The Rise of Maritime Containerization in the Port of Oakland

1950 to 1970

by

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ABSTRACT

Beginning in the 1950s, a revolution occurred in the technological foundations of the carriage of goods by ships. A labor intensive, piece-by-piece break-bulk method of loading and unloading cargo was replaced by a capital intensive, industrial process - containerization. This new technology, in which goods are packed into a metal box, transported as a unit, and unpacked only at the final destination, had far reaching impacts on stevedoring, ship operations and ports. The effects were even more widely felt, since containerization facilitated intermodal transport. Now, a container could be carried by ships, trains, and trucks, effortlessly moving between modes of transportation by a mechanized lift-off, lift-on transfer. Despite its advantages, previous attempts at containerization experienced only limited success. The efforts of Malcolm McLean and his firm Sea-Land Service, Inc. culminating with the departure of the vessel *Ideal X* carrying a deckload of containers from Port Newark enroute to Houston in 1956 ushered in the modern era of containerization. As if with the wave of a magic wand, cargo handling costs were reduced to less than one-six of traditional methods.

The adoption of containerization raises a number of issues about the acceptance of new technologies and the influence of port planning on technology, and conversely technology on planning. Specifically, why did containerization achieve dominance in the period following 1950, and why in the ports that it did? This thesis claims that containerization supplanted the traditional cargo handling techniques due initially to a series of critical events, without which the technology would likely not have been adopted. Then, following this period of stumbling progress, containerization achieved rapid growth due to economies-of-scale. To investigate this hypothesis, the rise of containerization in the Port of Oakland is examined. Oakland provides an ideal environment to study containerization, since it was small enough to avoid the extraneous, overwhelming detail of larger ports, but played a critical role in the early period of containerization on the West Coast.

The forces of government regulation, private enterprise, the need for efficient transport of war materiel to support the Vietnam War, increased trade with Asia, a Federal jobs program, and fundamental changes in the contract between shoreside labor and management all combined to provide an opportunity for the Port of Oakland to be a major participant in the establishment of containerization. By 1970, this new technology was well ensconced, entering an economies-of-scale phase that continues to the present. This underlying characteristic of the technology, with its large capital requirements acting as a barrier to entry, left fewer and fewer ports able to handle ever larger containerships, while simultaneously opening the door to a more intense form of global trade. Countries with only slightly lower cost structures could now effectively export, since decreased shipping costs maintained their cost advantage. The continuing ramifications of containerization, an almost invisible technological change to most people, are still being felt today.

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CONTENTS

ILLUSTRATIONS

TABLES

Table Page

1 Introduction

By 1970, the first phase of a revolution in the carriage of goods by sea was complete. This revolution overtook a tradition that could trace its origins and techniques back to antiquity and was engraved as firmly on its industry as its representation was engraved on Greek friezes of laborers shouldering amphora up gangplanks. Only slightly augmented with the introduction of cranes and nets at the beginning of the industrial revolution, the labor intensive process involved in stevedoring continued virtually unaltered to the mid 1950s. The change came not in the singular elegance of the clipper ships nor the unbridled exuberance of the Age of Steam. Instead, it took the form of a metal box.

Containerization is the term that encompasses the industrial shipping process of packing goods into a metal container at the point of production and transporting the container and its contents as a unit until it is unpacked at its final destination. This none-too-startling application of economies-of-scale has been around in various guises since the early nineteenth century, but it rapidly developed from a footnote in a 1956 cargo handling textbook, *Marine Cargo Operations* (Sauerbier 1956), to the observation of a 1971 Organisation for Economic Co-operation and Development (OECD) report that essentially all containerizable cargo on the transatlantic route was being carried in containers (Organisation for Economic Co-operation and Development 1971).

The consequences of this change in the conduct of shipping touched nearly every aspect of maritime life. Each of the three major communities: vessels, shoreside activity, and ports, were impacted. A vessel which required three teams of 26 longshoremen over a week to unload could now be turned around by eight men often in one eight-hour shift. With decreased manning requirements on vessels, combined with these shortened harbor stays, the character of ports changed. Without sufficient customers to support the usual shoreside attractions, the harbor was transformed from a sailortown to just another industrial setting. Finally, the logic of the technology, larger savings for larger vessels, left fewer and fewer ports able to compete for cargo. The result was the formation of specialized container handling ports, often at locations remote from the areas that handled traditional cargo, leaving behind abandoned facilities subject to the vagaries of decay and urban renewal.

The adoption of containerization provides a large set of challenging questions and a wealth of historical data that can be analyzed from many perspectives. It is a story that starts with a U.S. coastal shipping system under tremendous competitive pressure from rail and trucking, and ends with an international transportation system requiring extensive coordination among competing steamship lines, government and labor, as well as with rail and trucking. To avoid becoming overwhelmed by the complexity of this technological revolution and to uncover its essential points, two strategies are pursued. The first strategy restricts the scope of the inquiry geographically by limiting the study to the rise of containerization in the Port of Oakland. The second strategy constrains the analysis path to understanding the impacts of this new technology on ports, leaving to others the task of analyzing the myriad of additional, concurrent effects such as on labor or on international trade.

Even though the Port of Oakland grew up in the shadow of its much larger neighbor, the Port of San Francisco, Oakland was the port in the Bay Area that effectively adapted to containerization. The goal in choosing a single port as a test-bed for this analysis was to have a starting point for more general analysis. It was critical that the chosen port be a continuing participant from the early stages of containerization through its maturation, to allow a full picture of the development process. The port needed to be of such size that it was significant to containerization, yet not so large that the data would be skewed or a proper analysis could not be completed within a thesis. The Port of Oakland fit these criteria.

A key to understanding the establishment of this technology is recognizing that there was a perceptible pacing in the acceptance of containerization. First, a period of considerable stumbling, then slow development, then finally a period of breathtaking advances in which traditional cargo handling methods were mostly supplanted. This process fits well with a blending of the theoretical constructs of contingency followed by economies-of-scale. As will be discussed, variants of containerization were previously attempted, but were unable to gain a foothold until its successful introduction in the United States in the 1950s. Max Weber described the necessity of understanding causal events and of sorting out which contingent events were critical to a historical result.

> It does indeed bear on something decisive for the historical moulding of reality, namely, on what causal *significance* is properly to be attributed to this individual decision in the context of the totality of infinitely numerous "factors," all of which

> had to be in such and such an arrangement and in no other if *this* result were to emerge, and what role it is therefore to be assigned in an historical exposition.[1] (Weber 1949, 164)

A major part of this work is expended exposing the important factors and examining their contribution to the rise of containerization in the Port of Oakland. However, it is not just these factors that determined the time path. The characteristics of the technology itself, expressed through economies-of-scale, provided the internal dynamics for the second phase of the development of containerization.

To a modern economist, such as the entire generation raised on Paul A. Samuelson's *Economics* (1970), economies-of-scale describes an economic production process in which output increases more than in proportion to increasing inputs. Put another way, an industrial process exhibits this trait if increased production results in a lower average product cost. In industries where the production technology exhibits this characteristic, large enterprises tend to drive out smaller firms. Economies-of-scale often occurs in capital intensive processes, such as containerization. Much of the rapid adoption and consolidation of Northern California container activity in Oakland in the mid 1960s, is well explained by this definition.

A more global understanding of the effects of containerization is also accounted for by

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1. The risk in a case study, such as this one, is to focus on the facts to the exclusion of perceiving more general patterns. A historical analysis that follows Weber's injunction to understand the role of events is less likely to be led astray. In Exposition du Systeme du Monde, the great scientist Laplace restates this problem as, "If man had limited himself to the accumulation of facts, then science would have been merely a fruitless nomenclature, and he would never have learned the great laws of nature" (Dick 1981, 164)

economies-of-scale, but its use requires reference to an earlier viewpoint. In the late nineteenth century, economists attempted to reconcile Adam Smith's diminishing returns theory with the huge economic growth brought about by the industrial revolution. A new theory based on technology and economies-of-scale came out of Britain and is associated with the economist Alfred Marshall. Marshall's theory posited that the sources of this unexpected productivity arose from the use of standardized, interchangeable parts, and the specialization and division of labor (1919). Containers introduce standard, interchangeable components into the shipping process. As the technology matured, standards for containers and their fittings were developed allowing containers to be exchanged between firms, as well as between modes of transportation. Marshall then envisioned that if the economies-of-scale spread into the economy in general, it could drive economic growth and increased trade. This theory encompasses the more global impacts of containerization. The decreased shipping costs engendered by containerization fueled a significantly more intense level of trade and global interconnection.

While these theoretical concepts are part of understanding the development of containerization, the heart of this work lies firmly in maritime history, and the development of ports. This work builds on a substantial literature in the study of ports and port planning. It also, of necessity, taps the transportation literature, and works from the history of science.

The exemplar port study from maritime history is Robert Greenhalgh Albion's *The Rise of New York Port 1815-1860* (1939), which comprehensively exploits contemporary sources to build a description of the rise of the Port of New York. With less of an academic bent are the fine works generated by the Work Projects Administration (WPA) Writers Project which include, *A Maritime History of New York* (Writers' Program. New York 1941), and *Boston Looks Seaward: The Story of the Port, 1630-1940* (Writers' Program. Massachusetts 1941). Finally, the sheer overwhelming scholarship of Samuel Eliot Morison influenced this thesis, especially his integration of technology in maritime subjects as shown in such works as *The Ropemakers of Plymouth: a History of the Plymouth Cordage Company, 1824-1949* (1950).

A second discipline which influenced this work is urban planning, especially port planning. Ann L. Buttenwieser's *Manhattan Water-Bound* (1987) provides a contrasting treatment of the rise of the Port of New York. For West Coast ports, Scott Campbell from the Institute of Urban Regional Development at the University of California, Berkeley in 1986, conducted a retrospective study encompassing the changes in water transport in a report entitled, *Transformation of the San Francisco Bay Area Shipping Industry and Its Regional Impacts.* Similar ground is covered in Pedro Corro's 1980 University of California, Berkeley dissertation, *Regional Effects of Containerization.* Finally, the planning community leaves behind a massive legacy of planning documents, such as the U.S. Economic Development Administration's *A Study of the Future of a Marine Terminal Industry and the Feasibility of Developing New Marine Terminal Facilities in Oakland, California, Phase 1 Report* (1966). Often conducted by consultants, excerpts from these documents will be cited as primary sources.

Despite the wide-ranging impact of this technological revolution, few maritime historians have pursued this topic, and this thesis is a first step to rectify this situation. A “call to arms” for further study was sounded by the historian Arthur Donovan in a 1996 presentation at the annual meeting of the Society for the History of Technology. The only major work in this area, Donald Fitzgerald’s 1986 University of California, Santa Barbara dissertation, focuses almost exclusively on the Port of San Francisco. He attributes the feeble development of containerization in that Port to poor port management practices. After studying the Port of Oakland, it will be possible to reexamine containerization in San Francisco and see a more nuanced situation.

Research from a number of additional disciplines help inform this work. A small but significant body of literature in transportation history examines containerization’s development in the railroad industry. David G. Casdorph, writing in the model railroad literature (1986, 1988), has made significant contributions, and John H. White from the Smithsonian in articles (1985a,b 1988), and in his 1993 comprehensive *The American Railroad Freight Car: From the Wood-Car Era to the Coming of Steel* provides an important source for the early history of containerization.

The history of science literature has explored the unintended consequences of technology. Elting Morison in *Men, Machines and Modern Times* (1966), and Wolfgang Schivelbush in much of his writing, such as *Disenchanted Night: The Industrialization of Light in the Nineteenth Century* (1988) have detailed the ways in which technological outcomes caused radical changes in communities. This field is also a source of excellent studies of technology such as the superb volume, *The Quest for Longitude,* edited by William J. H. Andrewes (1996) examining the development of techniques for measuring longitude.

A final source for views on containerization is the popular maritime literature. During the rise of containerization, the U.S. Merchant Marine went into a severe decline, mostly due to other factors, but containerization did play a role. In many ways, these works mirror an earlier literature grieving over the transformation from sail to steam. A book which represents this literature and captures this perceived loss is John McPhee's *Looking for a Ship* (1990).

While the emphasis here is on the impact of containerization on ports, it is worth noting that other repercussions have been studied. The impact of containerization on port-side labor has been well investigated. Most relevant is Paul T. Hartmann's *Collective Bargaining and Productivity: The Longshore Mechanization Agreement* (1969), which looks at the collective bargaining agreement under which containerization developed on the West Coast. Additional background material on labor issues is presented in William Finlay's *Work on the Waterfront* (1988), and Vernon H. Jensen's *Strife on the Waterfront - The Port of New York since 1945* (1974). The Port of New York provides an interesting contrast to the West Coast experience, since containerization originally snuck in on an arbiter's decision and not, as on the West Coast, as part of the collective bargaining process.

Despite the huge impact of the Federal Government in all aspects of U.S. maritime activity in the twentieth century, its relationship to transportation has scarcely been seriously considered in the literature. Gerald R. Jantscher's Brookings Institute work, *Bread upon the Waters: Federal Aids to the Maritime Industries* (1975) is one of the few significant studies. While more accurately described as data than analysis, *Transportation Regulation* provides a comprehensive interpretation of Federal statutes as related to the maritime industry (Fair and Guandolo 1983).

Though outside the radar of scholarly literature, an area that a historian ignores at great peril is the origin myths of the containerization industry. This literature retells the heroic insight of Malcolm McLean and his company Sea Land Service, which single-handedly brought containerization to fruition. The awe in which McLean is held is demonstrated in his awards. These include the 1959 American Legion Merchant Marine Achievement Award presented by President Eisenhower for the development of ships to carry containers, the Seley Transportation Award presented in 1970, the Connie Award of the Containerization Institute, and the first Intermodal Pioneer and Visionary Award presented at the International Intermodal Expo '90 Conference (*VIA* April 1991, 40). Like many origin myths there are fragments of truth in these yarns; however, a much richer, complex and indeed perilous story can be recounted through careful study of the development of containerization in the Port of Oakland.

There is a wealth of primary materials concerning the rise of containerization. Numerous studies were conducted on behalf of the Federal and state governments as well as for the ports. Some of these reports, such as one conducted by Ebasco Services (1959) were surveys, which give insight into the plans of the steamship firms. Other sources consist of trade journals and conferences. Magazines such as *American Shipper* covered containerization, and of special importance is the *Proceedings of the American Merchant Marine Conference*, a yearly technical conference where many containerization results were described. Similarly, presentations at local chapters of the Society of Naval Architects and Marine Engineers are a rich source of insight into the industry's view of containerization. A number of marketing brochures have been preserved at the Transportation Library of the University of California, Berkeley, which shed light on how this technology was originally marketed.

The Port of Oakland left an extensive paper trail as well. The monthly Port newsletter preserves the Port's public face. A local shipping newspaper, *The Log*, provides coverage of the Port, and to a lesser degree, local newspapers cover at least the major events in the history of the Port.

This thesis builds on this trove of materials. The first task is to provide the context for the development of containerization. Chapter 2, "Containerization before McLean," carefully defines containerization and demonstrates that containerization or containerization-like technologies have been used at various times and places well before the modern advent of containerization. The chapter concludes with a detailed analysis of an example of unitization chosen from the many cargo handling experiments that were conducted by steamship firms immediately after World War II. Chapter 3, "The Port of Oakland," completes the overview material by situating the Port of Oakland in its geographical, political and historical setting.

These two background chapters lead directly to the main event, the rise of containerization in the Port of Oakland. Specifically, I claim the historical evidence shows that in the earliest period of containerization, the development of the technology was unsure, and dependent on a series of critical events, which will be described. Once the technology took root, a process of economies-of-scale tended to force consolidation, making entry into this market difficult and leaving only a few large container ports to supply a given coast. Two chapters will examine how the competing forces played out to lead to the successful deployment of this new technology in the Port of Oakland during the period of greatest change: 1950 to 1970.

The most compelling portion of the story is contained in the decisions, issues and events of the period before economies-of-scale took hold. For expository purposes, these issues will be grouped into the effects of labor’s changing view of mechanization, private enterprise activities, government regulatory mechanisms, the military, changes in international trade, and public works projects. Chapter 4, “The Rise of Containerization in the Port of Oakland: Precursors,” examines the preliminary events of the rise of containerization. These events began with a series of agreements between the longshoremen’s union and the steamship lines, which traded work rules for earnings guarantees. Next, a number of regulatory hurdles were cleared that allowed containerization to develop. The last critical event detailed in Chapter 4 was Sea-Land Service’s selection of Oakland as its Northern California intercoastal terminal in 1962.

Chapter 5, “The Rise of Containerization in the Port of Oakland: Fruition,” considers a series of overlapping events, mostly in the period 1965-1969, during which the initial trickle described in Chapter 4 turned into a mighty flow. One of the triggering events was the military’s adoption of containerization to support the materiel flow for the Vietnam War. At this point, Matson Navigation Company, the second largest container carrier on the West Coast, moved its facilities to Oakland. At the same time, increased trade with Asia favored West Coast ports, and when a group of Japanese steamship firms adopted containerization, they choose Oakland as their U.S. terminal. Finally, the Port needed a way to finance the additional physical plant necessary to support all this new business. A Federal jobs program and the construction of the BART subway system were utilized by the Port, at an especially auspicious moment, as sources of cheap capital. All of these events were critical for the adoption of containerization on the West Coast.

After these series of events, the technology entered a second phase consisting of economies-of-scale driven consolidation coupled with additional evolutionary developments. In this period, one of the critical issues was the ability to move cargo into and out of a port. Ports with good access to freeways for trucks, and rail links to move cargo by trains garnered a competitive advantage. Similarly, ports with access to large areas to store and marshal containers were in a better position to offer containerized services. Critical to this intermodal transport was the development and adoption of standards for containers.

The success of containerization drove ever higher levels of capital requirements and larger and larger vessels. This next level of intensity provided substantial barriers-to-entry for ports that had not adopted containerization, reconfiguring the transportation system into a large hub port, where international containerships called, and feeder ports. Cargo moved either directly to and from its destination via trains or trucks, or was transshipped via the feeder port on container barges or smaller containerships.

The concluding chapter reviews the early adoption of containerization, and then steps back to look at some of the effects caused by containerization. Finally, the story of containerization in the Port of Oakland is brought up to the present.

2 Containerization before McLean

Containerization derives from two complementary technologies, unitization and intermodal transport. Unitization is the process of combining smaller packages into one larger unit, which can be mechanically handled as a single item. For instance, layering and shrink wrapping products on a wooden pallet is a form of unitization that allows mechanized handling with a fork-lift. Intermodal transport requires that in a trip using multiple modes of transportation, such as ships and trains, the cargo is moved between modes of transportation without unpacking and repacking. An early illustration of this concept is the "farm to market" train service provided by the Long Island Railroad in the mid 1880s. Farmers would bring their wagons to a train stop where the wagons would be loaded on flat cars, and the locomotive force (the horses) were housed in box cars. At the destination, the carts were unloaded and pulled to the markets by the horses. In this way, the produce only needed to be loaded at the farm and unloaded at the market (*Long Island Daily Press* August 26, 1954).

Though the containerization industry counts its beginning with the plans of Malcolm McLean, and the departure of the vessel *Ideal X* with a deckload of containers from Port Newark enroute to Houston in 1956, this section highlights some earlier uses of unitization and intermodal transport. Appreciating that modern containerization is just a wildly successful relative of a long stream of intermodal, unitization techniques encourages posing more penetrating questions than is possible if the technology just sprung de novo from one man's head. Using the hypothesis of contingent events followed by economies-of-scales, these instances must be scrutinized for events that prevented these previous incantations of this technology from gaining sufficient scale to achieve technological dominance. Examining these issues also prompts questions relating the successful development in the Port of Oakland.

After briefly considering these early examples, the unitization technologies employed immediately after WWII by the Matson Navigation Company, a San Francisco based steamship line, are examined in some depth. These efforts illustrate the environment of intense experimentation in cargo handling that occurred in the postwar period. Finally, the early history of Sea Land will be described leading up to the September 27, 1962, arrival of the S.S. *Elizabethport* in Oakland, ushering in intercoastal container service between the East Coast and the Port of Oakland.

Before reviewing early containerization technology, a brief description of traditional cargo handling techniques is provided to contrast with later descriptions of containerization. Herb Mills conducted a number of sociological studies of the longshore work force after containerization. He summarized the golden era of shore work before containerization, when "most San Francisco longshoremen liked their work and the terms of their employment" (Mills 1979,128). The following extended quotation is taken from Mills and provides a lyrical account of the cargo handling process.

> A vessel which was to discharge and load general cargo was usually in berth for at least a week. Having arrived alongside the dock, its mooring lines were taken and secured by "linesmen." The crew secured the rat guards, the gangway, and a safety

net beneath the gangway. Had they not already done so, they then unshipped and raised the cargo booms (from the boom rests to which they are secured while at sea) and let go the battens securing the hatch tarpaulins. The vessel was thus readied for a longshore operation.

The gang men began arriving at the pier sometime after 7:00 A.M. They went to a nearby cafe for coffee and often breakfast. Meanwhile, each gang boss got his hatch assignment from his operational supervisor, the ship “walking boss.” (The walking bosses “walk” the ships and docks to supervise the work. Up until 1948, the walkers were also members of the longshore local, but in that year they were separately chartered by the ILWU.) The walking boss, or “walker,” then informed the gang bosses as to the nature of the cargo, its place of stow, any unusual circumstances, and the number of days the job was expected to last. The gang boss in turn passed this information on to his gang, usually over morning coffee or breakfast. The hall men, who had begun to be dispatched to the gangs and to the ship or dock walkers at 6:30 A.M. began to drift in. Greetings were exchanged. Conversations were begun; others were resumed. There was a lot of catching up to do.

