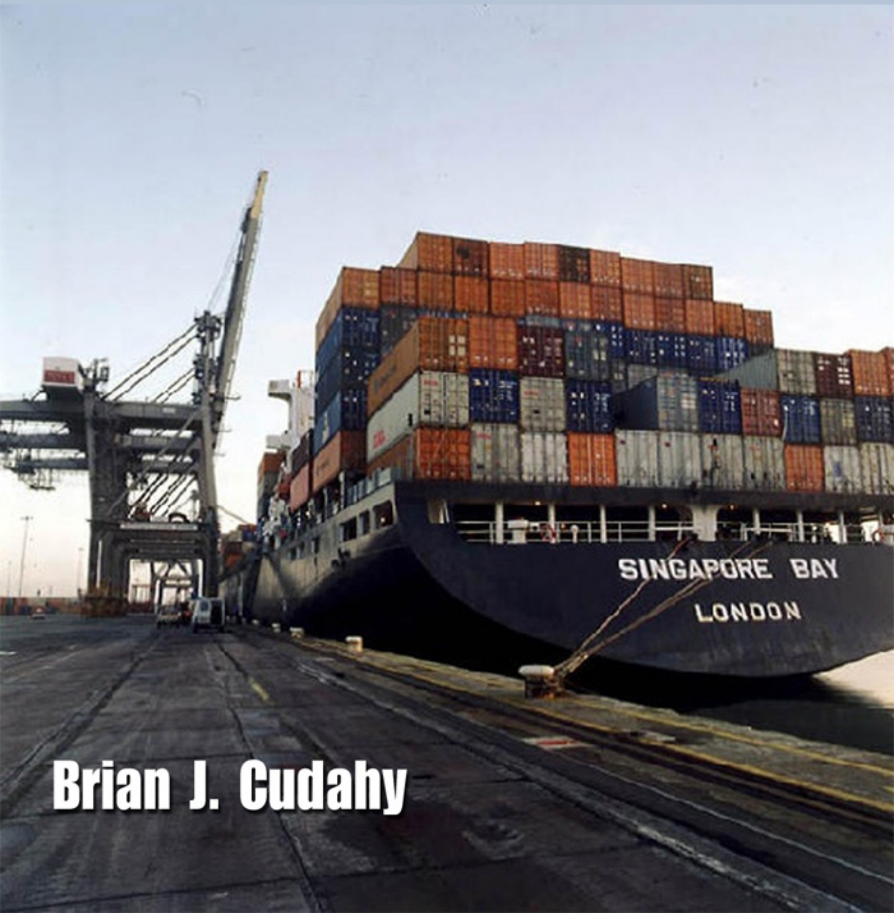
BOX BOATS

How Container Ships Changed the World



Brian J. Cudahy

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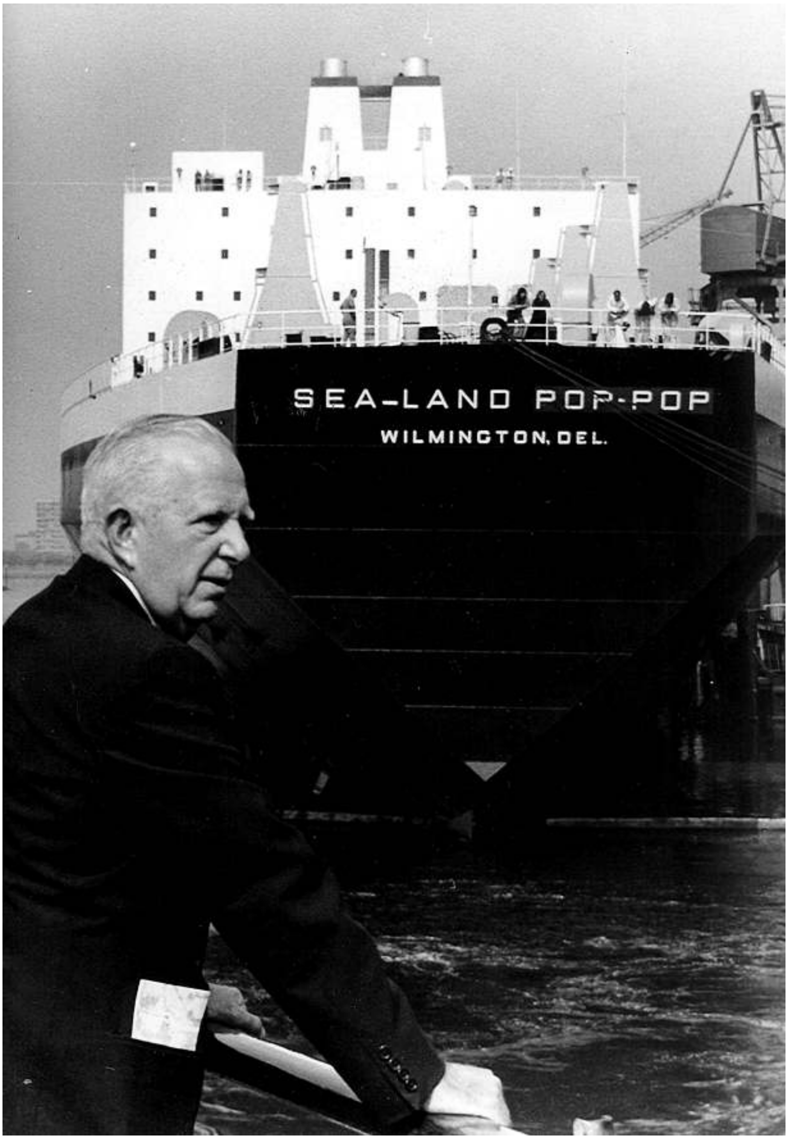

Malcom P. McLean, a trucker from North Carolina, is universally acknowledged as the individual who began the shift from break-bulk to containerized cargo transport at sea. The vessel shown here became the *Sea-Land McLean*, but was originally christened, in 1972, with the name by which McLean was known to his grandchildren.

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HOW CONTAINER SHIPS CHANGED THE WORLD

BRIAN J. CUDAHY

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CONTENTS

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Two people deserve special mention for assistance “above and beyond”: Captain Warren Leback, a man whose professional career involves a lengthy tenure as an important executive at Sea-Land, as well as a term as administrator of the United States Maritime Administration. The other is my friend and fellow member of the Steamship Historical Society of America, William du Barry Thomas. The many letters and emails Barry has sent to me during the course of this book’s preparation represent a full-blown history of Sea-Land and the container industry.

I have been especially fortunate in having access to two different, but parallel, oral history projects that were recently commissioned to record the history of containerization. One of these was done by and for the Smithsonian Institution, the other by the McLean Foundation, and they are identified in more detail in various notes.

A word of caution is in order, however, about such oral history accounts. They represent spontaneous recollections and are not products of scholarship and research. I have used quotations from both projects rather freely throughout the text. It should be remembered, though, that while the various individuals who are quoted themselves played critical roles in the development of the container ship industry, their recollections can be colored by the passage of time and may not be accurate in all respects. How a principal remembers things, however, can often be as informative as a more literal rendition.

Another special word of thanks must be offered to Geoffrey and Nancy Parker of Alexandria, Virginia, for providing me with access to the papers and documents of the McLean Foundation. Nancy Parker is the daughter of the late Malcom McLean, the onetime trucker from North Carolina who, many years ago, grew impatient when teamsters along the New Jersey waterfront took so terribly long to load a consignment of freight aboard a waiting cargo

ship, freight that he had driven north. But this is getting ahead of our story.

Countless others have given freely of their time to share recollections with me. They are too numerous to mention. You know who you are, though, and to all my sincere thanks.

INTRODUCTION

The weather in New York was hardly auspicious on Thursday, April 26, 1956. A cold rain fell on and off throughout the day, and the afternoon temperature never got beyond the mid-forties. While a crowd of 15,866 fans ignored the weather and attended the twenty-second day of the spring meet at Jamaica Race Track in Queens that afternoon, a scheduled night baseball game at the Polo Grounds in upper Manhattan between the New York Giants and the Brooklyn Dodgers was cancelled owing to the inclement conditions. New Yorkers in search of entertainment that April evening were better advised to consider something indoors. Undoubtedly, many went to the movies. Among the options, *Invasion of the Body Snatchers* was playing at several neighborhood theaters, while in midtown Manhattan, *The Man in the Gray Flannel Suit* was drawing crowds at the Roxy. Anyone in the metropolitan area who decided to spend a quiet evening at home could have tuned in to Channel Four and watched Groucho Marx star in *You Bet Your Life* at eight o'clock, followed by an episode of Jack Webb's *Dragnet* at eight-thirty.

Two important political stories emerged from Washington that April day a half-century ago. One was an announcement that Vice President Richard Nixon, after earlier hesitation, would remain on the Republican ticket when President Dwight David Eisenhower sought reelection in the fall. The second story involved bipartisan agreement in the House of Representatives over a massive new road-building program that Eisenhower had earlier proposed, an initiative that would be financed from an increase in the federal motor fuel tax and would soon lead to the design and construction of the Interstate Highway System.

Along the New York waterfront, the usual assortment of passenger and cargo ships sailed in and out of port. The French Line's *Liberté* backed away from North River Pier 88 shortly before noon and departed for the channel ports of Europe, while later in the afternoon, Moore-McCormack's *Brazil* set sail from Pier 32 at the foot of Canal Street, bound for Rio de Janeiro and Buenos Aires. Earlier that morning, Italian Line's *Saturnia* completed a fifteen-day crossing from Trieste when it tied up at Pier 84. All three vessels were veteran ocean liners that had been built before World War II and restored to luxury passenger service afterward.

Less glamorous but considerably more numerous in New York Harbor that day were thirty or more cargo ships of various shapes and styles that arrived from places as diverse as Aruba, Gibraltar, and Hamburg and docked at piers along the East River and the Hudson River, as well as in South Brooklyn. Longshoremen then began to unload whatever cargo the various ships had brought to New York, a job that took days. Another two dozen freighters (see appendix C) set sail from New York that April day bound for ports the world over—Yokohama, Manila, Le Havre, Havana—after an equally lengthy process of having cargo stowed and secured on board.

Something that very few people in and around New York could possibly have known or understood on that rainy and overcast day fifty years ago was that the seemingly routine departure of an apparently run-of-the-mill T-2 tanker on a coastwise voyage to Houston, Texas, would prove to be one of the most important maritime milestones in the long history of the port of New York, fully the equal, in the opinion of many informed observers, of a departure up the Hudson River to Albany in 1807 by a vessel that Robert Fulton called the *North River Steamboat*.

The T-2 tanker in question had been built in Sausalito, California, in 1945. It measured 10,572 gross registered tons, was 524 feet long, and bore the rather curious name *Ideal X.* The T-2 design was a standard wartime tanker whose profile would predominate in world petroleum trade for the better part of a quarter-century. It featured a stack and machinery aft, a pilot house with distinctive porthole-like windows atop a small deck house amidships, and open decks fore and aft where access ports to the vessel's carrying tanks were to be found. *Ideal X* was registered in the United States and flew the blue and white house flag of the Pan-Atlantic Steamship Company of Mobile, Alabama. When it pulled away from Berth 24 at the foot of Marsh Street in Port Newark, New Jersey, headed out to sea, and set a course for Houston that day, though, *Ideal X* was not merely another empty tanker traveling back to Texas in ballast to pick up additional petroleum product. A new and temporary spar deck, as it was called, had been installed several feet above the vessel's weather deck, and as *Ideal X* headed down Newark Bay and turned into the Kill Van Kull, fifty-eight brand-new trailer trucks were securely fastened to fore-and-aft slots in the spar deck. All were decorated with a catchy name that Pan-Atlantic Steamship had selected for what was, really, a new style of maritime operation: Sea-Land Service.

It was not the first time that trailer trucks had gone to sea. What was new, though, was the fact that the trailer trucks aboard *Ideal X* that day were not really trucks at all, in any ordinary sense. They were, to use a term that would be coined presently, *containers*—boxes, so to speak, that had been lifted off their detachable running gear on the pier and hoisted aboard the vessel by dockside cranes to be re-stored atop different wheels for delivery to their final destinations once the ship reached City Dock Number 10 in the Port of Houston six days later.

The style of transport that the *Ideal X* pioneered in New York on April 26, 1956, would grow in popularity and importance over the next half-century and become the standard and routine way that most ordinary cargo moves across the world's oceans. In the early years of the twenty-first century, commodities such as petroleum, coal, grain, and iron ore are still transported at sea in bulk. Automobile manufacturers have found that specialized vessels allowing new vehicles to be driven on and off ship are perfect for their purposes, and while such car carriers are efficient and effective, many would insist that their boxy design makes them the least graceful-looking vessels ever to sail the seven seas. Large and high-value cargo of various shapes and kinds typically travels aboard different kinds of ro/ro—roll on and roll off—vessels that are functionally, although not at all visually, similar to car carriers. But hoisting detachable containers aboard distinctive oceangoing vessels called container ships is the way most other cargo now travels at sea. Whereas *Ideal X* cleared New York Harbor and headed for Houston in 1956 with a capacity load of fifty-eight containers secured to its newly installed spar deck, over the next half-century the concept would evolve to the point where the newest and largest container ships about to enter service today are vessels capable of transporting in excess of nine thousand containers per trip.[1] The largest container ships in the world's merchant fleet today are far too big to transit the Panama Canal, while even larger vessels are on the drawing boards and will undoubtedly take to the seas in the years ahead.

In the chapters that follow, I will look into the history of the container-ship industry and its relationship to evolving patterns of world commerce and transport. It is, I think, a fascinating story that has gone largely untold for far too long, and yet it is a critical element of a global economy that is more dependent on overseas trade than ever before in world history. The emergence of containerization as the dominant form of cargo transport at sea has had a profound impact on vessel design, on the size and location of cargo ports and terminals, and on the relationship of various modes of freight transport one to another—motor carriers, railroads, steamship lines.[2] While the pages that follow endeavor to sketch the broad outlines of the container-ship industry at large, my method is to focus in some detail on the evolution of a single company and the impact of the container revolution on the development and operation of a single port city. The company is the Pan-Atlantic Steamship Company, the one that inaugurated container transport on April 26, 1956. The Pan-Atlantic house flag no longer flies from the mast of any ship, but the Sea-Land Service the company inaugurated a half-century ago is today part of the largest container operation in the world, a company whose main office is located across the North Atlantic in the city of Copenhagen, Denmark, a short walk along the waterfront from the famous statue of Hans Christen Andersen's "little mermaid," in fact. The company calls itself the A. P. Moeller Group.

As for the seaport whose dynamics have been altered so totally by something that began on a rainy and overcast April Thursday a half-century ago, when a T-2 tanker called *Ideal X* slipped away from its berth in Port Newark, steamed out to sea, and set a course for Houston, Texas: that harbor is the port of New York.

1 CARGO SHIPS, AMERICAN STYLE

A PRIMER

Oceangoing cargo ships have never rivaled passenger liners—or, for that matter, sailing ships, naval vessels, or paddlewheel steamboats—as objects of general interest and curiosity. The famous Liberty ships of World War II may stand as something of an exception to this generalization, but their fame is surely more a function of the role they played in ensuring Allied victory than of any inherent charm or grace they may have exhibited as examples of the shipbuilder's art. To be sure, many enthusiasts regard cargo ships with genuine affection. But if one looks through the shelves of a general bookstore in the section called "transport by sea," for every title one finds that concerns itself with cargo vessels—assuming, of course, that one finds *any*—there will likely be two dozen books about passenger liners, famous and otherwise. And of the two dozen, half or more may well be about a single ship that had the singularly bad fortune of striking an iceberg and sinking in the middle of the North Atlantic Ocean during the dark of an April night in the year 1912. (If our imaginary bookstore browser does find that single title dealing with cargo ships, well that it might be Richard Pollack's recent work *The Colombo Bay*, a wonderful narrative that describes a five-week voyage from Hong Kong to New York via the Suez Canal in the fall of 2001 aboard a container ship working for P&O Nedlloyd—a company we shall learn more about in subsequent chapters.[1])

Clearly, this publishing imbalance reflects some basic economic reality in the marketplace of books about ships. But it is an imbalance that is unfortunate, and it is unfortunate for a number of reasons, not least of them that cargo ships are just plain interesting. It is unfortunate because cargo ships have played a singular role in the history of waterborne commerce. It is unfortunate because the evolution of cargo ship design provides a fascinating glimpse into naval architecture and marine engineering. It is unfortunate because while the swift passenger liners of yesteryear have disappeared, their role assumed by jet airliners—and, perhaps, to a lesser and different extent, by leisure-oriented cruise ships—contemporary cargo ships are critical for the maintenance of world commerce and trade that is increasingly international and global in its scope.

Our story is about a single category of cargo ships, those specialized vessels that are known today as container ships—less formally, "box boats"—and whose voyages across the waters form a critical link in a worldwide supply chain that delivers merchandise to department stores, parts and components to factories, and just about anything that can be placed inside a container that is eight feet wide, eight-and-a-half feet high, and forty feet long to just about any recipient imaginable.

The United States Shipping Board

An important advancement in cargo ship development took place as the United States mobilized for possible participation in World War I. Under the aegis of a federal agency called the United States Shipping Board, established in 1916, a flotilla of merchant ships was designed and built to support the nation's possible entry into the Great War and address whatever logistical challenges would be involved in sustaining American Expeditionary Forces fighting across the North Atlantic in the fields of France. Armistice came too quickly for this well-intentioned effort to have any substantial impact on the outcome of the conflict. By war's end, 470 vessels had been completed, while an additional 1,300 or so hulls were delivered between 1918 and 1922. These vessels became the heart and soul of the country's postwar merchant marine. Various classes of standard wartime designs, the most notable among them being the colorfully named Hog Islanders, worked for such U.S. steamship companies as the Grace Line, Lykes Brothers, Moore-McCormack, and the Ward Line.[2] During this era there were dozens upon dozens of steamship companies operating deepwater merchant vessels that flew the U.S. flag. By most accountings, at the end of World War I the U.S. merchant fleet was second only to that of Great Britain in the number of oceangoing ships it owned and operated.[3]

The Great Depression took a toll on the nation's steamship companies. Few were able to acquire new vessels to replace and upgrade cargo fleets that, despite the influx of some relatively new tonnage from the Shipping Board, were beginning to show their age. Passage of a federal statute called the Merchant Marine Act of 1936, though, was an important turning point. This legislation combined a New Deal interest in invigorating the nation's dormant industrial base with a concern for future international engagements, the latter a policy that ran counter to general isolationist tendencies that had taken root in much of the country in the years after the Armistice.[4] Following the enactment of this law in 1936, the new United States Maritime Commission, successor agency to the earlier Shipping Board, undertook responsibility for developing a new set of standard specifications to upgrade the nation's merchant fleet.

The Merchant Marine Act of 1936

The Commission identified nine categories of vessels, each given a letter designation: P stood for passenger ships, for instance, B identified various designs of barges, and L was the code letter for bulk carriers designed for Great Lakes trade. Two Maritime Commission designs are of direct bearing on container-ship history: C for oceangoing cargo ships, and T for tankers.

Numerals were added to the letter designations to identify subclasses, with cargo ships identified as C-1, C-2, C-3, and C-4—the higher the number, the larger the vessel. A C-1 was a modest-size cargo vessel of just over four hundred feet in length and 7,000 deadweight tons that was suited to offshore or interisland trade. At close to 10,000 deadweight tons and 460 feet in overall length, a C-2 was a good deal larger and became the most popular subclass among the various Maritime Commission cargo designs. C-3s and C-4s were even larger.

The United States Navy had input into the C-2 design, particularly its hull form, and many such vessels would later serve as fleet auxiliaries. Preliminary specifications for the C-2 were circulated by the Maritime Commission in 1937, and efforts were made to solicit construction bids from shipyards in 1938. There were some complications in the bidding process that required adjustment, but the first C-2 vessels to be delivered included the *Donald McKay*, turned out by Sun Shipbuilding in Chester, Pennsylvania, in June 1939 for Moore-McCormack, and the *Challenge*, built by the Federal Shipbuilding and Dry Dock Company in Kearney, New Jersey, a month later and delivered to the American-Hampton Roads Line.[5]

Donald McKay was diesel-powered, a feature that was included as an option in the overall C-2 specification but not one that would be widely adopted, while *Challenge* was powered by a steam turbine engine, the more common C-2 power plant. In all, between 1940 and 1945, 240 cargo ships were built in the United States that can be identified as C-2 vessels. Of this total, only twenty-two were diesel-powered. The entire class became an important national asset during World War II, some even being converted into troopships. With passage of the Merchant Ship Sales Act of 1946 at war's end, large numbers of C-2s became available to begin the systematic rebuilding of the nation's peacetime merchant marine.[6]

The Maritime Commission's C-3 was a larger version of the C-2. Its deadweight tonnage was almost 12,000, it measured 492 feet in length, and in its civilian configuration it could include provision for as many as a hundred passengers in addition to cargo. Some C-2s featured passenger accommodations, but they were far more limited, a typical C-2 carrying, perhaps, no more than a dozen passengers. Both the C-2 and the C-3 featured a profile that can be called conventional for cargo ships of the era. The pilothouse and funnel were located atop a deckhouse that was positioned slightly astern of midships, and cargo hatches were found both forward and astern of this superstructure.

At 522 feet in length, the C-4 design was not only the largest of the Maritime Commission's cargo ships of the late 1930s, but it also had a profile that could be rather different from the C-2 or the C-3. Most C-4s featured a wheelhouse and superstructure that was located well forward, with a second deckhouse closer to the stern topped off by the vessel's funnel. In this basic cargo configuration, two holds were located forward of the wheelhouse, four holds were found between the wheelhouse and the second deckhouse, and the seventh hold was close to the stern.

So designed, the C-4 did not prove terribly popular with U.S. steamship companies. The most interesting adaptation of the basic design, though, was that forty-five of them were built from the keel up as troopships. In such a configuration, a C-4 could accommodate as many as three thousand soldiers and their equipment. C-4 transports participated in landings throughout the Pacific theater during the war's final months, and many continued in troop service during the Korean conflict and on into the 1960s. While there were minor variations among subclasses, a basic C-4 was 520 feet long with a deadweight tonnage of almost 15,000.[7]

It can safely be said that the C-4 lent itself to more creative postwar adaptations than did any of the other Maritime Commission cargo ships. The Air Force, for example, outfitted two as missile-tracking ships in the 1960s, while United States Lines chartered a number of C-4 troop ships shortly after VE Day to assist in the transport of war brides and immigrants from Europe to the United States. Other C-4s were converted into hospital ships, tankers, even bulk carriers for the Great Lakes trade. More to the point, C-4s would play a very important role in the early years of the container-ship industry.

Petroleum-carrying merchant ships were also included in the Maritime Commission's effort to develop a set of updated designs for the nation's merchant fleet in the late 1930s. Tankers typically featured a small deckhouse amidships that was topped off by the vessel's wheelhouse, with a separate superstructure at the stern where the vessel's funnel and ventilators were to be found, not totally unlike the profile of basic C-4 cargo ships, although this was a design that was popular in the petroleum trade since the nineteenth century, long before the days of the Maritime Commission. Between the dual superstructures and forward of the amidships one, tankers featured a broad and open main deck where valves and other gear were located that controlled the loading and unloading of product into the vessel's carrying tanks. Tanker designs generated by the Maritime Commission in the late 1930s were identified, simply enough, as the T-1, T-2, and T-3, with tankers built to T-2 specifications constituting the bulk of the wartime fleet that transported millions of barrels of petroleum across the Atlantic and the Pacific in support of the war effort. Following hostilities, T-2 tankers were conveyed to private operators and formed the backbone of the country's fleet for many years. A typical T-2 tanker had an overall length of 526 feet and a deadweight tonnage of 10,600.[8]

The U.S. Maritime Commission and its private sector partners that designed and built various classes of merchant vessels in the years after 1936 were surely—and quite deservedly—proud of their accomplishments. Even they would surely be surprised, though, by the extraordinary longevity of much of their handiwork. A quarter-century after VJ Day, various U.S.-flag steamship companies were expanding their fleets with new tonnage. And yet often as not, such "new" vessels involved the upgrading of veteran C-2s, C-4s, and T-2s, often cutting a vessel in half and splicing a new midbody section into its hull, a procedure often described in the trade press as "jumboizing."

World War II

Cargo ships built to Maritime Commission specifications would play a critical role during World War II. But transoceanic logistical challenges that were at the heart of the Allied war effort required a more dramatic response than merely accelerating the construction pace of conventional C-2 and C-3 cargo ships. Thus was born the famous Liberty ship, and after it the Victory ship. Neither was a state-of-the-art cargo vessel. At 441 feet in length, a Liberty Ship was comparable to a C-2 in size, but with a top speed of only 10.5 knots, it was substantially slower. Liberty ships and Victory ships were given letter designations by the Maritime Commission so they could be categorized along with the other standardized designs such as the C-2 and the T-2. Because they were developed as part of the nation's emergency mobilization for war, Liberty ships were identified as EC-2 vessels—E for emergency, C for cargo—while vessels built to Victory specifications were identified as VC-2s.[9]

The genius of the Liberty ship was that it could be produced quickly, it could be produced in quantity, and it could be produced without undue compromise of the nation's ability to concentrate its heavy shipbuilding resources on warships and other higher-value construction. The Liberty ship, for instance, was powered by an utterly conventional, even outmoded, triple-expansion reciprocating steam engine. Basic C-2 specifications called for more efficient steam turbine power plants with diesels as an option, but the nation's capability to produce steam turbines was more than fully subscribed for other tonnage—warships and T-2 tankers, for instance. So the Liberty ship program relied on an older engine design, one that could be produced in quantity without affecting the nation's ability to produce sufficient numbers of turbine engines for other vessels that needed them more.

Also central to the overall design was the matter of marine reduction gears, critical hardware that was in especially short supply since, before the war, United States shipyards imported substantial quantities of such gears—and the machine tools to produce them—from Germany. Reduction gears were necessary to step down the high-revolution output of a steam turbine engine before linking it to a propeller shaft, while reciprocating steam engines could be tied directly to the shaft without such gearing. Many war-built T-2 tankers, on the other hand, were powered by steam turbine engines, but in a revision of the Maritime Commission's original specifications, their propulsion was achieved by connecting the turbines to electric generators and then powering the vessel's propeller with an electric motor, another way to avoid the need for specialized marine gearing.

The Victory ship was yet another wartime cargo vessel that was produced in quantity. While it was superior to the Liberty in several important specifications, it, too, was not the equal of the C-2 in speed. (Some have called the Victory a no-frills version of the C-2.) U.S. shipyards turned out 2,751 Liberty ships starting with the *Patrick Henry* of 1941, making this design without any doubt the largest single class of seagoing merchant vessels of any and all time. Placed end-to-end, 2,751 Liberty ships would form a line more than two hundred miles long, and American shipyards supplemented this production by turning out 534 Victory ships.

Following hostilities, massive fleets of government-owned Liberty and Victory ships were available, almost immediately, to restore the American merchant marine to prewar capability. Indeed at war's end and for several years afterward, the American merchant marine would enjoy a distinction it never did before and will undoubtedly never achieve again: It was the largest oceangoing merchant fleet on the face of the earth. In 1946 there were some 130 U.S.-flag steamship lines, and the country's merchant fleet included 4,422 deepwater vessels of 1,000 gross registered tons or greater.[10]

Although they would soldier on for lesser operators for many years, Liberty and Victory ships would see relatively brief careers in postwar merchant service for the major U.S.-flag steamship lines. The style of cargo ship that American companies preferred was the faster and more modern C-2. As these were mustered out of government service during the late 1940s, they quickly replaced Liberty and Victory types and became the heart of the country's cargo fleet for the next decade and a half.

Some new cargo ships that were built immediately after the war were variations of the C-4 design. A whole subclass of C-4s that featured a more conventional cargo-ship profile—deckhouse and funnel slightly astern of midships—was built in the late 1940s and identified as Mariner-class vessels. Capable of making twenty knots, the Mariner class was really a different breed of vessel from wartime C-4s, although thanks to their length, Mariner class vessels were categorized as C-4s in Maritime Commission notation.

In any event, all of the original Maritime Commission designs would not only continue in postwar cargo service, but also, because they were so readily available and, not incidentally, because they were well designed and soundly built, would become the raw materials, so to speak, that naval architects would use to design and build the world's first generation of container-carrying vessels.

Table 1.1 displays basic comparative information about various standard cargo ships developed under the auspices of the Maritime Commission.

Loading and Unloading Cargo

Something common to virtually all cargo ships in the first half of the twentieth century was how they were loaded and unloaded—very, very slowly.

Cargo was carried in below-deck holds, open spaces that were reached through large hatches located on the surface of the main deck, sometimes referred to as the weather deck. Cargo ships were outfitted with a forest of masts, posts, and booms adjacent to the various hatch covers, equipment that was used to hoist cargo aboard ship from an adjacent wharf, and then lower it into one of the ship's holds for stowage below deck. Wharves where cargo vessels docked often included elevated steelwork that hoisting gear aboard ship could use as leverage to extend the ship's reach onto the pier. Cargo could also be hoisted aboard ship by cranes

TABLE 1.1. *Maritime Commission Cargo Ships*

Type	Description	Length	Beam	Deadweight tonnage
C-1	Small cargo	418 feet	60 feet	9,075
C-2	General cargo	460 feet	63 feet	8,794
C-3	General cargo	492 feet	70 feet	12,500
C-4	General cargo; Troop ship	523 feet	72 feet	6,100
EC-2	Emergency cargo; Liberty ship	442 feet	57 feet	10,419
VC-2	General cargo; Victory ship	455 feet	62 feet	10,734
T-2	Tanker	524 feet	68 feet	16,400
T-3	Tanker	553 feet	75 feet	18,400

and other equipment located ashore, but the more common practice was for the ship to load itself, so to speak, with its complex assortment of masts and booms. While the hoisting of cargo from pier to ship, or from ship to pier, was a mechanized process, making use of such equipment as gantries and forklift trucks, much of the overall effort involved extensive manual labor. Cargo that had been delivered by truck or train to one end of a pier in advance of a ship's departure had to be moved to a point where it could be reached by a ship's cranes and hoists, and once lowered into the hold, gangs of longshoremen would be required to ensure that the cargo was stowed in such a way that it would neither be damaged nor cause any damage during a potentially rough voyage across the sea.

Given the uncertainties of cargo ship schedules, freight was often delivered to a pier days and even weeks before it could be loaded aboard a vessel, thus creating another series of problems and difficulties, not the least of which were multiple opportunities for pilferage from cargo indiscriminately stored on piers for lengthy periods of time. Reflecting on these uncertainties, a steamship executive would later claim that it typically cost his company more to move a quantity of cargo a few hundred feet from the street in front of a pier to the hold of a ship than it did to transport it across the sea from one port to another.[11]

Such a style of service has long been referred to as break-bulk cargo operation. Break-bulk cargo is characterized by its multiplicity and diversity. In place of a single commodity that could be carried in indiscriminate bulk—coal, say, or petroleum, or grain—in break-bulk operations, cargo arrives in any number of different shapes, sizes, and configurations. In break-bulk service, a cargo ship might carry barrels of cooking oil, cartons of grocery products, office equipment in irregular shapes and sizes, bales of textile, machinery, bags of coffee beans, automobile parts, and so on. Given the investment of time and effort that was required to load and unload a break-bulk cargo ship, it was not uncommon for a vessel assigned to the busy transatlantic trade route between New York and the channel ports of Europe to spend as much time in port loading and unloading cargo, over its lifetime, as it did steaming across the ocean.[12]

Because loading and unloading in a port city was a lengthy task largely performed by local stevedores, seamen who toiled aboard oceangoing cargo ships had considerable free time to spend ashore as their vessels were serviced for the outbound voyage. An entire subculture would develop around these sailors and the often disreputable waterfront establishments they frequented in the various ports they visited. Today, with container ships completing their terminal operations in hours, not days, the very idea of a smoke-filled waterfront café whose patrons are largely lonely merchant seamen from countries the world over is as dated a concept as the horse and buggy or high-button shoes. Commercial establishments that cater to the needs of merchant seamen in ports throughout the world today are convenience stores that offer such services as the sale and rental of DVDs and videotapes, plus such basic merchandise as toiletries, snack food, cigarettes, and prepaid telephone cards. They also typically include banks of pay telephones, and even online computer terminals, for contacting family and friends back home.

It was within an older context, with the loading and unloading of cargo ships a process that consumed inordinate amounts of time, that a trucker out of Fayetteville, North Carolina, ventured north to the port of New York in late November 1937. The man was not merely a hired driver; he also owned the vehicle he had navigated north to the New Jersey waterfront opposite midtown Manhattan. His truck carried bales of export cotton from North Carolina that would be placed aboard a cargo ship of the American Export Line for shipment to Istanbul.

The man grew irritated, though, when the loading of the ship's cargo proved to be such a time-consuming process. And so, as he waited impatiently on the New Jersey waterfront and watched stevedores conducting their protracted operations, an idea began to form in his mind. "Wouldn't it make more sense," he may well have thought to himself, "if cargo could be hoisted aboard in larger lots and didn't have to be handled so many times by so many different people? Why couldn't my whole truck be put aboard ship, for instance, and then used to deliver its freight on the other side?"

Eventually the truck driver found that a five-dollar tip to a gang foreman helped get his cargo loaded with a little more dispatch, but as he later picked up a shipment of roofing material in New Jersey and then drove his truck south through Philadelphia and Baltimore and Washington along U.S. Highway One on his way back to North Carolina, he kept thinking about all the time he had wasted on the Hudson River waterfront. "There has to be a better way," the truck driver kept telling himself.

Twenty-three years later, in 1956, when a ship by the name of *Ideal X* pulled away from a different pier in northern New Jersey, a one-time North Carolina truck driver by the name of Malcom McLean had a chance to demonstrate that, indeed, there was a better way.[13]

Coastal Steamship Service

A characteristic of the American maritime scene that would be changed, and changed radically, in the aftermath of World War II was cargo service between various ports along the East Coast and Gulf Coast, as well as cargo transport between the East Coast and the West Coast. (As a matter of common terminology, *coastwise* generally refers to service along and between the East and the Gulf coasts, or up and down the Pacific coast, whereas *intercoastal* characterizes service between the East and West coasts via the Panama Canal.)

Such steamship service had to function under the provisions of an important federal statute. To move cargo from one United States port to another required the use of a U.S.-flagged vessel that had been built in a United States shipyard, was owned not only by a U.S. company, but also by a company under the direct control of U.S. citizens, and, finally, was operated by U.S. seamen. The Jones Act—named after Wesley Livsey Jones of Washington State, who served in the U.S. Senate from 1909 to 1932—was passed into law in 1920 as part of an effort to stabilize the country's postwar merchant marine.[14]

The Jones Act, although slightly modified, remains very much in force in the twenty-first century and will prove to be a determining factor in the subsequent history of the maritime industry. One legal requirement that the Jones Act does not make, however, and that will affect the container-ship industry in an interesting way, is that to be registered in the United States and fly the U.S. flag, a ship need not have been built in a domestic shipyard. A foreign-built vessel may be owned by a U.S. company, fly the U.S. flag, and show a U.S. hailing port on its stern. The Jones Act prohibits such a vessel from operating in domestic trade between U.S. ports, although it may operate between a foreign port and a U.S. port. Southampton to New York, yes; New York to Miami, no.

Coastwise and intercoastal steamship service, as protected by the Jones Act, was an important element of the nation's overall transport system in the years and decades before World War II. In 1939, no fewer than 165 vessels were engaged in intercoastal service, with 543 working coastwise trades. Fifteen years later, in postwar 1954, a mere 57 vessels were at work in intercoastal services, and of 283 cargo ships sailing coastwise, 230 were tankers moving petroleum from oil fields to refineries. In the late 1930s, no less than a third of all oceangoing vessels that entered the port of New York were working in wholly domestic trades.[15]

The war itself caused coastwise and intercoastal service to be curtailed severely. For one thing, oceangoing cargo ships were more needed for transoceanic assignments. What was more important, though, was that during the early years of America's participation in the war, lurking Nazi submarines began to take an awful toll on merchant ships attempting to steam up and down the Atlantic coast.[16] Coastwise and intercoastal services were resumed at war's end, but would never achieve the importance they enjoyed during the years before Pearl Harbor. Railroads that were used as safer wartime substitutes for coastwise and intercoastal steamships retained substantial market share afterward, and the postwar era also saw a new generation of over-the-road trucks—larger rigs with powerful diesel-powered tractors on the business end—competing for many of the same markets.

2 THE PAN-ATLANTIC STEAMSHIP COMPANY

1933–57

A corporation founded in the Great Depression year of 1933, called the Pan-Atlantic Steamship Company, can hardly lay claim to the kind of long and colorful maritime heritage that one associates with the likes of, say, Cunard or Holland America. With its operational headquarters in the quiet Gulf Coast port city of Mobile, Alabama, the new company's objective was to provide scheduled steamship service—primarily cargo, but perhaps some incidental passenger traffic as well—between ports along the Atlantic and Gulf coasts. Such coastwise steamship service, as it was called, represented a style of oceangoing transport that was quite popular, and reasonably profitable, in the decades leading up to World War II.

The Early Years of Pan-Atlantic

Pan-Atlantic, though, would never become much of a force in coastwise trade. The more prominent coastal steamship companies of the era—Clyde-Mallory, Merchant and Miners Steamship Company, the Savannah Line—could boast long histories and were especially known for the distinctive passenger tonnage they operated. As both a new carrier and one emphasizing cargo service, Pan-Atlantic would never rival its older and more glamorous competitors. But the company offered genuine liner service—that is to say, steamship arrivals and departures at selected port cities on a regular schedule. Before Pan-Atlantic was a year old, the company's fleet consisted of four oceangoing cargo ships, all standard designs that were built under the auspices of the United States Shipping Board as part of the nation's mobilization for World War I. Pan-Atlantic was formally chartered on July 24, 1933, and began operations between New Orleans and ports along the East Coast five weeks later on the first of September.[1] Table 2.1 provides statistical information about the initial Pan-Atlantic fleet; all four vessels were powered by three-cylinder triple-expansion reciprocating steam engines.

From the outset, Pan-Atlantic was a subsidiary of the larger Waterman Steamship Company. New Orleans–born John Barnet Waterman (1866–1937) founded the company that bears his name in 1919 as a venture that would help promote maritime commerce via the port of Mobile, and Waterman Steamship would see steady growth in the era between the two

TABLE 2.1. *Pan-Atlantic Fleet: 1935*

Off. No.	Name	Hull dimensions	GRT	Place built (year)	Notes
217373	*Pan Royal* a) *West Carnifax* b) *Exford*	411 × 54 × 27	5,627	San Pedro, Calif. (1918)	1, 2
218731	*Pan Atlantic* a) *Richmond Borough* b) *Willfaro* d) *XXI Aprile*	387 × 52 × 27	4,810	Staten Island, N.Y. (1919)	3, 4
218903	*Pan American* a) *Yaphank* b) *Willpolo*	387 × 52 × 27	4,810	Staten Island, N.Y. (1919)	4
219683	*Panama City* a) *Ossa* b) *Exbrook* d) *Atlas*	380 × 53 × 27	4,846	Tacoma, Wash. (1920)	2, 5

Notes

All vessel dimensions cited here and elsewhere are displayed in rounded feet.

1. Sank in the North Atlantic following collision with another freighter, February 9, 1943.

2. Acquired from Export Steamship Company, of New York, parent company of American Export Lines.

3. Sold to Italian interests and reflagged Italian, 1937.

4. Acquired from Williams Steamship Company of New York.

5. Sold 1937 and reflagged Panamanian.

world wars. Waterman began operations in 1919 with a cargo ship called *Eastern Sun* that it had been allocated by the United States Shipping Board. Built in Kobe, Japan, in 1918 and originally called *Taifuku Maru No. 2*, Waterman's first vessel was dispatched from Mobile on a transatlantic voyage to Liverpool and Manchester, and the company began a period of steady growth. In 1926, for instance, Waterman organized a subsidiary, the Mobile, Miami and Gulf Steamship Company, while the following year saw the company establish a separate division to operate steamship service to and from Puerto Rico. The Waterman corporate family eventually included a shipyard and a stevedoring firm in Mobile, and the company even made a less than successful effort to establish a commercial airline to fly between New Orleans and San Juan.[2]

Like its Pan-Atlantic subsidiary, Waterman Steamship was also based in Mobile, Alabama, and from the mid-1930s onward, Waterman concentrated its efforts on international routes and service to and from Puerto Rico, as well as intercoastal operations between the East and West coasts. Pan-Atlantic was left to handle coastwise service—that is to say, operations covered by the provisions of the Jones Act, and more particularly, service between ports along the East and Gulf coasts of the United States. In addition, Pan-Atlantic vessels provided short-haul feeder service to longer liner trades that Waterman operated.[3]

Waterman and Pan-Atlantic thus maintained separate identities, although vessels were often chartered from parent to subsidiary and subsidiary to parent. Furthermore, the blue-and-white house flag and stack markings of each company during this era evidenced similarities in their design. When they called at the port of New York, Waterman and Pan-Atlantic vessels both used North River Pier 45, at the foot of Christopher Street, in Manhattan; both companies also worked out of the same sales office in New York at 19 Rector Street, and were listed in the Manhattan telephone directory under the same number, WHitehall 4-3111.

In 1936, when the Pan-Atlantic fleet included four vessels, parent Waterman was operating a seventeen-vessel fleet of cargo ships. By the early 1940s, Pan-Atlantic's fleet had increased to six cargo ships, Waterman's to twenty-three.[4] Shortly afterward, but just before America's entry into World War II, Pan-Atlantic's six-vessel fleet was supplemented by two turn-of-the-century cargo ships, the *El Dia* and the *El Valle.* Each was a 4,500-gross-ton vessel built in 1901 at Newport News, Virginia, for service by the Morgan Line, a maritime subsidiary of the Southern Pacific Railroad.[5] After joining the Pan-Atlantic fleet, the former was renamed *Pan*

York and the latter *Pan Crescent*. (With respect to both Waterman and Pan-Atlantic, a word of caution is in order about vessel names. There was a practice, across the two related companies, to repeat popular vessel names, replacement tonnage often memorializing the name of an older vessel. Waterman's 5,432-gross-ton *Gateway City*, for instance, a 1920-built cargo ship the company operated before World War II, was recalled when the same name was bestowed on a C-2 cargo ship after the war, one that would figure prominently in the development of the container-ship industry.)

Executives at Waterman realized that the war in Europe would likely soon involve the United States. In June 1940, the company sent a telegram to a congressman from Alabama, William B. Bankhead, a man who was also the speaker of the U.S. House of Representatives. It read: "Believing that participation by the United States in the European War is inevitable and that speed is preferable to delay, Waterman Steamship Corporation requests that you advise President Roosevelt that it is ready to aid in every way it can with ships and other resources."[6]

Whether the company's 1940 telegram had any impact is moot, but Waterman and Pan-Atlantic suspended routine civilian operations in early 1942 shortly after the United States entered World War II, and the assets of both companies were deployed on war-related assignments. Waterman was called on to operate as many as 125 cargo ships during the war, only thirty-seven of which were former Waterman or Pan-Atlantic vessels. Of the thirty-seven, though, seventeen were sunk by enemy action, and 40 Waterman officers, as well as 147 seamen, were lost aboard them. One ex-Waterman freighter, the 1920-built *Kofresi*, was deliberately sunk on June 14, 1944, to help form a breakwater off Omaha Beach at Normandy.

The Postwar Era

Waterman and Pan-Atlantic resumed their prewar routes and services shortly after V-J Day. At first, Pan-Atlantic operated a fleet of five Liberty ships that it obtained under bareboat charter from the Maritime Commission. The Liberty was an emergency wartime design, produced out of necessity and with a top speed of only 10.5 knots. While vital to the war effort, Liberty ships were considerably less than state-of-the-art cargo vessels and could hardly provide competitive service in postwar commercial markets. Table 2.2 identifies Pan-Atlantic's postwar Liberty ships.

Pan-Atlantic later supplemented its five Liberty ships with two Victory-style cargo ships, also chartered from the Maritime Commission, the *Bessemer Victory* and the *Canton Victory*.[7] By 1950, though, Pan-Atlantic had

TABLE 2.2. *Pan-Atlantic Fleet: Chartered Postwar Liberty Ships*

Off. No.	Name	Hull dimensions	GRT	Place built (year)	Notes
242596	*Winslow Homer*	423 × 57 × 35	7,228	S. Portland, Maine (1942)	
242158	*Daniel H. Lownsdale*	423 × 57 × 35	7,210	Portland, Ore. (1942)	
242465	*John Bartram*	423 × 57 × 35	7,205	Richmond, Calif. (1942)	1
246912	*Albert K. Smiley*	423 × 57 × 35	7,198	Brunswick, Ga. (1944)	
242257	*John Laurance*	423 × 57 × 35	7,176	Houston, Tex. (1942)	

Note

1. Struck by torpedo in the Pacific, but no damage inflicted, June 6, 1943.

returned its seven chartered vessels to the federal government and acquired an equal number of C-2 cargo ships to form the core of its permanent postwar fleet. With the arrival of the C-2s, Pan Atlantic even advertised its scheduled sailings up and down the East Coast as available for limited passenger traffic, since each C-2 had accommodations for up to twelve passengers. Table 2.3 identifies the extent of the company fleet in 1955.

With its seven newly acquired C-2s in service, Pan-Atlantic established two routes, each served by multiple vessels and featuring scheduled departures every seven days. Three ships were assigned to a twenty-one-day circuit out of New Orleans that included calls in Mobile, Pensacola, Tampa, Georgetown, Boston, New York, and Jacksonville before returning to New Orleans, while four ships worked a twenty-eight-day circuit that also began in New Orleans and included stops in Mobile, Panama City, Tampa, Jacksonville, New York, Philadelphia, Baltimore, Jacksonville (again), Miami, Tampa (again), and then back to New Orleans. If all schedules were maintained as advertised, Pan-Atlantic vessels would make 1,042 separate port calls each year.[8] With respect to calls at the port of New York, Pan Atlantic and Waterman were no longer using North River Pier 45, but had shifted their operations to a pier at the foot of Columbia Street along the Brooklyn waterfront.

TABLE 2.3. *Pan-Atlantic C-2 Fleet: 1955*

Off. No.	Name	Hull dimensions	GRT	Place built (year)	Notes
245979	*Antinous*	449 × 63 × 27	6,065	Chickasaw, Ala. (1944)	1
251507	*Arizpa* a) *Jean Lafitte* b) *Warren* (USN) c) *Jean Lafitte*	449 × 63 × 27	6,064	Chickasaw, Ala. (1943)	1
251508	*Beauregard* a) *Afoundria* b) *Wayne* (USN) c) *Afoundria*	449 × 63 × 27	6,064	Chickasaw, Ala. (1943)	1
241993	*Chickasaw* a) *Delsantos* *b) Thurston* (USN) c) *Delsantos*	439 × 63 × 28	6,131	Kearny, N.J. (1942)	2
245398	*De Soto*	449 × 63 × 27	6,065	Chickasaw, Ala. (1944)	1
248489	*Iberville*	449 × 63 × 27	6,065	Chickasaw, Ala. (1945)	1, 3
243815	*Warrior*	449 × 63 × 27	6,065	Chickasaw, Ala. (1943)	1

Notes

1. Chickasaw-built C-2s represented a subclass designated C2-S-E1 that was designed especially for Waterman and its subsidiaries.
2. Classified C2-F and built to specifications developed by Lykes Brothers Steamship Company; the vessel never worked for Lykes, however.
3. First Pan-Atlantic C-2 to enter service; vessel departed Mobile for New Orleans on November 20, 1948.

Pan-Atlantic went to some pains to secure authorization from the federal government to extend its Gulf Coast service to Houston, Texas, and in 1951 such approval was granted.[9] The company, however, did not incorporate Houston into its permanent schedules immediately, although the fact it held such authority would later prove to be significant.

Pan-Atlantic's parent corporation, Waterman Steamship, also acquired a substantial fleet of cargo ships from the Maritime Commission after the war for its various services. Indeed with twenty-three C-2s on its roster and an overall cargo fleet that grew to fifty-five hulls by 1949, not all C-2s, Waterman ranked third among U.S.-flag operators of oceangoing steamships in the number of blue-water vessels in its fleet and the company operated more dry cargo ships than any other U.S.-flag steamship line.[10]

Coastwise steamship service, though—the forte of Waterman's Pan-Atlantic subsidiary—would never regain its prewar importance. Over-the-road trucks had become a more powerful force in long-haul cargo transport with the popularity of diesel-powered rigs in the postwar era, while railroads that had inherited the bulk of coastwise traffic during the war were beginning to experiment with a novel but obvious concept that could only strengthen their market share—hauling trailer trucks between distant cities atop flat cars in a style of service that quickly came to be called piggyback.[11]

Also in play was the fact that back in prewar 1940, certain aspects of federal regulatory control over coastwise and intercoastal steamship services had been shifted from the Maritime Commission, where they had long resided, to the Interstate Commerce Commission (ICC), an agency with no previous experience or background in matters associated with oceangoing transport, but with a decided bias toward railroads, many have insisted, in the setting of proper rates for what had become two highly competitive modes of transport.[12] It was the ICC, for instance, that Pan-Atlantic had to petition to secure authority to expand its service to Houston, Texas, as previously noted.

In a contemporary context where the setting of transport rates, or even the decision to offer a given transport service, is a largely unregulated corporate activity, it is difficult to overstate the degree and level of control that the ICC once exercised. Companies had to present lengthy documentation to establish a "rate base" for a particular commodity, and the ICC was notorious for the degree of documentation it demanded for, and the length of time it required to act upon, a company's request for a rate change. And, of course, it was the ICC that issued requisite "certificates of convenience and necessity" that were mandatory before a given company could even provide regular service between this point and that one in the first place. An entire subculture of professionals evolved who enjoyed the designation "ICC practitioner," and who earned lucrative fees by representing transport companies in their continuous and often protracted dealings with the commission.[13]

Another factor often cited as contributory to the decline of coastwise and intercoastal steamship service in the United States after World War II was the steadily increasing cost of stevedoring services at domestic ports. Unlike U.S.-flag steamship companies engaged in various international trades, in domestic service a steamship company was forced to pay higher U.S. wages on both ends of a voyage and all stops in between, thus increasing the impact of whatever postwar salary increases dockworkers were able to win. In prewar 1939, stevedoring for a typical intercoastal cargo voyage represented 32 percent of a trip's overall cost. By 1953, this figure had increased to 55 percent, as determined in a study conducted by an economist from Tulane University by the name of Marvin L. Fair. "It is obvious we are witnessing the disintegration of a major industry that has been very vital to the commerce and industry of the nation," Fair sadly concluded.[14] Another scholar expressed matters this way: "The postwar crisis has come to coastal shipping with the speed and violence of a sea squall."[15]

As these factors began to converge in the decade after World War II and alter the character of coastwise and intercoastal steamship services, the founder and chief officer of what had become one of the nation's larger common-carrier trucking companies felt it was time to see if an idea he had long harbored could be turned into an operational reality. Why not revive the moribund coastwise maritime industry by carrying loaded trailer trucks aboard cargo ships? So wondered Malcom P. McLean, the chief officer of North Carolina–based McLean Trucking, and a man who was understandably frustrated, back in 1937, when longshoremen in northern New Jersey took so long to offload a cargo of cotton that he had driven pierside to put aboard a waiting ship of the American Export Lines.

Malcom McLean

Malcom Purcell McLean was born on November 14, 1913, in Maxton Township, a farming village ninety miles south of Raleigh, North Carolina.

His family was of Scottish descent and had lived in rural North Carolina for many generations. With little formal schooling beyond grammar school, in the late 1920s Malcom McLean went to work first as a farmer, then as the operator of a small gasoline station.

One day a road-building contractor drove into McLean's filling station and asked where he might obtain the services of a truck and driver. McLean sensed an opportunity and bought a secondhand pickup truck himself for $150 with a mere $30 down, thus inaugurating what would eventually become McLean Trucking, one of the largest motor carriers in the country.[16]

Malcom McLean's principal gift was an uncanny ability to deal with numbers—particularly numbers that were preceded by dollar signs. He could perform calculations in his head that others would never attempt without mechanical assistance. Paul Richardson, a long-time colleague of McLean, once characterized the man this way: "Malcom did the new math before they ever heard about the new math."[17] Add to this quantitative acumen an instinctive ability to find and develop resources for capital investment, and one can begin to understand some of the dynamics that helped turn Malcom McLean's business ventures into impressive corporate success stories.

During the immediate postwar period, the idea of hauling loaded trailer trucks aboard ship was being explored in a variety of ways. Like carrying trucks on railroad flat cars, it was a rather obvious alternative to consider, and the enormous logistical strategy that was at the heart of the Allied victory in the recent war offered a number of interesting possibilities. Various sizes and styles of war-surplus landing ships, for instance, offered one tantalizing set of options.

On August 15, 1947, a company called American Overseas Chartering Corporation began offering an overnight trailer-ship service up and down the Hudson River between New York and Albany, a 150-mile trip, using a pair of converted U.S. Navy LST-class landing ships. (The company's New York terminal was actually across the river at Pier 16 in Hoboken, New Jersey, slightly upriver from the spot where, in 1937, Malcom McLean grew frustrated when it took longshoremen so long to unload his truck and put its cargo aboard ship.) The ex-USN *LST-970* was renamed *Albany*, and *LST-969* became the *New York* for what proved to be its brief career on the Hudson. American Overseas Chartering, later reorganized as Trailerships Inc., soon faded from the scene, though, its prospects not at all being helped when union teamsters in Albany initially balked at the idea of delivering trailers the new company had transported up the Hudson from New York aboard ship, trailers that had previously been driven north by fellow teamsters. For that matter, over-the-road trailer trucks could accomplish the New York–Albany trip, even before the construction of the New York State Thruway, in a small fraction of the time it took for the converted LSTs to work their way up or down the Hudson. (*Albany* and *New York* were acquired by McAllister Brothers when they were put up for auction by U.S. marshals in September 1955, with *Albany* later finding work with the Chesapeake Bay Ferry District for a number of years as the cross-bay ferry *Old Point Comfort*.)[18]

A landing-ship conversion that received considerable attention in the maritime trade press envisioned service across less sheltered waters than the Hudson River. Thus was an unfinished LST-class hull sent to the Merrill-Stevens Dry Dock and Repair Company in Jacksonville, Florida, for an extensive rebuild. It emerged in December 1956 as the 8,000-gross-ton trailer ship *Carib Queen,* a vessel capable of transporting ninety-two loaded trailers and ninety-seven automobiles on their own wheels in roll-on and roll-off (ro/ro) fashion. *Carib Queen* could also accommodate ninety-seven tons of general break-bulk cargo, and her conversion followed specifications that had been drawn up by a naval architecture firm from New York, Designers and Planners Inc.[19]

In early 1957 *Carib Queen* made a trip from the Brooklyn Army Base in New York to the historic French coastal port of St. Nazaire at the mouth of the River Loire on behalf of the U.S. Navy's Military Sea Transport Service (MSTS), and later began a less-than-successful commercial career. Initially operated by Gulf Atlantic Transportation Company of Jacksonville, and intended for use between Key West and Havana, *Carib Queen* was shifted to TMT Trailer Ferry before ever entering such service and was operated by that company between Florida and San Juan, Puerto Rico, for several seasons before being returned to MSTS and eventual conversion into the missile-carrying ship *Taurus*.

