women to throw together some cans of meat and vegetables for a casserole, and then, for dessert, decoratively place canned fruit on a cake made with premixed cake mix and frosted with whipped cream. Advertisers focused on presentation rather than sophisticated tastes. Mayonnaise and whipped cream became very popular during this time.¹⁴ Americans began to accept processed and more convenient foods; the flavors of America's culinary factories permeated many dishes and redefined the taste of American food. As the adoption of processed foods soared, the labor and waste of cooking shifted from the home to the factory. This transference, in combination with systemic changes in grocery distribution

¹¹ Susan Strasser, *Never Done: a History of American Housework*, 1st ed. (New York: Pantheon Books, 1982), 243–281; Evans, *Born for Liberty*, 234–254; Suellen M Hoy, *Chasing Dirt: The American Pursuit of Cleanliness* (New York: Oxford University Press, 1995), 167–173; Nancy Tomes, *The Gospel of Germs: Men, Women, and the Microbe in American Life* (Cambridge, Mass: Harvard University Press, 1998).

¹² Evans, *Born for Liberty*, 243–285.

¹³ Hoy, *Chasing Dirt*, 167–173; Elaine Tyler May, *Homeward bound: American families in the Cold War era*, Fully rev. and updated 20th anniversary ed. (New York, NY: Basic Books, 2008), 162–182; Strasser, *Never done*, 242–281; Laura Shapiro, “‘I Guarantee’: Betty Crocker and the Woman in the Kitchen,” in *From Betty Crocker to Feminist Food Studies: Critical Perspectives on Women and Food*, ed. Arlene Voski Avakian and Barbara Haber (Boston: University of Massachusetts Press, 2005), 29–40; Harvey A. Levenstein, *Paradox of Plenty: A Social History of Eating in Modern America*, Rev. ed., California studies in food and culture (Berkeley, CA: University of California Press, 2003), 80–100.

¹⁴ Shapiro, *Something from the Oven*.

and marketing in America, redefined previous relationships with food and the environment. Consumers no longer had direct relationships with suppliers of local wares, such as the butcher or truck farmer. Instead, the grocery store manager was their connection to food.¹⁵

Food came from farther away aided by advances in transportation and refrigeration technologies. Highways helped facilitate the rise of trucking which opened new possibilities for distribution and reorganized Americans' perceptions of space as much as railroads had years before.¹⁶ The railroad industry had been somewhat crippled during World War II after decades of dominance and power. Trucks provided more flexible routing and delivery. Construction of the interstate highway system, one of the greatest public works projects in history, expanded existing state highway systems and created millions of miles of smooth straight paved roads that provided quick access between cities.¹⁷

New energy sources fueled suburbanization and post-World War II American culture. Along with transportation advances, the use of electricity in America increased after the war. Expansion of urban electric utility companies and New Deal hydroelectric dams and electrification programs had brought electricity into many homes across America. The electric home appliances industry that emerged in the 1920s continued expanding so many household tasks became easier and more effective with electricity, or so the manufacturers claimed. Vacuum cleaners, laundry machines, coffee makers,

¹⁵ Vileisis, *Kitchen Literacy*, 160–196; Shane Hamilton, *Trucking country: the Road to America's Wal-Mart Economy*, Politics and Society in Twentieth-Century America (Princeton: Princeton University Press, 2008), 69–134; Vileisis, *Kitchen Literacy*.

¹⁶ John R. Stilgoe, *Metropolitan Corridor: Railroads and the American Scene* (Yale University Press, 1985); Stephen B. Goddard, *Getting There: The Epic Struggle between Road and Rail in the American Century* (Chicago: University of Chicago Press, 1996); Hamilton, *Trucking country*.

¹⁷ Hamilton, *Trucking country*; Owen D. Gutfreund, *Twentieth Century Sprawl: Highways and the Reshaping of the American Landscape* (New York: Oxford University Press, 2004).

radios, and televisions invaded homes as Americans used more and more electricity in their daily lives.¹⁸ Thousands of new food products emerged during this time as new children's and suburban family markets with high consuming power many of them. Radio programs and the new marvel of the television brought advertising campaigns into the home extolling the virtues of frozen foods, canned foods, children's cereals, cleaners, and beauty products.¹⁹ These new media outlets created both opportunities and competition for fruit canners. Larger canning companies extended their production to include frozen foods while still increasing canning production.

The market for frozen foods grew rapidly after 1946, but food scientists had been trying to perfect the method for decades before that. One of California's leading food scientists, William Cruess, studied frozen foods as early as the 1920s. He and his colleagues at the University of California, Berkeley, tried to find the best technology and method for freezing and maintaining the quality of frozen fruits and vegetables. The problem was that there were inconsistent results. The texture of frozen foods in some experiments was similar to lightly cooked food, at other times the foods were very mushy. Sometimes the foods tasted off-flavor as well. Testers could not describe exactly what was different, just that it was not right.²⁰ During World War II, the military was an early adopter of frozen foods as it constantly sought ways to provide fresh food to troops on the move. Military research on freezing during the war advanced the frozen food

¹⁸ Ronald C. Tobey, *Technology as freedom: the New Deal and the electrical modernization of the American home* (Berkeley: University of California Press, 1996); David E. Nye, *Consuming Power: A Social History of American Energies* (Cambridge, Mass: MIT Press, 1998).

¹⁹ Marchand, *Advertising the American Dream*; Susan Strasser, *Satisfaction Guaranteed: the Making of the American Mass Market*, New ed. (Washington, D.C. : Chesham: Smithsonian Institution ; Combined Academic, 2004), 163–202.

²⁰ Ruth Teiser, "A Half Century In Food and Wine Technology An Interview with William V. Cruess," Interview Transcript (Berkeley, CA, 1967), 68–79, UC Berkeley Regional Oral History Office.

industry, particularly in meat.²¹ Another contributor to the development of the process that particularly benefitted fruits and vegetables was Clarence Birdseye, an entrepreneur that developed a way to preserve fish reliably through freezing. His experiments led to the quick freeze method that by 1924, finally created a reliable way to create a frozen vegetable and fruit product that consumers enjoyed.²²

Historians debate which appliance had the most impact on everyday life, but for the food industry it was the refrigerator, particularly the freezer. The ability to freeze food was as significant a development in the history of food preservation as canning had been almost two centuries earlier. Frozen food allowed consumers access to fresh foods year round. The problems with the initial methods of creating frozen food were retaining quality and finding a consumer market. Just as it took time for the self-service model of grocery stores to develop, the creation of a frozen food distribution system was also necessary. Grocers needed display freezers; distributors needed additional cold warehouse spaces and refrigerated trucks. Consumers needed bigger freezers. The freezer section of early refrigerators was only large enough to hold an ice tray. The freezer section of the refrigerator got larger with push from the frozen food industry and consumers.²³ In 1946, consumers were eating 610 million pounds of frozen foods a year. By 1963, that number more than doubled.²⁴

The postwar consumer boom and introduction of new technologies contributed to changes in the way canners operated. The quest for increased efficiency and production

²¹ Fisher and Fisher, *Food in the American Military*, location 2152–2887.

²² Mark Kurlansky, *Birdseye: The Adventures of a Curious Man*, 1st ed. (New York: Doubleday, 2012), 140–146.

²³ Cruess, *Commercial Fruit and Vegetable Products; a Textbook for Student, Investigator and Manufacturer*, 689–692.

²⁴ Economic Research Service, *U.S. Food Consumption: Sources of Data and Trends, 1909-1963.*, Statistical Bulletin (U.S. Department of Agriculture, 1965), 130, CSUS Government Documents.

levels along with new products, such as frozen foods, required new machinery and factory reorganization. Canneries achieved new levels of mechanization throughout the 1950s. Peach pitting machines and peach peelers, for example, dramatically reduced the processing time for clingstone peaches. In 1947, the Tri Valley Packing Association invested six thousand dollars with Food Machinery and Chemical Corporation to develop a dependable peach pitter that could remove the pit from the gripping flesh of clingstone peaches without mangling the peach. Six thousand dollars was a substantial sum to spend on experimentation by a cooperative. The experiment did not work out to but TVPA had leased 124 pitters for 5 years from the newly formed Atlas Diesel Engine Corporation that specialized in fruit processing equipment. By 1955, the Filper Pitter, produced by the Filper Corporation, was even more effective at separating the peaches into halves and removing the pits.²⁵ Conveyor belts became more common throughout the cannery reducing the need for humans to push products and materials around on trolleys throughout the cannery. Changes in warehouse layouts accommodated forklifts, each rows of shelves or stacked products had more room surrounding it, and floors were made or refitted with concrete strong enough to hold the machines.²⁶

Refrigeration and faster transportation also contributed vitally to expansion of cannery production and grower distribution. While canning had always been a way to beat nature's clock and preserve as much of the harvest as possible, refrigeration made the process easier by increasing storage time between field and factory. Cold warehouses gave canners more time during the frantic annual pack by slowing the ripening of the fruit until the cannery processed it. Faster trucks and updated refrigerated trucks made it

²⁵ Tri/Valley Growers, "Tri/Valley Growers 50 years of survival and growth 1932 - 1982," 13, 19.

²⁶"New Wrinkles for Prunes," *Del Monte Shield*, November 1950.

possible to deliver fruits and vegetables from areas farther from the cannery. Cold storage and these improved trucking options increased flexibility during the pack and made new factory locations feasible. Rapid land use changes in northern California, especially in the Bay Area, caused canners to rethink cannery placement and flexibility of trucking systems and cold storage provided the means to ability to change the older location strategies. A shift in strategy was necessary, as older urban canneries that found themselves surrounded by new development were often unable to expand facilities and thus could not incorporate new equipment or accommodate higher levels of production. Also, the canners were farther from the orchards, increasing transportation costs. Orchards had crept away from the urban, industrial Bay Area to the Central Valley.

The impact of canneries in northern California is apparent in the increase of production of canning crops, such as clingstone peaches. The bearing acreage of clingstone peaches increased over thirty-three percent from 1945 to 1970. The canners provided a steady dependable market for growers.²⁷ Modernization of orchards management occurred concurrently with cannery improvements. Increased use of science and technology to control the production of quantity and quality of fruit in the orchard pushed farmers across America to try new techniques that produced greater yields per acre than ever before in history. California growers invested in the newest technology and had faith in science would solve the problems that had plagued them for decades, such as insects, poor soil, inconsistent return, plant diseases, and unpredictable weather. While these methods did produce more fruit, they were expensive and had

²⁷ California Crop and Livestock Reporting Service and USDA Agricultural Marketing Service, *California Fruit and Nut Crops: 1909-1955*, .; California Crop and Livestock Reporting Service and California Crop & Livestock Reporting Service, *1970 California Fruit & Nut Acreage*, Special Publications 261 (Sacramento, California, 1971).

unforeseen consequences even if they did increase production and product perfection.²⁸

The new techniques were expensive and required a heavy capital commitment. The increasing amount of investment in the orchard every year made it more difficult for smaller growers to compete and they sold their land to suburban builders or other growers.

Unlike the wheat fields of the Great Plains and Midwest, deciduous fruit orchards had largely resisted mechanized harvesting because of the difficulty of the harvesters machinery in the environment of the orchard. Before the efforts to mechanize the harvest began, agricultural laborers picked fruit by hand in the orchard and placed in a standardized cannery lug box. The lug boxes were then loaded on trucks and taken to a drop point or the cannery. From there, the fruit was graded and weighed, then moved on for cleaning and processing. By the 1950s, growers began to try for a more complete mechanization of the orchards to help during the harvest. The first step in mechanizing the orchards was to use tractors specially made for maneuvering through orchards, which began in the 1920s. The next step the canners and growers made toward mechanization was to reduce the amount of heavy lifting required, and thus decrease the amount of laborers required. Growers installed a rolling mechanism on the bed of their farm truck. The grower's workers would load the truck stacking the lug boxes up several feet high on the rollers. When the grower got to the distribution point or cannery, he backed up his truck to the cannery's roller mechanism and slid the lug boxes from his truck to the

²⁸ Stoll, *The Fruits of Natural Advantage*. Stoll explains the early acceptance of pesticides by growers and argues that the University of California and the state created a culture of acceptance for the chemicals without encouraging other methods of insect control. The use of pesticides in America before WWII is covered well in James C. Whorton, *Before Silent Spring; Pesticides and Public Health in Pre-DDT America* (Princeton, N.J: Princeton University Press, 1975).

cannery's conveyor setup. This eased the process of fruit delivery during a very busy and hot time of the year.²⁹

The Tri-Valley Packing Association expanded its facilities in northern California during the 1950s and 1960s to compete with the high production of other canneries during the decade. After World War II, it became obvious that it would be very difficult for small canning companies or cooperatives to survive in the new agribusiness environment. Postwar distribution systems favored large companies over smaller ones because the larger companies could produce more goods for lower prices and had better marketing personnel. By buying smaller canneries in the Central Valley and ultimately consolidating its manufacturing strength there, TVPA gained more control over the crops and processing in the region. They processed more raw materials and diversified crops, expanding into tomato canning, for example. This diversification extended the length of the pack because different fruits or vegetables were ready for harvest at varying times. The short packing season had been problematic for the industry since its inception. As canners invested more in technology after the war, idle equipment reduced their return on the investment in it, and therefore crop diversification was a necessity. In 1956, TVPA purchased Aron Canning between Stockton and Lodi. The Aron Canning tomato processing plant increased the cooperative's canned tomato production, allowed the cooperative to move tomato processing to the Central Valley, and relieved the overcrowding at its San José cannery. A year later, the cooperative purchased Mor-pak, which processed deciduous fruits and olives. In 1959, Bercut-Reynolds canning

²⁹ "At Calpak's Peach Receiving Stations They're Delivering the Goods," *Del Monte Shield*, September 1953.

company approached the TVPA and it became part of the growing cooperative.³⁰ These few years of acquisition greatly expanded to production capacity of TVPA. It also moved the concentration of their business to the Central Valley and away from San José.

A large group of small canners formed another cooperative in 1957, creating California Canners and Growers (Cal Can). The new cooperative consolidated several influential canners including Richmond-Chase and Filice Perrelli. Most of the company's facilities were in the Central Valley; it produced peaches, pears, apricots, tomatoes, and asparagus.³¹ Not long after the company's creation, TVPA, TVG, and Cal Can began to meet to discuss strategies for dealing with the growers' bargaining associations. As a result, they created CT Supply Company, a can manufacturing company located in Modesto. By pooling resources rather than purchasing a facility from a major can company, TVPA, TVG, and Cal Can saved over a million dollars in the first few years of the can company's operation.³²

Expansion in the 1960s

In January 1949, Calpak's company magazine, *Del Monte Shield*, printed a map showing its holdings. The company operated sixty-eight plants in eleven states and received raw materials from seven. (see Table 5.2 for details) The company had a brokerage or sales office in all but six of the forty-eight continental states. The company had moved far beyond being a representative of California agricultural interests only. Calpak expanded beyond North America into the Philippines in 1926, creating, Philpak. The company began operating in 1930 producing pineapples exclusively. The company did well, but the Japanese seizure of the islands during World War II left the factory and

³⁰ Tri/Valley Growers, *Tri/Valley Growers: History, Development, and Operations* (The Staff of the Joint Committee on Taxation, U.S. Congress, 1970), 5; Tri/Valley Growers, "Tri/Valley Growers 50 years of survival and growth 1932 - 1982," 19-22.

³¹ "Sutter County Man Heads New Grower Coop," *Modesto Bee*, October 19, 1957.

³² Tri/Valley Growers, *Tri/Valley Growers: History, Development, and Operations*, 6; Tri/Valley Growers, "Tri/Valley Growers 50 years of survival and growth 1932 - 1982," 20-21.

pineapple fields in ruins. During the 1950s, after Filipino independence, Philpak remained in the islands, restored operations, and even increased production. At the time, Calpak was already a large food processing company, yet it still had plans for expansion of production and markets into other countries.³³

Table 6.2 California Packing Operations June 1949³⁴

	Plants	Orchards / Farms	Warehouses/ Supplemental	Commodity
California	14	8	11	Apricots, cherries, figs, fruit cocktail, fruits for salad, peaches, spiced peaches, pears, stewed prunes, asparagus, carrots, green beans, new potatoes, spinach, chili sauce, pickles apricot nectar, pear nectar, prune juice, tomato juice, dried fruits, raisins, anchovies, sardines
Florida	1			Grapefruit, grapefruit juice, orange juice, blended orange and grapefruit juice
Idaho	1		1	Green beans, peas
Illinois	4	2	1	Corn, peas, lima beans, pumpkin
Minnesota	2	2		Corn, peas
New Jersey	2		1	Stewed prunes, asparagus, tomato

³³ "The Philippine Packing Corporation," *Del Monte Shield*, February 1949; Braznell, *California's Finest*.

³⁴ "Location of C.P.C. Operations," *Del Monte Shield*, January 1949; "Map Showing the Location of California Packing Corporation Operations," *Del Monte Shield*, June 1951; Braznell, *California's Finest*, 162–167. California Packing Company was born on the Pacific Coast. At its formation, it included companies and processing facilities in California, Hawaii, and Alaska. Newly created Calpak formed Utah Packing Corporation in 1917, a year after its own creation. The move to the Midwest occurred in 1926 with the purchase of Rochelle Canneries in Illinois. Within a few years, the company also moved into Minnesota and Wisconsin. This expanded the vegetable packing capabilities of Del Monte by adding peas, corn, and more tomatoes to the company's lineup. Right after World War II, the company began building in Crystal City, Texas, its first foray into the South. The company mostly contained its production facilities to the West and Midwest and when the company established a foothold, it often grew its facilities in the same region. The exception was the few canneries in the South and New Jersey. Del Monte's expansion from California, Hawaiian, and Alaskan canneries also broadened the company's impact on the communities in which it operated. The *Del Monte Shield* began to run a series of articles on Del Monte communities starting in 1953 that continued for almost a decade. Each article was three to seven pages long with images and descriptions of the city in which Del Monte had facilities. Often the theme includes the benefits of the company to the town.

				puree, tomato sauce, catsup, prune juice, tomato juice
New York	1			Coffee
Oregon	1	1	2	Plums, beets, carrots, green beans, pumpkin
Texas	1	1		Spinach, green beans, beets
Utah	5	1		Corn, green beans, lima beans, sauerkraut, tomatoes, tomato puree, tomato sauce, catsup, tomato juice
Washington	4	1	1	Berries, cherries, Elberta peaches, pears, plums, asparagus, corn, lima beans, berry juices, peach nectar, pear nectar, salmon
Wisconsin	1	1		corn, lima beans, peas, sauerkraut
Alaska	8			salmon
Hawaii	1	2		pineapples, pineapple juice
Philippines	1	1		pineapples, pineapple juice

Calpak's research on consumer trends in the 1940s indicated that the American market was reaching its peak. California's canners had always enjoyed an international market, but after World War II, they moved quickly to expand it. Even medium volume canners, such as Tri Valley Packing Association, tested the waters of foreign expansion.³⁵ The trend of modernization reached around the globe, and countries outside Europe and the United States attempted to achieve Western-style standards of living. As American food trends drifted across oceans to other countries, American food processors followed.³⁶

³⁵ William Allewelt, "Spokane Bank for Cooperatives Annual Meeting", 1965, 5.

³⁶ Braznell, *California's Finest*, 162–167; "South African Pictorial," *Del Monte Shield*, August 1960; "South of the Border," *Del Monte Shield*, August 1960; "New 'Calpak' announced for Italy," *Del Monte Shield*, January 1961; "Calpak Announces New Subsidiary in Japan," *Del Monte Shield*, July 1963; "A New Nectar pack in Venezuela," *Del Monte Shield*, September 1960; "Foreign Production Score Board," *Del Monte Shield*, September 1960.

Calpak did not expand again until 1956, but Calpak rapidly acquired production facilities across the world in the 1960. Operations canning tomatoes in Italy began that year, and Calpak acquired a sixty-five percent share of Canadian Cannery Limited, located in Hamilton, Ontario. By 1965, the company was packing peaches in South Africa, opened Productos de Monte in Mexico for pineapple growing and canning, completed a tuna cannery in Puerto Rico, and created Japan Calpak. The products of these companies were mostly for international markets.³⁷ In 1967, California Packing Company assumed the name of its premiere canned goods brand, Del Monte. At the same time, Del Monte acquired non-canning companies to diversify its revenue stream. Granny Goose Snack Products, which manufactured potato chips, pretzels, and snacks, was one of its first acquisitions.³⁸ The company added Service Systems Corporation to its holdings in 1967. Service Systems added institutional services, such as cafeterias, vending, building maintenance, and security, to Del Monte's many operations. That year Del Monte also purchased O'Brien, Sportorno, and Mitchell, a frozen foods company, which had manufactured the frozen foods eaten by Apollo 11 astronauts while they were in quarantine in 1969.³⁹ One year later, the company purchased West Indies Bananas, entering the competitive, commercial banana business for the first time.⁴⁰

As Del Monte moved food factories out of San Francisco and other busy urban centers, such as San José, the company utilized the land canneries had once inhabited to create enterprises that took advantage of the changing real estate market in northern

³⁷ "Calpak Announces New Subsidiary in Japan"; "South African Pictorial"; "Productos Del Monte," *Del Monte Shield*, January 1968.

³⁸ Eames Jr. and Landis, "The Business of Feeding People: The Story of Del Monte Corporation," 14; "My Name is Granny Goose," *Del Monte Shield*, April 1966.

³⁹ "Mission to the Moon," *Del Monte Shield*, July 1969. Del Monte dried fruits were available as snacks on the *Columbia* and *Eagle*.

⁴⁰ Eames Jr. and Landis, "The Business of Feeding People: The Story of Del Monte Corporation," 14; "The Business of Bananas," *Del Monte Shield*, Summer 1971.

California. The company's very first factory had been located near the wharves in San Francisco. In 1936, Calpak stopped producing canned goods there, and it became a warehouse. In 1963, Leonard Martin, a lawyer in San Francisco, purchased the warehouse and converted it into a multi-use facility, The Cannery, that housed restaurants and shops at Fisherman's Wharf.⁴¹ Del Monte used this concept in Monterrey turning its factory space into a dining and shopping complex on Cannery Row, a popular tourist attraction due in part to John Steinbeck's novel, *Cannery Row*. In West Sacramento, cannery land became a suburban development. In industrial Oakland, Del Monte used a different strategy, expanding terminal and warehouse spaces so that they were large enough to facilitate trucking companies with a national distribution system.⁴²

During the 1960s, questions arose about the ability of cooperatives to survive in this new era of big agribusiness. William Allewelt, a long-time executive for Turlock Growers and Tri/Valley Growers (TVG) and later a charter member to the board of the University of California (Davis) Agricultural Issues Center, often spoke openly about the future of cooperatives and the state of the economy. In 1962, he gave a speech titled "Can and Will Cooperative Marketing Survive," at a symposium on California agriculture held at the University of the Pacific. He concluded that it could, but added that the cooperatives needed to fundamentally change the way they operated to survive. The intriguing part of his paper was that he argued that the purpose of cooperatives in the 1960s was to represent California growers. Large canners, such as Del Monte, gathered

⁴¹ "Leonard Martin -- opened S.F.'s famed Cannery," *SFGate*, n.d., <http://www.sfgate.com/news/article/Leonard-Martin-opened-S-F-s-famed-Cannery-3326751.php#src=fb>, (accessed November 9, 2012).

⁴² Eames Jr. and Landis, "The Business of Feeding People: The Story of Del Monte Corporation," 14; "Plant No. 1 Revisited," *Del Monte Shield*, April 1969; "The Business of Bananas"; "The Living Earth," *Del Monte Shield*, November 1965; "Our Landed Assets go to Work," *Del Monte Shield*, Winter 1971.

produce from so many locations that it gave the company an advantage in bargaining with California growers because they could get produce from other sources. In addition, the company was so large that did not provide many opportunities for California growers to sell their crops. The presence of an alternative market was vital in California.⁴³

One can see the influence of Allewelt's suggested strategy in the growth and diversification of TVG, created by the merger of Tri Valley Packing Association and Turlock Growers in May 1963. Turlock Growers operated in the Central Valley not far from TVPA. At first in 1962, the two cooperatives discussed sharing facilities to decrease costs. Over time, the talks evolved into potential combination. The result was the combination of producing power from larger base of growers. After the merger, Tri/Valley Growers operated five canneries between the Central Valley and San José.⁴⁴

A key acquisition for TVG came only two years after the merger. TVPA had packed olives in San José for years, although it was not a major division of the cooperative. Despite the size of TVPA's olive operations, they still competed with other California olive processors, such as Oberti Olive Company operating in Madera. When executives at TVG heard the Obertis wanted to sell their business, they thought the purchase would allow TVG to increase its current olive production. The purchase of the Oberti also allowed TVG to move its olive facilities out of the old San José cannery. The company added thirty-six new storage tanks in anticipation of increased production. The Obertis continued to work with TVG because their expertise was valuable in expanding TVG's olive production and increasing the quality of the products. TVG executives

⁴³ William Allewelt, "Can and Will Cooperative Marketing Survive?" (presented at the Symposium on California Agriculture, University of the Pacific, 1962).