Toward 7:45 A.M., the men began to move toward the pierhead. The dock workers, who had been dispatched directly to the dock walker, now received their assignments, as did the late arrivals to the gangs or ship walker. The day began in earnest when at 8:00 A.M. the ship walker hollered, “O.K. men, let’s go.”

As the shipboard men streamed onto the vessel, the dock men for the gangs, raised the doors of the cargo shed. They then proceeded to locate and ready the gear and dock equipment that would be required. Having cleared their work area of any debris and having constructed a suitable seat (or “house”) for themselves, they stood ready to secure the “save-all.” (This is a cargo net that is slung between the dock and a vessel so as to prevent either a worker or cargo from falling into the water.) Meanwhile and on the basis of the information given them by the clerk with whom they worked, the other dockworkers “set up” for the palletizing and de-palletizing of cargo.

Having ascended the gangway, the shipboard men of each gang proceeded to rig the gear of their hatch. To facilitate this, half of the hold men rigged the inshore boom, while the other half rigged the one offshore. Except when operation circumstance might otherwise dictate, this inshore/offshore division of the hold men continued through the job. The hatch boards and strongbacks (or “Pontoons”) were then removed and safely stowed on the offshore weather deck or on the dock. Having thus “uncovered” the hatch, the hold men were ready to go below.

Frequently, the cargo to be discharged from the shelter deck (or upper ‘tween) had been loaded up to the hatch covers. In that event, the hold men—having clambered over the edge of the hatch—began the discharge by building that cargo into loads (pallet, sling or net) and sending them ashore. They continued to “dig

> down" until they reached the shelter deck itself. Next they cleared the "square," the deck area beneath the hatch covers. With that done, they began the discharge of cargo stowed in the "wings," the areas beneath the deck above. To do this, an important skill almost always came into play. This was the construction of a safe and suitable flooring over which the cargo could be moved from stow to the square and then hoisted ashore. The decision as to which of the available cargo-moving devices was best for this purpose was largely based on the nature of the cargo and its stow.
>
> Once finished with the cargo to discharged from the shelter deck, a loading operation might commence. As a rule, however, the men again uncovered to begin the discharge of cargoes from the lower 'tween deck. Frequently, this required re-rigging the gear. The operational circumstance encountered in the lower 'tween deck were a variation on those on the shelter deck, as was the subsequent uncovering and discharge of the "lower hold." (Mills 1979, 133-5)

As much as this passage captures a part of the cargo handling experience, the reader is reminded to temper this passage, with the somber note that longshore work was one of the most dangerous job categories in terms of on-the-job accidents according to a government study (Maritime Cargo Transportation Conference 1956). It is also worth noting that the repeated handling described by Mills was viewed by the steamship lines as a source of damage and providing opportunities for pilferage. Figure 1 shows the deck of a typical, traditional break-bulk cargo vessel. Note the movement of a palletized load.

In contrast to traditional cargo handling, over time, various unitization technologies have been devised to satisfy the needs of intermodal transport. What today is considered ship-based containerization was historically referred to as lift-on/lift-off, since cranes are used to lift containers among ships, trains and trucks. This is in contrast to roll-on/roll-off (ro/ro), in which the unitized item includes wheels, so it can be rolled onto and off of the ship. In railroad lingo, carrying trailers, which are truck bodies with wheels, is referred to

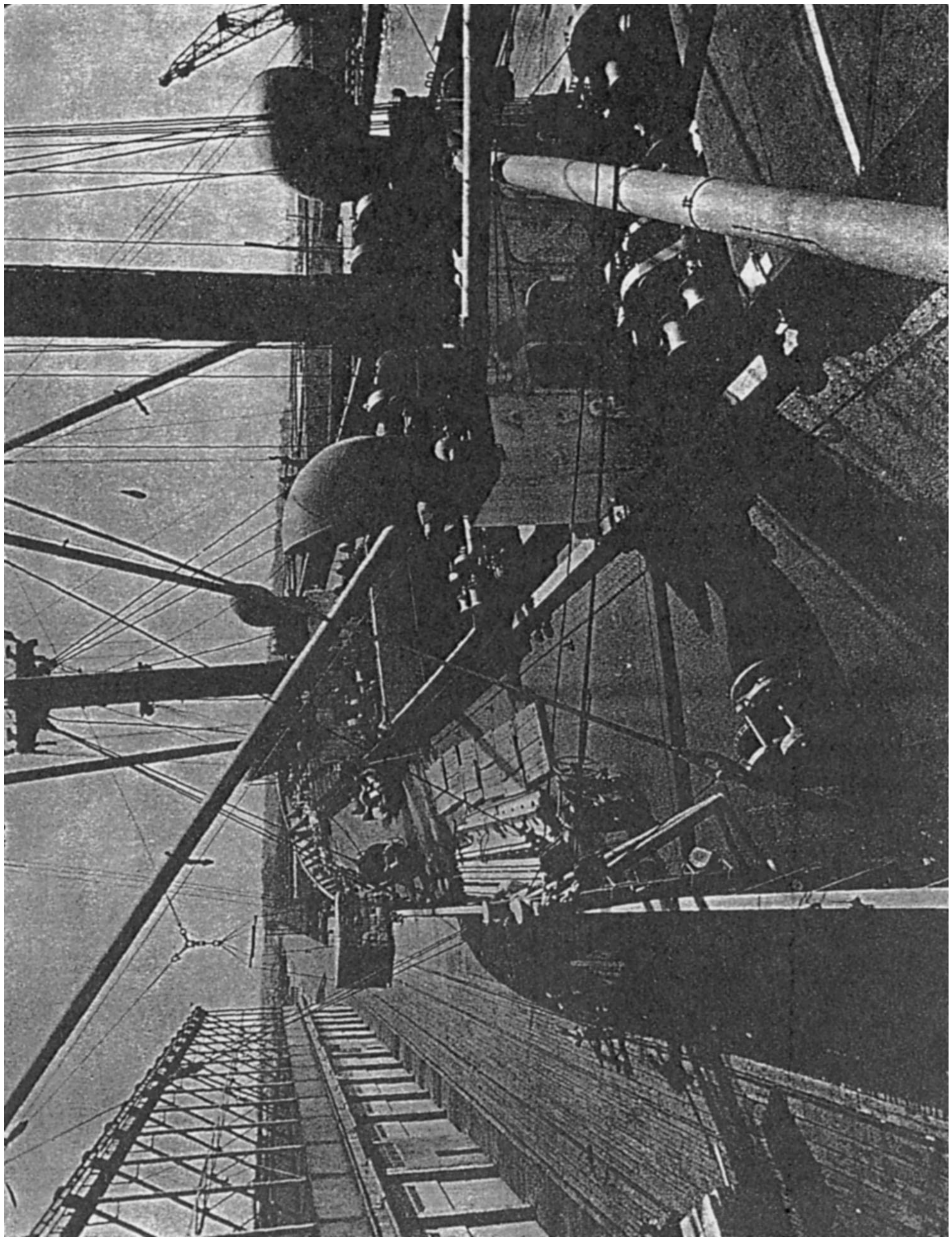

Figure 1. Traditional Cargo Handling Gear. Deck layout of traditional break-bulk vessel. Reprinted from Maritime Cargo Transportation Conference 1957.

as piggy-back. In the very early ro/ro literature carrying trailers at sea was referred to as fishy-back (*Business Week* March 24, 1956), but the use of this term has become extinguished.

For the periods I've examined in the nineteenth and twentieth century in which cargo needed to move via multiple modes of transportation, some form of unitization arose. The railroad historian John White notes a reference as early as 1821 where James Anderson, a Scottish economist, advocated a container system (1985b). During the era in which canal systems and railroads were coexistent in the United States, a number of intermodal technologies were used to transship cargo between these systems. Beginning in 1837, James O'Connor of Pittsburgh began service with demountable bodies for railroad and canal service between Pittsburgh and Philadelphia (White 1985b, 43). Later, from 1840 to the Civil War, a number of efforts at designing canal boats in sections came to fruition. These "sectionalized canal boats" could be easily loaded and unloaded from trains, but were handled as a unit in the canals (McCullough 1960).

In the 1830s, the Camden & Amboy Railroad used roll-on/roll-off containers for baggage on steamboats, railroad cars, and station drop-offs and pick-ups. In 1872, P.T. Barnum's Great Show adopted roll-on/roll-off flatcars for circus wagons with ramp end loading, and this system continues to the present day (White 1985b, 42-43). As mentioned earlier, the Long Island Railroad utilized farmer's wagons as the unit of transport in a farm to market system. One interesting maritime development was the use of sea barges for transporting entire railroad cars across sheltered waters, such as harbors. A generalization of this technology became known as seatrains. A report on cargo handling at the dawn of the container era notes, “Seatrains are large ocean-going vessels which transport loaded railroad cars and trailers on four-decks and now operate between New York, Savannah, and Texas City. They require special heavy-lift cranes at piers in each of these ports” (Ebasco Services, Inc. 1959, 96).

The phenomenal growth in the use of trucks for moving cargo started with the invention of the internal combustion engine by Nikolaus Otto in 1876, and the compression ignition variant by Rudolf Diesel in 1892. This important new transportation mode spread quickly between the end of WWI and the beginning of WWII, and trucking soon cut deeply into the freight carried by railroads and coastal shipping. In 1914, there were 99,000 trucks registered in the United States. By 1940, there were five million trucks and trailers, and by 1955 this number was ten million. Increased intercity freight carriage came riding in on Federal road construction support beginning with the Federal-Aid Highway Act of 1938 and culminating in the Federal-Aid Highway Act of 1956, which for the first time directed the use of a Federal gas tax to fund a proposed 41,000 miles of freeways (U.S. Federal Highway Administration 1999). In 1946, only 9 percent of intercity freight was handled by the trucking industry. By 1954 it was over 19 percent. Coupled with this increase, economics drove truck designers to separate the tractor from the trailer. In 1940, there were only 130,000 trailers registered, but by 1955 there were 700,000 trailers. So while the total number of trucks doubled between 1940 and 1955, the number of trailers increased by over 5 times. Containers would further generalize this trend. First the tractor and the trailer became modules, and then the trailer itself would be divided into a container module and a wheels module (Fruehauf 1959, 118).

The rise in trucking had a substantial impact on the railroads. “A study of railroad abandonments from 1921 to 1937 in New England showed that 43% of them were caused by highway competition. A later study of abandonment over the whole country showed that competition was responsible for 58% of the mileage in abandonment which had been authorized by the Interstate Commerce Commission from 1920 to 1943” (Locklin 1966). The struggle between rail and truck is well outside the scope here, except to note that an analogous decimation was occurring in coastal shipping and one response of the railroads was to look to various piggy-back and unitization schemes to compete with the trucking threat. Examples of these efforts included the Chicago North Shore and Milwaukee Railway carrying motor carrier vehicles and shippers’ vehicles loaded on flatcars between Chicago and Milwaukee from 1926 to 1947, and the Chicago Great Western Railway Company transporting highway trailers on flatcars between Chicago and St. Paul beginning in 1936 (Weitz 1954).

Since the early days of railroad regulation, common carriers have operated under tariffs that describe the price a commodity will be charged when it is transported from one location to another. The concept of common carrier, which applies to steamship firms as well as railroads, derives from English law. A carrier is one who carries goods. A common carrier is a carrier, who carries goods for the public at large, in distinction to a private carrier, who carries his own goods. Common carriers are subject to regulation, such as tariffs. Traditionally higher value commodities, such as shoes, were charged higher tariff rates than low value commodities such as coal.

In the 1930s, when railroads began experimenting with containers, the question arose as to the appropriate rate to apply. The Penn Central railroad carried containers at an "All Freight" rate, which was independent of the item type (up to weight limits) inside the container. This tariff was challenged by competing railroads and the trucking industry. In a 1931 decision, the Interstate Commerce Commission ruled that the Penn Central could carry containers, but was required to charge a rate tied to the most expensive item in the container. Under this burden, most railroads chose not to continue their container experiments (McKenzie, North and Smith 1989, 12), because this critical event nullified many of the economic advantages possible through containerization.

This issue did not arise again until the 1950s, again in a rail context, when the New Haven Railroad began a container service. In 1953, after questions pertaining to the legality of the freight pricing of this service were raised, New Haven submitted 20 questions to the Interstate Commerce Commission requesting a Declaratory Order under Section 5d of the Administrative Procedure Act (Weitz 1954). At this point, whether containerization in any mode of transportation would go forward hung in the balance. In litigation that reached up to the Supreme Court, the Court decided that an "All Freight" tariff was legal. This change allowed pricing to reflect the cost benefits of container service, and was a critical precursor to the rise of containerization.

The encroachment of trucking, besides its injurious effects on the rail industry, also caused a precipitous decline in coastal shipping. “From prosperous activity to near extinction in less than thirty years - this is the story of our waterborne general cargo trade along the Pacific Coast,” lamented a study of the potential for maritime cargo transport (Redal 1962, 1). This competitive pressure added an urgency to a wave of interest, that began after WWII, directed toward changing the way goods were carried by ships.

In 1953, at the request and support of the U.S. Departments of Defense and Commerce, the National Academy of Sciences established the Marine Cargo Transportation Conference (MCTC) operating unit, with the goals to study and develop new methods of handling maritime cargo (MCTC 1962). In 1954, an early MCTC research effort quantitatively analyzed cargo handling aboard the military supply ship, SS *Warrior*. This study showed that 36 percent of the total cost of moving a ton of waterborne material from the shipper to the ultimate receiver was spent on the pier (MCTC 1955). The MCTC studies are nearly unique and one of the best sources of specific cargo handling data. These studies were extensively quoted in the industry literature, since even during the period, gathering accurate quantitative data was difficult. A United Nations report noted:

> Any attempt at trying to determine the size and seriousness of the problem of the turn-around time for ships in port is hampered by a complete and utter lack of accessible factual data. What little information is available is usually in a form that renders it quite meaningless. Shipping companies are usually loath to make available their own operational data because of competition and ports cannot be expected to readily make available information which would highlight their inadequacies and shortcomings. (United Nations 1967, 5)

In parallel with government efforts, steamship managers returning from WWII had seen the successes of applying scientific techniques, such as operations research, to solving logistics problems. Experiencing the pressure of rising labor costs coupled with breakneck competition from rail and trucks in the coastal and intercoastal trade, these managers were forced to look for better ways to run their businesses. In the words of an early advocate of containerization (Weitz 1954), "It may seem strange that although Piggy-Back came of age as far back as 1926, it didn't take root and capture the imagination of the public until recently. Why is there now suddenly such intense interest? In my opinion, the main reasons for the present growth can be traced to spiralling labor and handling costs which have forced industry to reexamine old distribution methods with a view toward eliminating, as much as possible, the physical handling of freight."

A survey of cargo handling techniques conducted by the U.S. Maritime Administration (1956) enumerated nine firms pursuing alternative cargo handling techniques. One of these firms, the Matson Navigation Company, will be used to illustrate how firms struggled with these novel techniques. Matson was a long time West Coast - Hawaii shipper facing the same cost pressures as the rest of the industry. The company's dilemma is nicely summarized in testimony presented by Randolph Sevier, Matson's President, before a congressional committee. As recounted in a history of Matson, he "noted that cargo handling was 48 percent of the total cost of handling Hawaii's seaborne commerce. Labor, he said, accounted for 56 percent of the total cargo-handling and vessel costs. Total cargo-handling costs increased 167 percent from 1946 to 1961, and vessel operating costs per day went up 115 percent in the same period" (Worden 1981, 142).

Matson’s shipping business was concentrated in a small number of ports, which allowed the firm to operate its own shore facilities. Running these facilities led the company into the development of longshoring methods, tools, and cargo distribution techniques. Matson developed a number of unitization techniques before and during WWII including special pallets for canned pineapple devised by longshoremen on Maui, open boxes for brick and tile, and “Jensen Boxes.” These boxes, developed before 1942, were plywood containers, six by six by four feet, fitted with hinged doors and locking devices including numbered aluminum seals. Named for J. Harding Jensen, then head of Matson Terminals, Inc., these boxes were stuffed with liquor, candy, and any other cargo especially subject to damage or pilferage (Worden 1981, 141). These boxes were similar to boxes manufactured by the Dravo Corporation.

It was after WWII that a more methodical approach to unitization was undertaken, where the lessons of systematic study of logistics and operations research utilized during the War were carried over to industry. A paper published in the 1952 American Merchant Marine Conference Proceedings by R.F. McDonald, Manager Damage Prevention Division, Matson, begins “Shortage, damage, and pilferage - this unholy trio has plagued the transportation industry for centuries.” McDonald then described solutions the company had begun to adopt, which put them squarely on the path to containerization.

> In the early days of our [loss prevention] program it was found that pilferage accounted for approximately thirty-two per cent of our total claims payments, and it was felt that these pilferable items would have to be given special protection.
>
> Our terminals designed what is now known as the cargo-gard container. It is similar in principle to the Dravo Transportainer, but we feel that for our trade it is

> an improvement. The box has a base of four by five feet and is six feet high. It carries 135 cu. ft. or three tons and can be easily handled with our present fork lifts. All small packages that are easily lost are placed in these boxes. We started with one box in 1947 - we now have 326 in operation which means approximately twenty-five boxes for each vessel in the Pacific Coast-Hawaii trade. The moment cargo that is normally carried in these boxes arrives at the dock, it is placed in the container; or if the cargo arrives by rail car such as freight forwarders car, a box is placed at the door of the car and all small packages such as radios and small appliances, drugs, and similar items are immediately placed in the container. When loaded it is sealed, and this seal is not broken until it reaches its destination. (McDonald 1952, 193)

Already the issues that containerization will have to confront were being raised. Notice the care that was taken to avoid requiring new capital for moving the containers. The issue of the capital intensity of containerization will later become a major concern of ports. Also notice that the idea of the usefulness of unitization was already being openly discussed in the industry. Not only were unitization ideas spread through professional meetings as evidenced by McDonald's comments quoted above, but they were also disseminated through trade magazines, as in this excerpt from *The Log.*

> A container designed for economical loading and stowing of small and valuable packages while at the same time protecting against loss from breakage and pilferage is being produced under the trade name of Cargo-Gard by Wood Fabricating Company, Portland, Oregon. . . . Cargo-Gards are being successfully used by such well known shipping companies as Matson Navigation Company, which firm is currently using 125 of these containers in their off-shore trade. (*The Log* January 1950, 50)

In early 1956, Matson established an integrated research department, with Foster L. Weldon as director. This group conducted an intensive study of Hawaii's special freight problems, and reported their conclusions in mid-1957. The recommendations included a two-phase program to develop a seagoing container service. Phase I would involve conversion of six Matson freighters to carry 24-foot containers on deck, with conventional break-bulk cargo in the holds. Phase 2, contingent on the success of Phase 1, called for the introduction of all-container vessels, plus special-purpose carriers for bulk sugar, automobiles and outsized cargo. The freighter *Hawaiian Merchant,* sailing from San Francisco on August 31, 1958, with a deckload of twenty containers filled with everything from beets to baby food, inaugurated the service. Matson moved quickly and in the first year, six C-3 freighters were altered to each carry seventy containers on deck. Conversion of the C-3 *Hawaiian Citizen* into the first full containership on the Pacific was completed in 1960. The *Hawaiian Citizen* could carry 400 containers, including 72 with refrigeration (Worden 1981, 143-144).

The first container carrying ships departed from the Port of San Francisco, but that Port’s famous old finger piers, supported only by pilings, could neither bear the weight of containers and cranes, nor supply the required space for container storage and marshalling areas. Hence, the company first moved its container operations to the Todd shipyard in Alameda and later transferred operations to the Encinal Terminals, also in Alameda.

Though Matson was handling small numbers of small containers well before Malcolm Purcell McLean announced his intention for a containerized steamship service, the magnitude of McLean’s effort, the level of integration, and the technological innovation his company brought to containerization has conferred on him the title of “Father of Containerization.” It is probably most accurate to think of McLean as the Robert Fulton of containerization. Just as Fulton did not invent the steamboat, but instead was the first to make a going concern of the steamship business, similarly McLean did not invent containerization, but was able to raise an industry around this technology.

McLean got his start in transportation by founding the McLean Trucking Company of Red Springs, North Carolina in 1934 with a single truck. Over the next 20 years McLean built this company into the second largest trucking firm in the nation. To great fanfare, in 1954, McLean announced he would begin carrying trucks on ships. As reported in industry publications, the scheme was widely disseminated. “Announcement of plans to build four large dry-cargo ships, each to cost in excess of $5,500,000 is unprecedented in recent years. A survey revealed that not one dry-cargo ship has been built for a private American account since 1948, and that not a single order for a privately owned ship of this type is on the books” (*The Log* March 1954, 44). McLean’s plan was to build four trailer-transport ships using roll-on/roll-off technology, as well as to modify facilities at three ports, which were projected to be either Wilmington, N.C. or Charleston, S.C. along with New York and Providence. Given the military’s interest in ro/ro *The Log* noted, “The McLean ships will be particularly suited to military requirements” (*The Log* March 1954, 44).