Plans were constantly under discussion in the maritime world for new constructions, not converted landing ships, that would emulate *Carib Queen* as ro/ro trailer ships, but on a much larger scale.[20] If trailers traveling aboard railroad cars were commonly referred to as piggyback service, the advent of *Carib Queen* caused some in the maritime trade press to suggest that "fishy-back" was a proper parallel usage for trailers aboard ship. The emerging container-ship industry can only be grateful that the term never achieved popular coinage.

In Malcom McLean's mind, though, World War II provided a more tantalizing alternative for taking trailer trucks to sea than using converted landing craft. To maximize transatlantic capacity during the war, many ordinary T-2 tankers that were carrying precious fuel to Europe from the oil fields of America had been rigged to carry deck cargo, as well. A separate spar deck, so-called, was installed atop the tanker's weather deck and large items of cargo such as airplanes and trucks were then secured to the spar deck, while valves and ports leading to the vessel's petroleum-carrying tanks remained accessible beneath.

Fascinating, thought Malcom McLean.

Mindful of labor problems that Trailerships had encountered in Albany, one of McLean's early milestones in his effort to transport trailer trucks at sea was securing general agreement about the idea from the International Brotherhood of Teamsters, the nation's largest bargaining agent for over-the-road truck drivers. At a meeting of the union's executive board in Miami Beach on February 16, 1954, James K. McLean, Malcom McLean's brother and business associate, explained his company's plans in general terms. When he was finished, Dave Beck, the union's president, announced that the teamsters were supportive of the idea. As reported by the *New York Times*, Beck believed that "the project might result in some temporary displacement of drivers but the long-term effect would be to strengthen the (trucking) industry and improve employment opportunities."[21] Had Beck and his teamsters reacted negatively to McLean's idea and dug in their heels in opposition, it would hardly have prevented the eventual emergence of container-carrying ships. But it certainly would have caused the early years of the industry to have evolved in a much different way than they did.

McLean's initial idea was to form a partnership with an existing maritime company, one already in possession of requisite authorizations from the ICC to serve the markets he planned to enter. Because McLean initially felt that the most likely trade for container-carrying ships was transporting cotton from southern ports to the textile mills of New England, the first maritime company he considered—and would eventually acquire—was S. C. Loveland of Philadelphia, a firm that would have given him access to the ports of both New York and Providence, Rhode Island, as well as several southern harbors.

Loveland was hardly a major presence in the maritime field. In 1955 its fleet consisted of a half-dozen or so unpowered barges, plus a pair of absolutely delightful wooden-hull tugboats built in 1888.[22] In terms of corporate assets, though, far more important than the Loveland fleet were the ICC authorizations the company held.

At first, McLean felt that his own McLean Trucking Company would be the appropriate corporate entity for establishing a partnership with Loveland. For a variety of regulatory reasons, though, such a union never materialized. Instead, in January 1955, McLean negotiated the purchase of the Pan-Atlantic Steamship Company from Waterman, after an earlier effort in the fall of 1954 to secure control of Pan-Atlantic by acquiring a block of Waterman stock ended in failure.[23] McLean's acquisition of Pan-Atlantic was a straight-cash transaction. The purchase price was $7 million; seven C-2 cargo ships were included in the sale. To ensure observance of appropriate ICC rules and regulations, McLean removed himself from any operating responsibilities associated with McLean Trucking—the North Carolina company he had founded and was then serving as chief officer—and put his interest in the firm into a blind trust. He then established a new corporation, McLean Securities, to serve as the parent firm of Pan-Atlantic.[24]

Malcom McLean's daughter, Nancy McLean Parker, tells a delightful story about her father's acquisition of Pan-Atlantic. After informing his family they would soon be moving from North Carolina to Mobile, Alabama, McLean cautioned everyone to keep the news confidential, since premature publicity could jeopardize the pending transaction. Young Nancy presumed such secrecy did not apply to conversations with her best friend. Problems developed, though, since her best friend's father happened to be the editor of the local newspaper.

Three months later, in April 1955, McLean went his acquisition of Pan-Atlantic one better. For an investment of $42 million—money that was raised by using Pan-Atlantic as collateral, with financing arranged through the National City Bank of New York and an underwriting group headed by White, Weld—Malcom McLean became the principal owner of Waterman Steamship itself. Although the term had yet to be coined, McLean's acquisition of Waterman can be regarded as a leveraged buyout.

Working through a subsidiary of McLean Securities, the C. Lee Company, an offer was mailed to Waterman stockholders to acquire their holdings at $48.00 per share.[25] The transaction included thirty C-2 cargo ships, plus such Waterman subsidiaries as the company's shipyard in Mobile, a downtown office building in the same city, a hotel and golf course at Point Clear on the far side of Mobile Bay, and various properties in Puerto Rico.

The deal was blocked when the Federal District Court in Washington, D.C., issued a temporary restraining order in response to a suit filed by a Waterman stockholder. The Federal Court of Appeals quickly lifted the order, though, when former U.S. Senator Millard E. Tydings, a Democrat from Maryland who had been retained as counsel by Waterman, introduced testimony to the effect that the stockholder was acting on behalf of the New York and Cuba Mail Steamship Company—more popularly known as the Ward Line—a rival U.S.-flag steamship company whose own earlier efforts to secure control of Waterman had ended in failure. The plaintiff was "a mere pawn of a rival company," Tydings insisted, and was approaching the whole matter with "unclean hands."[26]

With McLean and his associates now controlling in excess of 90 percent of Waterman stock, in early May 1955 a new board of directors was elected, with Malcom McLean serving as chairman, while his brother, James McLean, was named president.[27] Before the first meeting of the new board was called to order, McLean's people realized that a quorum would not be present. One of the lawyers went out into the street, approached a total stranger, and asked him if he wanted to earn fifty dollars. The man said yes and was escorted inside and elected to the board—something that apparently could happen in the absence of a quorum. The stranger's presence allowed the meeting to proceed.[28] Later in 1955, the S. C. Loveland company became part of McLean's growing empire when it was acquired by Pan-Atlantic, and in 1957, the ICC would agree to transfer all operating rights held by Loveland to Pan-Atlantic.[29]

In later years, Malcom McLean would often discuss his acquisition of Waterman. He was especially pleased over a relationship he developed at the National City Bank in New York with Walter Wriston, who had earlier sought out McLean to solicit business for the bank from McLean Trucking—and thus was an obvious person for McLean to approach when he needed capital to acquire Waterman. McLean convinced Wriston that Waterman was a sound investment, and while Wriston, as an officer in the bank, had authority to approve a loan for $42 million, his superiors changed their minds and sought to reduce the amount.

McLean was incensed, paid a call on the bank's chief executives, and told them that Wriston believed the transaction amount was sound. The officers downplayed Wriston, claiming he was a new hire and little more than a clerk. McLean angrily replied, "He may be just a clerk but he's going to be both of your bosses soon."[30] On the strength of such passion the loan was approved in the full amount, and as McLean had so confidently predicted, Walter Wriston eventually became president of the bank. Indeed, Wriston and McLean would maintain a cordial business relationship for the rest of their respective careers.

As word of what McLean was planning to do—namely, carry loaded trailer trucks aboard ships in coastwise service—began to spread throughout the transportation industry, a consortium of railroad interests, led by the Wilmington, North Carolina–based Atlantic Coast Line, banded together and petitioned the ICC to thwart McLean's efforts. The railroads advanced two arguments. One held that McLean had failed to divest himself fully of McLean Trucking and the ICC clearly prohibited cross ownership of rival companies providing cargo service by different modes. The second argument was that the certificates of convenience and necessity the ICC had earlier awarded Pan-Atlantic envisioned the carrying of "general cargo," not loaded trailer trucks.

In both cases, the ICC effectively ruled in McLean's favor. Loaded trailer trucks *were* general cargo, the ICC declared, a finding that was consistent with an earlier decision it rendered in 1954 that permitted railroads to carry trailer trucks aboard flat cars without first receiving certification as motor carriers.[31] McLean was required to sever his ties with McLean Trucking completely, though to remain in conformity with ICC rules since placing his stock in a blind trust, as he had done when he initially acquired Pan-Atlantic, was insufficient. As part of the realignment, McLean Industries replaced McLean Securities as the parent corporation of his new endeavor, but essentially the commission rejected the complaints raised by the railroads. Meanwhile, plans were moving along to convert Waterman's Pan-Atlantic subsidiary into a trailer truck–carrying steamship company.[32]

McLean acquired Pan-Atlantic in early 1955. Shortly afterward, he filed an application with the Maritime Commission seeking ship-mortgage insurance for the construction of seven new Pan-Atlantic vessels, ships that were estimated to cost $9 million each. They were to be entirely new tonnage, designed from the keel up as ro/ro ships that would accommodate loaded trailers—conventional trailers, that is to say, that would roll on and off ship on their own wheels. As part of the pending transaction, Pan-Atlantic would trade in an equal number of wartime C-2s, vessels the Maritime Commission would then place in a reserve fleet at various anchorages located throughout the country to await any future emergency.[33]

In early November 1955, Clarence G. Morse, the administrator of the Maritime Commission, announced that his agency and Pan-Atlantic had reached agreement in principle on the pending transaction. The federal government would insure as much as $55.1 million of the proposed $63 million project. The new vessels, to be built by Bethlehem Steel, would each carry 268 trailers and have a cruising speed of 19 knots. In a separate action, Pan-Atlantic was authorized by the U.S. Office of Defense Mobilization to write off 60 percent of the project's total cost over an accelerated five-year period, a tax benefit whose purpose was to help provide the nation with up-to-date merchant vessels that could be called on by the military during future national emergencies.[34]

While McLean was anxious to acquire federal mortgage insurance from the Maritime Commission, as well as take advantage of tax benefits associated with accelerated depreciation, he was not seeking any direct subsidies from the government for his planned new operation, even though such assistance was available. In the years after 1936, companies that constituted the U.S. merchant marine would fall into one of two camps—steamship lines that relied on construction differential subsidies and/or operating differential subsidies provided by the federal government, and those that did not. Malcom McLean and his proposed container-ship operation belongs in the second category, not the first.

The First Container Ships

Even as plans to build these new ro/ro ships were moving forward, McLean was simultaneously pursuing a project that headed in a similar but slightly different direction. He acquired a pair of T-2 tankers that had been built during World War II and in 1955 sent them to Bethlehem Steel's Sparrows Point shipyard in Baltimore, where they were refitted with new spar decks, such as were used to haul large and bulky equipment across the North Atlantic during the war. McLean, of course, had no intention of carrying B-26 bombers or "deuce-and-a-half" Army trucks aboard his reconfigured T-2s. He was turning them into trailer ships—but not, in any sense, ro/ro trailer ships. McLean had in mind a different kind of highway trailer, one that could be detached from its running gear on the pier, hoisted aboard ship by crane, and then attached to a different set of running gear once the ship reached its destination.

Space aboard ship—which is to say, cubic footage—has always been both precious and limited. And while the notion of carrying loaded trailers was generally thought to be sound, why compromise a vessel's carrying capacity, McLean reasoned, and waste so much cubic footage by including a vehicle's undercarriage, when the only thing that really mattered was the trailer itself?

The first of the conversions—a T-2 that McLean renamed *Ideal X*—steamed out of Baltimore Harbor in late 1955 to begin an extensive series of sea trials that would demonstrate to officials from such regulatory and classification agencies as the United States Coast Guard (USCG) and the American Bureau of Shipping (ABS) that the concept was sound and the vessel's seakeeping abilities and stability would not be compromised by a spar deck full of loaded trailer-truck bodies.[35] Why McLean selected the name *Ideal X* for his first conversion is not known with certainty. The "Ideal" part was supposedly a description of the new intermodal service the vessel would offer, while the "X" referred to the coming together of diverse transport concepts to form a single service. McLean's second T-2, rechristened *Almena* for its new career with Pan-Atlantic, was also converted at Sparrows Point and was ready in time to help *Ideal X* inaugurate the new service in the spring of 1956.[36]

On the question of vessel names generally, at first Malcom McLean tried to adopt a policy he had earlier enforced at McLean Trucking: Units were identified only by numbers, and drivers were prohibited from painting identifying names or slogans on their tractor rigs, on the theory that uniformity helped ensure consistent maintenance policies throughout the fleet. And so McLean wanted to identify his new ships with generic names such as *Container Ship No. 1* and *Container Ship No. 2*. Paul Richardson tells how McLean eventually acceded to maritime tradition after he was told how unlikely it was that a captain at sea would be willing to go down with a ship that was identified only with an impersonal number.[37]

A modest challenge that had to be met, of course, was designing and building a fleet of trailer trucks that were capable of being removed from their running gear for transfer aboard ship. Prototypes were designed and built by the Brown Trailer Company of Toledo, Ohio, in early 1955, and the concept was not entirely unprecedented. In 1949, for example, Brown had built a fleet of rather similar trailers for a West Coast customer who used them to ship military cargo from Seattle to Valdez, Alaska, not aboard ships but atop barges. Upon reaching Valdez, the trailers then moved inland after being hoisted onto highway-style running gear. After Brown completed work on prototypes for McLean, production model trailers, as well as sets of detachable running gear, were then turned out in quantity by both Brown as well as by the Fruehauf Trailer Company of Detroit. McLean was also able to orchestrate an agreement between the

International Brotherhood of Teamsters and the International Longshoremen's Association over their respective jurisdiction in the loading and unloading of containers. Teamsters would drive a container into position at pier side and undo the clamps that were holding the container to the truck chassis on which it arrived, while longshoremen would secure hooks to the top of the container and operate the cranes that hoisted the cargo aboard ship. McLean also coined a distinctive name for the intermodal cargo operation he was poised to inaugurate. Proudly affixed to the exterior of the new trailers was a likeness of the Pan-Atlantic house flag and the simple but accurate designation Sea-Land Service.

It has sometimes been suggested that McLean Trucking was the over-the-road company that operated the land portion of a Sea-Land delivery. This is quite untrue; ICC regulations prevented McLean Trucking from having anything to do with the new venture. Instead, McLean contracted with existing and independent trucking companies at either end of his New York-to-Houston route to handle pick up and delivery away from the pier, although McLean had to acquire tractors—and hire teamsters—for moving containers in the immediate terminal area.

From a shipper's perspective, what was certainly the most appealing novelty of the new Sea-Land Service was the fact that a consignment of cargo could now move from point A to point B on the strength of a single bill of lading. No contracting with a trucking company to move a shipment from factory to pier, then a separate contractual arrangement with a steamship company or a freight forwarder, and finally a third agreement with another trucking company at the destination port. In addition, no need to worry over whether the trucking company would get the shipment to the pier in time to be loaded aboard ship, not to mention, of course, a major reduction in opportunities for pilferage on the pier, and a genuine speedup in door-to-door delivery time.

Ideal X and *Almena* entered revenue service in the spring of 1956, with the former's April 26 departure from Port Newark, New Jersey, universally regarded as the very first time a bona fide container ship made a scheduled trip on any waterway.[38] Each T-2 could accommodate fifty-eight trailer bodies, and each trailer was thirty-three feet long. Trailers were positioned eight abreast aboard ship and were secured to longitudinal slots that ran the length of the newly installed spar decks after being hoisted aboard by dockside cranes. Unlike contemporary container ships that sail the world's oceans with containers stowed atop each other to seemingly dizzying heights, all the containers that were transported aboard *Ideal X* and *Almena* were secured directly on the spar deck itself, not stacked one atop another.

A second pair of converted T-2s, *Maxton* and *Coalinga Hills*, quickly followed the two vessels. Conversion work on these two was performed at Mobile Ship Repair, the yard that McLean had acquired when he secured control of Waterman in 1955. *Maxton* was named in honor of Malcom McLean's North Carolina birthplace, while *Coalinga Hills* was the only T-2 in the Pan-Atlantic fleet to retain its original wartime name. In fact, *Maxton* was enrolled on the Waterman roster and chartered to Pan-Atlantic, while *Coalinga Hills* was owned by the Sword Line, of New York, and also chartered to Pan Atlantic. Like S. C. Loveland, the Sword Line was a company that McLean had earlier acquired primarily for the operating rights it held, although, as matters turned out, it was *Coalinga Hills* that proved to be a more important Sword Line asset.

All of these facts have sometimes caused confusion about the precise number of early T-2 conversions McLean secured and operated—which, in fact, was four.[39] It has often been asserted that *Maxton* was the first T-2 that McLean acquired and converted into a container ship. This is incorrect. McLean took title to the ship that he renamed *Maxton* from the Marine Navigation Company in April 1956, mere days before *Ideal X* inaugurated container-ship service. Interestingly, *Ideal X*, while the first converted T-2 to enter service, was not the first McLean acquired. The vessel that McLean called *Almena* was conveyed to Pan-Atlantic on April 27, 1955, while the ship that would be called *Ideal X* was transferred to Pan-Atlantic on August 12, 1955.[40] Table 2.4 provides additional information about the world's very first fleet of container-carrying steamships.

It was widely reported in the maritime trade press that in addition to carrying containers in both directions between New York and Houston, McLean also intended to have his converted T-2s transport petroleum on northbound runs from Houston to New York. Pan-Atlantic, though, only held ICC certification for the transport of general cargo. During the highly regulated 1950s, how could the company casually intrude itself into the petroleum trade?

The answer is that were Pan-Atlantic's T-2s to carry petroleum from Texas to New York, they would not do so under any ICC authority held by Pan-Atlantic but would be operating under what amounted to charter arrangements with an oil company. Major oil companies had their own fleets of tankers. In 1955, for instance, Esso Standard Oil owned and operated no fewer than fifty-two tankers, most of them wartime T-2s. Because

TABLE 2.4. *Pan-Atlantic Fleet: T-2 Tankers of 1956*

Off. No.	Name	Hull dimensions	GRT	Place built (year)	Notes
247155	*Ideal X* a) *Potrero Hills* b) *Capt. John D. P.* c) *Potrero Hills* d) *Elemir*	524 × 68 × 30	10,572	Sausalito, Calif. (1945)	1
247292	*Almena* a) *Whittier Hills*	524 × 68 × 30	10,544	Sausalito, Calif. (1945)	1
246810	*Coalinga Hills*	504 × 68 × 30	10,573	Sausalito, Calif. (1944)	2, 4
248800	*Maxton* a) *Black River* b) *Ponca City* c) *Marine Leader* e) *Potomac*	504 × 68 × 30	10,516	Mobile, Ala. (1945)	2, 3

Notes

For additional data about container ships cited in text, see appendix A.

1. Rebuilt for container-ship service by Bethlehem Steel, Baltimore.
2. Rebuilt for container-ship service by Mobile Ship Repair, Mobile.
3. Owned by Waterman; chartered to Pan-Atlantic.
4. Owned by Sword Line; chartered to Pan-Atlantic.

they ran only in company service and did not solicit general trade, Esso could operate its ships without any ICC authorization at all. And because there was typically a backlog of product to be moved north out of Texas, oil companies were more than willing to take advantage of any available tanker capacity and make charter arrangements with the owners of such vessels. McLean's converted T-2s would remain under ICC jurisdiction to the extent they solicited and carried general cargo—that is to say, loaded trailer trucks—on a scheduled basis between New York and Houston. As chartered petroleum carriers, however, they would assist oil companies in services that were not subject to ICC regulation.

While such dual use was clearly McLean's original intention, few, if any, of Pan-Atlantic's converted T-2s ever transported both containers and petroleum in revenue service. Terminal operations, especially at the New York end of the run, would have been especially complicated. An inbound

T-2 would have to dock at Port Newark to unload its containers, cast off and proceed south to one of the oil terminals along Arthur Kill to discharge its liquid cargo, return to Port Newark to take on a fresh cargo of containers, and only then return to sea. Such maneuvering would have had a devastating effect on Pan-Atlantic's ability to maintain regular schedules, and dependability would quickly emerge as an important factor in all container-ship operations.[41]

Ideal X and *Almena*, between them, were able to offer weekly service from both Port Newark and Houston. Once *Maxton* and *Coalinga Hills* joined the fleet, Pan-Atlantic was able to increase its service to every fourth day. "This stepped-up schedule is the best way we know to acknowledge shippers' support for this new type of service," Malcom McLean noted.[42]

Pan-Atlantic's fleet of converted T-2 tankers received extensive treatment in the trade press of both the maritime and the trucking industries, with most articles noting that McLean was also planning to build a fleet of brand new ro/ro trailer ships to complement his more radical container-carrying vessels. But then something funny happened. McLean cancelled plans to build new trailer ships, withdrew his application to the Maritime Commission for mortgage insurance, and turned to a different kind of rebuilding project that relied on readily available C-2 cargo ships.[43]

Containers and Only Containers

In lieu of a T-2 tanker that could transport as many as fifty-eight containers topside and petroleum below deck, McLean wanted a ship that would carry containers and only containers. C-2 cargo ships already in the Pan-Atlantic and Waterman fleets were the perfect candidates to be so converted, and the New York naval architecture firm of George G. Sharp was retained to develop specifications for the project.[44] Once Sharp completed design work, the actual conversions were performed at Mobile Ship Repair. The initial program included six C-2s, converted at a cost of $3.5 million apiece.

The first conversion to be completed, a wartime C-2 that had been renamed *Gateway City* when it joined the Waterman fleet in 1950, can rightly be called the world's very first all-container ship. That is to say, it could haul containers and only containers; it was rigged with vertical steel rails in its holds so containers could be stacked one on top of another in what would soon be called a cellular arrangement; and once newly designed hatch covers were put in place over these stacked containers, additional containers could then be placed atop the hatch covers and each other as deck cargo. Containers could be stacked four high in *Gateway City*'s holds, two high on deck.

Compared to the fifty-eight-container capacity of *Ideal X* and the other T-2s, *Gateway City* was able to carry 226 fully loaded containers, an almost fourfold increase. *Gateway City*'s deckhouse was cut back and reduced in size to allow maximum room for containers (all passenger accommodations were eliminated, for instance), its hatches were enlarged, and supplementary steelwork was welded in place to ensure no loss of structural integrity. In addition, to give the vessel added stability, outboard sponsons, as they are called, were added to the hull on each side, increasing the ship's beam from sixty-three to seventy-two feet.[45]

Much of the engineering that went into *Gateway City* was completely new and could look to no earlier maritime work for guidance. For instance, nobody had the slightest idea how much tolerance should be allowed between the containers and the vertical cell rails that held them in place. There had to be some leeway if containers were to be hoisted on and off ship, but if there was too much, containers could shift in heavy seas and cause all manner of damage.

Eventually, Pan-Atlantic decided to use three-quarters of an inch on each side in one direction, an inch and a quarter in the other. To test how effective these measurements were, a Pan-Atlantic technician bought some modeling clay in a Woolworth store in Newark. He then cut off little cubes of clay and placed them between containers and guide rails. When one of the converted C-2s returned to port after an early sea trial, the little cubes of clay were virtually undamaged, and Pan-Atlantic was pretty sure it had made the correct decision with respect to tolerances within a vessel's cell guides.[46]

Another point of difference between McLean's earlier T-2s and the converted C-2s was that the latter were equipped with onboard gantry cranes for loading and unloading cargo. No shoreside cranes were required, for each C-2 itself featured two movable cranes, one forward of the deckhouse to service the forward holds, another aft to handle the holds there. To ensure a vessel's stability, though, Pan-Atlantic adopted a policy that prohibited the cranes from both extending outboard of a vessel at the same time, and a longshoreman stationed on the vessel's navigating bridge enforced the policy with a system of colored signal lights. The cranes were designed by Pan-Atlantic's own engineering staff and built by the Skagit Steel and Iron Works of Sedro-Woolley, Washington. Each crane was powered by its own 210-horsepower diesel engine and had a rated lifting capacity of 60,000 pounds. The trade journal *Maritime Reporter* noted that when a ship was ready for sea, the arms of the onboard cranes were "folded like a bird's wings."[47]

The fact that the converted C-2s carried their own cranes necessitated the widening of their hulls by the addition of sponsons. The parallel tracks on which the cranes moved forward and aft were secured atop the sponsons so maximum hull width could be used for the storage of containers. Before the T-2s entered service in 1956, McLean had to make arrangements with port officials for the installation of secondhand cranes at both Port Newark and Houston. With the C-2s, no such shoreside equipment was necessary.

The flexibility of these onboard cranes was demonstrated dramatically a year later, in November 1958. The Coast Guard closed the Houston ship channel when it was discovered that high-octane aviation fuel was seeping into the waterway from the damaged tanker *Amoco Virginia*, and normal navigation in and out of the port was suspended. Conventional cargo ships bound for Houston were forced to anchor offshore in the Gulf of Mexico until the problem was corrected. Pan-Atlantic's *Bienville*, one of *Gateway City*'s five sister ships, with its onboard gantry cranes, was able to lease temporary space at a bulkhead in nearby Texas City, while tractors were pressed into service to shift waiting trailers to the makeshift facility from the Port of Houston.[48]

The maritime trade press was impressed with the quality of work that had gone into *Gateway City*, the monthly journal *Marine Engineering* going so far as to call the converted C-2 one of its "distinctive ships" of 1957.[49] The first of McLean's converted C-2s departed from Port Newark, bound for Miami and Houston, on October 4, 1957.

Coincidentally, just as the transatlantic passenger liners *Liberté* and *Saturnia* were in port in New York on the day *Ideal X* inaugurated container service eighteen months earlier, the same two ships set sail for Europe from New York on the day *Gateway City* made its initial departure. *Gateway City* arrived in Miami two days later on the rainy morning of October 6 and tied up at Pier One in that city's old seaport, the site of today's Bayside Mall. Sixty-one of the vessel's 226 trailers were unloaded in Miami, and three additional trailers were hoisted aboard before *Gateway City* departed for Houston several hours after arriving. As if to emphasize the efficiencies that the new container ships would bring to Miami, the first trailer to be unloaded from *Gateway City* was attached to its waiting chassis at 8:18 a.m. and dispatched away from the pier at 8:20, arriving at its consignee in downtown Miami at 8:30.[50] Among the business executives and civic leaders on hand to welcome *Gateway City* on the morning of October 6, 1957, were Malcom McLean and his brother James, who hurried south from New York after *Gateway City* left Port Newark to witness the vessel's arrival in Miami.

In subsequent months, additional C-2 conversions joined the Pan-Atlantic fleet, and the converted T-2 tankers that inaugurated containership service in 1956 were soon declared surplus and sold. With its converted C-2s in operation, Pan-Atlantic quickly settled into a service pattern that featured direct service between Port Newark and Houston, as well as a four-city itinerary that left Port Newark and called at Miami, New Orleans, and Tampa before returning north.[51]

The most telling statistic about their new container ships that Pan-Atlantic frequently cited involved the time and labor savings that could be realized during loading and unloading. A conventional break-bulk cargo ship would typically require 150 or more longshoremen working for at least four full days to unload and load a vessel's cargo. With a container ship such as *Gateway City*, the same task could be accomplished by a crew of fourteen in a little over a single eight-hour shift. Expressed in dollars and cents and using $2.80 per hour as a basic longshoreman's wage rate in the mid-1950s, a conventional cargo ship might incur stevedoring charges in excess of $15,000 during a typical port call. With one of McLean's new container ships, this figure could be reduced to less than $1,600.[52]

McLean himself never failed to talk about the cost savings that his innovation fostered. "We sacrifice tonnage for quick turnaround in port," he said some years later. "That's the theory of the trailership. A ship earns money only when she's at sea. Where costs rise is in port. The quicker you can get back to sea the more money you keep."[53]

Faster port operations were not the only opportunities for cost reduction that containerization fostered, though. Cargo traveling in sealed containers was far less susceptible to the perennial risk of pilferage on the docks, and Pan-Atlantic even developed some statistics suggesting that cargo transported in containers was less likely to be damaged at sea, even during heavy weather. In early tests, *Gateway City* encountered gale-force winds off Cape Hatteras and experienced a roll of 23 degrees, while her sister ship, *Azalea City*, rolled 27 degrees. Either condition would likely have caused serious shifting of cargo and consequent damage aboard a conventional break-bulk freighter, but the containerized cargo aboard the two Pan-Atlantic vessels did not shift at all.[54]

Speaking at a pierside ceremony in Port Newark on October 4, 1957, before *Gateway City*'s initial departure, Congressman Herbert C. Bonner, a Democrat from North Carolina and longtime advocate for McLean and his maritime endeavors, called the onset of the new service "the greatest advance made by the United States Merchant Marine in our time."[55] Elected officials have an understandable tendency to exaggerate matters, especially when standing behind a microphone or in the presence of newspaper reporters. Congressman Bonner's remarks in Port Newark in 1957, though, were closer to an understatement than an exaggeration.

Another aspect of what *Gateway City* foretold that day involves a story that Malcom McLean would often retell in later years. While dignitaries were enjoying a luncheon on shore, McLean wandered out onto the wharf and saw a man aboard the ship who was looking over the side and shaking his head in disagreement. McLean boarded *Gateway City* and asked the man what he thought of the new ship. The man turned out to be an official of the International Longshoreman's Association (ILA). In salty waterfront language, he told McLean that from his perspective, the best outcome would be if *Gateway City* were to sink "right here."[56]

Despite such misgivings about containerization, though, Malcom McLean would deal honorably with the ILA, and in the years and decades following 1957, New York longshoremen would become partners in realizing the benefits of containerization. Containerization would see the onset of a guaranteed annual income for longshoremen, predictable work hours, and a portion of the savings that containerization realized used to ensure a comfortable retirement for workers whose jobs were no longer required.[57] (How different such a state of affairs would be from earlier labor-management relations along the New York waterfront will be examined in chapter 3.)

October 1957 would prove to be a landmark month in both New York City and the world at large. Yet, notwithstanding Congressman Bonner's enthusiastic rhetoric, few could possibly have appreciated that the maiden voyage of Malcom McLean's *Gateway City* would prove to be such an important milestone. On October 4, 1957, the very same day that the world's first all-container ship left New York and headed south, the Soviet Union successfully launched the world's first earth-orbiting satellite, a tiny sphere that was known as Sputnik. In mid-month, the culture of New York was torn asunder when the New York Giants and the Brooklyn Dodgers—

two teams that had been scheduled to play each other at the Polo Grounds on the day in 1956 when *Ideal X* inaugurated the container-ship era—announced they were ending their long association with New York and Brooklyn and moving to San Francisco and Los Angeles. In their different ways, Sputnik, *Gateway City*, and the shifting of important cultural institutions from New York to the West Coast represent interesting glimpses into an uncharted future from the perspective of October 1957.

Table 2.5 provides statistical information about Pan-Atlantic's first fleet of true container ships, the C-2 conversions of 1957.

The Containers

Save for their detachable capability, the trailer-truck bodies that Malcom McLean acquired for the inauguration of container-ship service in

TABLE 2.5. *Pan-Atlantic Fleet: C-2 Conversions of 1957*

Off. No.	Name	Hull dimensions	GRT	Place built (year)	Notes
251506	*Gateway City* a) *Iberville* b) *Sumter* (USN) c) *Iberville*	450 × 72 × 25	9,014	Chickasaw, Ala. (1943)	1
243436	*Azalea City*	450 × 72 × 24	9,014	Chickasaw, Ala. (1943)	1
243438	*Bienville*	450 × 72 × 24	9,014	Chickasaw, Ala. (1943)	1
242073	*Fairland*	450 × 72 × 27	9,014	Chickasaw, Ala. (1943)	1
242074	*Raphael Semmes*	450 × 72 × 27	9,014	Chickasaw, Ala. (1943)	1
251508	*Beauregard* a) *Afoundria* b) *Wayne* (USN) c) *Afoundria*	449 × 72 × 27	9,016	Chickasaw, Ala. (1943)	1, 2

Notes

1. Preconversion dimensions of all six vessels differed from the values shown to the extent that they were 6,065 GRT and sixty-three feet wide.

2. Remained on the Waterman roster for several years after conversion.

1956–57 seemed unremarkable. There was one patented feature of Sea-Land containers, though, that would eventually form the basis of the standardization that remains at the heart of the container-ship industry to this day.

Placing containers side by side on a flat surface—such as the jury-rigged spar decks of McLean's original T-2 tankers of 1956—required that the trainer bodies merely be attached to the deck on which they were positioned. When matters progressed to the point that trailers were stacked one atop another, though, such as in the below-deck holds and, as important, atop the hatch covers of the first converted C-2 cargo ships in 1957, then the structure of the trailer body became a far more important matter.

A critical aspect of the design McLean executed involves eight corner castings incorporated into each trailer body, four on the top and four on the bottom. (The term *corner casting* is commonly used in the industry, even though such hardware need not be manufactured by a true casting process.) Structurally, the trailers were designed with sufficient internal strength so placing the bottom corner castings of one container directly onto the top castings of one beneath it transferred the load in such a way that a stack of containers became mechanically possible and the container on the bottom did not collapse under the weight of the container (or containers) above. The dynamics of the design were such that the strength of a container was derived primarily from its frame, not its side walls, although most contemporary containers feature side walls with vertical corrugations that, in fact, complement the frame and impart additional strength. The ability to stack containers atop each other, though, remains primarily a function of their frames, and more particularly their vertical corner posts. By contrast, the body of an ordinary highway trailer plays some role in supporting and restraining whatever cargo it is carrying, but it is more a weather covering than a dynamic part of the vehicle's structure. The principal "live load" such a trailer body typically has to support is whatever snow accumulates on the roof during a blizzard.[58]

While containers secured below deck inside vertical rails called cells required no mechanical coupling between containers to ensure stability, containers that were stacked atop a vessel's hatch covers surely did, since gravity alone would hardly be sufficient to keep containers properly aligned in even moderate seas. Here, though, is where McLean's patented corner castings did double duty. A casting includes an opening on each of its three outward-facing surfaces. (Think of the casting as, approximately, a six-inch cube set into each corner of a container and that is structurally part of the frame. Three of each cube's six surfaces face inward, three face outward.) McLean's engineers designed a metal device that fits into the corner castings of the container on the bottom and the one on top. When a twist lock is thrown, the containers are joined together and a vertical stack of separate containers is turned into a unified structure. In most cases, cable lashings are also used to ensure stability, but the heart of the system was and remains twist locks that link containers together through cleverly designed corner castings.[59] (It has been said that the twist lock for containers was designed in imitation of the bolt action of a military or sporting rifle.)

Although the spar decks installed on McLean's T-2 tankers did not permit containers to be stacked one atop another, the new thirty-three-foot units were designed with sufficient strength to permit stacking. Keith Tantlinger, who was then with the Brown Trailer Corporation, tells how his company delivered two prototype containers to the Bethlehem Steel shipyard outside Baltimore in the summer of 1955, where *Ideal X* and *Almena* were being adapted for container service. Tantlinger expected to meet Malcom McLean and other Pan-Atlantic officials for breakfast in a downtown Baltimore hotel the next morning and then drive out to the yard to inspect the two new units.

Tantlinger reached the coffee shop in ample time, but upon learning that the Pan-Atlantic people had already left for the yard, he caught a taxi and followed them. When he got there, he had to forgo the detailed presentation he planned to make about the design of the new containers, since McLean and his people were jumping up and down on top of the prototype units to test its strength and durablity.[60]

A year later, the Pan-Atlantic fleet had expanded, and McLean was able to load containers in stacks in the holds of his converted C-2s thanks to their unique and patented corner castings, even carry additional containers as deck cargo atop the hatch covers since the corner castings could be linked together with twist locks. The corner castings also enabled gantry cranes to secure a safe and reliable hold on a container and hoist it on and off ship. The business end of the gantry crane included a rectilinear steel frame called a spreader that was the same length and width as a container, eight feet wide and now thirty-five feet long. Each corner of the spreader featured a toggle-like device the crane operator engaged by remote control to effect a secure hold of the corner castings atop a container. By the end of 1957, the year *Gateway City* entered service, Pan-Atlantic had become, according to *Marine Engineering*, "the biggest trucking concern in the world in terms of equipment owned involving 7,234 pieces of highway equipment."[61] And while Brown Trailer produced the first experimental units for Pan-Atlantic, the Fruehauf Corporation soon became the principal supplier of the company's containers. For instance, in the spring of 1956 Pan-Atlantic placed an order with Fruehauf for 280 additional units.[62]

The thirty-five-foot trailer length that McLean adopted in 1957 did not reflect any prevailing national or federal standard for such rolling stock. It was selected, rather, in recognition of the fact that the state of Pennsylvania prohibited trailers in excess of this length from traveling its highways. Given Pennsylvania's critical location with respect to New York Harbor, though, limits set by the Keystone State were the next best thing to a genuine national standard.

Measured against twentieth-century innovations in fields such as electronics or nuclear medicine, a thirty-five-foot box that can be securely stacked atop similar boxes and that can be lifted by a crane hardly seems like cutting-edge technology. But it was, and Malcom McLean's foresight, in 1963, in freely forgoing the patent rights that his company held for the corner casting was an important factor in allowing the adoption of standards that permitted the extraordinary degree of interchangeability that remains a hallmark of the contemporary container-ship industry.

Reaching agreement on the appropriate size of containers proved to be a somewhat more taxing enterprise, though. McLean's company continued to use the thirty-five-foot containers it adopted in 1957 well into the 1970s, and they quickly became the largest single fleet of such equipment in the world. The American Standards Association (ASA) impaneled a committee in 1958 to investigate the matter of uniform container specifications, in conjunction with the International Standards Association (ISO), and decimal-based guidelines eventually emerged. Containers could be built to any length that was divisible by ten, with forty feet as the maximum. A further proviso was that two twenty-foot containers placed end-to-end would be no longer than a single forty-footer, with no protruding hardware. Any refrigeration equipment aboard a trailer, for example, had to be contained within the same external dimensions as nonrefrigerated units. From these early decimal-based standards, the practice soon evolved to regard twenty-foot containers as the norm—

neither ten-foot nor thirty-foot containers would ever prove to be popular—and the basic quantification system employed by the industry today involves what is called a trailer equivalent unit (TEU), with one TEU representing one twenty-foot container.[63] (Some speak in terms of FEUs today—forty-foot trailer equivalents—and suggest that the T in TEU can stand for "twenty" as easily as "trailer.")

Congress tried to foster greater container standardization by mandating that federal construction–differential subsidy funds could not be awarded for building container-carrying vessels that were not in conformity with ASA standards, but these requirements were eventually relaxed. Twenty- and forty-foot containers continue to constitute the great bulk, but not the entirety, of the world fleet today. Some sectors within the industry have strayed from earlier standards, and forty-eight-foot containers, as well as other nondecimal sizes, enjoy a measure of popularity.

3 FROM THE HUDSON RIVER TO NEWARK BAY

1915–48

When one thinks of New York Harbor, the image that often comes to mind is that of an inbound passenger liner proceeding slowly through the Narrows, past the Statue of Liberty, and finally ending its voyage at a pier along the Manhattan side of the Hudson River. Whether it be the superliner *United States* steaming into port after its record-setting transatlantic crossing in the summer of 1952, Cunard's *Carpathia* delivering survivors from the *Titanic* to New York in April 1912, a fictional Vito Corleone reaching America in the early years of the twentieth century in the film *Godfather II*, or even a contemporary cruise ship returning from a relaxing voyage to Bermuda, the Bahamas or Canada, the image is the same: through the Narrows, past the Statue of Liberty, to journey's end at a Hudson River pier.[1]

Newark Bay

Such an image, though, fails to acknowledge the extraordinary diversity that has long been New York Harbor. The port of New York extends over a large, two-state area and includes a variety of nooks and crannies—that is to say, rivers, bays and tidal straits—where oceangoing vessels have docked over the years. Depending on their size, ships can reach New York from the sea along two routes that bypass the Narrows completely, and there are miles of waterfront where deepwater ships can dock without ever catching a glimpse of the Statue of Liberty.[2]

Consider, for instance, a broad inland estuary called Newark Bay, a body of water that few visitors to New York ever get an opportunity to see or experience—other, perhaps, than a fleeting glimpse out the window of a car speeding along the New Jersey Turnpike.[3] The headwaters of Newark Bay can be found where the Hackensack and Passaic rivers combine to form the bay some 4.5 miles due west of the southern tip of Manhattan Island, while the lower reach of Newark Bay is five miles to the south where the bay flows into waterways called the Kill van Kull and the Arthur Kill opposite the northwest corner of Staten Island. When the converted T-2 tanker *Ideal X* sailed away from New York on the evening of April 26, 1956, to begin a voyage that is generally regarded as the start of the modern container-ship era, the berth the vessel departed from was along the western shore of Newark Bay.

Newark Bay is not easily achieved by vessels inbound from the sea. To reach the bay's sheltered waters, a vessel must first pass through the Narrows. Instead of continuing north past the Statue of Liberty and into the Hudson River, though, the route to Newark Bay requires a sharp turn to port into the twisting strait known as Kill van Kull. The Kill van Kull is less than a half-mile wide from shore to shore and subject to swift tidal currents. The south bank of Kill van Kull is the north shore of the New York borough of Staten Island, while the north bank is the southern limit of the city of Bayonne, New Jersey. Transiting Kill van Kull requires skillful pilotage. The Saint George terminal of the famous Staten Island Ferry is located on the Staten Island shore at the mouth of the Kill opposite Robbins Reef light, and important oil terminals, with moored tankers often extending out into the Kill from Constable Hook on the New Jersey shore, is another tricky aspect of traveling from the sea to Newark Bay.

After making their way through almost four twisting miles of Kill van Kull and passing under the Bayonne Bridge, ships bound for Newark Bay then make a turn to starboard around Bergen Point and enter the broad expanse of the bay.[4] Tugboats typically rendezvous with inbound ships in the Kill and assist with the turn into the bay, as well as with subsequent docking. With the arrival of the tugs, a docking pilot boards an inbound vessel and takes over from the harbor pilot who has guided the vessel in from the offshore pilot station adjacent to Ambrose light station. In years past, entering Newark Bay also required navigating through a pair of twin lift bridges of the Jersey Central Railroad that were located across the southern end of the bay. These bridges were removed in the 1970s as railroad commerce in New York assumed different operational patterns.[5] In any event, Newark Bay is today the site of the largest, busiest, and most important container port on the entire East Coast. Indeed, in many important respects, in the early years of the twenty-first century, Newark Bay *is* New York Harbor.

The Early Years

Matters were not always thus. As the nineteenth century became the twentieth, the principal docks and wharfs that oceangoing ships used when they visited the port of New York were traditional piers in Manhattan, extensive wharfage along the Brooklyn waterfront, plus a number of piers on the New Jersey side of the Hudson River in Jersey City and Hoboken. With such facilities, though, the overall port of New York evolved into nothing less than the principal seaport in all of North America, arguably the most important in the world.

With respect to passenger liners, New York harbor had few shortcomings. Unlike the channel ports of Europe where transatlantic passengers had to travel inland aboard boat trains to reach such cities as London or Paris, when one disembarked from the *Mauretania* or the *Leviathan* in New York, the entire city was at one's immediate disposal. The port of New York, though, was a considerably less hospitable harbor for seagoing cargo vessels.

The reasons largely involve contingencies of local geography. As one instance, the streets of Manhattan Island that led to the piers where most passenger and many cargo vessels docked were extraordinarily congested. And so the delivery of cargo to and from Hudson and East River piers by draymen and teamsters was hardly the last word in speed, efficiency, or predictability. In addition, because the waterfront surrounding Manhattan Island is finite, the preferred docking facility in New York was the finger pier, as it was called, a structure built out into the river perpendicular to the shore. The use of finger piers allowed more vessels to dock along a given stretch of waterfront than would be the case with bulkheads built along and parallel to the shore. Furthermore, given the intensive land-use patterns that prevailed along the waterfront in New York and the fact that deepwater cargo piers were located immediately adjacent to the city's business and commercial districts, the piers themselves were the principal places where cargo could be stored before or after a voyage. Some warehouses could be found inland from various piers in New York and these played a role in sustaining the port's maritime commerce, but the congested nature of the streets of Manhattan, and the limited space available on the piers themselves, remained defining limitations.

Finger piers featured different styles of construction depending on the era when they were built. By the end of World War II, for example, the most important harbor in all the Americas was an uneven mixture of the old and the not so old, the hopelessly outmoded and the reasonably passable. Many functioning piers dated to the nineteenth century and were built atop wooden pilings, while more modern structures featured concrete foundations. An analysis published in *Barron's National Business and Financial Weekly* shortly after the end of World War II put matters this way: "New York's pier system has been dropping into the water, piece by piece, for many years now."[6] A few finger piers in New York were fully open and provided no weather protection at all, but more typically, a finger pier included a warehouse-like structure from one end of the pier to the other that was called a transit shed, where inbound and outbound cargo could be stored and sorted.

In Europe, by contrast, because major seaports tended to be located away from densely settled urban areas—Southampton, not London; Le Havre, not Paris—finger piers were less popular (and less necessary) than long bulkheads with extensive acreage nearby for storing and sorting inbound and outbound cargo. It was also common, in European ports, for movable cranes to be positioned along the wharves where ships docked to assist in the loading and unloading of cargo. Furthermore, in Europe one would frequently find railway tracks adjacent to ship berths to facilitate the transfer of cargo from one mode of transport to another, an advantage that was a good deal less common in the United States, and practically (but not entirely) unknown in the port of New York.

Despite the lack of direct rail-to-sea transfer facilities, though, much of the cargo destined for ships docked in New York harbor was transported into the metropolitan area by train. Given the fact that finger piers in Manhattan, where so many cargo ships docked were not adjacent to rail lines, a complicated procedure evolved to transfer cargo from inbound freight cars to the holds of outbound merchant ships.

It was hardly the last word in efficiency or dispatch, although it certainly was colorful, and its development was surely assisted by the fact that the railroads serving New York conducted a good deal of interchange among themselves by shunting freight cars onto special barges called car floats that were equipped with railroad tracks, and then moving the barges from one railroad's terminal to that of another. Thus, freight cars arriving in New York from points south and west over the Pennsylvania Railroad and bound for New England would be placed aboard car floats at a place in New Jersey known as Greenville, just to the south of the Statue of Liberty. Then tugboats would move the barges across New York Bay, and the cars would be handed over to the New York, New Haven and

Hartford Railroad in the Bay Ridge section of Brooklyn for the rest of the trip north into New England. When such operations were at their peak in the years just before World War II, various railroads operating in and around New York owned 101 tugboats and 241 car floats.[7] (A general term used to describe such short-haul maritime transfer work is *lighterage*, while the specialized vessels designed to perform such tasks—tugboats, car floats, and other styles of freight boats—are known generically as lighters.)

Onward from the late 1890s, there was continual talk in New York of building a belt line railway, so called, to facilitate the direct interchange of freight traffic among the several railroads, reduce the need for lighterage, and permit more efficient transfer of freight from one railroad to another and between rail cars and cargo ships.[8] Proposals were advanced with varying levels of detail, many including the construction of freight-only rail tunnels under New York Bay and the Hudson River. Indeed when the Port of New York Authority was established in 1921, perhaps its most important mandate was to promote the construction of such a belt line railway.[9]

Just as the idea of a belt line freight railway in New York had languished in the years before the creation of the Port Authority, though, so was the new agency unable to turn the concept into a reality, and railroads continued to rely on fleets of tugboats, car floats, and other lighters to transport freight from railhead to ship—and from one railroad to another.

Keen-eyed observers of the maritime fleets maintained by the several railroads that served New York, though, could detect two different styles of freight car–carrying barges. For direct interchange between railroads when the name of the game was to carry as many freight cars as possible, car floats included three side-by-side tracks and freight cars were positioned as close to each other as possible. A second style of car float, though, featured only two tracks, with a loading platform in between, and these were designed to facilitate the loading and unloading of freight cars while they were on the car float. And so with a dozen or so freight cars aboard, a tugboat would position such a car float next to a moored cargo ship on the side away from the finger pier where the vessel was tied up. Longshoremen would then proceed to unload the freight cars and hoist the break-bulk cargo they contained onto the ship, while the process was reversed, of course, when inbound cargo was moving from ship to freight cars. (Such two-track car floats were also used to transfer cargo from freight cars to shore.)

Another style of lighterage for transferring cargo from railcars to merchant ships involved the use of specialized freight boats that required two separate handlings by longshoremen—one from freight car to freight boat, another from freight boat to seagoing merchant ship.

Such styles of service necessarily imposed penalties with respect to both the speed and the cost of delivery. It would typically be several days between the time an inbound freight car arrived in a classification yard on the New Jersey side of the Hudson River to the time its cargo was hoisted aboard a waiting cargo ship on the Manhattan side of the Hudson, even though the distance between classification yard and deepwater pier, as the crow flies, may only have been a mile or two. In addition, railroads, whose primary business involved dispatching trains along tracks, were forced to incorporate "marine divisions" into their tables of organization and hire, in addition to locomotive engineers and conductors, masters, mates, pilots and deckhands to operate their fleets of tugboats, car floats, and other lighters.

The emergence of containerization in the years after the early voyages of Pan-Atlantic's *Ideal X* and *Gateway City* would first reduce, and then eliminate, the need to transfer break-bulk cargo from freight cars to oceangoing vessels, and the specialized fleets of lighters that were once so common in New York Harbor would be rendered obsolete. In addition, changing patterns of railway freight operations brought on by mergers and consolidations would likewise play a role in dooming the once colorful practice of interchanging freight cars between railroads in New York by car float. In the early years of the twenty-first century, there is but one such service still in operation, although its future is difficult to predict. A specialized carrier called the New York Cross Harbor Railroad continues to use car floats to move freight cars from New Jersey to its right-of-way along the South Brooklyn waterfront.[10]

The Emergence of Port Newark

In the second decade of the twentieth century, before America's entry into World War I—and with cargo operations in and out of the port of New York relying on extensive lighterage operations to transfer consignments from freight cars to cargo ships—public officials in Newark felt the time was right to convert hundreds of acres of undeveloped tidal marshlands along the western shore of Newark Bay into a working deepwater seaport. One extraordinary advantage that such a port in Newark would have over similar facilities in New York proper was the fact that, unlike Manhattan and Brooklyn, Newark was located on the mainland and could manage the transfer of goods from freight car to cargo ship without the bother and expense of lighterage services. Furthermore, because railroad freight rates from inland cities to the metropolitan area were the same whether a shipment was destined for a point in New Jersey or New York, Newark felt its new port would prove attractive to railroads since they would be able to forgo the expense of lighterage operations with no decrease in revenue.

In 1915, James M. Reilly, the secretary of the Newark Board of Trade, prepared a pamphlet predicting "that the Newark Bay shore front will in the course of a few years become a great centre of manufactures and commerce and that the Port of Newark Terminal will become one of the great seaports on the Atlantic."[11] Reilly was not indulging in idle speculation. Work on the project had begun several months earlier and involved a municipal expenditure of $2.5 million to construct "a system of dockage extending a total length of 4,500 feet, 2,500 of which extends inward from the shore line and borders full length on a water channel 400 feet in width at the bottom, with a depth of 20 feet at low water."[12] Newark had acquired 930 acres of marshland along the bay and within its city limits for what was officially called the Bay Front Development and Meadow Reclamation Project, but would soon be universally known, more crisply, as Port Newark.

Port Newark featured a channel that was constructed inland from the edge of the bay roughly following the course of a waterway known as Maple Island Creek. For most of its length, the new channel was built perpendicular to the shoreline. Looking out to the bay from the inland end, though, the channel could be seen to feature a noticeable dogleg to the right before entering the bay. Originally called City Channel, and later Inshore Channel, this waterway is today known as Newark Channel, and the "dogleg right" remains an obvious characteristic. Newark officials were also able to marshal political resources and have the Army Corps of Engineers increase the depth of the main channel in Newark Bay from twelve to twenty feet.[13] This first phase of development at Port Newark involved the construction of docking facilities along only the northern side of City Channel, as well as along the shore of Newark Bay to the north of City Channel, although some marshland to the south of City

Channel was reclaimed for future development. In addition to Maple Island Creek, a waterway known as the Peddie Street Canal also flowed into Newark Bay, about a half-mile north of the creek. Sometimes called the Peddie Street Ditch, this facility was built many years earlier as part of Newark's sewer system and played no role in the later construction of Port Newark.

As the project proceeded and deepwater channels were dug across sections of the bay as well as through surrounding marshlands, the dredged material was pumped ashore through large pipes to help create solid shorefront behind bulkhead walls that had been erected along the water's edge. Part and parcel of Newark's effort was the creation of useable acreage adjacent to its new seaport where manufacturers could build factories and warehouses, and the city never failed to boast that three major trunk line railroads—the Pennsylvania, the Lehigh Valley, and the Jersey Central—had rights-of-way that crossed the newly developed area so freight could be delivered to the seaport with ease and dispatch. In addition, the Jersey Central Railroad would operate passenger service into the new development area from Newark, Elizabeth, and Jersey City, thus providing daily access for the many workers who would be required to operate the new seaport. The city of Newark also constructed paved roads across other portions of undeveloped marshland to allow motor vehicles and horse-drawn wagons to reach the new seaport, emphasizing again the fact that unlike the docks of Manhattan and Brooklyn, Port Newark was not located adjacent to existing industrial and commercial districts.[14]

The first elements of Port Newark were completed in late 1915. The formal opening of the facility was October 20; Newark mayor Thomas L. Raymond declared the day to be Port Newark Terminal Day, and 25,000 people visited the new facility aboard special trains, jitney buses, steamboats, and private automobiles. For this initial phase, the city had reclaimed three hundred acres of marshland and incorporated it into the new seaport.

What would substantially affect and even define the early history of the new waterfront facilities on Newark Bay, though, was the nation's mobilization for World War I; considerable equipment destined for doughboys fighting in France was loaded aboard cargo ships at the new municipal facility. In October 1917, the federal government purchased 133 acres at newly developed Port Newark for a supply depot for the Army's Quartermaster Corps, and the city of Newark used the $1.3 million the Army paid for continued expansion of the new port.[15] Port Newark also became the site of an important wartime shipbuilding operation. The Submarine Boat Corporation leased space at Port Newark and constructed a number of merchant ships for the United States Shipping Board on 14 shipways that were built along the shore of Newark Bay adjacent to City Channel.[16]

For one reason or another, the Army retained control of considerable waterfront acreage at Port Newark after war's end, and it was not until the summer of 1936 when the Army returned its Port Newark facilities to the city. Municipal officials then quickly signed a contract with a Philadelphia-based company, Atlantic Tidewater Terminals, to operate the facility as a commercial seaport under the name Newark Tidewater Terminals.[17] Two steamship companies that quickly leased docking facilities at Port Newark from Newark Tidewater Terminals were the Bull Line and American-Hawaiian, but another world war would soon impact additional commercial expansion, and Port Newark would once again serve as a port for the dispatch of military equipment bound for troops fighting overseas. In addition, World War II saw shipbuilding resumed at Port Newark.