⁴⁴ Tri/Valley Growers, *Tri/Valley Growers: History, Development, and Operations*, 5; Tri/Valley Growers, "Tri/Valley Growers 50 years of survival and growth 1932 - 1982," 24-25.

believed that the olive market was going to expand, and they wanted a bigger share of it. With the addition of Oberti, TVG now had high production capacity for tomatoes, peaches, and olives, three of the major fruit crops in northern California.⁴⁵

The increased production capacity of the canneries influenced the growers to raise their production levels as well. Continuing the trend with the industrialization of the orchards begun before World War II, growers used more machinery and science to solve problems in the orchards. Using pesticides to manage orchard pests became more prevalent after World War II, and as a result so did consumer and public health officials' concern over their effect on preserved food. Environmental historians have argued that America's rapid adoption of agricultural chemicals in the twentieth century came from warfare and military research. By World War II, the use of chemicals in wartime had increased dramatically, and from the war came pesticides converted for use in domestic markets.⁴⁶ At first, the pesticides seemed to offer modern miracles, but a darker side soon became apparent. In 1959, shortly before Thanksgiving, there was a national food scare over cranberries that the FDA suspected were exposed to aminotriazole, a pesticide that the FDA found was carcinogenic. Cranberry growers had been using the pesticide for several years before the FDA's decision about it in May 1959. By that time, the entire crops of 1957 and 1958 were in storage or in the food processing network. While cranberry growers expected leniency given the huge losses they would face from the loss of so many cranberries, the FDA gave them nothing and began to seize and test cranberries from the 1957 crop. The 1958 crop went untested until 1959 when the FDA

⁴⁵ Tri/Valley Growers, *Tri/Valley Growers Annual Report 1967* (San Francisco, CA: Tri/Valley Growers, 1967), Box 1:Folder 86, William Allewelt; Tri/Valley Growers, *Tri/Valley Growers: History, Development, and Operations*, 6; Tri/Valley Growers, "Tri/Valley Growers 50 years of survival and growth 1932 - 1982," 26.

⁴⁶ Russell, *War and Nature*.

began using their new process for testing for aminotriazole residues. When the FDA discovered that some of the untested berries had been shipped, they issued a public warning in October 1959. This event caught the attention of California's canners and the entire food processing industry. It was the first time the FDA had provided such little leniency.⁴⁷ A few years later, new concerns, about pesticides generally and DDT in particular, found a national audience.

Although first developed in the late nineteenth century, DDT (dichlorodiphenyltrichloroethane) was first used as an insecticide in the 1930s and found great success during the war as a means to control malaria. DDT use in U.S. agriculture boomed after the war, but by the 1960s, some Americans began to question its far-reaching implications for human health and the environment. Rachel Carson's *Silent Spring*, published in 1962, sparked a national debate over the impact of pesticides on human health. Carson explained in language that most Americans could understand how the environment and humans were connected. She detailed the path by which chemicals traveled from the field to humans.⁴⁸ As awareness increased about the use of various chemicals on crops, consumers also asked about the effects of the chemicals on preserved food. Did removal of the skin remove all DDT? What happened to poisons if it remained preserved in the can? Labor advocates also were worried about how handling DDT-sprayed fruits affected cannery workers.

⁴⁷ Mark Janzen, "The Cranberry Scare of 1959: The Beginning of the End of the Delaney Clause" (Dissertation, College Station, TX: Texas A&M University, 2010), 84–100.

⁴⁸ Rachel Carson, *Silent Spring* (Boston: Houghton Mifflin, 1994); Russell, *War and Nature*, 165–235.

An article in September 1962, “The Supposed Poisons in Your Food,” appeared around the time of the publication of Rachel Carson’s *Silent Spring*. The article begins as follows:

To us in Calpak, as “insiders” in the food industry, some of the wild tales you hear about various harmful and poisonous substances in America’s food supply sound pretty ridiculous. But to many people, they don’t sound ridiculous at all – they sound frightening.

Here are some of the questions people ask – along with authoritative answers that may help you put at ease any worried friends who ask you about food safety.⁴⁹

The article continues with a question and answer format. To each question, the author presents what seems like authoritative evidence to disprove the concerns about pesticides. For example, the author writes that in fact, all foods are chemicals, implying that it is silly to be concerned about chemicals. Following that are statements issued from the state of California and the FDA that America’s food supply is safer than it had ever been. The article then explains that while some pesticides can be toxic, it is not the chemical, but the fault of a grower that causes the problem. The author even goes so far as to use a source, the Vice-President of Quaker Oats Dr. F.N. Peters, to debunk the concept of natural foods. Peters argued that humans had not eaten natural foods in thousands of years. The author repeats these tactics and arguments, chemicals are safe, all foods are chemicals, repeatedly with different examples.⁵⁰ A critical reader would argue that his experts, such as the Quaker Oats Vice President, are not as convincing as they should be, and the logic of the article glosses over the fundamental arguments made in *Silent Spring*.

⁴⁹ “The Supposed ‘Poisons’ in your Food,” *Del Monte Shield*, September 1962, 8.

⁵⁰ “The Supposed ‘Poisons’ in your Food.”

Unfortunately, few records exist within company archives that provide detailed examples of how other canners dealt with the public's fears of pesticide residues.⁵¹ However, the CLC did have a pesticide program that they revived in 1963, presumably in response to public reaction to *Silent Spring* and overall consumer awareness of the increased use and dangers of pesticides. The CLC pesticide committee provided canners and growers with information about approved pesticides and acceptable levels of use. They also created worksheets for growers to use to track pesticide treatments that canners increasingly required before accepting produce. Additionally, the CLC coordinated with other trade associations, the California Freezers Association, California Dried Fruit Association, California Olive Association, and the California Grape and Tree Fruit League, held public workshops for growers across the state to inform fieldmen about the latest rules and methods for pesticide use. The CLC also testified at California Legislature Interim Committee hearings discussing the need for state level pesticide control laws.⁵² While the CLC was overtly vigilant in monitoring pesticide use in order to prevent pesticide residues in canned fruit and vegetables, there is little mention of organic farming in any of the records available connected to the industry through 1970.

Increased pesticide use was not the only dramatic change to the orchards, in the 1960s peach growers began to experiment with mechanical peach harvesters. Labor cost was a major concern that influenced this decision. In 1963, much to the dismay of growers, the federal government chose to end the Bracero program at the end of growing

⁵¹ Even folders in the CLC collection labeled as Pesticides were empty.

⁵² M.A. Clevenger, "Executive Vice-President's Report 1964", March 17, 1964, Box 1, Folder 4, California League of Food Processors Collection; M.A. Clevenger, "Executive Vice-President's Report 1965", March 23, 1965, Box 1, Folder 4, California League of Food Processors Collection; M.A. Clevenger, "Executive Vice-President's Report 1966", March 22, 1966, Box 1, Folder 4, California League of Food Processors Collection.

season the following year. Growers had become dependent on the program during the labor-intensive harvest season. For more than 20 years, Braceros had picked fruit and moved lug boxes to trucks. Facing the loss of this inexpensive labor, growers considered significant investments in technology for mechanical harvesting.⁵³ Depending on the crop, mechanical harvesting could be a complex problem. Tomato harvesting experiments began in the early 1960s. The tomato harvesters also collected the fruits and sent it down a conveyor into a truck. However, unlike the pineapple plant, growers replaced tomato plants each year. The tomato harvester also ripped up the plant and discarded it during the sorting process. Even though the tomato was more delicate than the pineapple, the plant was expendable. New hybrid varieties of tomatoes developed by University of California, Davis combined with improvements to the machinery led to successful new harvesting techniques. In 1964, farmers mechanically harvested five percent of the tomato crops; only two years later, it was up to seventy-five percent.⁵⁴

The success with tomatoes led to experiments with peaches. Mechanical peach harvesting combined the challenges of pineapple and tomato harvesting because peaches have delicate skin and grow on trees. The process for mechanically harvesting peaches was potentially quite brutal for the tree. Unlike the tomato plant or other grain crops, for example, peach trees need to survive the harvest from year to year. In other methods of mechanical harvesting, the farmer essentially cleared the field, leaving behind nothing but mostly stripped plants. After the harvest, another farm machine came through and disced anything remaining back into the earth. Obviously, a similar method was impossible for an orchard. Consequently, the industry developed a peach harvesting

⁵³ "Are We Headed for Crisis on the Farm? Part 1," *Del Monte Shield*, August 1964; "Are We Headed for Crisis on the Farm? Part 2," *Del Monte Shield*, September 1964.

⁵⁴ Tri/Valley Growers, "Tri/Valley Growers 50 years of survival and growth 1932 - 1982," 27.

machine fitted with a large net. The machine shook the tree vigorously causing the peaches to fall into the net. A hole in the net fed peaches through a tunnel into a sorter that separated the culls (green peaches) from ripe peaches.⁵⁵ The fact that mechanization was possible with such a delicate fruit is a testament to agricultural engineering, and Tri/Valley Growers believed that this new approach did not have to decrease quality of the peaches harvested.⁵⁶ However, the growers' assumptions discounted an important human element. A skilled agricultural laborer was able to select from a peach tree the ripe fruits and then come back later to the tree as the green fruits ripened. The mechanical harvesting method was less discriminating and thus more wasteful. However, the industry concluded that the reduced cost of labor outweighed the loss of some fruit. Thus, mechanical harvesting focused on quantity and speed rather than quality and reinforced the idea that high levels of production in the orchard was the primary goal and needed to be achieved at all costs, including potentially reduced quality.⁵⁷

Another successful experiment in the 1960s resulted in a new product - fruit and vegetable powders utilized lower grades of fruits and vegetables. Experiments with spray drying began during the war and continued in industrial labs afterwards. The Western Regional Research Laboratory worked with the USDA to refine the process for commercial use. It involved atomizing the fruit into slurry then spraying it into a tunnel with hot, moving air. The slurry becomes a fine powder that vacuums sucked into collectors. The process worked eggs, milk and vegetables, but it took some time for

⁵⁵ Lloyd Lamouria et al., "Harvester for Canning Fruit," *California Agriculture*, August 1957.

⁵⁶ Tri/Valley Growers, *Tri/Valley Growers Annual Report 1967*, 4.

⁵⁷ Tri/Valley Growers, "Tri/Valley Growers 50 years of survival and growth 1932 - 1982," 28.

processors to find commercial uses for the powders.⁵⁸ Undertaken by TVG in the mid-1960s, the company built a plant in 1966 specifically for the process. The equipment arrived in California for assembly. In the end, the drying facility created tomato powder sold to food processors to make other products. The food processors used the powders to make dried food mixes, such as boxed pasta and rice dishes and soup mixes.⁵⁹ The dried powders helped encourage even more product development in the processed and convenience food industry. Producers of packaged foods, such as boxes of pasta mix, created their own products using those manufactured by other food producers. Thus, they created foods made from ingredients that had gone through two or three factories from the field to consumers' plates.

A highlight of post-war reorganization of the canning industry was the creation of the Tri/Valley Growers supercannery. TVG began to consider the supercannery concept in the mid-1960s and announced its location in Modesto in early 1968.⁶⁰ This highly anticipated facility in the industry was a strategic move for TVG in many ways. The supercannery concept emerged as a solution to several needs. First, TVG was growing rapidly and adjusting what products it produced. Similar to other canners in the Central Valley, it grew increasing numbers of tomatoes and needed more production lines for the crop. As canners mechanized plants, they were less flexible to adapt quickly to rapid changes in production. Additionally TVG's older urban canneries were stuck into city spaces and had no more room to grow. Finally, cannery waste regulations set by federal,

⁵⁸ "1926 Successful Year for Western Canners."

⁵⁹ Tri/Valley Growers, "Tri/Valley Growers 50 years of survival and growth 1932 - 1982," 28.

⁶⁰ "Tri-Valley Will Build 'Super' Plant," *Lodi News-Sentinel*, February 17, 1968; "Modesto To Get Tri-Valley Super Cannery," *Lodi News-Sentinel*, February 17, 1968; "Tri-Valley Goes Slow On Big Plant," *The Modesto Bee*, December 16, 1966, sec. B; Tri/Valley Growers, *Tri/Valley Growers Annual Report 1967*.

state, local organizations were becoming increasingly burdensome to canners, and they sought better solutions than they could gain at existing canneries.⁶¹ After extensive research, the TVG finally decided that Modesto was the best location for the supercannery. It was near the CT Supply can manufacturing plant, a coordinated effort by TVG and Cal Can. Modesto had recently passed a sewage bond to build a plant capable of processing the cannery waste. In addition, the plant site was in the industrial section of Modesto that offered plenty of room for expansion and was near the train lines and highways.⁶²

On other fronts, the persistent problem of cannery labor, due to the seasonal nature of the pack, remained a concern. Canners hired large numbers of people to work long hours during the pack, and then laid them off when it was over. As labor unions gained more power after the war, cannery workers demanded high wages. The increased wages and added benefits for employees increased the operating costs of canneries. Expanding the length of the pack and extending the operating time of the cannery reduced the impact of these related problems.

The creation of the supercannery was quite exciting for all involved in California's fruit canning industry. The supercannery's price tag of \$15,000,000 required that the cooperative seek assistance from the Berkeley Bank for Cooperatives, which it received. So many industry people wanted to be involved in the project that engineers came out of retirement to assist. The facility encompassed 7 buildings with over 800,000 square feet of space and 6 warehouses totaling 600,000 square feet, in total about the size of twenty-eight football fields. Operations at the plant began in the summer of 1969 with

⁶¹ Cannery waste problems are addressed at length in chapter 6.

⁶² "Tri-Valley Will Build 'Super' Plant"; "Modesto To Get Tri-Valley Super Cannery"; "Approval of Sewer Bonds Clinched Tri-Valley Decision," *Modesto Bee*, January 27, 1969.

the opening of freestone peach production lines to take over the Stockton crops. Also that year, TVG closed the Mor-pak plant it had taken over a decade before. The following year, the company launched production lines for apricots, fruit cocktail, and pears that had once operated in San José. During 1969 and 1970, the movement of huge tanks and machinery on the small highways and rural roads from San José to Modesto was quite a sight according to news articles. At some points, the trucks carrying the equipment stopped traffic in all directions because they straddled the roads. The final stage of the transition was to combine all clingstone peach grading and processing at the new supercannery. The company transferred the machinery from TVG Plant One on Yosemite road in east Modesto, which was the original TVPA plant acquired by George Pfarr from Armour Cooperative Canneries in the 1930s. The supercannery was biggest cannery facility in the world and produced 18 million cases of fruit each year.⁶³ TVG dismantled the old Mor-pak cannery and their San José cannery before selling the land. When the San José cannery closed in 1970, it was an emotional move for some San Joséans to leave their valley and move to the Central Valley, but many of the workers chose to follow the movement of the industry.⁶⁴

By 1970, TVG's expansion seemed like the beginning of a new era for the company. Headquartered in San Francisco, the cooperative boasted the supercannery in Modesto and one plant each in Stockton and Madera. Thirteen hundred employees worked for TVG full time and during the packing season the number reached 6,000. The

⁶³ "Tri-Valley Will Close San Jose Canneries After This Season," *The Modesto Bee*, August 8, 1969, sec. B; Tri/Valley Growers, *Tri/Valley Growers Annual Report 1969* (San Francisco, CA: Tri/Valley Growers, 1969), Box 1:Folder 86, William Allewelt. Each case held 24 standard 2 ½ size cans. 2 ½ size cans are one of the standard can sizes developed by the canning industry. The 2 ½ holds about 3 ½ cups of a product, such as peaches and syrup or corn.

⁶⁴ Tri/Valley Growers, "Tri/Valley Growers 50 years of survival and growth 1932 - 1982," 30–33.

company had expanded beyond peaches and pears to include large production runs of olives and tomatoes reaching more of the crops of the Central Valley.⁶⁵

TVG's expansion, however, took place in the face of less reassuring market trends. While sales of canned foods continued to climb through the 1950s and 1960s, they hit a slump in the late 1960s, which the industry called the Cannery Recession. In the early postwar boom years, it had seemed as if processed foods were unstoppable and that the market had no bottom. When the companies finally did feel the hit, it was hard for them to believe. Beginning in 1968, the canners carried over too much stock. In 1969, there was also overproduction by some canneries; thirty percent of the pack remained by the start of the pack the following year. Tomatoes were down twenty-five dollars a ton. Apricots were down seventy-five dollars. William Allewelt, TVG's President and CEO, argued that tin and transportation had gone up 750% since 1955 and labor costs had tripled.

These developments placed many pressures on growers as well because canners had to reduce production to prevent more carryover. Reduced production meant that the canneries purchased less fruit. The impact of the Cannery Recession in northern California spread far. Members of TVG began to question the decision to invest in the supercannery in 1969 and 1971.⁶⁶ TVG took substantial measures to cut costs and increase efficiency to survive the toughest times since the Great Depression. The cooperative ended any non-essential programs until the crisis was over, froze salaries, limited production, reduced operating costs as much as possible, and continued to expand

⁶⁵ Tri/Valley Growers, *Tri/Valley Growers: History, Development, and Operations*, 2; "Tri-Valley Will Close San Jose Canneries After This Season."

⁶⁶ Tri/Valley Growers, *Tri/Valley Growers Annual Report 1969*; Tri/Valley Growers, *Tri/Valley Growers Annual Report 1972* (San Francisco, CA: Tri/Valley Growers, 1972), Box 1:Folder 86, William Allewelt; Tri/Valley Growers, "Tri/Valley Growers 50 years of survival and growth 1932 - 1982," 32–35.

markets. By 1972, sales began to recover, and in 1973, profits were on the rise again because of the increased output of the supercannery combined with the efficiency it afforded.⁶⁷

Opposition to Industrial Food

In the 1950s and 1960s, women's journals and trade association magazines suggested that women had neither the time nor the inclination to cook with raw ingredients. Editors covered the pages of magazines with advertisements of products that supposedly made women's lives easier. Recipes, often developed by industry kitchens, listed processed foods among their ingredients. These recipes and ads were part of the mass marketing campaigns launched by the fruit canners, and consumption studies confirmed that Americans were eating more processed foods after World War II. However, historian Laura Shapiro argues that women's attitudes towards cooking and food were more complex than what consumption studies and marketing materials portrayed. Despite the deluge of advertising and marketing plans, women still treasured and cooked family recipes and desired less processed ingredients. While Shapiro agrees that the marketing campaigns were intense and massive, they did not catch everyone and some regional food traditions survived.⁶⁸

In contrast to the media campaign emphasizing convenience cooking and processed foods, Julia Child was a strong voice emphasizing tradition. Many cookbooks on the market advised women to open various cans and boxes and combine them for a quick meal. One of the authors of *Mastering the Art of French Cooking* (1961), Child

⁶⁷ Tri/Valley Growers, *Tri/Valley Growers Annual Report 1977* (San Francisco, CA: Tri/Valley Growers, 1977), Box 1:Folder 86, William Allewelt.

⁶⁸ Shapiro, *Something from the Oven*.

endeavored to teach women how to cook, to enjoy food, and to step away from the can opener. She used fresh ingredients, flour, fresh meat, and lots of butter. Child was bold and brazen in the kitchen and her open friendly manner revealed how much fun she was having with food. Child developed a huge following very quickly. Her television show began with three small test segments on WGBH-TV, a small educational station in Boston, to see if anyone was interested. The immediate response was overwhelmingly positive and *The French Chef* was born. The show ran for ten years on public television stations across the nation. Child's goal for the show was to "take the bugaboo out of French cooking, to demonstrate that it is not merely good cooking but that it follows definite rules."⁶⁹ Child inspired many Americans, including some who later emerged as leaders in the local food, slow food, and foodie movements.⁷⁰

Historian William Belasco argues that opposition to industrial food also emerged from the 1960s counterculture, as was the case with Alice Waters. Health food advocates had been around for decades, but the youth of the 1960s began to connect the health foods with environments and consumerism. Then, they began to use their own diets as a way to express discontent and boycott large companies by using their economic power as consumers. Some people became vegetarians and rejected the traditionally meat-heavy American cuisine. Others joined cooperatives to support local agriculture and organic foods. Some even went so far as to reject the concept of putting a price on food. The varied response illustrates frustration with the many aspects of the industrial food system,

⁶⁹ Julia Child, "About the Television Series," in *American Food Writing: An Anthology With Classic Recipes*, ed. Molly O'Neill, Paperback. (New York: The Library of America, 2009), 400.

⁷⁰ Child, "About the Television Series"; Joan Reardon, *M.F.K. Fisher, Julia Child, and Alice Waters: Celebrating the Pleasures of the Table*, 1st ed. (Harmony, 1994).

such as the effect of a capitalist focus on profit in food production, the reduced quality of produce, and the emphasis of meat over fruits, vegetables, and varied grains.⁷¹

Some Americans began to question how beneficial the national processed foods system really was. One of the figureheads of the local food movement was Alice Waters, who said she began to experience food for the first time in France because the ingredients were so fresh. Upon returning home to the University of California, Berkeley, Waters wondered why she could not find in California the fresh ingredients she came to love in France. She was a student at Berkeley, but longed to open a café. She practiced cooking French dishes with her friends from school, and even took lessons from Julia Child's television series. While experiencing the Free Speech Movement in 1960s Berkeley, Waters began to question all aspects of American culture. Later, she began to wonder whether the easy availability of processed foods justified losing the lack of variety and taste of fresh produce, but there was also an element of environmental awareness in her quest for locally produced fresh foods. She connected ingredients to their source and eating to community.⁷²

Waters and her friends opened a small restaurant in Berkeley dedicated to providing the freshest foods from local suppliers. Chez Panisse, she explains, "has been defined for the search for ingredients." She believed that "a restaurant can be no better than the ingredients it has to work with." Waters searched Berkeley and the Bay Area, the original home of California's food processing industry, for fresh ingredients she

Warren James Belasco, *Appetite for Change: How the Counterculture Took on the Food Industry*, 2nd updated ed. (Ithaca: Cornell University Press, 2007), 1–107.

⁷¹ Warren James Belasco, *Appetite for Change: How the Counterculture took on the Food Industry*, 2nd ed. (Ithaca: Cornell University Press, 2007), 1–107.

⁷² Reardon, *M.F.K. Fisher, Julia Child, and Alice Waters*; Thomas McNamee, *Alice Waters and Chez Panisse* (Penguin (Non-Classics), 2008); Alice Waters, "The Farm-Restaurant Connection," in *American Food Writing: An Anthology With Classic Recipes*, ed. Molly O'Neill, Paperback. (New York: The Library of America, 2009), 559–568.

desired. Chez Panisse's chefs waded through streams looking for watercress, trolled the roadsides and railroad tracks for fennel and berries, and arranged purchases from local gardeners. The menu changed according to the season and availability, presenting a stark contrast to the prevailing philosophy of the food industry that sought to provide anything at any time. The philosophy of Chez Panisse caught on and contributed to the developing food genre of California cuisine. Much like the canning industry in its earliest days, California cuisine thrived by employing the natural assets of the state's environment. Rather than package the food and ship it to the world, however, restaurants, such as Chez Panisse, kept it local.⁷³ While the local foods movement took many years to catch on nationally, its message of eating fresh foods from local sources continues to be major opposition to the processed food industry.

At the dawn of the 1970s, the environmental movement and opposition to the effects of industrial food grew strong enough to influence the canners, and Del Monte altered its language in company articles to adapt to the nation's heightened awareness of ecology. The *Del Monte Shield* published articles as early as 1960 focusing on the company's relationship with the environment. The editor did not link the articles explicitly but the intention was clear. While it was nothing new for the magazine to run political articles, the environmental articles were strikingly different from the usual material. One article discussed the irrigation process and argued it was beneficial to the land; another explained the role of beekeepers in the field and the benefit of bees to the orchards. The articles connecting Calpak to the environment continued through the

⁷³ Waters, "The Farm-Restaurant Connection," 559; McNamee, *Alice Waters and Chez Panisse*; Reardon, *M.F.K. Fisher, Julia Child, and Alice Waters*.