To enter the steamship business, McLean first purchased S.C. Loveland Corporation, Inc., a steamship and tug-and-barge water carrier serving Atlantic ports. He next purchased Waterman Steamship Corporation and its subsidiary Pan-Atlantic Steamship Corporation in 1955, receiving 37 C-2 vessels, which in a single haul, gave him control of the largest dry-cargo capacity in the U.S. fleet at that time (Fitzgerald 1986, 23). The Interstate

Commerce Commission, which was opposed to a single firm owning multiple modes of transportation, forced McLean to divest the trucking portion of the firm. Over the next year and a half, McLean changed course and decided to start the “sea-land” service with demounted vans (truck trailers without wheels), initially converting two T-2 tankers to carry deck mounted containers. On April 26, 1956, the vessel *Ideal X* made a run from the Port of Newark to Houston carrying 58 containers on deck, inaugurating the modern container era. Figure 2 shows a Sea-Land container moving between a Pan-Atlantic ship and a trailer.

McLean’s new service was an immediate success. A popular business magazine reported, “First figures on the Pan Atlantic innovation have the waterfront gaping. It’s reported the ships can load cargo for a record low of 20 cents a ton, compared to the $4 - $5 that it costs to handle neatly palletized cargo by the familiar ships booms” (*Business Week* November 9, 1957, 105). It was in fact so successful that the roll-on/roll-off plans were permanently shelved, when in 1957 Pan-Atlantic canceled the construction of what had become an order for 7 ro/ro ships.

Instead, McLean announced plans to convert six C-2 ships into the first cellular containerships, vessels specifically designed solely to carry containers. The first of these was the vessel *Gateway City* which departed Port Newark on October 4, 1957 sailing to Miami. The first two vessels of this design held 226 trailer bodies, each with the trailer bodies stacked in vertical cells and onboard gantry cranes handling the loading and

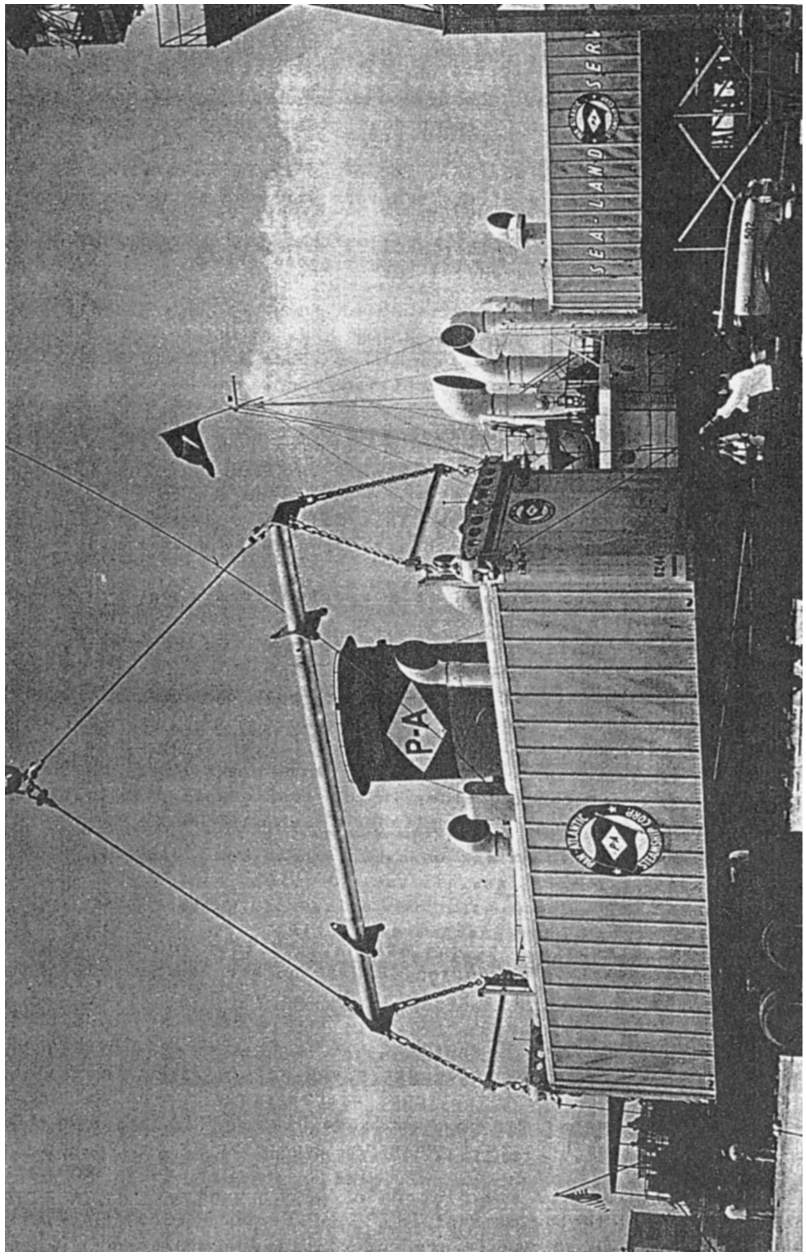

Figure 2. Early Containerized Cargo Handling. Reprinted from Tippets 1956

unloading. By the end of 1957, intercoastal container service included ports in New Jersey, Florida and Texas (Mckenzie, North and Smith 1989, 17). As described in *Fortune* magazine, “SS Gateway City of the Pan-Atlantic Steamship Corp. Mobile, Alabama, is one of four C-2 freighters that have become a sensation in the industry” (*Fortune* May 1958, 177). In 1959, Pan-Atlantic formally changed its name to Sea-Land Service, Inc.

The unloading/loading cycle of these vessels was remarkably efficient. The deck covers were removed to reveal vertical rows of containers stacked one on top of another all held in place in “cells” by specially designed fittings. An empty trailer is rolled up alongside the ship and the ship’s crane lifts the first container from the ship and deposits it on the trailer, which is driven off to the marshalling area to be stored and the next empty trailer picked up by the tractor. Meanwhile, another empty trailer is driven up. Again the crane moves over the cell and removes the next container and deposits it on the awaiting empty trailer. As soon as the first vertical cell is emptied, a truck with a container to be loaded pulls up from the marshalling area. The crane moves that container onto the ship, and moves the next container to be unloaded to the empty trailer. That trailer moves to the marshalling area, and is followed by a trailer with a container to be loaded which the crane operator picks up and deposits on the ship, eliminating any wasted motion of the crane. Times for each unload/load operation of a pair of 25 ton containers was 5 minutes.

In 1962, five years later, Sea-Land’s activities first involved the Port of Oakland, when Sea-Land introduced the first intercoastal container service between the East and West Coasts. This was a major coup for the Port of Oakland as reported in the Port’s newsletter.

“The first of four converted tankers, capable of carrying 474 thirty-five-foot highway trailers, will sail from Sea-Land’s new $19,000,000 terminal at Port Elizabeth, N.J. on September 8, arriving here after a stop at Long Beach” (Oakland August 1962).

M.P. McLean, chairman of the board of McLean Industries, Inc., stated:

> The opening of the intercoastal routes marks a new milestone in low cost ship transportation. Through the use of sealed trailers we are able to load and unload a vessel in one-sixth the time of conventional ships. In addition, we have reduced the problem of damage and pilferage to a bare minimum and reduced handling costs from some $24 per ton to $4.00 per ton. Shippers now have the dual advantage of lower cost and improved service. (Port of Oakland August 1962, 3-4)

There was no question, even at the time, that this was an important milestone for the Port of Oakland. A huge ceremony was arranged for the arrival of the first container vessel.

> More than 600 persons watched as the ship loaded and unloaded 35-foot trailers directly to and from truck chassis with its own huge gantry cranes. The *Elizabethport*, skippered by Capt. R.J. O’Toole, is the world’s largest dry cargo freighter and the first of a fleet of Sea-Land jumbo containerships which hold the promise of revitalizing the intercoastal trade by providing low-cost door-to-door service between the east and west coasts. (Port of Oakland October 1962, 5)

The stage was now set for containerization at the Port of Oakland. The next chapter will describe the Port of Oakland and describe its history up to the September 27, 1962 arrival of the *Elizabethport.*

3 The Port of Oakland

3.1 The Port's Setting

The Port of Oakland is situated on the eastern shore of the San Francisco Bay, approximately 8 miles from the Golden Gate Bridge, which spans the Bay's entrance to the Pacific Ocean. Beginning at Oakland in Alameda County and proceeding counterclockwise, the Bay is bordered by the California counties of Alameda, Contra Costa, Solano, Napa, Sonoma, Marin, San Francisco, San Mateo and Santa Clara, covering approximately 435 square miles of water and encompassed by 276 miles of shoreline. Although shipping is concerned with the deep water channels, over 40 percent of the Bay is less than 6 feet deep, and therefore many of these channels were artificially created or augmented.

Four major geologic faults, the San Andreas, the Hayward, the Concord and the Calaveras faults, have insured a seismically-active history for the Bay Area. San Francisco Bay, itself, resulted from subsidence associated with displacements on the San Andreas and Hayward faults in the late Pleistocene. The Bay drains over 40 percent of the land area of California. The San Antonio Creek drains a broad, low-lying plain on the eastern shore of the Bay, which gradually rises to the Berkeley-Oakland Hills to the east. This creek is locally referred to as the Estuary, and separates Oakland from the city of Alameda to the south. The Inner Harbor of the Port of Oakland occupies a portion of the Oakland side of the Estuary. The Outer Harbor faces the Bay just south of the San Francisco-Oakland Bay

Bridge. The third expanse of marine terminals in the Port, the Middle Harbor, is located on a peninsula just north of the entrance to the Estuary, between the Outer and Inner Harbors. Figure 3 shows a current map of the Port, including transportation links.

The tidal range in this area of the Bay, from mean lower low water to mean higher high water, is approximately 6.4 feet, though extreme weather has generated observed tidal ranges nearly double this value. Currents run approximately parallel to the approaches of the Outer and Inner harbors with ebb running at a maximum rate of 2 knots in a northwest direction. Wind waves typically follow the predominant west-northwest winds and certain combinations of wind, wave and current conditions can present navigational challenges at the approaches to the Port. As will be seen, filling for container terminals by the Port modified tidal flows in this area, causing concern to other marine terminal operators along this shore.

More than 80 percent of the Port's property consists of tidelands granted in trust to the City of Oakland for commerce and navigation by the State of California. Oakland's 19 miles of waterfront in the Port area are defined by the City Charter. The waterfront extends from just north of the Bay Bridge toll plaza down the Oakland Estuary to the east side of the metropolitan Oakland International Airport. During the rise of containerization, this area consisted of a mix of privately owned property, the Oakland Army Terminal, the Oakland Naval Supply Center, and more than 27 square miles of land and water area owned by the Port (Port of Oakland March-April 1963, 1).

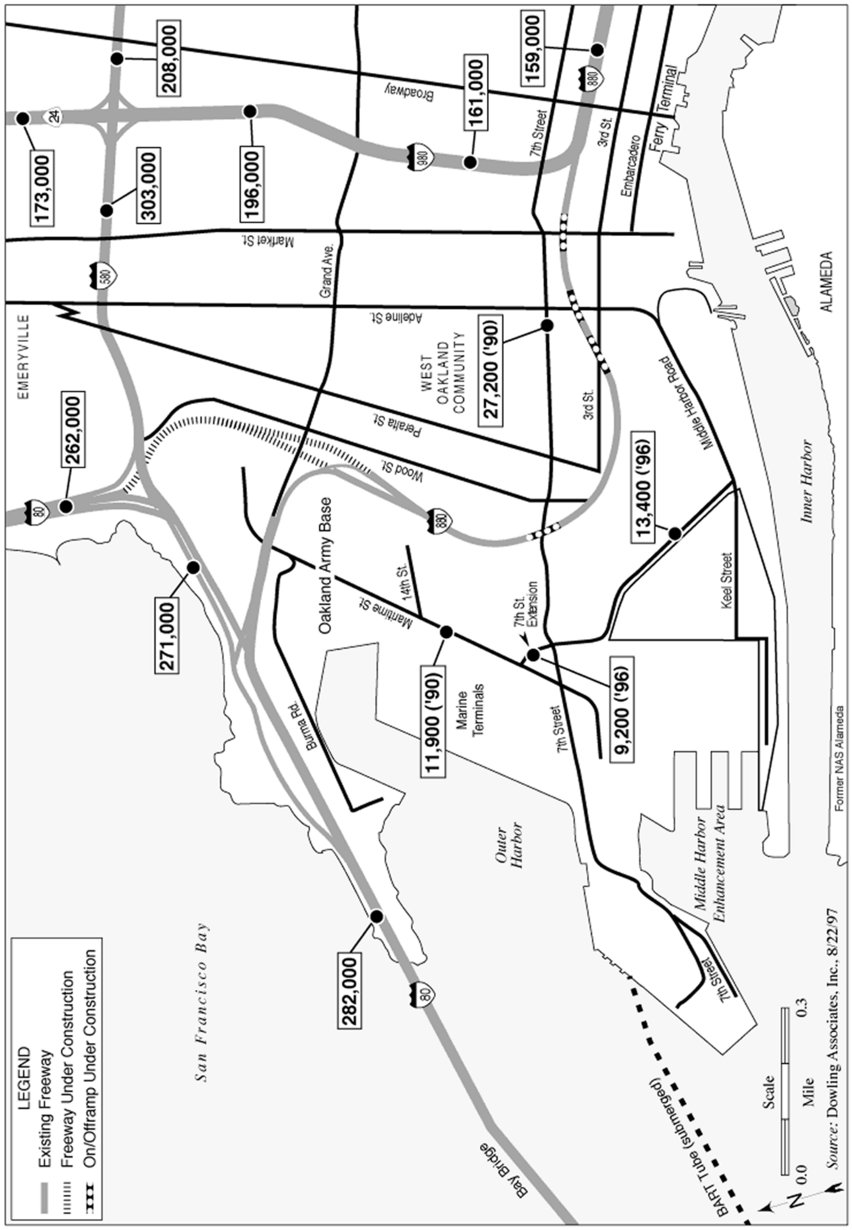

Figure 3. Modern Layout of the Port of Oakland. Reprinted from U.S. Army Corps of Engineers 1988.

Despite a decidedly industrial feel to much of the Port's property and a legacy of intensive use, the area encompassed by the Port supports a diverse biological community. As part of a recent environmental survey, the Army Corps of Engineers found "a wide variety of fish inhabit the affected environment. The Oakland Harbor contains estuarine, marine and anadromous fishes. Among them are various flatfish, surfperch, gobies, sculpin, silversides, pipefish, sharks and rays. Common flatfish are English sole, speckled sanddab, starry flounder and California halibut" (U.S. Army Corps of Engineers 1998). In the same survey, 43 taxa of birds were sighted, ". . . the greatest numbers were seen over the Outer Harbor shoal, where thousands of diving ducks (especially scaups and scoter) and hundreds of grebes of various species were counted." The appearance of government supported biome inventories for the Port should not be surprising, as the rise of containerization coincided with a growing public concern and government involvement with environmental issues, which also must be woven into this story.

The Port of Oakland entered the period of containerization with a substantial truck and railroad infrastructure for moving materials into and out of the Port. In July 1949 a "high-speed, six-lane artery," the Eastshore Freeway opened from Oak Street to 23rd Ave. This freeway was later renamed the Admiral Chester W. Nimitz Freeway and became part of an extensive limited access road system (Port of Oakland 1987, 13). Industrial Survey Associates of San Francisco in 1956 noted the importance of California's highway plans to the Port, which "will make the Port of Oakland increasingly accessible from all parts of the East Bay and the interior valleys for truck freight movement." For east-west shipments, Interstate highway 80 runs from San Francisco across the Bay Bridge just north of the Port's entrance to its terminus in New Jersey, while for north-south shipments the Interstate 80 spur 880 flows into the 580 and Interstate 5 which runs the length of the West Coast from the Canadian to the Mexican Border.

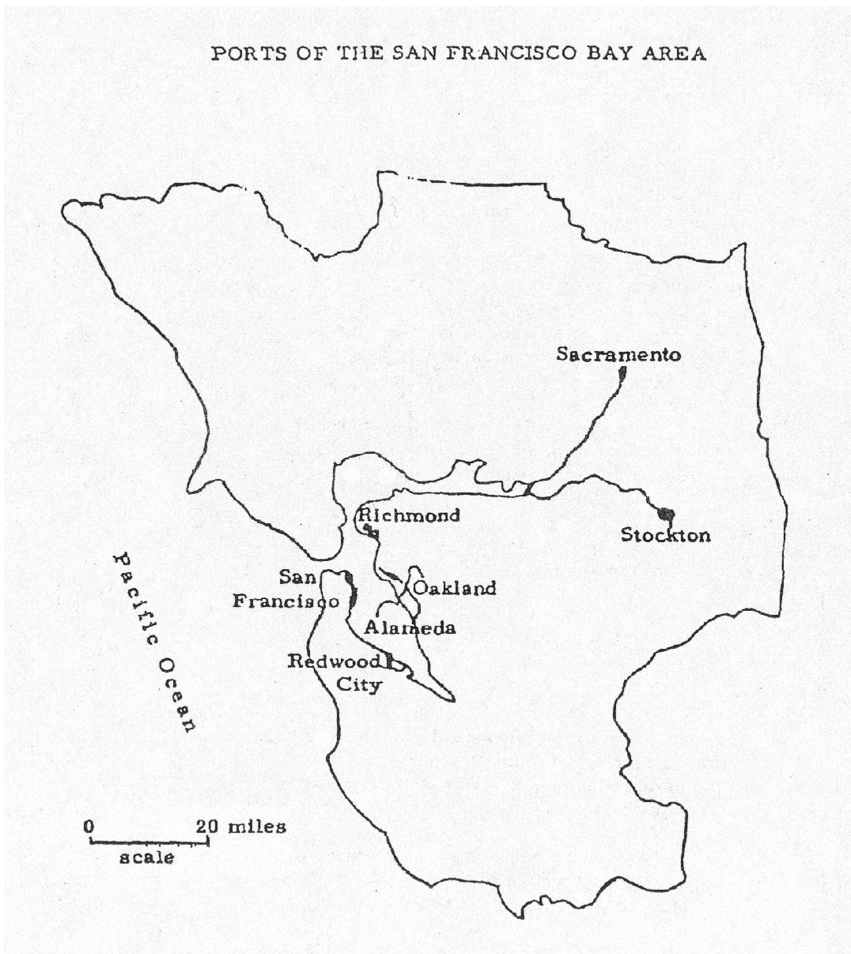

Figure 4. Map of the Ports of San Francisco Bay. Reprinted from Economic Development Administration 1966.

The Port was not blind to the advantages of its accessibility, noting that the Port began, “where three transcontinental railroads terminate and Freeways link the marine terminals with major highways serving all points” (Port of Oakland August 1957, 1). By the close of the initial introduction of containerization, rail service had consolidated to two major rail lines, the Burlington Northern/Santa Fe and Union Pacific. Figure 4 places the Port of Oakland in the context of the commercial ports of the Bay Area.

3.2 The History of the Port of Oakland before 1962

While legends built over time color historical events, they can be used as windows into the minds of those doing the retelling. The Port of Oakland’s myths go far into explaining the Port’s view of itself as a small but feisty competitor. This picture comes out clearly in its accounting of historical heroes and villains. There can be little question that the Port of Oakland revels in its past. In its reports and news releases, stories of wily lawyers or battles with the railroads are retold, and for this reason, it is important to set forth the history of the Port before 1962. At almost every turn in its literature, the Port described itself as arising from a tumultuous past to become the great port of its present. An illustrative case occurred when the Port purchased the last private terminal, the Howard Terminal pier and yard, on the Estuary in December 1978. Not only did the Port distribute a short history of the Howard family, which had established a coal terminal at the site in 1900, but in October 1982, when a container facility encompassing the site and surrounding land was completed, the Port christened the new 49-acre facility, the Charles P. Howard Container Terminal.

This celebration also took more substantive forms. Over its life, the Port has developed a legacy of displaying artifacts with significant historical links to the Port at its facilities. For example, in 1929, only two years after the Port was established as an agency independent of the city government, it acquired the three-masted Revenue Marine Service Alaskan patrol cutter *Bear.* This vessel, during its active life, was based in Oakland, and now the Port placed it on public display as a maritime museum (Oakland 1987, 7). In a similar vein, Jack London, the native son who grew up in the slums of Oakland and whose gritty style made him one of the most popular American writers at the turn of the twentieth century, was memorialized in the Jack London Square development. This 12-block area, which opened in 1951, was modeled on San Francisco's Fisherman's Wharf tourist attraction. The Port went to the effort of transporting and reassembling an Alaskan log cabin occupied by London in the Square. As described in the Port's history, "Because the associations [between Jack London and this area] are so strong, the project is named for Oakland's most famous literary figure, a man who embodied the city's vigorous character and celebrated it in his books" (Port of Oakland 1981, 15).

This "vigorous character" shines throughout the early history of this area. In most of the Port's retelling of its history, the universe began with the discovery of gold at Sutter's Mill on January 24, 1848. For a period quite before this "official" beginning, the Spanish had raised cattle and shipped hides from ranches in the Oakland hills. They were preceded by Native American inhabitation, mostly members of the Ohlone, who lived in the area stretching from San Francisco Bay to the Santa Cruz foothills (Redwood City Public

Library 1997).

The main export of the Spanish settlements was hides. The hides produced by the Spanish were often transported in Yankee ships and this industry is recounted in Richard Henry Dana's *Two Years Before the Mast.* Unlike the open roadsteads of 1835 described by Dana, by 1848 near what soon would become the City of Oakland, a boat landing, the Embarcadero de Temescal, supported Don Antonio Maria Peralta's Rancho San Antonio.