The Federal Shipbuilding and Dry Dock Company had long been an important U.S. shipbuilder. The company's principal facilities were located a short distance inland from Port Newark along the banks of the Hackensack River in nearby Kearny, New Jersey. Federal received numerous government shipbuilding contracts during the war, and the company took over the former Submarine Boat Company works at Port Newark for the duration and used it as an annex of its principal yard in Kearney.[18]

Something that made Port Newark an even more valuable military asset during World War II than it had been during World War I was the fact that on October 1, 1928, the city of Newark had opened a new municipal airport adjacent to its almost-new seaport. Like Port Newark, the Newark Municipal Airport was built on marshland, although it was inland from the seaport and its construction did not require quite as much reclamation of tidal swamps as did Port Newark.

Newark Airport would become an important pioneer in American aviation. It was the first U.S. airport to feature paved runways, for instance, the first to have runway lights for night operations, and the first to build an elevated control tower to direct flight operations. Not surprisingly, because it was the only commercial airport in the New York metropolitan area for several years, Newark quickly became the busiest airfield in all of the United States, a title it would surrender in 1939, though, when commercial air service was inaugurated at a newly expanded air field at North

Beach on Flushing Bay that was called the New York City Municipal Airport, and later renamed LaGuardia Field.

The U.S. Army Air Corps took over Newark Airport in early 1942 and closed the facility to commercial traffic. It became an important asset for dispatching military aircraft to Europe. Many warplanes flew to Europe out of Newark Airport over a variety of routings, while others, upon landing, were hauled from the airport to the nearby seaport by tractors or trucks, given a healthy dose of weatherproofing, and then hoisted aboard ships for shipment to Europe. Some aircraft were hoisted aboard barges at Port Newark and then transferred to oceangoing vessels moored elsewhere in the harbor, and many of the ships that transported such aircraft to the European theater were T-2 tankers equipped with special spar decks, a style of accommodation that would be used to inaugurate container ship service out of Port Newark in 1956.

As was the case following World War I, the Army retained control of elements of Port Newark after V-J Day, and with the pace of cargo operations in the harbor no longer running at the frantic levels of wartime, Port Newark played a rather modest role in New York Harbor's immediate postwar commerce. There was an added measure of inbound cargo in New York during the immediate postwar years, for much of the war materials that had earlier been sent to Europe had to be returned, and with respect to outbound cargo, the Marshall Plan was in full swing. Such traffic, though, lacked the pace and the urgency of wartime.

An important milestone was reached in 1947. The Army had no further use of Port Newark, and the Port of New York Authority agreed to lease both Port Newark and Newark Airport from the city of Newark and take over their operations. The formal handover took place on April 1, 1948, and the Port Authority immediately earmarked $66 million for a major upgrade of the one-time municipal facilities—$55 million for Newark Airport, $11 million for the seaport.[19]

Onward from 1948, Port Authority investment and expansion at Port Newark would be virtually continuous. Between 1948 and 1954, the public agency earmarked $23 million to upgrade and expand facilities at Port Newark; older wharves dating back to World War I were replaced with new construction, while channels and slips were dredged to permit deeper-draft vessels to use the facility. By 1949 there was a working depth of thirty-five feet from the Narrows to dockside at Port Newark, and hundreds of additional acres of swampland were reclaimed and absorbed into the port facility.[20]

What Port Newark was able to offer both steamship companies, as well as shippers, during these early years under Port Authority management, was spaciousness and convenience. Vessels docked not at narrow finger piers located at the foot of congested city streets, as they did in Manhattan and Brooklyn, but along lengthy bulkheads that featured extensive inland acreage where cargo could be conveniently sorted and stored. In addition, the entire seaport complex was far easier to reach by train or by truck from inland points throughout the United States. By this time, facilities at Port Newark included berths along both sides of City Channel, as well as along the shoreline of Newark Bay, while the rail connections that Newark officials boasted of in 1915 were expanded and spurs were extended along various wharves to facilitate the direct transfer of cargo between ships and freight cars. In addition, as truck transport assumed a larger role in freight delivery throughout the United States during the postwar era, the fact that the state of New Jersey was completing work on an important north-south toll road called the New Jersey Turnpike during the early years of Port Authority management at Port Newark gave the facility yet another advantage as a cargo port. The north-south axis selected for the New Jersey Turnpike ran—and continues to run—in a narrow corridor between Port Newark and Newark Airport.

By 1952, two important U.S. steamship companies, Luckenbach and American-Hawaiian, had leased terminal facilities and were operating cargo vessels out of Port Newark, and the Port Authority was able to boast that tonnage moving through its Newark seaport had doubled since it took over operation of the facility four years earlier. The third steamship line to execute a lease with the Port Authority and transfer its New York cargo operations to Port Newark was the Waterman Steamship Company, and along with Waterman came the vessels of its Pan-Atlantic subsidiary.[21] Before moving to berths 15 and 17 on the north side of City Channel at the foot of Doremus Avenue in Port Newark, Waterman and Pan-Atlantic vessels docked in Brooklyn at the foot of Columbia Street.

Expansion at Port Newark would continue under Port Authority auspices, and by the time Pan-Atlantic inaugurated container-ship service there in the years after 1956, a dozen or more steamship companies were making regular calls at Port Newark. These included Weyerhauser Steamship, Alcoa, Calmar Steamship, Pope, and Talbot. By 1956, the volume of cargo moving through Port Newark was a small percentage of that still being shipped from conventional piers in Manhattan and Brooklyn, but it was a percentage that was getting larger year by year.

Even before the onset of containerization, the convenience and the spaciousness of Port Newark were important factors in establishing the facility as an attractive cargo alternative to Hudson and East River piers. Once the container revolution began to take hold, though, it was the availability of adequate docking facilities at Port Newark—spacious wharves that lent themselves to the new and unusual needs of container-ship operators far more efficiently than older finger piers in Brooklyn and Manhattan—that would permit the port of New York to retain its status as a major seaport. When Port Newark was originally planned and developed, the very idea of containerization was in a distant future beyond anyone's horizon. Once containerization became a reality, though, the availability of suitable docking facilities at Port Newark allowed the overall port of New York to retain its status as the premier seaport on the East Coast. Were it not for the facilities available at Port Newark in the years after 1956, maritime cargo operations in New York Harbor could well have gone the way of such other once-important New York industries as shipbuilding, food processing, and brewing. It could have gone elsewhere, to Baltimore, Norfolk, Halifax, or Savannah. But because of the availability of spacious docking facilities at Port Newark, the overall port of New York continues to play an important role in cargo operations in the twenty-first century.

The Port of New York Authority

When the Constitution took effect on March 4, 1789, a section in the first article of that document would have a direct impact on the development of New York Harbor in subsequent years. In delineating the powers of Congress, Section Ten of Article One issues a rather explicit prohibition: "No State shall, without the consent of Congress . . . enter into any Agreement or Compact with another State."

Because the Constitution prohibited the several states from creating formal cooperative compacts with each other without explicit congressional approval, when various states had overlapping interests, the prevailing condition often turned out to be one of competition and conflict. Such was clearly the case in New York Harbor. At one point, the state of New York claimed that its jurisdiction included the entirety of all waterways flowing between New York and New Jersey up to the high water mark on the New Jersey side. This created a situation whereby a person strolling along the edge of the Hudson on the New Jersey side of the river at low tide was, at least in the eyes of New York officials, taking a walk on New York territory and subject to New York jurisdiction. (This situation was rectified by a formal treaty in 1834—an agreement that required congressional approval, of course—and the state line between New York and New Jersey has since been recognized as midstream.)

In the early decades of the twentieth century, officials in both New York and New Jersey began to realize that a more permanent style of cooperation between the two states was necessary if the country's most important harbor was to generate continued benefits. Long-standing conflict between the two states was one strong motivation for seeking a new and better alternative, with Newark's construction of a totally new seaport on previously unused marshland to compete with piers in New York a clear instance of such conflict. Another matter, though, was a recognition that New York Harbor did not function as efficiently as it might have during the World War I mobilization.

A prototype arrangement that seemed to offer considerable promise was one that had been created in and for London in 1909. Called the Port of London Authority, it was a special-purpose public entity whose jurisdiction, while specialized, extended across the boundaries of multiple local governments. (Use of the word "authority" as the general term for such a specialized public entity was reportedly a function of the fact that multiple sections of British law permitting the creation of the Port of London Authority read, "Authority is hereby given.")

The situation of competing jurisdictions in the port of London was not exactly parallel to that of New York vs. New Jersey, but in 1917 the legislatures of the two states established a study commission—the New York-New Jersey Port and Harbor Development Commission—and after three years of study and analysis, and with wartime inefficiencies both manifest and immediate, the commission issued a comprehensive report in 1920 that recommended the creation of a permanent two-state agency to foster and oversee the development of transportation facilities throughout the port.[22]

There was a fair degree of give-and-take between the recommendations of the commission and what the two state legislatures later enacted. The commission had in mind an agency with rather far-reaching and basic governmental powers, but the two states, wishing to reserve such authority to themselves and their subdivisions, created a unique kind of public entity that could acquire, construct, finance, and operate port-related facilities, but always with due deference to the priority of state and municipal units of government. The new entity could raise revenue by the sale of bonds and from fees and rentals levied on the users of its facilities, but it was given no direct powers of taxation, nor could it undertake any project at all without prior approval from impacted communities.

Congressional approval of the proposed compact was forthcoming in 1921, and a new public agency was established that was called the Port of New York Authority. A formal treaty establishing the new agency was signed in the lower Manhattan offices of the Chamber of Commerce of New York State on April 30, 1921.[23] (As a purely technical matter, the 1921 treaty was actually an amendment to the earlier 1834 agreement between the two states.) Conspicuously absent from the gala ceremony was Francis J. Hylan, then the mayor of the City of New York and an implacable foe of the very idea of such a new two-state agency, along with Governor Edward Edwards of New Jersey, over whose veto the new agency was created.[24] Governor Edwards's hostility was probably less reflective of general opposition to the creation of the Port Authority among his constituents than was Mayor Hylan's. Several decades of distrust, if not actual enmity, would prevail between the municipal government in New York and the Port of New York Authority.

Such disagreement aside, the new agency's formal history began on that April day in 1921. Its jurisdiction encompassed a 1,500-square-mile port district that was located within a thirty-five-mile radius of the Statue of Liberty, a district that included two state governments and 165 separate municipalities.[25]

A vital characteristic that was intended from the outset to be the defining feature of the new agency was professional competence coupled with a measure of insulation from the whims and fancies of elected politicians. As Jameson W. Doig describes it in *Empire on the Hudson*, the new agency "embodied the ideal of technical rationality, of relying on experts who focused on complex technologies and on large regional and national needs, and who gave little weight to the parochial interests of individual towns and cities."[26]

Despite claims and assertions to the contrary, the Port Authority would never be totally free from "the parochial interests of individual towns and cities." The Port Authority would earn high marks over ensuing decades for the technical competence of its staff and the professionalism of its work. But it was to be the agency's extraordinary ability to develop a consensus for its agenda among its various political constituencies that would be an even more defining characteristic. To assume that the Port Authority is an independent colossus with no regard for democratic processes and principles, as some critics have, is both unfair and incorrect.

The Port Authority was not the first entity to be created jointly by New York and New Jersey. In addition to the 1834 compact to regularize state boundaries, in 1919 an agency called the Bridge and Tunnel Commission was established to build a twin-tube vehicular tunnel under the Hudson River linking lower Manhattan and Jersey City. Construction got under way the following year, and the project opened to traffic on November 13, 1927. Called the Holland Tunnel in honor of the project's chief engineer, Clifford M. Holland, in 1931 jurisdiction over the tunnel was transferred, by statute, to the ten-year-old Port Authority.[27]

Between its creation in 1921 and the onset of World War II, the Port Authority's principal achievements involved the design, construction and operation of various vehicular crossings between the two states. The Port Authority directed a good deal of its early time and attention to the matter of building the belt line railway that had long been advocated as vital to the future of the two-state port, and such a goal was clearly set out by the new agency in a Comprehensive Plan that it published toward the end of 1921, mere months after it was established.[28] Little cooperation was forthcoming from the various railroads, however, and so the new agency focused its attention on vehicular projects. These were also seen as necessary and critical in the Port Authority's Comprehensive Plan of 1921, but while initially conceived as part of a larger and more comprehensive effort that would involve major realignment in regional railroad operations, the bridges and tunnels instead emerged as independent projects.

In any event, the Port Authority took over the Holland Tunnel in 1931, the same year that construction was completed on the massive George Washington Bridge linking Fort Lee, New Jersey, with the upper Manhattan neighborhood of Washington Heights. The new agency also built three bridges linking Staten Island and New Jersey, and began construction of a twin-tube vehicular tunnel under the Hudson River between midtown Manhattan and Weehawken, New Jersey. This crossing was called the Lincoln Tunnel. One of its two tubes opened to traffic in 1937; completion of the second was delayed by World War II and did not open until after VJ Day. (In the 1950s, a third two-lane tube was added to the Lincoln Tunnel, and a planned second or lower deck on the George Washington Bridge, originally intended to incorporate rail rapid transit, was built as an automotive-only addition.) Table 3.1 provides additional details about the Port Authority's early river crossings.

TABLE 3.1. *Port Authority Vehicular Crossings, 1921–40*

Date opened	Name	Style of construction	Between	Across
1921[1]	Holland Tunnel	Twin-tube underwater tunnel	Lower Manhattan and Jersey City, N.J.	Hudson River
1928	Outerbridge Crossing	Cantilever bridge	Staten Island and Perth Amboy, N.J.	Arthur Kill
1928	Goethels Bridge	Cantilever bridge	Staten Island and Carteret, N.J.	Arthur Kill
1931	George Washington Bridge	Suspension bridge	Upper Manhattan and Fort Lee, N.J.	Hudson River
1931	Bayonne Bridge	Steel arch bridge	Staten Island and Bayonne, N.J.	Kill van Kull
1937[2]	Lincoln Tunnel	Twin tube underwater tunnel	Midtown Manhattan and Weehawken, N.J.	Hudson River

1. The Holland Tunnel was completed and opened for traffic in 1921 but not conveyed to the Port Authority for management and operation until 1931.
2. Only one two-lane tube was completed and opened for traffic in 1937. The second tube was not completed until 1945.

The Port in Port Authority

The Port Authority's first venture into the maritime field was not a major effort. In wartime 1943, at the request of New York's governor, Thomas E. Dewey, the agency took over the operation of a state-owned grain elevator that was located along the Brooklyn waterfront on the shore of Gowanus Bay at the foot of Columbia Street, close to the place where Waterman and Pan-Atlantic cargo ships would dock after World War II. Under state auspices, this grain elevator had been operated as an adjunct of the New York State Barge Canal and used primarily for the storage of grain destined for overseas markets. By adding such a facility to its portfolio of responsibilities, though, the Port Authority was able to boast that it now had real-time experience in the management of a maritime asset. It would build on this experience in a few years, although the opening of the Saint Lawrence Seaway in 1959, which facilitated the direct shipment of export grain from ports on the Great Lakes, all but eliminated such traffic through the New York State Barge Canal, and the Port Authority closed its Brooklyn grain elevator shortly afterward.

As World War II was winding down, Austin Tobin, who had been appointed the Port Authority's executive director in 1942, began to direct the staff's attention to an agenda of activities for the postwar era. Suspicion of Tobin's agency was still a consideration in many political quarters, especially the City of New York, and it was clear that a major transportation dynamic once the war was over would be the need for expanded facilities to serve the commercial aviation industry. In the postwar era, the Port Authority and the city government would square off with each other over the matter of airfields, but out of this conflict would emerge an era of reasonable stability and cooperation.

In 1941, under Mayor Fiorello LaGuardia, New York had begun work on a major new airfield in southern Queens County on the shore of Jamaica Bay. Once wartime construction prohibitions were lifted, work resumed and the facility was called Idlewild Airport. Idlewild opened for business on July 1, 1948, and was formally dedicated on July 31 by President Harry S Truman and other officials.[29] (This facility is known today as John F. Kennedy International Airport. The name Idlewild derived from a golf course that previously occupied a portion of the site.)

The municipal government in New York, though, found that capital investment funds were severely limited in the postwar era, and in 1946, at the city's urging, the state legislature enacted a measure authorizing the city to form a municipal airport authority that would take over both the older LaGuardia Field as well as the new Idlewild. Using the structure of a quasi-independent public authority would enable the new agency to issue bonds for airport construction over and above the city's own restrictive debt limit, bonds that would be serviced by user fees generated at the facility itself—landing fees, space rental charges, concessions, and so forth.[30]

In opting for such a structure, the city was, of course, following the model pioneered by the Port Authority itself in 1921. Indeed such quasi-independent authorities had become quite popular throughout the United States in the years after 1921, with the City of New York taking a lead role in establishing a number of such entities to finance the construction of various highway facilities—the Marine Parkway Bridge, the Triborough Bridge, the Queens-Midtown Tunnel, and a number of others. Each bridge (or tunnel) was under the management of a separate special-purpose authority, bonds issued to raise construction costs were serviced from the facility's own toll revenues, and these several authorities also had this in common: Each and every one of them was controlled by an extraordinary New Yorker by the name of Robert Moses. (In later years, these separate authorities would be merged into the Triborough Bridge and Tunnel Authority, which itself would eventually become part of the Metropolitan Transportation Authority of New York State.)

Moses, a controversial figure in New York from the 1930s through the 1960s, wore many hats. He was the appointed commissioner of the city's Department of Parks, he managed the several single-purpose authorities that were created to promote the construction of various bridges and tunnels, he was the chief factotum of the Long Island State Park Commission that built and operated parkways and beaches on Long Island, and he headed up the New York State Power Authority. At one time, Moses simultaneously held down twelve separate public offices—and neatly sidestepped a legal prohibition that prohibited simultaneous employment at different public agencies by accepting a salary from only one of them. One of Moses's titles was Coordinator of Construction for the City of New York, and it was in this post that he was able to play an important role in all the pulling and hauling that led to the passage of legislation authorizing a city airport authority in 1946.[31]

Moses's feelings about the Port of New York Authority were fully as hostile as were those of Mayor John Hylan two decades earlier. He was adamant in his belief that the two-state agency had to be kept in check, never failed to use the press to deliver pointed criticisms of the Port Authority, and was especially vocal in his opposition to allowing the Port Authority to take over the operation of the city's airports.[32] Before the new city Airport Authority assumed control of Idlewild and LaGuardia, though—and while, thanks to Austin Tobin's behind-the-scene negotiations and advocacy, the idea of the Port Authority's moving into the aviation sector was under active discussion as an alternative course of action—Moses made a critical blunder. As Robert Caro, his biographer, describes it, when Moses told the president of Eastern Airlines, Eddie Rickenbacker, of the hefty new user fees that would prevail at Idlewild Airport once it was completed, Rickenbacker calmly announced that his airline would not use the facility at all and would concentrate its operations instead at nearby Newark Airport.[33] Mayor O'Dwyer was incensed at Moses's action, and, believing that comparable tolls and landing fees should prevail throughout the metropolitan area, he responded by transferring responsibility for both city airfields to the Port Authority, despite the fact that the mayor had earlier voiced opposition to such an idea and, indeed, had been an important proponent of the notion of a separate municipal airport authority.

As a procedural matter, O'Dwyer first invited the Port Authority to submit a formal proposal for the operation of the city's airfields. In actuality, though, Tobin and his people had made extensive direct and indirect contacts with O'Dwyer and his staff, especially through influential members of the banking community who suggested to the mayor that the new Airport Authority would be unable to market its bonds. And so when O'Dwyer issued a formal invitation to the Port Authority in 1946, it was anything but a bolt out of the blue. It was, rather, the culmination of a carefully orchestrated overture on Tobin's part, with many technical details worked out quietly by the Port Authority staff long before O'Dwyer issued his formal invitation.[34] When Moses's blunder finally tipped the scales in favor of common operation of all commercial airports within the port district, the Port of New York Authority was ready with a detailed and formal proposal. A lease agreement was executed between the Port Authority and the City of New York, and the former took over the operation of La Guardia Field and the still incomplete Idlewild Airport in 1947.[35]

The Port Authority's role with respect to maritime facilities did not develop quite as sharply, or quite as totally. Despite cooperation with the two-state agency with respect to airports, the City of New York remained unwilling to surrender any of its traditional control over docks within its jurisdiction, even though the Port Authority's first maritime venture was its 1943 assumption of responsibility for the operation of a state-owned grain terminal on Gowanus Bay in Brooklyn. Tobin continued to work behind the scenes to create a climate that might result in a larger Port Authority role along the New York waterfront, since he saw such expansion as vital to his agency's future. In mid-1948, for instance, *Barron's National Business and Financial Weekly* reported that the Port Authority was ready to issue $114 million in bonds to fund a massive rebuilding program at a number of city-owned piers.[36] But nothing would develop from such a proposal for a number of years.

What proved to be the next target of opportunity for Port Authority involvement in a working seaport developed as an adjunct, really, of the agency's negotiations with municipal officials in Newark for its takeover of the operation of Newark Municipal Airport in 1948. The Port Authority executed a lease with the city of Newark in October of 1947 to assume control of Newark Airport, an agreement that involved the same kind of preparatory work by Tobin and his staff as was the case with respect to the New York airports just a few months earlier.[37]

The jewel in the New Jersey crown was Newark Airport. Aviation was new and growing and glamorous, while cargo ships were none of these things. Tobin, though, recognized the importance of cargo operations to the continued vitality of the metropolitan area, and he also realized that expanding cargo operations at Port Newark could help achieve many of the long-range objectives in the way of rail-freight coordination that had eluded his agency during its early years. So while the Port Authority would invest considerable resources over the next decades in expanding the three airports that were incorporated into its mandate in 1947, quietly adding Port Newark to its portfolio at the same time gave the two-state agency an important toehold in the important sector of maritime cargo operations. Hardly incidental was the fact that Port Newark had few of the inherent limitations and liabilities that had long plagued cargo operations at various finger piers in Manhattan and Brooklyn.

Interestingly, what may well have been Port Newark's greatest asset when the Port Authority executed a lease agreement with the city of Newark in 1947 to take over its operation was the fact that hundreds of acres of undeveloped marshland extended south of Port Newark along the shore of Newark Bay and were available for expansion of the cargo terminal. This acreage was beyond the limits of the city of Newark and was within the political jurisdiction of the adjourning municipality of Elizabeth. In later chapters, we will see how the Port Authority would expand its initial holdings at Port Newark into this undeveloped marshland, dig another channel in from the bay along the course of Bound Creek—the boundary between Newark and Elizabeth—and create what, by century's end, would become the largest and most active cargo terminal on the East Coast.

Organized Labor on the New York Waterfront

On Wednesday, April 28, 1948, a veteran reporter who worked for the *New York Sun* was assigned to cover a seemingly routine crime story. Early that morning a thirty-year-old man by the name of Thomas Collentine was gunned down outside his home on Post Avenue in the Inwood section of upper Manhattan while on his way to work. Collentine died in Jewish Memorial Hospital some hours later, but when questioned by the police shortly after the shooting, he replied, "I don't know who shot me, and if I did I wouldn't tell you."[38]

The *Sun* reporter, Malcolm Johnson, approached his assignment that day with typical professional thoroughness. Decades earlier as a young reporter, Johnson had exposed criminal activities of the Ku Klux Klan in his native Georgia, and after moving to New York in 1928, he covered stories as diverse as the fire aboard the passenger liner *Morro Castle*, the Lindbergh kidnapping, and, during the recent war, the invasion of both Iwo Jima and Okinawa.

The murder of Thomas Collentine, though, would soon lead Malcolm Johnson to the most important story of his career—one for which he would later receive a Pulitzer Prize.[39] For in exploring this single violent crime, Johnson uncovered an extraordinary and pervasive pattern of violence, lawlessness, neglect, and criminality that prevailed in the workplace where Thomas Collentine earned his livelihood each day: the docks along the New York waterfront.

Collentine was a hiring boss on North River Pier 92. He worked for the John W. McGrath Stevedoring Company and was the man who ran a thrice-daily "shape-up" at Pier 92, a random process whereby lucky individuals were selected and given work assignments from among a larger crowd of longshoremen seeking employment that day. The story that Johnson uncovered and reported was one of shakedowns, kickbacks, thievery, loan sharking, and random murder. It was a story that involved corrupt union officials, disinterested shippers, spineless politicians, the overlords of organized crime—and, of course, ordinary dockworkers whose interests and welfare were being systematically ignored within a larger context of crime and corruption. Malcolm Johnson would soon understand perfectly well why a mortally wounded Thomas Collentine wanted no part of talking to the police.

Johnson's work ran as a dramatic series in the *New York Sun* between November 8 and December 10, 1948. Each Monday through Friday a new exposé was published—a total of twenty-four, every one on the front page—and readers were able to learn how such gangland notables as Lucky Luciano, Frank Costello, Meyer Lansky, and Joe Adonis all had a hand in criminal activities that helped define day-to-day operations along the New York waterfront.[40] Johnson's explosive series resulted in Governor Dewey's establishing a New York State Crime Commission to conduct an in-depth investigation of waterfront conditions, and from the work of this Crime Commission, genuine reform would eventually emerge.[41] The importance of Malcolm Johnson's investigative series in 1948, though, cannot possibly be underestimated. Johnson's series even formed the basis of Elia Kazan's 1954 film *On the Waterfront*, and this Academy Award–winning effort was also instrumental in helping create a climate where waterfront corruption would no longer be tolerated. (Local interests in New York were at first concerned that *On the Waterfront* would only serve to divert cargo traffic from New York to rival East Coast seaports.) The larger question, though, concerns how conditions on the New York docks deteriorated into such a sorry state of affairs.

From the early decades of the nineteenth century onward, the business of shipping had been a pivotal industry in New York. And while the loading and unloading of break-bulk cargo ships provided employment for thousands of New Yorkers over many years and decades, into the late 1940s the work of a longshoreman was structured in a most unusual way. The hiring of longshoremen was dominated by a process called the "shape-up" that was conducted several times each day on a pier-by-pier basis. No matter how long one had previously worked as a longshoreman, each day brought no guarantee of a day's work. Individuals who toiled as longshoremen worked under a system where their employment was more casual than steady.

The need for such an irregular system of work supposedly developed out of the schedules that steamship lines operated. While liner services nominally followed published schedules, they were schedules that were established to suit the needs of steamship companies, not longshoremen. Furthermore, even slight variations in schedule performance could quickly translate into the arrival of several vessels one day, few the next, with random arrivals and departures of unscheduled tramp steamers merely exacerbating the irregularity of the overall situation. Consequently, a large pool of longshoremen was necessary to meet maximum needs, while there would be insufficient work for the full pool on slack days. Longshoremen, of course, only earned wages on days when they actually worked.

In New York, steamship companies leased piers from the city and then contracted with stevedoring companies to provide the workers who would load and unload their ships. The stevedoring companies conducted the shape-up and hired gangs of men each day, although some of the major steamship companies bypassed stevedoring companies and hired longshoremen directly. There was another entity in the picture, the New York Shipping Association. It conducted negotiations with the International Longshoremen's Association (ILA) on behalf of its stevedore and steamship company members to establish wage rates and other conditions of employment for the longshoremen.[42]

The extraordinary traffic levels in the port of New York during World War II tended to mask many of the inherent problems associated with working on the docks. But with the return to more normal traffic after V-J Day, as well as the return from military service of men who regarded themselves as lifelong longshoremen and were anxious to reclaim their prewar jobs, labor problems on the New York waterfront quickly became obvious. In simple terms, too many men were seeking too few assignments. The fact that criminality had also become rampant along the waterfront only made matters worse.

Longshoremen were unionized workers, with the ILA the sole bargaining agent representing New York dockworkers. By the postwar period, though, the ILA had strayed from the lofty and democratic ideals that were part and parcel of the American labor movement. The ILA perpetuated a system of casual and irregular employment along the New York waterfront while the goal of most labor unions was to secure steady and regular employment for its membership. Add to this the fact that the end of Prohibition in 1933 saw a "migration of mobsters from the old bootlegger gangs into the loading rackets along the waterfront," and corruption became inevitable.[43]

In many respects, the cost of this criminality became an ordinary part of doing business on the New York waterfront, and it was passed along, indirectly but ultimately, to consumers of the goods passing through the harbor. But in another sense, honest longshoremen, dues-paying members of the ILA, were turned into victims in a far more direct way. Each and every longshoreman was utterly dependent on being individually selected at each day's shape-up by a hiring boss who may well have been working in partnership with known criminals. As a result, such a longshoreman "is not willing to jeopardize the little he has . . . by any disclosure of prevalent abuses."[44]

Under the shape-up system, the only qualification for seeking work on any given day was ILA membership. All manner of criminal types rubbed shoulders with honest workers in seeking daily assignments as longshoremen, and preferential hiring was often ensured by bribes and other forms of coercion. The presence of so many criminals loading and unloading ships understandably led to pilferage from break-bulk cargo shipments. Indeed, the reason why certain individuals appeared at a morning shape-up and went to work with a gang of longshoremen was often not to earn an honest day's wage, but to facilitate the theft of whatever it was they would be unloading. Nor should it be assumed that the word "pilferage" meant the removal of odd and occasional items by individual longshoreman—a coffee percolator by one man, a pair of shoes by another—the kind of freelance criminality one associates with random shoplifting from a department store. There was a degree of such ad hoc pilferage, to be sure, and in many cases it reached serious and measurable proportions. But the practice was far more extensive and included highly structured dimensions. An often-cited example was the pilferage of twelve tons of structural steel from in front of North River Pier 46, a facility whose lessee was the United States Lines, in the mid-1940s, clearly not something an individual longshoreman could take home inside his lunchpail.[45]

Malcolm Johnson's 1948 series in the *New York Sun* even brought out the fact that the gangsters and syndicate criminals who prevailed along the New York waterfront were intolerant of individual longshoremen helping themselves to "a bottle or two of liquor or maybe a sack of potatoes to take home to their families."[46] Wishing to reserve pilferage to themselves, dock bosses and their criminal associates would often turn in an individual longshoremen whom they discovered doing some freelance stealing and see to his being fired.

A quite arresting study of the social problems that the shape-up system of employment generated among New York longshoremen was written by a Roman Catholic priest from Brooklyn by the name of Edward E. Swanstrom.[47] Swanstrom's study, published in 1938, reflects waterfront conditions in the 1930s, arguably prior to the worst years of criminality on the docks. But Swanstrom documents vividly how the absence of steady and predictable work—and that alone—quickly leads to a variety of social pathologies in families that are dependent on a breadwinner's employment as a longshoreman.[48]

Edward Swanstrom was not the only Roman Catholic priest who fought against the evils under which New York longshoremen were forced to work. Shortly after he was ordained in 1944, a Jesuit priest by the name of John M. Corridan, S.J., was assigned to the Xavier Labor School on West 16th Street in the Chelsea section of Manhattan, and he quickly developed a ministry among nearby dockworkers.[49]

Criminality on the waterfront was more rampant when Corridan arrived on the scene in the 1940s than it had been when Swanstrom conducted his studies in the 1930s. And while mindful of the influence exercised by organized crime on the docks, Corridan focused particular ire on the role of the Shipping Association in preventing needed reform and tolerating crime and corruption. He was also vocal in decrying the way the ILA had abdicated its role as an advocate for its own membership. "The ILA in this harbor is a racket union," he said. "We have slave labor today because the men have no voice in their union."[50] Corridan—the model for Father Barry in *On the Waterfront*—undoubtedly felt that supposedly legitimate organizations—the Shipping Association and the ILA—were more susceptible to argument and persuasion than were lawless chieftains who presided over the criminal underworld.

Not, perhaps, the worst of its ills, but the shape-up system also made honest longshoremen especially vulnerable to loan-shark operations, since a family needed groceries whether its breadwinner brought home a pay envelope or not. Indeed, some longshoremen told reporter Malcolm Johnson that dock bosses preferred to have their men indebted to the loan sharks, since that made them more tractable. "At the pier where I work you've got to stay in debt to the loan sharks to keep working. As long as you owe them money you find that you keep working. If you are ever lucky enough to pay them off, you suddenly find that you can't work until you borrow from them again," one man said.[51]

Based on successful programs that had earlier been implemented in a number of European ports, as well as in cities along the West Coast of the United States, Edward Swanstrom had long advocated a "decasualization" of the work assignments of longshoremen—that is to say, the adoption of a system that would permit a greater degree of regularity in day-to-day work assignments and, above all, the elimination of the daily shape-up.[52] But it would not be until after World War II and the de facto meltdown of labor-management relations on the New York docks in the wake of Malcolm Johnson's investigations, and the revelations that emerged during the hearings of the Crime Commission, that such decasualization would be achieved. It would be achieved, in large measure, by replacing the thrice-daily shape-up at individual piers with work assignments distributed in publicly operated hiring halls, by eliminating known criminals from the pool of individuals seeking work as longshoremen, and by linking established programs of unemployment insurance with a more regularized work force to provide longshoremen with predictable levels of take-home pay.

Clearly, such massive and fundamental reform could not—and did not—happen all at once, and questions would continue to be raised as to the thoroughness of labor reform on the New York waterfront. At first, the ILA vigorously opposed efforts that stemmed from the findings of the Crime Commission and refused to cooperate with the agency that was established in 1953 to oversee waterfront hiring, the Waterfront Commission of New York Harbor. But in 1953 the ILA was expelled from the American Federation of Labor (AFL), and as a result of the revelations of the Crime Commission, the ILA's longtime president, Joseph P. Ryan, was forced to step down from his leadership position in the union, a post that he previously intended to retain for the rest of his life.[53]

Exactly how the trauma and reform that labor relations experienced along the New York waterfront in the late 1940s and early 1950s affected the subsequent shift of cargo operations in the port from largely break-bulk to primarily containerized is difficult to assess. Thanks to more progressive labor-management policies in subsequent decades and enlightened leadership at a reformed ILA, longshoremen became willing partners in the shift to containerization and enhanced their own job security as they did so. They would sit down to negotiate with ship owners like Malcom McLean and bring about a new era along the waterfront, one that would see overhead gantry cranes hoisting containerized cargo aboard ship in a fraction of the time it took during the days of break-bulk cargo. Absent the reforms instigated by Malcolm Johnson's articles, though, the corruption that was so rampant along the New York waterfront could well have had an extraordinarily negative effect on the onset of containerization, and substantially affected the subsequent success it would achieve in New York Harbor.

4 SEA-LAND

THE FIRST DECADE

1956–66

If Malcom McLean's Pan-Atlantic Steamship Company pioneered container-ship operations with the April 26, 1956, voyage of *Ideal X* from Port Newark to Houston, the idea of carrying detachable highway trailers aboard oceangoing ships would quickly gain popularity throughout the maritime world. Interestingly, though, while the overwhelming majority of the world's contemporary container ships do not sail under the U.S. flag, virtually all the industry's early developments were achievements of American steamship companies and the U.S. merchant marine.

Others Imitate McLean

The second major deepwater operator to experiment with the concept of transporting seaborne cargo in intermodal containers was a truly old-line U.S. steamship company, the Matson Line.[1] Matson vessels have long provided an important link between California and Hawaii, as well as points further west in the South Pacific. When Matson's *Hawaiian Merchant,* a C-3 cargo ship that had been built in 1945, quietly slipped under the Golden Gate Bridge and set a course for Honolulu on August 31, 1958, it marked the inauguration of container service on the Pacific. *Hawaiian Merchant* had been rigged to carry a modest number of containers as deck cargo—a mere twenty or so—while her below-deck holds remained configured for conventional break-bulk cargo. The vessel reached Honolulu on September 6, 1958, and its containers were offloaded onto narrow-gauge flatcars of the Oahu Railway and hauled away from the pier by a diminutive diesel locomotive. (By 1958, the Oahu Railway operated trackage only in the immediate terminal area, and the containers that arrived aboard *Hawaiian Merchant* had to be transferred to trailer trucks in a nearby freight yard for final delivery.)

Five other Matson C-3s were also outfitted to transport containers atop their hatch covers at roughly the same time, and Wayne Horvitz, an executive with Matson at the time, later downplayed the novelty of transporting containers as deck cargo. He likened such transport to hoisting any kind of large and unwieldy cargo aboard ship. "It's like you're loading an elephant for the Ringling Brothers Circus," Horvitz later remarked of Matson's initial efforts at containerization.[2] When Matson later added ro/ro (roll-on, roll-off) vessels to its fleet, circus elephants were able to perambulate aboard ship—on their own hoofs—and forgo the indignity of the cargo hoist.

Two years later, in the spring of 1960, Matson introduced its first all-container cargo ship on the San Francisco–Honolulu run, the *Hawaiian Citizen*. She, too, began life as a wartime C-3, and after being rebuilt into a fully cellular container ship at Willamette Iron and Steel's yard in Portland, Oregon, she was able to handle 356 containers.[3] Design work for the conversion was handled by Gibbs and Cox, and *Hawaiian Citizen* set sail for Honolulu from the Encinal Terminals in Alameda, California, on May 19, 1960, with a less-than-capacity load of 237 containers aboard. Twenty-six were refrigerated units that required electrical connections with an auxiliary power system aboard the ship to ensure that proper temperatures were maintained inside these containers during the voyage. Unlike Malcom McLean's *Gateway City* and her five sister ships, *Hawaiian Citizen* included no onboard gantry cranes for loading and unloading containers and relied, instead, on shoreside facilities for such tasks. Robert Pfeiffer, the long-time chairman of Matson, recently reflected on this difference between himself and Malcom McLean. "And we'd have friendly arguments. He believed in cranes being on the ship, we believed in cranes [that] are on the dock," Pfeiffer said.[4]

In addition, unlike the thirty-five-foot trailers that Pan-Atlantic specified for its rapidly growing fleet of container ships, Matson, following an extensive engineering analysis, concluded that a twenty-four-foot trailer body was perfect for the unique conditions that prevailed in its Hawaiian trade. (At the time, California permitted two twenty-four-foot trailers to be hauled by a single tractor on most state highways, while twenty-four-footers were also more appropriate for narrow Hawaiian roadways.) Oddly enough, while Pan-Atlantic and Matson can rightly be regarded as the two most important pioneers of seagoing container service in the maritime industry, each company adopted a trailer body whose length would prove to be at variance with industry-wide standards that would soon emerge. Matson converted a number of additional C-2 and C-3 cargo vessels into fully cellular container ships, as well as five larger C-4s. (See chapter 8 for additional treatment of Matson's container services.)

In 1960, a storied U.S. steamship company whose specialty had long been cargo and passenger service to Central and South America, the Grace Line, wrote another chapter in the growing field of containerized transport when it dispatched the first such vessel to sail from the United States to a foreign port. Grace Line's *Santa Eliana* was converted into an all-container ship from a wartime C-2 in Baltimore in late 1959 at the yard of the Maryland Shipbuilding and Dry Dock Company. Design work was under the direction of the George G. Sharp firm, which had handled the conversion of Pan-Atlantic's *Gateway City* and her five sister ships two years earlier. The effort for Grace Line reflected many of the same general concepts: outboard sponsons added to the hull, onboard gantry cranes, cellular container storage below deck with additional units secured on the weather deck atop the hatch covers.[5] *Santa Eliana*'s conversion differed slightly from *Gateway City*'s in that her length was increased by having a new forty-five-foot section spliced into the middle of her hull, and it may well be that this modest increase in hull length gave the Grace Line conversion a more pleasant appearance than the earlier Sea-Land effort. The magazine *Via the Port of New York* characterized *Santa Eliana* as looking "graceful"—no pun intended, presumably—and while maritime commentators had lots of good things to say about *Gateway City* when she entered service in 1957, all spoke to the vessel's new forms of efficiency, while none felt compelled to offer any compliments about that vessel's aesthetics.[6]

The overall cost of the Grace Line conversion was $6.9 million, and because Grace was a longtime participant in various subsidy programs run by the U.S. Maritime Administration, the federal government assisted the steamship company in paying for the conversion. Malcom McLean, on the other hand, long believed that federal subsidies were part of what was wrong with the U.S. merchant marine and never sought financial assistance from Washington for his container-ship operations.[7]

Grace Line adopted seventeen-foot trailers to initiate its new international service to Latin America, containers that were decorated with the legend the company adopted for its new venture: "Grace Line Seatainer

Service." To underscore the importance it was placing on its new container operations, Grace Line painted the hulls of its converted container ships in the same shade of gray it was then applying to the company's luxury passenger liners, not the black more commonly used for run-of-the-mill cargo vessels. *Santa Eliana* included a traditional Grace Line funnel, dark green topped off with a white and black band. Grace Line's first container ship could accommodate 476 containers—382 in cells below deck, the rest topside on the weather deck.

Santa Eliana departed from Berth 16 at Port Newark, where Grace had leased space for its new international container service, on Friday, January 30, 1960. Captain Ronald Mackenzie was on the bridge, and *Santa Eliana* was carrying a less-than-capacity load of 176 containers filled with such U.S. export products as radios, machinery, chemicals, beer, aspirin, and bubblegum. The schedule called for stops at three separate cities in Venezuela, the first of which was to be La Guayra, a small port in the eastern part of the country just across the Gulf of Paria from Port-of-Spain, Trinidad. Following La Guayra, calls were scheduled at Puerto Cabello and Maracaibo, and on the return trip to Port Newark, *Santa Eliana* would carry but a single containerized commodity—coffee. Along with a sister ship whose conversion Maryland Shipbuilding was in the final stages of completing, another C-2 called the *Santa Leonor*, Grace Line was poised to offer weekly container service between Port Newark and Venezuela.

Except things did not exactly go as planned. When Captain Mackenzie reached La Guayra, the Venezuelan Federation of Port Workers refused to let its members unload the containers that *Santa Eliana* was carrying, and a protracted standoff ensued. The union was concerned over the labor-saving implications of containerization and was attempting to ensure that its members would not lose work—and, more important, wages—with the onset of the new and more productive form of transport. *Santa Eliana* remained anchored outside the harbor at La Guayra for over two weeks while representatives of the stevedores, Grace Line, and the Venezuelan government tried to find common ground for a settlement.[8]

A settlement was eventually reached, but it was more temporary truce than permanent solution. *Santa Eliana* could proceed into port and unload its containers, but Grace Line agreed that it would not dispatch any more container ships to Venezuela until a permanent arrangement was negotiated with the federation.

It took two years before Grace and the Venezuelan longshoremen reached such an accommodation, and *Santa Eliana* and *Santa Leonor* remained tied up during the negotiations, with Grace Line supposedly incurring $2,000 in per-day and per-ship costs. Grace Line officials contacted United States Lines and inquired as to that company's interest in establishing a jointly operated transatlantic container service—ships, containers and terminal facilities at Port Newark supplied by Grace, the transatlantic route, service marketing and docking rights in Tilbury, England, the contribution of U.S. Lines. U.S. Lines, however, had no interest in such an arrangement, believing, at the time, that containerization was a short-term fad that was unworthy of its attention. Meanwhile, discussions and negotiations in Venezuela quickly spread to matters quite beyond the original issue and involved questions associated with how Grace Line's new container ships would impact the operations of break-bulk cargo ships sailing for the Venezuelan Line—and the jobs of workers who toiled aboard such vessels.

In October 1962, Grace announced that the two vessels would soon resume—or, more properly, inaugurate—the service for which they were intended. Another labor issue erupted at the last minute to complicate matters further, though, this one involving a Manhattan local of the International Longshoreman's Association (ILA) that objected to the transfer of work from the Hudson River piers that Grace Line traditionally used to Port Newark, a dispute in which the ILA found an unexpected international ally in the same Venezuelan longshoremen's union that scotched Grace Line's original plans back in 1960. Once this dispute was resolved, *Santa Eliana* and *Santa Leonor* went to work on the world's first international container-ship service in late 1962. But the labor agreements on which the service was based proved to be illusory and the two vessels were quickly withdrawn, never to operate in Grace Line service again.

Interestingly, Malcom McLean had faced a similar standoff by Caribbean labor interests when he attempted to inaugurate container service to Puerto Rico in 1958. McLean, of course, was anxious to expand his operations, and after successfully establishing service between Atlantic and Gulf Coast ports in 1956 and 1957, the next sector he felt was an appropriate market for container-carrying vessels was service to and from the island commonwealth of Puerto Rico, a jurisdiction heavily dependent on a steady flow of imports from the mainland. Rather than operate his intended new service under the Pan-Atlantic house flag, McLean utilized a separate operating company that was called the Waterman Steamship

Corporation of Puerto Rico, and on February 27, 1958, *Bienville*—one of *Gateway City*'s five sister ships—set sail from Port Newark with 266 containers aboard, many of them refrigerated units filled with meats, fruits, and vegetables.

It proved to be a singularly unsuccessful inaugural. Because when *Bienville* reached San Juan several days later, longshoremen there who were members of the United Dock Workers refused to unload the vessel, since they had grave reservations about job security. The standoff continued for the better part of a month, with the governor of Puerto Rico, Luis Muñoz Marín, playing a personal role in efforts to find common ground. Finally, on March 27, four weeks after she had set sail from Port Newark, *Bienville* left San Juan, all cargo still aboard, and set a course for New Orleans while matters were allowed to sort themselves out.[9]

Over the next several months, McLean negotiated a long-term agreement not with the United Dock Workers but with the ILA, a much larger labor union that he had successfully dealt with in New York and other mainland ports. In late July 1958 container-ship service between Port Newark and Puerto Rico finally got under way, with *Azalea City* and *Fairland* now assigned to the service.[10]

Oddly enough, a steamship operator called Seatrain Lines also faced the problem of uncooperative Latin American longshoremen back in 1928 when that company attempted to inaugurate a style of cargo service that anticipated McLean-style container operations in several important respects.

Seatrain—more formally the Over-Seas Steamship Company—specialized in transporting cargo in sealed containers that could travel from shipper to consignee without any en-route handling by the likes of stevedores. Except the "containers" that traveled aboard Seatrain vessels were not highway trailers detached from their running gear by gantry cranes; they were full-size railroad boxcars that were hoisted aboard ship at the company's various terminals. Boxcars—ninety or so of them—traveled as cargo on a Seatrain vessel running gear and all, and the several decks of the company's highly specialized vessels were equipped with railroad tracks so cars could be shunted forward and aft by mechanical devices aboard ship.[11]

In any event, Seatrain's initial market was service between U.S. ports and Cuba. Except when the first Seatrain vessel—a British-built ship that was registered in Canada and called, appropriately enough, *Seatrain*—steamed into Havana Harbor in December 1928, Cuban longshoremen told the vessel's captain that it was their intention not only to hoist the box cars ashore as Seatrain intended, but to remove cargo from the freight cars on the pier, manually, once they were brought ashore, then restore it all back aboard the cars before turning them over to Cuban railways for eventual delivery to their destinations. Seatrain soon worked out an agreement with the longshoremen in Havana, but it was a foreshadowing, certainly, of difficulties Malcom McLean would later face in Puerto Rico, and Grace Line would experience in Venezuela.

Seatrain, a company with corporate links to the Ward Line, was both a commercial and an operational success, and turned a nice profit hauling loaded freight cars between ports along the East Coast, and across the Straits of Florida to Cuba, onward from the late 1920s. The original *Seatrain* was later renamed *Seatrain New Orleans*, re-flagged in the United States, and became part of a fleet that grew to five vessels by 1940. Seatrain Lines made an aggressive effort to adapt its operations to the realities of containerization in the post-*Gateway City* era, and not without some success. Although Seatrain was liquidated in 1982, for several seasons the company could well be regarded as providing Malcom McLean with some of his most vigorous competition.[12]

Another company that attempted to enter the new "trucks-at-sea" market in the late 1950s was called the Erie and Saint Lawrence Corporation. After lengthy studies and evaluations, the firm retained the George G. Sharp firm to design a pair of yachtlike, diesel-powered vessels that, depending on one's definitions, could merit the distinction of being the first container ships to be built from the keel up in the United States.

The vessels were small—362 feet from stem to stern—and while they could transport containers, they were primarily ro/ro vessels and accommodated a maximum of 190 loaded containers, either as deck cargo or in a garage-like lower deck that was reached through a stern gate. Neither ship was equipped with vertical cells for carrying containers in their holds, a feature that would soon come to be regarded as mandatory for calling a vessel a bona fide container ship. Built at Maryland Shipbuilding and Dry Dock, the twin motor vessels were called *New Yorker* and *Floridian*, and they inaugurated a New York–Jacksonville route in the summer of 1960.[13]

The wonderfully named Erie and Saint Lawrence Corporation would not prove durable, however, and the company hauled down its flag in April 1961, less than a year after service was inaugurated. The Bull Line then charted *New Yorker* and *Floridian* for service between Florida and

Puerto Rico, but Bull Line, as will be seen shortly, was also on its last legs. *New Yorker* and *Floridian* were later acquired by Malcom McLean and used in service to Puerto Rico, primarily for their ro/ro capabilities. *Floridian* would enjoy a relatively brief tenure with McLean, but *New Yorker*, later renamed *Aleutian Developer*, was deployed for many years as a feeder vessel on the northern end of a route the company would soon inaugurate between Seattle and Alaska.

No More Pan-Atlantic

With the onset of a new decade, McLean decided it was time to retire the Pan-Atlantic name and logo. From early 1960 onward, his entire intermodal venture—trucks, trailers, and ships—would be known as Sea-Land Service, formally as well as informally. The company was operating container ships between East and Gulf coast ports, also from the mainland to Puerto Rico, and the concept McLean had introduced was not only proving to be a practical and attractive alternative for shippers, after suffering losses during its startup years, in 1960 the company began to post annual profits. (Sea-Land veterans of the early years tell of payless paydays from time to time when the new company's cash flow was less than robust.)

Sea-Land Service was also unusual to the extent that it was a U.S.-flag deepwater steamship company that was operating with no subsidies from the federal government. Onward from the passage of the Merchant Marine Act of 1936, the United States Government made funds available for oceangoing steamship companies under two general programs. One was a construction-differential subsidy that provided ship owners with money to help offset the higher labor costs associated with ship construction in domestic ship yards, while the other was an operating-differential subsidy that helped steamship lines offset the higher wages American crews typically earned. Since the Jones Act prohibited foreign-flag steamship companies from offering any wholly domestic services, operating-differential subsidies were not available for such trades, although construction-differential subsidies certainly were. The dual subsidies, justified as public policy to ensure a vigorous and active merchant marine in the event of future war, had become a virtual article of faith for many elements of the U.S. maritime industry. It was a faith, however, toward which Malcom McLean and Sea-Land maintained a posture of total apostasy.

While McLean was steadfast in keeping Sea-Land free of any encumbrances associated with various government subsidies, a different approach prevailed at Waterman Steamship, also a subsidiary of McLean

Industries. Initially, Pan-Atlantic and Waterman were jointly managed out of the older company's headquarters in Mobile. By 1958, though, McLean decided that a few degrees of separation would be a better idea. Waterman was about to go a different way and was seeking federal subsidies for its international services, while it was also becoming clear that the epicenter of Pan-Atlantic's new container operations was New York Harbor. So James McLean was left to manage the Waterman side of the house in Mobile, and McLean Industries also remained in Mobile. But Malcom McLean moved north and established a new headquarters for Pan-Atlantic in an old pineapple warehouse at the foot of Doremus Avenue in Port Newark.[14]

The next area that McLean felt was an appropriate market for container-ship operation was service between the East Coast and the West Coast via the Panama Canal, a lucrative trade for break-bulk cargo ships before World War II but virtually abandoned by steamship companies in the face of railroad competition in the postwar era.

On March 22, 1961, the 110-year-old Luckenbach Steamship Company dispatched its C-4 cargo ship *Marine Snapper* from San Francisco. It was bound for the East Coast, and coupled with an earlier departure from Brooklyn for San Francisco of the same company's *Lena Luckenbach*, it was widely thought that intercoastal cargo service had come to a sad, inevitable, and probably permanent end, since Luckenbach, the only company then offering such service, had announced it would do so no longer. "We were truly driven out of this trade by actions of the Interstate Commerce Commission favoring the railroads," the company's president, Edgar F. Luckenbach, said.[15] Mere weeks later, though, Malcom McLean announced that Sea-Land would soon restore intercoastal steamship service.[16]

Pan-Atlantic had petitioned the ICC for authority to operate intercoastal service in 1956. The commission granted McLean's company permanent authority in November of 1957, and it was on the strength of this ICC action that Sea-Land revived intercoastal service in 1961 using a pair of conventional C-2 break-bulk cargo ships from the Waterman fleet. Although it had not been converted into a genuine cellular container ship, *Fairport* began loading containers and general cargo in Portland, Oregon, on April 14, 1961, and transported this cargo from the West Coast to San Juan, Puerto Rico, where containers were transferred to one of McLean's specialized vessels for the final leg of the voyage to Port Newark. True container-ship service to and from the West Coast would have to wait on the availability of a new generation of Sea-Land container-carrying vessels that were then under development.

Elizabethport and Her Sister Ships

The vessels McLean acquired for his new intercoastal service involved more than the mere conversion of older tonnage for container-carrying service, although they did not quite constitute anything that could be regarded as vessels that were purpose-built from the keel up. The project would also involve shipyard work performed on two different continents.

The starting point of the new class of container ships was a quartet of veteran T-3 tankers that McLean acquired from Esso Standard Oil. Once dry-docked, shipyard workers proceeded to cut off both the bow and the stern of each old tanker, the latter being that portion of the ship where the vessel's propulsion machinery was located. Liberated midsections were discarded, while boilers and engines were overhauled and returned to like-new condition. Unlike many wartime T-2s that were built with turbo-electric propulsion because marine reduction gears were difficult to acquire, the ex-Esso T-3s featured steam turbine engines geared to the propeller shaft. Meanwhile, an entirely new 417-foot midbody section that had been constructed across the Atlantic at a shipyard in Hamburg, West Germany, was towed to North America to mate up with the bow and stern of the old T-3.[17]

One minor problem was that the midbodies had been designed on the assumption they would be spliced into T-2 tankers, not the slightly different T-3s McLean eventually acquired. Some last-minute design revisions were required to match the new midbodies to the dimensions of the T-3, but once joined, and with a new bridge and deckhouse built atop the stern section, McLean's design foreshadowed the general profile of most contemporary container ships—pilothouse and deckhouse aft, with cargo holds located between the deckhouse and the bow. Sea-Land itself, as well as other companies, would deviate from this profile from time to time in subsequent years, but the general appearance the new class of vessels exhibited in the early 1960s would effectively foreshadow common features of many container ships in the following decades.

To handle design work for these latest additions to his fleet, McLean retained the services of the J. J. Henry Company, an eminent New York naval architecture firm that would go on to enjoy a long and productive relationship with Sea-Land. The design Henry executed produced "new" vessels that were 628 feet long—as against the 501 feet of the T-3 tankers out of which they were partially built. The conventions of vessel documentation are such, however, that each reconfigured ship retained the same government-issued official number as the tanker whose bow, stern, and propulsion machinery it utilized, and could thus be considered the same vessel as the older T-3. This was a far from trivial matter, because thanks to a legal interpretation issued by the United States Customs Service, McLean was able to have new midbodies constructed in less costly European shipyards while still preserving the right to operate his ships in coastwise and intercoastal trades where strict Jones Act requirements prevailed—that is to say, trades requiring vessels that were built in U.S. shipyards. Congress would quickly close this loophole—and Sea-Land's competitors filed suit, unsuccessfully, to have McLean's rebuilt vessels excluded from Jones Act trade.[18] But for a short period of time in the early 1960s, steamship owners were able to regard the overseas construction of an entirely new vessel midbody that was four hundred or more feet long as a mere "repair"—not unlike fixing a broken mast light or putting a new hinge on a pilothouse door—something that did not have to be performed in a U.S. shipyard to retain a vessel's right to operate in Jones Act service.