1970s.⁷⁴ In fact, any time the company did something that was even remotely positive with respect to the environment, an article appeared in the *Del Monte Shield*. The Del Monte plants in San José were part of a massive composting project that offered an innovative way to dispose of cannery wastes, but other articles stretched the point.⁷⁵ For example, an article about the environmental benefits of cannery waste lagoons twisted reality and did not explain the larger picture. While the lagoons did support wildlife, the author of the article did not address the larger problem that wildlife, particularly birds, had few spaces to live because agricultural irrigation programs and the dams that supported the growth of cannery crops had destroyed their traditional wetland habits. Birds occupied lagoons because of limited options.⁷⁶

Conclusion

The food industry had heavily promoted the concept of their factories as the kitchens of America with meatpackers in Chicago and hog butchers in Cincinnati in the nineteenth century. The idea grew to include every aspect of the kitchen and became part of the modern dream in America, according to the food industry's advertising campaigns. The 1950s was a time of rapid expansion and product development as food producers transformed wartime innovations into consumer goods. The food industry's push from supplying raw materials to processed foods was part of a great post-World War II expansion of the American economy. Millions of new products reached an eager

Gene Willeke, "Effects of Water Pollution in San Francisco Bay" (Palo Alto, CA: Stanford University, 1968).

⁷⁴ "Irrigation," *Del Monte Shield*, June 1960; "The Living Earth"; "What's Buzzin'," *Del Monte Shield*, June 1960; "Water Pollution," *Del Monte Shield*, November 1965; "Blue Lagoons from Cannery Water," *Del Monte Shield*, Fall 1971.

⁷⁵ "The Living Earth."

⁷⁶ "Blue Lagoons from Cannery Water."

consumer market as decades of pent-up depravation and sacrifice released a frenzy of consumption. The food industry had developed strong production networks and integrated the advantages of modern media to create effective marketing campaigns that influenced consumer choice.

Cannery mergers continued after World War II, with substantially bigger canneries emerging. Both corporations and cooperatives grew larger. Tri-Valley Growers and California Cannery became huge players in the fruit cannery industry after the war. Similarly, grower associations continued to expand until there were few independent growers left unattached from a trade association or cooperative. By the 1930s, a trend towards large-scale organizations in food processing industries was obvious.⁷⁷ The phenomenon continued in the 1950s, and canning companies, as well as food processing in general, grew in size.⁷⁸ The largest food processing corporations became less specialized as they absorbed companies producing different products to diversify their revenue streams. All of these forces influenced the decisions of California's fruit canners to focus on change and expansion of markets and production. The largest fruit canners in northern California remained California Packing Company and Libby McNeill, & Libby, but new technology in canning production made it even more difficult for smaller canners to compete than before, requiring them to sell to larger companies or consolidate.

The impact of canneries in northern California also is apparent in the increased production of canning crops, such as clingstone peaches, pears, and tomatoes. Canners

⁷⁷ It was even included in a Senate investigation on big business in America. Hoffman, *Large-scale Organization in the Food Industries*.

⁷⁸ M. C. Hallberg, *Economic Trends in U.S. Agriculture and Food Systems Since World War II*, 1st ed. (Ames: Iowa State University Press, 2001), 79–83.

purchased more than 97 percent of the clingstone peaches and 70 percent of pears grown in the state.⁷⁹ Cannery and growers continue to manipulate varieties and crop totals to suit needs of the cannery rather than those of the field or the environment.

Canning was a high-energy industry. In the beginning it required the labor of many to pick, weigh, grade, clean, dice, slice, and move fruit in preparation for canning. Mechanization of the factory occurred piecemeal in different areas of the cannery. Machines that made and sealed cans appeared first, followed by label makers, label cutters, and then peach pitters. Cannery mechanized entire sections of the factory replacing many workers. A complex mixture of issues prompted the move toward greater mechanization: laws regarding factory sanitation and food safety, the standardization of products and procedures, increased labor costs, and increased return on investment associated with technology. Much of the energy to make canned food occurs before the consumer even purchased the product; the opposite was true of many homemade dishes using fresh ingredients.

Pesticides gave growers new tools to fight nature's attempted reclamation of orchards, but they soon discovered that the health implications of the chemicals produced a product consumers did not want. Mechanized harvesting and cannery processing reduced the amount of labor needed to harvest the crops. However, growers and cannery questioned the quality of crops harvested this way. They mechanized transportation, grading, and sorting, but in turn eliminated the human oversight that measured the quality of fruits. Not all peaches or pears ripened at the same time in a field.

⁷⁹ California Crop and Livestock Reporting Service and USDA Agricultural Marketing Service, *California Fruit and Nut Crops: 1909-1955*.

The post-war sales boom was a chimera for fruit canners; there was a recession by the end of the 1960s. As times changed, so did the desires of customers. New packaging materials and processing methods provides many new possibilities. Technology and culture helped change consumer preferences and provided new competition in the form of frozen, dried, and, eventually, freeze-dried foods.

Opposition to processed food emerged in the late 1960s. It developed alongside the national emergence of the environmental movement as Americans were beginning to see their environment in a different perspective. This new environmental perspective also reached the kitchen for some people. Alice Waters questioned America's changing diet and food supply wondering where the fresh, local ingredients had gone. She and like-minded cooks and friends began to adopt an approach to food that directly countered the message and philosophy of the industrial food system. Over a few decades, the local food movement grew enough to capture national attention and change the eating habits of consumers, as is evident in the popularity today of stores such as Whole Foods and Trader Joe's.

Despite this rising sentiment, California's canners were still operating with the same vision as they had since the beginning of the century. They sought to produce ever higher quantities of food. This was part of a larger trend in the American food processing industry. Consequently, California canners strayed farther from their roots in California agriculture by investing outside the state. As large canning industries, such as Del Monte, became part of the international food industry, they lost their connection to California's environment. Grower/canner cooperatives within the industry helped retain

the connection between California's canned fruit industry and California's environment and economy.

CHAPTER 7 – THE CANNERY WASTE PROBLEM

Everyone knows what it's like. When you buy a ripe, juicy peach or pear, there is a moment when your teeth break its peel and the delicious, fragrant, sticky juice flows from its flesh. It is inconvenient when the juice runs down the arm or chin, but discriminating fruit eaters know the best fruits are often the messiest. Now imagine the liquid, peels, and pits produced by tens of thousands of tons of peaches and pears, and then add tens of thousands of tons of cherries pits, tomato vines, and tomato pulp. Such was the scale of the waste fruit canners in northern California faced every day during summer packing. During the canning season, fruit canneries daily produced thousands of tons of sludgy waste consisting of solid materials from the preparation, pitting, and dicing of fruit and liquids from washing the production lines in the canneries. The viscosity of the waste made it difficult to transport to disposal sites. The waste decomposed quickly, emitting a pungent aroma of rotting organic matter that attracted insects and small animals. As canners increased production rapidly in the twentieth century, canneries' waste output grew as well.

As more people and industries had moved into northern California between the 1940s and the 1970s, the struggle to control the region's resources and land became more intense. Canners faced greater pressure from society and government agencies to take more responsibility for the impact of their wastes on the environment. Fruit canners in northern California used all the force of their production networks to confront the problem.

Cannery Waste Disposal in California before 1949

In California before World War II, the canneries in the Sacramento-San Joaquin Delta and San Francisco Bay area, also called the Bay-Delta Area, disposed of their waste in various ways depending on their location and products. Many canneries located near waterways disposed of waste by dumping it into rivers or the bay. Others disposed of cannery waste in open dumpsites because enough inexpensive land was available at the time to do so. The final destination of waste ultimately depended on the cannery's products and the environment in which it operated. Vegetable canneries often created more solids, such as pea vines and asparagus butts, that converted to animal feed more easily than wet wastes. Vegetable wastes were not difficult to separate from water used in cleaning or in the boilers. Thus, disposing of solid wastes in one manner and liquid wastes in another was not a complex procedure in commercial vegetable canning.

Deciduous fruits were another matter. They contained a much higher quantity of liquid and smaller fragments of material. While apricot and peach pits were relatively easy to separate from the mass of waste, peels were slippery, fragile fragments. The pulp removed during preparation was more of a liquid slush en masse than a solid. At the end of the day, the cannery created a mass of slimy, viscous, fruit sludge that was significantly easier to wash down a drain than sweep up with a broom. Therefore, canners sprayed down the preparation rooms to decrease labor costs. Spraying down rooms increased the amount of water canneries used and added to the water/fruit sludge.

Canneries could more easily screen vegetable waste, separating liquid and solids than deciduous fruit waste.¹

Huge volumes of fruit sludge released into rivers in the Sacramento-San Joaquin Delta or San Francisco Bay each summer increased pollution, diminished aquatic life, and disturbed water users throughout the region. While commercial boats did not mind sailing through floating bits of fruit and vegetable debris, anglers, and canoers did. Recreational use of the waterways grew as more people took up fishing and boating in California in the mid-twentieth century, and recreational users of the waterways focused on water health.²

California ranchers complained that canners posed a risk to their livelihood because their cattle could not drink river sources during and after a pack. In 1911, Manual Soares, a dairy farmer living next to the Penetencia Creek in Santa Clara County sued California Fruit Canners because cannery wastes left the stream running through his property “polluted, unwholesome, and impure.” The cannery debris allegedly formed “a poisonous scum... [that] infected [the air] with offensive and noxious smells and miasma.” Soares argued the water was unfit for humans and dairy cows, and thus the cannery was impeding on his riparian rights. California Fruit Canners representatives responded that they filtered their waste through multiple screens and settling tanks before

¹ O’Connell & Associates, *Report on Problem of Disposal of Processing Waste and Presentation of the Facts Relating to the California Fruit and Vegetable Canning Industry*; Cruess, *Commercial Fruit and Vegetable Products; a Textbook for Student, Investigator and Manufacturer*.

² The connection between the rise of tourism and recreation by the middle class and environmental awareness has been presented thoroughly by Samuel Hays. Samuel P. Hays, *Beauty, Health, and Permanence: Environmental Politics in the United States, 1955-1985*, Studies in environment and history (Cambridge, England: Cambridge University Press, 1987); Philip Garone, *The Fall and Rise of the Wetlands of California’s Great Central Valley*, Kindle ed. (University of California Press, 2011); Gene Willeke, “Effects of Water Pollution in San Francisco Bay” (Palo Alto, CA: Stanford University, 1968).

releasing it into the creek. Unfortunately, the outcome of Soares case was lost, but it illustrates the need for a way to measure cannery waste to settle conflicting water needs.³

The millions of gallons of fruit sludge created from summer to fall by canneries packing pears and peaches resisted an easy solution. Cannery waste tried to reduce the size of the solid pieces by grinding the waste before releasing it to assist in the dilution of the waste, or at least hide it better in the waterway. However, unbeknownst to them, this only increased the surface area of the waste adding to the oxygenation problems caused by the effluent. As cities developed sewage treatment plants, urban canners disposed of their sludgy waste in municipal processing systems. However, not all the sewage plants could accommodate residential and industrial needs. Urban areas grew quickly in California, the population increase overwhelmed existing systems, and when cannery waste overwhelmed the sewage plants untreated sewage went into waterways.⁴ Before the 1940s, it was difficult to prove quantitatively the impact of cannery wastes because there was no scientific research on the biological impact of green waste on environments. Both public authorities and canners were at a loss in the early twentieth century in finding a course of action to satisfy the most peoples' needs.

Stockton's early problems with cannery wastes were the first of many in northern California and illustrate the basic tenants of the conflicts. Positioned near the San Joaquin and Calaveras Rivers at the far Southeastern corner of the delta, the city's location was vital to its economic growth. Before the construction of the intercontinental railroad, most Californians and other visitors took a boat from San Francisco Bay, up the

³ As was the case with *Manual Soares et al. v. California Fruit Cannery Association* brought before the Superior Court of the County of Santa Clara in 1911. Soares was a rancher who sued the canners because his water source became polluted and unusable during the annual pack.

⁴ Frank M. Belick, "First-Year Experiences at San Jose, California," *Sewage and Industrial Wastes* 31, no. 1 (January 1, 1959): 100–104.

delta and along the San Joaquin River, to Stockton. It was a primary route to California's interior. People traveled to the Sierra Nevada Mountains, earning the city the monikers "The Gateway City" and "California's Inner Harbor." The proximity of Stockton to the river and gold mines made it a prime location for industry as well. Reaching a population of almost 48,000 by 1930, the city boasted of its importance to the Central Valley as a center of industry, agricultural processing, commerce, amusements, and education. Even railroad connections did not diminish the importance of river navigation in the Stockton area, and by the 1930s, the Port of Stockton also had a deepwater channel to accommodate ocean-going vessels that shipped bulk goods from interior California more cheaply than by railroad. Manufacturing in Stockton included the production of agricultural equipment, paper products, many varieties of food products, cans, and other machinery. Stockton was home to several major canners including, California Packing Corporation, Mor-Pak Preserving, Richmond-Chase, Stockton Food Products, and Foster & Wood Canning.⁵

At the end of the 1930s, Stockton's sewage disposal methods were failing, and canneries played a central role in the problem. Other than canneries, the only other source of industrial pollution into the San Joaquin River near Stockton was a fiberboard cannery that operated all year. Thus, the annual load of pollution was much different from the canneries' seasonal load created by from May to November. Additionally, Stockton's location on the San Joaquin River was at the head of a tidal estuary. Fed by mountain streams, the San Joaquin flows downstream into the bay, but the tidal forces of the bay and delta also directly affect the slow-flowing river. The spring melts fed the

⁵ *California Polk-Husted Directory Co.'s Stockton and Lodi City and San Joaquin County Directory 1908* (San Francisco, CA: Polk-Husted Directory Co., 1908), 17–18; *Polk's Stockton California City Directory 1941 Including Lodi* (San Francisco, CA: R.L. Polk & Co., 1941), 11–14.

river quickening the pace of water flow and decreased again the rest of the year. During the summer, which was the peak of the canning season, the tide from the bay affected the distance the rate the water in the river traveled by five to six miles. The oxygen in the water increased in the summer as aquatic plant growth increased and liberated more of the gas. Based on these conditions, Consulting Engineer, Clyde Kennedy, found the maximum amount of oxygen required to breakdown the wastes in the section of river near Stockton per day was 29,000 pounds. The average amount of waste disposal by Stockton into the river was 30,840 pounds per day of organic matter, including municipal sewage and the fiberboard factory but not cannery waste. During the canning season, this amount rose to at least 105,000 pounds per day of organic matter released into the river. The amount of organic material in the waste was an excess of 70,000 pounds per day on a river engineers deemed to be capable of diluting only 29,000 pounds per day. These figures only reflected 1936 and 1937 levels and did not include predicted urban and industrial growth. The numbers did include all cannery wastes into the sewage system. Cannery ground solid wastes and mixed them into the liquid wastes before releasing the entire mass into the sewage facility, a common practice before World War II.

Kennedy prepared a report laying out a solution to the problem that would make the city's system capable of handling the current processing needs then. While prominent fellow sanitary engineers in California applauded his engineering plan and the money the City of Stockton raised for the project, they still had reservations about it. William T. Ingram, Sanitary Engineer for the San Joaquin Local Health District, brought up the point that even as the City of Stockton updated its municipal processing systems, the canneries were planning to expand, and the city needed a larger plan to make the facilities last for

decades. Another Sanitary Engineer, Mr. Parkes, argued that if a company was responsible for a disproportionate amount of waste, then the company should pay the costs to process all of their waste themselves. Harold Gray, Sanitary Engineer in Berkeley, agreed with Parkes but added another suggestion that the byproducts of cannery wastes could be profitable. Unfortunately, he did elaborate on the concept. Nevertheless, Gray did not express optimism that the balance of payments or power would shift in Stockton. Similar discussions echoed through the valleys of the Bay-Delta Area in the mid-twentieth century.⁶

The waste problem in fruit and vegetable canneries was part of ongoing historical debate about regulation of industrial pollution in America. Two parts of this complex discussion are most pertinent to the cannery waste problem in California. One perspective argues that companies participated in environmental reform because it increased their own production efficiencies, reducing costs and increasing profits. Historian Samuel Hays argues that during the late nineteenth century, conservationists believed that improvements in science and technology would lead to less pollution.⁷ Pierre DesRochers in a later article adds that industries have an inherent economic incentive to reduce waste.⁸ However, this argument presumes profit motive will provide enough incentive to control waste because producers will develop the markets and technology to utilize as many resources as possible.

⁶ Clyde C. Kennedy et al., "Improvements in Sewage Treatment at Stockton, California, as Affected by Cannery Wastes," *Sewage Works Journal* 9, no. 2 (March 1, 1937): 271–284. Unfortunately, not all the first names were available. I matched up as many as I could to known engineers.

⁷ Samuel P Hays, *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement, 1890-1920* (Pittsburgh, Pa: University of Pittsburgh Press, 1999).

⁸ Pierre Desrochers, "How did the Invisible Hand Handle Industrial Waste? By-product Development before the Modern Environmental Era," *Enterprise & Society* 8, no. 2 (2007): 348–374.

The canners had employed technology, science, and management since the beginning of the twentieth century to make cannery production more efficient and use as much of the fruit from the orchard as possible. With assistance from food scientists at the University of California, Berkeley and the National Canners Association Laboratory, the industry conducted a number of byproduct experiments that resulted in new products. Professor William Cruess included a number of these innovations in *Commercial Fruit and Vegetable Products*, the text he used to train future cannery managers and food scientists. The first edition, dated 1924, contained detailed processing information for canning and drying of fruits and vegetables in addition to winemaking techniques and olive processing practices. Cruess described how wine makers, olive processors, fruit driers, and canners used the various waste materials.

A comparison of the different industries revealed that fruit canners were most likely to underutilize their waste. Some new products employed pieces of fruit that were difficult or impossible to use otherwise, such as fruit cocktail, vegetable salad, and crushed fruit products. Some of the major sources of waste, as Cruess explained, were cherry juice, syrups and the fleshy waste of peach products.⁹ Peach, apricot, and cherry pits were a large part of the canneries' solid waste during the packing season. One easy way to turn the pits from waste to a byproduct was by selling them to another company that could use them. Makers of beauty and baking products sought the oil from fruit pits to make facial creams and macaroon paste. The shells of the pit could also be ground up to form an exfoliating paste. Charcoal manufacturers also used the pits to make briquettes. On other fronts, the National Canners Association Western Research

⁹ Cruess, *Commercial Fruit and Vegetable Products; a Textbook for Student, Investigator and Manufacturer*.

Laboratory experimented with making products, such as feed and paper, from asparagus butts when the asparagus industry took off in California, but these were not successful. Before the 1940s, canners concluded the return on investment from the in-house creation of most byproducts from wastes was too low to provide them with an incentive.¹⁰

Canners' efforts to increase the efficiency and profitability of all orchard materials were successful, but they still created waste. Some scholars have echoed contemporary critics who claimed that canneries did not do enough to reduce waste, making it necessary for the state and municipalities to provide legislation forcing companies to engage to better conserve or protect resources. Christine Meisner Rosen addresses waste disposal practices in the food processing.¹¹ She argues that innovation in byproduct creation and improvements in waste disposal in meatpacking did not occur because of industry concerns for conservation and efficiency alone. Regulation in some form or another proved vital in forcing the industry to make changes.¹²

While many scholars studying water pollution focus on municipal water problems or toxic pollution, the history of green wastes derived from food manufacture and agriculture have gone largely unstudied. There are historians studying pollution who have contributed the argument that regulation is necessary to control industrial pollution, green or toxic. Historian Joel Tarr, whose work on Philadelphia was groundbreaking in

¹⁰ Ibid.; W. S. Everts, "Disposal of Wastes from Fruit and Vegetable Canneries," *Sewage Works Journal* 16, no. 5 (1944): 944–946; O'Connell & Associates, *Report on Problem of Disposal of Processing Waste and Presentation of the Facts Relating to the California Fruit and Vegetable Canning Industry*; J.R. Braden, "Letter from J.R. Braden, Richmond-Chase Co. to Robert Marsh", October 28, 1953, Box 36, Folder 54, California League of Food Processors Collection; Robert J. Marsh, "Letter to Members from the Canners League of California", June 11, 1962, Box 9. Folder 16, California League of Food Processors Collection.

¹¹ Christine Meisner Rosen, "The Business-Environment Connection," *Environmental History* 10, no. 1 (January 2005): 77–79; Rosen, "The Role of Pollution Regulation and Litigation in the Development of the U.S. Meatpacking Industry, 1865-1880."

¹² Rosen, "The Business-Environment Connection"; Christine Meisner Rosen and Christopher C. Sellers, "The Nature of the Firm: Towards an Ecocultural History of Business: [Introduction]," *The Business History Review* 73, no. 4 (December 1, 1999): 577–600.

its historical study of pollution, also finds that a combination of industry, government agencies, and scientists was essential in organizing regulatory and technical solutions to pollution problems.¹³ Martin Melosi adds to the concept that profitability is the key to understanding the history of regulation. When waste management practices failed to enhance profits, the state needed to step in, either to regulate waste or actually handle its treatment.¹⁴

Hugh Gorman's investigation of environmental regulation in the oil industry in *Redefining Efficiency* offers apt analogies for the cannery waste situation in California. He argues that there were two eras of environmental ethics. The first was the era of the gospel of efficiency, lasting from the late nineteenth century to World War II, and the second was an era of environmental awareness that began roughly around the 1950s. Gorman shows how the expectations of pollution control differed in the two periods, determining the extent of regulation. In the first era, there was a strong belief that technology and science could rectify any pollution as maximum industry efficiencies were reached. In the second era, a different approach emerged, in part because of perception that "cooperative" or business-led pollution control in the first era failed. A new philosophy emerged that increasingly held companies accountable for all aspect of resource use, even those aspects that were unprofitable.¹⁵

California's canners were not alone in struggling with the waste problem in America in the twentieth century. Canners' waste became a national issue, much like

¹³ Tarr, *The Search for the Ultimate Sink*.

¹⁴ Martin V Melosi, *Garbage in the Cities: Refuse, Reform, and the Environment*, Rev. ed., History of the urban environment (Pittsburgh, Pa: University of Pittsburgh Press, 2005); Melosi, *Effluent America*; Martin V. Melosi, *The Sanitary City: Urban Infrastructure in America from Colonial Times to the Present*, Creating the North American landscape (Baltimore: Johns Hopkins University Press, 2000).

¹⁵ Hugh S. Gorman, *Redefining Efficiency: Pollution Concerns, Regulatory Mechanisms, and Technological Change in the U.S. Petroleum Industry*, 1st ed. (Akron Press, Akron, OH: The University of Akron Press, 2001).

other industrial waste concerns. In the twentieth century, conflicts over food processing waste disposal began to intensify across the United States as land and water resources grew scarcer because of industrialization, population increase, and urbanization. The confrontations first began in the crowded, urban, industrialized East Coast areas, such as New York and Baltimore that housed many canneries. For much of the nineteenth century, canners had disposed of their wastes in nearby water sources or open dumpsites. A variety of groups challenged the canners' disposal methods arguing the decaying waste in rivers and on land was a source of noxious odors, attracted pests, and killed aquatic life. Higher population levels and increased industrialization in New York, Maryland, and Michigan made the canner's waste disposal methods a problem with the public earlier in those states sooner than it did in California.¹⁶

The Canners League of California received information about the waste disposal problems in other states because of its strong relationship with the National Canners Association, which was located on the East Coast. The news about the conflicts over cannery waste alarmed Preston McKinney of the Canners League of California enough that as early as 1928, he consulted with civil engineer Harold Gray about cannery waste problems in California. Gray assumed that increased conflict with local agencies was inevitable given the rapid development of California and recommended that the CLC and canners get ahead of the problem by conducting research on the impacts of cannery waste for themselves, thus, arming themselves against future regulation or litigation.¹⁷

¹⁶ Harold Gray, "Letter to Preston McKinney re: waste problem advice", May 8, 1928, Ca; Preston McKinney, "Letter to Harold Gray re: response to advice about waste problem", May 21, 1928, Box 3, Folder 16, California League of Food Processors; Paul A. Shaw, "Pollution Control Work of the California State Division of Fish and Game," *Sewage Works Journal* 12, no. 5 (1940): 947-953.