The full-force arrival of the Yankees to wrest gold from the ground generated the origin myths of the Port of Oakland and across the Bay in San Francisco as well. Initially, the governance of both of these ports was vested in the newly established State of California by its constitution. Lack of money quickly found the State diluting its authority by granting private interests rights to the waterfront. These two ports soon took divergent paths with the Oakland waterfront ceded to the city, while the State maintained ownership of the San Francisco waterfront until 1968. As is analyzed in Donald Fitzgerald's "A History of Containerization in the California Maritime Industry: A Case History of San Francisco" (Ph.D. dissertation, University of California Santa Barbara, 1986), the turmoil over control of governance of the Port of San Francisco impeded its ability to effectively deal with the issues of containerization. In both cases the early, private waterfront deals come back to haunt the ports.

Maritime aspects of the gold rush period have been well studied. Trade to California coincided with and accelerated the development of the lovely Clipper Ships. A century later, few would claim that their descendants, the containerships, would likely stimulate similar intense study or inspire artists to painting or poetry. It is useful to briefly examine two of the colorful characters of this period, who personify the rough and ready models of the Port's early days.

The historian, Samuel Eliot Morison, who has written widely on the Clipper era, relates the story of Dr. Samuel Merritt of Plymouth, a New England physician, who liquidated his medical practice and purchased a brig, filling it with merchandise and forty-niners and set sail for California. Due to the vagaries of the market, the merchandise he brought was in oversupply, but following the rule that the money was to be made from the miners not in mining, he returned to medicine and within a year had an income exceeding $40,000. Hiring a canny captain in touch with the market, his brig loaded piles in Puget Sound, which were hot items for the wharfs being built in San Francisco. The profit spawned a second trip north, which also proved profitable, but the market was soon glutted and so the vessel next turned south to the Society Islands for oranges. The profit from these endeavors allowed Merritt to close his office, purchase land in what was to become Oakland, and through wise investment become a multimillionaire and eventually mayor of Oakland (Morison 1977, 154-5).

A second, less savory character, Horace Carpentier achieved equal parts riches and infamy and is described in the Port literature as follows:

> As his first order of business, Horace Carpentier, the wily lawyer who founded the town [Oakland] in 1852, built a dock at the foot of Broadway. In exchange, he sought and received a private deed to the entire waterfront. In 1868, Carpentier profited enormously when the transcontinental railroaded ended its 3,000-mile westward journey at the ferry slips of the Oakland Long Wharf. As the bustling

> mainland terminus of the railroad, the city benefited tremendously too. But the battle to wrest control of the municipal shoreline from private interests kept Oaklanders busy in courtrooms - and often in the streets - until well into the 20th century. (Port of Oakland 1987, 3)

Carpentier's influence would also be felt through long-term agreements in which he ceded large areas of the waterfront to the Southern Pacific Railroad. Again, the Port's literature describes these contentious times.

> Here [the Oakland waterfront] entrepreneur John L. Davie backed by young [Jack] London and the "oyster pirates," skirmished with the Southern Pacific Railroad, which claimed exclusive ownership of Oakland's waterfront as part of its deal with Carpentier. (When the railroad refused to open the Webster Street drawbridge for Davie's "nickel ferry" Rosalie, he threw a hawser around the swinging section, backed the boat at full power and simply ripped the bridge apart.) Here staid Port Commissioner George Pardee, then mayor of Oakland, personally kicked down a fence the Southern Pacific erected across Broadway at Embarcadero in 1893. (Oakland 1987, 14-15)

These private arrangements overshadowed waterfront development. From the establishment of the City of Oakland in 1852 until a court decision in 1907, control of the waterfront was contentious and often decided through litigation. The 1907 decision fixed the city's rights to the low tide line of 1852. At that time, harbor development was placed under the Department of Public Works, which according to the Port's literature "depended on meager bond issues and competition with other city departments for tax funds" (Port of Oakland May 1961, 1).

The Port of Oakland was established as a separate department of the City of Oakland by the municipal election in 1926 and the Board of Port Commissioners took over exclusive control and management on February 12, 1927. Members of the Board are appointed by the City Council upon nomination by the mayor for staggered six-year terms (Port of Oakland March-April 1963, 1). The Board has the power to go directly to the voters to request revenue bonds. The outcome of this election was by no means certain. Competing uses for waterfront space was evident even as the Port of Oakland was transferred from the City.

The then current mayor of Oakland, John L. Davie, ex-cowboy and ferryboat operator, opposed the transfer of the Port arguing that the Port would never pay for itself due to the competition from San Francisco. He argued that the waterfront was better suited for factories and warehouses (Port of Oakland 1987, 4). The mayor was right for exactly one year. In 1927, the municipal wharfs were $21,000 in the red, but that was the last year the Port would not cover its expenses from its revenue stream. Eventually, the Port would reimburse the city for all taxpayer funds used in Port development, including the 1925 bond issue that created the independent Port of Oakland (Port of Oakland 1987, 22). Part of the Port's early success came from this bond issue, which allowed the Port to build three new terminals. Another part can be attributed to the Port's new control of its finances. Now the Port's earnings could be reinvested, instead of returning to the City's general fund.

For the first decade of its existence as an independent agency, the Port grew slowly, following the increase in population in the East Bay. The Depression brought a 7 percent decrease in cargo from 1928 to 1933, which is a significantly smaller decline than other ports. Aided by shipments of material for the construction of the Oakland Bay Bridge, which opened November 12, 1936, the Port actually saw increased cargo in 1934 and 1935.

The military buildup prior to WWII aided the Port. In September 1936, the U.S. Navy announced plans to construct a $12 million Naval Supply Depot on Port lands, which were transferred to the Navy. During the War, the Oakland Airport was used exclusively for military purposes, serving as a marshalling area for all planes bound for U.S. forces in the Pacific. Various government agencies, such as the War Shipping Administration, leased Port facilities for the duration of the War.

During 1947, Port facilities were decommissioned from military use in stages, and returned to civilian control. Again during the Korean conflict in the early 1950s, Port facilities were used by the military. In 1950, the first Japanese vessel since 1940 called at Oakland, a precursor of many ships that would follow. The Port began experiments with bulk handling equipment and early forms of unitization in the early 1950s.

The rise of containerization in the Port of Oakland coincided with the careers of two Port employees, Ben E. Nutter, who was initially hired as Port Engineer in 1957 and was Executive Director of the Port from 1962 to 1977, and Shoichi Kuwata, the Far East representative of the Port from 1965 to 1983. These two men played critical roles in fostering containerization in the Port of Oakland. Nutter, a civil engineer with extensive port construction experience, provided the engineering and management background to effectively implement containerization, while Kuwata, a retired senior executive from the Japanese N.Y.K. steamship line, built up an extensive set of contacts for the Port. During the initial, critical period, when Japanese steamship firms adopted containerization, his activities helped make Oakland a highly attractive choice for their U.S. container base. These two men's careers with the Port of Oakland serve as bookends for the rise of containerization.

Preceding Nutter, Dudley W. Frost held the post of Executive Director of the Port from July 1, 1952, to June 30, 1962, and was a member of the Board of Port Commissioners from 1946 to 1952. He oversaw the early postwar expansions of the Port and initial experiments in mechanized bulk and unitized cargo handling (Port of Oakland April 1962, 1). As early as December 1955, the Port examined various unitized cargo schemes including roll-on roll-off; "The open area to the west of the transit shed [at the 14th Street facility] with two ship berths, . . . is one of the facilities which the Port considers suitable for conversion for the roll-on roll-off operations expected in the near future" (Port of Oakland January 1956, 1). Adopting shoreside container handling requires extensive engineering considerations, and matched well with Ben Nutter's expertise.

> Ben E. Nutter, superintendent of Public Works for the territory of Hawaii, will become chief engineer of the Port of Oakland on January 1 [1957]. The appointment was recommended by Dudley Frost, general manager of the Port of Oakland, who said Nutter's 20 years of experience as a civil engineer particularly suited the needs of the Port of Oakland. The current expansion of Metropolitan Oakland International Airport, the present Port construction program and the planned future industrial expansion of the Port require the full-time supervision of the engineering staff. (Port of Oakland December 1956, 1)
>
> Nutter is a native of Kansas, but a resident of California since 1912. He graduated in civil engineering from Oregon State College in 1936. During the war and afterward he served with the U.S. Army Corps of Engineers as a civil engineer in military airfield and fortification construction, flood control and harbor

development. (Port of Oakland October 1962, 2)

Nutter's previous range of responsibilities had included, "construction of the Diamond Head Terminal, now the main terminal for Matson ships, in Honolulu" (Port of Oakland October 1962, 2). Both his relationship with the Army Corps of Engineers and with the Matson Navigation Company served him well in his new position. In 1956, the year before Nutter joined the Port, Sea-Land had begun its container service, and in 1958, Matson inaugurated its West Coast to Hawaii container service, briefly operating from San Francisco, then choosing Alameda, across the Estuary from the Port of Oakland.

At this same time, the Port of Oakland was gaining experience in mechanization for bulk commodity handling. In February 1961, the Port authorized bulk scrap handling at its Grove Street Pier, which required the Port to demolish some structures and add rails for trains and cranes, and required the leasee Howard Terminal to install two whirly cranes "to [increase] the speed and quantity of handling scrap and to handle other bulk [and] containerized cargoes" (Port of Oakland February 1961, 3). In October 1961, the whirly cranes—Washington revolving gantry type with lifting capacity of 42 tons and a boom reach of 110 feet—were assembled. The $300,000 project was aimed primarily to speed up handling bulk scrap, but as the Port's newsletter noted, "The cranes will also handle 20-ton containers to the hold area of vessels, one of the few pieces of equipment in the Bay Area able to perform such heavy lifts" (Port of Oakland October 1961, 3-4).

Cranes are one of four prominent technologies that required refinement to support containerization. Cranes provide the efficient lifting mechanism necessary to transfer containers between ship and shore. Unlike traditional ship's cargo handling gear, cranes need to handle substantially heavier loads, and accurately place containers in the hold and on trailers. This required innovations such as anti-sway bars for cranes to allow precise positioning. The second technology requirement was in the design of containers, which needed to be both light and strong. The larger, denser loads facilitated by these technologies required in turn shoreside improvements, including large aprons with sufficient footing to support the weight imposed by containers and their handling equipment. The fourth area of change was replacing warehouses with marshalling areas to buffer the containers before they are loaded on ships or trucked to their destinations. With the introduction of refrigerated containers, not only did these areas need to be paved, but power and outlets had to be supplied. The Port continued its planning for this new technology as revealed in a picture caption in the May 1961 Port newsletter, "Port of Oakland Outer Harbor Terminals, leased to Encinal Terminals, are steel and concrete with 336,030 square feet of space. Adjacent is open area for future container and bulk handling facilities" (Port of Oakland May 1961, 4).

As noted in Chapter 2, and detailed in the next chapter, containerization really arrived at the Port of Oakland in June 1962, when the Port successfully negotiated a lease with Sea-Land to be the Northern California headquarters for its intercoastal container service. At the end of the lease negotiations in July, Nutter succeeded the retiring Frost as Executive Director of the Port.

In addition to Nutter, Shoichi Kuwata played a critical role for the Port and containerization. Trade with Japan was increasing, and Oakland aimed to capitalize on this trade. “On a trade visit to Japan [in March 1965], Port executive director Nutter recruits Shoichi Kuwata, a retired board member and senior executive of Japan’s N.Y.K. Line, as Far East representative of the Port of Oakland” (Port of Oakland 1987, 19). Looking ahead, Kuwata turned out to be a canny hiring choice, as the Japanese were rapidly moving to deploy containerization. As will be detailed in Chapter 5, Kuwata organized a number of visits to the Port for both executive and engineering level employees from Japanese steamship lines, resulting in four Japanese steamship companies signing leases on container berths in the Port of Oakland in 1968.

The next two chapters will detail the events that drove the rise of containerization in the Port of Oakland. To provide closure on the careers of Nutter and Kuwata, who were critical to containerization, note that by 1970 containerization was well established in Oakland. The story now becomes one of additional steamship lines calling at the Port, additional shippers adopting containerization, and the Port growing to meet the increased traffic needs. For a new generation of Port managers, the novelty of containerization had long since worn off. On July 1, 1977, Ben Nutter retired as Executive Director of the Port of Oakland, and Walter A. Abernathy, the Deputy Executive Director was promoted to the post. Abernathy joined the Port in 1964 as Public Relations Director and become assistant to the Executive Director in 1966 (Port of Oakland 1987, 27). Six years later, on April 1, 1983, Shoichi Kuwata retired. His successor, Kazumi Nagao was recruited from the Yamashita-Shinnihon Steamship Company (Port of Oakland 1987, 30).

4 The Rise of Containerization in the Port of Oakland: Precursors

4.1 Introduction

There are many ways to unfold the rise of containerization in the Port of Oakland, but I have chosen to order the analysis by critical events in the light of the players involved rather than a strict chronological presentation. These events are divided between this chapter and the next. The events described in this chapter enabled containerization in the Port, while those in the next chapter combined to make containerization successful. First though, to provide context, this section presents an outline of the Port's containerization driven growth from 1959 to 1970.

Events from six critical areas significantly determined the fate of containerization in Oakland. The first was the decision by the International Longshoremen's and Warehousemen's Union (ILWU) to accept the Mechanization and Modernization (M&M) Agreements, which traded their right to control work rules for guaranteed lifetime employment and earnings guarantees. This agreement was finalized in 1961, and was again approved in contract negotiations in 1966. The maritime industry operated under a heavy layer of government regulatory policies, and events in this area are considered second. The impact of the U.S. military is the third area to be considered. Bridging this chapter and the next is private enterprise.

As described in the previous chapter, the Port of Oakland had begun investigating new cargo handling technologies as early as the mid 1950s, but it was Sea-Land Service selecting Oakland as the Northern terminal for its intercoastal container service in 1962, that squarely entered Oakland into the world of containerization. This is the fourth event considered. The relationship between Sea-Land and the Port of Oakland blossomed in March 1965, when Sea-Land signed a 20-year lease on berths in the Outer Harbor, and indicates the end of the precursor events.

The next chapter begins with the events that drove an even more intensive use of containerization in the Port. The first was the escalation of the Vietnam War, which substantially increased the amount of war materiel that had to be shipped through the Port. At the urging of Malcolm McLean, a containerized supply service to support the war effort was begun. The fifth event was a movement of trade away from the United States' traditional European partners toward Asia. The Port became intimately involved in this trend, when a group of Japanese steamship lines decided to base their newly formed U.S. container operations in Oakland. The last area considered is the impact of two government projects, which provided capital infusions into the Port at a critical juncture. Additional capital was required, since the upsurge in container activity placed a heavy burden on the capital resources of the Port. The first aid came with fill provided by the construction of a cross-Bay subway by the Bay Area Rapid Transit District (BART) formed in 1965. The second came from an Economic Development Agency (EDA) job creation grant for $10.1 million in April 1966. Both the fill and EDA money helped in the development of container facilities at what would become the new 7th Street Terminal. The rest of this and the next chapter will examine in detail the events summarized in this section.

4.2 Labor - The ILWU

The successful outcome of negotiations between West Coast labor and management of the tricky labor issues raised by containerization was critical to the establishment of containerization. The experience of Grace Line indicates one outcome when agreement can not be reached. Grace Line was gearing up to use containerization in its operations. In a paper on the design of containerships presented at the New York Metropolitan Section of the Society of Naval Architects and Marine Engineers it was noted:

> Grace Line is proposing to use a 17-ft. container for service between the East Coast of the United States and South America, again based on studies of the cargo being moved and the highway limitations in the eastern states. (MacMillan 1959, 132)

In the 1959 *Proceedings of the American Merchant Marine Conference,* J.M. Gilbreth, who was manager of the Operations Research Department of Grace Line Inc., reported on Grace Line's experience in carrying small containers. As a result of that experience, they decided to enlarge two C-2's to be able to carry 476 8' x 8' x 17' van containers. In Grace's response to a survey, it was noted, "Eventually six container ships will be employed on this line's route between U.S. West Coast ports and South America" (Ebasco Services 1959, 94).

On January 29, 1960, the *Santa Eliana,* Grace Line's first newly converted containership entered U.S. foreign trade, with containers containing powdered milk and other general cargoes. The trip to Venezuela is the first offshore, fully containerized service (Elmer A. Sperry Board of Award 1991, 7). What happened next is described by

Captain Ralph E. Holthausen, one of Grace Line's masters. "The longshoremen refused to unload the containers even though some sort of a previous agreement had been made by the agency. After 18 days an agreement was reached and the *Santa Eliana* was unloaded with the provision that no more vessels of this type would be used" (Holthausen 2000). After this initial sailing, Grace Line suspended operations on this route (Glickman 1961, 3). In 1961, at a presentation on the naval architecture of containerships, the difference between technically successful versus operationally successful is noted.

> Even though these [Grace Line] vessels were successful from a design standpoint, they are both now laid up in our [Maryland Shipbuilding & Dry Dock Company] yard awaiting the settlement of stevedoring differences with the Venezuelan Government. Unfortunately for the owners the change in Administration in Venezuela would not recognize previous written agreements. (Jory 1961, 74)

Not being able to reach agreement with the shoreside labor force, Grace Line sold the two modified containerships to Sea-Land. The consent of labor was a necessary and critical event for the success of containerization in the Port of Oakland.

The relationship between the West Coast union, the International Longshoremen's and Warehousemen's Union (ILWU), and the steamship lines, represented by the Pacific Maritime Association (PMA) was stormy, and sometimes bloody. A violent strike in 1934 wrested control of the hiring halls from management to the union. Between 1934 and 1948, there were no fewer than twenty major port strikes and thousands of small work stoppages. A sampling of days lost to strikes by Matson shows the company lost 1,435 vessel days to strikes in 1948, 2,502 vessel days in 1949, 952 vessel days in 1952, and various slowdowns and short strikes in 1954 cost 343 more unproductive days (Worden

1981, 121).

By the mid 1950s, the ILWU consisted of the 15,000 or so “fully registered” A men, 1,500 to 2,000 B men, and 10,000 casuals. For years, the union fought almost all new methods of cargo handling for fear of losing jobs, while employers battled just as stubbornly for each and every laborsaving device, regardless of its side effects. A number of theories have been put forth why the ILWU changed course in the late 1950s and gave up control of work rules. It is difficult to probe the motivations of labor, since there were far fewer forums for the union’s view to be recorded. While the Port and the PMA were prolific, much of labor’s views come from interviews or interpreters, such as the labor analyst Ben Seligman. Seligman presents the most widely held understanding of the ILWU’s motivation in negotiating the mechanization issue.

> By the late 1950s Harry Bridges, long-time leader of the I.L.W.U., had concluded that the force of technology was irresistible and that he would have to “adjust” to survive. He was determined to take care of the people in his union. Besides, the shipowners were beginning to mutter that they would take their cargoes elsewhere, though it was not clear where. In 1958 Bridges advised the stevedoring companies, represented by the Pacific Maritime Association, headed by Paul St. Sure, that he would agree to mechanization, provided the workers share in productivity gains. (Seligman 1966, 245-6)

In 1959, the PMA and the ILWU initiated a pilot agreement under which employers contributed $1.5 million to a Mechanization and Modernization Fund, which became known as the “M&M” fund, and the union agreed to lift certain workrules and to accept new laborsaving methods. Put into final form in 1961, the agreement provided that for five and one-half years, employers would put $5 million annually into the fund, basically to allow early retirement and pay for mandatory retirement for the A men. There was also a guarantee in the plan that the pay for regular longshoremen would not be allowed to drop below the equivalent of thirty-five hours in wages per week because of more efficient operation. The guarantee, however, did not apply to reduced hours stemming from economic conditions. The agreement was renewed in 1966. The significant paragraph regarding the union's new position reads: "It is the intent of this document that the contract and working and dispatching rules shall not be construed as to require the hiring of unnecessary men" (Worden 1981, 144-5).

While Grace Line's labor experience halted its entry into containerization, other labor actions could also have slowed the introduction of containerization. Containerization makes economic sense because its additional costs due to increased capital and less efficient use of stowage space aboard ship were significantly more than offset by the reduced labor costs and the quicker turnaround time of ships in port. Changes in work rules were necessary to achieve the cost benefits. The M&M agreement split the economic benefits among the shippers, the steamship lines, and labor. As estimated by Seligman (1966, 245-6), employers took a 20 percent increase in labor costs for an 80 percent saving in man-hours.

Though the M&M agreement had by far the most profound impact on containerization in the Port of Oakland, other labor issues are worth noting. The labor contract required that longshoremen must be additionally compensated for their travel time from the hiring hall to their place of work. Since the only hiring halls were in San Francisco and Stockton, under the 1961 contract, this added $8.42 per hour in additional labor costs for each fifteen-man gang working in Oakland compared to San Francisco. Changing housing patterns, with more longshoremen living in the East Bay, and increased cargo traffic handled by the Port resulted in the Port achieving parity with San Francisco in 1965, when the Port acquired its own Union Hall (EDA 1966, 24).