The first of the new class was completed at Todd's Hoboken yard across the Hudson River from midtown Manhattan in the fall of 1962 and was christened *Elizabethport*, to honor a new 92-acre, $150 million Sea-Land terminal and office complex on the shore of Newark Bay, but to the south of the Port Newark terminal at the foot of Doremus Avenue that McLean's ships had previously used. Built by the Port of New York Authority and leased to Sea-Land, the new facility included five steamship berths, as well as an open area where two thousand containers could be stored. (By this time, Sea-Land owned more than eight thousand containers, plus five thousand chassis to move containers over streets and highways to and from their landside origins and destinations.) Sea-Land executives and staff were also able to move out of the former pineapple warehouse they used as a headquarters building at Port Newark and manage the company's expanding business, instead, from a new and modern 200,000-square-foot office building at the new site.[19] Among the benefits incorporated into the new complex was an up-to-date computer system for monitoring the location of ships and containers throughout the company's rapidly expanding service area.

When Sea-Land was working out of the Doremus Avenue facility, the only technique for keeping track of where various containers were located around the Port Newark property was a big magnetic board inside one of the offices that featured an outline map of the facility, and a quantity of colored and numbered magnets that were positioned on the board to indicate where individual containers had been parked. One weekend—or at least so the story goes—a Sea-Land executive brought his young son to the office and told the boy to amuse himself for a hour or so while he took care of some paperwork. The youngster did, except when the operations staff reported for work early Monday morning, they found all the numbered magnets stacked neatly on the floor, and nobody had the slightest clue where any of over 2,500 containers were to be found around the yard.[20]

With a 417-foot midbody section that had been built at the Schlieker Werft yard in Hamburg, West Germany, and towed across the North Atlantic by the Dutch tug *Thames,* and with a bow, stern and machinery that had previously been the heart of the T-3 tanker *Esso New Orleans*, Sea-Land's newest container ship, *Elizabethport,* set sail from her namesake city on September 8, 1962, bound for Los Angeles and San Francisco. Several days after heading out the Kill van Kull and clearing New York Harbor, *Elizabethport* earned the honor of being the first all-container ship to transit the Panama Canal, and on September 26, the eighteenth day of the voyage, *Elizabethport* sailed under the Golden Gate Bridge and into San Francisco Bay.

(Speaking of lengthy voyages, the tug *Thames* required fifty-one days to tow *Elizabethport*'s new midbody from Hamburg to Hoboken. By contrast, a fifteenth-century Italian navigator by the name of Columbus was able to sail from Palos, Spain, to the New World in seventy days—and that included a four-week stopover for repairs in the Canary Islands.)

In the same month that *Elizabethport* inaugurated container-ship service between New York and the West Coast, the newly created New York Mets, the National League successor of the since-departed Dodgers and Giants, who had been scheduled to play each other on the day *Ideal-X* inaugurated the container-ship era, completed the team's first season in the big leagues, and managed to lose a grand total of 120 games, a dubious achievement that no major league team has yet been able to exceed or equal.

During the weeks and months after *Elizabethport* inaugurated container service between New York and the West Coast, three sister ships were delivered to Sea-Land that incorporated the same design concept—bow, stern, and machinery from a T-3 tanker, with a new midbody built in West Germany and towed across the North Atlantic. Like McLean's earlier C-2 conversions, the new vessels featured onboard gantry cranes for hoisting containers on and off ship. By way of capacity, the reconfigured vessels were able to handle 476 of the thirty-five-foot containers Sea-Land still preferred to use, better than double the capacity of *Gateway City* and her sister ships. With the advent of the four new vessels, Sea-Land's roster of container ships grew to ten hulls, *Ideal X* and the other T-2 tankers of 1956 having been quietly withdrawn from service and sold. Table 4.1 identifies the four vessels that McLean added to his fleet in 1962 to inaugurate intercoastal container service.

TABLE 4.1. *Sea-Land Fleet: T-3 Tankers of 1962*

Off. No.	Name	Hull dimensions	GRT	Place built (year)	Notes
242557	*Elizabethport* a) *Esso New Orleans* b) *New Orleans*	627 × 78 × 27	16,395	Chester, Pa. (1942)	1
241153	*Los Angeles* a) *Esso Albany* b) USS *Housatonic* c) *Esso Albany* d) *Esso Bethlehem*	620 × 78 × 30	16,395	Chester, Pa. (1941)	2
241220	*San Francisco* a) *Esso Trenton* b) USS *Chicopee* c) *Esso Trenton* d) *Esso Chattanooga*	630 × 78 × 27	16,401	Chester, Pa. (1941)	3
242653	*San Juan* a) *Esso Raleigh*	630 × 78 × 27	16,395	Chester, Pa. (1942)	2

Notes

1. Rebuilt for container service by Todd Shipyards, Hoboken, N.J.
2. Rebuilt for container service by Bethlehem Steel, Hoboken, N.J.
3. Rebuilt for container service by Bethlehem Steel, Baltimore, Md.

A brief reflection is in order, though, about the novelty—and the value—of placing a vessel's pilothouse and its deckhouse close to the stern. A few years earlier, Henry J. Karsch, of the same J. J. Henry Company that did the design work for the Sea-Land conversions, had been project manager for an effort that resulted in the lengthening of several T-2 tankers for Hess Petroleum, and Karach was instrumental in having these conversions include the concept of an aft deckhouse. Some years later, a conventional tanker of another company with its bridge and deckhouse amidships suffered an unfortunate explosion, a blast that took a heavy toll on the ship's crew who were working in the amidships superstructure—directly over the vessel's petroleum-carrying tanks.

After this tragedy, aft superstructures became the rule on tankers, and it was Karach who advocated placing *Elizabethport*'s pilothouse atop an aft deckhouse. This, too, would soon become standard container-ship practice, although not for the same safety-related reasons as prevailed aboard tankers. With container ships, placing a vessel's container-carrying holds in an open area not bisected by an amidships deckhouse greatly facilities the work of gantry cranes in loading and unloading a vessel, although in subsequent years, many container ships whose deckhouse was located well aft would also carry a small number of containers behind the deckhouse. From a navigational perspective, an aft pilothouse places the ship's officers further away from the bow, but it provides a better perspective on how the ship is performing, especially while maneuvering in close quarters. With a pilothouse located forward, it is sometimes difficult to detect when the stern of the ship has begun to swing in one direction or another.

In 1963, the year after Sea-Land began running *Elizabethport* and her three sister ships between the East and West coasts, the company acquired an unusual piece of marine equipment so container service could be extended north beyond San Francisco Bay to Portland, Oregon. The new addition was a 313-foot unpowered barge that was certified for open-ocean use, could accommodate sixty-seven thirty-five-foot containers on two separate decks, and was named *Columbia*. Unlike Sea-Land's ordinary container ships, though, *Columbia* was a ro/ro vessel, and most of the trailers it transported rode on their own undercarriage. *Columbia*, of course, could only travel between San Francisco and Portland in the company of a powerful seagoing tug, and Sea-Land contracted with the Foss Launch and Tug Company of Seattle to provide such propulsion.[21] Two years after entering service, *Columbia* would become one of Sea-Land's few deep-sea casualties. On February 27, 1965, while en route north out of Oakland, tug and barge found themselves racked by a severe Pacific storm. The tug's crew was forced to cut the barge loose, and *Columbia* promptly sank—along with sixteen containers and ten chassis.[22]

Also roughly coincident with Sea-Land's extension of container service to the West Coast was another new option for the company's customers: the opening of a terminal in New York in mid-1961 that catered to what, in railroad parlance, would be called "less than carload lots" (LCL) of freight. With Sea-Land, the term might be revised to "less than container lots," but the fact remains that a new Sea-Land terminal at 501 West 19th Street, in Manhattan, was a place where shippers could send smaller consignments that Sea-Land would then consolidate, place aboard containers, and forward to their destinations.[23]

A final matter that relates to Sea-Land's inauguration of intercoastal service in the early 1960s is the fact that a one-time operator of such service, the American-Hawaiian Steamship Company, was actively considering a reentry into the market. In 1955, American-Hawaiian had come under the control of an American shipping executive of extraordinary talent, Daniel K. Ludwig. American-Hawaiian had withdrawn from intercoastal service two years earlier in 1953, but after Ludwig took charge, all manner of proposals began to surface to the effect that the company would acquire ten new container ships and resume service between the East Coast and the West Coast.

In point of fact, American-Hawaiian would acquire no new vessels, and since Ludwig disposed of all the company's other tonnage in 1956, the American-Hawaiian house flag would never again fly from the mast of any vessel. But Ludwig's maneuverings were taken quite seriously, and the upshot of it all was an agreement between Ludwig and McLean that saw Ludwig purchase 800,000 shares of Sea-Land stock and become a major investor in McLean's company. Daniel Ludwig did not remain a force at Sea-Land for very long, and he soon redirected his talents and capital to the sector with which he will always remain most identified: the construction and operation of tankers and other kinds of bulk carriers.[24]

Management Style

As Sea-Land grew from a small company promoting a new and untested transport technology into a major force in the U.S. merchant marine, the way the company conducted its business also evolved. Initially, Sea-Land was a freewheeling operation that had little regard for the kind of constraints—that is to say, established business procedures—that were common at older companies, particularly older steamship companies. Malcom McLean's own managerial style went hand in glove with the character of the company's early years, and some trace his tolerance for such an approach to his own roots in the over-the-road trucking industry, a sector that was hardly known for its button-down behavior.

McLean's own penchant for numbers and his ability to absorb, analyze, and recall instantly enormous volumes of quantitative data set the tone. Sea-Land veterans remember how during the early years at Port Newark, he would constantly scribble odd notes to himself on small scraps of paper and toss them indiscriminately into one of his desk drawers. Weeks and even months later, when a related matter was under discussion, McLean had the uncanny ability to open the drawer and fish out whatever it was he had earlier reminded himself, and bring it to bear on the topic at hand. One Sea-Land veteran from the early days likened working for Malcom McLean to trying to get a drink of water from a firehose.[25]

While many people characterize Sea-Land's early days as freewheeling and unstructured, there were a number of sound business principles the company religiously observed. One of these was the importance of paying proper attention to the recruitment and training of new personnel. Sea-Land quickly gained a reputation for the quality of its recruitment and training programs, and the company was in a class by itself in the importance it placed on instilling a management way of thinking in its trainees. Paul Richardson, a man who went to work for McLean Trucking directly out of college in 1952 and subsequently accompanied Malcom McLean to Sea-Land, where he would eventually serve as the company's president, felt that a major difference between Malcom McLean's enterprise and rival elements of the U.S. merchant marine is that while other executives primarily saw themselves as steamship operators, the people at Sea-Land saw themselves as managers.[26]

Sea-Land was equally conscientious in the recruitment of its maritime personnel. One important indicator of the satisfactory working environment aboard Sea-Land vessels was an extraordinarily low turnover rate among licensed people. When an officer was appointed master of a given vessel, for example, he would remain with that vessel for an extended tenure, until a promotion might develop to a newer or larger vessel, perhaps. In addition, when a vessel's master was enjoying shore leave, it was routine Sea-Land practice to have the ship's first officer assume his duties rather than place a different officer aboard, a practice that contributed positively to shipboard morale. Sea-Land very much regarded the officers aboard its ships as part of the company's management team, and not as a separate class of "mere employees."[27]

Charles Cushing, a Sea-Land veteran and confidant of Malcom McLean, recently reflected on the various cultures that were brought together to create Sea-Land. There were people from the maritime industry who ran the company's ships, longshoremen who worked in the various ports, lots of people with a background in the trucking industry, new hires fresh from some of the best universities in the country, and overlaying it all, a large delegation of southerners. Out of this unusual mix, though, would emerge a sharply focused and smooth-running organization.[28]

North to Alaska

The next new market for Sea-Land was container service along the Pacific Coast between Alaska and the lower forty-eight. Two former C-4 troopships were in the process of being converted into container ships at Todd's Seattle yard by the A. H. Bull Steamship Company, a venerable operator whose specialty was service to and from Puerto Rico. Bull recognized early on the benefits that containerization might entail; it had already chartered *New Yorker* and *Floridian*, the two small ro/ro vessels built by the ill-fated Erie and Saint Lawrence Corporation, and deployed the pair in service to Puerto Rico.[29]

Although it had recently come under the ownership of Manuel E. Kulukundis and was on the verge of making radical changes in the way it did business, Bull Line was in the throes of serious financial difficulties; the company lost $3.9 million in 1961, for example.[30] McLean had earlier attempted to acquire Bull Line outright and merge it with Sea-Land, and while this proved unsuccessful, in 1962, after Bull Line declared bankruptcy, he was able to purchase the partially converted C-4s and turn them into ships that eventually bore the names *Seattle* and *Anchorage*, the terminals of Sea-Land's new Alaskan service.[31]

On March 27, 1964, southwest Alaska had been struck by an extraordinarily severe earthquake—the "Good Friday earthquake," as it has been called—and when Sea-Land's recently converted container ships made their way around the Kenai Peninsula and up Cook Inlet shortly afterward for the very first time, the cargo they were carrying was largely material to assist in the rebuilding of the earthquake-stricken area. It was the start of a permanent service, though, not a one-time relief effort, thus providing the port of Anchorage with its very first year-round steamship service.

Before Sea-Land's entry into the Alaskan trade, cargo service between Anchorage and Seattle used Seward as a winter port, since ice-clogged Cook Inlet was thought to be impassible. Despite later enthusiasm for intermodal service involving steamships and railroads, McLean wanted no part of hoisting containers from ships to flat cars at Seward and using train service northward from there to Anchorage during wintertime. So after being assured by his maritime people that the key to navigating Cook Inlet during wintertime was to make sure the propeller rode low in the water, Sea-Land decided that year-round service directly into Anchorage was perfectly feasible. (Damage to the thin leading edge of a vessel's propeller blades, not the heavier steel of its hull, was thought to be the more serious threat that the kind of ice found in Cook Inlet represented.[32])

In terms of carrying capacity, when *Seattle* and *Anchorage* were acquired in 1962 and their initial conversion completed, they could each accommodate 166 containers, plus 435,000 cubic feet of break-bulk cargo, the design Bull Line had specified for its service to Puerto Rico. Before deploying the vessels on its new Alaska service two years later in 1964, Sea-Land converted the pair into fully cellular ships that could each handle 360 containers. Initially called *Mobile* and *New Orleans*, they retained their 166-container configuration. Sea-Land used them to inaugurate a new service linking Elizabethport, Baltimore, and San Juan, Puerto Rico—with a stop, southbound, in Jacksonville, Florida. Since Baltimore initially lacked any shoreside facilities for loading containers and the two ex-Bull Line vessels had no onboard gantry cranes, on their early trips, *Mobile* and *New Orleans* carried containers out of Elizabethport, but only break-bulk cargo to and from Baltimore. By April 1963, proper loading facilities had been provided adjacent to a pier owned by the Canton Rail Road, and Baltimore joined the growing list of American ports that were equipped to hoist containers on and off ships.[33]

An older steamship line also inaugurated container service to Alaska at roughly the same time as Sea-Land. The Alaska Steamship Company converted a pair of war-surplus Liberty ships into cellular container ships—rechristened *Tonsina* and *Nadina* for the new operation—and put them in service between Seattle and Seward, but not beyond to Anchorage, like Sea-Land. *Tonsina* and *Nadina* could also accommodate a small quantity of conventional cargo, but they were primarily container ships. Alaska Steamship also converted a third Liberty, the *Oduna*, into a partial container ship and used it to serve Kodiak Island in Alaska's Aleutian chain. *Tonsina* and *Nadina* were unusual container ships in that they were rigged to carry containers—176 of them each—in cells that faced athwartships, not fore and aft as had become standard practice in the still-new industry.[34] It is difficult to verify general statements about Liberty ships, since so many of them wound up operating for so many different companies in so many different parts of the world during the postwar era. But it is thought that the two (or three) Alaska Steamship vessels represent the only instance of Liberty ships being converted into cellular container ships. (They may also be the world's only deepwater container ships that were powered by reciprocating steam engines.) Alas, competition from Sea-Land proved to be the undoing of Alaska Steamship, and the company quietly went out of business in the mid-1960s.[35]

Alaska Steamship, incidentally, should not be confused with Alaska Freight Lines, another waterborne carrier specializing in cargo transport to the land of the midnight sun. Alaska Freight Lines, based in Seattle, was primarily a tug-and-barge operation, and Malcom McLean acquired this company in 1964 to help establish a toehold in the Alaskan market.

Across the North Atlantic

The next important milestone for container-carrying cargo ships would be their deployment on the premier steamship route of all time, service across the North Atlantic from New York to the channel ports of Europe. Despite thoughtful assessments in the mid-1950s that container ships were inappropriate for transatlantic service and would likely remain a wholly domestic innovation, on Friday evening, March 18, 1966, the 13,264-gross-ton, C-4 cargo ship *American Racer*, two years old and flying the house flag of the United States Lines, eased away from North River Pier 62 at the foot of West 22 Street—one of New York's famed "Chelsea piers" that had been built in 1904—and headed out to sea.[36] Secured below deck in her holds, along with other more conventional cargo, were fifty twenty-foot containers. *American Racer*, one of four C-4s United States Lines had outfitted to handle its initial venture into containerized service, belonged to a class of cargo ships that United States Lines called its Challenger Class, but which were also identified as C-4s under Maritime Commission notation.

Viewed from the Bay Ridge shore in Brooklyn as she headed through the Narrows and out to sea that evening, *American Racer* would have looked, for all the world, like any other break-bulk cargo ship, since the containers she was carrying were stowed out of sight and below deck, and she was equipped with all the kingposts and booms of a typical cargo ship. Yet, although she carried other break-bulk cargo that day, she was rigged with genuine cells for holding containers and can rightly be called the first true container ship to cross the North Atlantic. (For more on United States Lines container-ship operations, see chapter 6.) Moore-McCormick also inaugurated transatlantic container service at roughly the same time with a fleet of six C-4s the company had converted into partial container ships.[37]

Sea-Land, though, would not be far behind the competition. McLean's people had been traveling throughout Western Europe putting together a network of local and regional agents to generate business for a proposed transatlantic service and handle various "land" aspects of Sea-Land Service. On the evening of Saturday, April 23, 1966—three days shy of a decade after the departure of *Ideal X* and a mere thirty-six days after *American Racer*'s inauguration of transatlantic container service—Sea-Land's *Fairland* slipped her mornings at Elizabethport and headed out to sea, bound for Rotterdam. (If Southampton and Le Havre were the major channel ports in the days of the great transatlantic passenger liners, Rotterdam long enjoyed—and continues to enjoy—the same distinction with respect to cargo traffic.) Securely stacked above and below *Fairland*'s deck were 226 containers, containing everything from cameras to safety razors to components for prefabricated houses. While *American Racer* will forever hold the distinction of being the first container-carrying merchant ship to cross the North Atlantic, *Fairland*, which reached Rotterdam on May 4, 1966, will likewise be identified as the first all-container cargo ship to link North America and Europe. *Fairland* also called at Bremen, West Germany, and steamed up the Firth of Forth to the Scottish port of Grangemouth before returning to Elizabethport. At Grangemouth, several containers were hoisted aboard that were being sent to bottlers and distributors in the United States and whose contents were wholesale lots of Scotch whiskey.[38]

Before *Fairland*'s initial transatlantic voyage could be called a success, some rather long odds had to be overcome. While the vessel was at sea on its way to Europe, the port agent Sea-Land had retained in Bremen suddenly resigned, and a replacement had to be found on extremely short notice.[39] In the way of bad omens, a crane operator in Bremen was unfamiliar with the controls that held a container on its spreader and he released a container prematurely with fatal results.[40] In addition, at a reception in Rotterdam prior to *Fairland*'s arrival, an executive with Holland America Line, livid over the idea of this American newcomer intruding itself into the venerable transatlantic cargo trade but confident the new service would not succeed, approached Sea-Land's vice president for marketing, Scott Morrison, and all but shouted in his face, "Your containers come here on one trip, and you come back with the next ship and take all the containers home."[41]

Looking back at the first fifty years of container-ship service, the 1956 voyage of *Ideal X* and the 1957 departure of *Gateway City* are important historical benchmarks. But if any one voyage can be said to have grabbed the traditional world steamship establishment by the lapels, given it a good shake, and underscored the point that containerization was here to stay, it was *Fairland*'s 1966 arrival in Rotterdam. Prior to 1966, major steamship companies on both sides of the Atlantic were content to regard Malcom McLean's innovative container ships as a novel idea whose use would be restricted to relatively incidental coastwise and intercoastal domestic services in the United States, with perhaps some deployment in the Caribbean, as well. When *Fairland* steamed into Rotterdam Harbor on May 4, 1966, though, steamship executives would retain such points of view only at their peril. Nor could *Fairland*'s transatlantic voyage be dismissed as any kind of one-time stunt or demonstration. It was the start of a steady weekly service; seven days after *Fairland* set sail from Elizabethport, another Sea-Land container ship followed her across the North Atlantic to the channel ports of Europe.

Some commentators believe that *Fairland*'s call at Grangemouth was a revelation for many European steamship operators; while containers themselves could be ignored as a technical development whose novelty would likely wear off, Sea-Land's ability to lure some of the lucrative Scotch whiskey trade to its new style of service was not something to be treated casually. Malcom McLean himself said that once Sea-Land began to transport whiskey across the North Atlantic, traditional steamship operators "knew the monkey was dead."[42]

To provide a little maritime context for Sea-Land's inaugural transatlantic departure, harbor activity in New York on the day *Fairland* departed for Europe included Furness, Withy's *Queen of Bermuda* and *Ocean Monarch* departing in tandem for Hamilton, Bermuda, as well as Home Line's *Oceanic* leaving port in a style of passenger service that would soon eclipse transatlantic travel in both importance and popularity, a leisure-oriented cruise to Nassau, in the Bahamas. Earlier in the day, the Greek Line's *Queen Frederica* arrived in port from Piraeus, the seaport of Athens, and North German Lloyd's *Bremen* completed a crossing from Bremerhaven and Southampton. The night before *Fairland* set sail for Rotterdam, Sea-Land's *Gateway City*, the company's very first cellular container ship, left Elizabeth on a routine sailing for Jacksonville, Florida. The transatlantic service that *Fairland* inaugurated on April 23, 1966, would become a more dominant market for Sea-Land in future years, while coastwise container service to places like Jacksonville that *Gateway City* was still operating in 1966 would soon fade from the scene—as, indeed, would intercoastal service as well.[43]

The First Decade

Despite the fact that many of its domestic services would soon be deemphasized, the expansion of international routes would ensure that Sea-Land's business continued to grow and the company would find itself in need of additional tonnage on an almost continual basis. In addition, it would be the growth of international markets that would shape the future of the entire container-ship industry and reflect profound forces that were at work in the world's economy.

Sea-Land was always ready to recognize a bargain as the fortunes of other steamship companies waxed and waned and serviceable tonnage came on the market. In 1964, for instance, McLean was quick to react when Grace Line grew exasperated with its inability to sustain its New York-Venezuela container service and declared its converted C-2s, *Santa Eliana* and *Santa Leona,* surplus. Because the conversion of the two cargo vessels into container ships for Grace had been supervised by G. H. Sharp and included many of the same features the firm had earlier incorporated into *Gateway City* and her sister ships in 1957, they were appropriate additions to the Sea-Land fleet. With their cells reconfigured at the Ingalls Shipyard in Pascagoula, Mississippi, to accommodate Sea-Land's thirty-five-foot containers rather than the smaller seventeen-footers that Grace Line preferred to use, the two ships were deployed, initially, in Sea-Land service to and from Puerto Rico.[44]

Because Grace Line had used Construction Differential Subsidies from the federal government to acquire and convert the two vessels, McLean had to pay back a prorated portion of these funds, since he had no intention of using the pair—or any other Sea-Land vessels, for that matter—in any kind of subsidized service. There was also an interesting development in the initial names the two vessels bore once they joined the Sea-Land fleet. McLean planned to inaugurate a new service to Puerto Rico that would bypass San Juan and call, instead, at the island ports of Mayaguez and Ponce, the eventual Sea-Land names of the newly acquired vessels. He was anxious to keep the new service an in-house secret as long as possible and not tip off the competition about his plans. So until they were ready for service, the two ships bore the place-holder names *Sea* and *Land*—and did not become *Mayaguez* and *Ponce* until they were ready to enter service.

Despite its bad luck with *Santa Eliana* and *Santa Leonor*, Grace Line still believed there was a future in carrying containers to and from South America. In 1963 and 1964 it took delivery of four ships that could each accommodate 175 twenty-foot containers—along with 117 passengers—and deployed the quartet in passenger-cargo service between New York and South America. Because the vessels had to load their containers at Port Newark, Grace Line established a small passenger terminal there that the Port Authority built for the line at a cost of $180,000, and while many container ships featured accommodations for a dozen or so passengers, Grace Line's *Santa Magdalena* and her three sister ships are among the very few that were designed and built, from the outset, as combination passenger and cargo/container vessels.[45]

On April 26, 1966, Sea-Land marked the tenth anniversary of the departure of *Ideal X* from Port Newark with a quiet in-house celebration. On the day of the event, *Fairland* was east of Cape Race, Newfoundland, steaming across the North Atlantic toward Rotterdam for the very first time. Table 4.2 presents a snapshot view of the nineteen-vessel Sea-Land fleet as the company completed its first decade of service—nineteen container ships out of a total of fifty-seven such vessels then operating under the U.S. flag for a variety of steamship companies.[46]

The single T-2 conversion of 1963, *Summit*, was to have been a three-ship project; McLean acquired a trio of veteran T-2s for the effort, *Gulflight*—which actually became *Summit*—as well a sister ship, *Gulfmoon*, plus another T-2 called *Baltimore Trader*. The latter two vessels were never converted, though, since Sea-Land was quite favorably impressed with the performance of the converted C-4s it had acquired from Bull Line and would soon acquire additional C-4s for future conversions. The unconverted T-2s were made available for charter work as petroleum carriers for several seasons under the names *Ridgewood* and *Westfield*, though.

The four C-2 conversions of 1965 and 1966 represented additions to the company's original class of true container ships, *Gateway City* and her five

TABLE 4.2. *Sea-Land Fleet: 1966*

Off. No.	Name(s)	Capacity (in 35-foot containers)
C-2 conversions of 1957		
251506	*Gateway City*	226
	a) *Iberville*	
243436	*Azalea City*	226
243438	*Bienville*	226
242073	*Fairland*	226
242074	*Raphael Semmes*	226
251508	*Beauregard*	226
	a) *Afoundria*	
T-3 conversions of 1962		
242557	*Elizabethport*	476
	a) Esso New Orleans	
	b) New Orleans	
241153	*Los Angeles*	476
	a) *Esso Albany*	
	b) *Esso Bethlehem*	
241220	*San Francisco*	476
	a) USS *Chicopee*	
	b) *Esso Trenton*	
	c) *Esso Chattanooga*	
242653	*San Juan*	476
	a) *Esso Raleigh*	
ex-Bull Line C-4 conversions of 1963		
247275	*Seattle*	360
	a) *Marine Fox*	
	b) *Dorothy*	
	c) *Mobile*	
246736	*Anchorage*	360
	a) *Marine Panther*	
	b) *Alicia*	
	c) *New Orleans*	

TABLE 4.2. *(Continued)*

Off. No.	Name(s)	Capacity (in 35-foot containers)
T-2 conversion of 1963		
243658	*Summit*	226
	a) *Jalapa*	
	b) *Gulflight*	
ex-Grace Line C-2 conversions of 1965		
245546	*Mayaguez*	274
	a) *White Falcon*	
	b) *Santa Eliana*	
	c) *Sea*	
245544	*Ponce*	274
	a) *Santa Leonor*	
	b) *Sea*	
C-2 conversions of 1965–66		
251507	*Arizpa*	225
	a) *Jean Lafitte*	
	b) *Warren* (USN)	
245189	*Wacosta*	225
243815	*Warrior*	225
244018	*Afoundria*	225
	Total	5,654

sister ships of a decade or so earlier. While converted from the same subclass of Waterman C-2s as the earlier vessels, this quartet lacked onboard gantry cranes—Sea-Land was beginning to rely more on shoreside cranes—and so they did not require hull sponsons and could be regarded as a simplified version of the earlier conversions. The four vessels did not give Sea-Land any technical improvement in container-ship design, much less performance, and must be seen as an almost desperate effort to expand overall carrying capacity whatever the cost.

As the company began its second decade of service, the Sea-Land fleet would grow beyond these nineteen hulls. In fact on the very day of the anniversary celebration in 1956, shipyards in both Baltimore, Maryland,

and Pascagoula, Mississippi, were putting the finishing touches on still more conversion projects that would soon expand the Sea-Land fleet to twenty-five hulls, a substantial increase of 31 percent. And because the majority of the new vessels would feature greater carrying capacity than any of the older ones, this 31-percent increase in the number of vessels would increase Sea-Land's overall container-carrying capacity by a robust 55 percent.

From Troopships to Container Ships

In early 1964, the U.S. Maritime Administration (MARAD)—the successor agency of the Maritime Commission established in 1936—allocated eighteen surplus C-4 troopships to seven different U.S.-flag steamship companies for conversion into various kinds of cargo vessels. One stipulation of the MARAD offer was that the companies had to use the vessels in services that were not receiving operating-differential subsidies from the government. Such a requirement was made to order for Sea-Land and the company received six of the vessels, more than any other operator, returning an equal number of former Waterman cargo ships to MARAD in exchange.[47] All six of the C-4s had been built in Vancouver, Washington, in 1945 at the Kaiser yard there. Conversion of the troopships into modern container-carrying vessels was a project that cost Sea-Land in excess of $34 million. While two of the six newcomers would be converted with no changes to the basic geometry of their hulls, the four others would follow the general plan Sea-Land had earlier developed for *Elizabethport* and her sister ships. A newly built 443-foot midbody section was spliced between the original bow and stern producing a vessel capable of transporting more than six hundred containers, while the two C-4s that retained their as-built hulls were each able to transport more than three hundred containers. Because Congress had "closed the loophole" that allowed McLean to have the midbodies of *Elizabethport* and her sister ships built in less expensive overseas shipyards, the C-4 conversion involved new midbody sections that were made in the U.S.A.

A further statutory requirement of the MARAD program was that an applicant had to "trade in" another hull before taking title to a vessel from the reserve fleet. There was no stipulation as to the ultimate usefulness of the vessel being traded in, so steamship companies would often take title to old ferryboats or excursion steamers and transfer them to MARAD in exchange for more useful T-2 tankers or C-4 troop ships. Traded-in vessels were often referred to as "box tops" in maritime circles, and the fleet roster in Appendix A identifies various hulls that Sea-Land conveyed to MARAD in exchange for ships that became the heart and soul of its container-carrying fleet in the late 1960s and early 1970s. In any event, table 4.3 provides additional details about Sea-Land's C-4 conversions of 1966.

The advent of the converted C-4s saw McLean orchestrate a financial arrangement that, while common in other U.S. industrial sectors, was regarded as downright radical by a steamship industry that many observers characterized as excessively bound to traditional ways of doing business. The conversion work on four of the C-4s was performed at the Ingalls Shipyard in Pascagoula, Mississippi. And because Ingalls had by then become a subsidiary of Litton Industries, a diversified electronics firm with headquarters in Beverly Hills, California, McLean was able to have Litton establish a new subsidiary, Litton Industries Leasing Corporation, and Sea-Land would acquire the converted vessels through a charter arrangement with Litton. MARAD agreement was required before the arrangement could be executed, and Sea-Land was able to expand its fleet for the proverbial "no money down." It acquired the C-4s from MARAD on the basis of a no-cash exchange for an equal number of ex-Waterman cargo ships, Litton did the conversion at Ingalls and took technical title to the containerships through Litton Leasing, and no money changed hands until Sea-Land's first lease payment came due.[48]

Malcom McLean would later expand the use of Litton for financing his fleet, and additional vessels were conveyed to Litton and then leased back to Sea-Land for operation. Such vessels, while technically owned by Litton Leasing, continued to be decorated in Sea-Land's livery and could only be distinguished from company-owned tonnage by examining enrollment certificates and other legal documents. Sea-Land's livery, incidentally, called for a black (or gray) hull, white superstructure, and a white funnel with a black band at the top, a red band at the bottom, and a stylized "SL" logo in black, white, and red.

Other Matters

Something else that Sea-Land did at the time of its tenth anniversary was largely abandon the idea of hoisting containers on and off ship with onboard cranes. Containerization was here to stay and there was no doubt that shoreside equipment could do a better job—which is to say, a faster job. Furthermore, movable cranes aboard ship limit a vessel's carrying

TABLE 4.3. *Sea-Land Fleet: C-4 Conversions of 1966*

Name of original C-4 troopship	Sea-Land name(s)	Off. No.	Nature of conversion	Where performed
Marine Cardinal	*Baltimore* b) *San Pedro*	248238	No lengthening in 1964; vessel would be lengthened in later years	Maryland S/B; Baltimore, Md.
Marine Shark	*Charleston*	248095	No lengthening in 1964—or ever	Maryland S/B; Baltimore, Md.
Marine Falcon	*Trenton*	248239	New 443-foot midbody spliced between original bow and stern; original propulsion machinery retained	Ingalls S/B; Pascagoula, Miss.
Marine Jumper	*Panama*	248241	New 443-foot midbody spliced between original bow and stern; original propulsion machinery retained	Ingalls S/B; Pascagoula, Miss.
Marine Tiger	*Oakland*	248076	New 443-foot midbody spliced between original bow and stern; original propulsion machinery retained	Ingalls S/B; Pascagoula, Miss.
Marine Flasher	*Long Beach*	248240	New 443-foot midbody spliced between original bow and stern; original propulsion machinery retained	Ingalls S/B; Pascagoula, Miss.

capacity. Sea-Land thus began what would prove to be a continually escalating effort of designing bigger, faster and more far-reaching shoreside gantry cranes to load and unload containers.

In 1966, Sea-Land acquired its first 415-ton gantry crane, a $750,000 product whose operating machinery was built by Pacific Coast Engineering of Alameda, California, and whose steel structure was fabricated on the opposite side of the continent by the Newport News Shipbuilding and Dry Dock Company. When the first of the new cranes was installed at Elizabethport, it was able to load or unload a single container in sixty seconds—as against two or three times longer with the older onboard cranes. In subsequent months, Sea-Land installed twenty-two similar gantry cranes in twelve other important port cities that the company's vessels served.[49]

Expansion and improvement of the Elizabethport facility, of course, would be virtually continuous over the years, to accommodate both Sea-Land and other Port Authority tenants. When Hapag-Lloyd's *Hamburg Express* came on the scene in the late 1970s, for example, and established new standards in container-ship carrying capacity, it required a clearance of 76.5 feet between the vessel's waterline and the underside of the spreader on shoreside cranes to service containers that were stacked four high atop the vessel's hatch covers. And because the Port Authority recognized that even larger vessels would soon follow *Hamburg Express*, C. R. Cushing and Company was retained to help upgrade the port's cranes.

Instead of recommending the acquisition of totally new cranes, the Cushing firm was able to design a set of upgrades for the existing equipment. Some cranes were improved by using hydraulic jacks and splicing new steelwork into their base. For others, though, a massive floating crane, owned by Sun Shipbuilding, was brought to Elizabethport to lift the topmost part off a crane and set it aside gently, while new steelwork added footage to the lower portion of the crane. Because the Port Authority was increasing the height of steel structures that were adjacent to Newark International Airport, the project had to be approved by the Federal Aviation Administration before it could proceed to ensure the added height represented no hazard to arriving and departing aircraft.[50]

Another service enhancement that Sea-Land arranged roughly coincident with the company's tenth anniversary was connecting service, by contract carriers, to and from smaller ports that conventional container ships could not visit. In Puerto Rico, for instance, a company called Slater Boat Service took delivery of a 166-foot motor vessel whose design was based on boats that had been developed to service offshore oil rigs in the Gulf of Mexico—head boats, as they are sometimes called. *Rio Haina* was built at Moss Point, Mississippi, by Halter Marine and could accommodate two dozen thirty-five-foot containers on her open rear deck. While not owned by Sea-Land, because she hauled containers decorated with the distinctive Sea-Land logo and featured the same decoration on her own stacks, *Rio Haina* appeared, for all the world, as if it were the smallest container ship in the growing Sea-Land fleet as the vessel moved containers on short voyages between Sea-Land's terminal in San Juan and smaller ports around the island commonwealth, as well as in nearby Caribbean countries. The namesake of *Rio Haina*, for instance, is a small seaport in the Dominican Republic.[51]

Sea-Land's Scott Morrison has suggested that Malcom McLean's background in the trucking industry was a factor in adopting such a system of line-haul service between major ports, and feeder operations onward to smaller ports, something that will continue to characterize Sea-Land for many years.[52] Morrison also suggests that it was a casual conversation about Sea-Land's feeder system with a Maplewood, New Jersey, neighbor while sitting around a swimming pool one day. Morrison's neighbor was Bob Crandall, who would later become the president of American Airlines, which was instrumental in the airline industry's developing a similar service pattern, one that it would call a "hub and spoke" operation.[53]

Another factor that affected Sea-Land's growth in the late 1960s—and consequently translated into a need for even more tonnage—was the fact that the United States found itself fighting a land war in Southeast Asia. The enormous logistical effort that was needed to support troops in the field provided yet another opportunity to demonstrate the speed and efficiency of shipping seaborne cargo in containers. A final matter associated with the company's first decade, though, was McLean's decision to divest himself of Waterman Steamship, the onetime parent company of Pan-Atlantic.

The Sale of Waterman Steamship

McLean negotiated the sale of the Waterman Steamship Company to independent interests in the spring of 1965. Waterman Steamship of Puerto Rico, however, the formal name under which Sea-Land operated its service to and from the island commonwealth, remained a subsidiary of McLean Industries. The devolution of Waterman Steamship was a $15 million transaction, with McLean selling 1.9 million shares of stock in the company to two brothers, Cornelius S. and Edward P. Walsh, individuals who had earlier held executive positions with States Marine Line, an important U.S.-flag steamship company.[54] The transaction included fifteen cargo ships, most of which were then operating in various tramp services.[55]

After its separation from McLean's control, Waterman Steamship would manage to survive, and even thrive, although the company did have to endure a short period under the protection of Chapter 11 bankruptcy proceedings before achieving stability. Despite travails, though, in the early years of the twenty-first century, the Waterman house flag still flies from the masts of a small fleet of oceangoing cargo vessels, vessels that maintain liner service under the U.S. flag between ports along the East and Gulf coasts and the Middle East. Today's Waterman offers container service, but neither exclusively nor primarily. Its vessels also accommodate ro/ro traffic, but its principal operations are LASH service, as it is called. LASH is an acronym that stands for lighters aboard ship, and the distinctive service such vessels offer calls for loaded barges to be floated through a stern gate in the ship, then lifted aboard ship by an onboard crane for overseas transport, and finally refloated for delivery once the vessel reaches its destination.

5 SEA-LAND APPROACHES MATURITY 1966–85

Sea-Land continued to be the pacesetter in the growing container-ship industry for the rest of the 1960s, throughout the 1970s, and on into the 1980s. Malcom McLean's company thus found itself continually in need of additional tonnage to serve new markets, while other steamship operators soon realized that transporting cargo in sealed intermodal containers was just about the smartest thing that ever happened to overseas shipping since the development of the steel hull.

More Conversions

There was continual talk at Sea-Land of designing and building totally new container ships. In 1965, for instance, Malcom McLean announced that Litton Industries would soon build six new container ships for his company's about-to-begin transatlantic service.[1] But despite such talk—and the 1965 announcement turned out to be just that, talk—the conversion of older tonnage remained the company's preferred option for many years. The U.S. Maritime Administration had steady supplies of World War II–era vessels available for such conversion projects, and while it was certainly less expensive to add a new container ship to the fleet by converting, say, a C-4 cargo or troopship or a T-2 tanker, an equally important advantage was that such conversion work could yield a finished product in less than half the time it would require to build an equivalent new vessel from the keel up. Other steamship companies, in both the United States and Europe, were taking delivery of new container-carrying hulls from various shipyards. Sea-Land, the industry's pioneer and unquestioned leader, remained an advocate of converting older tonnage through most of the 1960s.

Between 1967 and 1969, Sea-Land added three converted T-2 tankers to its container fleet, vessels that could each accommodate 332 thirty-five-foot containers, bore the names *Houston*, *Jacksonville*, and *Tampa*, and were converted at the Todd shipyard in Galveston, Texas. Even before the last of these three vessels had entered service, the first of ten converted C-4 troop ships joined the Sea-Land fleet. Nine of the ten were originally built by Kaiser in Richmond, California, the tenth vessel was built at Kaiser's Vancouver, Washington, facility, and two of these conversions—vessels that sailed for Sea-Land as *Chicago* and *Saint Louis*—involved adding a new bow and midbody to the stern and machinery of the C-4 at Todd's yard in San Pedro, California.[2] So converted, the vessels featured a carrying capacity of 622 thirty-five-foot containers, making them the largest Sea-Land container ships up until that time. The eight other converted C-4s involved no alterations to the geometry of their hulls, each had a carrying capacity of 360 containers, and the work was performed at a variety of shipyards—from Hoboken, New Jersey, to Portland, Oregon. Once completed, all of these conversions exhibited what had become a standard Sea-Land profile: deckhouse and machinery aft, with containers carried in below-deck cells and atop the hatch covers between the deckhouse and the bow. (A few odd containers could often be carried as deck cargo, and sometimes in below-deck cells, aft of the deckhouse.)

The larger *Chicago* and *Saint Louis* each featured eleven rows of containers, while the C-4 conversions that retained their original hull configuration carried seven rows of containers. Table 5.1 identifies the ten C-4 conversions that joined the Sea-Land fleet between 1968 and 1970.

Europeans Join the Game

Although European steamship companies began to orient their cargo operations around container services in the years after *Fairland*'s inauguration of transatlantic service in 1966, one looks in vain for the names of such traditional transatlantic companies as the French Line or Holland-America among container-carrying lines. Instead, European operators preferred to join forces and form new cooperative ventures as their means of entering container-carrying trades. Thus was the Atlantic Container Line Ltd. (ACL) established, a consortium that eventually included La Compagnie Générale Transatlantique (French Line), Cunard, Holland-America, the Swedish American Line, Rederi A/B Transatlantic, and the

TABLE 5.1. *Sea-Land Fleet: C-4 Conversions of 1968–70*

Off. No.	Name	Hull dimensions	GRT	Place built (year)	Notes
516542	*Chicago* a) *Gen. C. H. Muir* c) *San Juan*	695 × 78 × 30	18,455	Richmond, Calif. (1945)	1
515620	*Saint Louis* a) *Gen. M. L. Hersey* b) *Pittsburgh*	695 × 78 × 30	18,455	Richmond, Calif. (1943)	1
248242	*Galveston* a) *Marine Serpent*	523 × 72 × 30	11,389	Vancouver, Wash. (1945)	2
511485	*Boston* a) *Gen. M. M. Patrick*	523 × 72 × 31	11,522	Richmond, Calif. (1944)	2
513557	*Brooklyn* a) *Gen. C. C. Ballou* c) *Humacao* d) *Eastern Light*	523 × 72 × 31	10,958	Richmond, Calif. (1945)	3
516541	*Philadelphia* a) *Gen. A. W. Brewster USMC*	523 × 72 × 31	10,979	Richmond, Calif. (1945)	4
511487	*Portland* a) *Gen. D. E. Aultman*	523 × 72 × 31	12,521	Richmond, Calif. (1945)	5
511486	*Newark* a) *Gen. H. B. Freeman*	523 × 72 × 31	11,522	Richmond, Calif. (1945)	2
516540	*New Orleans* a) *Gen. E. T. Collins* c) *Guayama* d) *Eastern Kin*	523 × 72 × 31	11,400	Richmond, Calif. (1944)	5

TABLE 5.1. *(Continued)*

Off. No.	Name	Hull dimensions	GRT	Place built (year)	Notes
513556	*Mobile* a) *Gen. Stuart Heintzelman*	523 × 72 × 31	11,307	Richmond, Calif. (1944)	6

Notes

1. Converted to container ship at Todd Shipyards, San Pedro, Calif.
2. Converted to container ship at Todd Shipyards, Galveston, Tex.
3. Converted to container ship at Todd Shipyards, Hoboken, N.J.
4. Converted to container ship at Bethlehem Steel, Baltimore, Md.
5. Converted to container ship at Wilmette Iron & Steel, Portland, Ore.
6. Converted to container ship at Alabama Dry Dock & Shipbuilding, Mobile, Ala.

Wallenius Lines. In the fall of 1967, the new venture's initial vessel, the diesel-powered *Atlantic Span*, tied up at Elizabethport after completing its first transatlantic voyage.[3] It would then continue a twenty-eight-day circuit that included calls at Baltimore and Portsmouth, Virginia, in the United States, and Antwerp, Rotterdam, Gothenburg, and Bremerhaven in Europe. (Lest too much emphasis be placed on *Fairland*'s transatlantic voyage in 1966 as the motivation for Europeans to enter container-carrying trades, the cooperative venture that would become ACL had its origins in 1965, the year before *Fairland* made her symbolic crossing.)

Atlantic Span was not exclusively a cellular container ship, though. The vessel could accommodate 859 trailer equivalent units (TEUs) both above and below deck, but it was also equipped with stern and side gates to allow roll-on, roll-off (ro/ro) cargo to be carried as well. Ro/ro capacity was one thousand automobiles, or some equivalent combination of larger vehicles and fewer cars. In addition, carrying maximum ro/ro cargo reduced the vessel's TEU capacity. *Atlantic Span* was outfitted with an internal system of traffic lights and closed circuit television to permit the safe and swift loading and unloading of ro/ro "traffic" between the stern gate and internal ramps leading to six different car-carrying decks.

Atlantic Span was owned by Rederi A/B Transatlantic—individual vessels were owned by various consortium members, although all sailed under the blue and white colors of ACL—and it was one of four virtually identical ships that constituted the new venture's first generation of container-carrying vessels, the G-1 class, as it was called. The diesel-powered

G-1s were equipped with bow thrusters, would later be lengthened to increase carrying capacity, and were quickly joined by six faster and larger G-2-class vessels. When *Atlantic Span* entered service in 1967, the trade journal *Maritime Reporter* called it "the first ship built from the keel up for transatlantic container service."[4]

ACL remains a contemporary presence in the container-ship industry, and its current vessels continue the tradition of carrying ro/ro cargo in addition to containers. ACL is not the same broad-based consortium it originally was, however, and is now more of a stand-alone corporation that enjoys a working relationship with the Grimaldi Group, an important operator of European ferry services.

In any event, the consortium approach would prove popular with European steamship operators. An all-British venture called Overseas Containers, Ltd. (OCL) was composed of a number of traditional UK-based steamship companies: British and Commonwealth Shipping Company, Ltd.; Furness, Withy; Ocean Transport and Trading Group; and the legendary Peninsula and Oriental Steam Navigation Company, more popularly known as the P&O Line.

The first OCL-designed vessel, *Encounter Bay* of 1969, is frequently referred to as the world's first cellular container ship with a capacity in excess of one thousand TEUs. Such a characterization, however, overlooks a small class of vessels that was built for American Export Lines two years earlier in 1967—*C.V. Lightning* and three sister ships that could each accommodate 1,070 TEUs. For whatever reason, though, *Encounter Bay* earned more headlines in the maritime press than *C.V. Lightning*, and the British vessel's status as the first container ship to break the thousand-TEU mark has rarely been challenged.[5]

The initial trade where OCL sought to operate the new vessel was a very traditional British route, service from home waters to points "east of Suez" as far as Australia. When OCL attempted to inaugurate container service between England and Australia, though, it faced much of the same kind of labor opposition that Grace Line experienced in Venezuela, and Malcom McLean encountered in Puerto Rico. A new British container port at Tilbury in the Thames estuary sat unused for several seasons while *Encounter Bay* and her three sister ships—*Botany Bay*, *Flinders Bay*, and *Jervis Bay*—were forced to load and unload containers to and from Great Britain across the channel in Rotterdam, with short sea ferries then used to reach the homeland.

As designers and naval architects from the participating steamship companies begin the effort that would lead to the construction of *Encounter Bay*, one of them articulated an important characteristic of container ships with rare precision, noting that "for the first time in dry-cargo ship design the nature of the cargo was precisely known."[6] This was, perhaps, a truth that was self-evident to naval architects since the days of *Gateway City*, but it does emphasize something fundamental about the new style of oceangoing transport. From a design perspective, a container ship does not carry furniture, or automobile parts, or burlap bags filled with raw coffee beans, or barrels of heavy-duty motor oil—and it certainly does not have to be designed to accommodate one style of cargo more than another. It carries containers and only containers, look-alike boxes that are eight feet wide, eight-and-a-half feet high, and with two or three different options with respect to length—twenty feet, thirty-five feet, forty feet. True enough, some containers require electrical connections to keep refrigeration units in operation while at sea, but as OCL designers noted, from a ship owner's perspective, what was inside a container was largely irrelevant, and vessels did not have to be designed with flexible storage space to accommodate freight of different shapes and sizes because "the nature of the cargo was precisely known."

OCL generated some statistics after *Encounter Bay* had been in service for a full year that once again demonstrated the increased productivity container ships are able to realize. While *Encounter Bay* spent three hundred days of its first year at sea and only sixty-five days in port, over the same interval the most modern break-bulk cargo ship operated by any of the OCL partners was in port for 149 days and at sea for merely 216.[7]

Like ACL, OCL remains an active force in the container-ship industry in the twenty-first century, although the membership of the consortium has seen a bit of alteration over the years. In 1980 Furness, Withy was acquired by Hong Kong interests associated with C. Y. Tung, and it has been reported that Tung saw this acquisition of Furness, Withy as a way to gain a foothold in OCL. The other members of the consortium viewed any cooperation with the shipping tycoon as unwise, however, and so Furness, Withy left the OCL fold. P&O later withdrew when it decided to operate container tonnage under its own flag. And as for OCL's first container ship, *Encounter Bay*, after three decades of dependable service, the vessel was withdrawn from service and sent to the breakers in 1999.

The notion of separate and independent steamship companies operating container-carrying vessels under the aegis of a joint venture was a rather limited phenomenon when the first such entities materialized in Europe in the late 1960s. As we will see in the next chapter, however, the concept would achieve far more widespread popularity in the mid-1980s.

Another distinctive characteristic of early European container-ship ventures was a willingness to use diesel engines for the propulsion of their container-carrying vessels, certainly to a far greater extent than their American counterparts. One factor that militated against the use of diesel propulsion by U.S. companies was a stipulation associated with the U.S. construction-differential subsidy program. Vessels constructed with such financial assistance from the federal government had to be equipped with U.S.-built engines and, simply enough, no U.S. firms were then offering diesel engines that were appropriate for heavy duty, container-ship application. Granted, this represented no problem at all for Sea-Land, since McLean's company would never seek any such federal subsidies. But it does help explain why other U.S. steamship companies were behind their European equivalents when it came to the adoption of diesel engines for seagoing tonnage.

In addition to new container-carrying services inaugurated by ACL and OCL in the years after *Fairland*'s inaugural transatlantic voyage in 1966, two traditional European steamship companies began operating container ships between Europe and North America. Hapag-Lloyd—itself an earlier merger of North German Lloyd and the Hamburg American Line—entered the trade in 1968. Hapag-Lloyd would grow into one of the world's major container-ship operators in subsequent years, and at various times would be able to boast that its fleet included the world's largest container-carrying vessel. A second European steamship company to have an early presence in the North Atlantic container trade was Manchester Liners, Ltd. Established in 1898, Manchester Liners would never rival the likes of Cunard or White Star as a premier British steamship company, but the company was an important cargo carrier and its specialty was service between the United Kingdom and Canada. In November of 1968, the company's 452-TEU *Manchester Challenger* became Great Britain's first fully cellular container ship designed for deepwater trade. Britain's very first cellular container ships were likely vessels built to operate short-sea ferry routes—Harwich to Zeebrugge and Tilbury to Rotterdam, for example—and that worked for British Rail and a ferry subsidiary of the famous P&O Lines.[8]

Another dimension of the new enthusiasm that container ships were then beginning to enjoy in countries beyond the United States during Sea-Land's second decade of service can be found in the fact that in April

1969—thirteen years after *Ideal X* left Port Newark for Houston and only three years after *Fairland* first crossed the North Atlantic—shipyards throughout the world were at work building 199 container ships of a thousand gross registered tons or more. To be sure, many of these were smaller vessels designed for various feeder trades, but forty-seven could accommodate more than a thousand TEUs. *Encounter Bay* was one of them.

Of the 199 vessels under construction, only thirty-two were being built in the United States, while the rest were under construction in forty-eight different European yards. And in a statistic that more foreshadowed the future than described the present, six shipyards in the Far East were at work on eleven new container ships.[9]

Interestingly, though, among the 199 new vessels under construction in April 1969, not a single hull had been ordered by Sea-Land, the industry's pioneer and operator of by far the world's largest fleet of container ships. As matters would turn out, though, four of the 199 would wind up on the Sea-Land roster before being delivered to the company that ordered them.

Vietnam

The logistical effort that the United States mounted to keep its troops in Vietnam supplied with the equipment needed for war provided yet another opportunity for Malcom McLean and Sea-Land to demonstrate the efficiency of containerized transport. It took a bit of convincing, though, before the U.S. military was ready to acknowledge the improvements that Sea-Land could bring to its transpacific supply lines.

Ronald Katmis, a longtime Sea-Land executive, tells of a business trip to Germany in January 1966 in conjunction with the company's soon-to-begin transatlantic container service. What should have been an overnight flight from the United States to Europe was delayed and failed to reach Germany until late in the day. Then after a business dinner with German associates, Katmis was understandably exhausted and ready for a good night's sleep. Suddenly the telephone in his hotel room rang and Malcom McLean was on the other end of the line. "Ronnie," McLean thundered, "meet me in Beirut tomorrow morning at ten o'clock."[10]

The exhausted Katmis was able to plead for mercy and McLean agreed to meet him a day later—and in Paris, not Beirut. The two then boarded a plane, though, headed east, and seven stops and thirty-three hours later, arrived in Saigon. Katmis, who left home thinking his January travels would be restricted to northern Europe, was wearing a winter suit and topcoat, while the Saigon temperature was 104 in the shade when they stepped off the plane. Over the next week, though, the Sea-Land party toured various U.S. installations in Vietnam as guests of the Department of Defense to assess how containerization might improve the overall logistical effort. Katmis, it can fortunately be reported, was able to supplement his heavyweight winter wardrobe with tropical clothing acquired in Saigon.[11]

While the vast majority of Vietnam-bound supplies were then being transported as break-bulk cargo, the concept of using some kind of a container for transoceanic shipping was not foreign to the U.S. military. A smaller steel container—six-feet square, eight-feet high, and known as a Conex box—had long been popular. One problem, though, was that an empty Conex box could be lifted by a small squad of soldiers and was readily adaptable to all sorts of ad hoc uses by in-country personnel. And so after Conex boxes were unloaded, they would often be commandeered and converted into storage sheds, command posts, offices, and any number of other uses instead of being returned for fresh consignments. Larger, Sea-Land-style containers would not be so adaptable.