¹⁷ Gray, "Letter to Preston McKinney re: waste problem advice"; McKinney, "Letter to Harold Gray re: response to advice about waste problem"; Harold Gray, "To Preston McKinney re: follow up on Waste Problem", May 22, 1929, Box 3, Folder 16, California League of Food Processors.

Available records indicate that the CLC completed little research, not for lack of interest, but perhaps because the Great Depression threw California agriculture into a whirlwind.

Government agencies used existing public health laws and nuisance laws to hold food processors responsible for the complete output of their factories. In 1937, Colonel W.A. Johnson of the United States Army Corps of Engineers Office in Baltimore, Maryland asked the NCA to publish a notice for member canners. It brought to their attention the 1899 Rivers and Harbors Act that forbade the dumping of refuse into U.S. tidal waters or their tributaries. It was one of the few federal laws that protected water health. The notice recommended that the canners use mechanical filtration methods to remove as much solid material as possible before releasing liquid wastes into waterways.¹⁸ The connection of waterways through the Bay-Delta System similarly gave the federal government authority to control pollution in the waterways of northern California. The U.S. Army Corps of Engineers, U.S. Customs, and U.S. Coast Guard were involved in patrolling the waters and enforcing the federal law.¹⁹

In California, legislators gave the authority to regulate and enforce water policy to different agencies, making the complex matter confusing for all involved. The Public Health Department was responsible for protecting humans from transmittal of disease through waste. To this end, the department created a permit system for pollution disposal and issued other permits to allow companies to start dumping waste. However, the department engaged in few follow-up activities because it lacked adequate personnel and technical knowledge to enforce policies fully. Some companies even operated without permits. The Fish and Game Department had the authority to protect wildlife from

¹⁸ National Canners Association, "NCA Information Letter 687", March 5, 1938, Box 3, Folder 16, California League of Food Processors Collection.

¹⁹ Shaw, "Pollution Control Work of the California State Division of Fish and Game."

pollution through Section 481 of the Fish and Game Code, which it did with official notifications and cease and desist orders. The courts offered a third way to control pollution at the state level. Injured parties, such as, had the option of filing suits against polluters, seeking injunctive relief or money. The results of such cases were unpredictable.²⁰

All parties to these matters expressed frustration with the laws. Paul Shaw of the California Division of Fish and Game argued the laws in use were inadequate to protect waterways from pollution because they did not protect the interest of industry, agriculture, or recreationists. He claims the loopholes simply let the problem go unchecked. Pollution from canning had been severe for years, mostly from asparagus, peach, and tomato processing, when he wrote his assessment in 1940. In response to pressure, industry representatives complained the laws were not clear enough for long-term planning needs. In determining where to build manufacturing facilities, companies could never be certain how local agencies would react to their waste disposal methods. The acceptable levels varied by county and city. Companies did not want to invest in facilities only to discover a few years later that they needed to retool to meet new local waste disposal standards. Industry representatives also argued that the role of certain agencies required greater definition; the same people advising manufacturers also policed them, creating a conflict of interest. The uncertainty about the absolute minimum of what

²⁰ Ibid.; O'Connell & Associates, *Report on Problem of Disposal of Processing Waste and Presentation of the Facts Relating to the California Fruit and Vegetable Canning Industry*, 8.

was required led to confusion about the prioritization of water needs by industry, agencies, and the courts.²¹

In March 1938, the Canners League of California received a letter from Shaw advising that the canners' practice of discharging waste into state water violated Section 481 of the Fish and Game Code. Shaw's letter did not threaten immediate legal action; rather, he set out basic guidelines, asked the CLC to notify member canners about the rule, and offered to work with canners to find the right technical solutions for each cannery. For example, with canneries that did not use lye, acid, oils, or other chemicals, simple screen systems would remove the solids. Canneries using chemical substances needed to install additional means of trapping or neutralizing the waste.²² The reaction of the CLC was to organize a strategy to overcome the situation. CLC representatives invited Shaw to a meeting of the Operating Committee to get more details from him but also to demonstrate that the canning industry was willing to work with state officials. He explained that the canners should put the plans in place as soon as possible; he expected to see screening of asparagus processing that season. Because asparagus butts were much easier to spot in the waterways, they provided a good case for department officials to begin to enforce the law. Ground fruit wastes, by contrast, were much more difficult to measure once they entered the water. California Packing Corporation and Libby, McNeill, Libby were the two biggest canning companies in northern California, that together produced seventy-five percent of California's pack. They agreed to install some

²¹ Shaw, "Pollution Control Work of the California State Division of Fish and Game"; O'Connell & Associates, *Report on Problem of Disposal of Processing Waste and Presentation of the Facts Relating to the California Fruit and Vegetable Canning Industry*, 8.

²² Paul A. Shaw, "Letter to Sylvia Kempton of Canners League of California", March 17, 1938, Box 3, Folder 16, California League of Food Processors Collection.

of the equipment for the 1939 summer canning season. However, most canners delayed, citing the lack of materials or the high cost of complying with the regulation so quickly.

While many canners undoubtedly hoped to delay compliance, the demand to add filters occurred at the same time they had to finance the purchase of the fruit and pay initial labor costs and before the newly created cans of fruit sold at the end of the year. While, the effects of the Great Depression were beginning to fade from California's agricultural economy in the late 1930s, many canners vividly remembered how many of their competitors went out of business during that decade. In this financial environment, they were slow to accept fully the concept that industry bore responsibility for waste management from creation to decomposition as a cost of business. Canners believed their contributions to local economies meant that they should receive assistance with waste services. In earlier decades, state and city representatives would have agreed. However, the period from the 1930s to the 1960s was one of change in the perception of responsibility for waste management in the State of California.²³

During World War II, canners largely avoided the pollution problem because aiding war mobilization was their highest priority, but the waste concerns returned full force after the war and became much worse from the canners' perspective. Cities across the United States built more than 600 municipal treatment works between 1946 and 1949. Water demands grew quickly in western states, especially California, for industrial,

²³ "Minutes of the Operating Committee of the Canners League of California", April 5, 1938, Box 56, Folder 13, California League of Food Processors Collection; "Meeting of Operating Committee of the Canners League of California", November 29, 1938, Box 56, Folder 13, California League of Food Processors Collection; "Meeting of Operating Committee of the Canners League of California", October 7, 1938, Box 56, Folder 13, California League of Food Processors Collection; "Meeting of Operating Committee of the Canners League of California", November 8, 1938, Box 56, Folder 13, California League of Food Processors Collection; Ibid.; "Meeting of Operating Committee of the Canners League of California", April 19, 1938, Box 56, Folder 13, California League of Food Processors Collection; "Meeting of Operating Committee of the Canners League of California", April 5, 1938, Box 56, Folder 13, California League of Food Processors Collection.

municipal, and recreation uses. City governments in the San Francisco Bay area, Santa Clara County, and the Central Valley began to tell cannery owners that city facilities could no longer process the canneries' waste as before because the costs of municipal waste processing were soaring. Rather than deal with the entire waste cycle of their product, cannery owners only wanted to focus on the front of the pipe, production. As soon as waste was out of the cannery, they no longer assumed responsibility for it. The perception of production in which the producer does not have to follow the product or waste through its life cycle has always been common in America, and it was only until enforced environmental regulation was in place that companies began to be more concerned with the end of their products' life cycles. As there was little profit for the food manufacturers in waste management, government agencies had to manage it by either creating regulations or processing the waste themselves.

Location and environment were vital factors for canners when it came to discovering waste management solutions. The cost of transporting and disposing of waste was the key factor in cannery managers' decision-making about waste disposal. Canners sited near rivers or large bodies of water could, and often did, dump their wastes into the water. Canners without easy access to water, tended to use municipal sewage systems. In the late 1930s, canners began to organize themselves quietly, solidifying their political power by reaching out to their networks of production. The tactic of cooperation in the face of adversity had served the fruit canners well on other occasions, such as when faced with food safety regulation and labor organization, therefore, it is not surprising to see it reemerge during the struggles over cannery pollution.²⁴ After

²⁴ In the early twentieth century, canners transitioned from a chaotic industry to a well-organized one by creating strong trade associations and through massive company consolidations. They also formed

receiving Shaw's letter in 1938, the Cannery League of California recommended that its members form regional committees to resolve waste management issues. Active groups formed based on environment, with waste committees in Santa Clara County, the East Bay, and the Central Valley that coordinated with the Cannery League of California. The groups also worked with city and county public health officials and engineers in their respective regions to negotiate regulations about pollution and to exchange information. The CLC was vital in facilitating exchange of information between the cannery waste disposal groups that was helpful in determining tactics. In cities in which fruit processing had strong economic power, such as San José and Modesto, city and county officials were accommodating in working with the canners to solve the problems.²⁵

Many scientists and engineers also worked on the cannery waste problem across the United States seeking technical solutions. Scientists in California, Wisconsin, and New York did the much of the research because these were states with large concentrations of fruit and vegetable canneries. The ultimate goal was reducing cannery effluent's impact, but the definition of clean water varied between scientists, industry, and regulators. One of the critical indicators to measure the health of water into which green waste was disposed was the biochemical oxygen demand, B.O.D, for which the definition is "the quantity of oxygen required to stabilize the organic material occurring in wastes."²⁶ Scientists wanted to a way to measure how much oxygen cannery waste required during decomposition. For many scientists and regulators, the goal was to keep

closed ties with the National Cannery Association, state agencies, and the University of California. When a major problem occurred, the Cannery League of California often served as a point of organization to pull together these connections.

²⁵ "Minutes of the Operating Committee of the Cannery League of California."

²⁶ O'Connell & Associates, *Report on Problem of Disposal of Processing Waste and Presentation of the Facts Relating to the California Fruit and Vegetable Canning Industry*, 1.

the balance of oxygen in the water at a level that would not destroy existing aquatic life or change ecosystems. The B.O.D. rate of peach waste was 30 pounds of oxygen per ton of peach waste, the second highest B.O.D. requirement of California Cannery products. Spinach had the highest B.O.D. rate at 50 pounds per ton. In fact, deciduous fruits processed by fruit canners had the highest B.O.D. rates among commonly canned fruits and vegetables.

Ultimately, the technology the cannery or sewage plant used to process effluent depended on the type of effluent, government regulation, cost, and the environment in which the cannery was located. Thus, engineers developed a number of solutions. Mechanical methods included series of filters that were either stationary or rotating. In some systems, the canneries pooled the waste in tanks and used chemicals to separate or dissolve organic material. There were also experiments using biological principles in decomposition in using oxidation ponds to alter the composition of the waste. Lined with stones on the bottom, the effluent filled in the top of the pond and trickled through the various organisms living in the rocks at the base of the pool increasing the oxygen level the effluent. Over time, the lifeforms that break down organic matter broke down the effluent and oxidized the water so the water would be safe to release into waterways.²⁷

Throughout the nineteenth century, California's citizens reorganized natural resources by chopping down wooded areas, harvesting minerals, reclaiming wetlands, and building irrigation projects. As the decades marched on, the technology for manipulating the water supply became more complex and larger in scale. Water became more dependable for more people, but agricultural, population, and industrial demands

²⁷ Ibid., 8, 27–31; Everts, "Disposal of Wastes from Fruit and Vegetable Canneries"; Curtis L. Newcombe, "Aspects of Water Pollution Study in the California and Great Basin Area," *The Scientific Monthly* 74, no. 1 (January 1, 1952): 9–13.

continued to increase, further adding to water needs.²⁸ The state's population grew from 5,677,251 in 1930 to 15,717,204 in 1960. In Santa Clara County alone, the population increased 450%.²⁹ Notifying the canners that they had to start filtering their waste was part of a focus shift in California water regulation from water distribution to improving water quality in existing waterways. Water laws in California before the 1940s had primarily centered on the mechanics of the state's water systems and water rights in a geographically diverse state.

The problem with dumping cannery waste into waterways was the volume of organic material introduced to the ecosystem. Few water sources were able to dilute thousands of tons of organic wastes daily with no affect on existing aquatic life. When dumped into the river, for example, the decomposition of the cannery sludge absorbed so much oxygen from the water that it suffocated the aquatic life in the area, such as

²⁸ This is well-covered territory for environmental historians, especially those of California's environmental history. Donald J. Pisani, *From the Family Farm to Agribusiness: The Irrigation Crusade in California and the West, 1850-1931* (Berkeley: University of California Press, 1984); Donald Worster, *Rivers of Empire: Water, Aridity, and the Growth of the American West*, 1st ed. (New York: Pantheon Books, 1985); Igler, *Industrial Cowboys Miller & Lux and the Transformation of the Far West, 1850-1920*; Norris Hundley, *The Great Thirst: Californians and Water: A History*, Rev. ed. (Berkeley: University of California Press, 2001); Isenberg, *Mining California*. A review of the California Water Resource Bulletins reinforces the laser-like focus on moving water around the state. Division of Engineering and Irrigation, *Water Resources of California* (California: State of California Department of Public Works, 1923), University of California - Davis; Frank Adams, *Irrigation Districts in California*, California Department of Public Works. Division of Engineering and Irrigation, Bulletin no. 21 ([Sacramento: California State Printing Office, 1929); Department of Water Resources, *Sacramento River Basin*, Reports on State Water Plan (California: State of California, Department of Public Works, 1931), University of California - Davis; Department of Water Resources, *San Joaquin River Basin*, Reports on State Water Plan (California: State of California, Department of Public Works, 1931), University of California - Davis. After hydraulic mining ended in California, the focus on water quality diminished for decades.

²⁹ Social Explorer Tables (SE), Census 1960 (US, County & State), Social Explorer & U.S. Census Bureau. <http://www.socialexplorer.com.ezproxy.lib.uh.edu/pub/reportdata/htmlresults.aspx?ReportId=R10294644>

Social Explorer Dataset (SE), Census 1930, Digitally transcribed by Inter-university Consortium for Political and Social Research. Edited, verified by Michael Haines. Compiled, edited and verified by Social Explorer. <http://www.socialexplorer.com.ezproxy.lib.uh.edu/pub/reportdata/htmlresults.aspx?ReportId=R10294647>

phytoplankton, zooplankton, insects, bird species, plants, and fish.³⁰ As the waste overcame the dilution power of waterways, canners destroyed aquatic life and diminished the quality of flowing water sources annually for downstream users. In the early twentieth century, city sanitary engineers and cannery managers believed in the cleansing power of water without fully understanding the biological processes occurring in the river. They thought the water absorbed the green waste, just as soil took in fertilizer, or simply washed it away to the ocean. For full dilution of green wastes in waterways, however, strength of water flow and level of oxygen were central variables. The strength of the water flow determined how fast the particles of waste were dispersed before decomposing and how much oxygen was pulled into the water from surface absorption and aeration.

Aquatic life, especially flora, was also a vital factor in determining the dilution abilities of a waterway. Plant life and algae provided more oxygen to water, but decaying plants and algae absorb oxygen. In the summer, when the sun was bright, the blooms affected the oxygen levels in the water because there were blooms, then the bloom crash as the algae died that absorbed a lot of oxygen.³¹ The geography of the water also source determined both water flow and the amount of oxygen within. Green waste that collected in areas of standing water quickly turned septic, altering the types of insects, fish, and plants that lived in the area. The change in flora and fauna lasted for seasons; even after spring flooding washed away the green waste before some of the aquatic life that lived in a healthy water environment returned. Therefore, the ecology of a waste disposal site

³⁰ Shaw, "Pollution Control Work of the California State Division of Fish and Game"; P. W. Claassen, "The Biology of Stream Pollution," *Sewage Works Journal* 4, no. 1 (January 1, 1932): 165–172; Kennedy et al., "Improvements in Sewage Treatment at Stockton, California, as Affected by Cannery Wastes."

³¹ Claassen, "The Biology of Stream Pollution."

was a vital factor in determining the type of treatment cannery waste needed to undergo in the cannery and before its release into waterways. Some cannery locations required much more processing of their effluent to reduce organic matter because the waterways into which the canneries dumped the wastes had very little dilution power and could not accept untreated green wastes without depleting all the oxygen in the water. When canneries did not want to deal with the difficult process of determining proper in-plant treatment and measuring the impact of their waste, they turned to municipal systems that were already dealing with these problems and employed experts, sanitary engineers and biologists.

In California, existing water sources and wet waste disposal were inseparably linked because the aridity in the state overall meant that there was not enough water to just flush the amount of waste the state created. (see Map 6.1) northern California had an abundance of water compared to Southern California, but within the Delta, waterways differed. For example, the Sacramento Valley had much more water, to the point of flooding problems, than the San Joaquin Valley, whose residents struggled with slow flowing waterways for much of the year. The water flow of the San Joaquin River offered less dilution power than the San Francisco Bay or Pacific Ocean because its flow decreased once the spring melts dissipated. As diversions for irrigation and drinking water pulled away water from the river, the flow dwindled even more. In contrast, the San Francisco Bay had more water and tidal flows, with the latter providing better dilution power but it had more polluters. The concept of dumping waste upriver and letting it flow out to sea also neglected to take into account the workings of the Delta wetlands. The river water meanders and forms pools as it works its way to the bay.

Across the Bay-Delta Region, some areas have better water flow than others. Creating standards for the discharge of effluent into the Bay-Delta system was extremely difficult and became a contentious political topic for decades as understanding Bay-Delta ecology developed concurrent with major economic, political, and social changes in the region that were dramatically altering resource use.³²

³² Ibid.; Newcombe, “Aspects of Water Pollution Study in the California and Great Basin Area.”



Map 6.1 Map of Major Rivers of California

From Water Manipulation to Water Quality in the 1950s

After World War II as the pressures of urbanization, environmental reform, and increased production converged to make the cannery waste situation more critical because more people desired resources. At first, most canners did as little as possible believing their economic contribution to the community was vital enough to give them the privilege to pollute without recrimination. As the canning industry's economic and politic power waned after World War II, canners had to accede to water quality regulations, boost efforts at in-factory pollution management, and bear more costs of sewage processing. During the cannery waste crisis, however, new byproduct experiments with cannery waste revealed technical opportunities that canners previously ignored. While canners once concluded that the return on investment was not high enough to pursue such opportunities, new regulatory pressures made them options that are more viable. In 1944, W.S. Everts of the California League of Canners did not have much faith in the byproduct industry because of the low return on investment. Sending the waste through municipal sewage plants was easier. Over time, the increasing pressure from the community and rising costs of waste disposal made byproduct experiments a more worthy investment.³³

By the 1940s, California was beginning to reach a point where water needs and pollution were becoming desperate. The vast water reorganization schemes, such as the Central Valley Project, reorganized water flow. It decreased the flow in areas that flooded, increased it in areas that needed more water, and tried to make rivers flow

³³ Everts, "Disposal of Wastes from Fruit and Vegetable Canneries."

consistently all year. The project also wreaked havoc on water quality. The Sacramento-San Joaquin Delta drained through miles of agricultural land before entering San Francisco Bay, one of the most populous areas of the state. Water pollution collected from all the tributaries and rivers along the way. The various types of pollution -- pesticide runoff, cannery wastes, and other industrial waste, municipal plant output -- mingled together and increased in concentration as they moved through the Delta to the Bay. When combined with decreased water flow as a result of dam building, the toxicity and water health of the sprawling northern California Delta had deteriorated in the first decades of the twentieth century.³⁴ Californians tried to sort out how to reallocate water across the state as available water sources were declining because of lax pollution laws. Outbreaks of waterborne diseases worried public health agencies, and public officials found inadequate sewage processing was the source, as humans and animals contracted diseases from the water. Cases of avian botulism and massive fish kills alerted the Department of Fish and Game to declining water quality. Water borne diseases, such as typhoid, remained a problem in California, and the Board of Public Health sanitary engineers worked to increase public awareness of water quality and safe procedures for handling water and sewage.³⁵ Despite the efforts of the Departments of Fish and Game

³⁴ Garone, *The Fall and Rise of the Wetlands of California's Great Central Valley*; Kaiser Engineers, *Final Report to the State of California San Francisco Bay-Delta Water Quality Control Program*, June 1969, University of California - Davis; San Francisco Bay-Delta Water Quality Control Program, *Bay-Delta Report* (Sacramento, CA: San Francisco Bay-Delta Water Quality Control Program, State Water Resources Control Board, 1967).

³⁵ "Twenty-First Biennial Report of the State Board of Health of California for the Fiscal Years from July 1, 1908 to June 30, 1910" (California State Printing Office, 1910), Senate and Assembly Journals, San Jose State Library; "Nineteenth Biennial Report of the State Board of Health of California for the Fiscal Years from July 1, 1904 to June 30, 1906" (California State Printing Office, 1906), Senate and Assembly Journals, San Jose State Library; "Twenty-ninth Biennial Report of the State Board of Health for July 1, 1924 to June 30, 1926", n.d.; Shaw, "Pollution Control Work of the California State Division of Fish and Game"; Garone, *The Fall and Rise of the Wetlands of California's Great Central Valley*, 3012–3068.

and Public Health, state authority remained too scattered to address the complexity of California's water problems.³⁶

Conditions seemed to change in 1948 when the U.S. Congress passed the Water Pollution Control Act. It gave California's state agencies the authority and funding to identify pollution sources and correct the problems. With this new legislation and in response to the fomenting water quality issues, the California State Legislature created a commission to analyze the state's water health situation. California's water pollution issues had reached very dangerous levels. San Francisco Bay waters were unhealthy for public use. Pollution came from industries, agriculture, and even home owners that fouled water and leached into the land and reached underground water sources. Led by pro-business Republican Assemblyman Randal Dickey, the commission had twenty-four days of hearings before releasing their findings. During the hearings, industries formed the California Association of Producing Industries (CAPI) to lobby the commission and shifted the focus of pollution control from industry to sewage control. In the end, the commission found that the public health threat from water came from sewage rather than industrial waste.³⁷ The findings were helpful to many industries, but canners used municipal systems, which were under attack because of the commission's declaration and the resulting focus of the Dickey Act.

William J. O'Connell, a consulting sanitary engineer for the Canners League of California, prepared a report on cannery wastes and water usage for the Dickey commission. It emphasized the economic importance of the fruit and vegetable canning

³⁶ Shaw, "Pollution Control Work of the California State Division of Fish and Game."

³⁷ Benjamin Ross and Steven Amter, "Poisoned Water, Contaminated History: A Lost Story of Industrial Water Pollution," *Dissent* 47, no. 3, Social Sciences Full Text (H.W. Wilson), EBSCOhost (accessed November 9, 2012). (Summer 2000): 53–57.

industry in California hoping to persuade them the canning industry's resource needs were a high priority. He called the canneries, "kitchens of the nation" because they prepared vegetables and fruits in bulk that were once prepared in the home, saving the dicing, canning, and waste from homes. His report remains an informative overview of the state of canning and the way it used resources. It was also the beginning of a long-term public relations battle in which canneries tried to explain themselves to the public to gain allies in the face of new regulations on water use and health.³⁸

The commission concluded that California needed a centralized system for monitoring water pollution that, in turn, would allow for better enforcement of pollution laws. The 1949 Dickey Water Pollution Act created the State Water Pollution Control Board and nine Regional Water Pollution Control Boards. The mandate of state the board was to create statewide policies for water quality and provide a central authority for organizing the many local authorities involved with water pollution in California. The law tasked the regional boards with creating water pollution plans for specific locales and reporting to the state board the results of their efforts. The federal and state acts were vital in focusing energy and attention to what would evolve into the pursuit of overall water health.³⁹ The canners were concerned about the ramifications the Dickey Commission would have for them. They were correct in worrying because the Act resulted in much more attention to water quality, despite the criticism it has received from scholars. The history of the California fruit canners reveals that the water pollution

³⁸ O'Connell & Associates, *Report on Problem of Disposal of Processing Waste and Presentation of the Facts Relating to the California Fruit and Vegetable Canning Industry*.

³⁹ A. M. Rawn and Vinton W. Bacon, "Philosophy of Water Pollution Control in California," *Sewage and Industrial Wastes* 27, no. 11 (November 1, 1955): 1302–1309; Anonymous, "California's Water Pollution Problem," *Stanford Law Review* 3, no. 4 (July 1, 1951): 649–666; Newcombe, "Aspects of Water Pollution Study in the California and Great Basin Area."

control boards were the first state agency to provide consistent pressure on the canneries to reform their waste disposal methods.