> Construction is now underway on the new East Bay Center for Warehouse Union, Local 6, ILWU, in the Port of Oakland Industrial Park. Located on an acre parcel at 99 Hegenberger Road, the headquarters facility will be surrounded by landscaped terraces and include a dispatch hall, meeting rooms and administrative offices. The unique building will be marked by two parabolic arches which support the entire center section of the roof from steel cables. The center was designed by Oakland architect Herbert T. Johnson, A.R.A., who modeled the suspended roof from previous experience as architect on the Golden Gate Bridge project. (Port of Oakland May 1965, 2)

Another issue that arose during this period was a jurisdictional one between unions. The issue related to which union should pack containers not packed by the shipper. The ILWU struck the Pacific Coast container docks on March 17, 1969 demanding that all containers except those packed by the shipper be loaded and unloaded by longshoremen rather than warehousemen of the Teamsters' union. A federal court ordered the longshoremen back to work under their existing contract, but jurisdictional issues would continue to arise, some reaching to the Supreme Court for resolution. Labor unrest returned in 1971, when a 100-day strike was only ended after a court injunction under the Taft-Hartley Labor Law (Port of Oakland 1987, 24).

The M&M agreement provided the basis for all of the other activities of containerization. Without the consent of labor, a very different path to adopting containerization would have almost certainly taken place. As a crane operator quoted in William Finlay's *Work on the Waterfront* noted, "You see, when you say 'no' to an employer, it's like a revolt, it's a miniature revolution" (1988, 175). In this case, it was labor saying 'yes' that generated a revolution that was anything but miniature.

4.3 The Regulatory Environment of the Maritime Industry

4.3.1 Introduction

The United States Federal Government was inextricably intertwined in the maritime industry. The executive, legislative, and judicial branches all played major roles in the development of containerization. The focus here is constrained to the agencies most directly involved with the development of containerization in the Port of Oakland.

Two Federal agencies generated the bulk of the regulatory oversight in the maritime industry, the Interstate Commerce Commission (ICC) and the Maritime Board. A newcomer, environmental regulation, became of increasing importance during the 1960s. Given the critical importance of dredging and filling for the Port of Oakland and the environmental impact of this activity, this form of regulation is also considered.

Before heading into the details of maritime regulation, this section begins with a detailed example, which vibrantly demonstrates the economic impact of regulatory decisions. In April 1956, the East Bay Ports and their tenants, including the Port of Oakland, the Port of Stockton, Howard Terminal of Oakland, Encinal Terminals of Alameda, and Parr-Richmond Terminal of Richmond, filed a formal complaint before the Federal Maritime Board against an overland tariff of the Pacific Westbound Conference.

The Pacific Westbound Conference consisted of 14 U.S. and foreign steamship companies and an additional 14 foreign associated members shipping between the U.S. and Asia.

Cargo vessels operate in one of two modes, as liners or as tramps. Liners follow defined routes at specified times, and at advertised rates, while tramps go from port to port opportunistically moving cargo. Operating on a set schedule was an American innovation that began with the Black Ball Line's New York to Liverpool service in 1818.

Historically, scheduled service engenders price competition, usually of a cut-throat nature, which is good for the shippers and bad for the shipping companies. The shipping companies' response to this situation has typically resulted in attempts by the competitors to coordinate their activities. In the waterborne trade, this coordination, in the form of dividing routes and fixing prices, became known as the conference system and first appeared openly in the British-Calcutta trade in 1875. The effects of the "anti-competitive" nature of this coordination became a political issue in the United States at both the state and federal level. Legislation enacted toward the end of the 19th century placed common carriers under regulatory oversight.

In 1956, the Federal Maritime Board was the final arbiter on rates and routes for the shipping conferences in which U.S. steamship lines participated. The East Bay ports' complaint was prompted by an overland tariff of the Pacific Westbound Conference, which instituted a penalty on goods originating overland from east of Denver and shipped to the Far East from any Bay Area port, except for the Port of San Francisco (Port of Oakland September 1956, 1).

In July 1957, the Federal Maritime Board ordered the Pacific Westbound Conference to amend its overland tariff to grant East Bay ports parity with San Francisco (Port of Oakland August 1957, 1). The Board acknowledged that the discrimination violated Section 205 of the Merchant Marine Act of 1936. This crucial decision opened the door of Far East trade for the Port of Oakland placing it on equal footing with the Port of San Francisco. Without this decision, it is unlikely that trade with Japan through the Port of Oakland would have developed, and without that trade, it is highly unlikely that Japanese steamship firms would have chosen Oakland as their container base in 1968. The rest of this chapter will detail the regulatory environment during the rise of containerization.

4.3.2 Federal Regulation of Maritime Activities

One need look no further than the U.S. Constitution to find the foundations of maritime trade regulation. The Commerce Clause, Article 1, Section 8, Clause 3 states: "The Congress shall have power . . . to regulate commerce with foreign nations, and among the several states, and with the Indian tribes." The case of *Gibbons v. Ogden*, 22 U.S. 1 (1824), which involved a dispute over steamboat routes decided in 1824, was one of the earliest rulings in which the Supreme Court applied this clause.

The facts of the *Gibbons* case are straightforward. The New York State legislature had granted an exclusive monopoly to Robert Fulton, the first successful steamboat operator and his financial partner Robert R. Livingston to operate steamboats on New York waters. Aaron Ogden, who later became governor of New Jersey, purchased from Livingston the right to operate a steamboat between New York and Elizabethtown Point, New Jersey.

Thomas Gibbons began operating a competing service in 1818. A long series of court cases ensued with Ogden receiving support from the New York courts, while Gibbons continued his operations due in large part to the skill of his young steamboat captain, Cornelius Vanderbilt, in dodging the sheriff.

Gibbons retained Daniel Webster, and the decision, authored by Chief Justice Marshall, established that Congress was supreme in regulating interstate commerce and the Fulton-Livingston monopoly was void. With the market now open, at least two steamship owners named their vessels after the Chief Justice and the door was cracked ajar for future Federal intervention in maritime activities.

Three acts established the predominant regulatory framework under which containerization developed. The first is the *Act to Regulate Commerce of 1887,* which is better known as the *Interstate Commerce Act.* The second is the *Shipping Act of 1916,* which along with its amendments collectively became known as the *Merchant Marine Acts.* The last major regulatory act is the *Intercoastal Shipping Act of 1933.* These acts created two regulatory agencies, the Interstate Commerce Commission (ICC) and the Federal Maritime Board (FMB) embodying broad regulatory powers over transportation.

The Interstate Commerce Commission was originally created to ameliorate railroad abuses, but its authority was broadened to include trucking and, for short periods, maritime activity. While the ICC may seem marginal to containerization, in fact the intrinsic intermodal nature of this technology brought it under ICC purview. As noted earlier, an ICC decision in the 1930s essentially brought containerization on the railways to a halt, while a court ruling in 1956 against the ICC again opened up the economic potential of containerization. The ICC is also of interest since the FMB was modeled after the ICC. Finally, the ICC's role in setting tariffs for truck and rail held the economic balance among the various modes of transportation. However, at the dawn of containerization, a radical change occurred in the legislative philosophy of this balancing act.

Through its initial years, the ICC held a predominantly regulatory responsibility, but the Great Depression brought about changes in the ICC's role. These changes culminated and were codified in the *Transportation Act of 1940.* A national transportation policy was declared in the preamble of this Act, "[the ICC became duty bound to] provide for fair and impartial regulation of all modes of transportation, . . . to recognize and respect the inherent advantages of each, . . . foster sound economic conditions in transportation, . . . all to the end of developing and preserving a national transportation system" (Transportation Act 1940).

It is beyond the scope of this paper to detail the inherent difficulties in devising rates so as to not favor one mode of transportation over another, trying to square the tariffs between rail, truck and ships to keep them in balance. However, it must be noted that during this period both coastal shipping and rail shipments declined in favor of a rapidly rising trucking industry. The Port of Oakland viewed the ICC rate proceedings as crucial, which can be seen in its 1954 founding membership in the Northern California Ports and Terminals Bureau. The Bureau, established in conjunction with Howard Terminal, Encinal

Terminals, the Port of San Francisco, and the Sacramento-Yolo Port district, provided a unified front for these organizations in tariff negotiations with the railroads before the ICC. The Bureau's goal was to arrive at tariffs that were both competitive with rival ports, such as those in the Gulf States, and also to keep waterborne transport competitive against intercoastal rail transport. This second goal was often in conflict with the economic interests of the railroads. Part of the Bureau's task was to maintain land-based tariffs sufficiently dear to allow viable rates in coastal and intercoastal maritime commerce, which provided continued revenue for the ports and their operators. The ICC's job was to find a balance between these competing demands.

The Bureau had significant success in its appeals of tariffs, but four years later, the rules of the game changed with the *Interstate Commerce Act of 1958.* This Act provided that, "Rates of a carrier shall not be held up to a particular level to protect the traffic of any other mode of transportation." In the words of the Bureau, this law "had the effect of unleashing the railroads against the domestic water carriers" (Port of Oakland February 1960, 2-3).

Despite the ICC's activity, the main regulatory player was not the ICC, but the maritime agencies. The legislative history and naming of maritime regulatory agencies is slightly convoluted. *The Shipping Act of 1916* established the Federal Maritime Board to regulate waterborne common carriers engaged in foreign commerce. The *Intercoastal Shipping Act of 1933* added regulation of common carriers in intercoastal commerce, but responsibility was later transferred for all domestic trade, except off-shore domestic commerce, to the ICC by the *Transportation Act of 1940.* The *Reorganization Plan No. 7 of 1961* separated the regulatory and promotional aspects of Federal maritime activity by transferring the regulatory aspects of the Federal Maritime Board to the newly established Federal Maritime Commission (FMC), "respecting rates, services, practices, agreements and discrimination of common carrier lines and conferences engaged in off-shore domestic trade" (Fair and Guandolo 1983, 41). Subsidy activity was transferred to the Maritime Administration (Marad) of the Department of Commerce. Public Law 89-670, known as the *Department of Transportation Act* established the Department of Transportation, which brought together under one roof many of the administrative and promotional transportation agencies on April 1, 1967, when the Department officially opened for business. On August 6, 1981, Public Law 197-31 transferred Marad to the Department of Transportation.

The classic text in regulatory law is *Transportation Regulation,* by Fair and Guandolo. First published in 1947, the ninth edition, published in 1983, provides useful insight into the then current interpretation of the regulations. With the wave of deregulation beginning in the 1980s clouding our current view, it is important to view these regulations as seen by the litigators of the period, as described in this textbook. The authors provide a succinct summary of maritime regulation.

> In merchant marine shipping only the common carriers and the ports and terminal operators that serve them are subject to economic regulation. All agreements between parties to these operations must be filed and approved. Much of the regulation relates to the steamship conferences which prescribe rates and service regulations of member lines. There is no regulation of rate levels per se.

> Regulation of rates and service is essentially restricted to preventing discrimination between shippers, ports and localities. Filing and adherence to tariffs are required. Reparation may be awarded for misrating. (Fair and Guandolo 1983, 40)

In international shipping, due to the intense competition from other nations, the main Federal effort was promotional. Aid was typically in the form of construction and operating subsidies. While these were the major mechanisms, there was other indirect aid, such as requiring that Federal humanitarian food relief be shipped in U.S. vessels. Further discussion of this promotional activity will be postponed until the military subsection. These subsidies were justified in the name of national defense, and while administered by a civilian agency, the military had a large say in which projects received funding.

Before we leave Marad, it is useful to note that since the Federal government played such a large role in the market for vessels, both by selling surplus military vessels into civilian service and through construction subsidies, that it was common practice to use Marad ship designations in describing ships. These designations are typically a letter indicating the type of vessel, C for cargo, T for tanker, followed by a number indicating length. So for instance, McLean's purchase of Waterman Steamship Corporation was described as "McLean, who owned Georgia-based McLean Truck Company, purchased Waterman Steamship Corporation and its subsidiary Pan-Atlantic Steamship Corp., in 1955. He received 37 C-2 vessels, which was the largest single dry-cargo capacity in U.S. fleet" (Fitzgerald 1986, 23). Similarly, McLean converted "two T-2 tankers, *Ideal X* and *Alameda* for container service" (Fitzgerald 1986, 24). The designation C-2 indicates a cargo vessel of length between 400 and 450 feet, while a T-2 vessel was a tanker between 450 and 500 in length at the load water line (U.S. Maritime Administration 1984, 167).

For inland water carriers, regulation tried to solve a fundamentally different problem. As described by Fair, “While their [FMC’s] regulation generally followed the pattern of railroad regulation in regard to rates, mergers and the enforcement provisions, the emphasis was on control of competition by a certificate of public convenience and necessity procedure for entry and extension” (1983, 24). The view was that irresponsible competitors would over-saturate the market until no individual concern, no matter how well run, could be viable. The goal was to stabilize the industry.

Three critical cases, one in each of the FMC’s areas of control, steamship-port leases, conference rates, and control of competition on routes, made their impact felt on containerization in the Port of Oakland. In the first two cases, the rate of uptake of containerization would have been significantly slowed had the cases been decided differently.

In the mid 1960s, the Port of Oakland required significant infusions of capital to expand its container facilities. The standard means of raising capital for the Port was by issuing revenue bonds, where the revenue from the completed project is used to repay the indebtedness. The more certain the source of revenue, the higher the bond’s ratings, and the lower the interest rate the Port had to offer to attract investors. One way to assure income is by securing tenant leases for the facility, and tenant leases require FMC approval. In January 1966, over the objections of the Ports of San Francisco and Los

Angeles and Encinal Terminals of Alameda, the FMC approved a 20-year preferential assignment lease for 24 acres and two deepwater berths between the Port of Oakland and Sea-Land Service. This arrangement allowed Sea-Land priority on these facilities, but other operators could use the facilities if they were not previously scheduled by Sea-Land. This lease allowed the Port Commissioners to go to the voters to request a $3.2 million improvements revenue bond, which was approved (Port of Oakland January 1966, 2).

A second area of the FMC's authority was oversight of tariffs. Resistance to railroad containerization arose partially from trucking firms aligning against container rates, but also from railroads without container plans opposing lower tariffs. A similar phenomenon occurred in shipping conferences between steamship firms that adopted containerization and those that did not. The FMC, as the final voice in conference tariffs, had critical control of this issue. In the FMC case, *Disposition of Container Marine Lines Through Intermodal Container Freight Tariffs Nos. 1 and 2,* 11 F.M.C. 476, 492, the Commission ruled on rate regulation of container service. This case involved port-to-port transportation between the United States and inland points within the United Kingdom. The complainants claimed the port-to-port portion of the container rates was out of line with tariffs of the conference. The Commission ruled that the conference rate contracts were "nonexistent in the application of intermodal service. It was, therefore, not within the scope of the conference dual rate contracts" (Fair and Guandolo 1983, 234-5). This decision opened up container tariffs to separate rate negotiations.

It was not just tariffs and leases that affected containerization. Though the effect is slightly more subtle, the Federal government's control of shipping lines' routes determined the intensity of competition on these routes and hence their profitability. Profitability, in turn, was a major factor in determining the availability of capital to the shipping lines for investment in container operations. Government decisions balanced ensuring competition to keep rates low, with avoiding over-competition which could irreparably damage the already fragile shipping lines. Just as Matson Navigation Company was pushing against the limits of its container operations in Alameda, and contemplating a move to the Port of Oakland, its profitability was put at risk.

Matson's cash-cow run to Hawaii was threatened in July 1965, when the Secretary of Commerce authorized the States Line, a privately owned, subsidized American flag carrier serving the Far East from the Pacific Northwest and California, to increase its annual calls at Hawaii from twenty-six to fifty-two. Matson sued in federal court to have the ruling overturned. The case dragged on until 1970, when the defendant, which had actually only run a few ships on this route, dropped its request for additional service.

Ironically, part of Matson's expansion plans were based on its expectation of participating in the increased Asian trade, which required government approval. Matson entered that service in February 1966, when the Maritime Administration approved a Matson proposal to operate a nonsubsidized freight service between the Pacific Coast, Hawaii and the Far East (Worden 1981, 149-150). Partly in anticipation of the growth in cargo from these new routes, Matson announced it would move from Alameda to a newly planned container facility at Port of Oakland.

Increasing the cargo handling capacity of a port, such as to accommodate Matson's move to the Port of Oakland, often requires not only expanding the port's berthing facilities, which may involve filling wetlands, but also enlarging the channels leading into the port. The responsibility for overseeing these activities until the 1960s fell entirely on the Army Corps of Engineers, and from the 1960s onward was shared with various agencies overseeing environmental regulations. Details of the construction of the new container facility, to which Matson moved from Alameda, will be postponed to the next chapter, but the regulatory environment will be described here. In a 1999 interview, Clyde J. Hart, Jr., the Maritime Administrator, was asked,

> 'What do you see as the biggest challenges facing the maritime industry and what are Marad's plans to meet them?' He responded, 'I think there are several major challenges facing the maritime industry of the future. Adequate dredging of critical navigation channels leading into our nation's ports and waterways surely ranks near the top of the list.' (Hart 1999, 13)

It is interesting to observe the reversal of power between shipping lines and ports during the rise of containerization. Traditionally, with many small vessels calling on numerous ports, ship design and construction was limited by port depth considerations. A 1953 report prepared by the Army Corps of Engineers examined the issues surrounding vessel draft.

> The economical limit of draft of tankers in the foreseeable future will be determined by the depths of water provided in harbors and channels. . . . The design of large bulk-cargo vessels is influenced by the depths available in harbors and channels. It is technically and economically sound to construct supertankers and super-ore-carriers. The cheapest way to gain additional capacity, from the ship point of view, is to increase the smallest dimension, namely, the draft. It is the view of this committee that if there were no limitations in depths of channel, the draft of

> many of the super bulk-cargo-vessels now under construction would have been designed to be in excess of 40 feet. (U.S. Army Corps of Engineers 1953)

While containerization was not yet on the scene, the conclusion that port depth was controlling vessel draft for tankers and bulk ships would soon hold in the world of containerships as well.

Economies-of-scale leads containerization to best fit fewer, bigger ships calling on an ever diminishing number of ports. As containerization supplanted break-bulk cargo handling, anxiety over channel and berth depth was transferred from ship owners and designers to the ports. It now became a critical issue for ports whether there was sufficient depth to attract and handle each succeeding generation of containerships. Now, ports are scrambling to be the regional hub, the one port in an area where containerships call. Ports that planned to remain competitive for container traffic must either have natural depths to support these vessels, or blast and dredge their channels to allow the safe passage of increasingly larger ships. Blasting and dredging are the province of the Army Corps of Engineers.

The Army Corps of Engineers traces its lineage back to 1775, when General George Washington assigned a deputy, General Rufus Putnam, to plan for the defense of New York City against British attack (Klawonn 1977). The Corps' mandate was broadened by Congress in 1824 to include responsibility for improvements to the navigable waters of the United States. With appropriations from Congress, the Corps maintains and improves the channels leading to ports. Congress approved the first Federal navigation improvement in

San Francisco Bay in 1868. The day after the Port of Oakland became an independent entity on January 20, 1927, Federal legislation provided $1.4 million to dredge 30-foot channels in the Outer Harbor and Estuary, plus $100,000 annually for maintenance (Port of Oakland 1987, 4). Maintenance of channels is a concern in San Francisco Bay since there are two major hydrographic forces causing shoaling - new material introduced from fresh water sources, mostly from the Sacramento and San Joaquin rivers, and redistribution of existing materials due to the dynamics of the movement of water (U.S. Army Corps of Engineers 1998).

The funding process for channel improvements is long, and suffused with the internecine politics of ports competing against each other for limited funds. Beginning in 1955, the Port began to lobby for appropriations to increase the harbor depth from 30 to 35 feet (Port of Oakland March 1956, 1). This request was motivated by a predicted increase in draft of bulk scrap metal vessels then utilizing the Port. It was not until March 1962, that an appropriation of $4,716,000 was approved by the U.S. Bureau of the Budget to fund the deepening of these channels (Port of Oakland March 1962, 1). By this time, the Port had noted the trend in increased draft for containerships, and used this as additional evidence for the need for deeper channels.

So central was the Army Corps of Engineers to the Port’s plans that the Port kept fairly close watch on Federal regulations relating to the Corps. When under the influence of environmental forces, legislation was introduced in 1967 to transfer the responsibility for maintaining harbors from the Corps to the Department of the Interior, the Port

Commissioners went on record opposing the legislation.

> Commissioner George J. Vukasin who has board assignment to the Port's marine terminal facilities said the proposed bill could make the development and maintenance of the nation's waterways and harbors subservient to the other interests of the Department. Under the present organization the Chief of Army Engineers must submit for review to the Secretary of the Interior all construction permits for maritime areas, prior to their authorization by Congress. This procedure was established to provide protection for the interests of sport and commercial fishing, wildlife conservation, recreation and natural beauty. (Port of Oakland May 1967, 2)

Beginning in the mid 1960s, environmental concerns and regulations began to affect the Port's calculations. Fill for additional terminals and dredging to clear channels were historically the life blood of ports. These activities tend to be unhealthy for fragile wetlands ecosystems. The Port's initial view of the conflict between environmental concerns and economic growth is recounted in a May 1966 address by Executive Director Nutter before the San Francisco Bay Conservation and Development Commission, "Future port developments requiring bay fill will have to be judged rationally if Oakland is to fulfill her destiny as the West Coast's transportation center" (Port of Oakland May 1966, 4). Later in the speech, Nutter describes recreational uses, such as a pleasure boat facility, and a municipal golf course as examples of the Port meeting its environmental duty. For Nutter, the question was trading off competing uses and the value that should be placed on each type of activity. He continued, "each port project and its site's competitive uses must be weighted and decided on some rational basis. We must have ways to comprehend and compare competitive use values" (Port of Oakland May 1966, 4).