Given the realities of government procurement policies, McLean had to sell his idea aggressively before any transport contracts were advertised for bid that specified containerization as an option. One argument that Sea-Land effectively advanced to flag officers in all branches of the military is the degree to which break-bulk cargo operations into places like Cam Ranh Bay were so susceptible to pilferage that it was entirely possible that half or more of the cargo aboard any incoming ship was winding up in the hands of the Viet Cong. Paul Richardson put it this way: "We had a supply line in Vietnam that was supplying both sides—the Viet Cong and ourselves."[12] In addition, the slow pace of unloading break-bulk cargo inevitably resulted in incoming vessels' having to ride at anchor for days and weeks while waiting for berths to clear. McLean and his people made their case on two fronts—they tried to convince officers in Vietnam to demand a more secure supply chain, and they advanced a case in Washington that Sea-Land provided a service that could get supplies to the front faster and more securely than break-bulk operations.

McLean's arguments carried the day. Onward from 1966 and for the rest of the years that U.S. forces were engaged in South East Asia, Sea-Land won multiple contracts from the Military Sea Transport Service (MSTS) of the U.S. Navy and the Army's First Logistical Command to ship containers to Vietnam. Thought to be the first military contracts to transport containers to the Far East was a $12.8 million, two-year contract between Sea-Land and MSTS for service between Oakland and Okinawa, and a $10.9 million agreement with Seatrain for similar services, that were executed in May 1966.[13]

Sea-Land stationed as many as 450 company personnel in Vietnam to handle the land side of the operation, including the staffing of a complete trucking company. Initially, Sea-Land vessels docked in Da Nang, and since there were no shoreside cranes there, this represented an ideal assignment for converted C-2s and T-3s that featured onboard loading equipment. Eventually, a major container terminal was established at Cam Ranh Bay, and it was here that Sea-Land erected shoreside cranes to load and unload its ships. The cranes at Cam Ranh Bay terminal were located on a large floating pier that had been assembled in Japan by the DeLong Corporation and towed across the South China Sea to Vietnam. The first Sea-Land vessel to off-load containers at the new Cam Ranh Bay facility was the converted C-4 *Oakland*, which steamed into port in December of 1967. Vessels equipped with onboard gantry cranes were still required to serve the other ports in Vietnam, though.[14]

Sea-Land dedicated seven vessels to Vietnam service, and a statistic often cited is that these seven were able to handle ten percent of all inbound Vietnam cargo, while it took a fleet of 250 cargo vessels to handle the remaining ninety percent. As stated, this claim may seem rather underwhelming, but perhaps a more forceful way of expressing matters is that Sea-Land was able to transport ten percent of Vietnam-bound cargo aboard two percent of the hulls used in such service. As traffic increased, Sea-Land supplemented its container fleet with chartered tonnage, including vessels from rival Seatrain.

While the Vietnam experience itself is clearly not a happy chapter in American history, it remains the case that the logistical supply chain that supplied U.S. troops in the field was yet another dramatic demonstration of the efficiency and the effectiveness of containerized transport.[15] In addition, though, an important benefit that Sea-Land was able to gain from its contract services to Vietnam was an opportunity to test various markets on the far side of the Pacific as further opportunities for containerized operations, especially eastbound traffic out of Asia bound for North America. Sea-Land was obligated to expedite containers bound for Cam Ranh Bay, of course, but on return trips there was flexibility, and after a year of returning empty to the west coast, vessels were able to call at various Asian ports and provide real-time demonstrations of the benefits that containerization offered. Sea-Land inaugurated formal liner service out of Yokohama in 1968 after developing a working agreement with the Mitsui Corporation to handle terminal operations and landside deliveries, and feeder service was soon established between Japan and South Korea. On December 21, 1968, Sea-Land's container ship *San Juan* arrived in the port of Seattle, thus completing the company's very first West Coast–Cam Ranh Bay–Yokohama–West Coast circuit. Hong Kong and Taiwan were added to the network the following year, 1969, and the service pattern that quickly evolved called for loaded containers to be shipped from the West Coast to Vietnam, empties to be moved from Cam Ranh Bay to Yokohama, Hong Kong, and/or Taiwan, and, finally, containers filled with products manufactured in the Far East to be carried across the Pacific to consumers in North America.

Malcom McLean tells an interesting story about starting up Sea-Land service to Japan. With no idea whatsoever about the shape and style of that country's economy, he acquired a batch of annual reports from major Japanese corporations, flew to Japan, and, believing that Mitsui was the company he was looking for after reviewing the annual reports, stopped by the office of that company's president early one morning with no appointment or advance warning, a technique that McLean had perfected into a virtual art form over the years. When the president arrived at work, he agreed to give his unexpected visitor a few minutes—a few minutes that turned into four hours and resulted in a working agreement between Mitsui and Sea-Land.[16]

The *Mayaguez* Incident

It was while Sea-Land was providing logistical support to U.S. troops in Vietnam that one of the company's vessels became involved in an unfortunate and tragic international incident. Sea-Land's *Mayaguez*—built in 1944 as the C-2 cargo vessel *White Falcon* and later converted into the container ship *Santa Eliana* by Grace Line for that company's ill-fated Venezuelan service—was one of the vessels Malcom McLean's company had deployed in South East Asia.

Sea-Land did not merely haul containers across the Pacific from the United States to Vietnam. There was considerable traffic to be moved between Asian ports, and so on May 7, 1975—a week after the fall of Saigon—the *Mayaguez* departed Hong Kong bound for Sattahip, Thailand, and Singapore with a full load of containers, a voyage of almost three thousand miles that the vessel had made many times before. After proceeding down the South China Sea and around Pointe de Camau at the southern tip of Vietnam, May 12 found the *Mayaguez* steaming north by northwest in the Gulf of Siam, sixty miles off the coast of Cambodia—but a mere eight miles from a small island called Poulo Wai that Cambodia claimed as its territory. The master of the *Mayaguez*, Capt. Charles T. Miller, later said; "We were taking a route considered a normal traffic route for all commercial ships. We were 61 miles off the coast of Cambodia, and I didn't feel we were cruising in dangerous waters."[17]

Except matters quickly turned very dangerous indeed. In mid-afternoon, several armed Cambodian gunboats under the control of the Khmer Rouge, some of them American-made PCF class Swift boats, surrounded the *Mayaguez* and put a 76-mm shot across her bow. Miller stalled as long as he could and sent out urgent SOS radio messages, but eventually surrendered his vessel to the rebels. The *Mayaguez* then either steamed itself or was towed to an anchorage off an island closer to the Cambodian coast, and the crew was taken ashore. President Gerald Ford denounced the seizure of an unarmed merchant ship as "an act of piracy," and when negotiations appeared unlikely to resolve the situation, a military response was ordered.

This is when matters turned terribly, terribly tragic. An assault force, as well as a fresh civilian crew, arrived aboard the Knox-class frigate USS *Harold E. Holt* (DE-1074). They successfully took back the *Mayaguez*, raised the American flag on the vessel's main mast, and the *Holt* towed the vessel back to international waters. Meanwhile, the Cambodians had released the thirty-nine-man Sea-Land crew—all were unharmed—but a Marine helicopter assault that was deployed to rescue the crew suffered fifteen U.S. combat deaths. In addition, three men who were unfortunately left behind later became fatal casualties, and twenty-three U.S. airmen died in a helicopter crash in Thailand that was part of the overall operation.[18]

As for the *Mayaguez*, the vessel was undamaged and returned to Sea-Land. Along with all of Sea-Land's older converted C-2s, though, its days were numbered, and it would never again return to U.S. waters. In May 1979, Sea-Land's *Mayaguez* arrived at Kaohsiung, Taiwan, where it was later dismantled and reduced to scrap.

While the incident involving the *Mayaguez* was the more newsworthy, another of Sea-Land's converted C-2s saw hostile action during the Vietnam War. In May 1969, the converted C-2 *Fairland*—the container ship that had inaugurated Sea-Land's transatlantic service three years earlier in 1966—came under rocket attack from Viet Cong forces. The ship's hull was penetrated, but it was above the waterline and caused little damage and no casualties.[19]

Some Unique Conversions

Before it began designing and building new container ships from the keel up, Sea-Land undertook an extraordinarily complicated—or at least unusual—conversion project. The "raw materials" for this extraordinary effort were three of the company's earlier container ships, a trio of recently acquired T-2 tankers, and three newly constructed bow and midbody sections. Out of this assortment of something old and something new, six container ships were pieced together.

In the first phase, sterns and machinery were cut away from the container ships *Anchorage*, *Seattle*, and *Baltimore*—all three having earlier been converted from C-4 cargo and troopships—and joined to newly built bow and midbody sections, thus creating the container ships *Rose City*, *San Pedro*, and *Pittsburgh*. The finished ships were 695 feet long, and each could accommodate 602 of Sea-Land's thirty-five-foot containers, thus placing them, in terms of carrying capacity, among the company's largest tonnage. Indeed after conversion, this trio was identified by Sea-Land as belonging to the same general class of vessels as the converted C-4s *Chicago* and *Saint Louis*, now a group of five similar vessels that could each accommodate slightly in excess of six hundred containers and were typically assigned to Sea-Land's most important international trades. (*Chicago* and *Rose City* were identified as the C4-J1 class, while *Pittsburgh*, *Saint Louis*, and *San Pedro* constituted the C4-JC class.) As was the case with earlier conversions, the "identity" of a given vessel—that is to say its official number—remained with the stern and machinery. And so *Rose City* can be regarded as the "same vessel" as the container ship *Anchorage* that Sea-Land acquired from Bull Line in 1965, since it included the same stern and machinery and was identified by the same official number.

In the second phase, each container-carrying midbody that was liberated during the first phase of the project was then joined to the stern and machinery from a recently acquired T-2 tanker to create another new—or at least different—container ship. But because they incorporated the stern and machinery of a trio of T-2 tankers, these three newly created container ships carried the official numbers of the tankers. Sea-Land elected to christen this trio *Seattle, Anchorage*, and *Baltimore,* the names previously carried by container ships whose stern and machinery—and official identity—had earlier become *Rose City*, *San Pedro*, and *Pittsburgh*. To complicate matters further, these various efforts were carried out in a number of different shipyards, and partial hull sections were welded closed and towed through open water to distant cities to complete the program.

Such a complicated effort could be expected to run into a few glitches along the way. Sea-Land's John Boylston recalls heading home one evening after spending the day poring over technical details of a conversion effort that was moving forward at a Todd shipyard. Suddenly, while driving along the New Jersey Turnpike, he realized that a particular midbody and bow utilized direct current to run its anchor windlass and other auxiliary equipment, while the T-2 stern and machinery to which it was in the process of being welded produced only alternating current to power such auxiliary equipment. It took a little rewiring, and a rectifier or two had to be incorporated into the vessel's electrical system, but everything worked out in the end.[20] Despite occasional errant steps, the conversion projects moved along just fine.[21]

Table 5.2 lays out this multi-phase effort. The rationale behind the project was to correct an earlier propulsion imbalance, with *San Pedro*, *Rose City*, and *Pittsburgh*—and their C-4 engine rooms—capable of powering a rather larger vessel than the original *Seattle*, *Anchorage* and *Baltimore*, while T-2 machinery was a much better match for a smaller hull.

Sea-Land's original plan called for the bow and midbody section of the three T-2 tankers, *Bull Run*, *Petrolite*, and *Esso Roanoke*, to be scrapped.

TABLE 5.2. *Sea-Land Fleet: Multiple Conversions of 1969–70*

Stern and machinery of the container ship . . .	joined with a newly built bow and midbody to create the container ship . . .	with the original bow and midbody joined to the stern and machinery of the T-2 tanker . . .	to create the container ship
Anchorage (246736)	*Rose City* (246736)	*Bull Run* (243850)	*Anchorage* (243850)
Seattle (247275)	*Pittsburgh* (247275)	*Petrolite* (245025)	*Seattle* (245025)
Baltimore (248238)	*San Pedro* (248238)	*Esso Roanoke* (246103)	*Baltimore* (246103)

As the *Petrolite*-into-*Seattle* project was moving forward, though, a T-2 tanker called the *Oregon Standard* was involved in a serious accident near the Golden Gate Bridge. Low and behold the no-longer-needed sections from *Petrolite* were just what the proverbial doctor ordered, and when *Oregon Standard* was repaired and returned to sea, major elements from *Petrolite* had been incorporated into its hull.[22]

Table 5.3 presents a snap-shot view of the trades each of Sea-Land's 41 container ships were working on September 8, 1972, mere weeks before the first of the company's newbuildings entered service.

The final two vessels noted in the preceding table were each distinctive. Whole bona fide members of the Sea-Land fleet, neither was a genuine cellular container ship. *New Yorker* was a diminutive craft that was originally built for service between New York and Florida under the short-lived house flag of the Erie and Saint Lawrence Corporation, as discussed in chapter 2. While the vessel carried some containers as deck cargo, it was primarily a ro/ro vessel. More interestingly, *New Yorker*—together with a sister ship, *Floridian,* which enjoyed a much shorter tenure with Sea-Land—were the first diesel-powered members in the company's fleet.

Detroit, on the other hand, not only began life as a C-3 cargo ship, but when acquired by Sea-Land in 1962 and placed in the company's Puerto Rico service, it also retained its traditional cargo-hoisting masts and booms and remained a conventional break-bulk cargo ship. *Detroit* could accommodate a small number of containers as deck cargo, but the vessel's forte was transporting automobiles below decks, primarily secondhand cars from the mainland to the island commonwealth where such vehicles were in heavy demand. *Detroit* was also deployed in Vietnam service by Sea-Land, but this was not the first time the vessel steamed in harm's way.

On December 7, 1941, the C-3 that later became Sea-Land's *Detroit* was serving in the United States Navy as the seaplane-tender USS *Tangier* (AV-8). *Tangier* was moored directly astern of the battleship USS *Utah* on the northeast side of Ford Island at Pearl Harbor on that quiet Hawaiian morning. (USS *Utah* was built in 1931 as a true battleship and identified as BB-31. Earlier in 1941 it had been converted into a mobile target platform and was redesignated AG-16.) When Japanese planes began their sneak attack on the fleet that morning, gunners aboard *Tangier* were among the first to return fire, and the crew of the *Tangier* claimed three downed aircraft that morning.

TABLE 5.3. *Sea-Land Fleet on September 8, 1972*

Vessel	Service or location
C-2 conversions	
Gateway City	New York–Jacksonville–San Juan
Azalea City	Baltimore–San Juan
Bienville	Mobile–San Juan
Beauregard	At Cam Ranh Bay
Fairland	Hampton Roads–New York–Boston
Raphael Semmes	At Saigon
T-3 conversions	
Elizabethport	Tacoma–Yokohama–Hong Kong
Los Angeles	Busan–Yokohama–San Francisco
San Francisco	Tacoma–San Francisco–Yokohama
San Juan	Los Angeles–Yokohama–Busan
T-2 conversion	
Summit	Tacoma–Anchorage
C-2 conversions	
Afoundria	Jacksonville–San Juan
Arizpa	Jacksonville–San Juan
Wacosta	Baltimore–San Juan
Warrior	New York–San Juan
Ex-Grace Line C-2 conversions	
Mayaguez	New Orleans–San Juan
Ponce	Charleston–New York–Jacksonville
C-4 conversions	
Long Beach	Los Angeles–San Francisco–Yokohama
Trenton	Cam Ranh Bay–Hong Kong–San Francisco
Panama	Hong Kong–Yokohama–San Francisco
Oakland	Los Angeles–San Francisco–Yokohama
	*Charleston*New York–Houston
T-2 conversions	
Jacksonville	New York–San Juan
Houston	Los Angeles–San Francisco–San Juan
Tampa	New York–Los Angeles

TABLE 5.3. *(Continued)*

Vessel	Service or location
C-4 conversions	
Chicago	San Francisco–Kobe
Saint Louis	Busan–Tacoma–San Francisco
Galveston	Anchorage–Tacoma
Boston	New York–San Juan
Brooklyn	Tacoma–Anchorage
Philadelphia	New York–Los Angeles
Portland	New York–Houston
Newark	New York–Rotterdam
New Orleans	New York–Houston
Mobile	Tacoma–Anchorage
C-4 conversions	
Rose City	Los Angeles–Kobe–Yokohama
San Pedro	Vancouver–Hong Kong–Singapore
Pittsburgh	Tacoma–San Francisco–Yokohama
C-4 + T-2 reconversions	
Anchorage	New York–Los Angeles
Seattle	San Francisco–New York
Baltimore	New York–Bremerhaven
SL-18 class	
SL 180	New York–Rotterdam–Bremerhaven
SL 181	Rotterdam–New York
MV Class	
New Yorker	New Orleans–Puerto Rico
C-3 car carrier	
Detroit	Miami–San Juan

Note

Vessels identified as *SL 180* and *SL 181* were designed and built by the Matson Navigation Company but acquired by Sea-Land before entering service. *SL 180* and *SL 181* were temporary names; the vessels would later be identified *Sea-Land Venture* and *Sea-Land Economy*.

Some years later, Sea-Land was ready to retire *Detroit*, and the company offered the vessel to Hawaiian interests for incorporation into a permanent memorial. No interest in such a donation was forthcoming, though, and the former USS *Tangier* was scrapped.

The Magnificent SL-7

When Sea-Land eventually did acquire its first fleet of newbuildings, they turned out to be vessels of rare distinction. When ship fanciers gather to talk about the very finest deepwater vessels ever to fly the U.S. flag, Sea-Land's SL-7 class container ships belong on any short list of finalists, right up there with Iowa class battleships, Mariner class cargo ships, even the *Leviathan* and the *United States*.

First of all, they were fast. Malcom McLean wanted a vessel that could cross the world's most hostile oceans, fully laden, at speeds in excess of thirty knots. They were also big. With a length of 946 feet and a carrying capacity of 896 thirty-five-foot containers, plus four hundred TEUs, they were, for their day, the largest container-carrying hulls ever built. The SL-7 would surrender its title of world's largest container ship in a few years, though, as ever larger tonnage was built by any number of companies.

When the Sea-Land staff began to draw up preliminary plans for the new ships, a top speed of thirty knots was specified. McLean, though, was nervous, and to ensure that his new vessels would indeed achieve that speed, he insisted that a ten-percent margin be added to the specification, and so the top speed of the new vessels has always been said to be thirty-three knots. Other preliminary requirements of the project included a fleet of eight new vessels, the ability to transit the Panama Canal, and full port turnaround in twenty-four hours.

Internal procedures at Sea-Land had become a good deal more formal from the freewheeling style of earlier years, and so after the staff had completed preliminary specifications for the new ships, approval of the project by the company's board of directors was required. (In the early days, Malcom McLean was the final word on just about everything and anything.) So the Sea-Land staff made a presentation to the board, and the board voted fourteen to one against going forward with the project.

The staff was crestfallen, but McLean himself, who had cast the sole affirmative vote, was anything but. A consultant was retained whose forte was not naval architecture or capital financing, but the delivery of effective oral presentations. At a subsequent board meeting the consultant presented the staff's recommendation a second time—same data, same information, but with lots of fancy charts and colorful graphics—and the board voted fifteen to nothing to move the project forward.[23]

The next step was to retain a naval architect to turn the staff's preliminary specifications into more formal designs. As McLean and his people visited one naval architect after another, though, all were quite unwilling to take on the extraordinary, and perhaps risky, assignment. One firm felt it was the maritime equivalent of the supersonic transport plane, an aviation proposal that the United States had recently determined to be too costly for further consideration. Another prominent firm politely suggested that what Sea-Land really wanted was a perfectly ordinary twenty-two-knot container ship similar to one the firm had recently designed for another of its clients.

One day, McLean and his staff made a presentation to James Henry, the founding principal of the J. J. Henry Company that had worked with Sea-Land in the early 1960s when *Elizabethport* and her three sister ships were converted from T-3 tankers. When the staff presentation was over, Henry calmly turned to McLean and said, "Well, what color would you like the ship, Mr. McLean?"[24] The J. J. Henry Company was retained to design the new vessels.

McLean himself maintained an intense interest in the SL-7 project, from the earliest design stages through to inaugural voyages. William du Barry Thomas, who spent his professional career working for J. J. Henry and is a noted maritime historian in his own right, recalls the only time he ever met Malcom McLean. It was at the Netherlands Ship Model Basin in Wageningen, where engineers were running evaluations on various potential hull forms for the SL-7. When McLean visited the facility, Thomas recalls that he put but a single question to the engineers: "Will it be fast?" Assured that it would be, McLean departed, leaving the engineers to complete their work.[25]

Malcom McLean had no maritime background, and he was in no sense an enthusiast about ships and the sea. He would often refer to his container ships as "nothing but wheelbarrows," and it may well have been his lack of any appreciation of the heritage of steam and sail that allowed him to decide calmly that he wanted a fleet of container ships that could travel the seven seas at thirty-three knots.

As the J. J. Henry Company pressed forward with design work, locating a shipyard that was able and willing to construct the new vessels proved to be every bit as challenging as retaining a naval architect. In August

1969, though, contracts were signed with three different northern European yards: A. G. Weser would build three vessels at its yard in Bremen; another West German company, Rheinstahl Nordseewerke, would construct two ships in Emden; and the remaining three hulls in the eight-vessel fleet would be turned out in the Netherlands at Rotterdam Dockyard. The cost of the eight ships would be $53.4 million each—or $427 million for the fleet.[26]

Splitting an order for nominally similar vessels among different yards was not unusual, but it rarely produced ships that were carbon copies of each other. Shipyards typically perform a good portion of a ship's final engineering work, and they also have flexibility in acquiring components from various vendors—navigational gear, propulsion machinery, and so forth.

Sea-Land, though, wanted vessels that were as identical one to another as humanly possible, and so a cooperative effort called the Containership Construction Center (CCC) was established. Representatives of all three shipyards, plus, of course, Sea-Land and J. J. Henry, staffed it. A resident coordinator for the American Bureau of Shipping (ABS) also worked at the CCC, and since the ships would be registered in the United States and employ U.S. crews, retired officers from the United States Coast Guard were retained to facilitate later inspections by that all-important agency. Another aspect of the procurement that helped ensure uniformity was the avoidance of any contractual terminology that gave a shipyard the discretion to provide equivalent equipment to that indicated in the specifications. (Construction contracts often specify a particular component in detail, sometimes even by brand name, but then give the shipyard broad flexibility by adding the phrase "or its equivalent." The SL-7 contracts contained no such open-ended language.)

As for the design that J. J. Henry developed, it was a radical departure from what had become conventional container-ship configuration. Typical container ships feature a sharp flare of the hull immediate behind the bow so the vessel achieves maximum beam for as much of its hull length as possible, a design that also helps prevent "green water" from crashing up onto the weather deck in rough seas and possibly damaging containers stowed there. As important, by achieving maximum width as close to the bow as possible, a greater number of containers can be carried in a ship's forward holds.

Such a hull form might have been fine for vessels designed to operate in the twenty-knot range, but it would hardly do when speeds in excess of thirty knots were desired. Consequently, the SL-7 featured a very sharp and graceful hull that was more akin to something one might expect to find on a light cruiser or a fast passenger liner than a routine container ship. The hull lines also narrowed gracefully toward the stern, and while the SL-7 did feature a squared-off transom stern, this transom was less than half the width of the vessel's full beam. Containers were carried ten across amidships, but only six across close to the stern.

J. J. Henry paid considerable attention to a deckhouse for the SL-7; in fact, the final design included dual deckhouses. One was located close to the bow and incorporated the pilothouse and cabin accommodations for a vessel's officers. A forward deckhouse would help protect containers on the weather deck from "green water" coming over the bow, but another factor influencing the design was the height of lift-bridges of the Jersey Central Railroad at the entrance to Newark Bay that the SL-7 would have to navigate en route to and from Elizabethport. The bridges imposed "air draft" limits that a single deckhouse, wherever it was located, would have had problems observing.

The second deckhouse, where the remainder of the crew had their accommodations, was slightly aft of amidships and was topped off by a pair of side-by-side funnels. The boilers were located directly beneath the funnels, of course, and deep down in the vessel, the engines were immediately aft of the boilers.

An interesting design feature that the J. J. Henry people were asked to incorporate at Sea-Land's request called for a slight rise in the main deck aft of this second deckhouse. The reason was to allow additional containers to be carried below deck, but it did create a somewhat unusual "bump" in the otherwise graceful hull lines of the SL-7. Unusual configurations such as this were rather more common in some of Sea-Land's earlier conversion projects, but it caused one observer to remark to a Sea-Land colleague, "You can't even build a new ship without it looking like a conversion."[27]

Another curious feature of the SL-7 was a function of its hull form. Because there was insufficient beam forward of the pilot house to incorporate any container cells there, a conventional break-bulk cargo hatch was included in the weather deck close to the bow, and the vessels were able to accommodate whatever odd-size cargo could be hoisted into this hold. Plans are one thing, though, facts are another, and despite the capability that was incorporated into the SL-7 design, Sea-Land never used these holds to carry break-bulk cargo.

When it came to developing a propulsion plant for the SL-7, engineers had calculated that to sustain a speed of thirty-three knots, 120,000 horsepower would be required. The only style of engine that could generate such power was a pair of compound steam turbines, each geared to a separate shaft and propeller. A compound steam turbine is, in effect, two engines linked together. High-pressure steam directly from the boiler is fed into the first and smaller turbine, but because this steam is still capable of generating additional force, it is then fed into a second, but much larger, turbine to tap this additional energy. With an SL-7 operating at full power, the high-pressure turbine rotates at 5,038 rpm, the low pressure turbine at 3,574, and double reduction gears step this down to a more workable 135 rpm on the propeller shafts.[28] (Compound steam engines often cause confusion in vessel documentation registers, since some authorities identify a single compound engine as two engines, others as one.)

Diesel engines were evaluated for the SL-7 but quickly ruled out, and while there was some talk during the design phase of using nuclear reactors to generate steam for the turbines, the eventual choice was a pair of more conventional Foster-Wheeler D-type two-drum boilers, each feeding steam to one of the sets of turbines. As for the turbine engines themselves, each was a General Electric (GE) model MST-19 unit that was rated at 60,000 horsepower. The complete engines for the first SL-7 were built entirely at GE's Lynn, Massachusetts, facility, while the other seven SL-7s featured internal engine elements built in Lynn, while external castings were produced in Europe.

In terms of auxiliary machinery, electricity for various onboard purposes was generated by two GE turbo-alternators that were fed steam at full boiler pressure, and there was also a large twelve-cylinder General Motors model 12-645E7 diesel engine, plus a smaller Caterpillar diesel, that could also be used to generate current; two Aqua-Chem distilling plants were able to convert 33,300 gallons of seawater into freshwater each day.

One maritime trade journal suggested that the compact and efficient design of the SL-7 engine room was based on that of Essex class aircraft carriers of the United States Navy.[29] In any event, J. J. Henry put considerable effort into laying out the engine room, since an important operational specification of the SL-7 was an ability to load and unload all containers inside twenty-four hours, and various scheduled maintenance activities had to be completed, in port, within this narrow window.

Table 5.4 displays basic statistical information about Sea-Land's new SL-7 vessels.

The first two SL-7s—one called *Sea-Land McLean*, the other *Sea-Land Galloway*—headed out for sea trials on the very same day. The *McLean* had been built in Rotterdam and the *Galloway* in Bremen, but the man who was heading up the SL-7 project for Sea-Land, Warren Leback, had a very stern injunction to issue about the pending trials. "I'm absolutely dictating," Leback insisted, "that one of these ships is to sea trial in the North Sea between Sweden and Finland and the other ship is to go off the coast of Norway and sea trial there, and you're not to get within 100 miles of each other because I don't want any races."[30]

Leback's caution generated something rather unexpected. The tests were going routinely enough, and commercial fishermen working at sea were understandably taken by the high-speed runs they were witnessing and hastened to tell their friends about the goings-on by radio. One of the fishermen off the Norwegian coast was telling someone about this big and fast new vessel he had seen an hour or so earlier, when another fisherman many miles away suddenly came on the air and said the same ship was steaming past his location at that very moment. And so stories quickly circulated that there was a new ship at sea—*and it could travel at a hundred knots*. Malcom McLean was delighted with such rumors and felt they would throw his competition completely off stride.

Another interesting story from the initial sea trials involves a U.S. Navy observer who was aboard to evaluate the performance of the GE turbines for possible future use aboard aircraft carriers. The Navy observer asked

TABLE 5.4. *Sea-Land's SL-7: Statistical Information*

Data element	Value
Length (overall)	946′ 1.5″
Length (waterline)	900′ 0″
Length (between perpendiculars)	880′ 6″
Beam (molded)	105′ 6″
Draft	30′ 0″
Gross registered tons	41,127
Deadweight tons	27,358
Classification Society	American Bureau of Shipping (ABS)

if the vessel could be run at full speed astern, and such a trial was arranged. The SL-7—even with its flat transom stern—was able to sustain twenty-three knots at full power while running astern. At one point during the run, the SL-7 overtook a bulk carrier that was moving along at a perfectly respectable fourteen knots. The master of the bulk carrier was quickly on his radio telling anyone in listening range that he had just been passed, at speed, by a ship that was steaming backward.[31]

The SL-7 proved to be exceptionally vibration-free. It has been said, for instance, that when off-duty crew members awoke at sea on early voyages, they often felt the ship must have lost power and was adrift, so firm was the deck beneath their feet. There was really only one design problem that surfaced during the early days of the SL-7. Devices known as shafting fairwaters—streamlined fiberglass shrouds that allow sea water to pass smoothly around awkwardly-shaped struts that hold the propeller shafts in place—developed a tendency to fall off, as did a similar hub at the end of the propeller shaft. Their absence took a toll on a vessel's top speed, and also created issues associated with cavitation. The problem was identified before the fourth vessel had been delivered, and a new all-steel design was quickly engineered to solve the problem. To ensure that everything was working smoothly, though, Sea-Land arranged to have underwater movies taken of an SL-7 running at speed. And so when *Sea-Land Trade* was proceeding from Europe to the Panama Canal to inaugurate the SL-7 era on the Pacific, camera crews were stationed at a place called Brown's Deep in the Caribbean, where the sea is known to be exceptionally clear.

Routine fare available on many cable television channels includes underwater movies of dolphins and whales swimming around in the presence of camera crews. Imagine how different an experience it must surely have been, though, when instead of a gentle Blue Whale slowly swimming past, or even a more threatening species like a hammerhead shark circling slowly around a camera operator, three teams of scuba divers stationed themselves on either side, *and underneath*, a 44,000-gross-ton containership that was steaming past a marker buoy at thirty-three knots.[32]

Before the SL-7 entered service, an extensive training regimen was developed to help deck officers, as well as harbor pilots and docking pilots, familiarize themselves with the operating characteristics of the new vessels, especially in close quarters. Engineers were concerned that because of various trade-offs that were made during the design process to ensure high-speed performance, the new ships would not have good maneuvering characteristics at slow speed. (The SL-7 also lacked a bow thruster because the streamlined hull was too narrow to permit its installation in the area where such an accessory would be most effective.) At a facility operated by the U.S. Army Corps of Engineers in Vicksburg, Mississippi, a large hydrostatic likeness of the approach to Newark Bay was constructed—including the twin bridges of the Jersey Central Railroad that inbound and outbound ships had to pass under at a slight angle—and with a nine-foot model of an SL-7 that had been built at Stevens Institute in Hoboken, officers were able to try their hand navigating the radio-controlled model, while a similar likeness of Rotterdam harbor was built at the same model basin in the Netherlands where SL-7 hull forms were earlier tested. As a practical matter, though, the SL-7 proved to be a good deal more maneuverable at low speed than many designers felt it would be.

On October 6, 1972, *Sea-Land Galloway* steamed under the Verrazano Narrows Bridge and became the first SL-7 to visit the Port of New York. When the vessel was later assisted into its berth at Port Elizabeth by a flotilla of McAllister tugs—Sea-Land traditionally contracted with McAllister for docking assistance—a distinctive white band that encircled the top of its hull was especially dramatic. (For some reason, this white band was later painted over.) Far more significant, though, was the fact the new vessel had completed a westbound crossing from Bishop's Rock off the southern coast of Cornwall, England, to Ambrose Light adjacent to the pilot station outside New York Harbor, the traditional North Atlantic course, in four days, seventeen hours, and seventeen minutes and at an average speed of 31.07 knots. It was the fastest transatlantic crossing ever made by any cargo ship, and among passenger liners, only *Normandie*, *Queen Mary*, and *United States* had ever recorded swifter crossings.

The following spring—and with the shafting fairwater problem resolved—*Sea-Land McLean* bested the time her sister ship had posted by a substantial measure, shaved in excess of twenty hours off *Galloway*'s earlier mark, and reached Ambrose Light three days, twenty-one hours, and five minutes after clearing Bishop's Rock at an average speed of 32.71 knots. But even this would not be the end of it; in August of that same year, *Sea-Land Exchange* bested *Sea-Land McLean*'s performance by arriving at Ambrose in three days, eleven hours, and twenty-four minutes—an average speed of 34.92 knots. Both of these performances were faster than the best crossings ever recorded by either *Normandie* or *Queen Mary*, leaving Malcom McLean's new superships second only to the *United States* as all-time speed champions of the North Atlantic, with *Sea-Land Exchange*'s time a mere 0.97 knots behind what was then the fastest transatlantic crossing of all time. *Sea-Land McLean* later posted 33.005 knots on an eastbound crossing, while in August of 1973, *Sea-Land Trade* departed Kobe, Japan, and reached Race Rocks at the entrance to the Straits of San Juan de Fuca north of Seattle five days and six hours later, having crossed the Pacific at 32.75 knots. *Sea-Land Commerce* later steamed from Yokohama to Long Beach, California, at 33.216 knots, a record that represents the fastest transpacific crossing ever made by any merchant ship, passenger or cargo.[33]

Not nearly as fast as these noteworthy crossings but interesting nonetheless is the fact the SL-7 could maintain twenty-four knots when running on one boiler and two turbines, and an eminently respectable twenty-one knots with but a single boiler and a single turbine on line. Table 5.5 identifies the eight SL-7 vessels.

The onset of SL-7 service in the fall of 1972 was delayed a week or so because of a labor dispute. While the United States Coast Guard had approved operation of the new vessels with only five deck officers aboard, Sea-Land was proposing to assign six. The International Association of Masters, Mates and Pilots, however, was holding out for eight, and as a result a work stoppage managed to bring the entire Sea-Land fleet to a halt. The issue may well have been less about SL-7 staffing levels as much as it was over the fact that the ordinary working agreement between Sea-Land and the bargaining unit had expired in June and little progress was being made toward a new contract. Eventually a compromise was reached that called for the SL-7 to operate with a master and six other officers, the impasse was over, and the new ships could enter service.[34]

Feeder Service

While *Sea-Land Galloway* arrived at Elizabethport from Europe on October 6, 1972, the SL-7 era is better said to have begun the next day, when *Galloway* left New York for Rotterdam and *Sea-Land McLain* began a westbound voyage for New York from Europe. Sea-Land had developed a new and different transatlantic service pattern for its new ships. They would call at only three ports: Elizabethport in the United States and Rotterdam and Bremerhaven in Europe. Container service to and from

TABLE 5.5. *Sea-Land Fleet: SL-7 Class of 1972*

Off. No.	Name	Place Built (Year)
542200	*Sea-Land Galloway*	Bremen, West Germany (1972)
540413	*Sea-Land McLean*	Rotterdam, Netherlands (1972)
545200	*Sea-Land Commerce*	Bremen, West Germany (1973)
546383	*Sea-Land Exchange*	Rotterdam, Netherlands (1973)
550723	*Sea-Land Resource*	Rotterdam, Netherlands (1973)
550721	*Sea-Land Market*	Bremen, West Germany (1973)
545201	*Sea-Land Trade*	Emden, West Germany (1973)
550722	*Sea-Land Finance*	Emden, West Germany (1973)

other ports—Baltimore, Norfolk, or Boston in the United States, Antwerp, Le Havre, or any of the British ports in Europe—would be handled by other vessels deployed in feeder service out of the major ports. In the United States, such feeder service was operated by Sea-Land itself with its older vessels, while in Europe, contract arrangements of various sorts were made with other companies to connect with the SL-7s in Bremerhaven and Rotterdam and deliver containers to other ports. Some of these feeder vessels were time-chartered by Sea-Land and decorated in Sea-Land livery, while others operated under less formal arrangements. Table 5.6 identifies a sampling of vessels that were providing feeder service to and from Sea-Land's own international liner routes at the time the SL-7 fleet entered service.

Although a good many of the feeder vessels that transported containers in and out of major transfer ports such as Rotterdam were owned and operated by independent steamship companies, Sea-Land eventually saw potential for profit in such service, and in the late 1970s the company

TABLE 5.6. *Adjuncts to Sea-Land Fleet: Various Feeder Vessels*

Flag	Name(s)	Dimensions (GRT)	Place Built (Year)
Liberia	*Grand Navigator*	484 × 67 × 30 (10,095)	Osaka, Japan (1970)
Japan	*Otowasan Maru*	564 × 70 × 34 (14,469)	Tamano, Japan (1952)
Italy	*Relay* b) *Guido Baldo* c) *Atlantic Ferry* d) *Sea Star X*	242 × 43 × 12 (1,184)	Deest, West Germany (1970)
West Germany	*Mar Tierra*	312 × 46 × 23 (1,422)	Bremerhaven, West Germany (1970)
West Germany	*Black Swan*	319 × 57 × 18 (994)	Deest, West Germany (1969)
West Germany	*Albert Friesecke*	243× 36 × 13 (499)	Hamburg, West Germany (1968)
Austria	*Stadt Ascheddorf* b) *Kydor Pioneer* c) *Senta* d) *Virginia Express* e) *Seadoll III* f) *Miramar* g) *Patritsia V* h) *Mona*	246 × 43 × 12 (500)	Deest, West Germany (1969)
West Germany	*Ragna*	244× 42 × 12 (499)	Hamburg, West Germany (1968)
Singapore	*Flying Scot* a) *Greyhound* c) *Cast Salmon* d) *Cast Raccoon* e) *Pablo Metz* f) *Mersin* g) *Pablo Metz*	376 × 68 × 14 (1,599)	Deest, West Germany (1970)
Italy	*Tiber*	314 × 53 × 15 (2,998)	Alblasserdan, Netherlands (1970)

established a small offshore subsidiary to share in this trade. Sea-Land organized a Bermuda-based company called InterSea Operations, and InterSea then established branch offices in places as diverse as Singapore, Hong Kong, Rotterdam, and Flexistowe. Table 5.7 identifies three classes of smaller container-carrying vessels—all built in Japan between 1978 and 1984 and registered under various flags of convenience—that constituted

TABLE 5.7. *Sea-Land Fleet: InterSea Operations Feeder Vessels*

Flag	Name	Hull dimensions	GRT	Place built (year)	TEU Capacity
Bay Class					
Panama	*Shelly Bay*	450 × 69 × 26	8,635	Imabari, Japan (1983)	540
Panama	*Seaward Bay* b) *Santa Paula* c) *Sea Florida*	450 × 69 × 26	8,428	Imabari, Japan (1983)	540
Liberia	*Somers Bay* b) *Sea Link*	450 × 69 × 26	8,654	Hakata, Japan (1984)	540
Liberia	*Sandys Bay* b) *Sea Lark*	450 × 69 × 26	8,654	Hakata, Japan (1984)	540
World Class					
Singapore	*World Tiger* b) *Sea Lotus*	502 × 76 × 28	10,381	Yokkaichi, Japan (1978)	754
Singapore	*World Lion* b) *Sea Legend*	502 × 76 × 28	11,314	Yokkaichi, Japan (1978)	754
Liberia	*World Lynx*	502 × 76 × 28	11,312	Yokkaichi, Japan (1979)	754
Panarea Class					
Panama	*Panarea* b) *Panarea I* c) *Amersham*	396 × 68 × 26	6,764	Yokkaichi, Japan (1980)	528
Panama	*Oahu* b) *Chesham*	396 × 68 × 26	6,807	Yokkaichi, Japan (1980)	528
Panama	*Pagai* b) *La Trinity* c) *Denham*	396 × 68 × 26	6,807	Yokkaichi, Japan (1980)	576

the InterSea operation and provided feeder service to Sea-Land's international liner routes.

Returning to the advent of the SL-7 class in the fall of 1972, on the same day that *Sea-Land Galloway* set sail from Port Elizabeth for Rotterdam for the very first time, Cunard's *Queen Elizabeth 2* departed New York for Southampton. It is interesting to speculate if the two vessels were ever in sight of each other during their transatlantic crossing. The SL-7 was a considerably faster vessel than *QE2*, but *Sea-Land Galloway* made this crossing at reduced speed and reached Europe a day behind the latter-day Cunarder.

Once a Week with Two Ships

In the long and storied history of steamship service between the United States and Europe, a cherished goal was to provide weekly service from each continent and to protect such a schedule with but two vessels. Cunard was unable to achieve such a goal until its *Queen Mary* of 1936 and *Queen Elizabeth* of 1940 were able to operate in tandem after World War II. A plausible case can be advanced that North German Lloyd's prewar sister ships, *Europa* and *Bremen*, had engine rooms that were capable of turning in such performance, but available records indicate that this pair never managed weekly departures. Every eight days, perhaps, but not every seven days.

It was only when Malcom McLean's magnificent SL-7 came on the scene that a second steamship company was able to provide weekly departures from both sides of the North Atlantic—and do so with but two vessels. Steamship enthusiasts will likely never confuse *Sea-Land Galloway* and *Sea-Land McLean* with *Queen Mary* or *Queen Elizabeth*, and for obvious reasons. But if the name of the game is to steam across the world's most hostile ocean at sufficient speed to maintain weekly departures from Europe and North America, then Sea-Land Service stands as fully the equal of the fabled Cunard Line.

While it is interesting to discuss the new vessels in terms of steamship traditions associated with the North Atlantic, in point of fact, six of the eight vessels were initially deployed in transpacific service, and not across the North Atlantic at all. McLean's original plan was to operate his new fleet in around-the-world service, but he backed off such a concept. Instead, six vessels were assigned to conventional east-west trade between the West Coast of the United States and the Far East.

Fundamental shifts were underway in world commerce, and one result of these shifts is that the manufacture of all sorts of products was shifting away from the areas where they had traditionally been produced. More and more of everything—from baseball gloves and model railroad trains to men's socks and television sets—was being manufactured in Asia. Malcom McLean was more than willing and ready to recognize such trends. And so six of his new SL-7s were deployed in transpacific service, where their thirty-three-knot speed was faster than any previous steamship service ever operated across that ocean. Table 5.8 displays where all eight units in the new fleet could be found on a particular day, selected quite arbitrarily, a year and some months after the new era had been inaugurated. (The final SL-7, *Sea-Land Finance*, had been delivered to the company mere weeks earlier on December 4, 1973.)

The full and complete capital investment that the SL-7 represented involved $427 million for the eight vessels. But an almost equal amount of new investment was earmarked for a series of non-vessel improvements that were necessary to ensure that the new ships would operate at maximum efficiency. New shoreside cranes were installed at all three terminals the SL-7s would serve, improved berthing facilities were constructed, and at the southeast corner of the Elizabethport facility, a unique turntable was built so gantry cranes could be rotated 90 degrees to work vessels docked at berths along either of the perpendicular bulkheads in the Sea-Land terminal.[35]

Sea-Land's fleet of trailers also had to be expanded substantially in advance of the arrival of the new vessels, and an up-to-the-minute

TABLE 5.8. *Sea-Land's SL-7 Fleet on January 31, 1974*

Vessel	Service
Sea-Land Commerce	Kobe–San Francisco
Sea-Land Exchange	Hong Kong–San Francisco
Sea-Land Finance	Hong Kong–San Francisco
Sea-Land Galloway	At Kobe
Sea-Land Market	Rotterdam–Port Elizabeth
Sea-land McLean	Port Elizabeth–Bremerhaven
Sea-Land Resource	Los Angeles–Yokohama
Sea-Land Trade	Los Angeles–Yokohama

computer system was designed and installed to develop loading and unloading plans for each departure, keep track of which trailers were being kept where, and create up-to-date manifests and forward them to other ports in the Sea-Land system by bouncing electronic signals off orbiting satellites that land stations across the North Atlantic could receive. The Port of New York Authority also got into the act and expanded approach channels and enlarged a turning basin in Newark Bay to accommodate the big new vessels.

And so the SL-7 era at Sea-Land began in October 1972. A year later, on October 6, 1973, though—with the eighth and final SL-7 still two months away from being delivered to Sea-Land—Egypt and Syria invaded Israel in a conflict that has since been known as the Yom Kippur War and were thoroughly defeated by Israeli forces. One wholly unforeseeable consequence of this conflict was that the promise the SL-7 program represented for Sea-Land barely a year earlier was undone.

The R. J. Reynolds Era

On August 29, 1972, a Sea-Land delegation was in Rotterdam, the Netherlands, and at the shipyard of Rotterdam Dockyards that afternoon, Margaret Sykes McLean, the spouse of Sea-Land founder Malcom McLean, christened the first of the company's new SL-7 container ships *Sea-Land McLean*.

By 1972, Malcom McLean's children were raising families of their own, youngsters who called their grandfather "Pop-Pop." At the family's request, officials of Rotterdam Dockyard made a temporary change in the way the name of their newest vessel was rendered across its stern. The ship's home port remained Wilmington, Delaware, but when Malcom McLean got a look at the big new SL-7 that was to bear his name, what he was pleasantly surprised to see was not *Sea-Land McLean*, but rather *Sea-Land Pop-Pop*.

Three days later, the Sea-Land party had traveled 250 or so miles to Bremen, in West Germany, and at the A. G. Weser shipyard there, Mrs. Alex H. Galloway christened the second SL-7 *Sea-Land Galloway* in honor of her husband. Alex H. Galloway was the about-to-retire chairman and chief officer of the R. J. Reynolds Tobacco Company.

R. J. Reynolds had been anxious to diversify its holdings in the face of increasing social and political pressure that was steadily building against its principal product line, namely cigarettes. And so while it would eventually add such products as Oreo Cookies to its basket of wares, in January

1969 a thoroughly friendly $400 million takeover was negotiated whereby R. J. Reynolds became the principal owner of Sea-Land Service. McLean sold his shares in the company he had founded, but continued to serve as president of Sea-Land after the transaction, in addition to holding a seat on the R. J. Reynolds board of directors—and acquiring a substantial portfolio of R. J. Reynolds stock. R. J. Reynolds and Malcom McLean were both from North Carolina, of course, and long before anybody ever heard of a T-2 tanker called *Ideal X*, Reynolds was a major customer of McLean Trucking and relied on the company for shipping quantities of its products to market.

Most observers feel that the takeover was advantageous to both companies. For its part, before acquiring Sea-Land, R.J. Reynolds's nontobacco revenues represented merely twelve percent of the corporation's total revenues, while once Sea-Land was part of the picture, nontobacco revenue had increased to twenty-six percent.[36] Reynolds even changed its formal corporate name to acknowledge the new order. Before the merger, the company was the R. J. Reynolds Tobacco Company; after the merger, it became R. J. Reynolds Industries. The formal date of Sea-Land's acquisition by Reynolds was May 13, 1969.

For Sea-Land, the merger provided a badly needed source of investment capital, and while the SL-7 program had begun to move through various design phases prior to the merger, it is doubtful in the extreme if Sea-Land had the financial resources to execute construction contracts without additional support. McLean even arranged to establish a new company, Reynolds Leasing, to assume title to the new SL-7s and charter them to Sea-Land Service for operation.

During the Reynolds era, McLean gradually scaled back his involvement with Sea-Land, although he certainly kept his hand in the SL-7 project from beginning to end. While many Sea-Land veterans felt a bit uncomfortable with the added layers of procedure and oversight that the merger brought with it, most would agree that under R. J. Reynolds, Sea-Land remained Sea-Land and maritime people did not find themselves continually second-guessed by people whose principal business experience involved, essentially, manufacturing and selling cigarettes. There was some additional business formality, to be sure, but Sea-Land itself had begun to move away from its freewheeling style of earlier years even before the R. J. Reynolds takeover.

One change that John Boylston, a long-time Sea-Land hand, noted with a degree of humor is that after the merger, business meetings that were held at Reynolds's facilities always included bowls of tobacco products on the conference tables, and people were free to help themselves and indulge. Boylston was a pipe-smoker, though, and the only brand Reynolds then provided was called Carter Hall—which, to Boylston's tastes, was simply awful. The diplomatic solution was for him to take a package of Carter Hall tobacco home, throw away the contents, and refill the empty box with his preferred brand.[37]

More Sea-Land Newbuildings

Early in the R. J. Reynolds era—indeed, while the SL-7s were still under construction—Sea-Land was able to follow up its contracting for the new eight-vessel class with four additional newbuildings. These were not, though, vessels that were designed and built by Sea-Land itself, nor were they even remotely in the same league as the SL-7 with respect to carrying capacity, much less speed. Acquiring the steam-powered quartet was more a case of taking advantage of a target of opportunity—actually two separate targets of opportunity—than the careful carrying out of any long-range corporate strategy. The four vessels were under construction for two other U.S. steamship companies, but they became Sea-Land's SL-18 class before earning a single dollar for their original owners.

Two vessels, designed by the Matson Navigation Company for that company's Far East trade, were under construction at Bremer-Vulkan in Bremen, West Germany. *S. T. Alexander*, the first of the pair, was launched on June 2, 1970, and was able to accommodate 1,175 of Matson's distinctive twenty-four-foot containers, plus an additional 148 forty-footers. (This is about 1,500 TEUs.) But before either the *Alexander* or its sister ship, the *H. P. Baldwin*, was completed, Matson had withdrawn from its international transpacific service, and because the two foreign-built hulls could not be used in Matson's basic Hawaii service since they were not Jones Act–compliant, Sea-Land was able to acquire the pair and add them to its fleet as, eventually, *Sea-Land Economy* and *Sea-Land Venture*. (The two vessels actually worked for several months as *SL 180* and *SL 181*, were in service before the first SL-7s were delivered, and in that sense could be called Sea-Land's very first newbuildings.)

Sea-Land's Scott Morrison believes that the acquisition of these two vessels provides an interesting glimpse into how internal procedures at the company had become more formal in the days after R. J. Reynolds assumed control. Morrison and Warren Leback, the executive who headed up the SL-7 project for Sea-Land, had learned through various industry contacts that Matson might be willing to negotiate the sale of its two yet-to-be-delivered vessels, and the two quickly developed a plan for acquiring the pair and deploying them in a new Gulf Coast–Europe trade. One day Morrison and Leback ran into a Reynolds executive waiting for an elevator and quickly outlined their idea to him. The Reynolds man was aghast and insisted that paperwork had to be completed, and a formal proposal put forward, before such a course of action could even be considered.[38]

The other two SL-18 class vessels were quite similar to the Matson pair and were built at Bethlehem Steel's Sparrows Point yard in Baltimore for Pacific Far East Lines (PFEL). Each accommodated 1,664 TEUs; thanks to their domestic construction, both were able to operate in Jones Act trades. PFEL, which had come under the control of the Alioto family of San Francisco in its final years, filed for bankruptcy before the vessels were delivered, though, and Sea-Land was handed yet another opportunity to supplement its rapidly expanding fleet with two additional hulls, vessels that were christened *Sea-Land Producer* and *Sea-Land Consumer*.

Interestingly, while Sea-Land acquired these two container ships from PFEL, they were designed and ordered from Bethlehem Steel by Matson, and conveyed to PFEL during construction. All four of these SL-18 class vessels had thus been developed under Matson supervision, were similar in general appearance and specification, and featured a profile that did not follow conventional container ship design of the era. They included a deckhouse and navigation bridge close to the bow, funnel and machinery aft, and containers in between, a design that bore some similarity to Sea-Land's SL-7.[39] The two Bremer-Vulkan vessels, *Sea-Land Economy* and *Sea-Land Venture*, could also carry a small number of containers below deck and atop their hatch covers forward of the deckhouse, and these two ships were also delivered with their hulls rendered in Matson's distinctive gray livery, rather than typical Sea-Land black. Table 5.9 provides additional information about the four SL-18 class vessels.

When Sea-Land acquired the SL-18s, it was in the process of converting its operation from the use of the thirty-five-foot containers it had relied on since 1957 to the more common twenty- and forty-footers that had become standard in the industry. Matson also inaugurated container service with an unusual twenty-four-foot unit, and it, too, was beginning a similar shift to more standard containers. Consequently, the vertical cells in the two Bremer-Vulkan ships were designed to be flexible; they could be converted from handling twenty-four-foot containers to forty-footers

TABLE 5.9. *Sea Land Fleet: SL-18 Class*

Off. No.	Name	Hull dimensions	GRT	Place built (year)	Notes
531478	*Sea-Land Venture* *a) S.T. Alexander* *b) SL 180*	720 × 95 × 34	24,774	Bremen, West Germany (1970)	1
532410	*Sea-Land Economy* a) *H.P. Baldwin* b) *SL 181*	720 × 95 × 34	24,774	Bremen-Vegesack, West Germany (1971)	1
552819	*Sea-Land Producer* a) *New Zealand Bear* c) *CSX Producer* d) *Horizon Producer*	720 × 95 × 34	23,510	Sparrows Point, Md. (1974)	2
552818	*Sea-Land Consumer* a) *Australia Bear* c) *CSX Consumer* d) *Horizon Consumer*	721 × 95 × 32	23,763	Sparrows Point, Md. (1973)	2

Notes

1. Designed and built by Matson Navigation Company and identified by Sea-Land as Class 18M.
2. Designed by Matson, conveyed to Pacific Far East Line during construction, and identified by Sea-Land as Class 18P.

voyage by voyage, and this feature greatly facilitated their conversion to Sea-Land specifications.[40] When Sea-Land put the pair in service, they were rigged to carry 552 thirty-five-foot containers and 181 forty-footers. On the other hand, the two SL-18s that Sea-Land acquired from PFEL had been converted to carry standard-size containers only, and when they joined the Sea-Land fleet they were rigged to carry 120 twenty-foot containers and 613 forty-footers, with an additional 159 spaces atop the hatch covers that could accommodate either forty-foot or even forty-five-foot containers.

Sea-Land's shift from thirty-five-foot to forty-foot containers was necessarily a gradual one that took several years to effect. In 1975, for instance, Sea-Land owned 52,000 thirty-five-foot containers and 10,000 forty-footers. By 1984, the company's inventory of forty-foot containers had increased threefold to 32,000 units, although its fleet of thirty-five-foot containers had also grown from 52,000 to 56,000. Were Sea-Land to have parked one of its containers in New York's Times Square in 1984 and placed all the others in a row behind it, the resulting line of containers would extend north on Broadway to the city limits, on up the Hudson to Albany, west through the Mohawk Valley to Buffalo, along the southern rim of Lake Erie into Ohio, and end in the western suburbs of Cleveland, Ohio.