By the 1950s, Stockton was on the verge of outgrowing its sewage processing facilities again. As earlier engineers predicted, industry and population had increased rapidly outpacing the sewage processing capabilities of the city. Once again, city leaders and engineers discussed how to resolve the problem. Harold Wise carefully laid out the case of how industrial manufacturers were responsible for the more complex needs of the sewage processing plant in a report. This time, it was obvious that the city could no longer financially support the canners' waste. The result ultimately was to charge manufacturers for more of the costs of disposing of the cannery effluent.⁴⁰

In contrast, Modesto, a smaller town north of Stockton in the Central Valley, had already begun charging higher fees for canners. It was a much smaller community for much of the twentieth century, and it was a railroad stop for an agricultural community. Dependent on food processors, the city government's approach to the cannery waste problem was to incorporate the needs of canners into the municipal waste management plan. To draw and retain food processors, Modesto's government worked to guarantee the ability to process the waste. Cannery waste consultant, William O'Connell explained that in the early 1950s, the city of Modesto had the worst problems with cannery waste because of their location and the amount of canneries in the area. However, the city found solutions by working directly with the canners and other manufacturers in the area. They developed a sewage processing system that collected the domestic and industrial waste separately. The cannery wastes went through a six-step system that removed

⁴⁰ W.J. O'Connell, "Letter from W.J. O'Connell to R.J. Marsh", March 21, 1955, Box 37, Folder 4, California League of Food Processors Collection.

organic material and oxygenated the water until it had the same B.O.D. rate as domestic sewage. (Not all of the sewage went through the more expensive processing.) Then, the sewage processing plant either disposed of it in the Tuolumne River or across fifty acres of spreading beds and percolation basins. The beds and basins further purified the effluent as the water moved through the soil into the Central Valley aquifer.⁴¹

A common difficulty with cannery waste in the Central Valley was slow flowing water during the canning season. To the north in the Sacramento Valley, canners had much less difficulty because of the strong flow of the Sacramento River, but the one advantage Central Valley canners had was land to build technical solutions to the problem. Although urbanization and land prices were on the rise in the valley, the population density remained significantly lower than what the counties around the San Francisco Bay experienced in the 1940s and 1950s. The land gave Central Valley canners more options to build waste processing facilities and dispose of waste privately on open land without becoming an immediate nuisance to nearby residents. In contrast, land was becoming a premium resource around the Bay, and even had canners there wanted to invest in in-plant processing of cannery wastes, there was no affordable land to expand their facilities. Canners near the Bay had the advantage of water flow. The flow of the Bay was strong far from the tidal flats of the shore. The dilution power of the nearby Pacific Ocean was even stronger. That being the case, these bodies of water also were undergoing increasingly intense scrutiny by the water pollution control boards.

While canners in Oakland and around the East Bay traditionally discarded their waste in the San Francisco Bay, that waste disposal method became extremely

⁴¹ Wm. J. O'Connell, "California Fruit and Vegetable Cannery Waste Disposal Practices," *Sewage and Industrial Wastes* 29, no. 3 (March 1, 1957): 268–280.

problematic in the mid-twentieth century because industrialization and population density had increased rapidly in the area, particularly since the United States had entered World War II. In the early 1950s, the newly created Regional Water Pollution Control Board for San Francisco Bay (SFRWPCB) began to measure the amount of waste output into the Bay. In 1955, there was a SFRWPCB meeting regarding the reports of the waters near the Oakland Scavenger Company output pipe. Many canners in the East Bay area relied on Oakland Scavenger to dispose of fruit solids and liquids. The company's method for dealing with the problem was to dump the cannery waste into earthen holding cells at their facility, and then cover the waste with domestic garbage. The liquid from the cannery waste drained through holes in the cells at a rate of 125,000 gallons a day, and a pump moved it out into the bay at a distance of seventy-five feet beyond the cell. Based on the data the board collected from surveys of the effluent, it concluded that disposal of the liquid created an odor nuisance and deoxygenated nearby tidal flats. Oakland Scavenger Company claimed complete surprise at the critique. The managers argued that no government entity previously approached the company, and therefore the company reasonably assumed that it was operating responsibly. Oakland Scavenger advised the Canners League that the company could no longer accept cannery wastes and meet the effluent limits established by the SFRWPCB unless someone found new methods of disposing of the liquid portion of the waste. Oakland Scavenger asked CLC and the Western Research Laboratories of the National Canners Association, located in Berkeley, to assist in researching the problem. In the request for research assistance, the company took long-term change into account by mentioning how new construction at Oakland Airport would alter tidal flows and effluent coming from the San Leandro

Municipal Disposal plant to the west of the company's facilities. This foresight was critical in finding a long-term solution and reducing capital expenditure.⁴²

As pollution increased along the shoreline of the Bay, so did regulation, but in response, canners, and other industries dumped waste farther from shore. A *San Francisco Chronicle* article on January 12, 1958 titled "Pollution Boards Eight Ineffective Years," described the deteriorated state of the Bay near Oakland. Residents complained of a constant "rotten-egg odor[.]" and "slime so thick south of the Richmond inner harbor that one Fish and Game warden sank up to his hips in seconds." The combination of industrial and municipal waste pumped into the Bay was beyond the powers of the tides to carry out to the ocean. The author asks why the State Water Pollution Control Board was less effective than the Air Pollution Control Board. His answer was the laws for water pollution were weaker than those for air pollution because water pollution had not yet gained the same place in people's fears as air pollution had. Despite this perception difference, the pressure from residents, recreational users, and environmentalists was strengthening. In response, the State Water Pollution Control Board amplified pressure on polluters by filing Cease and Desist orders on industrial facilities.⁴³

By the late 1950s, the canners accepted they could not dump into San Francisco Bay any longer and looked for alternative methods of disposing of liquid waste. One possibility was sending the effluent to the East Bay Municipal Utility District (EBMUD). The complication was that the canners would have to treat the waste partially in the

⁴² O'Connell, "Letter from W.J. O'Connell to R.J. Marsh"; Tony Dalcino, "Letter to Regional Water Protection Control Board", March 31, 1955, Box 37, Folder 4, California League of Food Processors Collection.

⁴³ Donovan Bess, "Pollution Board's Eight Ineffective Years: Sewage Still Poison's Bay," *San Francisco Chronicle*, January 12, 1958.

cannery before sending it on to EBMUD because the facility would not treat liquid wastes containing high levels of organic matter.⁴⁴ To avoid in-plant processing, the canners, led by A.C. Richardson of Calpak, negotiated a group contract in 1958, hiring Oakland Scavenger to pump the liquid waste into a barge, carry it out to the Pacific Ocean, and dump it in the water. All the major companies, except for Hunt, were part of the ocean dumping plan. Solid wastes continued to be stored at the Oakland Scavenger Davis Street facilities. The Oakland Scavenger service picked up the waste from canneries and took it to a holding facility. The service then separated the liquid from the solid waste in holding cells through drainage holes. The liquid drained into a tank underneath the cells and, Oakland Scavenger pumped it out onto a barge. The barge took the waste twenty miles into the Pacific, south of the main shipping lanes, where the dilution power of the ocean was much stronger. Ocean dumping moved the waste beyond the heavily used waters of San Francisco Bay, but not beyond regulatory authority.⁴⁵

The ocean dumping procedure was a complex process that required canners to coordinate many variables. Strict regulations about when and how to discharge the waste fell under the jurisdiction of several agencies including the Regional Water Quality Control Board, the State Department of Public Health, Department of Fish and Game, and the U.S. Coast Guard. Tidal flows were also important variables, and effluent could only flow into the sea while the tide was outgoing; as the outgoing tide increased the

⁴⁴ H.A. Knudsen, "Letter to Mr. Mercer, Bacteriologist of Western Research Lab of NCA", January 14, 1958, Box 3, Folder 13, California League of Food Processors Collection.

⁴⁵ A.C. Richardson, "Note to East Bay File", March 11, 1958, Box 3, Folder 13, California League of Food Processors Collection; Alan Richardson, "Letter to Carl Kingsbury, Stokely-VanCamp; W.D. Poggetto, Fruitvale Canning; Eugene Sullivan, Hunt Foods; Max Dietz, Gerber Products; Peter Maier, American Home Foods; G.W. McDougall, F.M. Ball & Co.; W.A. Mercer, NCA; R.J. Marsh, CLC", 1958, Box 3, Folder 13, California League of Food Processors Collection.

dilution power of the water. Any company engaged in ocean dumping was also responsible for monitoring the effect of the waste in the water. Detailed plans for disposal included procedures for collecting and discharging the waste. In addition to making sure no floating particles or odor remained at the discharge sites, SFRWPCB regulations required a sampling of the ocean water to ensure the discharged waste dispersed properly. The barge crew sampled the water at nine sampling points before and after the waste entered the water. Tests on the samples checked the amount of oxygen in the water to verify that the decaying fruit waste had not caused septic fermentation. The San Francisco Regional Water Quality Control Board held all records created of the sampling. There is no indication, however, that they were reviewed after they were submitted.⁴⁶

Another dimension of ocean dumping involved the public reaction to the holding facility. The presence of many tons of fruit waste in one place during summer and early fall produced a foul smell and attracted insects and animals. Had the plan worked reliably, the cannery waste might have presented less of a public health problem and public nuisance. During the canning season of 1959, however, tugboat workers went on strike, and cannery waste backed up in the holding facility creating a putrid stench that permeated the city of San Leandro. Angry citizens wanted a resolution and that year the city passed ordinances to prevent disposal of cannery wastes in late summer and early fall at the facility in the city.⁴⁷ The cause of the strike, tugboat workers' wages, along with

⁴⁶ John Harrison and Fred Dierker, "Letter to Robert Marsh", May 15, 1958, Box 3, Folder 13, California League of Food Processors Collection.

⁴⁷ "Leandro Grateful to Cannery League," *Haywood Daily Review* (Haywood, CA, May 3, 1960); "Canneries Agree to Dump Waste at Sea to Halt Odors," *Oakland Tribune* (Oakland, CA, May 3, 1960); "Cannery Put Lid on City's Stink," *San Leandro Morning News* (San Leandro, CA, May 3, 1960); Wesley McClure, "To Robert Marsh, Cannery League of California", May 11, 1960, Box 3, Folder 13, California League of Food Processors Collection.

the difficulties of obtaining an adequate barge increased the canners cost of disposing of the cannery waste from \$1.30 per ton in 1958 to \$2.60 per ton in 1960. It cost 35 cents per ton to dispose of waste with Oakland Scavenger before the ocean disposal scheme. The astonishing price increase forced the canners to rethink their commitment to the scheme. The cannery managers investigated other solutions, such as building a pipeline from the Oakland Scavenger facility into the bay long enough to satisfy environmental requirements, but the SFRWPCB rejected the pipeline idea.⁴⁸ In the end, pressure from the city and lack of options forced the East Bay canners into paying the higher price for ocean dumping. Citizens of San Leandro were relieved and even commended the canneries for taking action.⁴⁹

When intense struggles over cannery waste began in the 1950s, canners in Santa Clara County had already been meeting since 1936 to discuss matters of common concern. Most of the group's discussions included the cannery waste problem. Before the 1960s, Santa Clara County had the largest concentration of fruit canneries in California, probably in the United States. Although the county was primarily rural, its largest city, San José, was home to many urban canneries; they formed an important economic and social anchor for the area. When the area began to urbanize rapidly after World War II, the process sent shockwaves through many aspects of life and placed new pressures on local services, such as sewage disposal.⁵⁰ Some canners used the only municipal waste plant in Santa Clara County, there was only one for the whole county, and others disposed of their wet garbage on open land.

⁴⁸ "Meeting of the East Bay Canners", March 25, 1959, Box 3, Folder 13, California League of Food Processors Collection.

⁴⁹ McClure, "To Robert Marsh, Canners League of California."

⁵⁰ Belick, "First-Year Experiences at San Jose, California"; Brown and Caldwell, *Treatment and Disposal of the Sewage and Industrial Wastes of San Jose and Vicinity*, July 1959.

Land disposal prompted concern from Santa Clara County Health Department about creation of breeding grounds for insects and other pests. The department ordered them to use of the Newby Island disposal facility or guarantee that they would follow certain procedures for the proper care of the open disposal sites, such as discing, spraying for insects, and inspecting for problems. The department continued to follow up on the private waste disposal operations, reporting the results of their investigations to the canners at the Santa Clara County Canners meetings, which included the canners and representatives from the garbage hauling companies. Usually, at least fifty percent of the operations during the 1950s operated at county standards, meaning there were few flies and no extensive odor. When there were problems, they generally occurred because of lack of attention to the procedure of spreading the waste. Often the waste was too thick, the soil was not prepared to receive the waste, or the wastes needed to be disced into the soil more thoroughly. The department added that some complaints came from people who simply did not want to live near a disposal site and filed nuisance complaints to force the companies to move.⁵¹

What is most interesting in the communication between the Santa Clara Health Department and the Santa Clara County Canners is the consistency with which the department representatives insisted the canners follow their trail of waste from beginning to end, and that the department was so accommodating in assisting the canners. For example, after World War II, Santa Clara County issued an ordinance allowing the use of the dump and cover method of waste disposal only at certain sites. Because only using the preapproved sites was incredibly expensive for the canneries, the county and the

⁵¹ "Minutes of Fourteenth Meeting of Board of Directors of Santa Clara County Canners Association", February 15, 1950, Box 46, Folder 23-24, California League of Food Processors Collection.

canners reached what Dr. W. Elwyn Turner, head of the Santa Clara County Health Department, termed a “Gentlemen’s Agreement.” The department allowed the canners to dispose of wastes at their sites as long as the cannery managers used methods approved by the health department and kept them open to inspection. The two sides maintained the agreement until 1960 when Turner announced that the rapid urbanization of Santa Clara County meant the arrangement was no longer tenable. With the 1960 season, he told the canners he was unable to offer much leniency any longer because citizens would no longer tolerate nuisances near their neighborhoods. If canners failed to resolve their problems quickly that year, the department would report violations to the District Attorney. In response, the SCCC formed a committee to respond to public health complaints.⁵²

Disposing of liquid wastes via sewage systems or waterways was much more difficult in Santa Clara County. The canneries of Santa Clara County were not as close to San Francisco Bay as those in the East Bay were making direct ocean or bay dumping cost prohibitive. Many canneries were concentrated in San José and used the county sewage processing facilities or disposed of cannery wastes in Coyote Creek. Before World War II, the Santa Clara canners had received the same warning from the Fish & Game Department as other canners in northern California, but the department did not enforce the required screens with openings of not more than 1/32 inch until after the war. In the 1950s, Santa Clara County had one sewage processing plant for the entire county, which was not adequate for processing all the canners waste in addition to homeowners

⁵² “Minutes of Meeting of San Jose Committee of Waste Disposal January 9, 1939”, 1939, Box 56, Folder 16, California League of Food Processors.

wastes to the specifications of the SFRWPCB.⁵³ The San Francisco Regional Water Pollution Control Board argued that the southern section of the bay had too much pollution and began measuring the outflows of the sewage processing plant and local manufacturers, which allowed the board to connect the pollution to the polluters more precisely.⁵⁴

Given the extreme difficulty of wet sewage disposal in Santa Clara County, an innovative solution to cannery waste disposal was to try to create a product to make from the fruit sludge. Processors sold vegetable wastes for cattle feed often, thus canners and food scientists began to experiment with the concept. The National Canners Association Western Regional Research Laboratory in Albany, California and the Canners League of California experimented with the conversion of pear waste to feed molasses and dried feed pulp. In 1949, the NCA lab and the CLC had worked with the University of California Agricultural Experiment Station in Davis to see if the products were palatable to cows and sheep. After some experimentation with the livestock, it turned out that the cows and sheep both thought it was tasty. The project pushed past its original pear experimentation and tested the experiment with the other high forms of cannery waste, such as peaches and tomatoes. The project was exciting for everyone involved and attracted media attention.⁵⁵

While agricultural scientists proved the concept of pear waste conversion in the laboratory, several Santa Clara County canners invested in a new company, Pacific

⁵³ Belick, "First-Year Experiences at San Jose, California"; Brown and Caldwell, *Treatment and Disposal of the Sewage and Industrial Wastes of San Jose and Vicinity*.

⁵⁴ Brown and Caldwell, *Treatment and Disposal of the Sewage and Industrial Wastes of San Jose and Vicinity*.

⁵⁵ United States Department of Agriculture, "USDA Press Release about San Jose Waste Disposal Experiment", January 24, 1952, Box 36: Folder 45, California League of Food Processors Collection; M.A. Clevenger, "Pilot-Plant Research on Cannery Waste Pays Off," *The Canner*, November 5, 1949; M.A. Clevenger, "Pilot-Plant Research on Cannery Waste," *Western Canner & Packer*, November 1949.

Biochem, that promised to make the processing of pear waste into cow feed profitable. While the theory was sound, there were a number of production and marketing problems with Pacific Biochem. The company had ongoing difficulties setting up the factory to operate within budget and on schedule. Canneries produced waste, delivered it to the factory, but Pacific Biochem could not process most of it because of management's inability to bring the factory to full production. San José Scavenger Company had to take the waste to Newby Island instead. Thus, the canners were paying disposal fees rather than getting a return on their investment in waste processing. Also, the San José Scavenger Company drivers dripped the wet garbage on their routes to the factory and Newby Island. The spillage from the trucks was the source of nuisance complaints from people living on their routes causing the Health Department to reprimand Pacific Biochem, the canners, and the hauling company. After a few years of intermittent operation, the amount of products made proved inadequate to cover operations. While the concept worked in the experimentation phase, the parties could not make it economically feasible. The company ceased operating in 1955 with a \$40,000 deficit. However, another company operating in Oregon did succeed a few years later in using pear waste to produce byproducts, proving the concept was possible.⁵⁶

⁵⁶ Box 55: Folder 41 Waste Disposal 1951, Box 36: Folder 46 Waste Disposal Tersini Plant Sale 1952, Box 36: Folder 53 Tersini Plant Sale, Box 21: Folder 59 Tersini Plant Sale 1955, California League of Food Processors Collection, University of California – Davis Special Collections. These folders are filled with notes on the meetings of the Waste Disposal Committee, many of which discuss the functioning of the plant. Cannery executives, managers, trade association leaders, and other engineers discuss and problem-solve the various technical difficulties with the large scale processing of the pear waste.

Cannery Waste in the 1960s

The rising wave of environmental activism in the 1960s led to additional regulation of water sources in America to decrease pollution and create healthier water systems. Recreational users of water, wildlife activists, public health practitioners, mothers, families, and concerned citizens joined to demand increased legislation to protect water sources and enforcement of existing laws.⁵⁷ For fruit canners in California, the change in water use priorities meant increased environmental regulation. Canners began to change their approach to dealing with the cannery waste problem and invest more attention, time, and money into alternatives to disposal.

The Central Valley remained primarily an agricultural region through the 1970s, and as priorities changed, city and county officials struggled to balance demands for increasing environmental regulation with the primary source of revenue for people in the area. As orchards turned into suburbs elsewhere, the Central Valley became the primary producer of canning fruits. In 1966, Tri-Valley Growers (TVG) launched a feasibility study for building a “supercannery” that combined the operations of three plants in downtown areas of San José, Stockton, and Modesto into one facility. As TVG searched for a location, access to inexpensive, reliable waste facilities was a priority. Modesto’s long-term plan for processing cannery and industry sewage met state and federal standards. Astute planning by Modesto city planners made it the center of fruit

⁵⁷ Richard N. L. Andrews, *Managing the Environment, Managing Ourselves: A History of American Environmental Policy*, 2nd ed. (New Haven: Yale University Press, 2006); Hays, *Beauty, Health, and Permanence*.

processing in northern California in the 1960s and 1970s creating more jobs for locals at the supercannery and nearby food packaging manufacturing facilities.⁵⁸

As the years passed, Stockton continued to struggle to meet sewage treatment needs. The city's location on the San Joaquin River was not advantageous in terms of diluting waste into the river because its slow flow did not produce enough oxygen during the peak sewage processing times. The addition of the Deep Water Channel to increase navigation to and from the city made the problem even worse as it created a "natural settling basin." Thus, the requirements for the city to disperse effluent into the river were much higher than other cities. Additionally, by 1969 the city still had not installed the equipment needed to process the volume of cannery wastes they received. In April 1970, the Central Valley Regional Water Quality Control Board (CVRWQCB) had a filed Cease and Desist Order against the City of Stockton that ordered them to stop accepting industrial waste until they met the CVRWQCB requirements. Each of the canners in Stockton attended the hearing following the issuance of the order to stand up with the City of the Stockton and protest the actions of the CVRWQCB. In the end, the two sides resolved the problem, and Stockton built a multi-million dollar expansion to its processing plant.⁵⁹

Not long after the Stockton battle, the city of Tracy began receiving notifications from the Central Valley Water Quality Control Board about its effluent. The CVRWQB gave specific directions on what facilities to build to meet the disposal needs and environmental regulations, but the city council felt the regulations were too strict or

⁵⁸ "Tri/Valley Growers New Super Plant", n.d., Tri/Valley Growers; "Approval of Sewer Bonds Clinched Tri-Valley Decision"; Tri/Valley Growers, "Tri/Valley Growers 50 years of survival and growth 1932 - 1982," 29-32.

⁵⁹ Bill Cook, "State Agency Chairman Defends New Sewage Treatment Standards Stockton will be Required to Meet," *Stockton Record*, March 5, 1969.

“unrealistic.”⁶⁰ The Cannery League, the cannery, and city councils of Stockton and Tracy viewed the pollution regulations in relation to other cities and not their specific environments. Jenks consistently advised the CLC to tell canners to get involved in the creation of regulation earlier to prevent undesirable standards from passing. Another tactic canners opposed to the new regulations in their city or county used was to question the validity of the regulations and the science used to create regulations. Specific requirements of the regulations became more detailed as science and technology emerged to measure water health, and advocates of water health used these tools combined with greater public and governmental support to enforce the spirit of laws put in place decades before.⁶¹ The problem with enforcing water quality in the early twentieth century had been that too many ways existed for manufacturers and cities, such as Stockton, to argue their effluent was not harming the environment. More precise measurement and understanding of ecology allowed environmental agencies and activists to prove the waste was indeed causing substantial environmental change.

Increasingly in the 1960s and 1970s, consultants advised canners and the CLC to start thinking very seriously about methods of waste disposal other than through municipal sewage systems and waterways; they recommended in-cannery processing or more creative postproduction disposal methods, such as the pear byproduct plant. They believed the new methods could provide solutions to the waste problem helping people

⁶⁰ Central Valley Regional Water Quality Control Board, “To the City of Tracy”, October 16, 1970, Box 20, Folder 27, California League of Food Processors Collection; City of Tracy, “To Central Valley Regional Water Quality Control Board”, January 12, 1971, Box 20, Folder 27, California League of Food Processors Collection; Jack Walter, “State Board Cracks Down on Pollution,” *San Francisco Examiner*, February 10, 1971.

⁶¹ William Jenks, “To James Bell”, July 19, 1971; William Jenks, “To James Bell”, December 7, 1970, Box 20, Folder 27, California League of Food Processors Collection; William Jenks, “To James Bell”, October 8, 1971, Box 19, Folder 8, California League of Food Processors Collection; Central Valley Regional Water Quality Control Board, “To the City of Tracy”; City of Tracy, “To Central Valley Regional Water Quality Control Board.”

view the canners in a more positive light when the cannery waste problem came up in political situations.⁶² One solution to the fruit sludge problem was composting. While it may seem like a simple concept, composting cannery waste on large scale was a complex process requiring consistent maintenance and coordination. The Department of Agricultural Engineering at the University of California, Davis began the composting project, and it provides another example university and industry cooperation. The basic plan was to use food processors' waste to provide fertilizer or fertilized land for farmers. The many facets of the operation were tested at a smaller scale, such as the amount land required for various loads of cannery waste, compliance with public health regulations, degree of improvement in soil quality, estimated cost, and potential for groundwater contamination.⁶³ Recycling agricultural waste was an age-old solution that diminished somewhat in twentieth century America. For many centuries, people used waste to feed animals or fertilize land. However, fear of spreading disease led to a decline of the practice.⁶⁴

In the 1970s, the Santa Clara County Canners Association developed the Cooperative for Environmental Improvement, CEI, Inc. A brochure about the company's startup claims its purpose was to meet the environmental and economic needs of Santa Clara County. The county closed cannery land disposal sites because of the many new residential neighborhoods. After formally setting up the company, the President, Harvey Lancaster, searched for a site for the project, and eventually selected 2,300 acres on the

⁶² Jenks, "To James Bell"; Jenks, "To James Bell"; Canners League of California, "Report of the Waste Disposal Technical Advisory Committee", July 13, 1960, Box 55 Folder 22, California League of Food Processors Collection.