The Port of Oakland first felt the sting of environmental legislation from the California legislature in the form of the McAteer-Petris Act (1965), which established the Bay Conservation and Development Commission (BCDC) to oversee planning matters for the entire Bay. In introductory materials prepared by the BCDC, this legislation is described.

> The McAteer-Petris Act has long served as the key legal provision under California state law to preserve San Francisco Bay from indiscriminate filling. Based on the recommendations of the San Francisco Bay Conservation Study Commission, and the efforts of State Senator Eugene McAteer, Assemblyman Nicholas Petris, Save San Francisco Bay Association, and the Bay Area public, on September 17, 1965 the California Legislature and the Governor signed into law the McAteer-Petris Act.
>
> This law established the San Francisco Bay Conservation and Development Commission (BCDC) as a temporary state agency charged with preparing a plan for the long-term use of the Bay and regulating development in and around the Bay while the plan was being prepared. The San Francisco Bay Plan, completed in January 1969, includes policies on 18 issues critical to the wise use of the Bay ranging from ports and public access to design considerations and weather. In August 1969, the McAteer-Petris Act was amended to make BCDC a permanent agency and to incorporate the policies of the Bay Plan into state law. (San Francisco Bay Conservation and Development Commission 1999)

Nutter's arguments went to the economic benefits of additional facilities. Nutter said that not only will increased tonnages require new port facilities but that the nature of containerized cargoes require facilities much larger than those of the past.

> The ability of Oakland to meet these space requirements, plus the city's excellent freeway and rail network, led the study team [an economic feasibility study conducted for the Economic Development Administration] to conclude that containerized freight operations will be centered in Oakland. (Port of Oakland May 1966, 4)

The Economic Development Administration (EDA) study mentioned by Nutter was an initial step in determining eligibility for a job creation grant for the Port of Oakland. As background for this project, Amory Bradford, a consultant to the EDA project in Oakland, spoke with many local, concerned parties. Bradford is an interesting source on environmental issues, since he not only had a stake in the success of the Oakland jobs project, but he also was involved in conservation issues in his role as a director of the National Audubon Society. Bradford related a meeting with Catherine Kerr, the wife of Clark Kerr, a well known labor economist and the then President of the University of California, Berkeley. In an interesting maritime link, Clark Kerr served as an arbiter in many labor actions including negotiations between the ILWU and waterfront employers in 1946-7. Catherine Kerr was deeply involved in the environmental movement in the Bay Area and she and Martin Myerson, the Dean of the School of Environmental Design, met with Bradford on April 7, 1966.

> My [Bradford's] preoccupation with Oakland was soon jolted by a sharp reminder that what we were doing there had a direct effect on planning for the whole Bay Area. . . . Mrs. Kerr, an articulate and very positive lady, came right to the point. As an active conservationist and a member of a committee formed to prevent further land fill in San Francisco Bay, she wanted to protest the use of EDA funds to enable the Port of Oakland to fill in the large area to be occupied by the Seventh Street Terminal at the Oakland Mole. . . . I pointed out that the Port's plan for filling this part of the Bay had been adopted before EDA was involved, and that work on it had been started under the regulations that existed then, before the legislative ban on all further fill. . . . Mrs. Kerr said that she regarded the Port of Oakland as a major threat and a very powerful force which operated without sufficient outside control. She felt that the Port should have been required to redevelop the dilapidated existing pier facilities along the Estuary instead of being permitted to create new land in the Bay. (Bradford 1968, 119-120)

Bradford also noted that an earlier Federal study (which he unfortunately does not cite) on the effects of fill on the Bay supported Catherine Kerr's position.[1]

As reflected in Bradford's statement, the Port initially tried to have its construction activity grandfathered by using the Port's development plan as a pre-existing planning document. As described in the Port newsletter recounting Nutter's address to the BCDC, "Nutter pointed out that development of the industrial park was initiated prior to the effective date of the McAteer-Petris Act, and is proceeding according to a long-established port plan" (Port of Oakland May 1966, 4).

Catherine Kerr's views on the power of the Port are quite interesting. The evidence shows there was a lack of understanding between the Port and environmentalists. The Port seemed to interpret environmentalism as a call for more recreational facilities. This rendition of the environmental message, coupled with the Port's attempts to continue existing projects, made the Port's statements and actions non-responsive to its critics.

The Port began to accommodate to the new regulatory environment, by first hiring the planning and engineering firm of Wilsey & Ham of San Mateo. They were tasked to study possible future directions for the Port with instructions, "to emphasize recreational development within the Port area while accommodating the Port's pressing need for expanded facilities" (Port of Oakland February 1969, 2).

In November 1968, the Port adopted a master plan based on the Wilsey & Ham work. It is possible to see a change in the Port's understanding of this issue. The Port's newsletter described the constraints of this new plan.

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1. In less than a year after this meeting, Catherine Kerr would no longer be an active force on this issue, since Clark Kerr would be dismissed from his position by the newly elected Governor Ronald Reagan in punishment for his handling of the Berkeley Free Speech Movement, and the Kerrs would be off to Washington, D.C.

> A significant feature of the plan, according to Port Commission president, Peter M. Tripp is a substantial reduction of the amount of Bay fill required for immediate and long range marine terminal projects. Tripp said that at one time the Port's marine terminal planning called for as much as 1,000 acres of fill. "Our immediate needs for new marine terminals require about 150 acres of land, and our long range needs are for about 400 acres," said Tripp.
>
> "Our policy under the new plan," Tripp continued, "will be to accommodate as much of this growth as possible by acquiring existing private property along the Estuary and possibly some military property in the Outer Harbor. This approach substantially reduces fill requirements and will free additional land for public and commercial recreational use." (Port of Oakland November 1968, 1)

The result of this new environmental awareness was the almost complete cessation of filling activities. Just as argued by Catherine Kerr, the Port was able to meet its space needs by acquiring land along its waterfront. However, dredging was a continuing necessity. To remain open, the Port had to continue to dredge its channels to relieve shoaling, while to remain competitive in an industry of ever increasing vessel draft, it needed to dredge ever deeper channels. This dredging would be more expensive as well, because the dredged spoils now needed to be transported to an environmentally suitable dumping ground.

4.4 The Military

4.4.1 Introduction

There is almost no part of the containerization story that was not influenced by the military. From the shared experience of WWII service by the men involved, to the sustained interest by the Navy in increasing the efficiency of its materiel transport, the military influence was ubiquitous. Much of the government's involvement in maritime activity was justified under an ostensible defense motive. For instance, the Declaration of

Policy of the *Merchant Marine Act of 1936* (Section 101) states:

> It is necessary for the national defense and development of its foreign and domestic commerce that the United States shall have a merchant marine (a) sufficient to carry its domestic water-borne commerce and a substantial portion of the water-borne export and import foreign commerce of the United States and to provide shipping service on all routes essential for maintaining the flow of such domestic and foreign water-borne commerce at all times, (b) capable of serving as a naval and military auxiliary in time of war or national emergency, (c) owned and operated under the United States flag by citizens of the United States insofar as may be practicable, and (d) composed of the best-equipped, safest, and most suitable types of vessels, constructed in the United States and manned with a trained and efficient citizen personnel. It is hereby declared to be the policy of the United States to foster the development and encourage the maintenance of such a merchant marine. (Fair and Guandolo 1983, 40-41)

The bulk of military activity in containerization occurred outside the specific scope of the Port of Oakland, but an informed view requires mention of the military's influence. For the Port of Oakland, the military was not just a presence in Washington initiating action from afar. Instead, the military was a physical presence in the Port. As part of the military build-up in the later part of the Depression, the U.S. military began operating out of the Port of Oakland. In September 1936, the U.S. Navy requested and city voters approved transferring title of 390 acres to the Navy on which a $12 million Naval Supply Depot for the Pacific was built (Port of Oakland 1987, 9). In January 1941, the U.S. War Department condemned a large section of Oakland's Outer Harbor Terminal for an Army Quartermaster's Corps (Supply Depot), which was commissioned on December 8th (Port of Oakland 1987, 11).

During WWII most of the harbor was leased to the military. The Oakland airport was converted to military use, with San Francisco's airport supporting any civilian needs. After the war, the U.S. Army returned the Outer Harbor Terminal in exchange for 122 acres of tidelands to expand the Oakland Army base. At the outbreak of the Korean War, the Army briefly leased the Outer Harbor terminal, but then returned it to the Port to be run by the Port on a contract basis (Port of Oakland 1987, 11-13).

As mentioned earlier, the preeminent source of data on cargo handling comes from publications of the Marine Cargo Transportation Conference (MCTC), with its strong ties to the Navy. It is likely that through its publications and presentations at professional meetings its results reached the Port of Oakland. More directly, one of the early actions of the MCTC was to open a field office in the Ferry Building at the Port of Oakland, “to undertake a comprehensive study of all factors affecting the turn-around of general cargo ships in the San Francisco Bay Area, including San Francisco, Oakland, and Alameda” (MCTC 1964).

The next section considers a primary mechanism through which the military impacted containerization in the Port of Oakland, by influencing which ships got built in the United States. It specifically describes the military’s role and the paradox that confronted the steamship lines between what they wanted and what they could obtain subsidies to build. The military will also appear in the next chapter when the influence of the Vietnam War on containerization is considered.

4.4.2 The Paradox of Subsidy

One must be careful not to assume that there was a cohesive government policy with regard to unitization technologies. The Navy for example, was not of one mind in its choice of technology. In 1959, Vice Admiral John M. Will, Commander of the Military Sea Transportation Service (MSTS), addressed the Propeller Club, a yearly conference held for members of the maritime industry. He expressed his constituency's preference for roll-on roll-off.

> While I speak on behalf of the Roll-on Roll-off ship, this does not mean that I oppose the Lift-on Lift-off concept. It just so happens that for the accommodation of military material, the Roll-on Roll-off ship is the more adaptable. Eliminating truck trailers or container of any kind, it should be borne in mind that of the Army's total cargo movement, 24% consists of wheeled or tracked equipment. . . .
>
> The foregoing is a broad outline of the considerations that have influenced the preference of the military for the Roll-on Roll-off ship. At the present time we have one- the USNS Comet. The Army has estimated a requirement in the immediate future for five more similar ships for peacetime operation. In addition, to meet current mobilization plans, at least fifteen more ships of this type will be required. There are a number of means by which these requirements might be fulfilled. The most direct method, of course, would be for us to see appropriations for construction by the government. The next alternative would be to invite offers from private companies to construct the ships and charter them to us on a long-term basis. I might say, parenthetically, that statutory authority now exists for us to acquire five roll-on roll-off ships under such an arrangement. If it can be avoided I hope neither of these alternatives will have to be adopted. Operations under either plan would mean the elimination of the tonnage the ships would carry from the program of military cargo distribution to the berth lines. In other words, this would perpetuate government-in-business.
>
> The third possibility and the one we are seeking to bring about, is to induce the established berth line operators to meet the requirements. In view of the extensive ship replacement programs projected by most of the principle lines, they might well give consideration to incorporating some roll-on roll-off capability in their new construction. I realize that the lines must keep their ships economically adaptable for commercial service and that the inclusion of roll-on roll-off capability may create some problems. However, based upon recent studies and discussions with individual operators, I do not regard these problems as insurmountable. Since the military planners have determined that we must have roll-on roll-off ships available for mobilization, we must either look to the shipping industry to provide them or undertake government construction. It is just as simple as that! And if the government builds them, considering the huge investment represented, it is wholly unlikely in deference to the taxpayer, that the ships would

> be held in an inactive reserve status. Consequently, they would undoubtedly be operated on many of the routes served by the private-owned lines. (Will 1959, 114)

These words struck a resonant chord with his listeners that a modern reader might not fully appreciate. Not only was the spectre of competition on their routes raised, but the proposed 15 new ships constituted a huge fleet in an industry where McLean's purchase of 37 ships gave him the largest dry-cargo capacity in the U.S. fleet. Equally important was that the steamship lines' existing plans for new ships could come adrift, since these plans were strongly tied to government ship building subsidies and hand-me downs. The reality of this relationship is captured in a description of Matson's ship acquisition plans.

> For nearly half a century, American shiplines had been partially dependent on government ships used in one war or another and sold as surplus afterward. In the late 1940s this again was the source for most lines and the supply of vessels was greater than ever before. In 1946 Matson sold eight ships, too small or too venerable for the Hawaii trade to Asian and South American buyers. Then it began assembling a fleet of war-built freighters: fifteen C-3 types, four smaller C-2s, and three slow Liberty ships. (Worden 1981, 118)

This audience knew how critical government funding was to their business. The previously cited U.S. Army Corps of Engineers study on vessel depth requirements further details this understanding. "Regarding current trends in design, it is known to you that few, if any, general-cargo ships have been built in this country by private capital since the last world war. The Maritime Administration has been the only builder of such vessels" (1953).

Finally, the audience was certainly aware of a Marad funded study in 1956 detailing various paths forward for unitized transport. "Applications have been made to the

Maritime Administration for government mortgage insurance for the construction of various roll-on roll-off, lift-on lift-off and conveyor type vessels" (U.S. Maritime Administration 1956). This dependency on government handouts shows another side of the amazement raised by McLean's announced container plans, since his efforts were in the domestic trade and thus not eligible for subsidies.

The competing needs of the military for transport of wheeled vehicles versus the efficiency advantages of containerization capturing civilian transport were never reconciled. This situation shows the paradox of subsidy, where the needs of those giving the subsidy did not match those of the recipients. As commercial vessels mostly went the way of containerization, the military ended up building specialized hybrid transport vehicles. In 1999 for instance, the Military Sealift Command, a successor to the MSTS, took delivery of two new classes of ships, the *Bob Hope* and the *Watson*. Both have storage of about 400,000 square feet for rolling stock in six ro/ro decks and 5 cargo holds for general cargo or containers, with two sets of cranes to load and unload this material if dockside support is unavailable (*American Ship Review 1999* 1999).

4.5 Private Enterprise - Part 1: Sea-Land Service, Inc.

Against this background of regulation, steamship lines began experimenting with containerization. Sea-Land Service, Inc. and Matson Navigation were the two largest players for the Port of Oakland. As the decade progressed, additional firms calling at the Port of Oakland began adopting containerization. This section will describe the early years of Sea-Land's interaction with the Port. Over this period, as container traffic increased, the technology Sea-Land applied to containerization began to mature into its modern form. These developments included larger containerships successively entering service, shore-based cranes to handle containers, and barges used to supply nearby secondary ports. The next chapter, after some introductory material, will continue the Sea-Land story, following its crucial involvement in containerization and the Vietnam War.

4.5.1 Sea-Land Service

Sea-Land Service was the corporate driving force behind the early development of containerization in the Port of Oakland. The early history of this firm has already been recounted, and starting in 1956 with service from the Port of Newark operating to Houston and later Puerto Rico, Sea-Land continued to expand its business. In 1962, Sea-Land transferred its operations to a new $19,000,000 facility in Port Elizabeth, and also announced a West Coast container service. Westbound, this service left Port Elizabeth, transited the Panama Canal and made stops at Long Beach, where a new Sea-Land terminal was built, and terminated in Oakland. As noted by the Port's newsletter, the marvel was, "in a matter of 14 hours, it will discharge its containers and load new ones [at Long Beach], setting sail once again for Oakland" (Port of Oakland September 1962, 5-6). Eastbound the ships had an additional stop in Puerto Rico, before returning to Port Elizabeth. Initially, the service ran on an 18-day schedule, using two ships. By the end of the year, four jumbo trailer ships on this service provided a 9-day schedule (Port of Oakland September 1962, 6).

Sea-Land was operating converted tankers, each capable of carrying 474 thirty-five foot containers. Each ship was equipped with onboard gantry cranes, which eliminated the need for external loading equipment. This version of the technology had the advantage of allowing visits to ports without extensive shoreside facilities, and allowing ports less initial expenditure to support containerization. Alternatively, since Matson, operated its own terminals, Matson chose shore-based cargo handling equipment from the beginning of its container service. As it turned out, onboard cranes were a temporary technology. They required substantial maintenance, and took up valuable deck space, so by the mid 1960s, they were mostly replaced by shoreside support facilities.

In 1962, Sea-Land negotiated a preferential lease with the Port of Oakland for a 650-foot section of an Outer Harbor berth and exclusive use of six acres for the staging of up to 340 trailers. Figure 3 shows the location of the Outer Harbor. The Port also constructed a new truck terminal with the total cost for the improvements for Sea-Land coming in at $600,000 (Port of Oakland April 1962, 3).

Sea-Land selecting the Port of Oakland was in no uncertain terms, a very big deal. A large ceremony was organized. “The S.S. *Elizabethport*, first of a new fleet of jumbo containerships, will steam into the Port of Oakland’s Outer Harbor for a civic celebration September 27 to mark the rebirth of intercoastal steamship service” (Port of Oakland September 1962, 5-6). Those invited to the event were made aware of this technology, which could unload and load a replacement container in an average of four minutes. This technology had brought to Oakland the *Elizabethport,* one of a set of sisterships, which were the largest dry cargo freighters in the world.

On October 20, 1962, the second of the Sea-Land vessels, the S.S. *San Juan* arrived skippered by Capt. Martin Solnordal of Oakland (Port of Oakland November 1962, 5). Containerized trade increased on the West Coast with Sea-Land adding additional services. A 1966 report summarized the effects of this first growth spurt.

> The overall trend of coastwise and intercoastal general cargo tonnage in the Bay Area was relatively constant from 1950-1960. Since then, tonnage has declined from approximately 2.6 million tons in 1960 to 1.7 million tons in 1964. This trend is reflected in all Bay Area ports except Oakland-Alameda. Oakland and Alameda have generally increased their tonnage. They accounted for about 1 million tons in 1964, almost 60 percent of the Bay Area total for that year. Unlike the rest of the Bay Area ports (with the exception of Richmond), their total domestic general cargo tonnage was higher in 1964 than in 1949: 1 million tons compared to 500 thousand tons. Much of this growth occurred between 1961 and 1964 and corresponds to the initiation of container service from these ports. Also, part of the tonnage increase can probably be attributed to the growth of Hawaiian trade, where Matson is prominent. (U.S. Economic Development Administration 1966, 8)

As containerization increased its hold in the West Coast coastal trade, another change was occurring in the operations of the maritime industry. To cut costs by decreasing manning requirements, on short passages the industry was replacing ships with combinations of tugs and barges. In this configuration, only the much smaller tug required crew. This change was reflected in containerized transport as well. On February 27, 1965, the Sea-Land carrier *Columbia* sank during a storm. *Columbia* served as a feeder to Portland for an Alaskan container service. Initially Sea-Land replaced the *Columbia* with a 196 container vessel, the *Summitt*, but in May 1965, Sea-Land adopted a tug and barge solution for the Oakland to Portland feeder portion of the trip.

> Sea-Land Service, Inc. has leased barge 207 and the ocean-going tug the Henry Foss, from Foss Launch and Tug Co. to go between Oakland and Portland, where

> direct all-water service now exists with Anchorage, Alaska. . . .
>
> Henry Foss is reported to be the most powerful tugboat in the United States. She is 149 feet and powered by two 2,500 hp diesel engines. She was built on the hull of a Army LT tug. The barge will have a capacity of 95 Sea-Land trailers on a lift-on lift-off basis.
>
> A schedule was established last month and calls for the tug to depart Oakland on alternate Fridays and depart Portland southbound on alternative Tuesdays. (Port of Oakland May 1965, 2)

At this point, the prerequisites leading up to explosive growth had been satisfied. Labor had signed on. The necessary regulations were in place. And private enterprise had begun to adopt the technology. The next chapter follows this explosion.

5 The Rise of Containerization in the Port of Oakland: Fruition

5.1 Introduction

As this chapter opens, the Port of Oakland is at the beginning of a period of rapid expansion of containerization. The growth arises from two sources. The first is a maturation of the technology as the hurdles described in the previous chapter were successfully passed. The second comprises three events: the use of containerization in support of the Vietnam War; the adoption of containerization by Japanese steamship firms, including their choosing Oakland as their base of operations; and Matson transferring its container operations from Alameda to Oakland.

Critical in this period was the development of container facilities at the 7th Street Terminal. This terminal, shown in Figure 3, occupies the peninsula, constructed from fill, at the end of 7th Street. Portions of this facility were leased to both the Japanese steamship lines and Matson for their respective operations. Financing the development of this terminal is the last event in the rise of containerization, since a combination of fill from building the BART system, combined with a federal jobs program provided the critical funding necessary to get the terminal project under way.

The first section in this Chapter continues the private enterprise story by looking at Sea-Land’s continuing activities. This segues into the Vietnam effort, since Sea-Land was the contract carrier for the container service to Vietnam. Following Sea-Land, the efforts of the second largest container carrier in the Bay Area, Matson Navigation, are considered. Matson's efforts show the interweaving of the maturation of containerization and the rise in trade with Asia. Matson was also important to the Port since it became the first new tenant at the 7th Street Terminal. The private enterprise section concludes by noting the routinization of this technology, as it was adopted by additional steamship lines. The third section in this chapter considers the second major event, the rise of trade with the Far East and how Japanese steamship lines decided to locate their base in Oakland. The last section then considers the events surrounding the financing of the 7th Street Terminal.