A service expansion that took place shortly after the SL-18 class joined the fleet gave Sea-Land additional flexibility for serving Mediterranean and Middle Eastern trades. In 1975 a new terminal was opened in Algeciras, Spain, a port located immediately inside the Straits of Gibraltar and across the Bay of Gibraltar from the most famous rock in the world. Sea-Land's facility at Algeciras was not intended as a place to off-load containers bound for inland points in Spain, though. Rather, it was primarily a transfer facility where container ships working transatlantic trades could exchange containers bound for, or originating in, ports such as Barcelona, Marseilles, Genoa, and Naples, as well as smaller points, and Sea-Land would develop a variety of cooperative arrangements with smaller container-ship companies based in Europe to handle such feeder operations. Both the SL-7s and the SL-18s became frequent visitors to Algeciras in the years after 1975.

From Steam to Diesel

Following the construction and delivery of the steam-powered SL-7s in 1972 and 1973 and the parallel acquisition of the SL-18s, all subsequent Sea-Land newbuildings would feature diesel propulsion. The company would add additional steam tonnage to its fleet in subsequent years, but these were "previously owned" vessels obtained in conjunction with corporate realignments of one sort or another.

One factor that prompted Sea-Land to adopt diesel propulsion in a big way was its experience with the SL-7. As noted earlier, the big new speedsters were only in service a single year when war erupted in the Middle East, a war that soon led to a global phenomenon called the Arab Oil Embargo.

A vital operational assumption behind Sea-Land's strategy in acquiring a fleet of steam-powered container ships that could operate at thirty-three-knot speed was that both the price and the availability of the Bunker C fuel such performance required was steady and constant. As a result of the Arab Oil Embargo that was imposed in the wake of the Yom Kipper War, though, neither the price nor the availability of the enormous quantities of fuel that an SL-7 required was either steady or constant. Bunker C fuel oil that cost $22 a ton in 1973 rose to $70 a ton in little over a year's time.

Speed at sea is expensive. It is expensive in the finely designed hull form that is necessary to achieve high-speed performance; it is expensive in the quantity of fuel that must be consumed to achieve the desired speed; it is expensive in the capacity trade-offs that are required to incorporate an engine of adequate size, plus sufficient fuel-carrying capability, into the overall design.

Perhaps the most classic example one can cite goes back to the early years of the twentieth century when the Cunard Line built its famous twin transatlantic liners *Mauretania* and *Lusitania*, vessels that were designed to sustain twenty-four-knot speed. The fuel needed to push the big vessels from a relatively fast twenty-two knots to an even faster twenty-four knots was twice that needed to sustain twenty-two knots.[41] Stated in different terms, a nine-percent increase in speed was only achieved after a 100-percent increase in fuel consumption.

Sea-Land's statistics for its SL-7 offer even more dramatic contrasts. If an SL-7 were to throttle back and cruise at a modest twenty-five knots, the vessel would consume 240 tons of Bunker C in a day's time. Push the vessel to its designed maximum speed of thirty-three knots, though, and the daily fuel consumption jumps to an extraordinary 614 tons a day. (Fully bunkered, an SL-7 carried 5,488 tons of fuel.)[42]

The Arab Oil Embargo of 1973 produced unprecedented increases in world petroleum prices that were at least fourfold. When oil prices doubled again in 1979 in reaction to continued unrest in the Middle East, Sea-Land found itself in an untenable position. With the cost of fuel escalating at rates even the most cautious company planners would have had difficulty imagining, much less including in any kind of formal calculations while the SL-7 was under design, continued operation of the big vessels at thirty-three knots became impossible. The only short-term course of action was to slow the big vessels down.

Sea-Land still wanted to maintain weekly transatlantic departures with its SL-7s, though. But to do so at a reduced speed of twenty-three knots, one of the six transpacific vessels had to be shifted to the Atlantic, and while customers could count on the same departure frequencies, transatlantic delivery times had increased by at least two full days, and from the perspective of Sea-Land's accountants, it now required three vessels—and three crews—to sustain such weekly departures. Meanwhile, on the Pacific, five vessels, not six, were making round-trip circuits in thirty-five days at twenty-three knots, rather than twenty-one days at thirty-three knots, although the longer circuit did include an additional port call.[43]

In any kind of long-term perspective, though, the situation was untenable, both operationally and financially. Sea-Land had paid a premium price for a high-performance vessel, and yet the eight ships had to be throttled down and operated well below their design limits. And so, after the much-heralded vessels had been in service for little more than a decade, Sea-Land was able to negotiate their sale to the U.S. Navy, where they were converted into fast supply ships to support U.S. forces operating in foreign lands. Six SL-7s were conveyed to the Navy in 1981 for $203.4 million, while the final two changed hands the following year for $65 million.[44]

The steam turbine engine remains a marvelous technical achievement, especially in a marine environment, and its deployment in vessels from the *Normandie* and the *United States* to the SL-7 and the latest fleet carriers of the United States Navy forcefully documents its performance capabilities. But one of the prices that must be paid to achieve the kind of high-speed performance that the steam turbine is uniquely able to provide is that it has an almost insatiable appetite for fuel. And so as the price of fuel continued to rise after the 1973 war, Sea-Land was more than willing to explore the fuel economies that diesel power might generate.

The D-6 Class

Given Sea-Land's earlier propensity for splicing and upgrading older tonnage, it is perhaps appropriate that the company's first venture in diesel-powered container ships involved the rehabilitation of a quartet of veteran hulls.[45]

As described in chapter 4, in 1962, Sea-Land had added *Elizabethport* and three sister ships to its fleet, vessels that combined the bow, stern and machinery from wartime T-3 tankers with newly built midbodies. By the 1970s, this quartet was showing its years, even while the container-carrying middle portions of their hulls were relatively new.

What Sea-Land did, in 1977, was dispatch all four vessels to the Mitsubishi yard in Kobe, Japan, and there each vessel's bow and stern was cut away and discarded. The midbodies were retained, newly built bows and sterns were spliced onto them, and new six-cylinder Sulzer 6RND90 diesel engines were installed as well. So rebuilt, Sea-Land's first diesel-powered container ships joined the roster and were designated the D-6 class. They were a bit longer and had a larger carrying capacity than the converted T-3s they replaced: 662 feet versus 627 feet in length, and 673 forty-foot containers versus 476 thirty-five-footers. Overall cost of the project was $52.5 million—four almost-new container ships for less than the price of a single SL-7.

Because the project involved new machinery and a new stern, the resulting hulls were regarded as entirely new vessels and so were issued new official numbers by the Coast Guard when they were formally enrolled as U.S. merchant vessels. Though technically new, thanks to their older midbodies, D-6 class vessels enjoy a unique historical lineage. And this note: when the four new midbody sections were built in Germany in the early 1960s, they featured a riveted topside strake, since all-welded hull construction had yet to achieve the universality it would later enjoy. The D-6 class was still in service in the early years of the twenty-first century and more than likely embraces the only active container ships in the world to exhibit riveted construction along the midbody section of their hulls.[46] Table 5.10 identifies the four vessels and provides relevant statistical information about them.

From D-6 to D-9

In the late 1970s, there was some talk that R. J. Reynolds was so pleased with both the results—and the cost—of the D-6 conversion project that Sea-Land would soon develop a similar upgrade program for some of its converted C-4s. Nothing materialized from such reports, though, and what in fact happened next was that the company designed and built a new class of diesel-powered container ships from the keel up, an effort that would be called the D-9 class. Some of the criteria that were established for the new vessels as design got underway were a service

TABLE 5.10. *Sea-Land Fleet: D-6 Class of 1977*

Off. No.	Name	Hull dimensions	GRT	Place built (year)	Notes
594374	*Sea-Land Leader*	662 × 78 × 39	17,618	Kobe, Japan (1977)	1
594375	*Sea-Land Pioneer*	662 × 78 × 39	17,618	Kobe, Japan (1978)	2
593980	*Sea-Land Pacer*	662 × 78 × 39	17,618	Kobe, Japan (1978)	3
594073	*Sea-Land Adventurer* b) *Sea Adventure* c) *Maersk Constantza* d) *Sea Adventure* e) *Maersk Koper*	662 × 78 × 39	17,618	Kobe, Japan (1978)	4

Notes

1. Midbody formerly part of Sea-Land's *Elizabethport*.
2. Midbody formerly part of Sea-Land's *Los Angeles*.
3. Midbody formerly part of Sea-Land's *San Juan*.
4. Midbody formerly part of Sea-Land's *San Francisco*.

speed of twenty-one to twenty-two knots, the ability to transit both the Panama Canal and the Suez Canal, and diesel propulsion with engines controlled directly from the pilothouse.

The D-9 project was unusual in that Sea-Land did not retain a conventional naval architect to develop plans and specifications. Rather, because Sea-Land was then involved with Mitsubishi Heavy Industries on the D-6 effort, it had sufficient confidence to retain that company to prepare such documents for its newest class of vessels, and a contract to this effect was executed in the spring of 1978.

This did not mean that Mitsubishi would automatically be awarded construction contracts to build the D-9 class; subsequent competitive bidding would be required, and in August 1978 Sea-Land sent invitations to bid to shipyards in twelve different countries. Mitsubishi was able to win construction contracts, though, although not for the entire twelve-vessel fleet. Indeed, because of an important contractual requirement that Sea-Land insisted upon, it is unlikely that any single yard could have won a contract for the entire D-9 effort. Sea-Land expected all twelve ships to be delivered within a twelve-month period and so, like the SL-7 effort, D-9 construction was shared by three different builders—three builders and four yards, in fact.

Mitsubishi would build seven of the new vessels, three at its yard in Kobe, four in Nagasaki; another Japanese shipbuilder, Mitsui Engine and Shipbuilding, would turn out three vessels from its yard in Tomano; and Hyundai Heavy Industries, of Ulsan, South Korea, would build the final two. All construction contracts were executed on October 13, 1978, and the per-vessel cost was $44.12 million—or $396 million for the full dozen. Stated differently, Sea-Land would acquire twelve D-9 vessels for $29 million less than it paid for eight SL-7s almost a decade earlier.[47]

As the case with the SL-7, Sea-Land wished to achieve maximum similarity despite construction by multiple shipyards, and so Mitsubishi's Kobe yard was assigned the task of coordinating the overall project. Hull forms were tested under the supervision of people from Mitsubishi's Kobi facility, in cooperation with the Nagasaki Technical Institute, and it was the Kobi yard that played a lead role in ensuring that, to the maximum extent possible, all yards used the same vendors to supply equipment—everything from navigational gear and lifeboats to coffee makers and lighting fixtures.

Sea-Land's requirement of delivery within a single calendar year was met with ample time to spare. The first vessel, *Sea-Land Patriot,* was handed over to Sea-Land by Mitsubishi on January 30, 1980, while the final vessel, *Sea-Land Mariner*, was delivered by Mitsui on November 15, 1980. All twelve flew the U.S. flag and were registered in the United States, although their offshore construction meant they were not eligible to work any Jones Act trades.

With respect to technical specifications, with a service speed of twenty-two knots, the D-9 class was not at all as fast as the earlier SL-7—nor is it likely that any deepwater container ship ever will be. The new vessels were even a bit smaller than the SL-7 in carrying capacity. Expressed in TEUs, the SL-7 was rated at 1,974, while the comparable number for the newer D-9 was 1,678, although this figure was later recalculated and set at 1,780. (Because Sea-Land was still in the process of converting from the exclusive use of thirty-five-foot containers to more industry-compatible twenty- and forty-footers, the D-9 was designed with a number of container-carrying cells that could be adjusted in size as the transition progressed.)

D-9 class vessels were each equipped with a nine-cylinder Sulzer model 9RND90M diesel, engines that were built, in Japan, by Mitsubishi, but under license to Sulzer, and are commonly referred to as "slow-speed" diesels. The engine is directly linked to a five-bladed propeller that rotates at 122 rpm at cruising speed, and the only significant design adjustment that had to be made after the vessels entered service and accumulated some hours of operation was an ever-so-slight alteration in the pitch of the propeller. With respect to general external appearance, the D-9—like the D-6 before it—eschewed the SL-7 (and SL-18) concept of a forward deckhouse and returned to the more conventional container ship profile of an after deckhouse, but with some containers accommodated between deckhouse and stern.

Table 5.11 displays technical information about the D-9 class, while table 5.12 identifies each of the twelve vessels and indicates the shipyard where it was constructed.

For a season or two after its new D-9 class vessels entered service, Sea-Land had both its SL-7s and its D-9s working simultaneously. Business was running at record levels and the company needed all this tonnage to

TABLE 5.11. *Sea-Land's D-9 Class: Statistical Information*

Data element	Value
Length (overall)	744′ 7⅝″
Length (waterline)	
Length (between perpendiculars)	698′ 9⅞″
Beam (molded)	100′ 4.75″
Draft	31′ 2″
Gross registered tons	24,867.09
Deadweight tons	23,308
Classification Society	American Bureau of Shipping (ABS)

TABLE 5.12. *Sea-Land Fleet: D-9 Class of 1980*

Off. No.	Name	Place Built (Year)
604246	*Sea-Land Defender*	Tomano, Japan (1980)
604247	*Sea-Land Developer*	Kobe, Japan (1980)
606062	*Sea-Land Endurance*	Ulsan, South Korea (1980)
604248	*Sea-Land Explorer*	Nagasaki, Japan (1980)
604249	*Sea-Land Express*	Tomano, Japan (1980)
606065	*Sea-Land Freedom*	Nagasaki, Japan (1980)
606061	*Sea-Land Independence*	Nagasaki, Japan (1980)
606064	*Sea-Land Innovator*	Ulsan, South Korea (1980)
604245	*Sea-Land Liberator*	Nagasaki, Japan (1980)
606066	*Sea-Land Mariner*	Tomano, Japan (1980)
604244	*Sea-Land Patriot*	Kobe, Japan (1980)
606063	*Sea-Land Voyager*	Kobe, Japan (1980)

serve its customers in an efficient and dependable manner. When the SL-7s were sold to the U.S. Navy in 1981 and 1982, though, the company found itself short of tonnage and five modern diesel-powered container ships were chartered in from three separate overseas companies to pick up the slack and ensure that the company would not lose market share. Two 1,340-TEU vessels were obtained from Cia Transatlantica Espanola SA (CTE) and two 1,444-TEU ships from Orient Overseas Container Line (OOCL) of Hong Kong, while the fifth came from Singapore-based Neptune Orient Line (NOL) and was rated at 1,569 TEUs. All five vessels were diesel-powered, thus creating the remarkable phenomenon of a Sea-Land deepwater fleet that was entirely steam as late as 1979 operating twenty-one modern diesel-powered container ships less than five years later.[48]

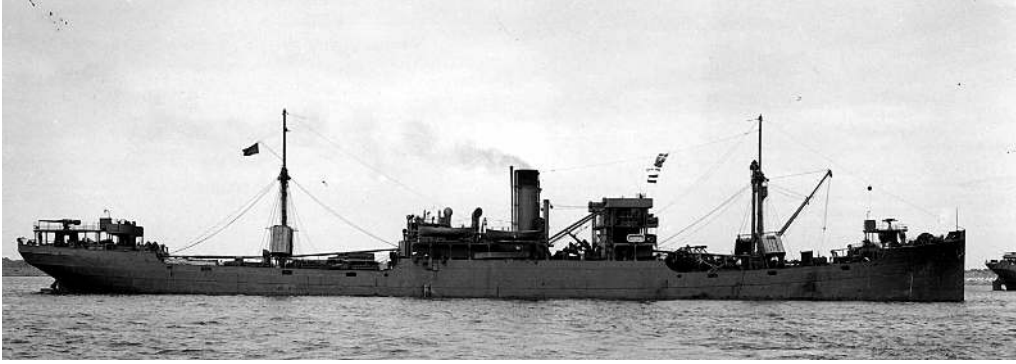
Sea-Land would charter many vessels over the years. The chartering of these five is especially noteworthy, though. Table 5.13 identifies the vessels that Sea-Land obtained, through charter, to run alongside its new D-9s and compensate for the departed SL-7s.

TABLE 5.13. *Sea-Land Fleet: Chartered In Tonnage of 1982*

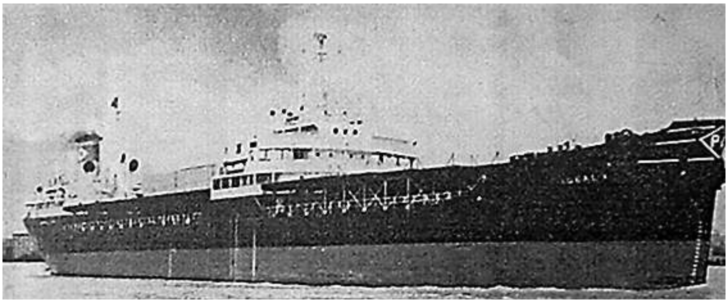
Flag	Name	Owner	Built (Year)	Dimensions	Propulsion
Malta	*Pilar* b) *CGM Champagne* c) *Pilaro* d) *Al Khakji* e) *Sea Dragon* f) *Maersk Kyoto* g) *Irenes Synthesis* h) *ACX Clover* i) *Global Synthesis* j) *MSC Spain* k) *Irenes Synthesis*	CTE	Real, Spain (1982)	604 × 89 × 36	7-cyl. B&W diesel
Malta	*Almuden* b) *Prosper* c) *TSK Chorus* d) *Al Khaumah* e) *Sea Fortune I* f) *Irenes Horizon* g) *Global Horizon* h) *MSC Australia* i) *Irenes Horizon*	CTE	Real, Spain (1982)	604 × 89 × 36	7-cyl. B&W diesel

TABLE 5.13. *(Continued)*

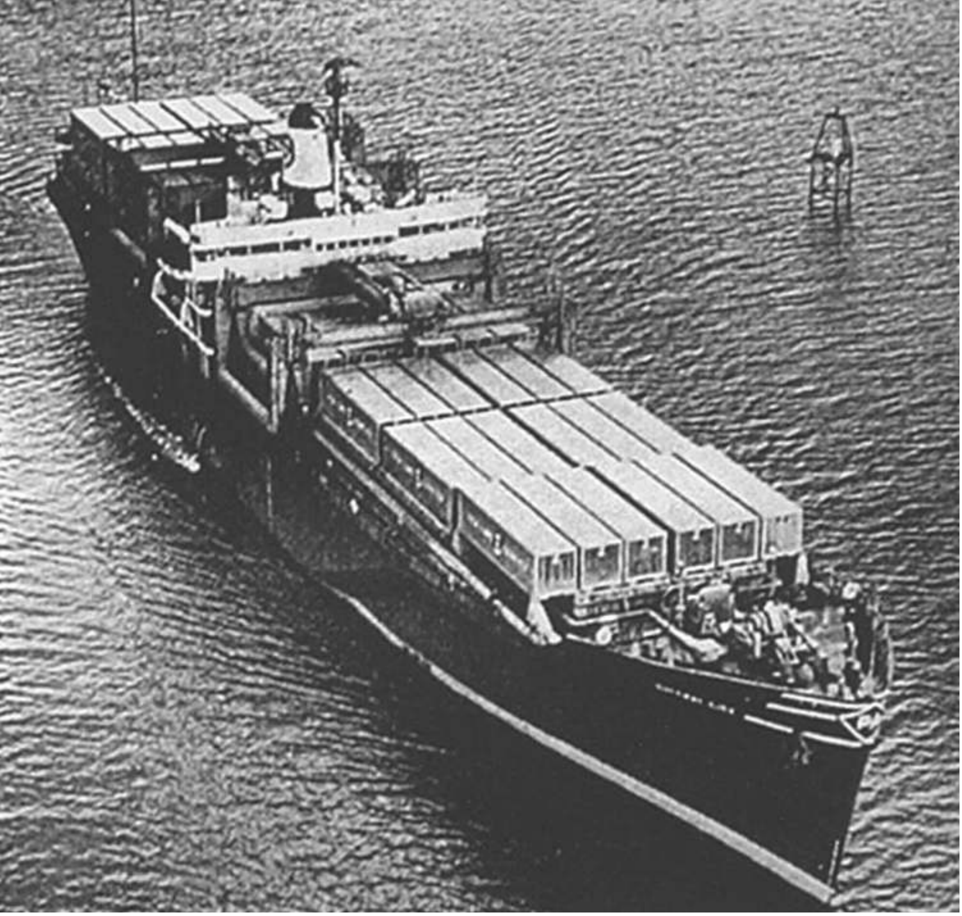
Flag	Name	Owner	Built (Year)	Dimensions	Propulsion
Liberia	*Oriental Commander* a) *Pacific Phoenix* c) *Ocean Commander* d) *Ocean Commander 1* e) *ScanDutch Hispanio* d) *San Francisco Bay* e) *Pacific Song* f) *Eagle Trust*	OOCL	La Seyne, France (1972)	769 × 85 × 32	10-cyl. Sulzer diesel
Liberia	*Oriental Leader* b) *Ocean Legend* c) *Dart America* d) *OOCL America* e) *OOCL Blessing* f) *Ocean Blessing*	OOCL	La Seyne, France (1971)	769 × 85 × 32	10-cyl. Sulzer diesel
Singapore	*Neptune Coral* b) *NOL Coral* c) *Dragon Komodo* d) *MSC Laurencea*	NOL	Kure, Japan (1977)	729 × 106 × 38	12-cyl. Sulzer diesel



Pan Royal was a First World War-era cargo ship that helped inaugurate Pan-Atlantic Steamship service in the early 1930s. Shown here in wartime livery, she was lost during a trans-Atlantic convoy in 1943. *Steamship Historical Society of America*)



Above: Although its containers were secured to a specially installed spar deck and not in below-deck cells, the April 26, 1956, voyage of the T-2 tanker *Ideal X* from Port Newark to Houston is commonly regarded as the inauguration of the container-ship era. Below: With company executives watching intently from above the pilot house, longshoremen and teamsters work cooperatively to hoist containers aboard Pan-Atlantic's *Gateway City* in 1957.



The converted C-2 cargo ship *Gateway City* carried containers both on deck and in below-deck cells.

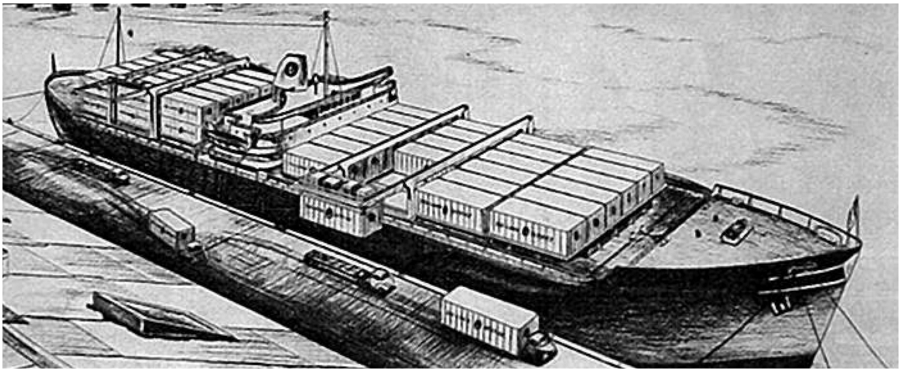
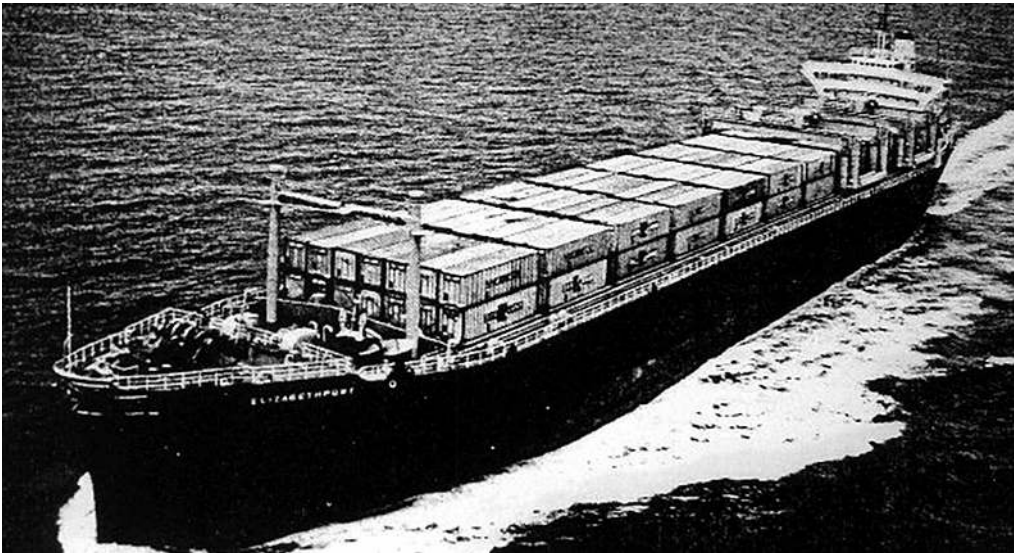
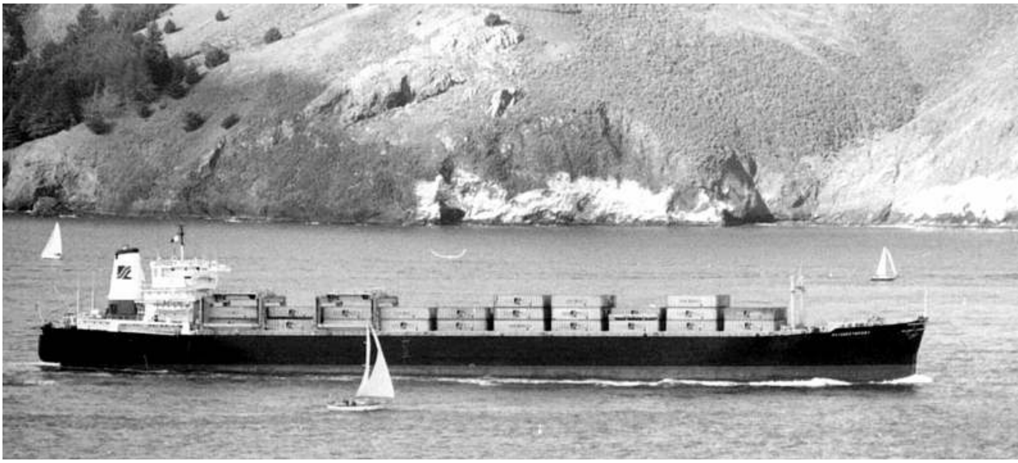


Illustration of Pan-Atlantic's conversion of ordinary C-2 cargo ships into the world's first cellular container ships.

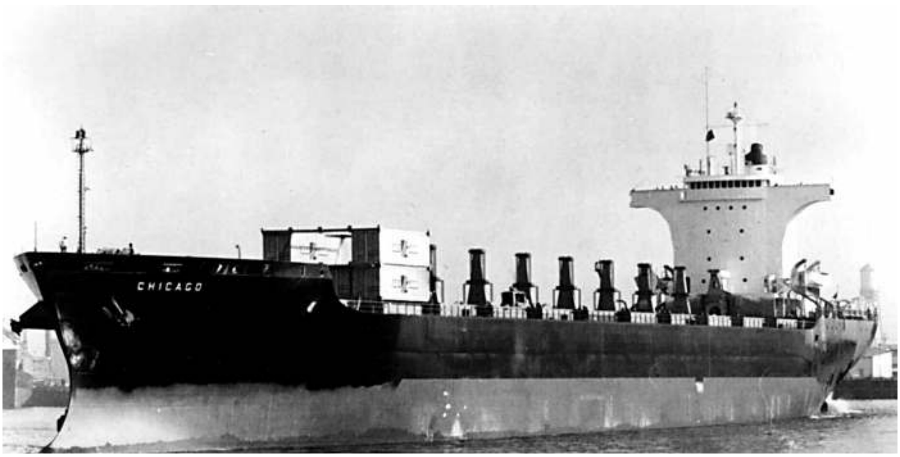


Sea-Land’s *Elizabethport* incorporates the bow, stern, and machinery of a T-3 tanker, plus a newly constructed mid-body section.



Elizabethport steams through the Golden Gate into San Francisco Harbor. (*Paul Tully*)

Sea-Land's *St. Louis* was converted into a cellular container ship from the C-4 troop transport *General M. L. Hersey*.



Sea-Land's *Chicago* was converted into a cellular container ship from the C-4 troop transport *General C. H. Muir*. (*Steamship Historical Society of America*)

A thin, knife-like bow was a critical design feature to ensure that Sea-Land's SL-7 would achieve high-speed performance. (*McLean Foundation*)

Sea-Land Galloway (left) and *Sea-Land Commerce* (right) under construction at the A.G. Weser shipyard in Bremen, West Germany. (*McLean Foundation*)

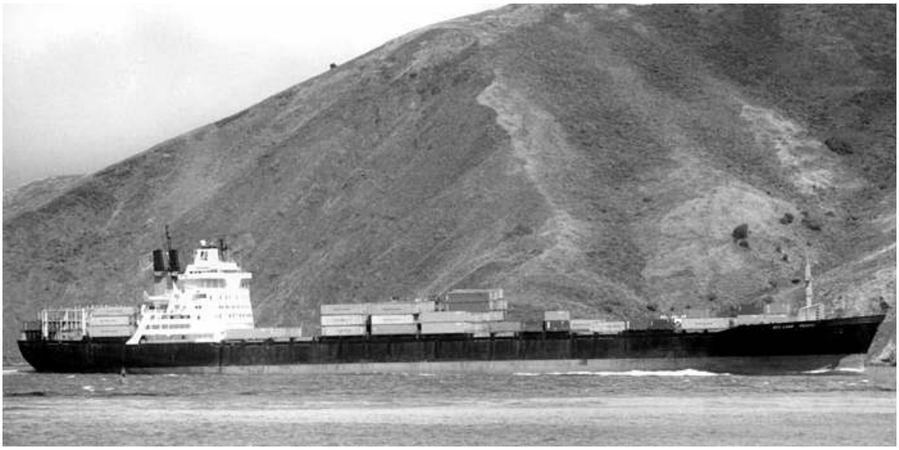
While final fitting out continues on *Sea-Land Galloway*, work goes forward on *Sea-Land Market* (on the same ways where *Sea-Land Galloway* had been constructed) and *Sea-Land Commerce*. (*McLean Foundation*)

Sea-Land Galloway slides down the ways. (*McLean Foundation*)

Sea-Land Galloway shortly after entering service in 1972. (*Steamship Historical Society of America*)

Above: In January 1979, *Sea-Land Finance* maneuvers through the Golden Gate into San Francisco Harbor after crossing the Pacific. By this time, unanticipated increases in the cost of fuel oil had forced Sea-Land to throttle down its SL-7 fleet to less impressive speeds. (*Paul Tully*). Below: Although the USNS *Regulus* now serves as a ro-ro cargo ship for the military, the handsome lines of her origin as the SL-7 container ship *Sea-Land Commerce* are evident. (*U.S. Navy*)

On the fiftieth anniversary of Malcom McLean's bold initiative of 1956, few active containers still feature the once-distinctive Sea-Land logo and decoration.



Above: *Sea-Land Pacific* was designed and built by Farrell Lines, later worked for the United States Lines, and was acquired by Sea-Land c. 1978. (*Paul Tully*). Below: A Maersk-Sealand container ship being unloaded at the Port Elizabeth facility on Newark Bay.

Sea-Land Explorer, a D-9 class container ship built in 1980, heads into San Francisco Bay. Most of her above-deck containers bear the Maersk name and logo, indicative of cooperative ventures between Sea-Land and the Danish company preceding their 1999 merger. (*Paul Tully*)

Above: *Sea-Land Voyager*, seen here passing through the Kill van Kull on its way to Port Elizabeth on Newark Bay, is a D-9 class container ship that was designed and built by Sea-Land in 1980 but conveyed to Maersk-Sealand in 1999. Below: *Horizon Pacific*, formerly *Sea-Land Pacific*, steams under the Golden Gate Bridge. Horizon Line vessels feature a version of the original Sea-Land logo on their stacks. (*Paul Tully*)

The Maersk Sealand designation on the hull of the 2004-built *Maersk Denver* identifies this photo as from the 1999–2005 era. With its acquisition of P&O Nedlloyd in 2005, the Danish company now calls itself, simply, Maersk Line.

Above: With containers stacked seventeen across on her stern, a Maersk-Sealand container ship heads north in Puget Sound. Below: A 1998 air view of what was then the Sea-Land container terminal at Port Elizabeth, New Jersey. Contemporary container ports require vast acreage inland from the berths to sort and store inbound and outbound containers. (*Duffy/Granard Associates*)

6 FROM RJR TO CSX 1985–99

After the new SL-7s entered Sea-Land service in late 1972, Malcom McLean scaled back his involvement in the day-to-day operations of the company. McLean continued to retain substantial portions of the R. J. Reynolds stock he had acquired at the time of the 1969 merger, and he remained a member of the Reynolds board of directors through 1977. He severed his ties with the tobacco conglomerate completely in April 1980, though, when he liquidated 1.3 million shares of stock for $44.5 million.[1]

The man who created Sea-Land in 1956 and turned it into the premier player in the new container-ship industry over the subsequent decade and a half had other challenges to address. He dabbled a bit in real estate in the mid-1970s and devoted some time to farming interests in his home state of North Carolina. The venture that bears more significantly on the subsequent history of transporting containers at sea, though, is the fact that in April 1978—two years before selling off the last of his R. J. Reynolds stock—Malcom McLean became the principal owner of no less a steamship company than the United States Lines.

United States Lines

For many Americans, the very name United States Lines once represented the very epitome of transport stability, on a par with the Pennsylvania Railroad and Pan American World Airways. And while United States Lines declared bankruptcy and went out of business in late 1986, ten years after McLean acquired the company, that final decade not only represents an interesting chapter in the evolution of the container-ship industry, but it also provided yet another opportunity for Malcom McLean to challenge conventional steamship wisdom and accomplish a few dramatic things that few others would have dared think about, much less try.

While it is possible to trace the history of the United States Lines back to the America Line of the nineteenth century, the modern company had its origins in 1921 when the United States Shipping Board created United States Lines as a government-owned corporation. In 1929, the government sold the company to the P. W. Chapman Company, but Chapman soon defaulted and the government was forced to foreclose. It was not until mid-Depression 1931 that United States Lines reentered the private sector, this time to stay, when International Mercantile Marine (IMM), a consortium headed by P. A. S. Franklin and long associated with the turn-of-the-century financial empire of J. P. Morgan, acquired it. IMM and United States Lines merged into a single corporate entity under the latter name in 1943.[2]

After World War II, United States Lines is perhaps best known for the record-breaking transatlantic performance turned in by its magnificent new passenger liner, the *United States*, in July of 1952.[3] But the company also acquired a substantial fleet of C-2, C-3 and C-4 cargo ships during this same era and operated them on a variety of world routes. As these vessels started to become long in years—and recognizing the limitation of tonnage that reflected designs from the 1930s—United States Lines acquired ten new cargo ships in 1962–63 that it designated the Challenger class, 11,300-gross-ton vessels that could maintain twenty-one-knot speed and that were built in a number of different U.S. yards. Traditionally, United States Lines cargo ships bore names that began with the word "American"—*American Scout*, *American Ranger*, *American Merchant*—although vessels assigned to transpacific service were identified with the name "Pioneer"—*Pioneer Glen*, *Pioneer Mist*, *Pioneer Star*—and were operated under the aegis of a United States Lines subsidiary, the American Pioneer Line. All vessels were decorated in the same livery, however: black hull, white superstructure, and a red funnel with white and blue bands at the top.

The first United States Lines vessels to be rigged for carrying containers were a fleet of five ships that were built in 1964–65 at the Chester, Pennsylvania, yard of the Sun Shipbuilding Company and were a minor variation, really, on the earlier Challenger class of break-bulk cargo ships. The first transatlantic voyage by any container-carrying vessel—described in chapter 5—was an eastbound crossing in 1966 by *American Racer*, a member of this five-vessel class of ships, which were equipped with genuine container-carrying cells but were not exclusively container ships. In 1968–71, United States Lines took delivery of the company's first all-container newbuildings, the eight-vessel Lancer class. Designed by J. J. Henry and also turned out by Sun Shipbuilding, they were fast, could sustain twenty-five-knot speed, and were each able to accommodate 1,240 trailer equivalent units (TEUs). When the first Lancer keel was laid at Sun Shipbuilding, plans called for break-bulk cargo vessels. It was while the first of these ships were under construction, though, that the company did some fast redesign work and had the hulls lengthened, widened, and converted into fully cellular container ships.[4]

United States Lines would expand its container fleet with a number of acquisitions from other steamship lines throughout the 1970s as the nature of the company's cargo operations shifted from predominately break-bulk to predominately container.

In December 1968, United States Lines was acquired in a hostile takeover by the Belleville, New Jersey, investment syndicate of Walter Kiddie and Company, and it was under Kiddie management that the line began to reorient itself to the realities of the container era with an added degree of urgency.[5] (It was also early in the Kiddie era, in November 1969, that the *United States* was removed from passenger service and placed in layup status.) Kiddie never achieved any degree of comfort or stability as the owner of United States Lines, though; virtually from the outset, reports circulated throughout the maritime and investment communities that the company's assets were available—for sale, for lease, but above all for the right price.

The steamship line most often mentioned as a candidate for establishing some kind of cooperative arrangement with United States Lines was, interestingly enough, Sea-Land Service. Malcom McLean had often said that he thought Sea-Land and United States Lines would make a good match, and in October 1969—mere months after Sea-Land had become a subsidiary of R. J. Reynolds and while McLean's influence was running strong—it was announced that Sea-Land would enter a twenty-year time-charter agreement and acquire sixteen United States Lines vessels for approximately $61 million a year—or $1.2 billion over the twenty-year term of the charter, a commitment of serious proportion. Were these sixteen container ships to come under Sea-Land control, parent R. J. Reynolds would find itself managing three-quarters or more of the container-carrying tonnage then under the U.S. flag.[6]

Because United States Lines vessels had largely been built with construction-differential subsidies from Washington, the Federal Maritime Commission (FMC) had to approve the charter plan; vigorous protests were lodged with the FMC by other U.S.-flag steamship companies, which feared the power that Reynolds and Sea-Land would wield if the deal were to go forward. In July 1970 an FMC examiner recommended that the full commission approve the transaction, but no final action was forthcoming. With matters in a state of uncertainty and the charter proposal languishing, in November 1970 R. J. Reynolds and Kiddie announced they were terminating the pending arrangement.[7]

This was hardly the end of matters, though. Months later Kiddie and Reynolds announced agreement on a plan whereby the latter would acquire United States Lines in toto, although it would continue to be operated as a stand-alone entity, not merged into Sea-Land in any operational sense. In early 1973, the FMC approved this transaction by a three-to-two vote, with the commission chair, Helen Bentley, calling the agreement "at best exceedingly impractical, and at worst totally unworkable."[8]

Then matters grew even more complicated. A federal court declared that the FMC had no authority to rule on mergers of steamship companies, FMC promptly appealed, and in March 1973 the United States Supreme Court refused to hear the case, essentially validating both the commission's action and the proposed merger. While this seemed to clear the way for the acquisition, lawyers in the Justice Department's antitrust division took a dim view of the pending transaction, and the takeover proposal was thwarted from that quarter.[9]

Matters continued to drag on and the future of United States Lines was anything but clear. In the wake of all this uncertainty, in April 1978, McLean Securities acquired United States Lines from Walter Kiddie and Company in a $160 million transaction.[10] Malcom McLean still owned a substantial block of R. J. Reynolds stock, but his acquisition of United States Lines was a venture in which there was no Reynolds involvement.

This all happened in April 1978. Before the year was out, Malcom McLean announced that United States Lines had signed a contract with Daewoo Heavy Industries, of South Korea, for the largest order of merchant vessels ever placed at one time by any private corporation.

The agreement called for Daewoo to construct twelve new diesel-powered container ships that would each accommodate in excess of 4,258

TEUs. Construction would take place at the brand-new $500 million Okpo shipyard that Daewoo was building on Koje Island, thirty-five miles southwest of Busan. By way of contrast, on the day that United States Lines signed its contract with Daewoo, the largest container ship then in service was Hapag-Lloyd's *Frankfurt Express*, a mammoth vessel that could handle 3,045 TEUs. Each of McLean's new vessels would be forty percent larger than what was then the largest container ship in the world, while taken collectively, the "Daewoo dozen," as they were quickly dubbed, would have a capacity in excess of any other world container-ship fleet.

So they were big. And each driven by a powerful Sulzer-designed model 7RLB90 diesel engine, they were the first-ever United States Lines ships that were not steam-powered.[11] In addition, the contract with Daewoo marked the first time United States Lines ever ordered vessels from an overseas shipyard. Expectedly, the new vessels did not come cheaply; the price tag worked out to $47.5 million per hull, and according to William Kelly, the president of the National Maritime Council, a trade association, McLean's purchase represented "the boldest American stroke in shipping in twenty years," while *Forbes* magazine reported that lenders "fought to finance McLean's vision."[12]

An important aspect of the Daewoo dozen was their design speed. While the newcomers were record-setters in many quantitative categories, McLean was ever mindful of the problems he faced some years earlier with Sea-Land's SL-7s when their high-speed capability quickly turned into a fatal liability. In assessing the markets the new ships would enter, he specified relatively slow-speed performance for his new vessels—a top speed slightly in excess of eighteen knots, and a service speed of sixteen knots. This was perfectly average for break-bulk cargo ships of the 1950s, but it was decidedly below standard when contrasted with the performance other container-ship operators assumed to be necessary in the mid-1980s.

McLean, though, was never one to run with the crowd, a characteristic that would prove to be an extraordinary business strength most of the time, but a tragic flaw on rare occasions—and this would prove to be one of them.

McLean was convinced that cost control had become the new name of the container-ship game. The new vessels included extensive automation in their design and operation—push-button control of hatch covers, for instance—features that McLean believed would allow the vessels to operate competitively with foreign-flag ships, because while U.S. seamen earned higher wages than their overseas equivalents, the Daewoo dozen would require fewer of them per vessel. Couple such labor productivity with the new fleet's record container-carrying capacity and the economy of scale it promised, and McLean was convinced that his new ships would quickly propel United States Lines into first place among the world's growing fraternity of container-ship operators.

The new ships were designed by C. R. Cushing and Company, a noted New York naval architectural firm; Charles Cushing and Malcom McLean had enjoyed a long and productive business and personal relationship, and Cushing had earlier worked for McLean at Sea-Land. The ships featured diesel engines that could be directly controlled from the pilothouse, while the engine room was able to run for hours on end with no crew in attendance at all. By way of contrast, when *Gateway City* steamed out of Port Newark in 1957, the vessel required an onboard crew of forty-seven people to sustain normal operations. Each of the Daewoo dozen—whose carrying capacity exceeded *Gateway City*'s by a factor of ten—could be safely operated by a crew of 21, less than half the number needed to operate the converted C-2. Stated differently, *Gateway City* was able to carry 4.8 thirty-five-foot containers per crewmember, while each of the Daewoo dozen was able to transport 202.8 forty-foot containers per crewmember.

For all their innovations, though, just as the tragic flaw of Sea-Land's SL-7 was the unexpected cost required to sustain high-speed performance, so, too, would the Daewoo newbuildings have to be called commercial failures for reasons associated with speed. Namely, they were far too slow and proved unable to operate at sufficient speed to be competitive in a rapidly changing container-ship marketplace. In addition, because they were underpowered, they were unable to maintain even their own less demanding schedules in the face of any kind of adverse weather, the *Wall Street Journal* reporting that strong crosswinds would often cause the new vessels to fall behind on their itineraries.[13] Table 6.1 displays information about the Daewoo dozen, a fleet that United States Lines preferred to call the Econships.

McLean retained the traditional United States Lines practice of prefacing the names of the new ships with the word "American," while the vessels were distinguished one from another by honoring various states. On May 31, 1984, *American New York* was the first of the class to be so christened. Malcom McLean's spouse, Margaret McLean, was the vessel's sponsor, the same role she had played for *Sea-Land McLean* over a decade

TABLE 6.1. *United States Lines: The Econships*

Hull dimensions	950 × 106 × 30 feet
Gross registered tons	57,075
Deadweight tons	57,000
Container capacity	2,464 TEU in hold; 1,794 TEU on deck; 4,258 TEU total
Crew	21 persons
Main engine	Hemco-Sulzer 7RLB90x1 diesel
Propeller	Five blades, fixed pitch; 24.9 feet in diameter
Cruising range	30,000 nautical miles @ 18 knots
Classification	American Bureau of Shipping (ABS)
Initial voyage of initial ship	*American New York*; Busan, South Korea, Hong Kong, Kobe & Yokohama, Japan, to Savannah, GA & New York. Arrived Savannah, July 22, 1984; arrived New York, July 27, 1984.

earlier, and three additional Econships, *American New Jersey*, *American Alabama*, and *American Maine*, were christened at Daewoo's Okpo yard on the same day.

With the construction of the twelve Econships for United States Lines, all named after states, C. G. Yoo, the general director of the Daewoo shipyard, was looking ahead to future business with McLean when he observed that his company was ready and willing to build the thirty-eight additional vessels it would take to have one named after each of the fifty states.[14] McLean also thought he sensed a new market for noncontainerized traffic that his new Econships might tap. U.S. mass transit agencies were then starting to acquire new rolling stock more from overseas suppliers than from domestic car builders, so the new U.S. Lines vessels were outfitted with a spacious open area on the main deck beneath the superstructure where things like subway cars might be transported.

American New York left Busan, South Korea, for the United States in the early summer of 1984 and following a transit of the Panama Canal made its initial U.S. landfall in the port of Savannah, Georgia, on July 22. Then it was north to New York, the new vessel's once and future home port, and arrival there on the rainy morning of July 27. *American New York* slipped under the Verrazano Narrows Bridge and headed up the Hudson, where it was accorded the harbor's traditional fireboat welcome by marine units of the New York Fire Department. Instead of docking at a Hudson River pier, though, *American New York* reversed course in the Hudson at a point near the World Trade Center with assistance from a flotilla of Moran tugboats. (Frank Duffy, the longtime editor of the Moran house organ, *Tow Line*, commented that when *American New York* was in the midst of being turned in the Hudson, it almost seemed like a new bridge had been built across the river from lower Manhattan to Jersey City.[15]) The big container ship then headed south past the Statue of Liberty and west through the narrow confines of the Kill Van Kull. Unlike Sea-Land vessels, *American New York* did not later swing north into Newark Bay and dock at the huge Port Authority container-ship facilities at Elizabethport. United States Lines leased space at a different Port Authority–operated container facility, one that was located on the Staten Island shore of the Arthur Kill at a place called Howland Hook, just beyond Shooters Island and the entrance to Newark Bay, and that is where Moran tugs assisted the new container ship into its berth.[16] Because Arthur Kill is too narrow a waterway to turn a large vessel like an Econship, docking pilots first direct an inbound vessel into the lower reaches of Newark Bay, turn it there, and then carefully move the ship astern into Arthur Kill for docking at Howland Hook. Indeed with the advent of the Econships, the Port Authority agreed to expand the Howland Hook facility to the tune of $85.7 million by building new cranes and expanding storage space so the big new ships could be loaded and unloaded efficiently.

Something that was largely ignored at the time *American New York* inaugurated the Econship era, though, was the fact it was the largest vessel ever to fly the famous house flag of the United States Lines, besting the company's previous record holder, the since-retired superliner *United States* by 3,746 gross registered tons. The *United States* was 990 feet long, while each of the Daewoo dozen was slightly shorter at 950 feet. The overall size of a merchant vessel, though, is best reflected by its gross registered tonnage and using this measure, *American New York* established a new company standard.

When *American New York* left the Daewoo shipyard in South Korea and began to steam eastward across the Pacific, it was less than a finished product. United States Lines newbuilding team had a "punch list" with no fewer than 480 unfinished items that Daewoo had yet to complete to the owner's satisfaction and that would only be completed while the ship was at sea. McLean had pressured the shipyard to get the big new vessel in operation as quickly as possible so he could capture a share of the lucrative transpacific summer trade that moved Christmas merchandise from Asia to North America.[17] Santa Claus was coming to town, but he was not riding a miniature sleigh pulled by eight tiny reindeer. This time Santa's toys and goodies were all neatly stowed inside forty-foot containers and carried aboard a 57,075-gross-ton container ship.

The service pattern that McLean established for his big new ships was a continuous series of eighty-four-day eastbound voyages around the world, something that was fully as radical in 1984 as building a container ship that could accommodate in excess of 4,000 TEUs. This would enable the new ships to serve the rapidly growing Asia-to-North America market, as well as the always important North America-to-Europe trade, without having to worry about competing for traffic in much smaller westbound markets on both routes. With twelve of the new ships maintaining an eighty-four-day 'round-the-world circuit, each vessel was, effectively, seven days behind the one ahead of it, thus providing weekly service over all the important trade routes McLean hoped to serve—and dominate.

At first, things went well. McLean was even able to expand the scope of United States Lines operations by acquiring the remnants of both Moore-McCormack in 1983 and Delta Line in 1984, thus providing United States Lines with access to South American markets, although both acquisitions were largely intended to generate feeder service for the new global itineraries of the Econships. McLean even followed up his acquisition of the Daewoo dozen with five somewhat smaller newbuildings, two from South Korea's Samsung Shipbuilding—*American Ohio* and *American Georgia*—and three vessels that had been under construction at the Odense Steel Shipyard in Denmark for Delta, but were eventually delivered to United States Lines as *American Hawaii*, *American Michigan*, and *American North Carolina*.[18] The three Danish-built vessels were 1,936-TEU container ships that featured onboard cranes for loading and unloading, as well as a stern ramp that allowed a modest amount of roll-on, roll-off (ro/ro) cargo to be carried under the deckhouse.

Interestingly, Malcom McLean had christened one of his converted T-2 tankers of 1956 *Maxton* to honor the town where he was born. Now, almost three decades later, he was able to honor his home state, as well, with a vessel that would become one of the last deepwater container ships he ever acquired. Like the Econships, the five new vessels were diesel-powered.

Under McLean, United States Lines did not merely add tonnage to its fleet. The company also upgraded the management of its container operations by the installation of a high-speed facsimile system to transit a vessel's "stowage plan" to its next port of call, thus facilitating timely planning for the unloading and dispatching of a vessel's containers. Before the deployment of this automated system, United States Lines would often dispatch a courier—by airplane—from one port to the next to deliver such important documents.[19]

It would be the huge Econships, though, whose advent would have the greatest impact on the operations and fortunes of United States Lines. Major competitors were able to greet the arrival of McLean's new vessels with a withering series of rate reductions, and one newcomer to the container-ship industry even put a series of its own newbuildings into the same around-the-world service that McLean once thought he might have all to himself. Given the debt load that acquisition of the twelve new vessels represented—McLean actually acquired seventeen new ships if the five later fleet additions are included, and there was also debt associated with his earlier purchase of the company from Kiddie—United States Lines had little ability to match the discounted rates that other companies were offering. Nor was the competition particularly kind in their comments when it became clear that the Econships were not living up to expectations. Kerry St. Johnson, the chairman of London-based Overseas Containers, Ltd., offered this comment: "I suspect Mr. McLean felt the seas would part for him the way the Red Sea parted for Moses."[20]

Despite valiant efforts to reduce costs—United States Lines captains supposedly cut back on the cartons of American cigarettes they traditionally gave to pilots working vessels through the Suez Canal—the end of the road came quickly for United States Lines shortly after all twelve Econships had entered service. Their slow speed made them unable to compete—compete with Sea-Land, compete with other large-volume container-ship operators, and most telling of all, compete with a new Far Eastern company that had recently emerged on the scene and called itself Evergreen Marine—or, in the words of container-ship authority R. F. Gibney, the "Taiwanese entrepreneurial enigma that is Evergreen."[21] (It was Evergreen that challenged McLean by offering a competitive around-the-world service—in both directions—at cheaper rates and with faster ships!) We will learn more about the "enigma that is Evergreen" in chapter

8. More immediate is the fact that late in the afternoon on Monday, November 24, 1986—after a frantic weekend of trying to restructure the company's massive debt and a mere two years after *American New York* inaugurated the Econship era with a maiden voyage from Busan, South Korea, to Savannah and New York—McLean Industries and United States Lines filed for protection under Chapter 11 of the federal bankruptcy code.[22] Once United States Lines vessels that were then at sea completed their voyages and returned to port, they were tied up and secured because the company had suspended all transatlantic and around-the-world service. Asked what would happen after that, a company spokesman said that "the banks will come after them, and they'll do what they want with them."[23]

Earlier in 1986, another U.S. transport firm terminated its operations through bankruptcy. McLean Trucking, founded by Malcom McLean in 1934 and sold by him in 1955 when he acquired the Pan-Atlantic Steamship Company, was one of several over-the-road common carriers that were unable to adapt to the new realities of a substantially deregulated trucking environment. McLean Trucking, which had merged with Delta Trucking some years earlier and celebrated its fiftieth anniversary in 1984, terminated all operations and filed for Chapter 11 protection in mid-January of 1986. While the company continued to call itself McLean Trucking until the very end, no members of the McLean family held any substantial interest in the company in the years after 1955.[24]

Returning to United States Lines, the company was not alone in specifying slower and more economical diesel power plants for new container tonnage that was designed in the early 1980s in reaction to earlier instability in world petroleum markets. What put McLean more at risk than any of the others, though, was the sheer size of his acquisition—not only the largest container ship of all time, but eleven carbon copies built to the same extraordinary specifications. A rival company that might have expanded its fleet in more modest and measured fashion in the 1980s was also at risk to the extent that it acquired slow-speed vessels, but not at all to the same extent as United States Lines, a company that clearly "bet the store" on its new Econships and their performance specifications. (Not surprisingly, in the early years of the twenty-first century it would appear that many of these slower vessels from the 1980s are becoming candidates for the breakers before older, but faster, container-carrying tonnage that was built in the 1970s.)

The out-of-service Econships—towering vessels that were far more imposing when seen in port than even the likes of Cunard's *Queen Elizabeth 2*—were tied up in various harbors throughout the world, the brilliant red, white and blue of their funnels standing in mute tribute to a once-proud steamship company that was no more.

Sea-Land's Post–R. J. Reynolds Era

In 1983—five years after Malcom McLean had taken over United States Lines—R. J. Reynolds announced that in reviewing its ongoing diversification strategies, it did not see a relationship with Sea-Land as worthy of continuation. As early as 1978, a decade after acquiring Sea-Land, Reynolds was saying that it had reservations about the future earning capabilities of its container-ship subsidiary. This was before the SL-7s were sold to the U.S. Navy, and Sea-Land did manage to improve its performance in the profit-and-loss department in the early 1980s. In 1983, though, Sea-Land's profits dropped by 52 percent over the previous year, and in midsummer of 1984, executives at Reynolds announced that Sea-Land would be spun off and turned into a stand-alone corporation, independently listed on the New York Stock Exchange and with no relationship to R. J. Reynolds, thus marking the end of an important era in Sea-Land history—and, of course, the beginning of a new one.[25]

The new era would turn out to be rather short-lived. Curiously, though, in the year after it was devolved from R. J. Reynolds's control, Sea-Land managed to post the highest earnings in the company's twenty-eight-year history.