⁶³ Hermann Timm, "Letter to Lawrence Taber, CLC", December 4, 1972, Box 21, Folder 36, California League of Food Processors Collection; Hermann Timm, "Letter to Lawrence Taber, CLC", May 17, 1973, Box 21, Folder 36, California League of Food Processors Collection.

⁶⁴ Melosi, *Garbage in the Cities*.

Santa Clara and San Benito County line. The company began hauling cannery waste from the 1970 pack to the leased land. Trucks brought the waste to the property, and bulldozers spread it over the land evenly to dry. The first thin layer dried for a couple days. Then, the waste was disced into the soil allowing the microorganisms to break down the waste and create carbon dioxide, water, and humus. The first year, CEI received 67,251 cubic yards of material from the Santa Clara County Cannery and the San Benito County Cannery. They were up to processing 98,742 cubic yards a year in two years. The site also became a place to dispose of surplus or unusable products. For example, the California Prune Growers Advisory Board dumped 2,585 tons of prunes there in 1970.⁶⁵

Cannery found the results of the experiment rewarding because they had a reliable way of removing waste for which they received good press, and others benefitted as well. The Public Health Departments of Santa Clara County and San Benito County were relieved of the struggle for cannery waste disposal for a few years. Both counties kept watch over the process to ensure the CEI management handled the waste properly, as composting on such a large scale can have dangerous results if neglected. The University of California Agricultural Experiment stations also watched the operations and conducted experiments on part of the acreage to see the maximum the earth would bear. In some of the experiment stations projects, they successfully composted four times as much waste as CEI used large scale. Farmers also had something to gain from composting. The chosen site's soil was alkaline, and the waste was mostly acidic. Experimenters hoped the introduction of waste would create balanced humus and improve the soil for planting.

⁶⁵ "Cooperative for Environmental Improvement, Inc.: A Santa Clara County Cannery Food Residuals Disposal Association D-2613", n.d., California League of Food Processors; Reed, A.D. et al., "Soil Recycling of Cannery Wastes," *California Agriculture* 27, no. 3 (March 1973): 6-9.

The first plantings in the soil of the compost experiment grew normally, and in some cases, even better.⁶⁶

As it was also an agricultural extension experiment, the knowledge gained became part of the agricultural science community. A description and analysis of the experiment appeared in several scientific publications. Passing on the knowledge allowed other canning communities and companies across the United States to learn from the experiment and assess risks. Small food processors in the Midwest and East were under many of the same pressures as the California canners in regards to the waste and suburbanization problems and learning about the experiments of communities with more resources, such as northern California, gave them information they could not have afforded to discover themselves.⁶⁷

The composting experiment illustrates how canners tried to remain in cities around the Bay Area. Moving farther from the highly populated Bay Area could have reduced their waste problems, but they would have lost the benefit of working in the city. The canners argued the cities would have also lost the economic benefit of the canneries.⁶⁸ This was a valid point. At that time, canning and fruit culture was still a vital part of the economies of Santa Clara and San Benito. However, within years, industrial growth and the explosion of Silicon Valley overshadowed the contributions of the fruit processors to Santa Clara County. By the 1970s, canneries moved to the Central Valley because land was cheaper, and expanding operations was less expensive.

⁶⁶ “Cooperative for Environmental Improvement, Inc.: A Santa Clara County Canners Food Residuals Disposal Association D-2613.”

⁶⁷ Reed, A.D. et al., “Soil Recycling of Cannery Wastes”; William N. Helphinstine, “Using Cannery Wastes on Forage Cropland,” *California Agriculture* 30, no. 9 (September 1976): 6–7.

⁶⁸ “Cooperative for Environmental Improvement, Inc.: A Santa Clara County Canners Food Residuals Disposal Association D-2613.”

As much as canners used alliances to increase political power, they also used public relations tactics. The canners sought to overcome the pollution problem and change their image. They increased news coverage of the steps they took to solve the waste problem including changes in cannery design, such as the Modesto Supercannery, and byproduct experiments, such as the pear to cattle feed project and large-scale composting project.⁶⁹

Conclusion

Canned fruits and vegetables offer two main conveniences. First, canning preserves food for a very long time in a tough container. It is an amazing food solution for disasters and foreign environments. Second, it is a food of convenience. One can have vegetables or fruit with a miniscule amount of energy and waste compared to the amount of energy -- sun, labor, and fossil fuels -- put into production and the waste already redirected from the consumer. Thus, the consumer avoids having to do a lot of chopping and peeling and discarding a pile of vegetable or fruit scraps. Commercial canned food redirects all of the energy and waste from millions of consumers to one location, and that location pays the price environmentally for the economic and social benefit of hosting a food processing industry. This case study is just one small part of the larger story of the environmental history of the food processing industry.

The search for a pollution resolution is an interesting story that reveals how the connections between food processors, farmers, and cities were changing in the mid 20th century. Rapid suburbanization in northern California dramatically changed land use and put pressure on existing infrastructure systems, such as transportation, electricity, and sewage. The changing economic climate of northern California also altered the resource

⁶⁹ "Canning Industry Information Kit", 1970, Box 64, Folder 27, California League of Food Processors Collection.

use priorities of the region. World War II had a dramatic effect on the growth of new industry in northern California. Heavy manufacturing, such as shipbuilding, and new high technology businesses became fast growing industries. Just a few decades after the war, Silicon Valley thrived where orchards had once blossomed. These new industries would help California rise to the top of economic and political power in the United States. The new economy and population of northern California caused conflicts over resource use and disrupted existing power structures.

Varying perspectives of urban/rural relationships emerge in this study. The agricultural wealth of California's growers poured into canneries and packinghouses, and the leftover material created a huge mass of waste. In the early twentieth century, urban canneries began dumping their waste into municipal sewage systems. The boom of suburban building and new industries in the twentieth century led to a sewage crunch in Bay Area communities, and cities began to force businesses to pay their fair share of the cost of processing it.

Although the waste problem was common to all northern California canners, the disposal options varied based on the environment in which the cannery existed. The diversity of the geography of California is quite evident in this problem. It takes roughly an hour and a half, without traffic, to drive from San José to Modesto, but the waste disposal options of Bay Area canners were quite different from those in the Central Valley. Sewage and industrial pollution of water systems are a vital part of the history of water use in California. More water use meant more waste from sewage because the water that goes in a factory or home often comes out in another form. Preserving existing water sources is imperative in arid regions.

One can also see the effect of growing environmental awareness. Early complaints about river pollution came from the Fish and Game department, farmers, and anglers. After World War II, California's legislature created river pollution regulation agencies to monitor not just water consumption, but water health. They set strict regulations that forced many canners to find alternate ways of disposing of waste. These were at times very creative and showed great potential for opportunities to reuse waste. Canners that decided to try to bury or dump on the ground risked attracting hordes of pests. Sanitary engineers across the United States produced reports on the best methods of disposing of cannery waste ranging from purification plants to composting. Often the method called for processing the waste in some way, but the question remained – how clean is clean? Much like the quest for food safety regulation, the quest to dispose of waste often led to many definitions of purity. Scientific studies produced by industrial researchers, university scientists, and ecologists provided many definitions of purity and contradictory priorities for water quality.

The canners' waste situation also reveals a failure of self-regulation of water pollution. Environmental regulation of food processors in the twentieth century was necessary because the canners did not manage unprofitable waste problems until state and federal agencies forced their hand. When they did finally find creative byproduct solutions, the strong forces that encouraged increased agricultural production and processed food markets, primarily supported by the United States Department of Agriculture and the California Department of Agriculture, were not there to support byproduct industries, as they had been to support the creation of more traditional agricultural markets. The byproduct experiments illustrated the potential for new ways to

solve the cannery waste problems, so why did they fail? Lack of markets. The same networks of production combining food processors, government agencies, grocers, truckers, and consumers built a vast processed food empire but made it very hard for people to take risks and change the stream of product flow. The politics and mindset of the USDA and California Department of Agriculture come into play here. Both agencies have a mandate to increase agricultural markets, but these cases show that they only take that mandate as far as farmers, not processors. Why did the California Department of Agriculture or USDA not get involved during this crisis to help support fledgling byproduct markets? Is it because of entrenched power of grain growers to create cattle feed or the power of chemical manufacturers that led to the rejection of creating compost for organic farming? Other new markets for agricultural goods are often created through consumer demand, but in these early days of the environmental movement, the power of the consumer had not yet been harnessed. Perhaps it was due to a philosophy of material use in American culture that has not traditionally encouraged reuse for the sake of conservation, even when material reuse was unprofitable.

CONCLUSION

California Cannery and Growers filed for bankruptcy in June 1983. According to a *Wall Street Journal* article, sales had been declining for several years resulting in more than \$197 million of accumulated debt. Cal Can had produced the top selling diet fruit brand in the nation, Diet Delight, until the FDA announced in 1969 that cyclamates, the sweetener used in the canned fruit, caused cancer. When the FDA banned the use of cyclamates, Cal Can could no longer sell the product or its stock. Another report published in 1982 contradicted the FDA's findings, but it was too late for Cal Can, and the company had to write off twenty million dollars in losses. When filing for bankruptcy, Cal Can listed the cyclamates ban as partially responsible for its demise.¹ Whether the decline of Cal Can was due solely to the cyclamates scare or to mismanagement in a transitional period in agribusiness did not help the five hundred grower members of the cooperative who were owed thousands in back payments by the cooperative.² The members of Cal Can represented the small and mid-size growers of California, and the loss of a large marketing outlet reduced their options for selling their fruits and vegetables. It was also a loss to the region because Cal Can was a locally owned enterprise that returned the profits back to the growers of northern California.

The decline of Cal Can was just the beginning of transitions in the agribusiness industry that had far-reaching consequences for northern California's fruit canning

¹ Bill Bucy, "Court backs Growers Co-op in U.S. Suit," *Modesto Bee*, December 20, 1984, sec. C; Warren Lee, "Ban on cyclamates may be lifted after review of recent studies," *Modesto Bee*, August 1, 1984, sec. A, (accessed October 29, 2012); Carolyn de la Pena, *Empty Pleasures: The Story of Artificial Sweeteners from Saccharin to Splenda* (The University of North Carolina Press, 2010), 69–83.

² Kathie Smith and T.J. Burnham, "Cal Can getting governor's ear," *Modesto Bee*, June 1, 1983, sec. B, (accessed October 29, 2012).

industry. In December 1999, Del Monte plant number three closed in San José after eighty-two years of production. By the time the cannery closed, reporter Geoffrey Tomb claimed the cannery had become an “economic rock” in the San José community. Compared to other agricultural industry jobs, the pay was better, and it was reliable.³ The *San José Mercury* covered the event as it would the closing of any honored institution and printed a series of articles titled the “Final Harvest Series.” The last pack in the San José cannery lasted more than two months and had three shifts operating around the clock to produce fruit cocktail and canned pears. Del Monte held a big goodbye party in a pear storage room where employees exchanged memories surrounded by thirty tons of pears. While the plant only moved to Modesto, Tomb wrote that the closing of the cannery marked the end of an era in San José’s history.⁴ San José was once the Valley of Heart’s Delight, but many of the orchards had already moved to the Central Valley by the time the plant closed. In 1940, there had been 18,584 acres of apricot orchards in Santa Clara County, but by 1998, there were only 500 left. Del Monte, born from northern California’s entrepreneurs, culture, and environment was leaving the valley as well.⁵

Over the decades, the semi-conductor industry had replaced the fruit industry as the dominant business in Santa Clara County. While the companies of Silicon Valley were born into the community created by horticulturists and food processors, they did not have the ties to the land their predecessors had. Silicon Valley could move to Los Angeles, California or Austin, Texas without significant change in the product. The lack

³ Geoffrey Tomb, “Fruitful Legacy,” *San Jose Mercury*, September 12, 1999, Final edition.

⁴ Geoffrey Tomb, “The Last Dance,” *San Jose Mercury*, October 10, 1999, Final edition.

⁵ Geoffrey Tomb, “As the Final Harvest Ends, a Tech Fortune Begins,” *San Jose Mercury*, December 18, 1999, Final edition.

of dependency on Santa Clara County's soil and climate of Silicon Valley's companies was similar to many other companies that emerged in the Bay Area after World War II.

While Del Monte remained a standard, recognizable brand for consumers, in 1979, R.J. Reynolds acquired the Del Monte Corporation. DMC had weathered difficult transitions in the 1960s and 1970s and become a very solid international and diverse corporation, and the company prospered under R.J. Reynolds. In 1988, Kohlberg Kravis Roberts purchased R.J. Reynolds for more than twenty-four billion dollars. To help pay for the purchase, KKR divided up Del Monte's divisions and sold them piece by piece to overseas buyers, dismantling a century's worth of building. In 1990, Del Monte's management team, led by Ewan MacDonald, acquired the remainder of DMC for \$1.48 billion, most of which was financed outside the company. Under MacDonald's leadership, the company grew by nine percent a year. Del Monte continued to acquire and sell different brands, such as Nabisco, Kraft, and Birdseye, through the 1990s and early 2000s.⁶ By 2011, Kohlberg Kravis Roberts & Co once again purchased Del Monte for five billion dollars.⁷ Del Monte's beginnings symbolized the early fruit canning industry in California, but the company quickly outgrew the state and became a national company. Loyalty held DMC to its roots in northern California to some degree as it always headquartered in San Francisco, except when under R.J. Reynolds. Nevertheless, Del Monte Corporation no longer answered to Californians, it answered to its stockholders that were located across the world, unlike California's cooperatives. DMC

⁶ Paula Kepos, ed., "Del Monte Corporation," in *International Directory of Company Histories*, vol. 7 (Detroit: St. James Press, 1993), 130–132.

⁷ Doug Cameron, "Del Monte Foods Agrees To Takeover By KKR-Led Group," *Dow Jones DBR High Yield* (November 26, 2010): n/a, (accessed October 29, 2012); Ben Harrington, "KKR group agrees \$5bn deal for Del Monte Foods," *Daily Telegraph (London, England)*, November 26, 2010; Martin Arnold, Lina Saigol, and Helen Thomas, "KKR leads \$5bn buy-out deal for Del Monte Foods," *The Financial Times*, November 26, 2010.

continued to purchase from California growers, but its worldwide investments did not tie the company to the environment or economy of northern California.

In contrast to Del Monte, Tri/Valley Growers had many ties to the San Francisco Bay area, the Delta, and the Central Valley as it represented growers and local businesses there. TVG filed for reorganization under Chapter 11 of the U.S. Bankruptcy Code in July 2000. Surrounding this sad event for many growers in the Central Valley was intense speculation about what went wrong. Many people questioned whether cooperatives were still viable models in the twenty-first century. When it went into bankruptcy, TVG supported 1,500 annual employees and 9,500 seasonal workers. The company had grown to include nine processing facilities, including the supercannery in Modesto, and had more than five hundred grower members, mostly in the Central Valley. It had become a competitive producer in the California canning industry along with Libby and S&W Foods.⁸ The decline of TVG was devastating for many in the Central Valley. The unionized cooperative provided competitive wages in the region for permanent and seasonal workers. In fact, many depended on the seasonal work as part of their annual income. Growers were counting on their long-term investment in the cooperative to help increase their production in the future. Bill Cox, a former member of TVG, said that he could have planted another hundred acres with the equity he lost when TVG fell apart.⁹

William Allewelt, former President of TVG, gave an emotionally charged speech at University of California, Davis a few years after the bankruptcy arguing that the

⁸ Hariyoga Himawan and Richard Sexton, "The Bankruptcy of Tri Valley Growers: What Went Wrong and What Can We Learn From It?," *Agricultural and Resources Economics Update* 7, no. 6 (August 2004): 1–4.

⁹ John Holland, "The bankruptcy of giant farming co-op Tri Valley Growers holds lessons," *Modesto Bee* (Modesto, CA, July 11, 2010), online edition.

cooperative's decline was a failure of management decisions made in the late 1980s and 1990s. He continued to support agricultural cooperatives and declared them vital to California agriculture.¹⁰ Agricultural economists Himawan Hariyoga and Richard Sexton of the Giannini Foundation analyzed the decline of TVG, explaining that the company had not reacted well to changes in the marketplace, particularly in tomato processing. At the end of the cooperative's existence, peach growers had to cover a huge deficit created every year by unsuccessful tomato processing operations. Additionally, the cooperative had purchased outdated facilities from failed cooperatives, which added to its current difficulties in processing olives or tomatoes because the plants required updating in addition to maintenance. Finally, executives trying to salvage the company by tearing apart the TVG management team that had spent many years in the California food industry and replacing them with people with little experience in fruit and vegetable processing or cooperative management. Hariyoga and Sexton also argue that it was not a failure of the cooperative model but an inability of TVG to adjust fast enough to changes in agribusiness in the 1980s.¹¹ While validating the cooperative model probably gave faith to contemporary members of cooperatives in America, it still did not help the growers and workers that had to find a new way to survive economically when the company failed.

An industrial food system had emerged between the Civil War and the 1970s in response, in part, to Americans' changing relationship to the environment. The California canners' story is part of a larger narrative of how the modern American food

¹⁰ William Allewelt, "A Look into the Failure of Tri Valley Growers" (presented at the Vegetable Crops Continuing Conference, University of California, Davis, 2006).

¹¹ Himawan and Sexton, "The Bankruptcy of Tri Valley Growers: What Went Wrong and What Can We Learn From It?".

supply developed, and the impact of the America's food system on food producing regions, such as California, the Midwest, and the Great Plains. Immigration, industrialization, and urbanization in the United States displaced many people in the nineteenth century. They found themselves in unfamiliar environments where they sought reliable and familiar food. In time, processed foods and grocery stores emerged to fill this need creating products and a purchasing experience familiar to anyone anywhere in the country. Food production became a specialized process often sequestered into geographic regions, while national food trends affected the economy, environment, and culture of regions. While some historians have argued that urban market forces shaped distant agricultural hinterlands, the canners history reveals that urban consumers also drove what growers produced. Producers played an important role, influencing, what consumers' diets through advertising and product development. National marketing campaigns and the use of mass media, especially during and after the 1950s, was part of a larger trend towards creating an American cuisine that included many processed foods.

California's fruit canning industry also reveals another aspect of urbanization and industrialization in the West. One does not find exactly the same patterns as in the East because of the timing of the development of these areas, but northern Californians did incorporate industrial practices in many ways. California's industrialization included agroindustries, such as fruit and fish canning, winemaking, or cheesemaking. While food preservation had been more of a craft before the 1900s, it became an industrial venture at the end of the century.

Changes in energy use, transportation, and methods of production were essential developments in creating opportunities for mass production of processed food.

California's distance from the more populated East coast made shipping produce very expensive for fruit and vegetable growers without canning and transportation technology advancements. Just as the trains that crossed the country used thousands of tons of coal, canneries also burned fossil fuels to keep their factories running. Even fruit driers, once dependent on solar energy and human labor adopted ovens to increase stability and control over production. In the 1950s and 1960s, fossil fuels dependency increased rapidly for food processors as canners replaced workers with machinery and growers mechanized harvesting of cannery crops.

As technology and science became more vital to the industry, universities and scientists played an increasingly important role. In California's fruit canning industry, the University of California was a critical part of fruit canners production network. From the early years of the fruit boom in California, the university's agricultural scientists lent their knowledge and expertise to growers assisting with everything from the San José Scale to soil salinization. The university farm provided a space for both experimentation and teaching. UC scientists spent hours training future growers and assisting current growers with new advances in horticulture. The university extension services were essential as well. The service provided growers with practical knowledge without requiring university enrollment. In the 1920s, UC provided specialized research for fruit processors through the Fruit Products Laboratory led by William V. Cruess. The lab helped solve problems common to food processors and create new products, such as fruit cocktail. Some new products, such as crushed peaches and fruit nectars, helped to create additional markets for California's fruit industry solving a significant problem with fruit overproduction. UC provided the science behind processed fruit products for many years

even contributing to the earliest studies of frozen foods. The exchange between canners and growers was reciprocal, university scientists learned from canners, vintners, and growers as well, incorporating what they learned in their own research. University of California, Berkeley and the University of California, Davis taught thousands of food and agricultural scientists the methods used by the California fruit processors and growers preparing them to enter America's food industry, agriculture, or government service. Thus, California's food processing industries contributed to the development of food processing across the nation.

When food became a concern to public health, another group of university scientists uncovered the causes of botulism poisoning. Karl Meyer of UC and Ernest Dickson of Stanford University were vital in creating standards that canners across the country could follow to prepare safe products. Until publication of the National Canners Association pamphlet "What Every Canner Should Know," there was no one source of information to which all canners could turn. Meyer's expertise in public health continued to benefit the industry as he served on the Cannery Inspection Board for many years contributing to the regulation of California's canned goods and increasing the quality of products. Although Dickson and Meyer moved on to study other organisms and diseases, their work on botulism poisoning was invaluable to the national, and perhaps international, food processing industry.

Food processors became the "kitchens of the nation" as the twentieth century progressed. Canners spent millions of dollars courting female consumers. Their advertising campaigns taught consumers how to use new products, check for safety, and read labels. Canners and the CLC fought long and hard to protect their image and to

guarantee that consumers associated their products with quality. Marketing departments studied the needs of consumers, especially women, and hired home economists to help develop products and provide legitimacy through public endorsements. For all of the canning industry's study of women, it continued to support a gender hierarchy that favored men. Gender divisions developed early in the canning industry and remained in place until the 1970s. Canneries hired thousands of women each year as seasonal workers, and precious few women became executives, most women worked on the production line peeling, pitting, dicing, and canning. Women worked the most tedious positions in the canneries, while men made decisions about the commercial food industry. Gender disparity extended to the discipline of food science as well. Until the feminist movement of the 1960s and 1970s, women often became home economists while men became food scientists. The social structure of American society deemed women capable of canning at home and on production lines, but incapable of running a cannery or canning company.

The history of industrial food provides many examples of the dependence of American business on large organizations, and the consistency of the trend towards larger institutions throughout the twentieth century. From canning corporations themselves to their trade associations, the Cannery League of California and the National Cannery Association, canning firms and associations were huge. In response, growers and canners formed cooperatives to provide the benefits of a large company to small and medium growers and canners. By the mid-twentieth century, cooperatives also increased in size to compete with the trend favoring big businesses in the food processing industry.

Although California canners were market leaders with strong production networks, the history of California's canned fruit industry reveals the extent to which federal and state governments were directly involved in the food processing industry as both promoters and regulators. Between the California Department of Agriculture, the United States Department of Agriculture, California State Board of Health, and the Food and Drug Administration, canners received support and vital information. However, the various government agencies involved with the canners were not always capable of handling the needs of the fast changing world of food processing. For example, standardization of canned goods would have been valuable to consumers as they were learning about new canned fruit products. However, the prevailing philosophy of government/business relationships prevented the USDA from pursuing this course. The Canners League of California, along with Calpak, spearheaded the creation of standards for canned fruit that the entire fruit canning industry in California adopted. This example of the associative state is just one of many throughout the industry's history.

Even though the associative state model was often the preferred business-government relationship for the canners, it proved incapable of adequately controlling public health problems related to the canning industry. The most glaring example is during the botulism scare when the fruit canning industry could not require the canners to follow the cooking procedures developed by the Botulism Commission without the creation of state regulations. Even then, it took three statutes and the formation of an inspection board to force all canners to comply. In the end, regulation was helpful to the industry overall as it provided consumers with more confidence to purchase canned foods. However, the cost of new technology (retorts and special thermometers), extra

labor, and inspection fees was borne more easily by larger canners than the rest of the industry. Thus, it favored the larger canners. Another example of state involvement is California's Industrial Welfare Commission was authorized to enforce the minimum wage law created by the state in 1916. Rather than prosecute the canners' piece-wage system, they worked out an system, paid for by the canners, to make sure the canners were paying the workers enough to meet the minimum wage. Finally, canning peach growers and canners required state intervention to control overproduction beginning in the 1920s. Governors stepped in to solve disputes between canners and growers, and the state helped create and monitor marketing orders to control production.