5.2 Private Enterprise - Part 2: Sea-Land, Matson and Others

5.2.1 Sea-Land Service (Continued)

As cargo traffic increased, Sea-Land's terminal requirements outgrew its 1962 lease, with its preferential assignment of a 650-foot section of two berths in the Port's Outer Harbor and 6-acre marshalling yard (Port of Oakland April 1962, 3). In March 1965, Sea-Land signed a 20-year lease for the use of a 26-acre, two-berth Outer Harbor terminal, which would be built by the Port. It included two new shoreside gantry cranes. This was part of the industry's move away from shipboard cranes. The bill for improvements was $2,500,000. The site was designed to accommodate more than 1,000 truck trailers, with Sea-Land doubling the number of vessels servicing the Port (Port of Oakland March 1965, 1). With the completion of this facility, increased traffic could be supported, and as predicted from economies-of-scale, the size of containerships increased proportionately. On the Elizabeth N.J. to Long Beach, and Oakland run, "in August 1966 the SS Oakland visited the Port of Oakland. It was a 685 ft. Sea-Land containership stretched from a C-4 troopship with the addition of a 165-foot midbody. She carried 609 containers, including 100 refrigerated units, each 35 feet long. Speed of 15.5 knots" (Port of Oakland August 1966, 2).

Sea-Land's presence in the Port continued to grow. In 1967, Sea-Land leased an additional 14 acres in the Outer Harbor, with 3 acres for terminal operations and 11 acres for an expanded truck terminal, giving Sea-Land a total lease of 40.7 acres in the Port (Port of Oakland May 1967, 1). In May of 1968, Sea-Land expanded again growing to 44 acres, principally to accommodate new container storage areas. Sea-Land entered additional markets as noted in the Port's newsletter.

> Sea-Land Service will initiate fully containerized ocean freight service from Japan to the United States, the Caribbean and Europe in early December [1968] announced Charles I. Hiltzheimer, Sea-Land group vice-president.
>
> Sea-Land containerships will sail every six days from Yokohama to Seattle, Washington, and Oakland, California. At the West Coast ports, the Sea-Land trans-Pacific service will link up with other Sea-Land services to provide containerized service to Alaska, Panama, Puerto Rico, Eastern United States, and Gulf ports, Dominican Republic, Virgin Islands and European ports.
>
> Hiltzheimer said that eight containerships will be used on the service from Yokohama and that initial service will be eastbound since the Sea-Land vessels are committed to hauling U.S. military cargo westbound. (Port of Oakland November 1968, 2)

The next big step for Sea-Land and the Port of Oakland was handling containerized cargo for the Vietnam War. Malcolm McLean lobbied for the use of containerization to supply the troops. He was specifically cited for his contribution in the use of containerization in the Vietnam War effort, when presented with the Elmer A. Sperry

Award by the American Society of Mechanical Engineers in 1991 (Elmer A. Sperry Board of Award, 1991).

In June 1967, Sea-Land inaugurated a new containership cargo service carrying military supplies from the Port of Oakland to the Port of Da Nang under a multi-year contract to the Military Sea Transportation Service (MSTS), Admiral Will's old outfit. The first ship dispatched in this service was the *Bienville* carrying containers of dry and perishable cargo, including vegetables from the Salinas Valley. The *Bienville* was soon joined by two sister ships of the C-2 class with service running from Oakland to Da Nang every 15 days, stopping at Seattle on the return voyage.

Calling on Da Nang was only temporary as in December 1967, Sea-Land completed construction of a container terminal at Cam Ranh Bay, South Vietnam. The S.S. *Oakland*, a 685-foot containership, made the first Oakland - Vietnam run in that month. The Port was quickly able to capitalize on this new traffic, and was able to pass a bond issue. Part of the revenue from this bond was used to install a third crane at the Sea-Land facility (Port of Oakland 1987, 21).

This new route generated a potentially costly problem, that had a most satisfactory solution. Given the limited commercial trade with Vietnam, on the return trip from Vietnam, referred to as the back-haul, the vessels were essentially empty and not generating revenue. As was noted earlier, trade with Japan was increasing, and the balance was tipping in favor of imports from Japan. Sea-Land was able to supplement its income from this military cargo by carrying back-haul goods from Japan. In December 1968, Charles I. Hiltzheimer, Sea-Land group vice-president, announced that Sea-Land would initiate a fully containerized ocean freight service from Japan to the United States. Sea-Land containerships in this service sailed every six days from Yokohama to Seattle and Oakland (Port of Oakland November 1968, 2).

At this point containerization was firmly established in the Port. We next look at the relationship of the Port and the second largest container steamship line in the Bay Area, Matson Navigation Company. As was noted earlier, Matson started its container operations out of San Francisco, but quickly moved to Alameda across the Estuary from Oakland.

5.2.2 Matson

In this period of sealing the success of containerization, Matson was important to the Port of Oakland as it was the first steamship firm to sign a lease at the Port's new container facility at the 7th Street Terminal. The development of this facility wields its way through this section, as well as the sections on Far East trade, and finance.

Matson Navigation Company was founded in 1882 as a steamship firm operating between San Francisco and Hawaii. By the end of the 1950s, Matson had become a conglomerate with oil holdings and hotels in Hawaii, while still retaining passenger and steamship lines making runs to Hawaii and the Pacific islands. In 1959, Matson changed course by selling many of its auxiliary businesses. In an interview, Randolph Sevier, Matson's President, stated, "In disposing of its non-shipping assets in this manner, Matson will be in a much stronger position to [concentrate] on shipping operations in the Pacific"

(Worden 1981, 139). The 1960 Matson annual report contained the observation that, “Matson begins the new decade of the sixties as a steamship company, carrying on a tradition born more than seventy-five years ago when Captain Matson launched the service” (Worden 1981, 139).

As described in Chapter 2, Matson was an innovator in unitization technologies and had begun a containerized service in 1958. In 1962, Stanley Powell, Jr. succeeded Randolph Sevier as President. Under his leadership, Matson continued containerizing and mechanizing its fleet. Matson faced a number of interesting obstacles on its Pacific Coast - Hawaii trade. Its westbound cargo was mostly finished products, which were easily containerized, while eastbound it carried mostly bulk—sugar and molasses. This presented the problem of mismatched cargos that had to be alternatively carried on the same vessel. A second problem was that in the Islands, Matson had to support a number of outports in which it did not make economic sense to spend lavishly on capital.

To address the first problem, Matson specified multi-purpose vessels. For instance, in 1965 they commissioned two vessels.

> Two former military transports, C-4s, were converted into combination containerships and automobile, molasses, and bulk-sugar carriers by inserting 110 foot midsections to make each 630 feet long, with 29,300 tons displacement. Each ship could carry 690 containers and 192 automobiles westbound and on the return could lift either 12,000 tons of sugar and 134 containers or 3,800 tons of molasses and 470 containers. (Worden 1981, 149)

To address the second problem, Matson first experimented with container barges for the interisland trade. Matson built *Islander,* a 300 foot barge with a ship’s hull and a capacity of 155 containers. The barge carried an integral onboard crane to be used to distribute containers from transoceanic vessels at various Hawaiian outports. *Islander* was designed to be either towed or operated under its own power with six crew. The seagoing union refused to man a powered vessel with such a small crew, so the I*slander* was instead towed in interisland service with a tug (Worden 1981, 146). In 1966, Matson ordered an interisland feeder vessel, to carry 212 containers, as well as 1,600 tons of molasses. (Worden 1981, 149-50).

In Matson's 1964 annual report, Powell advanced a bold new direction for the company. Arguing that their experience with mechanization was the intellectual capital of the company, he proposed using that knowledge to capture trade on additional routes.

> Matson has now emerged from its long period of transition from a diversified company to one principally in the transportation business. The time has come to explore possible areas of expansion in the field of transportation so that operational risks, now confined to one area of the Pacific, can be more diffused. In the development of the ocean freight container system, now serving Hawaii so well, Matson has also forged a high degree of technical and managerial know-how in its staff of able and experienced people. This is an additional reason to undertake a program of expansion. (Worden 1981, 148)

Powell's vision became reality when the Maritime Administration approved a Matson proposal to operate a nonsubsidized freight service between the Pacific Coast and the Far East. In April 1966, in anticipation of this new trade, Matson announced it would lease a container yard and dock facilities to be built in Oakland, and operate a joint venture with Nippon Yusen Kaisha (NYK) for facilities in Japan (Worden 1981, 150). The Oakland move was predicated on Matson outgrowing its facilities in Alameda. A study at the time noted, “Also, there are increasing rumors that Matson’s container operation in Alameda is reaching its capacity. These rumors were confirmed by Encinal Terminals, which leases the container facility to Matson. Consequently, it appears that Alameda cannot absorb much additional containerized tonnage” (U.S. Economic Development Administration 1966, 36).

In June 1968, the Port of Oakland appointed Elmo A. Mazzera, a retired Bank of America Vice President, as general chairman of the Port of Oakland’s 7th Street Marine Terminal Dedication Committee. On September 12th over 1000 guests celebrated the opening of the new terminal, and on the following two days, the Port held an open house for the public.

> Matson’s Hawaiian Queen called at the Port of Oakland’s 7th Street Terminal the day the complex was dedicated. Matson’s site occupies about one-third of the terminal, and includes a 28-stall container freight station, . . . and an equipment maintenance depot. (Port of Oakland September 1968, 3)

The first few years of Matson’s Japan service were profitable, and Matson extended its service to Manila, Taiwan, Hong Kong and Korea. These services did not prove out, and competition from Japanese firms decreased available cargo and drove down shipping prices on the route between the U.S. and Japan. Matson placed the blame for this decline on two sources. The first was that the Japanese were reserving high value items for their own steamship firms. “By 1970,” said M.H. Blasidell, a vice-president of Matson’s holding company, “Matson was getting only the bicycles [eastbound while high-revenue cargo moved in Japanese bottoms]” (Worden 1981, 153). The second reason was that other Far East countries were slow to embrace containerization, or placed impediments in the way of containerization. For instance, after two years of negotiations with the Korean government, Matson was allowed to initiate a container service. Unfortunately, the best they could negotiate was to bring in a tractor with every trailer. After 6 months, the service was discontinued due to the poor economies of the route.

In addition to the two reasons put forth by Matson for the failure of its Far East containerization plans, a third reason was that Matson overestimated the value of its containerization experience. At this point in containerization's development, the barrier to entry was not as high as Matson had assumed for steamship firms to add containerized service. The evidence from the Japanese firms shows that a couple of years of development allowed a steamship firm to enter the market. The next section details some of the new entrants that called on the Port of Oakland. So while for ports the barrier to entry was significant, for steamship lines, at this point, it was not.

The losses incurred by the poor performance of Matson's Far East container services led to Powell's resignation in early 1970. The new management was no longer interested in Far East trade, and by midsummer 1970, the service was halted. Despite this setback, by 1970 Matson had become almost exclusively a mechanized bulk and container company. Only two vessels still maintained space for conventional cargos and in August 1970, Matson divested itself of all its conventional cargo handling equipment and facilities (Worden 1981, 153). This change was reflected in customers' comments, not always positive. "'Those people,' said one customer [of Matson] 'worked on the theory that if it won’t go in a box we don’t want it’” (Worden 1981, 147).

5.2.3 Additional Container Operations

As the decade closed on the 1960s, containerization was now a routine part of the Port’s operations. New commodities were transported in containers as shippers realized they could readily reap cost benefits.

> Edward E. Combs, general manager of Levi Strauss International, said his company tried the new shipping technique to cut handling costs. “The results have been excellent,” he stated. “Containerization will enable us to save several hundred thousand dollars annually. Containers also preserve product appearance and condition, and permit us to use the same type of cardboard packaging for domestic and overseas shipments.”
>
> The first shipment of containerized Levis to pass through the Port of Oakland departed for France aboard Holland-American Line’s Moedyk, which loaded the cargo at the Outer Harbor terminal. (Port of Oakland February 1968, 4)

With the infrastructure necessary to support large scale containerization in place, the Port could now reap the benefits of economies-of-scale. Handling an additional steamship line was now just a matter of scheduling. This state-of-affairs encouraged additional lines to base their operations out of Oakland, servicing ever more varied routes. In July 1969, the first regular container service between Oakland and Europe was inaugurated with the arrival of the containership *Axel Johnson* at the 7th Street Terminal (Port of Oakland 1987, 23). Putting the end-of-decade results in perspective, the Port history notes:

> Sweden’s Johnson Line . . . is the ninth ocean carrier to base container operations at the Port of Oakland. Paced by Sea-Land’s 1 million tons annually, Oakland now handles the second largest volume of containers among ports of the world. Already, 11 years ahead of predictions, Oakland’s 1969 container traffic exceeds 3 million tons. (Port of Oakland 1987, 23)

The next section continues the argument that despite fairly high barriers to entry for ports, steamship lines found it within their reach to containerize their operations. The case of Japanese steamship firms is considered in detail.

5.3 The Rise of Trade with the Far East

Starting in the 1960s, U.S. trade with Japan became an ever larger part of foreign commerce. This trend was apparent to the Port of Oakland, and in 1963, the Port sent a trade mission to Japan. The delegation included Peter M. Tripp, past president of the Port Board, and Ben Nutter, Executive Director of the Port. As a result of this trip and projections of additional trade with Japan, planning began for three possible improvements to the Port. The first was for a bulk loading facility on the Southern Pacific Mole. The second was for 10 berths in the North Harbor near the Bay Bridge approaches. The third was for a general cargo facility at the Ninth Avenue Terminal (Port of Oakland January 1964, 1). As seen from the Port's newsletter:

> The need for new general cargo terminals is seen in predictions by Japanese and American interests in Japan that trade between Japan and the United States will continue to increase, perhaps double within the next 10 years. . . . Tripp pointed out that Japan imports more products from the United States than it exports to this country--the balance of trade being heavily in favor of the United States. (Port of Oakland January 1964, 2)

The next three years saw increased contacts between the Port of Oakland and representatives from Japanese industry and government. As mentioned in Chapter 3, on a trade visit to Japan in March 1965, Port Executive Director Nutter recruited Shoichi Kuwata as Far East representative of the Port of Oakland. Kuwata arranged additional contacts for the Port. These contacts proved critical as the Japanese inched toward adopting containerization. As the Port newsletter noted,

> Currently, there are no major container terminals in Japan. During the past few years, however, the van container has proven to be the most economical means for the ocean shipment of general cargo and is being adopted by both domestic and foreign shipping companies. In coming years, Japan will develop a number of container terminals for this fast-growing trade. (Port of Oakland May 1966, 3)

As the Japanese became convinced of the value of containerization, they studied how the technology was used in the Port. In May 1966, a Japanese Government survey team gathered data from the Port to be applied in Japan's first containerized facility. In October 1966, another group of Japanese visitors arrived at the Port of Oakland. This group included employees of the Harbor Bureaus of Osaka and Yokohama, as well as executives from the N.Y.K. Line (Port of Oakland October 1966, 1,3). The Port newsletter described other visitors.

> Additional visitors included representative Tatsuzo Mizukami, president of Mitsui & Co. Ltd., Japan's oldest and largest commercial trading house. Also representatives from the Japanese Ministry of Transport, steamship lines, freight forwarding firms, and heavy industrial concerns that will be involved in the production of container ships and container-handling equipment in Japan. (Port of Oakland December 1966, 4)

It is not surprising, given the close cooperation between the Port and the myriad of Japanese visitors, that negotiations began in 1966 between the Port and Japanese steamship firms for leases in the Port. These negotiations were successfully concluded on January 23, 1968, when four Japanese steamship companies signed a five-year preferential lease to base their container operations in the Port of Oakland at the 7th Street Terminal. The four firms were Japan Line, Ltd., Kawasaki Kiesen Kaisha Ltd., Mitsui O.S.K. Lines, and Yamashita-Shinnihon Steamship Co., Ltd. The facilities designed for these lines consisted of an 8-acre terminal with a container handling and marshalling yard, a berthing area consisting of a 724-foot long section of a 1,589-foot wharf, and a 30-long-ton-capacity container crane.

This first foray into containerization represented an investment of approximately $65 million by these steamship firms for containerships and containers. Two additional firms, N.Y.K. Line and Showa Line, leased shared facilities with Matson at the 7th Street Terminal. The agreements were approved midyear by the Federal Maritime Commission and the Japanese Ministry of Transport.

The new facility was officially dedicated on September 12, 1968, and the 16,900 ton *Hakone Maru*, the first of Japan's new fleet of containerships, arrived September 23 on her maiden voyage. The vessel was owned by N.Y.K. Line and was one of six ships built for the six Japanese lines for the California-Japan container trade. The *Hakone Maru* was 574 feet long with a beam of 85 feet and could carry 752 twenty-foot containers.

> At the 7th Street Terminal she discharged about 200 containers of radios and TV sets, china, textiles, and electrical appliances. Outbound cargoes consisted of about 200 containers of hides, cattle, raisins, boric acid and borax. The ship sailed for Tokyo on September 24. (Port of Oakland September 1968, 3)

It wasn't until November that regular service was established when on November 9th, the M.S. *America Maru* of Mitsui-O.S.K. Lines tied up at the Port of Oakland's 7th Street Terminal. The *America Maru* was followed by calls from vessels of the three other Japanese container lines, the "K" Line's M.S. *Golden Gate Bridge*, followed by

Yamashita-Shinnihon's M.S. *Kashu Maru* on November 20, and Japan Line's *Japan Ace* on November 23. These vessels supported weekly sailings providing express container freight service between Oakland and Japan (Port of Oakland November 1968).

With this service established, businesses to support this trade opened offices in the Port. Japan's largest transportation organization, Nippon Express Company, inaugurated a door-to-door container service between the U.S. and the Far East using the Port of Oakland's 7th Street Terminal. This company together with its agent, Universal Car Loading and Distributing Company, which had an Oakland terminal, announced plans to put 50 containers in service on the trans-Pacific routes before the end of 1968 (Port of Oakland November 1968, 2).

Similarly, Oakland Container Terminal Corporation (OCT) operated the 8-acre complex at the 7th Street Terminal for Japan Line, "K" Line, Mitsui O.S.K. and Yamashita-Shinnihon. OCT aimed for a sustained loading rate of 22 to 25 containers an hour, the equivalent of about 500 cargo tons an hour, which allowed a containership to be loaded and unloaded with 24 shift hours of work (Port of Oakland December 1968, 1,3)

From 1970 to 1980, the value of trade between the U.S. and Japan (the sum of exports and imports) increased by a factor of 6 (U.S. Census 1999). The portion of this trade that passed through Oakland increased the Port's cargo volume by 1 million tons, and by the mid 1970s had become approximately one-third of the cargo handled by the Port (Port of Oakland 1987, 22).

5.4 Financing: Two Sources of Capital

5.4.1 Background

The escalating demand for containerized services in the mid 1960s led the Port of Oakland to consider ways to expand its operations. This expansion required building additional facilities and acquiring the concomitant cargo handling equipment. The foundation of the Port's plan was filling an area in the Outer Harbor and building a container facility on this new land. This facility became known as the 7th Street Terminal.

Obtaining the capital to finance this plan became a significant impediment to further development. At this critical juncture, the Port grabbed the opportunity for an in-kind trade of easements for fill with the newly formed Bay Area Rapid Transit District (BART or BARTD). At the same time, a jobs program from the Economic Development Administration (EDA) offered a new source for construction funds. That the Port needed additional capital was clear. A Port history states, "This money [from the jobs program] saved the Port from having to go out to the voters for money and came with the terms requiring only a 40 percent repayment spread over 40 years" (Port of Oakland 1987, 20). Amory Bradford, a consultant to the EDA, estimated that the situation was a bit more sticky: "A recent $20 million revenue bond to expand the airport had used up most of the Port Authority's credit" (Bradford 1968, 33). Not only would the 7th Street Terminal require funding, but the growing needs of existing tenants, especially Sea-Land, were also competing for scarce capital resources. For instance in August 1966, the port went to the voters for $2.7 million to expand the Sea-Land terminal (Port of Oakland 1987, 20).

The Port's final plan was to develop the 7th Street Terminal into a world class container facility. By this time, the requirements to support containerization were well understood. Ben Nutter noted:

> Considerable care was exercised in selecting a site for the Seventh Street complex. Its western tip is only 7,000 feet from 60-foot water depth in the Bay, and dredging a channel to this depth can easily be accomplished. The terminal is close to all freeway networks, and will be linked to the Nimitz by Seventh Street, which will be widened to four lanes at its west end. Terminus points for major transcontinental railroads are in very close proximity and scores of trucking firms serve the entire area. . . . Wharves at container berths will have aprons, or decks, 78 feet wide. This will permit installation of container cranes with a rail gauge broad enough to permit complete truck and straddle carrier operations beneath the cranes. Each container berth will have an average of 10 acres of back-up area for marshalling containers. . . . Ships of almost any length will be accommodated, an important feature since containerships 900 feet long are on the drawing boards. (Port of Oakland June 1967, 1,4)

All that remained was finding the capital to realize this vision. Just as the Port was looking for construction resources, the Bay Area Rapid Transit District needed a location for an East Bay station for its transbay rail system, and a place to dump the spoils from tunneling and other construction. Availing itself of the free assistance from BART coupled with a Federal program that was looking to fund projects to create jobs, the Port obtained the initial capital for the new container facility.

5.4.2 BART's Role

In early 1965, a three-county Bay Area Rapid Transit District was formed to unify public transportation in the Bay Area. One of this agency's first actions was to propose a $133 million tube through which a high-speed commuter rail would ferry passengers between Oakland and San Francisco. In return for easements along 7th Street and through the ferry mole, the Port extracted a number of concessions from BART. The District agreed to raze the structures on the mole, and dike and fill 140 acres of wetlands with the 5.3 million cubic yards of spoil from excavating the Oakland section of the rail system (Port of Oakland 1987, 19).