One interesting vessel betterment effort from Sea-Land's immediate post–R. J. Reynolds era recalls the company's seemingly incurable tendency to upgrade and improve existing tonnage. In 1985, each of the twelve D-9 class vessels—none over five years old—was dispatched across the Pacific to one or another yard of Mitsubishi Heavy Industries in Japan, and there new hundred-foot midbody sections were spliced into the vessels, increasing their length from 745 to 845 feet, with gross registered tonnage rising from 25,224 to 32,629. As a result of this surgery, carrying capacity increased by 44 percent, from 1,718 TEUs to 2,472, and the rebuilt vessels were redesignated as the D-9J class.[26]

Sea-Land also sensed a bargain of serious proportions in the aftermath of the United States Lines bankruptcy. McLean had financed the Daewoo dozen largely through Korean investment banks, but with the vessels sitting idle in places like the Brooklyn waterfront opposite lower Manhattan, the investment was generating absolutely no return.[27] As a result, in 1988 Sea-Land was able to acquire the twelve hard-luck Econships at substantially below going market prices. McLean had paid $47.5 million per vessel in 1984, while Sea-Land acquired all twelve for little more than $13 million per hull in a transaction with Econ Associates, a New York–based limited partnership that was representing various creditors of United States Lines. Once redecorated in Sea-Land livery, the ships were known as the company's Atlantic class. Table 6.2 identifies each of the twelve vessels.[28]

When Sea-Land acquired the twelve ex-United States Lines ships in 1988—and deployed them on schedules that supplemented faster services provided by faster vessels—Sea-Land was no longer the stand-alone corporation it had been after emerging from R. J. Reynolds's control in 1984. Yet another new era began for Sea-Land in April 1986, two years after the company had been spun off by R. J. Reynolds and almost thirty years to the day after *Ideal X* left Port Newark for Houston.

Enter CSX

In early 1986, less than two years after Sea-Land left the R. J. Reynolds family, an investment syndicate attempted a hostile takeover of the company. The bid was spearheaded by an investor from Dallas, Texas, by the name of Harold Simmons, a man who already held a sizable block of Sea-Land stock. Had his bid been successful, Simmons intended to secure a position on the Sea-Land board of directors for himself as well as for a colleague, retired admiral Elmo Zumwalt.[29]

Simmons's announced goals for the company, once he secured control, included reducing overhead expenses, retiring older and less efficient vessels, and applying for a federal operating subsidy from the U.S. Maritime Administration (MARAD), a course of action that Sea-Land had never previously pursued. Simmons, who already held 34.8 percent of Sea-Land, was seeking to double his stake in the company to secure effective control and was offering to buy outstanding shares for $25 a share. Reaching his goal would require an investment of $445 million.

Sea-Land was able to thwart Simmons's hostile bid during the early months of 1986, despite the fact that he raised his offer to $26 a share. Finally, though, after the New York Stock Exchange ended trading on the afternoon of April 21, 1986, an announcement was issued in Richmond, Virginia. CSX Corporation, one of the nation's more stable and prosperous railroads, was proposing a friendly takeover of Sea-Land that had previously and quietly been negotiated between the two corporations and

TABLE 6.2. *Sea-Land Fleet: Atlantic Class of 1988*

Off. No.	Name	Hull dimensions	GRT	Place built (year)	Notes
665786	*Sea-Land Atlantic* a) *American Oklahoma* b) *Karen H.*	950 × 106 × 42	57,075	Okpo, South Korea (1985)	
665783	*Sea-Land Integrity* a) *American Virginia* b) *Jacqueline J.* c) *Virginia*	950 × 106 × 42	57,075	Okpo, South Korea (1985)	
665223	*Sea-Land Motivator* a) *American New Jersey* b) *Elizabeth L.* c) *Raleigh Bay*	950 × 106 × 42	57,075	Okpo, South Korea (1984)	
665790	*Sea-Land Performance* a) *American Washington* b) *Ruth W.*	950 × 106 × 42	57,075	Okpo, South Korea (1985)	
665784	*Sea-Land Pride* a) *American Kentucky* b) *Mary Ann* c) *Galveston Bay*	950 × 106 × 42	57,075	Okpo, South Korea (1985)	
665787	*Sea-Land Quality* a) *American Illinois* b) *Patricia M.*	950 × 106 × 42	57,075	Okpo, South Korea (1985)	
665782	*Sea-Land Achiever* a) *American Alabama* b) *Leyla A.* d) *Galveston Bay* e) *Sea-Land Achiever*	950 × 106 × 42	57,075	Okpo, South Korea (1984)	

TABLE 6.2. *(Continued)*

Off. No.	Name	Hull dimensions	GRT	Place built (year)	Notes
665788	*Sea-Land Commitment* a) *American California* b) *Marguerete* d) *CGM Ile de France* e) *OOCL Inspiration* f) *Sea-Land Commitment*	950 × 106 × 42	57,075	Okpo, South Korea (1985)	
665789	*Newark Bay* a) *American Utah* b) *Irene D.* c) *Utah* e) *LTC John U.D. Page*	950 × 106 × 42	57,075	Okpo, South Korea (1985)	
665781	*Sea-Land Value* a) *American Maine* b) *Kim D.*	950 × 106 × 42	57,075	Okpo, South Korea (1984)	
665222	*Nedlloyd Holland* a) *American New York* b) *Catherine K.* d) *Sea-Land Florida*	950 × 106 × 42	57,075	Okpo, South Korea (1984)	
665785	*Nedlloyd Hudson* a) *American Nebraska* b) *Susan C.* c) *Nebraska* e) *OOCL Inspiration*	950 × 106 × 42	57,075	Okpo, South Korea (1984)	

TABLE 6.2. *(Continued)*

Off. No.	Name	Hull dimensions	GRT	Place built (year)	Notes
	f) *Sea-Land Oregon*				
	g) *SSG Edward A. Carter, Jr.*				

that bettered Simmons's offer by $2 a share. Joseph F. Abbey, then the chairman and chief executive officer of Sea-Land, recommended that his board accept the CSX offer, and in the face of the CSX proposal, Simmons refused to make a counteroffer and withdrew his bid. A new and different phase was about to begin for an entity that once called itself the Pan-Atlantic Steamship Company.[30]

Railroads

When it orchestrated its friendly takeover of Sea-Land Services in 1986, the name CSX was relatively new in the evolving world of North American railroading. CSX was, essentially, the amalgamation of a number of previously independent rail companies and the name itself had only begun to appear on freight cars and diesel locomotives a year earlier in 1985.

As recently as 1957—the year *Gateway City* inaugurated cellular container service—there were 116 Class One railroads, as they are called, in the United States, major carriers with annual revenues above a certain threshold that is adjusted from time to time to ensure that the designation only applies to the nation's major carriers. With only a handful of exceptions here and there, by the turn of the twenty-first century, these 116 Class One companies had merged themselves into four major carriers.[31] (In 1957, the definition of a Class One railroad was one with annual operating revenue in excess of $3 million. By 2004, the threshold had risen to $277 million.)

In the west there is Union Pacific, the sole corporate name from the World War Two era that has survived all the mergers and acquisitions, even though the Union Pacific of today is many times larger than it was even a quarter-century ago and incorporates such once-independent railroads as Southern Pacific, Western Pacific, Missouri Pacific, and the Denver and Rio Grande Western. Also in the west will be found the Burlington

Northern-Santa Fe (BNSF), the sole U.S. railroad whose right-of-way and rails span almost the whole continent. With railheads in all major ports along the Pacific coast, the company's eastern limit is in Florida, certainly an authentic enough Atlantic seaboard state. But BNSF tracks end in the Gulf of Mexico port of Pensacola, not in, say, Jacksonville or Miami. Burlington Northern–Santa Fe is a merged railroad that incorporates such once-independent companies as the Santa Fe, the Chicago, Burlington and Quincy, the Great Northern, and the Northern Pacific.

East of the Mississippi one finds the country's other two major railroads. Norfolk-based Norfolk Southern is an amalgamation of such carriers as the Southern, the Nickel Plate, the Wabash, and the Norfolk and Western, while the nation's fourth major railroad is CSX.

If one seeks to identify the nucleus of today's CSX, a good case could be made that it is a modest-sized railroad once known as the Chesapeake and Ohio (C&O). The C&O ran between Newport News in the tidewater area of Virginia and Chicago, with lots of branch lines to tap the many coalfields in between. To this day, the CSX main line east from Richmond is a major corridor for export coal bound for overseas through Newport News. In 1963, the C&O merged with its long-time rival the Baltimore and Ohio and the combined railroad soon absorbed the Western Maryland to form what was called the Chessie System. In 1980, the CSX Corporation was established to serve as a holding company for both the Chessie System and another evolving railroad network that called itself the Family Lines, an amalgamation of the Atlantic Coast Line—the principal railroad that sought to thwart Malcom McLean's plan to transport loaded trailer trucks aboard ships in 1956—the Seaboard Air Line, the Louisville and Nashville, and a number of others. In 1986, Chessie System and Family Lines were operationally merged, and the resultant railroad identified itself as CSX.[32]

Until 1998 in the east, there was also Conrail—the amalgamation of a number of once-bankrupt railroads such as the Reading, the Lehigh Valley, and the infamous Penn Central—itself the product of an earlier merger of the Pennsylvania and the New York Central. Conrail was created in 1977 under federal supervision, but the company rationalized its routes and services in subsequent years, achieved profitability, and was eventually divided, half acquired by Norfolk Southern, half by CSX.

When CSX became the parent corporation of Sea-Land Service in 1986, its own acquisition of Conrail, and with it direct rail access to such Northeast port cities as New York and Boston, was still in the future. Indeed, CSX's later sell-off of Sea-Land in 1999 was said to have been part of the railroad's strategy to secure capital for the Conrail takeover, a transaction that carried a price tag of $10.2 billion.[33] Even without Conrail, though, the CSX of 1986 was a formidable railroad; its lines extended from south Florida to Ontario, from Pennsylvania to Missouri, and it was then—and remains today—the only railroad with a main line that parallels the busy I-95 corridor along the East Coast from Miami to the Northeast.

Intermodal

Four years before CSX assumed control of Sea-Land in 1988, the railroad—then still called the Chessie System—received authorization from the Interstate Commerce Commission to acquire controlling interest in a corporation called American Commercial Lines, a barge company whose home base was in Lafayette, Indiana, and whose specialty was traffic along America's inland rivers.[34] So when Sea-Land later became part of the CSX equation, and with a new corporate emphasis that CSX planned to place on "seamless" intermodal transport, it would be possible—at least in theory—for a container of export merchandise that originated, say, in an industrial park outside Toledo, Ohio, to travel from there to a local railyard on a highway chassis, west to Saint Louis aboard a CSX freight train, down the Mississippi River from Saint Louis to the port of New Orleans under the care of an American Commercial barge, and at New Orleans be hoisted aboard a Sea-Land container ship bound for Rotterdam. Ohio to Holland—aboard four different modes of transport—and all of them part of the CSX family.

CSX invested considerable energy in various intermodal initiatives throughout the 1980s and the 1990s, but such a full international paradigm proved more illusory and theoretical than practical and profitable. Indeed as CSX numbers crunchers began to examine the details of Sea-Land finances as the twentieth century entered its final years, they were more motivated by a desire to reduce day-to-day expenses than to create that seamless intermodal system. In addition, there was also the matter of devoting sufficient corporate attention to, and finding sufficient corporate resources for, the enormous challenges associated with the takeover of almost half of the rail lines formerly operated by Conrail. (Some earlier "mega-mergers" by U.S. railroads had resulted in monumental traffic delays as operations from rival companies failed to integrate smoothly. CSX was determined to avoid such problems with its acquisition of Conrail—although many feel its success in doing so was less than perfect.[35])

But if U.S. railroads, CSX among them, were somewhat less than aggressive in developing intermodal services to their fullest potential, one could advance a rather plausible argument that it was container-ship operators—acting on their own and irrespective of corporate links with overland railroad companies—that did more to foster true intermodal opportunities than any other transport sector. The concept was known as a land bridge, an awkward term that refers to a container's traveling aboard a ship and a railroad train as part of a single shipment.[36]

Both Sea-Land and American President Lines (APL) were pioneers in dispatching containers that originated in the Far East from West Coast ports to East Coast cities aboard railroad trains. Sea-Land and the Southern Pacific Railroad, for instance, inaugurated such a service out of the port of Los Angeles in 1977 that is universally regarded as the first of its kind, but APL and the Burlington Northern Railroad followed closely behind with a service from the port of Seattle, and APL would quickly become more aggressive than any other container-ship company in developing overland railroad extensions of its oceangoing steamship services.

At first, railroad companies were reluctant to regard container-ship operators as anything other than conventional customers of their freight services. Railroads would supply flat cars and locomotives, routine rate-making protocols would necessarily apply, and the freight trains that hauled container-carrying cars would observe traditional railroad operating practices with respect to schedules and interchange with other railroads.

The needs of container-ship operators, though, would soon force American railroads to adopt unconventional policies and techniques. One of these was the development and use of a double-stack railcar, as it has been called. As this technology eventually developed, a double-stack car turned out to be five separate cars linked together into a permanent unit to reduce car-to-car vibrations along the way.[37] The most important feature of the double-stack car is that its basic floor—the "flat" portion of a flat car—is slung low between the running gear so two containers could be stacked atop each other, while still respecting clearances along the right-of-way. It should hardly come as a surprise to learn that a man who played an important role in the development of the double-stack container car was Malcom P. McLean.

Sea-Land people had been meeting with executives from the Southern Pacific, but the railroaders kept insisting that the floor level of a conventional flat car precluded transporting containers one atop another, as McLean wanted to do.

One day McLean and his wife and children were invited to a reception at the White House, and they traveled to the capital from northern New Jersey aboard a Pennsylvania Railroad train. As they were walking along the platform at Washington Union Station, McLean noticed that a considerable amount of permanent equipment hung below the floor level of the cars, especially steam pipes and brake hoses that were connected to each other below the couplers of the cars.

Getting down on his hands and knees, McLean crawled beneath the cars to estimate how high above the rails this equipment rode, and he determined that it cleared by a mere three inches. Armed with this information, Sea-Land people renewed their efforts with the Southern Pacific, and the world's first double-stack container car, Southern Pacific No. 513300, was turned out by the American Car and Foundry Company, a joint effort of Sea-Land and Southern Pacific.

Not so lucky, though, was the man who was en route to a White House reception. His little inspection tour in Washington Union Station put a big hole in Malcom McLean's trousers—he called them his "britches"—and when he arrived at 1600 Pennsylvania Avenue shortly afterward, the man was anything but the last word in sartorial splendor.[38]

The use of double-stack cars on various eastern lines was initially rather restricted due to more limited clearances on railroads serving such cities as New York and Baltimore. High-voltage overhead catenary wires that provide current for electric-powered trains along the Northeast Corridor, for example, were a limitation; so were various nineteenth-century tunnels built long before anyone ever thought about stacking containers one atop another. Many of these clearance limitations have since been addressed, and double-stack trains now serve most eastern cities.

Different and important as it may have been, the double-stack car was merely a piece of rolling stock. Far more radical was a policy that soon took hold whereby container-ship companies themselves would acquire their own fleets of double-stack cars, and the railroads would merely supply motive power and operating personnel for moving such a train over their tracks—"hook and haul" service, as it is sometimes called, the same style of operation railroads provide to energy companies that own fleets of hopper cars for transporting coal from mine to power plant.

Given such arrangements, container-ship companies were no longer held hostage to traditional railroad operating practices and were able to exercise far greater control over the land portion of their shipments. APL, for example, established what amounted to a "railroad division" within its table of organization to oversee the operation of its land-bridge services. While precise numbers differ from company to company, a rule of thumb maintains that if an all-water service from the Far East to the East Coast via the Panama Canal requires thirty days to complete, use of a land-bridge connection at a West Coast port can reduce transit time to twenty days.[39]

In a highly readable book that traces the adoption of both piggyback and containerized technology by U.S. railroads, David J. DeBoer explains how the instinctive reaction of most railroad executives to just about any intermodal innovation, technical or operational, was no. DeBoer delights in telling how such totally unrelated developments as the passage of the Staggers Rail Act of 1980—a piece of federal legislation that substantially deregulated U.S. railroads—as well as a massive snowstorm between Chicago and Buffalo during the winter of 1978–79 helped create conditions that led to more widespread use of railroads to move transpacific containers eastward, and the shift from railroad-owned rolling stock to cars that were owned by container-ship companies.[40]

What may well have been the most radical dimension of these new rail-bridge services, though, was the rapidity with which they were adopted and became commonplace. Within a few short years, most major container-ship companies owned large fleets of railcars and were contracting with various railroads to move these dedicated trains eastward from West Coast ports. When Denmark's Maersk Line took the plunge and acquired a fleet of double-stack cars in 1990, publicity people from both Maersk and the Santa Fe Railway got together, painted Santa Fe locomotive No. 146 as if it, too, were part of the Maersk empire—it was not, of course—and posed a special train at various desert locations along the famous Santa Fe Trail, all rendered in traditional Maersk blue, and not Santa Fe red and silver.[41] By mid-1989 there were in excess of one hundred double-stack trains, each a mile or so long, operating across the country every week, trains whose rolling stock was composed of cars owned by various container-ship companies and decorated with logos that were previously seen only on the funnels of ships in the harbor, not freight cars speeding past country grade crossings. And the hundred double-stack trains of 1989 would continue to grow. By 1993 the weekly count had reached 241—156 out of the dual ports of Los Angeles and Long Beach, 34 out of Oakland, and 51 from the three ports in the Pacific Northwest, Seattle, Tacoma, and Portland—while by 1996, APL alone was dispatching 250 rail-bridge trains of various sorts each week.

Once container-ship companies established this new working relationship with operating railroads and became the owners of the trains that carried containers inland from various seaports, they were able to incorporate flexibilities into train operations. Where railroads were previously reluctant to interchange container-carrying freight cars with other roads except in conventional fashion and at conventional junctions—a process that could often be inordinately time-consuming—container-ship operators were able to specify when and where cars were to be removed from a double-stack train and dispatched along a different line. A train that originated in Tacoma, Washington, for instance, might split into two sections in the Twin Cities, with one heading south to New Orleans and the other heading east to Norfolk or Savannah.

Dispatching double-stack rail-bridge trains into the New York metropolitan area was not possible from the outset. Clearances along eastern railroads tended to be more restricted than on lines in the west, and because Conrail enjoyed a monopoly on rail freight traffic into a number of eastern cities, it faced no competitive pressure to upgrade its rights-of-way to permit the operation of double-stacks. Enter the New York, Susquehanna and Western Railroad.[42]

In the era of railroad deregulation that the Staggers Act brought on, this small regional carrier was able to secure westward access out of its previously limited Northern New Jersey territory, and by linking into an east-west mainline that was once part of the Erie Railroad—and that had been built with generous overhead clearances—the Susquehanna, once on the verge of abandonment, secured its own future by becoming the easternmost link that permitted coast-to-coast double-stack trains to reach New York.

Sea-Land first joined forces with the Susquehanna to move rail-bridge trains in and out of New York. Such trains began or ended their transcontinental "voyages" at an intermodal railyard Sea-Land built in Little Ferry, New Jersey, along the Hackensack River and adjacent to the northern end of the New Jersey Turnpike. The first bright red Sea-Land double-stack cars to reach metropolitan New York drifted into Little Ferry behind six Susquehanna diesel locomotives shortly before noon on August 5, 1985. The train had begun its transcontinental journey several days earlier on the shore of Puget Sound in the Pacific Northwest and headed up into the Cascade Mountains over the Burlington Northern, the railroad that handled the train all the way to Chicago. Then it was a route over the Norfolk Southern through Indiana, Ohio, and Pennsylvania to Buffalo, where the Delaware and Hudson took over and forwarded the train to Binghamton, New York. This is where the Susquehanna entered the picture, coupled its black and yellow diesel locomotives onto the head end, identified the departure as train SLN-4, and began the final leg of the transcontinental journey through such Delaware Valley communities as Hancock and Port Jervis.

Upon reaching the Sea-Land facility in Little Ferry—in 1985 as well as in later years—containers are removed from land-bridge trains and continue onward from there by highway—to the big Port Authority container facility at Elizabethport, or to whatever might be their final destination.[43] With the sale of Conrail to CSX and Norfolk Southern in 1998, additional east-west routings for double-stack cars were established and the Susquehanna no longer serves as the eastern leg for such traffic. In the early 1990s, the Port Authority—by then formally renamed the Port Authority of New York and New Jersey—built a new rail facility at Elizabethport called ExpressRail that facilitates the exchange of containers between double-stack railcars and oceangoing container ships.[44]

However important double-stack land-bridge services have become as a way of forwarding containers inland from ports in the United States, the most unusual example of such an intermodal operation is surely one that operates over the famous trans-Siberian Railroad. Begun in the early 1970s, the service quickly became an important link for cargo that originated on the Pacific coast of Latin America and was bound for such cities as Moscow and Leningrad—even Helsinki, Oslo, and Copenhagen—even though the volume of such traffic is a small fraction of that in North America. By the end of 1974, more than 4,000 TEUs a month were moving westward over the system; Sea-Land became a participant in the trans-Siberian land bridge in 1990.[45]

From Conferences to Alliances

A business practice that was central to the operation of ocean-liner services since the final quarter of the nineteenth century—long before the first containers went to sea aboard Malcom McLean's *Ideal X*, certainly—was the establishment of conferences, as they have been called, among otherwise competing companies. Conferences were cooperative arrangements that steamship companies established and joined—if they chose to—and whose central requirement was that, by virtue of their joining, members must agree to charge a comparable price for the same service as other conference members.[46] Conferences among steamship companies proved to be one of the few institutions that national governments, including the United States, tended to tolerate, despite general opposition to price-fixing and other cooperative practices that could be characterized as monopolistic. As Mary Brooks explains in *Sea Change in Liner Shipping*, "traditional competition policy guidelines applicable to most land-based industries have not been applied to liner shipping."[47]

The Calcutta Conference of 1875 is generally regarded as the first true conference to be established by steamship companies, closely followed in 1879 by the awkwardly named Agreement for the Working of the China Trade, Outbound and Homebound. (Conferences rarely distinguish themselves by the adoption of catchy names for their cooperative ventures.) In the United States, the Shipping Act of 1916 sanctioned conferences "as a means of stabilizing steamship activities and rates," and most U.S.-flag companies joined conferences in the various trades they worked.[48] The 1916 legislation required U.S.-flag steamship companies to secure government approval for any conference membership, but such authorizations were, in most cases, granted rather routinely, although an undercurrent of "anti-conference" sentiment would always be present in Washington, with organizations representing shippers routinely in the forefront of keeping such views alive.

Over the years many conferences have been established—well over a hundred by most reckoning—with individual conferences established for specific international corridors, even for specific directions within corridors; typically there were separate conferences for cargo and passenger services. Sea-Land had a penchant both for joining conferences and for canceling its membership in the face of pending market developments but then rejoining when business conditions so warranted. Canceling membership in a given conference gave a steamship company freedom to quote rates below those charged by other members of the conference, while joining a conference meant that price was eliminated as a competitive factor with other conference members. Typically, given sea routes were served by both conference members and non-conference members, although nonmembers tended to be in the minority with conference members supplying the bulk of the tonnage, and the bulk of the departures, in a given trade. When Malcom McLean put his new Econships in service for United States Lines in 1984, major competitor Evergreen was able to undercut McLean's prices because it was not a conference member in the critical trades where McLean's new ships had to do well. In 1969, eight steamship companies, including Sea-Land, proposed the establishment of the first exclusive conference for container-ship operations, and such an entity was eventually established.[49]

In more recent years, the importance of conferences has diminished to a measurable degree, while new forms of cooperation have arisen. They are known as alliances—or, sometimes, strategic alliances. (In the United Kingdom, a strategic alliance is often called a consortium.) Under a conference agreement, steamship companies are free to compete with each other in a variety of ways—dependability, speed of delivery, reliability—and each conference member remains in sole control of its own fleet. Steamship companies, however, may not quote prices that are different from other conference members. Conferences often establish other operational constraints that its members are obliged to observe—frequency of service, for example, or ports served—but eliminating price as a competitive factor is the principal hallmark of a steamship conference. Like so many endeavors, the actual operation of a given conference involves a good deal of bureaucratic give and take, negotiations among and between members, and meetings.

Alliances, on the other hand, typically involve fewer participants in a given cooperative entity, but they not only preclude competitive action in a variety of price and non-price areas, they practically constitute a de facto merger among and between alliance participants. Individual companies are still responsible to their shareholders and earning profits remains each company's corporate objective; but in a variety of areas, from joint marketing, to equipment-sharing arrangements, to schedule coordination, two or more companies operate in virtual partnership.

An important factor behind the formation of alliances was the fact that as container ships got larger, and operations became more productive, steamship companies could easily accommodate more business aboard fewer container-ship departures. By the turn of the twenty-first century, major operators were placing orders for newbuildings with capacities approaching 9,000 TEUs, with even larger vessels likely in future years.[50] Mindful of the fact that excess capacity can represent as fatal a flaw to a shipping business as insufficient customers, many lines began to think about increasing overall capacity along a given trade route, but doing so with fewer sailings.

But if container-ship operators were motivated by an understandable desire to introduce more efficiencies, the requirements of their customers were often at odds with such initiatives. Many shippers are more sensitive to the frequency of departure than any other variable—including speed and cost. And so conflict arose when container-ship operators attempted to balance supply and demand by shifting, perhaps, from weekly to biweekly departures along a given route. The container-ship operator might feel that providing a 6,000-TEU vessel over a given trade twice a month offers more capacity, while being substantially less expensive to operate, than weekly departures with 2,500-TEU vessels. For a shipper, though, whose reliance on a "just-in-time" supply chain from, say, a factory in the Far East to a chain of discount department stores in Georgia and Alabama, the proposed schedule that is more productive and efficient from the perspective of the container-ship operator would be nothing short of a disaster.

The concept of just-in-time delivery involves, to use an admittedly oversimplified example, ten inbound containers each filled with a single commodity that recently arrived in port from an overseas manufacturer backing up to one side of a distribution center. (The operative terminology is important here, too; it is a *distribution center,* not a *warehouse.*) Then, in a swift but carefully orchestrated process, the merchandise is removed from the ten inbound containers and sorted, and ten percent of the product from each container is placed aboard each of ten trailer trucks backed into the other side of the distribution center for subsequent delivery to retail outlets. There is no warehousing, and no labor costs associated with shifting merchandise from inbound containers to storage areas, and then onto trucks for later delivery. Merchandise arrives from overseas factories "just in time," and is dispatched immediately to stores and other points of sale.

The solution to this dilemma was the creation of an alliance, whereby an individual steamship company could offer its customers the same weekly departures they had come to rely on, although the actual vessel that cast off on any given departure might fly the house flag of any alliance member. Hypothetically, a vessel of the ABC Line might handle departures on the first Tuesday of each month, the DEF Line on the second Tuesday, and so forth.

Alliances often lead to the chartering of vessels from one member company to another, and still another form of cooperation that has developed during the alliance era—but often separate from the formation of formal alliances—is the practice of one company's chartering capacity aboard another carrier's vessels, "slot chartering" as it is often called. Given the enormous size of contemporary container-carrying vessels, a steamship company can realize substantial savings in response to market fluctuations by offering service between two ports not with its own vessels, but by virtue of its chartering so many TEUs aboard the sailings of another company. Again using our two hypothetical container-ship companies, a shipper may contract with the ABC Line to have a container full of goods delivered to an overseas destination, and the shipper conducts all its business with the ABC Line. ABC Line handles the international shipment of its customer's container by placing it aboard a container ship of the DEF Line, with whom it has contracted to reserve 1,000 TEUs per week, perhaps, over a given trade route.

One visual impact of the onset of alliances and other space-sharing arrangements has been the gradual disappearance of vessels whose containers are all decorated in the same corporate color scheme. Part of the multicolor diversity one sees aboard contemporary container ships is the result of large numbers of containers that are now owned by container-leasing firms, not container-ship operators. Thanks also to the formation of alliances, the days when a Sea-Land vessel would sail under the Verrazano Narrows Bridge into New York Harbor with nothing but Sea-Land containers visible on its weather deck are long gone.

A case could be made—and Lane Kendall and James Buckley do so in their landmark study, *The Business of Shipping*—that the 1967 creation of Atlantic Container Line (ACL) by a number of different European steamship companies, fifteen years before the onset of the alliance era, represented an early effort at creating a strategic alliance.[51] ACL, discussed in chapter 3, whether it can correctly be called a true alliance or not, certainly gave up a large measure of any continuing claim to such a status when ACL became more of a stand-alone company in later years.

In some respects, contemporary alliances among container-ship operators are not unlike the "code sharing" arrangements that major airlines have adopted in recent years. A daily flight from Washington, D.C., to Frankfurt, Germany, for instance, might be listed separately among the services offered by both United Airlines and by Lufthansa. On any given day, only one aircraft would operate the flight, but passengers would appear at the gate with tickers and confirmed reservations issued by both United and by Lufthansa.

In the United States, passage of the Shipping Act of 1984 paved the way for companies like Sea-Land to explore new kinds of cooperative ventures with other operators. In October 1984, for instance, Sea-Land and the German container-ship operator Hapag-Lloyd filed an application with the Federal Maritime Commission under the terms of the new legislation to establish a space-sharing arrangement on a transpacific trade.[52] It was granted and became Sea-Land's first such cooperative venture. Oddly enough, the Shipping Act of 1984 was nominally an effort to curb the power of the older steamship conferences and allow more liberal policies to prevail. Europeans, on the other hand, welcomed the emergence of alliances as a way to counter the rapid growth and potential market dominance of a few large companies, with Sea-Land and Evergreen typically identified as the lines in question.[53]

European nations were also going through fundamental realignment in areas associated with competition and cooperation as part of the establishment of the European Common Market and the European Union, and such matters affected developing relationships—conferences as well as alliances—among container-ship operators.[54] In September 1998, for instance, an EU commission levied a substantial fine of $318 million against all sixteen members of the Transatlantic Conference Agreement (TACA), arguably the largest and most important of all the steamship conferences, after finding that TACA was in violation of a number of highly technical antimonopoly provisions. Sea-Land's share of the fine was $27.5 million, second in dollar value only to P&O Nedlloyd's $41.26 million.[55]

The general point remains, though, that both conferences and alliances represent degrees of cooperative activity that, while alien to many aspects of public policy associated with corporate practices, have largely been tolerated by national governments and transnational institutions because of a perceived need to ensure a measure of stability in international steamship services.

Among container-ship operators, alliances have evolved, and individual companies typically do not devote the entirety of their fleets to the alliance. As is the case with a route-specific conference, a company might elect to join, or form, an alliance for its transatlantic services from the channel ports of Europe to the East Coast of the United States, but remain independent for its transpacific services—with or without joining any of the many transpacific conferences.

Ignoring, for the moment, such earlier ventures as ACL, the contemporary alliance era is usually said to have begun in the mid-1980s, and by 1995 four major strategic alliances were in operation. With respect to Sea-Land, it, too, decided that developing trends in the industry warranted giving alliances some serious attention—and its decisions in this regard would substantially affect its future. By 1988 Sea-Land had negotiated vessel-sharing arrangements with both P&O Containers, of Great Britain, and Nedlloyd, a Dutch firm. (P&O Containers and Nedlloyd would later merge and form P&O Nedlloyd.) Sea-Land chartered three of its recently acquired Atlantic class vessels to P&O, two to Nedlloyd, and entered an agreement that called for Sea-Land to control 58 percent of shared capacity, P&O 25 percent, and Nedlloyd 17 percent on several trades between Gulf and East coast ports in the United States and Europe.[56] In addition, Sea-Land leased two Atlantic class vessels—former Econships from United States Lines—to Hong Kong-based Orient Overseas Container Line (OOCL) and named them *OOCL Inspiration* and *OOCL Innovation* for the duration of the arrangement. This created, of course, the anomaly of vessels appearing in formal vessel registers with Sea-Land showing as their owners, but decorated in the livery of OOCL, and bearing names that were part of that company's vocabulary.

Sea-Land also established working agreements with a number of smaller European container-ship operators in an effort to secure entry into specialized markets, essentially using its new partners as feeders for its own international routes. In 1985, for instance, cooperative relationships with French and Italian container-ship companies provided Sea-Land with entry to Kuwait and Bahrain, countries Sea-Land had never been able to serve on its own. As a result of these relationships, as many as two dozen vessels that were owned by such companies were given Sea-Land names and decorated in Sea-Land livery.

Eventually, these early forays in cooperative endeavors were followed by Sea-Land's establishing a formal two-company alliance with a container-ship company that could easily be called the most independent-minded in the entire industry, the Maersk Line. Sea-Land's alliance with Moeller-Maersk was established in 1995, following a space-sharing arrangement between the two companies that began in 1991.[57]

Further aspects of Sea-Land's relationship with Moeller-Maersk will be explored in the next chapter, but with respect to immediate and short-term impacts, following the formation of this alliance, Maersk's profits increased by 23 percent in 1996, and its slot utilization—a key measure of productivity in the industry—rose to a little below 90 percent, versus an industry average of 62 percent. For its part, Sea-Land was able to save $100 million a year in costs it was able to share with Maersk, and its income rose despite an overall decline in the industry. Table 6.3 identifies the four major alliances as of 1995.

TABLE 6.3. *Container-ship Alliances: 1995*

Alliance	Participating container-ship companies	Vessels participating in the alliance
Global Alliance	American President Lines (APL); Mitsui-OSK; Nedlloyd; Orient Overseas Container Line (OOCL)	77 out of 187
Grand Alliance	Hapag-Lloyd; Neptune Orient Line (NOL); Nippon Yusen Kaisha Line (NYK); P&O Container Lines	60 out of 182
Tricon/Hanjin	Cho Yang; DSR-Senator; Hanjin Shipping Co.	60 out of 95
Maersk/Sea-Land	Maersk (A.P. Moeller); Sea-Land Services	175 out of 206

The fourteen container-ship companies that were alliance participants in 1995 owned and operated a grand total of 670 vessels. Of this total, 372, or 55 percent, were dedicated to alliance services, the rest operating in nonalliance trades. In the years after 1995, alliance affiliation would see considerable shifting and change; NOL acquired APL and the merged company joined the Global Alliance, while Nedlloyd and P&O also merged into a single company and cast its lot with the Grand Alliance. (We shall explore further details about the NOL's acquisition of APL in chapter 8.) In addition, a new although much less formal alliance was established by Cosco, K-Line and Yangming, three Far Eastern container-ship companies.

In any event, in a world where supposedly unfettered global competition is regarded as an unquestioned dogma of contemporary business and public policy, a critical link in the global supply chain has long managed to operate under the umbrella of various formal relationships that insulate their members from some of the less predictable side effects of competition, such as price-cutting and the need to sustain sufficient capacity to accommodate the needs of customers.

More Vessels

A steady theme throughout the Sea-Land story has been the continual attention the company has paid to ensuring that its fleet is both productive and competitive. As described earlier, in 1988 Sea-Land acquired all twelve Econships that Malcom McLean had built for United States Lines and that had been idle since that line filed for bankruptcy and suspended operations in 1986. Sea-Land's penchant for refining and upgrading its fleet saw rather interesting expression after the company acquired the former Daewoo dozen. Because the weakness of these vessels was their slow speed, Sea-Land developed a program to reduce their size and give them a little extra power boost so they might run a little faster.

The Econships were the world's largest container ships when they were built—although they had surrendered this crown by the time Sea-Land acquired them in 1988. Sea-Land engineers felt that taking a hundred-foot section out of their hulls, reducing capacity from 4,258 TEUs to 3,918, and supplementing the original seven-cylinder Sulzer diesels with a new twelve-cylinder booster diesel that generated electricity and added "muscle" to the propeller shaft through an electric motor, would leave Sea-Land with a generous enough vessel for most major trade routes, but one whose increased speed would make it more competitive.[58]

It remains unclear how successful this effort proved to be, although the fact that Sea-Land only sent three of the former Econships, *Sea-Land Motivator*, *Sea-Land Pride,* and *Sea-Land Value,* to the Blohm and Voss yard in Germany for the alterations suggests that the program's design objectives were less than fully realized. Once so rebuilt, the three former Atlantic class vessels were identified on the Sea-Land roster as the SL-31 class. The other nine former Econships retained their as-built configuration, and as noted earlier, several were chartered to such container-ship operators as Nedlloyd, P&O, and OOCL under various vessel-sharing arrangements.

Before these three Atlantic class vessels were rebuilt, Sea-Land had considered plans for an even more radical solution to the chronic speed problems of the one-time Daewoo dozen. Namely, slice the vessels in half three hatches forward of the deckhouse and join the after end to a newly built bow and midbody, but one of a proper size to permit twenty-one- or twenty-two-knot speed from the original engine. Then, the Econship forebody would be grafted onto a newly built stern section, complete with machinery, thus creating another series of container ships that could also manage the same speed.

The proposal advanced to a point where class names were identified for the new vessels; the twelve smaller ships with the original Daewoo engines would be the D-14 class, while the larger vessels, with new engines, would have been the D-18 class.[59] The complexity of it all proved overwhelming, though, and the only Atlantic class vessels to be substantially altered were the three SL-31s.

What Sea-Land called its Atlantic class, though, were not the only ex-United States Lines vessels the company acquired following the latter's bankruptcy in 1986. U.S. Lines' final fleet included a mix of vessels that were both designed and built to its own specifications, as well as ships it acquired through the takeover of other companies. Sea-Land thus assumed title to three Lancer class ships, steam-powered vessels that were built by United States Lines in 1968 as the company's first fully cellular container ships, as well as five slightly newer steam-powered container ships that wound up in the United States Lines fleet when that company acquired the Farrell Line. In 1991 Sea-Land even acquired two LASH-type vessels that were built in 1980 by Waterman Steamship—the one-time parent corporation of Pan-Atlantic—and converted them into 2,100-TEU container ships that were called *Sea-Land Reliance* and *Sea-Land Spirit*. Table 6.4 identifies the ex-United States Lines vessels—over and above the Econships—that were acquired by Sea-Land.

Sea-Land also continued to upgrade its fleet by designing and building new container ships. One relatively small class of vessels—a mere three hulls—enjoys the distinction of being the first and only Sea-Land newbuildings to be constructed from the keel up in a U.S. yard. The trio was built in the Great Lakes city of Sturgeon Bay, Wisconsin, and after completion, made their way to the sea via the Welland Canal and the Saint Lawrence Seaway. Sea-Land was willing to contract with a U.S. yard for this acquisition not because the Bay Shipbuilding Corporation had underbid such overseas yards as Mitsubishi or Hyundai, but rather because Sea-Land had to acquire new tonnage for its Puget Sound–Alaska trade and the Jones Act stipulated that such vessels necessarily had to be built domestically. (These three vessels were designed and ordered prior to the CSX takeover of Sea-Land and delivered afterward.)

The trio were fully cellular container ships that were 710 feet long and could each accommodate 1,712 TEUs, small by conventional standards of the day, but quite appropriate for Sea-Land's Alaska trade. Powered by a seven-cylinder Mitsubishi diesel, the trio included such features as a controllable-pitch propeller as well as forward and aft water-jet thrusters to assist in close-quarters maneuvering. The trade publication *Marine Engineering,* looking to the future and seeing few, if any, possible orders for additional U.S.-built cargo vessels, declared the trio to be "the last

TABLE 6.4. *Sea-Land Fleet: Other Ex–United States Lines Vessels*

Off. No.	Name	Hull dimensions	GRT	Place built (year)	Notes
515155	*Sea-Land Challenger* a) *American Legion* b) *Sea-Land Legion* d) *Horizon Challenger*	700 × 90 × 32	19,157	Chester, Pa. (1968)	1
518444	*Sea-Land Crusader* a) *American Lark* b) *Sea-Land Lark* d) *CSX Crusader* e) *Horizon Crusader*	700 × 90 × 32	19,203	Chester, Pa. (1969)	1
516464	*Sea-Land Discovery* a) *American Liberty* b) *Sea-Land Liberty* d) *CSX Discovery* e) *Horizon Discovery*	700 × 90 × 32	18,894	Chester, Pa. (1968)	1
544303	*Sea-Land Expedition* a) *Austral Ensign* b) *American Marketer* c) *Sea-Land Marketer* e) *CSX Expedition* f) *Horizon Expedition*	668 × 90 × 37	21,687	Pascagoula, Miss. (1973)	2
547288	*Sea-Land Hawaii* a) *Austral Endurance* b) *American Merchant* d) *CSX Hawaii* e) *Horizon Hawaii*	668 × 90 × 35	21,687	Pascagoula, Miss. (1973)	2
541868	*Sea-Land Navigator* a) *Austral Envoy* b) *American Envoy* d) *CSX Navigator* e) *Horizon Navigator*	812 × 78 × 36	28,087	Pascagoula, Miss. (1972)	2
612085	*Sea-Land Pacific* a) *Austral Pioneer* b) *American Pioneer* d) *CSX Pacific* e) *Horizon Pacific*	813 × 90 × 33	28,095	Baltimore, Md. (1979)	2

TABLE 6.4. *(Continued)*

Off. No.	Name	Hull dimensions	GRT	Place built (year)	Notes
552706	*Sea-Land Trader* a) *Austral Entente* b) *American Entente* d) *CSX Trader* e) *Horizon Trader*	813 × 90 × 37	28,087	Pascagoula, Miss. (1973)	2
623168	*Sea-Land Enterprise* a) *Austral Puritan* b) *American Puritan* d) *CSX Enterprise* e) *Horizon Enterprise*	813 × 90 × 34	28,095	Baltimore, Md. (1980)	2

Notes

1. Lancer class vessels designed and built by United States Lines.
2. Designed and built by Farrell Lines; later acquired by United States Lines.

oceangoing merchant ships to be built in the United States."[60] (The magazine's prediction was slightly off the mark, as Matson would later order a number of new container ships for its Jones Act trade between California and Hawaii—vessels we shall learn more about in chapter 8.) In any event, the arrival of the three new vessels allowed Sea-Land to retire four older steam-powered vessels that it had previously used in its Alaskan trade. Interestingly, when Sea-Land inaugurated Alaskan operation in 1964, one of its vessels was named *Seattle* to honor the southern terminal of the service. The replacement trio in 1987 included no Seattle references, but one vessel was called *Sea-Land Tacoma*. The reason is that Sea-Land shifted its Puget Sound operations south from Seattle to Tacoma, where a massive terminal was opened in 1985, a facility that fosters the intermodal transfer of incoming containers to waiting railroad trains for subsequent dispatch eastward over what is now called the Burlington Northern Santa Fe Railroad.

Table 6.5 displays relevant information about Sea-Land's three new container ships, vessels that were designated the D-7 class on the company's roster.

If the D-7 class was a minor and specialized addition to the Sea-Land fleet, a more substantial acquisition that reflected the industry trend of

TABLE 6.5. *Sea-Land Fleet: The D-7 Class of 1987*

Off. No.	Name	Hull dimensions	GRT	Place built (year)
910306	*Sea-Land Anchorage* b) *CSX Anchorage* c) *Horizon Anchorage*	710 × 78 × 34	20,965	Sturgeon Bay, Wis. (1987)
910803	*Sea-Land Kodiak* b) *CSX Kodiak* c) *Horizon Kodiak*	710 × 78 × 34	20,965	Sturgeon Bay, Wis. (1987)
910307	*Sea-Land Tacoma* b) *CSX Tacoma* c) *Horizon Tacoma*	710 × 78 × 34	20,965	Sturgeon Bay, Wis. (1987)

building ever larger vessels was a nine-ship order placed with Isjikawajima-Harima Heavy Industries (IHI) of Japan in the early 1990s. The newcomers were constructed in two different company yards—four ships at Kure, five at Chita—and were identified as the Champion class. Sea-Land explored a number of unusual possibilities before contracting with IHI for this order, including constructing the midbody and bow in one country, stern and propulsion machinery in another. Each of the nine new vessels could accommodate 4,082 TEUs, measured 958 feet in length, and was driven by a powerful Sulzer diesel engine. In terms of Sea-Land traditions, what was surely the most novel feature of the newbuildings was not to be found among their technical specifications. What was different about these new container ships was the fact that once they were completed and delivered to Sea-Land, they were registered in the Republic of the Marshall Islands, not the United States. Table 6.6 provides information about Sea-Land's Champion class vessels.

Flags of Convenience

CSX and Sea-Land had decided to follow what was rapidly becoming a near-universal trend among U.S. steamship operators, namely the placement of vessels under "flags of convenience" to generate savings in their day-to-day operation. In addition to placing newly built Champion class vessels under foreign registry, CSX also initiated a program of reflagging vessels that had originally been registered in the United States to the open registries of foreign countries as a further effort to reduce costs.

TABLE 6.6. *Sea-Land Fleet: Champion Class of 1995*

Flag	Name	Hull dimensions	GRT	Place built (year)
Marshall Islands	*Sea-Land Champion*	958 × 106 × 43	49,985	Chita, Japan (1995)
Marshall Islands	*Sea-Land Charger*	958 × 106 × 43	49,985	Chita, Japan (1997)
Marshall Islands	*Sea-Land Comet*	959 × 106 × 43	49,985	Chita, Japan (1995)
Marshall Islands	*Sea-Land Eagle*	959 × 106 × 43	49,985	Chita, Japan (1997)
Marshall Islands	*Sea-Land Intrepid* a) *Sea-Land Intrepid* b) *CSX Intrepid*	958 × 106 × 43	49,985	Kure, Japan (1997)
Marshall Islands	*Sea-Land Lightning*	958 × 106 × 43	49,985	Kure, Japan (1997)
Marshall Islands	*Sea-Land Mercury* a) *Sea-Land Mercury* b) *CSX Mercury*	958 × 106 × 43	49,985	Kure, Japan (1995)
Marshall Islands	*Sea-Land Meteor*	958 × 106 × 38	49,985	Chita, Japan (1996)
Marshall Islands	*Sea-Land Racer*	958 × 106 × 43	49,985	Kure, Japan (1996)

Once a vessel leaves U.S. registration, it no longer must be operated by more costly U.S. seafarers, considerable regulatory burdens—and therefore costs—are avoided, and certain tax benefits may also accrue.[61] A Sea-Land liner fleet that had long consisted of none but U.S.-registered tonnage soon included vessels that would only fly the Stars and Stripes from their masts as a maritime courtesy when they were making a call at a “foreign” U.S. port.

In June 1993, while the Champion class vessels were under design, CSX petitioned the U.S. Maritime Administration (MARAD) to reflag thirteen older Sea-Land vessels under the registry of the Marshall Islands. Authorization for such a massive effort was delayed, and while CSX still had such a large scale reflagging program in mind, expedited approval was then sought to reflag only five vessels, and in mid-February of 1995 MARAD approved such an action. As a result, as table 6.7 shows, five Sea-Land container ships were removed from U.S. registry and the name of the tiny mid-Pacific municipality of Majuro, in the Marshall Islands, was painted on their sterns as their home port.[62]

Other than the Champion class of newbuildings, this five-vessel transaction would prove to be Sea-Land's principal effort at reflagging older tonnage during the 1990s. Two additional vessels were transferred to Marshall Islands registry in following years, while two of the original five

TABLE 6.7. *Sea-Land Fleet: Marshall Islands Reflagging of 1995*

U.S. Off. No.	Name(s)	Built (Year)	2005 Registry	Notes
606065	*Sea-Land Freedom*	Nagasaki, Japan (1980)	Marshall Islands	1
606066	*Sea-Land Mariner*	Tomano, Japan (1980)	Marshall Islands	1
665223	*Sea-Land Motivator* a) *American New Jersey* b) *Elizabeth L.* c) *Raleigh Bay*	Okpo, South Korea (1984)	U.S.A.	2
665784	*Sea-Land Pride* a) *American Kentucky* b) *Mary Ann* c) *Galveston Bay*	Okpo, South Korea (1985)	U.S.A.	2
665781	*Sea-Land Value* a) *American Maine* b) *Kim D.*	Okpo, South Korea (1984)	Singapore	3

Notes

1. D-9 class vessel originally built by Sea-Land.
2. Atlantic class vessel, formerly owned by United States Lines, and rebuilt to smaller dimensions by Sea-Land in an effort to improve speed and performance.
3. Atlantic class vessel, formerly owned by United States Lines.

reflagged vessels were returned to U.S. registry at the same time.[63] A Sea-Land official estimated that by reflagging, the company stood to save between $2.5 and $3 million per vessel per year, since more costly U.S. crews could be replaced by less expensive seafarers of various nationalities.

Although Sea-Land did not decide to use flags of convenience for its international liner fleet until the 1990s, the company had long relied on offshore registries for vessels that provided feeder services in and out of major overseas terminals. Many of these vessels were not owned by Sea-Land itself but provided feeder service under service contracts of various sorts. In chapter 5 we learned of a Sea-Land affiliated company called InterSea Operations Ltd., and the several feeder vessels it managed could be regarded as Sea-Land tonnage. Indeed, in 1988, Sea-Land's four-vessel D-6 class of 1977—the company's first diesel-powered container ships—were reflagged Bahamian and transferred to InterSea for intra-European trades. By the mid-1990s, though, the majority of vessels used in contract feeder services were not owned by Sea-Land, although they were typically identified with "Sea-Land" names. Table 6.8 identifies a sampling of such tonnage.

The variety of names under which many of these vessels have been known over relatively short periods of time is indicative of the fluid state under which contract feeder services operate. The vessel identified as *Sea-Land Salvador*, built in Hamburg in 1984, certainly stands out for the fact that over the span of two decades, it has been identified under seventeen different formal names.

The nine-vessel Champion class of 1995 was followed a few years later by a newbuilding project that could well have resulted in the largest vessels ever to work for Sea-Land Service. Yet another corporate realignment would take place between their ordering and their delivery, though, and this meant that they would never sail with the Sea-Land fleet. Built in South Korea by Hyundai Heavy Industries, the five vessels can each accommodate a massive 6,250 TEUs. (Ignoring again, for purposes of comparison, the difference between a thirty-five-foot container and a forty-foot one, these vessels each have a carrying capacity that is twenty-eight times greater than that of *Gateway City*, Sea-Land's first cellular container ship of 1957.)

The vessels are 998 feet long and have a beam of 132 feet—far too wide to transit the Panama Canal and thus are the first, and only, post-Panamax vessels to be ordered by Sea-Land. Each features a 10-cylinder

TABLE 6.8. *Adjuncts to Sea-Land Fleet: Various Feeder Vessels*

Flag	Name(s)	Dimensions (GRT)	Place built (Year)
Denmark	*Sea-Land Costa Rica* a) *Colleen Sif* c) *Colleen Sif* d) *OPDR Madeira* e) *Colleen Sif* f) *MSC Sebnem*	439 × 75 × 25 (8,908)	Frederikshavn, Denmark (1991)
Antigua & Barbuda	*Sea-Land Colombia* a) *Maersk Bogota* c) *Saudi Buraydah* d) *Major* e) *City of Istanbul* f) *OPDR Gran Canaria* g) *MSC Atlas*	490 × 74 × 27 (9,600)	Szczecin, Poland (1992)
Germany	*Sea-Land Argentina* b) *MSC Provence* c) *Coni Cartagena* d) *CMA CGM Eagle* e) *Coni Cartagena*	676 × 98 × 37 (25,713)	Okpo, South Korea (1997)
Antigua & Barbuda	*Sea-Land Salvador* a) *Jork Eagle* b) *Dalsa* c) *Wiking* d) *Woermann Ulanga* e) *Wiking* f) *Kahira* g) *City of Salerno* h) *Karyatein* i) *Wiking* j) *Sieipner* k) *May Tikai* m) *Maersk Caracas* n) *Christine Delmas* o) *Cielo de Venezuela* p) *Sea Pilot* q) *Margret Knuppel*	438 × 71 × 25 (8,639)	Hamburg, West Germany (1984)

TABLE 6.8. *(Continued)*

Flag	Name(s)	Dimensions (GRT)	Place built (Year)
Greece	*Sea-Land Iberia* a) *Chevalier Paul* b) *Carmen Marna* c) *Zim Livorno*	827 × 100 × 36 (35,530)	La Seyne, France (1976)
Germany	*Sea-Land Mexico* b) *Stadt Berlin* c) *Mekong Sapphire* d) *Stadt Berlin*	480 × 75 × 27 (9,528)	Cuxhaven, Germany (1998)

B&W diesel built under license by Hyundai Heavy Industries that generates an output of 77,572 horsepower. Table 6.9 displays statistical information about the vessels.

Despite the heading of the preceding table, the five big vessels would never formally join the Sea-Land roster. They are owned by Costamarine Shipping, a Greek company—hence their Greek registry—and they are bare-boat chartered on a long-term basis for operation.[64] Except for reasons that will be explained in the next chapter, when the quintet entered service in 2000 and 2001, the firm that had been founded by Malcom

TABLE 6.9. *Sea-Land Fleet: Newbuildings of 2000*

Flag	Name	Hull dimensions	GRT	Place built (year)
Greece	*Sealand Michigan*	998 × 132 × 46	47,667	Ulsan, South Korea (2000)
Greece	*Sealand Virginia* b) *Safmarine Himalaya*	998 × 132 × 46	47,667	Ulsan, South Korea (2000)
Greece	*Sealand Washington*	998 × 132 × 46	47,667	Ulsan, South Korea (2000)
Greece	*Sealand New York*	998 × 132 × 46	47,667	Ulsan, South Korea (2000)
Greece	*Sealand Illinois*	998 × 132 × 46	47,667	Ulsan, South Korea (2000)

McLean over four decades earlier had evolved into yet another new and different corporate formality, and the Sea-Land house flag would never fly from the masts of any of the five vessels.

Falling Waters, West Virginia

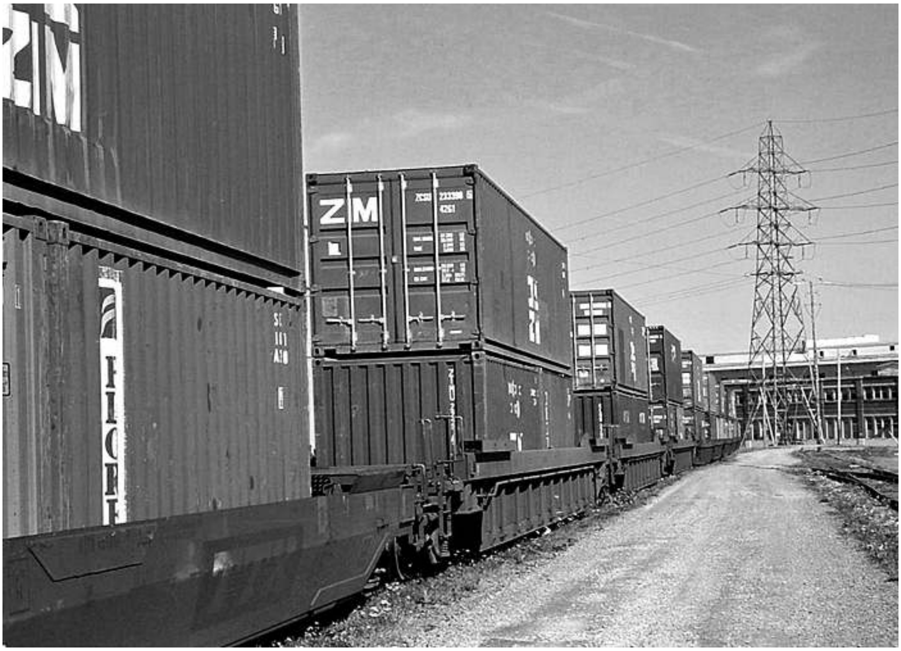
With all the shifting and reflagging and buying and selling of vessels that occurred during Sea-Land's CSX era, what may well be the most curious development of all is one that saw several deepwater Sea-Land container ships remaining under the U.S. flag, but showing their "home port," for a short period of time, as the unincorporated village of Falling Waters, West Virginia! Falling Waters is located on the Potomac River seventy or so miles west by northwest of Washington, D.C., on the far side of the Blue Ridge Mountains.