For many decades, canners received assistance from municipal governments. Cities helped process canners waste as an incentive for operating in their towns. When cannery waste did become too much for cities to process, they were extremely accommodating to the canners' needs when negotiating canners' financial responsibilities, as in the case of Stockton, Modesto, and San José. When canners finally solved the public health problems they had created, they received accommodations from local officials, as in the case of San Leandro. Finally, municipal and county police departments intervened in the strikes of the 1930s on the side of the canners to help end the strike. Cities benefitted the canneries as much as canneries benefitted cities and both sides went out of their way to keep up good relations.

The transformation of northern California's landscape in the twentieth century into agricultural and agroindustrial spaces had a dramatic impact on environments, as the goal of the agroindustries was to always increase production. This mentality combined with the same push for production in agriculture encouraged destructive land use

practices. Canning created a market for certain fruits, such as Clingstone peaches. As growers planted orchards they adopted a monocrop agriculture system, which destroyed biodiversity and required the use of pesticides and fertilizers as balances that occur between predator and prey were destroyed along with nitrogen cycles. Canneries and growers used copious amounts of water, which supported the major redirection of water sources in California. Dams and the “reclamation” of wetlands drained the region destroying habitats for birds, fish, small mammals, and plants.¹² Reorganizing waterways through dams and levees also changed where freshwater and seawater met within the Delta and saltwater began to creep farther into inner California. Years of irrigation washed away minerals and soil balance in the Delta and Central Valley causing soil salinization. Finally, using aquifers to supply irrigation water depleted underground supplies causing subsidence in some areas of northern California.

As California’s canners became the “kitchens of the nation,” their waste problems created conflicts with other resources users in the state. Food processors relied on urban infrastructure to operate; they needed electricity, water, and sewage disposal creating conflict over the use of these resources. While food processors created thousands of tons of waste every day in the packing season, they also experimented and adopted byproduct reuse, such as with composting and cattle feed projects. However, some of these experiments were not successful because the American system of consumerism and waste utilization did not reward such efforts.

While this case study analyzes an industry in a portion of one state, it is indicative of the environmental history of food processing in the United States. Much of the power

¹² Garone, *The Fall and Rise of the Wetlands of California’s Great Central Valley*. Garone’s work on this subject as it relates to bird habitats is informative and engaging.

of the canneries, and other food processors, centered in production networks that included complex relationships between industrialists, scientists, universities, and the state. The networks were most successful when the goal of everyone in the network was high production at all costs. When societal values began to change and compete with the goals of the canning industry, canners had to adapt or go out of business. California's fruit canners had a powerful, lasting impact on the national processed foods industry, but even greater influence in their home region. So many people were part of or affected by the industry's production networks that the northern California fruit canning industry influenced the culture and resource use of the area.

The label on a can of Del Monte's fruit cocktail is deceptively simple despite the information it contains, much like A.J. Waterhouse's poem *Santa Clara Valley*, which describes a fictional creation of the Valley of the Heart's Delight. Both the poem and the label hide the labor, economy, environments, and politics of the fruit canning industry and presents only artistically rendered fruit glistening with dew as if plucked from nature without human intervention. The same holds true of many of the products on grocery shelves. Rarely does one get a glimpse of the complex history behind the product. Images of people on the products are fictional marketing characters, Uncle Ben, Aunt Jemima, and Betty Crocker. However, all of those products have a story to tell that reveals the rich history of growers, farmers, workers, food processors, universities, the state, and the environment of America.

APPENDICES

APPENDIX A – MAPS OF CALIFORNIA

Political Map of California

Map of California Elevation

Detail Map of Region Analyzed

Maps of Locations of Common California Fruit Crops

APPENDIX B – DEMOGRAPHIC INFORMATION FOR CALIFORNIA

Population Changes in Select Counties in California

APPENDIX C – CALIFORNIA’S PRODUCTION OF CANNED FRUITS

California Canned Fruit Production

APPENDIX D – UNITED STATES CONSUMPTION OF CANNED FRUIT

Per Capita Food Consumption Comparison, 1910-1963

Canned and Chilled Fruits: Per Capita Consumption, 1909-1963

Dried Fruits: Per Capita Consumption, 1909-1963

Canned Fruit Utilization, 1909-1963

Statistics and maps were valuable resources in the development of this dissertation. They reinforce the arguments and conclusions so strongly that they are almost constantly part of the discussion; thus the most valuable tables and maps are

included here. Appendix A contains various maps of the California. The first two maps provide an overview of the political and topographical features of the state. The third is a detailed map of the region covered by the dissertation, the San Francisco Bay Area, the Sacramento-San Joaquin Delta, and the Central Valley. The last set of maps, prepared by the California Crop Service, shows the general locations of where various crops were most often grown. Appendix B contains a table detailing the population change in the counties under examination in this dissertation. You can use the chart's data with the first map in Appendix A to understand the movement of population in the region. Appendices C and D contain tables and graphs that detail the production and consumption of canned fruit over time. The Canning Age Almanac first printed the data used to compile the table. The consumption data comes from a report prepared by the USDA Economic Research Service. The information for the report was often taken from trade associations' reports and data gathered from the companies directly. Looking at the tables, one can see how trends in production and consumption changed over time.

APPENDIX A – MAPS OF CALIFORNIA
POLITICAL MAP OF CALIFORNIA



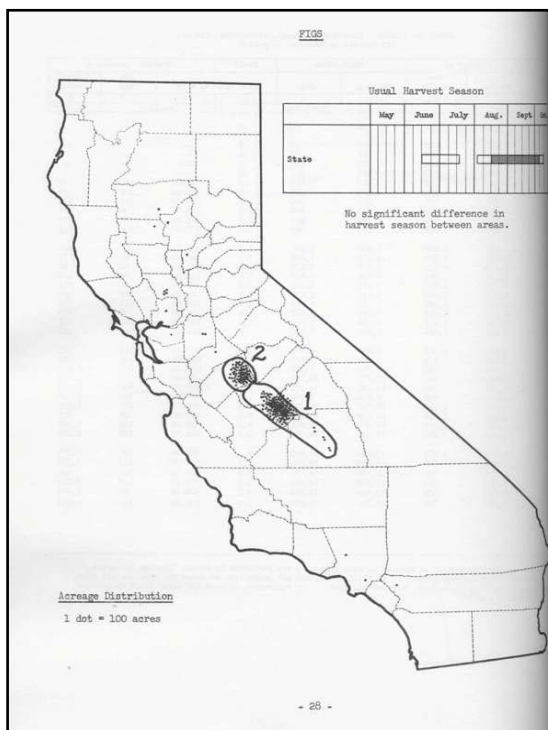
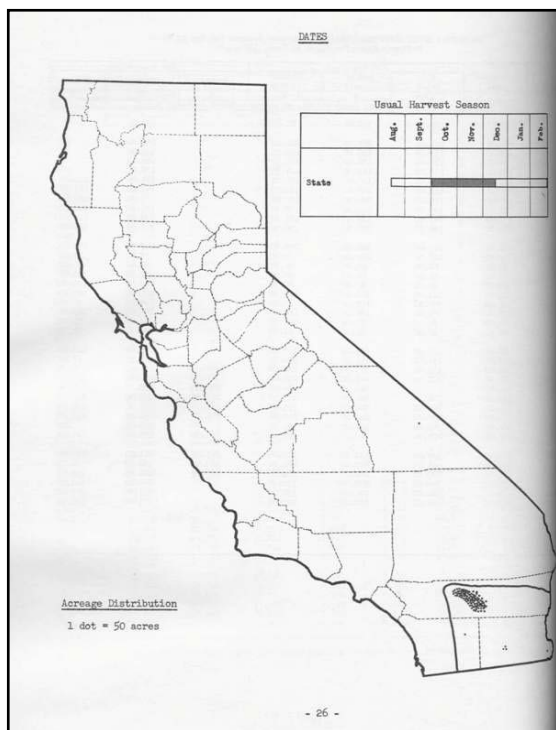
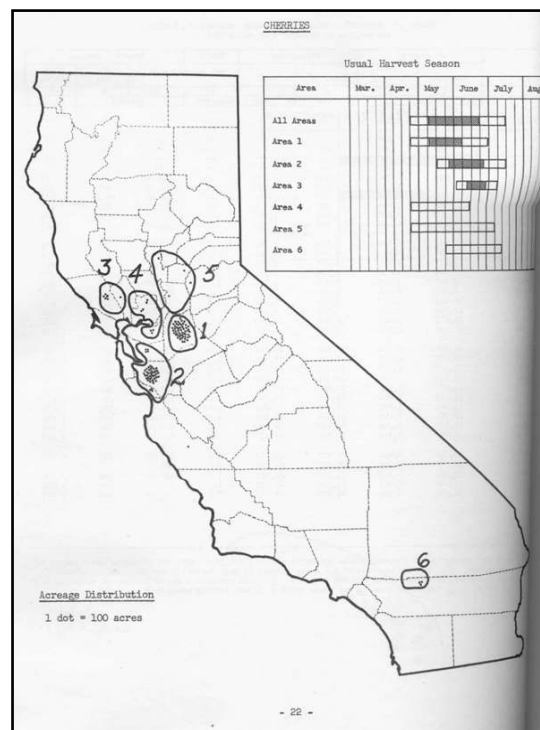
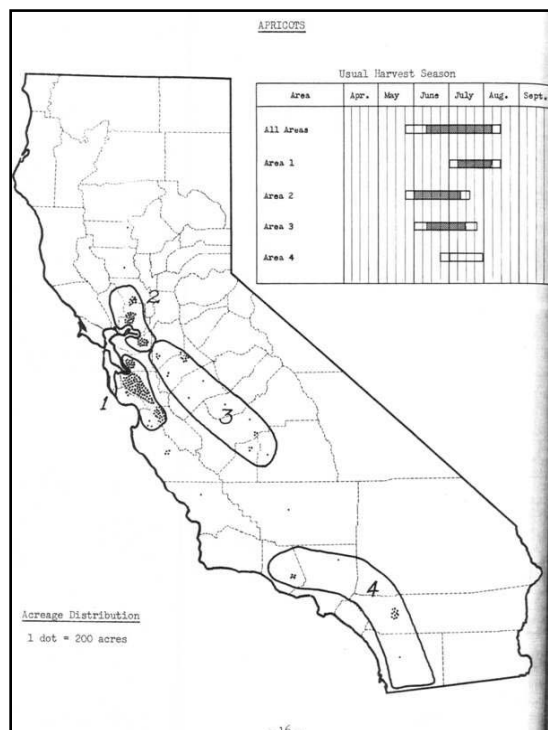
MAP OF CALIFORNIA'S ELEVATION

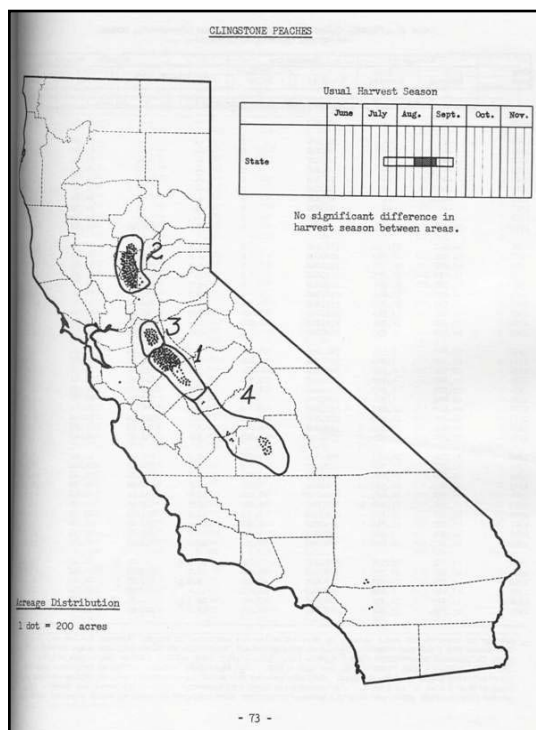
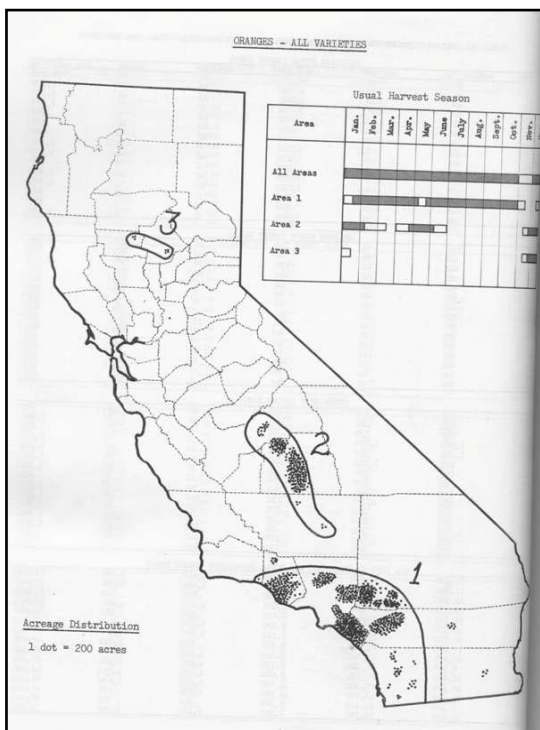
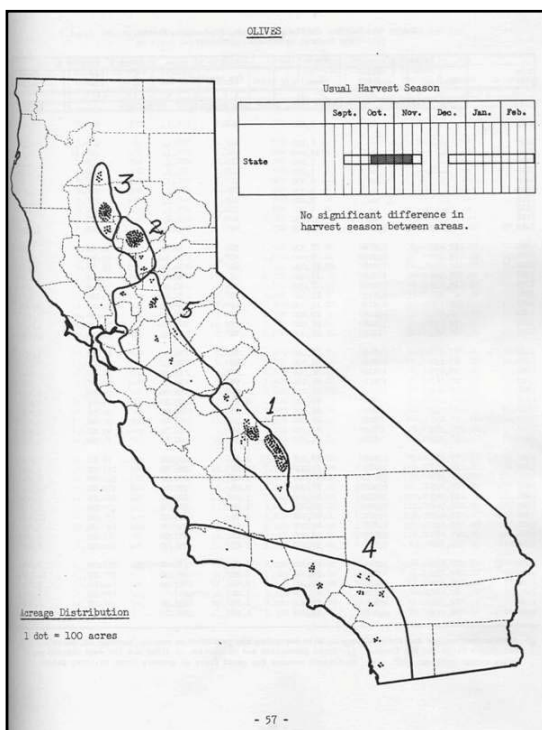
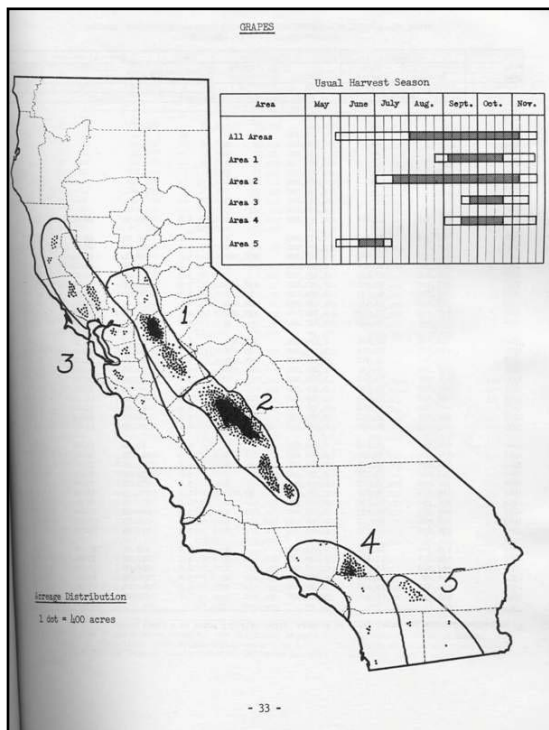


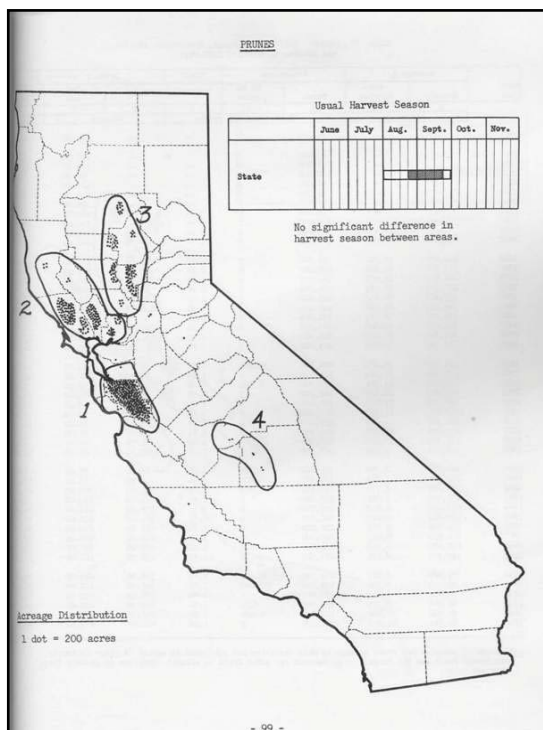
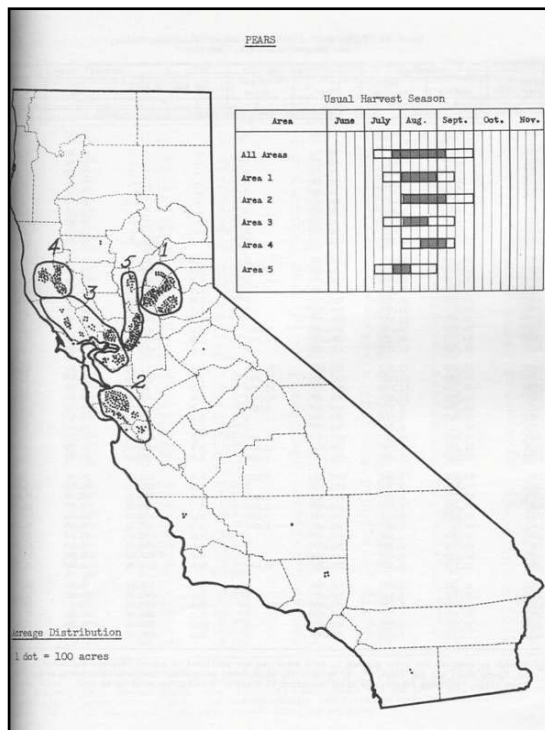
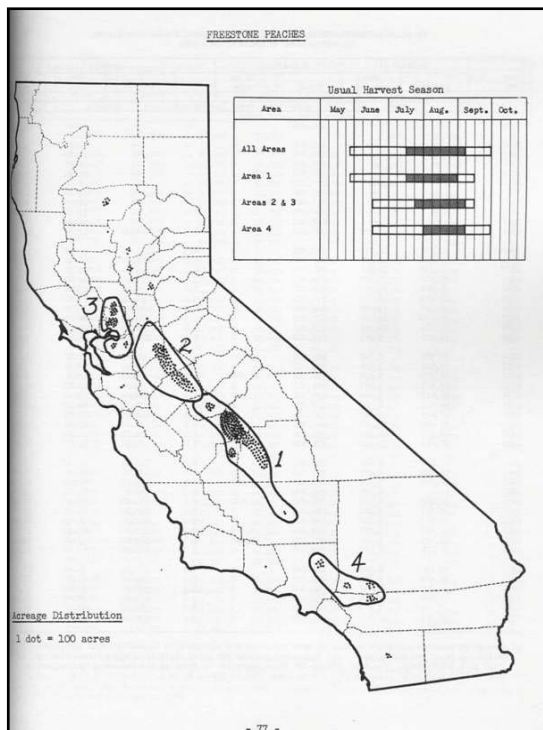
DETAIL MAP OF REGION ANALYZED



LOCATIONS OF CALIFORNIA CROPS







APPENDIX B – POPULATION CHANGES IN SELECT COUNTIES, 1900-1970¹

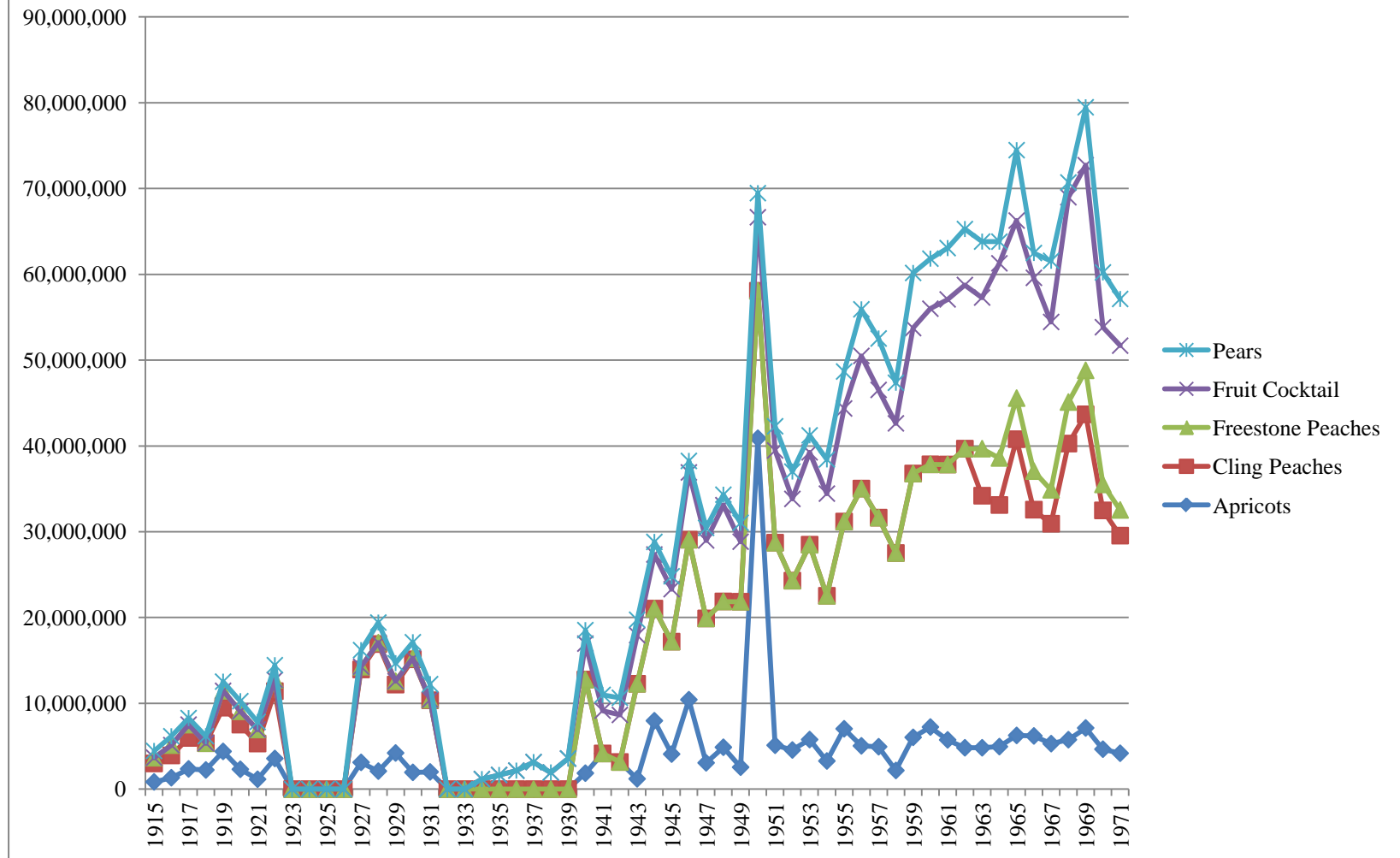
Population Changes in Select Counties, 1900-1970²								
	1900	1910	1920	1930	1940	1950	1960	1970
Alameda	130,197	246,131	344,177	474,883	513,011	740,315	908,209	1,073,184
Contra Costa	18,046	31,674	53,889	78,608	100,450	298,984	409,030	558,389
Sacramento	45,915	67,806	91,029	141,999	170,333	277,140	502,778	631,498
San Francisco	342,782	416,912	506,676	634,394	634,536	775,357	740,316	715,674
San Joaquin	35,452	50,731	79,905	102,940	134,207	200,750	249,989	290,208
San Mateo	12,094	26,585	36,781	77,405	111,782	235,659	444,387	556,234
Santa Clara	60,216	83,539	100,676	145,118	174,949	290,547	642,315	1,064,714
Santa Cruz	21,512	26,140	26,269	37,433	45,057	66,534	84,219	123,790
Solano	24,143	27,559	40,602	40,834	49,118	104,833	134,597	169,941
Stanislaus	9,550	22,522	43,557	56,641	74,866	127,231	157,294	194,506
Sutter	5,886	6,328	10,115	14,618	18,680	26,239	33,380	41,935
Yolo	13,618	13,926	17,105	23,644	27,243	40,640	65,727	91,788

¹ U.S. Census Bureau, Total Population 1970, 1960, 1950, 1940, 1930, 1920, 1910, 1900, Prepared by Social Explorer,
<http://www.socialexplorer.com.ezproxy.lib.uh.edu/pub/reportdata/HtmlResults.aspx?reportid=R10346625>
 (accessed 10.30.12)

² U.S. Census Bureau, Total Population 1970, 1960, 1950, 1940, 1930, 1920, 1910, 1900, Prepared by Social Explorer,
<http://www.socialexplorer.com.ezproxy.lib.uh.edu/pub/reportdata/HtmlResults.aspx?reportid=R10346625>
 (accessed 10.30.12)

APPENDIX C – CALIFORNIA CANNED FRUIT PRODUCTION

California Canned Fruit Production, 1915-1971 (in cases)



CALIFORNIA CANNED FRUIT PRODUCTION (IN CASES OF 24 CANS) ¹

	Apricots	Cling Peaches	Freestone Peaches	Fruit Cocktail	Pears
1915	842,370	2,149,375	667,375		788,415
1916	1,327,770	2,597,390	1,202,940		1,032,810
1917	2,356,553	3,607,568	1,554,393		758,142
1918	2,233,314	3,122,458	1,393,595,		811,950
1919	4,395,204	5,096,249	1,962,700		1,071,687
1920	2,312,020	5,205,511	1,547,687		1,184,288
1921	1,150,514	4,162,849	1,633,418		872,396
1922	3,569,918	7,844,912	1,314,597		1,712,773
1923					
1924					
1925					
1926					
1927	3,116,713	10,829,681	320,812		1,929,805
1928	2,097,070	14,811,606	163,830		2,336,593
1929	4,211,471	7,972,086	392,478		2,101,901
1930	1,954,194	13,173,703	120,078		1,871,488
1931	2,005,724	8,348,652	71,965		1,808,655
1932					
1933					
1934				1,167,851	
1935				1,649,907	
1936				2,156,808	
1937				3,152,313	
1938				1,941,817	
1939				3,563,437	
1940	1,859,473	10,908,444		4,189,372	1,570,805
1941	4,155,369	12,931,841		4,989,212	1,839,837
1942	3,159,547	14,659,804		5,484,144	1,998,107
1943	1,200,662	11,075,262		5,652,767	1,808,468
1944	7968,858	13,068,379		6,301,818	1,469,138
1945	4,082,085	13,104,942		6,112,239	1,505,782
1946	10,422,205	18,647,917		7,831,517	1,344,638

¹ The Canning Trade, *Almanac of the Canning Industry for 1923*, 80; The Canning Trade, *Almanac of the Canning Industry for 1932*, 76,78.