It was quite appropriate that the ferry mole would again be put to maritime use, since in the early 1870s, the mole was the site of Oakland's 2-mile wharf, which at its peak included five docks providing berths for 22 ocean-going vessels (Port of Oakland October 1965, 1). Fittingly, use of the mole had just reverted to the city on the expiration of Southern Pacific's lease in 1961, ending a legacy which began with Horace Carpentier over 100 years before.

The quality of fill would soon become a point of contention between the Port and the EDA. Before the EDA's involvement the Port noted, "Port engineers estimate that the suitable fill material from BARTD will be sufficient to completely dike and develop one-fourth of the site. The new terminal will include approximately 28 acres for wharves and docks" (Port of Oakland October 1965, 1). "The Port will obtain the remaining fill from other construction projects and from sand borrow pits within the Port area" (Port of Oakland August 1966, 7).

5.4.3 Economic Development Administration

By focusing on the technology, or even broadening our view to the Port of Oakland, it is far too easy to forget about the world just outside the Port's gates. While the Port was becoming more prosperous, the City of Oakland was suffering from the litany of social ills common to large U.S. cities. A study of poverty in Oakland (University of California 1966) showed the total household population of the city was 365,490, of which 30 percent were black, and 10 percent “Spanish surnamed.” Unemployment was twice the national average with most of the burden falling on minority groups.

Against the backdrop of the Watts riots in 1965, “experts sent by the President [Johnson] to survey conditions in other ghettos picked Oakland as one of those most likely to be the next Watts” (Bradford 1968, 2). Beginning in the Kennedy Administration, the Federal government funded programs, such as the *Accelerated Public Works Act of 1962*, Public Law 89-136, which aimed to aid “depressed” areas, mostly rural, by creating jobs. This vision was expanded to include cities, since joblessness was seen as an underlying cause of the disturbances. The Port’s history briefly summarizes the Port’s participation in the jobs program.

> Oakland having been designated an area with a long-term unemployment problem the Port applied for and received a $22.8 million dollar grant under the Economic Development Act of 1965. Of this money $10.1 million was allocated to the Port’s Seventh Street project to build a container facility on land reclaimed using excavation fill from the newly constructed BART system. (Port of Oakland 1987, 20)

There are three primary sources for the EDA saga consulted here: the first, a book written by a consultant to the EDA (Bradford 1968); the second, an academic response to the Bradford book (Pressman and Wildavsky 1973); and the third, the Port documents from the time.

The Economic Development Administration, a part of the Department of Commerce, was established by the *Public Works and Economic Development Act*, passed on August 26, 1965. This Act was the successor to the *Area Redevelopment Act of 1961*, which was aimed at reducing rural unemployment. The EDA statute provided for grants totalling up to $500 million per year for four years. For the year ending June 30, 1966, Congress appropriated $300 million.

Because many of the statutory requirements of the Act were modeled on the earlier *Area Redevelopment Act*, Oakland was one of the few large cities that could actually qualify as having an unemployment problem. While many large U.S. cities had areas of unemployment, when unemployment was averaged across each entire city as required by the Act, most potential beneficiaries did not meet the required unemployment level, and were disqualified (Bradford 1968, 33). From the EDA perspective, the Port's plan for a new marine terminal and industrial park was ideal. If the project was realized, jobs would be created; but if not, there was the very real possibility that existing industry, constrained by the current conditions, would be forced to leave Oakland exacerbating unemployment (Bradford 1968, 33).

The Port Authority staff was already investigating ways to fund additional facilities for the Port. Monroe Sullivan, who had just joined the Port, had worked through the details of applying for an EDA grant. When the appropriations for the EDA were passed in October 1965, the groundwork for the grant application was already laid. The Port had completed initial technical and architectural studies, allowing the plan to be presented to the EDA in late January 1966, and the grant to be filed in February 1966 (Bradford 1968, 33).

After the initial presentation, between January 31, 1966 and February 11, 1966, Amory Bradford conducted meetings at the Port. Bradford's comments about these meeting provide a valuable outsider's view of the Port's workings.

> I [Bradford] met several times with Ben Nutter, executive director of the Port of Oakland and his assistant, Monroe Sullivan, to study the projects submitted by the Port, which offered the principal opportunity for EDA to invest in facilities to create new employment in Oakland. These were: a $10 million hangar at the airport to be leased by the rapidly expanding World Airways; a new marine terminal with access roads, costing $10 million; and a $2 million expansion of the industrial park on land near the airport. Nutter, an engineer, was cautious, slow to make decisions, and rather overwhelmed by the size of this new program, which would nearly double the value of the Port's facilities. Sullivan, more a promoter and expediter, was a great help in keeping things moving. (Bradford 1968, 64-65)

While offering an outsider's view of the inner workings of the Port, this insider/outsider distinction would soon cause tension in the relationship between the Port and the EDA. Even early on, Bradford noted a mismatch between the EDA goals and what he described as the conservative Republican business community. "The response from the local government and business people indicated that they were seeking information that would help them contribute to Oakland's economic growth, without much concern about whether this would actually reduce unemployment" (Bradford 1968, 41).

The relationship between the Port and the EDA became strained even before the grant was signed, and discord continued throughout the life of the grant. The first snag occurred when, "toward the end of March [1966], however, the White House staff quietly placed a 'Freeze' on all large Federal grants, until a program could be developed to counteract the inflationary pressures of Viet Nam" (Bradford 1968, 112). This impediment was soon rectified and the grant was announced at a joint press conference held at the Oakland airport on Friday April 29, 1966, attended by California Governor Edmund G. Brown, Oakland Mayor John Reading, and Assistant Secretary of Commerce for Economic Development, Eugene Foley. At that point, the entire Port program was projected to provide 2,200 jobs when complete (Bradford 1968, 123).

Also in April, San Francisco-based Matson Navigation Company signed a lease for a 42-acre facility at the 7th Street Terminal. As noted in the earlier section on Matson, a study conducted for the EDA indicated that Matson was straining against the limits of its facilities in Alameda. The new Port of Oakland location would serve as the center of Matson's Bay Area containerized cargo operation. Matson was the pivotal first tenant, signing a 20-year lease, beginning January 1, 1969. The jointly developed specifications included two deepwater berths each 35 feet deep, with provision for deepening to 40 feet or more. The site provided the company with more space for its rapidly growing container operations between the mainland and Hawaii, and fit into their announced plans to expand service to the Far East (Port of Oakland May 1966, 2).

These two events, the promise of the grant money and the signing of the lease by Matson were the critical elements in getting the container port underway. Almost immediately though, conflict raged between the Port and the consultants hired by the EDA.

> During the summer [1966], an EDA consultant had objected to the method by which the port was filling the area to be used for the marine terminal. In the consultant's opinion, the material being used for filling the bay--material that came

> from Bay Area Rapid Transit construction sites--contained a great amount of objectionable debris. (Pressman and Wildavsky 1973, 33-4)

This impasse halted all work and no further action was taken until late January 1967. This discord was a harbinger of a continued power struggle between the Port and the EDA over which would control the direction of the project. In January, the Port submitted an application to relocate the EDA project and removed Matson from the project. Matson had asked to opt out of the EDA-funded part of the terminal. “The Matson Company, frankly admitting that it did not plan extensive new hiring, had requested to be separated from the port’s arrangement with the EDA” (Pressman and Wildavsky 1973, 33-4). On April 12, 1967, the EDA approved the change in project location and two days later the Port submitted its architecture/engineering (A/E) agreement to the EDA. Work commenced immediately on the Matson facilities, and the federal agency approved the A/E agreement on June 25. It was not until the fall of 1967 that the engineers started the EDA work.

To try to alleviate some of the strain in the relationship between the Port and the EDA, a planning study was ordered from Kaiser Engineering at the behest of the EDA. A master plan was developed for the terminal, which called for nine berths, seven to handle containerships with the remaining two set aside for vessels carrying break-bulk cargoes, or a combination of break-bulk and containers. A Port newsletter summarized the report.

> All berths would have reinforced concrete marginal-type wharves, rather than the traditional finger piers which jut into the water. Water depth at each berth initially will be 36 feet. It will be possible to dredge the berths to 60 feet and extend the wharves outward when ships requiring deeper water call at Oakland. The wharves will be located to permit expansion without interfering with shipping channels. (Port of Oakland June 1967, 1,4)

Not only was there continuing unhappiness in the Port by the EDA's perceived interference, but there was also criticism of the entire EDA project. The book *Implementation* (Pressman and Wildavsky 1973) is an analysis of the project, and notes:

> Walter Abernathy [Quoted in LA Times, March 16, 1969 pg 8] assistant executive director of the Port of Oakland, observed that "our people felt the Federal government was going a little too far in telling us how to run our business." Other critics, with a different perspective, felt that most of the EDA money would "help the Vietnam war effort rather than the poor. World Airways gains much of its revenue for transporting cargo to Vietnam and the Marine Terminal would accommodate increased military traffic." (Pressman and Wildavsky 1973, 5)

In September 1968, the new 7th Street Terminal was dedicated. During the two-day open house, which included picnics, fishing derbies, and boat tours, over 6,000 visitors came to the Port. Conestoga wagons belonging to the early California Cielo family that once carried supplies over the Sierra to the Mother Load country were displayed and contrasted with the 88 feet high container cranes built by PACECO in Alameda (Port of Oakland September 1968, 1 -2).

So, despite the bickering, how did the job creation turn out? As Matson took occupancy of its part of the terminal—the section not funded by the EDA—the EDA released a report, which stated that as of October 1968 only 10 jobs of the type planned had been created and none of these were from the marine terminal (Pressman and Wildavsky 1973, 54). Though the EDA-financed section of the terminal was not yet completed, in the December 1970 report, the EDA took another tack. They now found 1000 new jobs being created in the marine terminal. These 1000 jobs, of which approximately 350 had gone to minorities, were in the other part of the terminal. The EDA explained that the Port would not have gone ahead with the 7th Street Terminal without the EDA money, so it was legitimate to count these as newly created jobs (Pressman and Wildavsky 1973, 66-69).

In many senses this is entirely correct. The critical event was the signing of the grant, not the actual transfer of the money. The grant allowed the terminal work to go ahead, and Matson to sign on as a tenant. By December 1, 1970, the EDA's Office of Public Works reported that the terminal was “78 percent complete,” and the EDA project was completed in May 1971 (Pressman and Wildavsky 1973, 61).

We are now near the end of the tentative, early stages of the technology. Containerization had taken root. While crucial at that specific moment, in retrospect the real impact of the EDA grant was as a signal that the Port could support an increasing stream of container traffic. Given the delays imposed by the added layer of EDA bureaucracy, by the time the EDA part of this project was completed, it was the other, already completed sections of the terminal development, that ironically supplied the hoped for growth in jobs.

In the end, the Port's new 7th Street Terminal consisted of 12 berths in a peninsular configured terminal increasing the Port's capacity by 80 percent. The design was modern with shorebased gantry cranes, and large open marshaling areas with access to railroad and highway facilities. The early, stumbling toward containerization was now over (Port of Oakland 1987, 19).

6 Conclusion: After the Rise

By 1970, containerization was well on its way to becoming one of the seminal technologies of the second half of the twentieth century. The early, tentative phase was over and containerization for dry goods, along with mechanized handling for bulk goods, had in all but specialized cases, such as car carriers, swept away competing technologies. The impacts of decreased transportation costs were far reaching, both in the shipping industry and in the global economy.

When the Sea-Land containership *Elizabethport* pulled into the Port of Oakland on September 8, 1962, it ushered in a decade of immense change for the Port and the shipping industry. Containerization was not preordained at this point. There was no technological determinism that decreed containerization would succeed. Grace Line's containerization fiasco in 1960 demonstrates one failure mode. Fitzgerald in his 1986 dissertation, "A History of Containerization in the California Maritime Industry: A Case History of San Francisco," argues that the lack of containerization development in San Francisco was due mostly to poor planning. The Oakland experience indicates a more complex explanation is required. San Francisco, being at the tip of a peninsula, lacked the intermodal access that containerization requires. Its waterfront had already been turning toward non-maritime use, such as the Pier 39 tourist attraction. Finally, the logic of the technology imposed significant economic barriers to latecomers.

The rise of containerization in the Port of Oakland shows that planning plays a part in the implementation of a new technology. However, at least for containerization in this Port, a combination of fortuitous events combined with clever planning allowed the Port of Oakland to initially adopt containerization. Then, the forces of economies-of-scale took hold providing the Port with a wild ride of expansion.

While global economic effects are the province of other works, given the importance of Far East trade to the Port of Oakland, it is worthwhile to briefly ponder the impact of containerization on the economies of the countries of the Far East, especially Japan. Japan's postwar growth was export driven, utilizing lower labor costs to derive a cost advantage in their goods. Containerization, with lower transportation costs, helped preserve this cost advantage. Though to my knowledge, good econometric studies have not been done, it seems likely the growth of these export-driven economies would not have been as robust, and maybe not even possible, without containerization.

For the Port of Oakland, our interest here, the period following this rapid development included the evolution of containerization technology and continued economy-of-scale effects. One critical area of technological evolution was standardization. Standards are necessary both to increase investment in the technology and also to allow a totally integrated intermodal system. Without standardization, there is increased risk to capital, since the investor not only assumes the normal business risks, but also incurs the additional risk of adopting a technology that may be bypassed by an alternative before the investment is recouped. The earliest and most important standards to be accepted were for container sizes, and the fittings used to tie containers down in transport.

While Sea-Land's initial service utilized 35 foot long containers, a length determined by the maximum legal trailer length in all the 48 states at that time, Matson's service started with 24 foot long containers, and Grace Line adopted 17 foot long containers. The industry standardized on 10, 20 and 40 foot long containers, which were first implemented as an American Standards Association (ASA) recommendation in 1961, and then became an International Standards Organization (ISO) standard in 1965 (EDA 1966, C3). This standardization led to a single container unit of measure, the TEU or twenty foot equivalent unit. In this system, a 10 foot container counts as .5 TEU, while a 40 foot container represents 2 TEUs. A modern containership such as the *Regina Maersk* is said to have a maximum capacity of 6,600 TEU.

As exemplified by the *Regina Maersk,* the movement to larger and deeper vessels has been relentless. In length and width, first containerships achieved "panamax" dimensions, the maximum sized vessel that can fit through the Panama Canal, and then in 1988 grew to even larger "post-panamax" dimensions, creating a new generation of ships that are unable to transit the Canal (*Lloyds List* July 7, 2000). Recent industry articles are positing "malaccamax" vessels, vessels of draft approaching the depth of the Straits of Malacca (*Lloyds List* May 24, 2000).

A vessel earns income by moving goods from one location to another. Time in port is pure cost, so these larger vessels aim to discharge larger loads at fewer ports. From these hub ports, containers are carried to their final destination on a combination of double-stacked (containers two-high) rail cars, container barges and trucks, completing the intermodal cycle. Large numbers of smaller ports and areas of larger ports unable to support containerization became derelict or assumed other uses.

The Port of Oakland continued to grow, and over the next thirty years the Port acquired additional land in the Port environs to support containerization. Additional container lines negotiated leases with the Port, and an ever larger assortment of products were transported in containers. By July 1981, the Port had completed a $28 million redevelopment of Outer Harbor berths 5 and 6 creating an almost unbroken mile of container facilities along Oakland's western waterfront (Port of Oakland 1987, 29).

To keep pace with newer generations of containerships the Port requested and in October 1986, Congress authorized $74 million for a dredging project to widen the Outer Harbor channel and widen and deepen the Inner Harbor Channel to 42 feet at mean lower low water. Reflecting the changing political environment, this was the first time that Congress required the Port to share in the cost of improving the channels (Port of Oakland 1987, 31). In October 1998, the Port of Oakland received approval to dredge the approach channels to 50 feet, with the work to begin in 2000 and be completed in 2004 (Port of Oakland October 1998, 1).

A striking feature of the economies-of-scale aspect of containerization is how rapidly it spread internationally. Table 1 shows the top 10 container ports for 1998 in thousands of TEUs. Only 2 of the top 10 ports are located in the U.S., both ports of San Pedro Bay in Southern California.

Table 1. Cargo Volume at Major World Container Ports

Rank	Port	1995 (x 1000 TEUs)	1998 (x 1000 TEUs)
1	Singapore	11,830	15,100
2	Hong Kong	12,529	14,900
3	Kaohsiung	5,053	6,271
4	Rotterdam	4,787	6,011
5	Pusan	4,503	5,753
6	Long Beach	2,740	4,098
7	Hamburg	2,890	3,547
8	Los Angeles	2,555	3,378
9	Antwerp	2,329	3,266
10	Shanghai	1,526	3,066

Source: Port of Rotterdam 2000

This table also indicates that despite all the Port's efforts, the Port was unable to maintain its leading role in containerization on the West Coast. Even in the 1960s, storm clouds appeared on the horizon foretelling the eventual end of Oakland's dominance in containerization. A 1966 EDA report indicates: "Some of the reasons that have been given for the Bay Area's declining share of U.S. general cargo export to the Far East are the faster population growth in Southern California, more modern facilities available at Long Beach (as result of that port's great income from oil), increasing port promotion on the part of Southern California ports, etc.” (EDA 1966, 56).

Table 2 shows the top 10 U.S. container ports in 1998. The Ports of San Pedro Bay, Long Beach and Los Angeles have both overtaken Oakland, and Seattle is nipping at Oakland’s heels. There have been repeated efforts over the years to foster cooperation among the Bay Area ports to increase the attractiveness of the Bay as a container hub, but these have come to naught. A 1987 Port document still harkened back to San Francisco’s attempts to annex the Port of Oakland in 1888 and 1912, making cooperation seem unlikely (Oakland 1987, 5).

Table 2. Cargo Volume at Major U.S. Container Ports

Rank	Port	1998 TEUs
1	Long Beach	4,097,689
2	Los Angeles	3,378,217
3	NY/NJ	2,466,013
4	San Juan	1,990,275
5	Oakland	1,575,406
6	Seattle	1,543,726
7	Charleston	1,277,514
8	Hampton Roads	1,251,891
9	Tacoma	1,156,495
10	Houston	968,169

Source: American Association of Port Authorities 2000

So as this is written, the containerization revolution has been won. Containerization is an established technology that has had far reaching impacts in the world economy. The story for the Port of Oakland is a bit cloudier. While having had a good ride in the early days of containerization, it now struggles against the forces of economies-of-scale, which had served it so well.

Appendix 1. Timeline of Select Events 1950 to 1970

1950 Cargo-Gard box mentioned in *The Log*
First Japanese vessel calls on Port of Oakland since 1940

1951 Jack London Square opens

1953 Marine Cargo Transportation Conference (MCTC) established

1954 MCTC S.S. *Warrior* Study
McLean announces plan to carry trucks on ship (Trailerships)

1955 McLean purchases Pan-Atlantic Steamship Company, receiving 37 C-2s

1956 April 26: Pan-Atlantic's *Ideal X* sails from Port Newark to Houston with deckload of containers
New Haven Railroad Supreme Court decision
Matson establishes a research department
Federal-Aid Highway Act of 1956 passed (gas taxes to highways)

1957 October 4: Pan-Atlantic's *Gateway City* (containership) sails from Port Newark to Miami
Ben E. Nutter hired as Port Engineer

1958 August 31: Matson's *Hawaiian Merchant* sails with deckload of containers
Interstate Commerce Act of 1958 passed

1959 Pan-Atlantic changes name to Sea-Land Service, Inc.
PMA and ILWU initial Mechanization and Modernization Agreement (M&M)

1960 January 29: Grace Line's *Santa Eliana*, Venezuela stevedoring problem
Matson's *Hawaiian Citizen* (containership) sails

1961 October: Whirly cranes installed in Port of Oakland's Grove Street Pier
Container standards drafted (ASA)
M&M Agreement finalized

1962 March: Port receives funding to deepen channels from 30 to 35 feet
September 27: Sea-Land's *Elizabethport* arrives Oakland
Ben E. Nutter becomes Executive Director of Port of Oakland

1963 Port of Oakland trade mission to Japan

1964 Matson announces plans for Far East container service

1965 March: Sea-Land signs 20 year lease of Outer Harbor berths
September: McAteer-Petris Act established San Francisco Bay Conservation and Development Commission (BCDC)
Shoichi Kuwata hired as Far East representative of the Port
BART formed
ISO container standard finalized
Union hiring hall opens in Oakland

1966 April: Matson signs lease for facilities to be built at 7th Street Terminal
April 29: EDA grant approved
M&M renewed
Negotiations with Japanese steamship firms for container berths initiated

1967 June: Sea-Land's *Bienville* sails to Da Nang
December: Sea-Land's SS *Oakland* sails to nearly opened container terminal in Cam Rahn Bay

1968 January 23: Four Japanese steamship firms sign 5 year lease at 7th Street Terminal
September: 7th Street Terminal dedicated. Matson and Japanese firms take occupancy
Ownership of Port of San Francisco transferred from State to City

1969 July: First regular container service to Europe from Port of Oakland
ILWU jurisdictional strike over container packing
BCDC made permanent and San Francisco Bay Plan established

1970 August: Matson divests all conventional cargo handling equipment and facilities

1971 OECD reports essentially all containerizable cargo on transatlantic route being carried in containers

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Index

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