1947	3,063,794	16,829,932		9,082,079	1,459,879
1948	4,878,145	16,994,265		11,219,258	1,218,746
1949	2,553,633	19,284,175		6,994,809	2,198,509
1950	4,089,0554	17,181,609		8,570,395	2,807,512
1951	5,110,758	23608,651		10,742,761	2,819,697
1952	4,559,951	19,732,889		9,525,677	3,188,207
1953	5,775,150	22,708,145		10,760,213	1,982,750
1954	3,279,780	19,248,612		11,907,455	3,983,765
1955	7,031,387	24,148,953		13,178,470	4,304,291
1956	5,043,301	29,980,588		15,460,031	5,427,359
1957	4,940,034	26,697,031		14,883,778	5,992,788
1958	2,173,673	25,341,302		15,106,618	4,735,742
1959	6,034,229	30,746,601		16,943,519	6,427,225
1960	7,236,391	30,614,654		18,135,249	5,831,063
1961	5,738,790	32,091,455		19,236,300	5,983,165
1962	4,819,466	34,856,527		19,073,144	6,521,755
1963	4,819,000	2,9372,000	5,484,000	17,611,000	6,522,000
1964	4,955,000	28,156,000	5,482,000	22,681,000	2,526,000
1965	6,259,000	34,518,000	4,792,000	20,687,000	8,206,000
1966	6,199,000	26,366,000	4,497,000	22,525,000	2,890,000
1967	5,299,000	25,631,000	3,953,000	19,557,000	7,124,000
1968	5,761,000	34,508,000	4,841,000	23,863,000	1,723,000
1969	7,126,000	36,550,000	5,129,000	23,909,000	6,746,000
1970	4,654,000	27,826,000	3,030,000	18,319,000	6,381,000
1971	4,182,000	25,360,000	2,994,000	19,141,000	5,441,000

APPENDIX D – UNITED STATES FOOD CONSUMPTION TABLES

UNITED STATES PER CAPITA FOOD CONSUMPTION COMPARISON¹

	Fresh fruit	Processed fruit	Dairy	Meat	Fresh vegetables	Canned vegetables	Frozen vegetables	Vegetable soup / baby food	Potatoes	Beans	Flour / grains	Sugars	Coffee
1910	148.4	14.3	86.1	92.2	114.1	32.1		75.2	208	84.3	149.1	54.4	64.9
1915	165.5	21.6	87	82.7	113.3	39.8		75.9	194.2	81.2	141.1	54.7	73.7
1920	154.4	30.7	90.7	83.5	118.7	40.7		80.7	162.6	81.8	129.2	62.8	78.5
1925	144.6	33	96.4	85	117.8	56.8		84.1	159.5	96.4	129.8	80.2	74.7
1930	144.6	35.3	96.4	80.1	125.6	63.1		90.5	138.3	97	131	85.1	81.4
1935	155.4	39.2	95	73.6	122.6	57.1		87.9	156.4	107.7	119.2	82	88.3
1940	153	57.4	99.5	986.7	130.4	74.8	8.2	99.5	126.5	117.2	120.1	85.9	100.8
1945	144.3	57	106.7	94.6	130.4	90.6	26	117.6	128.9	116.2	130.5	69.5	99.8
1950	119.9	78.7	102.4	93.2	114	90.2	46.6	100.6	105	116.9	112.1	101.2	102.7
1955	102.2	98.3	10.8	101.4	104.1	97.9	90.4	100.8	101.4	96.8	102.2	100	96.3
1960	98	104	93.9	101.9	100	100.5	106.4	101	108	100.7	99.7	102.1	100.7
1963	82.2	97.6	96.5	106.1	95.9	105.7	110.9	100.2	118.7	107.5	97.4	102.4	105.8
Change between 1910 and 1963	-66.2	83.3	10.4	13.9	-18.2	73.6	110.9	25	-89.3	23.2	-51.7	48	40.9
Percent Change	-45%	583%	12%	15%	-16%	229%	1352%	33%	-43%	28%	-35%	88%	63%

¹ Economic Research Service, *U.S. Food Consumption: Sources of Data and Trends, 1909-1963.*, 6–7.

CANNED AND CHILLED FRUITS: PER CAPITA CONSUPTION, 1909-1963²

	Apple/ applesauce	Apricot	Berry	Cherry	Cranberry	Fig	Fruit Salad and Cocktail	Peach	Pear	Pineapple	Plum and Prune	Olive	Citrus Segment	Total
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1909	0.7	0.4	0.2	0.1				0.6	0.4	0.3	0.1	0.2		3
1910	0.7	0.4	0.3	0.1				0.9	0.4	0.5	0.1	0.2		3.6
1911	0.6	0.5	0.3	0.2				0.8	0.4	0.6	0.1	0.4		3.9
1912	0.7	0.5	0.3	0.2				0.8	0.5	0.8	0.1	0.3		4.2
1913	0.5	0.4	0.3	0.1				0.9	0.5	1.1	0.1	0.3		4.2
1914	0.7	0.6	0.4	0.2				1.2	0.5	1.7	0.1	0.3		5.7
1915	0.5	0.4	0.4	0.2				1	0.6	2	0.1	0.4		5.6
1916	1.1	0.6	0.4	0.2				1.2	0.7	2.3	0.2	0.4		7.1
1917	1.5	0.9	0.5	0.3				1.5	0.8	1.8	0.2	0.2		7.7
1918	1.2	0.9	0.5	0.3				1.2	0.9	2	0.2	0.3		7.5
1919	1.1	1.8	0.7	0.4				2.1	1	1.9	0.3	0.4		9.7
1920	0.9	0.9	0.6	0.5				2.1	1.1	2.8	0.2	0.3		9.4
1921	1	0.7	0.6	0.2				1.9	0.4	2.9	0.2	0.3		8.2
1922	0.8	0.6	0.6	0.5				2	0.3	2.2	0.2	0.3		7.5
1923	1.1	0.5	0.6	0.6		0.1	0.1	2.4	0.4	2.5	0.1	0.5	0.1	9
1924	0.9	0.5	0.8	0.6		0.1	0.2	2.1	0.3	2.7	0.1	0.4	0.1	8.8
1925	0.9	0.7	0.6	0.6		0.2	0.2	3.2	0.6	3.4	0.2	0.4	0.1	11.1
1926	0.9	0.8	0.8	0.9	0.1	0.2	0.2	3.2	0.9	3.2	0.2	0.4	0.2	12
1927	0.8	0.7	0.7	0.4	0.1	0.2	0.3	4.2	0.7	3.6	0.2	0.5	0.2	12.6
1928	1	0.8	0.7	0.7	0.1	0.2	0.3	3.7	0.7	3.3	0.3	0.6	0.2	12.6

²Ibid., 35.

1929	1.1	0.8	0.7	0.7	0.1	0.1	0.4	2.9	0.9	3.2	0.4	0.6	0.4	12.3
1930	0.8	0.8	0.5	0.8	0.1	0.1	0.4	3.2	0.9	3.8	0.3	0.5	0.6	12.8
1931	0.7	0.6	0.7	0.7	0.1	0.1	0.2	2	0.7	1.1	0.3	0.5	0.2	7.9
1932	0.8	0.6	0.3	0.7	0.1		0.3	2.8	0.9	2.7	0.2	0.4	0.4	10.2
1933	0.9	0.7	0.4	1	0.1		0.5	2.6	1	3.5	0.4	0.4	0.3	11.8
1934	1	0.7	0.5	0.8	0.2	0.1	0.5	2.6	1	3.6	0.4	0.5	0.6	12.5
1935	1	0.7	0.5	1	0.2		0.7	2.8	1	3.9	0.6	0.5	0.5	13.4
1936	1.2	1	0.5	1.1	0.3	0.1	0.9	3.5	1.3	4.9	0.7	0.5	0.7	16.7
1937	1	1	0.3	1	0.3	0.1	0.9	2.7	1.1	3.5	0.6	0.4	0.6	13.5
1938	1.1	1	0.5	1	0.4	0.1	1.1	3.5	1.2	3.6	0.5	0.6	0.8	15.4
1939	1.2	0.9	0.4	1.2	0.5	0.1	1.2	3.5	1.1	4.3	0.6	0.5	0.6	16.1
1940	1.5	0.9	0.4	1.4	0.6	0.1	1.6	4.4	1.5	4.7	0.5	0.7	0.8	19.1
1941	1.4	1	0.5	1.3	0.5	0.1	1.5	3.3	1.5	4.4	0.6	0.6	1.1	17.8
1942	1.7	1.1	0.6	1.1	0.6	0.3	1.9	4.4	1.3	2.8	0.6	0.6	0.3	17.3
1943	1.6	0.3	0.4	0.7	0.3	0.2	1.3	3.2	1.4	2	0.6	0.6	-	12.6
1944	1	1	0.1	0.9	0.3	0.1	1	1.3	0.4	2	0.5	0.7	-	9.3
1945	1.1	1.3	0.1	0.8	0.5	0.3	2.4	4.9	0.9	0.8	0.7	0.6	-	14.4
1946	1.4	2.8	0.2	1.8	0.8	0.2	2.7	5.4	1.7	3.4	0.7	0.7	0.5	22.3
1947	1.7	0.9	0.3	1	0.8	0.3	2.1	4.5	1.2	3.3	0.6	0.7	0.8	18.2
1948	1.9	1	0.5	1.2	0.4	0.1	2.2	4.6	1.2	3.4	0.5	0.8	1	18.8
1949	2.1	1.1	0.6	1.4	0.5	0.1	2.3	4.9	1.4	3.4	0.5	0.5	0.9	19.7
1950	2.4	1.1	0.4	1.8	0.7	0.1	2.6	5.9	1.6	3.4	0.4	0.8	0.8	22
1951	2.3	0.9	0.4	1.4	0.8	0.2	2	4.8	1.2	3.5	0.3	0.8	0.9	19.5
1952	2.7	0.9	0.4	1.5	0.8	0.2	2.4	5.1	1.7	3.3	0.4	0.9	0.7	21
1953	2.4	1.1	0.4	1.5	0.8	0.1	2.1	5.3	1.7	3.6	5	0.9	0.9	25.8
1954	2.5	1	0.4	1.4	0.8	0.1	2.1	5.6	1.7	3.4	0.4	0.7	1	21.1
1955	2.8	1.1	0.3	1.5	0.9	0.1	2.4	5.5	1.9	3.5	0.5	0.9	1.2	22.6
1956	3.1	1.1	0.3	1.2	0.9	0.1	2.6	5.3	1.6	3.4	0.5	0.6	1.1	21.8

1957	3.1	1	0.3	1.3	0.8	0.1	2.6	5.8	1.8	3.4	0.5	0.9	0.8	22.4
1958	3.3	0.9	0.3	1.3	0.9	0.1	2.6	5.8	2	3.3	0.4	0.8	1.1	22.8
1959	3.2	0.9	0.3	1.3	0.8	0.1	2.7	5.9	1.9	3.3	0.3	0.8	0.8	22.3
1960	3.4	1	0.2	1.2	0.6	0.1	2.7	6.1	2	3.4	0.3	0.8	1	22.8
1961	3.6	1.2	0.2	1.2	1	0.1	2.7	6.2	1.8	3.3	0.2	1	0.9	23.4
1962	3.4	0.9	0.2	1.2	0.8	0.1	2.8	6.3	2.1	3	0.4	0.8	0.9	22.9
1963	3.6	1.1	0.1	1	0.8	0.1	2.8	6.5	2	3.3	0.3	0.9	0.6	23.1

DRIED FRUITS: PER CAPITA CONSUMPTION, 1909-1963¹

	Apples	Apricots	Dates	Figs	Peaches	Pears	Prunes	Raisins and Currants	Total
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
1909	0.2	0.2	0.2	0.3	0.6		1	1.7	4.2
1910	0.3	0.1	0.3	0.3	0.5		0.6	1.4	3.5
1911	0.3	0.1	0.2	0.3	0.3	0.01	1.6	1.4	4.21
1912	0.4	0.1	0.3	0.3	0.6		1	1.8	4.5
1913	0.2	0.1	0.3	0.3	0.7		0.6	1.5	3.7
1914	0.1	0.2	0.2	0.3	0.6	0.01	0.8	1.8	4.01
1915	0.4	0.2	0.3	0.2	0.6		1.5	1.8	5
1916	0.5	0.1	0.2	0.4	0.5		1.4	2	5.1
1917	0.4	0.3	0.1	0.3	0.7		2.1	22.4	26.3
1918	0.4	0.1	0.2	0.3	0.4		0.9	2.1	4.4
1919	0.4	0.1	0.3	0.5	0.6	0.01	2	2.9	6.81
1920	0.2	0.1	0.3	0.4	0.5	0.1	1.7	3.4	6.7
1921	0.1	0.1	0.4	0.6	0.4		1.2	2.7	5.5
1922	0.3	0.2	0.5	0.4	0.5	0.1	1.9	2.6	6.5
1923	0.1	0.2	0.4	0.5	0.4		1.4	2.6	5.6
1924	0.2	0.2	0.5	0.5	0.4	0.1	1.5	3	6.4
1925	0.1	0.1	0.6	0.5	0.3	0.1	1.8	2.8	6.3
1926	0.1	0.2	0.4	0.4	0.4	0.1	1.6	2.8	6
1927	0.1	0.2	0.4	0.4	0.2	0.1	2.3	2.6	6.3
1928	0.1	0.2	0.4	0.4	0.4	0.1	1.7	2.9	6.2
1929	0.2	0.2	0.4	0.4	0.2	0.1	1.9	2.5	5.9
1930	0.1	0.2	0.4	0.3	0.4		1.9	2.1	5.4
1931	0.1	0.3	0.4	0.2	0.2		1.6	1.9	4.7
1932	0.1	0.3	0.4	0.3	0.3		1.7	2.3	5.4
1933	0.1	0.3	0.4	0.3	0.3		1.5	2.3	5.2
1934	0.1	0.2	0.5	0.3	0.3		1.6	2.1	5.1
1935	0.1	0.2	0.5	0.3	0.3		2.2	2.3	5.9
1936	0.2	0.3	0.5	0.4	0.4		1.8	1.9	5.5

¹ Ibid., 40.

1937	0.2	0.3	0.4	0.4	0.3		2.2	2	5.8
1938	0.1	0.1	0.4	0.3	0.3		1.6	2.6	5.4
1939	0.3	0.4	0.4	0.4	0.3	0.01	2.1	2.5	6.41
1940	0.1	0.1	0.4	0.4	0.4		2	2.6	6
1941		0.2	0.2	0.4	0.1		1.6	1.8	4.3
1942	0	0	0.2	0.5	0		1.3	2.2	4.2
1943	0.1		0.2	0.4	0.1		2.1	3	5.9
1944	0.1	0.2	0.4	0.4	0.2		1.8	3	6.1
1945	0.2	0.1	0.4	0.4	0.3	0.01	2	2.5	5.91
1946	0.2	0.2	0.5	0.3	0.1		1.4	1.8	4.5
1947	0.2	0.1	0.3	0.3	0.2		0.9	1.7	3.7
1948	0.1	0.2	0.5	0.3	0.1		0.8	1.9	3.9
1949	0.2	0.2	0.4	0.4	0.1		1	1.8	4.1
1950	0.15	0.15	0.56	0.34	0.11	0.01	1.06	1.68	4.06
1951	0.13	0.12	0.51	0.32	0.12	0.01	0.81	1.79	3.81
1952	0.11	0.1	0.51	0.3	0.1	0.01	0.96	1.73	3.82
1953	0.11	0.13	0.46	0.31	0.1		0.84	1.8	3.75
1954	0.12	0.1	0.51	0.31	0.1	0.02	0.95	1.77	3.88
1955	0.11	0.14	0.51	0.29	0.09	0.01	0.72	1.72	3.59
1956	0.08	0.09	0.53	0.33	0.07	0.01	0.83	1.76	3.7
1957	0.08	0.08	0.6	0.33	0.07	0.01	0.88	1.54	3.59
1958	0.1	0.04	0.39	0.35	0.06	0.01	0.66	1.41	3.02
1959	0.09	0.06	0.45	0.31	0.07	0.01	0.71	1.57	3.27
1960	0.09	0.08	0.51	0.34	0.06	0.01	0.61	1.42	3.12
1961	0.08	0.08	0.4	0.33	0.05	0.01	0.63	1.56	3.14
1962	0.11	0.05	0.38	0.25	0.05	0.01	0.66	1.5	3.01
1963	0.09	0.06	0.44	0.3	0.04	0.01	0.58	1.48	3

CANNED FRUIT UTILIZATION¹

	Production	Imports	Supply				Utilization							
			Beginning Stocks			Total Supply	Total Use	Exports and Shipments			Domestic Disappearance for Food			
			Commercial	USDA	Total			Commercial	USDA	Total	Military	USDA Donation	Civilian	Total
	Mil. Lb.	Mil. Lb.	Mil. Lb.	Mil. Lb.	Mil. Lb.	Mil. Lb.	Mil. Lb.	Mil. Lb.	Mil. Lb.	Mil. Lb.	Mil. Lb.	Mil. Lb.	Mil. Lb.	Mil. Lb.
1909	227					227	273			-			273	273
1910	269	69				338	338			-			338	338
1911	275	90				365	365			-			365	365
1912	297	105				402	402			-			402	402
1913	280	134				414	414			-			414	414
1914	378	191				569	569			-			569	569
1915	336	236				572	572			-			572	572
1916	459	271				730	730			-			730	730
1917	609	204				813	813	12		12			801	801
1918	590	230				820	820	31		31			789	789
1919	860	234				1,094	1,094	64		64			1,030	1,030
1920	720	323				1,043	1,043	30		30			1,013	1,013
1921	569	347	64		64	980	965	72		72			893	893
1922	878	283	17		17	1,178	1,036	208		208			828	828
1923	788	349	142		142	1,279	1,191	168		168			1,023	1,023
1924	796	393	88		88	1,277	1,126	204		204			1,022	1,022

¹ Ibid., 125.

1925	1,066	490	51		51	1,607	1,559	269		269			1,290	1,290
1926	1,376	471	48		48	1,895	1,690	273		273			1,417	1,417
1927	1,154	528	205		205	1,887	1,771	262		262			1,509	1,509
1928	1,415	484	116		116	2,015	1,858	336		336			1,522	1,522
1929	1,310	493	157		157	1,960	1,792	290		290			1,502	1,502
1930	1,379	555	172		172	2,106	1,864	277		277			1,587	1,587
1931	1,058	579	249		249	1,886	1,611	255		255			1,356	1,356
1932	963	385	275		275	1,623	1,525	244		244			1,281	1,281
1933	1,317	502	98		98	1,917	1,789	303		303			1,486	1,486
1934	1,395	529	627		627	2,551	1,827	242		242			1,585	1,585
1935	1,543	577	724		724	2,844	2,060	348		348			1,712	1,712
1936	1,685	656	784		784	3,125	2,429	280		280			2,149	2,149
1937	1,990	581	696		696	3,267	2,014	266		266			1,748	1,748
1938	1,415	568	1,253		1,253	3,236	2,372	360		360			2,012	2,012
1939	1,918	622	864		864	3,404	2,450	346		346			2,104	2,104
1940	1,783	656	954		954	3,393	2,554	32		32			2,522	2,522
1941	2,300	564	839		839	3,703	2,696	44	45	89	256		2,351	2,607
1942	2,191	512	1,007		1,007	3,710	3,034	30	35	65	723		2,246	2,969
1943	1,575	625	1,496	57	1,553	3,753	2,475	27	78	105	746		1,624	2,370
1944	2,062	529	1,238	40	1,278	3,869	2,466	24	131	155	1,120		1,191	2,311
1945	1,909	347	1,364	39	1,403	3,659	2,553	38	103	141	551		1,861	2,412
1946	3,139	504	1,078	28	1,106	4,749	3,286	94	47	141	58		3,087	3,145
1947	2,619	512	1,394		1,394	4,525	2,923	237	6	243	86		2,594	2,680
1948	2,500	619	1,540		1,540	4,659	2,944	72	1	73	141		2,730	2,871
1949	2,672	615	1,715		1,715	5,002	3,101	86	-		99		2,916	3,015
1950	2,750	689	1,901		1,901	5,340	3,508	93	-		117		3,298	3,415
1951	3,126	657	1,839		1,839	5,622	3,543	99	2	101	504		2,938	3,442
1952	2,787	669	1,930		1,930	5,386	3,658	128	2	130	305		3,223	3,528

1953	2,898	742	1,712		1,712	5,352	3,587	134	3	137	130		3,320	3,450
1954	3,037	727	1,768		1,768	5,532	3,656	209	2	211	85		3,360	3,445
1955	3,459	733	1,896		1,896	6,088	3,994	227	1	228	101	31	3,669	3,801
1956	3,610	778	2,094		2,094	6,482	4,121	320	1	321	196	44	3,604	3,844
1957	3,443	789	2,361		2,361	6,593	4,181	321	2	323	81	56	3,780	3,917
1958	3,347	802	2,409		2,409	6,558	4,410	368	2	370	140	56	3,900	4,096
1959	3,982	822	2,148		2,148	6,952	4,395	353	3	356	154	74	3,885	4,113
1960	4,345	277	2,557		2,557	7,179	4,553	394	3	397	98	77	4,058	4,233
1961	3,697	226	2,644		2,644	6,567	4,873	477	3	480	152	102	4,241	4,495
1962	4,922	220	2,694		2,694	7,836	5,050	672	3	675	162	87	4,213	4,462
1963	4,371	234	2,786		2,786	7,391	5,042	583	2	585	144	66	4,313	4,523

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