It is not at all uncommon for vessels to identify as their home port a place they would never actually visit—and, in some cases, never could visit. (Many U.S. ships on the Great Lakes that are far too large to transit the Welland Canal and the Saint Lawrence Seaway show Wilmington, Delaware, as their home port, for instance.) Falling Waters lacks so much as a single traffic light and could well compete for the title of the most curious home port ever assigned to any deepwater vessel.

The explanation for this anomaly can be found in a new single-story brick building in Falling Waters that is adjacent to nearby Interstate Route 81. Thanks to the vigilance of West Virginia's senior U.S. senator, Robert Byrd, and his well-known penchant for "encouraging" federal agencies to relocate various operations to the state he represents by the insertion of compelling language in appropriations and authorization measures, the building is the home of the Vessel Documentation Center of the United States Coast Guard. Exactly how several vessels came to be listed with Falling Waters, West Virginia, as their formal hailing port remains shrouded in myth and mystery. Some kind of clerical error was likely made, though, and no actual Sea-Land vessels ever had "Falling Waters, WV" painted across their sterns. But when the Coast Guard released digital files of registered U.S. merchant vessels for 1998 and 1999, deepwater vessels including *Sea-Land Endurance* and *Sea-Land Express* were listed with their home port showing as Falling Waters. Formal publications such as the definitive *Lloyds' Register of Shipping* then dutifully went to press and turned the inadvertent mistake into a permanent record that will remain on library shelves—well, as close to forever as any printed volume is likely to survive.

Oddly enough, Falling Waters, West Virginia, is not far from a bona fide maritime installation that was established to foster the shipment of containers by sea. An hour's drive south of Falling Waters is a facility called the Virginia Inland Port. Here, close to the intersection of Interstate Routes 81 and 66 and just outside Front Royal, Virginia, containers being hauled along the highway can be dropped off and shifted to railroad cars for forwarding to the ports of Norfolk, Portsmouth, and Newport News in the tidewater area of the state, while inbound containers follow the reverse course. The state of Virginia established this "inland port" for two reasons: to reduce traffic congestion on highways leading to the state's principal seaports, and to foster the use of Virginia seaports by making the over-the-road haul for truckers shorter than it would be to Baltimore or New York.

A pair of container corner castings, stacked one atop the other and linked together with a toggle-like device. Such simple but standardized equipment is at the heart of the new style of cargo transport.



Double-stack railroad cars bring additional efficiency to containerized transport.

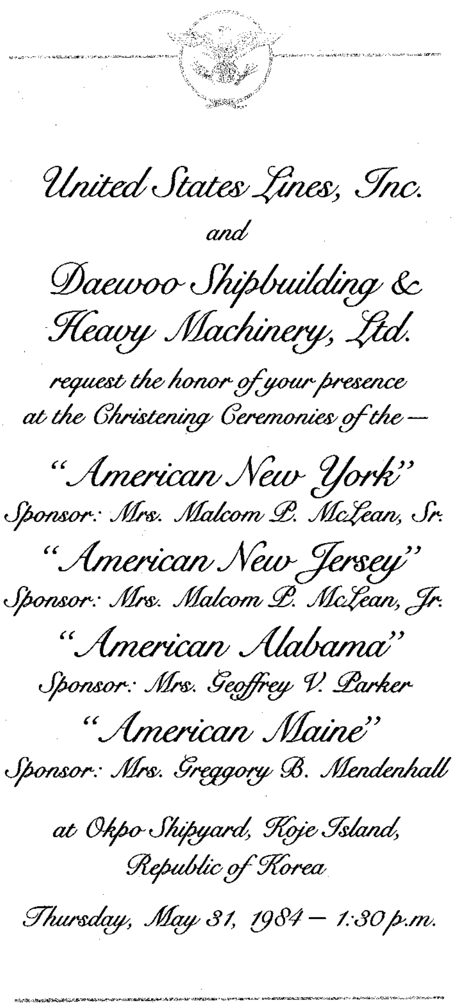
High in the Cascade Mountains along the bank of the Columbia River, a Burlington Northern Santa Fe freight train forwards containers to eastern markets from the ports of Seattle and Tacoma.

Above: The 1994-built container ship *Feihe*, operated by state-owned China Overseas Shipping Company (COSCO), has a capacity of 4,315 TEUs. Containers are stacked thirteen across as the ship is unloaded at the port of Boston. Below: Efficiency requires that refrigeration equipment not protrude beyond the dimensions of a container. Eimskip is a small Scandinavian company that specializes in service to Iceland.

A typical waterfront scene in the container era. A ship is waiting to be loaded while inbound and outbound containers are stacked nearby. This is St. Petersburg, Russia.

Above: *APL Malaysia,* built by Hyundai Heavy Industries in 2000 and accommodating 4,843 TEUs, is maneuvered into the port of Southampton, England, by a pair of tractor tugs. Below: Hapag-Lloyd's *Bremen Express,* also built by HHI in 2000 with a 4,890-TEU capacity, seen here leaving Seattle, reveals the lines of a typical container ship: most containers are in cells forward of the deck house, which is toward the stern but with room for some additional containers aft.

When *American New York* made her first visit to New York Harbor in late July 1984, escorted by a flotilla of Moran tug boats, she was the largest container ship of all time. (*Duffy/Granard Associates*)



United States Lines, Inc.
and
Daewoo Shipbuilding &
Heavy Machinery, Ltd.
request the honor of your presence
at the Christening Ceremonies of the —

"American New York"
Sponsor: Mrs. Malcom P. McLean, Sr.
"American New Jersey"
Sponsor: Mrs. Malcom P. McLean, Jr.
"American Alabama"
Sponsor: Mrs. Geoffrey V. Parker
"American Maine"
Sponsor: Mrs. Greggory B. Mendenhall

at Okpo Shipyard, Koje Island,
Republic of Korea

Thursday, May 31, 1984 — 1:30 p.m.

Invitation issued jointly by United States Lines and Daewoo Shipbuilding for the christening ceremonies of the first four Econships, *American New York*, *American New Jersey*, *American Alabama*, and *American Maine*. (*McLean Foundation*)

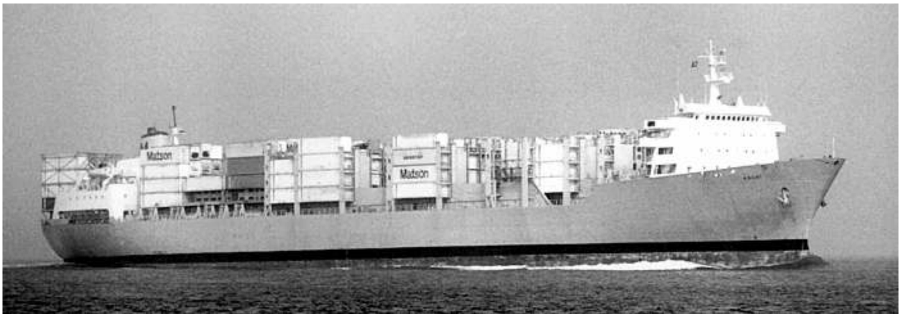
MOL Encore moves into Long Beach Harbor after a trans-Pacific crossing. The panamax ship has a capacity of 4,578 TEUs and works for Japan's Mitsui-O.S.K. Line, a company that was formed in 1964 through the merger of Mitsui Steamship and the Osaka Shogen Kaisha Line.

The first of the massive 1984 Econships of the United States Lines, *American New York*, is turned by Moran tugboats in lower Newark Bay before docking at the Howland Hook container terminal on Staten Island. (*Duffy/Granard Associates*)

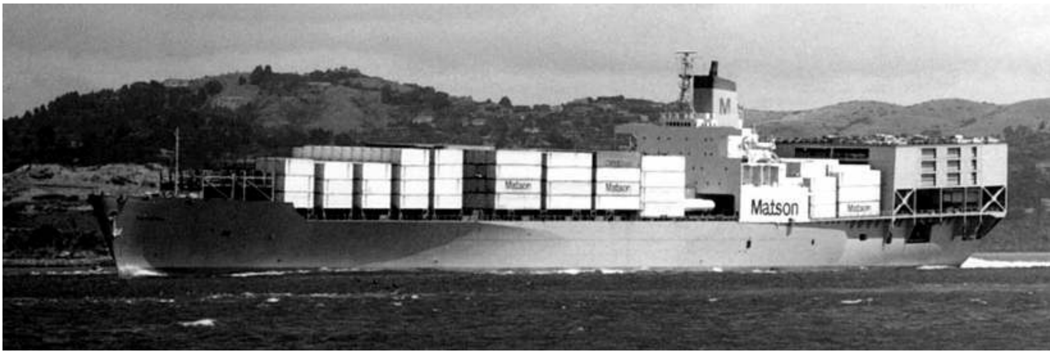
United States Lines acquired a fleet of cellular container ships and began making inroads into the new style of transport. The 19,267 gross ton *American Astronaut*, built in Chester, Pennsylvania, in 1969, leaves the port of San Francisco.

Like many of Sea-Land's early container ships, Matson Navigation Company's *Hawaiian Monarch* was once a C-4 cargo ship. (*Thompson Tully*)

Above: Matson's *Hawaiian Citizen* began life as the C-3 cargo ship *Sea Wren* and was converted into a container ship in 1960. (*Paul Tully*). Below: Matson's *Kauai*, shown after conversion into a hatchcoverless container ship. (*Paul Tully*)



Lihue is currently a cellular container ship in the Matson fleet, but began life as a LASH-type cargo vessel owned by Pacific Far East Line. (*Roger J. Cudahy*)



Originally a ro/ro vessel, *Matsonia* was later converted into an unusual hybrid. Forward of the deck house are conventional container cells, but abaft is a garage for transporting automobiles between Hawaii and the mainland. (*Paul Tully*)

With a forward deck house and machinery slightly abaft of midships, Matson's *Mahimahi* steams under the Golden Gate Bridge into San Francisco Harbor. The general design recalls Sea-Land's famous SL-7. (*Paul Tully*)

Like *Lihue*, Matson's *Ewa* was built as a LASH-type ship by Pacific Far East Line. Matson retains these vessels in a reserved status to handle unusual traffic demands. (*Paul Tully Collection*)

Sisters in the mist—on opposite coasts. Two large sister ships of South Korea's Hanjin Shipping: *Hanjin Osaka* (above), making its way up the Savannah River, and *Hanjin Marseilles* (below), in Seattle. Both ships were built in 1992 and are registered as 51,000 gross tons.

Harbel Cutlass was built in 1980 and is an example of a smaller container ship that is classified as "geared," meaning that it carries its own equipment—gear—for loading and unloading containers.

Saudi Hofuf is one of four sister ships built in 1983 for the state-owned National Shipping Company of Saudi Arabia (NSCSA), which maintains a regular trade between ports in the Middle East and the East Coast of the United States.

The stern gate of *Saudi Hofuf*, which can handle ro/ro cargo.

Above: This medium-sized container ship entering the port of Savannah in the fall of 2005 appears to be named *Mont Ello*; in fact, it is the German-registered *Montebello*, which somehow lost two letters at sea. Below: As a ship's name, *CMA CGM Potomac* may sound awkward. CMA + CGM is a French holding company representing a merger of Compagnie Maritime d'Affretement and Compagnie Generale Maritime, the latter a product of an earlier merger that included Compagnie Generale Transatlantique, better known as the French Line, of *Normandie* fame.

7 After 1999

Horizon, Maersk-SeaLand, and Beyond

In January 1999, the CSX Corporation issued a seemingly routine announcement. It was splitting its Sea-Land subsidiary into three separate divisions. The international liner business would be one unit, and a separate division would be established to handle domestic container-ship services where Jones Act provisions had to be observed, while terminal operations at home and abroad would be the province of yet a third new CSX unit.[1] All three units would be managed out of a headquarters in Charlotte, North Carolina—ironically, Malcom McLean's home state—where CSX had moved all Sea-Land management functions some years earlier.

The announcement suggested to many observers that far more than a merely internal reorganization was involved. Speculation quickly spread through the railway, the container-ship, and the investment sectors that this management action would facilitate CSX's divesting itself of its international liner business entirely. Bloomberg News Service reported that the "move could make it easier for CSX to sell its ocean-shipping business and concentrate on its railroad," while the *Journal of Commerce* claimed that the possibility of CSX's divesting itself of Sea-Land had been a "persistent rumor over the past few years."[2]

The rumor proved to be predictive as well. Before 1999 had run its course, CSX had indeed divested itself of Sea-Land Service.

Moving the Hyphen

The obvious company to acquire Sea-Land's international liner business and merge it into its own worldwide operations was the steamship operator with which CSX had earlier developed a cooperative strategic alliance, the Maersk Line, a wholly owned subsidiary of Denmark's A. P. Moeller Group. After acquiring Sea-Land from CSX in 1999, Moeller-Maersk combined its new property with its own international container-ship subsidiary and called the operation Maersk-Sealand. Five new vessels that Sea-Land had designed and ordered before the merger were delivered afterward and bore names such as *Sealand Michigan* and *Sealand Illinois*, telling with no hyphen between "Sea" and "Land." Maersk ordered three additional vessels from the same shipyard and that were built to the same specifications. Like the earlier five, the three were owned by Costamare and chartered to Maersk-Sealand, but they bore the names *Maersk Kolkata*, *Maersk Kobe*, and *Maersk Kalamata*.

CSX chairman John W. Snow—a man who would later serve as Secretary of the Treasury during the administration of President George W. Bush—felt the divesture would unlock more value at both CSX and Sea-Land, and much was said about CSX's being able to concentrate attention and effort on its "core business"—which is to say running the railroad—now that Sea-Land and its deepwater container ships were no longer part of the corporate picture.

As early as 1996, CSX made no secret of the fact that the Conrail acquisition was its first priority. "Because of the overriding importance of the Conrail transaction," the company's annual report warned that year, "our main public policy focus has been on rail issues." Three years later, the 1999 report noted, "Selling Sea-Land's international business was a hard but necessary decision."[3]

Even earlier in 1995, when rumors began to surface that CSX was thinking about selling Sea-Land to Maersk after the two companies had established a strategic alliance, the same John Snow emphatically denied that any such development was even possible. "Sea-Land is not for sale," Snow insisted.[4] The following year Tommy Thomsen, the chief executive at Maersk, issued a parallel denial. Despite such seemingly unambiguous assertions, though, in the years after 1995 Snow began to hint broadly that CSX was disappointed with Sea-Land's earnings. Fourth-quarter income in 1998 fell 79 percent over the previous year, for instance, the sharpest profit decline of any CSX unit. The corporation summed matters up in its 1999 annual report: "Recent years have seen profit margins decline as a number of strong, well-capitalized competitors entered the business. Projected worldwide vessel overcapacity and substantial, ongoing capital requirements pointed to a worrisome outlook, and we made the strategic decision to sell Sea-Land's international business assets to Danish carrier Maersk Line."[5]

It took most of 1999 to iron out a number of regulatory details associated with the sale, and the formal date of Sea-Land's transfer from CSX to Maersk was December 10, 1999. Sea-Land Service, Inc., a company whose emergence out of the Pan-Atlantic Steamship Company will forever stand as a major accomplishment of Malcom P. McLean, failed to see the dawn of the new millennium by a mere twenty-one days. The container-ship industry that Sea-Land sired, however, greeted the new century with vigor and promise, and that stands as a permanent legacy of extraordinary proportion.

What Happened?

It is difficult to identify a clear and single reason why CSX divested itself of Sea-Land—and, as important, why the oft-stated goal of creating a seamless, intermodal transport system was apparently abandoned so quickly. Certainly the financial and managerial pressures associated with the Conrail acquisition are perfectly reasonable factors that pressured the corporation to refocus its objectives and redirect its resources in ways that were important.

Another issue, though, is that while CSX made some strategic capital investments in its Sea-Land subsidiary during the years it was part of the overall corporation, future years would demand far heavier levels of commitment if Sea-Land were to remain competitive, and this was something CSX had no desire to undertake. Sea-Land was part of CSX for thirteen years, from 1986 through 1999, an era that saw the construction of the nine-vessel Champion Class of newbuildings, plus the acquisition of twenty-one vessels that formerly ran for United States Lines, including the twelve Econships, and this was certainly not an insignificant level of capital investment. But even greater levels would soon be required, as the Sea-Land fleet continued to age and, as important, the worldwide container-ship industry continued to build newer, larger, and more efficient vessels. This, simply enough, was not a prospect that CSX relished.

A telling and early glimpse into CSX thinking about Sea-Land might be evident in an interview that a man by the name of Alex J. Mandl gave to the *Journal of Commerce* in late 1988, a mere two years after CSX acquired Sea-Land. It was Mandl who had headed up the management team at CSX that recommended the acquisition of Sea-Land two years earlier, and in mid-1988 he was named chairman and CEO of the new CSX container-ship subsidiary. But to Mandl, it was clear that not only Sea-Land but also the entire container-ship industry were beset by fundamental economic problems. "The industry may never make an adequate return if everyone continues reinvesting in new ships to drive costs down while simultaneously pushing rates down," Mandl said.[6] One is left to speculate if this was a problem Mandl understood two years earlier in recommending the acquisition of Sea-Land, or something that only became evident once CSX was able to gain a more detailed inside look at container-ship operations and finance.

A further comment from Mandl during the 1988 interview that likely points toward Sea-Land's eventual departure from CSX control involves his reflection on global economics, and the emergence of both alliances and other cooperative efforts among container-ship operators. Addressing specifically Europe's plan to abolish trade barriers among the twelve original members of the European Community, Mandl noted, "We have had considerable discussion among the executive management of Sea-Land on how we might protect ourselves during this transformation in Europe."[7] In closing, Mandl made this point: "A joint venture with a European company is the kind of option that makes a lot of sense."[8]

The alliance era was rather well established in 1988 when Mandl was interviewed by the *Journal of Commerce*, and passage of the Shipping Act of 1984 had paved the way for U.S.-based companies to participate in such joint ventures. In any event, it would appear that as early as 1988 corporate thinking at CSX had begun to embrace the notion that the future of Sea-Land involved emphasizing linkages with overseas container-ship operators. Whether this also meant that CSX was willing to compromise its original goal of making Sea-Land part of a seamless and intermodal transportation system is, perhaps, a moot question. The fact remains, though, that Mandl's observations in 1988—reservations about Sea-Land's earning capabilities together with a future that would involve forming a partnership with an overseas container-ship operator—is the way matters, in fact, turned out.[9] American Commercial Lines, the family of inland towboat and barge operations that was to have given CSX an even more pronounced intermodal dimension, was also spun off and converted into an independent and freestanding corporation in mid-1998.[10]

As noted in the previous chapter, CSX would also decide to register Sea-Land newbuildings in the Marshall Islands, and would both seek and secure government approval to reflag some of the company's older tonnage in the open registry of that same mid-Pacific jurisdiction. While such steps were significant with respect to the overall health and condition of the U.S.-flag merchant marine, they were more efforts to achieve operational economies than indicators of any fundamental change in thinking about retaining Sea-Land as part of CSX.

Perhaps the only satisfactory conclusion one can draw is that it was all more inevitable than anything else. Not that CSX acquired Sea-Land in 1986 knowing it would sell the company to a Danish conglomerate before century's end, but rather that the continuation of disturbing economic trends in the container-ship industry—"overcapacity" is a handy code word for a variety of more complicated matters—coupled with global opportunities associated with the European Union and the possibility of strategic alliances, made the continuation of Sea-Land as a CSX subsidiary, much less as a U.S.-flag carrier, a less attractive option than it had appeared to be a mere twelve years earlier.

Horizon Lines and Jones Act Services

Only Sea-Land's international liner business was transferred to Maersk in 1999, though. CSX established a separate unit to retain and operate the company's domestic container-ship services, and these were not conveyed to Maersk. Eighteen Sea-Land vessels that were certified for Jones Act services (that is to say, they were registered in the United States and had been built there as well) remained under CSX ownership and continued to operate under the flag of a new unit called CSX Lines. (Vessels that remained in the fleet of CSX Lines lost the "Sea-Land" preface in their names and were renamed with designations such as *CSX Tacoma* and *CSX Navigator*.) CSX also retained what had previously been Sea-Land's domestic terminal operations, and while most overseas terminals were part of the package conveyed to Maersk, CSX retained control of an especially valuable terminal property in Hong Kong.[11]

Even these arrangements would be subject to further adjustment, though, and CSX soon decided to divest itself of CSX Lines and convert the unit into an independent and stand-alone company. Thus in February 2003—three years and some months after the international liner operation had been conveyed to Maersk-Moeller—a $300 million transaction was executed between CSX and the Carlyle Group, of Washington, D.C., and a new company was created that was called Horizon Lines.[12] Corporate headquarters of the new steamship company remained in Charlotte, North Carolina, and the sixteen-vessel fleet that had been working for CSX Lines was transferred to Horizon and continued to offer container-ship services between the U.S. mainland and Puerto Rico, Hawaii, Alaska, and Guam. Also included in the transaction was a quantity of containers said to be in excess of 21,000.

Horizon adopted a vessel livery and color scheme of its own, and the stack markings that appear on its vessels incorporate the old Sea-Land logo in a modified, but recognizable, fashion. Horizon even affixed a winged emblem to the bow of its ships that prominently displays the initials "HL"—wonderfully reminiscent of the letters "PA" that once adorned ships of the Pan-Atlantic Steamship Company, and the "SL" that was long carried on the bow of Sea-Land vessels. The new company's sixteen container ships were also renamed and are currently known as *Horizon Challenger*, *Horizon Discovery*, and so forth.

A quick review of the roster of ships that Horizon acquired from CSX might suggest that the new company wound up with a rather elderly fleet, while newer and more modern Sea-Land tonnage was all conveyed to A. P. Moeller. There is truth to this observation, but it was not a case of Moeller getting first pick among Sea-Land vessels with Horizon forced to accept only the leftovers. Because it would be operating solely Jones Act–protected trades, Horizon necessarily required vessels that were built in the United States. Other than the three D-6 class container ships that were turned out in Sturgeon Bay, Wisconsin, in 1987 for Alaskan service, Sea-Land had never built a Jones Act–eligible vessel of its own from the keel up. All the converted T-2s and C-4s had long been retired by the time Horizon came on the scene, of course, so the bulk of the vessels that were available to constitute a Jones Act–eligible startup fleet were steam-powered tonnage that Sea-Land had acquired from other companies, principally United States Lines. At the time Horizon Lines was created in 2002, the oldest units in the new company's fleet had been in service for the rather remarkable span of thirty-four years.

The Carlyle Group would not retain Horizon Lines among its assets for any extended term, however. In July 2004, in a $650 million transaction, Horizon was sold by Carlyle and was taken over by another investment syndicate, Castle Harlan Partners of New York, an organization whose portfolio included a variety of enterprises with a total value in excess of $7 billion. Among the holdings of Castle Harlan are restaurant chains, plus firms that manufacture such products as lawn furniture and garden tools.[13] Then in early 2005, under Castle Harlan, it was announced that

Horizon Lines had submitted a filing to the Securities and Exchange Commission that would lead to an initial public offering of stock valued at up to $287.5 million.[14]

No matter the investors behind Horizon Lines, though, the company operates the largest fleet of Jones Act–compliant vessels currently under the U.S. flag, and Horizon is the only provider of liner service in all Jones Act–protected trades—Puerto Rico, Alaska, Hawaii and Guam. (An oddity of the Jones Act is the fact that steamship service to and from the U.S. Virgin Islands is not covered by its restrictions—nor was service to the Philippines in years past when these islands were a U.S. possession.) Table 7.1 identifies the vessels that were conveyed to Horizon and constituted its fleet in 2005.

It will be interesting to see how Horizon's future plays itself out. The company sees itself as the true heir of the early Sea-Land tradition of innovation and customer service, and by 2003, Horizon's president, Chuck Raymond—a Sea-Land veteran, incidentally—proudly boasted that in excess of 70 percent of the company's bookings were being made by shippers via the company's website on the Internet. "We haven't heard anybody in the liner business talking numbers above small double digits, say 15 or 17 percent," Raymond pointed out.[15]

Raymond also acknowledged that the age of the Horizon fleet was a shortcoming that would have to be addressed—and perhaps soon—and in response to a reporter's question, he would not rule out the possibility of the company's entering selected international markets in the future. When Sea-Land was conveyed to A. P. Moeller in 1999, the element that was retained by CSX to operate Jones Act trade was precluded from expanding into any markets that were competitive with Maersk-Sealand for five years, a restriction that expired in 2004.[16]

Maersk-Sealand

As for A.P Moeller and Maersk, it is difficult to say how much of today's Maersk-Sealand represents a continuation of the old Sea-Land culture and traditions, and how much is simply an expanded version of a company whose roots are Danish through and through. In fact, in 1999, the same year it acquired Sea-Land, Maersk also bought out another international container-ship company, Safmarine of South Africa, a corporation that, while owned by Maersk, continues to be operated as a stand-alone entity.[17]

TABLE 7.1. *Horizon Fleet: 2005*

Off. No.	Name	Hull dimensions	GRT	Place built (year)	Notes
910306	*Horizon Anchorage* a) *Sea-Land Anchorage* b) *CSX Anchorage*	710 × 78 × 34	20,965	Sturgeon Bay, Wis. (1987)	1
515155	*Horizon Challenger* a) *American Legion* b) *Sea-Land Legion* c) *Sea-Land Challenger* d) *CSX Challenger*	700 × 90 × 32	18,775	Chester, Pa. (1968)	2
552818	*Horizon Consumer* a) *Australia Bear* b) *Sea-Land Consumer* c) *CSX Consumer*	720 × 95 × 34	23,763	Baltimore, Md. (1973)	
518444	*Horizon Crusader* a) *American Lark* b) *Sea-Land Lark* c) *Sea-Land Crusader* d) *CSX Crusader*	700 × 90 × 32	18,888	Chester, Pa. (1969)	2

TABLE 7.1. *(Continued)*

Off. No.	Name	Hull dimensions	GRT	Place built (year)	Notes
516464	*Horizon Discovery* a) *American Liberty* b) *Sea-Land Liberty* c) *Sea-Land Discovery* d) *CSX Discovery*	700 × 90 × 32	18,895	Chester, Pa. (1968)	2
623168	*Horizon Enterprise* a) *Austral Puritan* b) *American Puritan* c) *Sea-Land Enterprise* d) *CSX Enterprise*	813 × 90 × 34	28,095	Baltimore, Md. (1980)	3
544303	*Horizon Expedition* a) *Austral Ensign* b) *American Marketer* c) *Sea-Land Expedition* d) *CSX Expedition*	668 × 90 × 37	21,687	Pascagoula, Miss. (1973)	3
547288	*Horizon Hawaii* a) *Austral Endurance*	668 × 90 × 35	21,687	Pascagoula, Miss. (1973)	3

TABLE 7.1. *(Continued)*

Off. No.	Name	Hull dimensions	GRT	Place built (year)	Notes
	b) *American Merchant* c) *Sea-Land Hawaii* d) *CSX Hawaii*				
910803	*Horizon Kodiak* a) *Sea-Land Kodiak* b) *CSX Kodiak*	710 × 78 × 34	20,965	Sturgeon Bay, Wis. (1987)	1
541868	*Horizon Navigator* a) *Austral Envoy* b) *American Envoy* c) *Sea-Land Navigator* d) *CSX Navigator*	812 × 90 × 37	47,667	Pascagoula, Miss. (1972)	3
612085	*Horizon Pacific* a) *Austral Pioneer* b) *American Pioneeer* c) *Sea-Land Pacific* d) *CSX Pacific*	813 × 90 × 33	28,095	Baltimore, Md. (1979)	
552819	*Horizon Producer* a) *New Zealand Bear* b) *Sea-Land Producer*	720 × 95 × 34	23,763	Baltimore, Md. (1974)	

TABLE 7.1. *(Continued)*

Off. No.	Name	Hull dimensions	GRT	Place built (year)	Notes
	c) *CSX Producer*				
625873	*Horizon Reliance* a) *Edward Rutledge* b) *Sea-Land Reliance* c) *CSX Reliance*	893 × 100 × 41	34,077	Avondale, La. (1980)	
624457	*Horizon Spirit* a) *Benjamin Harrison* b) *Sea-Land Spirit* c) *CSX Spirit*	893 × 100 × 41	34,077	Avondale, La. (1980)	4
910307	*Horizon Tacoma* a) *Sea-Land Tacoma* b) *CSX Tacoma*	710 × 78 × 34	20,965	Sturgeon Bay, Wis. (1987)	1
552706	*Horizon Trader* a) *Austral Entente* b) *American Entente* c) *Sea-Land Trader* d) *CSX Trader*	813 × 90 × 37	28,087	Pascagoula, Miss. (1973)	3

Notes

1. Designed and built by Sea-Land; only diesel-powered vessels currently on Horizon roster.
2. Designed and built by United States Lines.
3. Designed and built by Farrell Lines.
4. Designed and built by Waterman Steamship.

Maersk-Sealand is certainly a major participant in a steadily expanding container-ship industry, the only question being whether Maersk-Sealand is the industry leader in all important categories of container-ship performance, or merely most of them. Table 7.2 displays the world's ten largest container fleets—measured in active trailer equivalent unit (TEU) capacity as well as tonnage on order—at the time A. P. Moeller acquired Sea-Land in 1999.

In late 1999, newly created Maersk-Sealand deployed almost as many TEU slots as the industry's second- and third-place carriers combined, while the new tonnage it then had on order, all by itself, could be considered the tenth largest container-ship fleet in the world. More whimsically, were Maersk-Sealand required to achieve its 1999 carrying capacity solely with vessels similar to Pan-Atlantic's *Gateway City* of 1957, the world's largest container line would have to own and operate a fleet of 2,409 converted C-2 cargo ships.

Maersk-Moeller is so vast a maritime operation that when it decides to build a new container ship—or two, or six, or twelve—it rarely has need to shop among the world's shipyards to find construction capacity. Maersk is able to build tonnage at its very own shipyard, the Odense Steel Shipyard in Lindo, Denmark. For that matter, the maritime operations of the

TABLE 7.2. *Major World Container-Ship Fleets: 1999*

Steamship company (including subsidiaries)	TEUs in service	TEUs on order	Projected TEUs
Maersk-Sealand	544,558	128,340	672,896
Evergreen Marine	311,951	65,450	377,401
P&O Nedlloyd	268,625	83,952	352,577
Mediterranean Shipping Co. (MSC)	225,636	8,200	233,836
Hanjin Shipping Co.	217,804	40,600	258,404
APL Ltd.	199,881	15,160	215,041
China Ocean Shipping Co. (COSCO)	189,016	57,500	246,566
NYK Line	156,821	0	156,821
Mitsui OSK Lines (MOL)	146,026	16,500	162,526
Zim Israel Navigation Co.	144,741	0	144,751

A. P. Moeller Group are considerably more extensive than the subsidiary known as Maersk-Sealand. A steamship company called, simply, the Maersk Line is a separate entity, and in the year 2005 its fleet included the modest total of 172 deepwater merchant vessels, seventy-eight of which were fully cellular container ships. The Maersk-Sealand fleet, on the other hand, consists of "merely" forty-six vessels, thirty-seven of which are hulls that were formerly owned by Sea-land Service.[18] Interestingly, in 2005, nineteen of these thirty-seven vessels remain registered in the United States, thus producing this anomaly: a firm based in Copenhagen, Denmark, operates more U.S.-flag container ships than any domestic steamship company, including Horizon Lines.

The reason for this curious situation is not that Maersk-Sealand plans to operate vessels in any services covered by the Jones Act. In fact the U.S.-flag vessels in the Maersk-Sealand fleet were all built in overseas shipyards and are not qualified for Jones Act trade.

Backtracking to 1999, Maersk-Sealand was required to continue the U.S. enrollment of fifteen ex–Sea-Land vessels that are part of a government initiative known as the Maritime Security Program (MSP). The MSP is a federal program that was established in 1996 and signed into law by President Clinton to replace, after a fashion, the operating differential subsidy program that was created in 1936 and phased out during the Reagan administration.

The purpose of the MSP is to ensure that both ships and crews are available for any sea-lift needs of the U.S. Department of Defense. Each enrolled vessel earns a fixed-fee annual payment for its owner irrespective of any calls the government may make for the use of the ship. In addition, owners are compensated at standard commercial rates should a vessel actually be required for defense-related work.

Unlike operating-differential subsidies, the MSP places no restrictions on what trades an enrolled vessel may ordinarily work, and the program is administered by the Maritime Administration (MARAD), an arm of the U.S. Department of Transportation. (In 2004, the Bush administration advanced a legislative proposal to shift management of the MSP from MARAD to the Department of Defense, but as of this writing in early 2006, no congressional action had been taken on the proposal.)

During 1999, when the sale of Sea-Land to A.P. Moeller was under discussion, MARAD insisted that Sea-Land vessels that had previously been enrolled in the MSP—by Sea-Land—must remain so as part of its agreement to the overall transaction. Because vessels enrolled in the MSP must be owned by U.S. interests, remain under the active management of U.S. firms, and be crewed by U.S. seafarers, a rather unusual structure was established for the fifteen Sea-Land vessels that were to remain in the MSP.

Although seemingly conveyed to Danish interests, the fifteen vessels were made subject to mortgage instruments held by domestic banks, a step that is considered adequate to establish formal U.S. ownership. Next, the vessels were managed, for Maersk-Sealand, by a newly created firm that was called United States Ship Management, Inc. (USSMI). This company provides qualified U.S. seafarers to operate the ships, thus fulfilling the statutory requirement that MSP vessels be operated by U.S. crews and be under the control of entities composed of U.S. citizens. Finally, USSMI time-charters the vessels, along with their crews, to Maersk-Sealand, and their day-to-day operation is at the direction of that company as part of its ordinary international container-ship services. Table 7.3 identifies the fifteen Sea-Land vessels whose enrollment in the MSP survived the conveyance of the Sea-Land fleet to Moeller-Maersk in 1999.

After 1999, Maersk-Sealand would substitute newer tonnage from the Champion class of 1995 for some of the vessels originally enrolled in the MSP. Ironically enough, when they were built, Champion-class vessels were enrolled in the open registry of the Marshall Islands as a way of avoiding more costly wage rates associated with U.S. seafarers. Before joining the MSP, of course, such vessels had to be reflagged under the stars and stripes.

As for the kind of services MSP vessels may be called upon to provide, in 2000 Maersk-Sealand was awarded a five-year charter from the U.S. Navy's MSC to transport containers of ammunition from the United States to various overseas locations. The containerships *OOCL Innovation* and *OOCL Inspiration*—both registered in the MSP—were assigned to this important service, vessels that were earlier owned by Sea-Land but decorated in the livery of Hong Kong–based Orient Overseas Container Line, a company with which Sea-Land had established a cooperative working agreement. (Since they would no longer be operating in conjunction with OOCL, the two were renamed *Sealand Oregon* and *Sealand Commitment*, respectively.)

Curiously enough, A. P. Moeller was no stranger to the MSP when it acquired Sea-Land in 1999. At the time the MSP program was created three years earlier in 1996—and when vessels began to be enrolled in

TABLE 7.3. *Maersk-Sealand Fleet: Ex–Sea-Land Vessels Enrolled in the MSP, 1999*

Off. No.	Name	MSP agreement number	Place built (year)	Notes
665782	*Sealand Achiever* a) *American Alabama* b) *Leyla A.* c) *Galveston Bay* d) *Sea-Land Achiever*	MA/MSP 29	Okpo, South Korea (1984)	1
665222	*Sealand Florida* a) *American New York* b) *Catherine K.* c) *Nedlloyd Holland*	MA/MSP 30	Okpo, South Korea (1984)	1
665789	*Newark Bay* a) *American Utah* b) *Irene D.* c) *Utah* e) *LTC John U.D. Page*	MA/MSP 31	Okpo, South Korea (1985)	1
665785	*Sealand Oregon* a) *American Nebraska* b) *Susan C.* c) *Nebraska* d) *Nedlloyd Hudson* e) *OOCL Innovation*	MA/MSP 32	Okpo, South Korea (1984)	1
665788	*Sealand Commitment* a) *American California* b) *Marguerete* c) *CGM Ile de France* d) *OOCL Inspiration* e) *Sea-Land Commitment*	MA/MSP 33	Okpo, South Korea (1985)	1
665786	*Sea-Land Atlantic* a) *American Oklahoma* b) *Karen H.*	MA/MSP 34	Okpo, South Korea (1985)	1
604246	*Sea-Land Defender*	MA/MSP 35	Tomano, Japan (1980)	2

TABLE 7.3. *(Continued)*

Off. No.	Name	MSP agreement number	Place built (year)	Notes
606062	*Sea-Land Endurance*	MA/MSP 36	Ulsan, South Korea (1980)	2
604248	*Sea-Land Explorer*	MA/MSP 37	Nagasaki, Japan (1980)	2
606064	*Sea-Land Innovator*	MA/MSP 38	Ulsan, South Korea (1980)	2
665783	*Sea-Land Integrity* a) *American Virginia* b) *Jacqueline J.* c) *Virginia*	MA/MSP 39	Okpo, South Korea (1985)	1
604245	*Sea-Land Liberator*	MA/MSP 40	Nagasaki, Japan (1980)	2
604245	*Sea-Land Patriot*	MA/MSP 41	Kobe, Japan (1980)	2
665790	*Sea-Land Performance* a) *American Washington* b) *Ruth W.*	MA/MSP 42	Okpo, South Korea (1985)	1
665787	*Sea-Land Quality* a) *American Illinois* b) *Patricia M.*	MA/MSP 43	Okpo, South Korea (1985)	1

Notes

1. Sea-Land Atlantic class vessel; originally built by United States Lines.
2. Sea-Land D-9 class vessel; later rebuilt as D-9J class.

1997—Maersk sensed an opportunity and quickly established a U.S. subsidiary, Maersk Line, Ltd., of Norfolk, Virginia, and arranged to have four 1,325-TEU containerships reflagged in the United States and enrolled in the MSP. Table 7.4 identifies these four vessels—U.S.-flag container ships operated by Maersk that were never part of the Sea-Land operation.

As was the case with ex–Sea-Land vessels enrolled in the MSP, Maersk has shifted and reflagged its MSP vessels over the years. In 2005, *Maersk Tennessee* was flying the flag of Afghanistan, for example, and *Maersk Texas* was Liberian-registered, while other company tonnage had been reflagged in the United States.

More recently, Maersk-Sealand petitioned MARAD to allow the vessels under the control of U.S. Ship Management to be shifted to its own Norfolk-based U.S. subsidiary, Maersk Line, MARAD agreement was forthcoming and in early 2005, the fifteen MSP vessels previously managed by U.S. Ship Management were shifted to Maersk Line.

Maersk on the Move

In 2005, A. P. Moeller-Maersk unveiled a breathtaking corporate strategy that would further strengthen its position in the container-ship industry. The Copenhagen-based company planned to acquire, in its entirety, P&O Nedlloyd, merge its operations into Maersk-Sealand, and create a container-ship colossus that would be twice as large as the industry's second-largest container-ship company. Preliminary approval of the merger came from the European Union in July 2005. The new company would

TABLE 7.4. *Maersk Fleet: Vessels Enrolled in the MSP, 1999*

Off. No.	Current name	Former name	GRT	Dimensions	Built (Year)
1052356	*Maersk California*	*Caroline Maersk*	20,800	620 × 91 × 33	Denmark (1994)
1052357	*Maersk Colorado*	*Clifford Maersk*	17,000	526 × 91 × 33	Denmark (1992)
1051612	*Maersk Tennessee*	*Thomas Maersk*	18,900	572 × 91 × 33	Japan (1994)
1051102	*Maersk Texas*	*Tinglev Maersk*	18,900	572 × 91 × 33	Japan (1994)

have to forgo serving certain trades, one of many details worked out by late 2005, and the newly merged entity chose to identify itself as the Maersk Line. Sea-Land Services ceased to exist as an independent maritime company in 1999. By 2006, even its vestigial identity in the hyphenated form Maersk-Sealand had disappeared from the seven seas.

At longer range, it is difficult to imagine that the acquisition of P&O Nedlloyd by Maersk would not trigger additional mergers in the industry, including, possibly, combinations involving European-based companies with onetime rivals based in the Far East. An active and vigorous industry is like that, though. It just keeps on changing.

Malcom McLean: The Final Curtain

The individual who has often been called the father of containerization refused to regard the 1986 liquidation of United States Lines as the end of his involvement with the industry. Malcom McLean—with little formal education beyond grammar school—had a wonderful catholicity of interests. During the same petroleum crisis that laid his magnificent SL-7 container ships low in the mid-1970s, McLean was investigating the possibility of harvesting millions of tons of peat from his North Carolina farm and promoting such fuel as an alternative source of energy. He was active in diverse industries—from a major life insurance company to a mechanized pig farm, from prefabricated houses to electron microscopes. And always, of course, after taking a gold mechanical pencil out of his jacket pocket and performing extended calculations on the back of whatever envelope happened to be handy.

Malcom McLean received many honors. In 1999, the International Maritime Hall of Fame designated him its "Man of the Century"—a century, it should be noted, that saw such maritime developments as the Liberty ship, atomic-powered warships, and the superliner *United States.* On the occasion of its fortieth anniversary in 1994, the editors of *American Heritage* magazine identified McLean as the first of ten people who had orchestrated major changes in American life over the past four decades—but whom few people had ever heard of.[19] Malcom McLean received many additional honors—including an award from President Dwight Eisenhower in 1959 and recognition from President Bill Clinton in 1996.

What has to be a most remarkable finale to a magnificent career, though, is the fact that in 1991, at the age of seventy-seven, Malcom McLean founded yet another container-carrying shipping company, a firm that he called Trailer Bridge. (According to the New York Stock Exchange, Trailer Bridge was the fifth publicly traded company McLean established.)

Unlike the seagoing vessels of Sea-Land Service or United States Lines, Trailer Bridge uses tug-and-barge technology, and it has restricted itself to a single, though lucrative, market—round-trip service between Jacksonville, Florida, and Puerto Rico. Trailer Bridge operates seagoing barges with containers stacked three high, and its barges are powered by contract tugboats. What is unique about Trailer Bridge, though, is the fact that its vessels are configured to handle fifty-three-foot containers, the largest trailer currently authorized to operate in all fifty states.[20]

Malcom McLean passed away in his home in upper Manhattan on Friday, May 25, 2001, at the age of eighty-seven.[21] It was forty-five years and twenty-nine days since a converted T-2 tanker bearing the unlikely name *Ideal X* sailed away from nearby Port Newark on a memorable voyage to Houston, Texas.

On May 30, 2001, Malcom McLean's family and friends gathered at the Fifth Avenue Presbyterian Church in New York for a memorial service. The eulogy was delivered by Charles L. Cushing—the longtime friend and business associate who, two decades before, had designed what were then the largest container ships of all time, the famous Econships that sailed for United States Lines.

"Malcom's secret weapon was his uncanny ability to select and surround himself with very talented and capable people," Cushing told the congregation. McLean "revolutionized and sped up the entire transportation chain and reduced its cost." The result, Cushing said, was "a steady and identifiable increase in the standard of living in the developing countries and elsewhere throughout the world."[22]

One is only left to wonder how differently things might have turned out if during Thanksgiving week of 1937, gangs of longshoremen in northern New Jersey who were loading cargo aboard American Export Line's *Examelia* had worked a little faster, shown a little more dispatch, hoisted several bales of cotton aboard the ship a little quicker—and allowed a truck driver to return home to North Carolina a little sooner than he actually did.

8 THREE OTHER COMPANIES

The shape and size of the current world container-ship fleet incorporates dimensions that few could possibly have predicted—or even imagined—on a rainy Thursday afternoon in April 1956 when *Ideal X* set sail for Houston from Port Newark with fifty-eight trailer-truck bodies secured to its jury-rigged spar deck. Previous chapters have outlined how the Pan-Atlantic Steamship Company evolved into Sea-Land Service, and Sea-Land eventually became part of Maersk-Sealand. To gain additional perspective on the development of the container-ship industry, past and present, let us explore briefly how three other and rather different fleets of container ships have assumed their current proportions—American President Lines, Evergreen Marine, and Matson Navigation. Two were originally U.S.-flag companies, although only one remains so today, while the third is based in Taiwan and represents the emergence of Far Eastern interests in the contemporary container-ship industry.

APL and NOL

A Singapore-based steamship company known as the Neptune Orient Line (NOL) may not be a familiar name to North American maritime enthusiasts. Organized in 1968 just as containerization was beginning to revolutionize cargo transport at sea, NOL can boast of no lengthy heritage from the days of break-bulk cargo ships, and certainly no era when the company operated luxury passenger ships across the oceans of the world. What NOL does bring to the table, though, is the fact that an October 1997 transaction involving NOL would foreshadow Sea-Land's acquisition by Maersk-Moeller two years later in 1999. In 1997 NOL laid out $825 million and acquired one of the more famous U.S.-flag container ship companies of that era, American President Lines (APL). Unlike A. P. Moeller's merging of Sea-Land into a company that was called Maersk-Sealand and bore little resemblance to the Sea-Land of old, NOL has retained APL as the operating "brand" for its container ships, and the traditional APL name and logo remain visible on the contemporary scene.

APL continues to own and operate a number of U.S.-flag container ships under the provisions of the Maritime Security Program (MSP)—a venture in which Maersk-Sealand also participates, as was discussed in the previous chapter.[1] But while APL has its operating headquarters in Oakland, California, the contemporary APL is a wholly owned subsidiary of a Singapore-based parent company and is a very different entity from the American President Lines of yesteryear.

American President Lines dates to the mid-nineteenth century, when William H. Aspinwall was the successful bidder on a government contract to deliver mail between the west coast of Panama and the new Oregon Territory. Aspinwall's company was called the Pacific Mail Line, and its success was assured when gold was discovered in California in 1848. Pacific Mail was later acquired by the Southern Pacific Railroad, and after that by the Grace Line.

A second constituent element of APL was a transpacific steamship company called the Dollar Line that was established in 1900. Its easily recognized stack marking was a large dollar sign, and the company played an important role as trade between the United States and China grew in importance during the early years of the twentieth century. By the end of World War II, Pacific Mail and Dollar had been merged and the combined entity was called American President Line, a premier U.S. flag steamship company operating both passenger and cargo tonnage between the West Coast and the Far East.[2]

APL recognized the benefits that containerization would bring to its cargo operations rather early in the game. The company had experimented with various styles of onboard containers even before the 1956 inaugural voyage of Pan-Atlantic's *Ideal X*, although the first APL vessels that were rigged to carry true containers, as the term would come to be understood, were *President Lincoln* and *President Tyler*, launched in 1961 as combination container ships and break-bulk freighters and identified, by APL, as Searacer-class vessels. The two vessels remained in the APL fleet until 1979, when they were retired. During the remainder of the 1960s and on into the 1970s, additional company vessels were adapted to carry containers, in addition to break-bulk cargo, while other units in the APL fleet were converted into fully cellular container ships.

Unlike Sea-Land and its penchant for acquiring wartime vessels such as T-2 tankers and C-4 troopships for reworking into container ships, APL preferred to use newer cargo tonnage as the "raw material" for its conversion projects. For example, a C-4 that was built by Ingalls Shipbuilding in Pascagoula, Mississippi, in 1967 as the twenty-three-knot break-bulk cargo ship *President Van Buren* was sent to Todd's Seattle yard in 1972, lengthened from 574 feet to 663, and emerged the following year, with no change of name, as a container ship capable of transporting 1,094 trailer equivalent units (TEUs). The lengthened *President Van Buren* merited redesignation, under MARAD notation, as a C-6 cargo ship, and similar conversion projects were undertaken on four other C-4s—*President Fillmore*, *President Grant*, *President Taft*, and *President McKinley*. In fact, these vessels, which APL identified as its Seamaster class, had been designed and built from the outset to facilitate later conversion into container ships.[3]

(Because APL traditionally memorialized past presidents of the United States in christening its vessels, the company's pool of potential vessel names was limited. Consequently, many names have been repeated on multiple vessels, even within the relatively recent era of container-ship operations. One must therefore exercise a measure of caution in referring, for example, to "the container ship *President Tyler*," since APL operated two different container carriers—not to mention two earlier break-bulk cargo ships—that bore this name.)

Four additional C-4s built in the 1960s for the American Mail Line, a company that APL later acquired, were also lengthened in the early 1970s and converted into container ships, each with a capacity of 1,100 or so TEUs. APL named them *President Roosevelt*, *President Truman*, *President Eisenhower*, and *President Kennedy*. They would soon be followed by APL's first fully containerized newbuildings, a quartet of vessels the company called the Pacesetter Class.

The Pacesetters, designed by the George C. Sharp Company of New York, were built to the same general specifications as four Farrell Line container ships of the same era. In fact, APL and Farrell were able to solicit bids for these new vessels jointly, and all eight were built in Pascagoula, Mississippi, by Ingalls Shipbuilding.[4] APL's first Pacesetter was *President Jefferson*, and it was soon joined by *President Madison*, *President Pierce*, and *President Johnson.* (The fourth Pacesetter was named after President Andrew Johnson, not LBJ.)

Each Pacesetter could maintain twenty-three knots and carry 1,570 TEUs, while propulsion was generated by a Westinghouse steam turbine engine. Pacesetter-class vessels were 668 feet long and equipped with bow thrusters to assist in close-quarters maneuvering.

The four Farrell Line container ships, also built in Pascagoula and near sister ships of APL's Pacesetter class, later worked for Sea-Land after earlier being acquired by United States Lines when that company took over Farrell, and eventually the ex–Farrell Line vessels wound up on the roster of Horizon Lines. The first of the four, *Austral Envoy*, reportedly set a transpacific speed record when it steamed over a 7,928-mile course from the western end of the Panama Canal to Sydney, Australia, in thirteen days and seven hours at an average speed of 24.85 knots.[5] (Sea-Land's SL-7s posted multiple transpacific crossings at far faster speeds. *Austral Envoy*'s record applies only to a specific route, not to any and all transpacific crossings.)

APL experienced some wrenching corporate realignments during the 1970s, and suffered a series of business reversals as well. In September 1976, the Seamaster-class container ship *President Grant* went aground off the port of Keelung, Taiwan, and was eventually declared a total loss, while decreasing market share prompted the company's principal stakeholder, then a San Francisco–based energy company known as Natomas, to think about reducing its investment in the troubled steamship line.[6] Various overtures to bring Pacific Far East Line (PFEL) under the APL wing were unsuccessful, but in the mid-1970s, the tide began to turn. APL discontinued all passenger operations in 1973, recognizing that its future involved none but containerized operations, and in 1977 APL eliminated steamship service to and from the East Coast, substituting dedicated land-bridge railroad service as a better way for containers from the Far East to reach eastern destinations.[7] Freight revenues rose by an impressive 73 percent between 1975 and 1977, and a net income of $18 million was posted in 1977, against a $10 million loss in 1973. Rather than reducing its investment in APL, Natomas increased its stake instead and by 1980, APL was a wholly-owned subsidiary of the energy company.

The next expansion of APL's container fleet was more a matter of seizing an opportunity than developing a careful long-term strategy. PFEL entered receivership in August 1978, and its fleet was liquidated. The company had acquired four new LASH-type vessels in the early 1970s—vessels that carry cargo in "containers," except rather than highway trailers detached from their running gear, LASH containers are large barges that are lifted onto the ship by an onboard hoisting mechanism at the vessel's stern. (As discussed in previous chapters, Sea-Land acquired two LASH-type vessels from Waterman Steamship in 1990 and converted them into cellular container ships.)

In 1979, APL acquired three of PFEL's four LASH vessels and converted them into cellular container ships, each with a capacity of 1,856 TEUs, while PFEL's fourth LASH-type vessel wound up on the roster of United States Lines as *American Trader*. APL later had additional work done on its ex-PFEL vessels and their container-carrying capacity was increased to 1,984 TEUs. In any event, PFEL's *Golden Bear* became APL's *President Grant*, *Thomas E. Cuffe* became *President Hoover*, and *Japan Bear* became *President Tyler*.

In the early 1980s, APL was again in the market for new container tonnage, although serious consideration had earlier been given to expanding the company's container-carrying capacity by increasing the size of older vessels. In any event, the company not only decided to acquire new vessels, it also took a bold step—at least a bold step for a U.S.-flag company—and specified diesel propulsion for the newbuildings. While APL did not face the same devastating impact from the Arab oil embargo of 1973 as did Sea-Land with its high-speed SL-7s, steam turbine engines still consumed large quantities of fuel, and the switch to diesel was amply warranted. The three vessels ordered in 1982—*President Lincoln*, *President Washington*, and *President Monroe*—were built at Avondale Shipyards in Louisiana; each had a carrying capacity of 2,590 TEUs, and they were the largest container ships built in the United States up until that time, as well as the first diesel-powered container ships to be turned out by any American yard. Each vessel was powered by a powerful twelve-cylinder Sulzer model 12RND90M diesel engine that had been built in the United States by Allis-Chalmers, under license from Sulzer. The new vessels included a forward deckhouse, and because APL continued to identify its vessels with notation that was originated by the Maritime Commission back in the 1930s, the three new container ships were designated C-9–class cargo vessels. Interestingly, APL chose to handle design aspects of this fleet expansion with in-house personnel and did not retain an outside naval architect.[8]

The next fleet additions foretold APL's future in a way that few—and perhaps even few at APL—would have been able to appreciate at the time. The company acquired a pair of four-year-old container ships from Neptune Orient Lines of Singapore in 1984, reflagged the vessels in the

United States, and added them to the APL fleet as *President F.D. Roosevelt* and *President Eisenhower*. The two had been built in Japan, and with a capacity of 2,600 TEUs each, they would reign—although only briefly—as the largest container ships in the APL fleet. (They beat out the three Avondale-built C-9s in this regard by the modest margin of ten TEUs.)

APL's next fleet expansion would follow Sea-Land's lead and avoid the higher costs associated with U.S. yards by contracting with an overseas shipbuilder. As discussed in previous chapters, companies could register vessels built in foreign yards in the United States, although such tonnage was ineligible for Jones Act–protected services and for any form of subsidy from the Maritime Administration (MARAD). Since the major trades APL worked were international, the company felt comfortable forgoing Jones Act eligibility. In addition, because MARAD subsidies were on the verge of being eliminated anyway, there was little risk in APL's acquiring newbuildings from overseas shipyards.

In October 1986, the company contracted with Howaldtswerke–Deutsche Werft of Kiel, West Germany, to design and oversee the construction of five new container ships. Howaldtswerke-Deutsche was given overall design responsibility and would turn out the first vessel, while construction of the remaining four would be split between Howaldtswerke-Deutsche and Bremer Vulkan of Bremen, West Germany. In keeping with past APL practice, MARAD notation was again used to identify the newcomers and they were designated the C-10 class.

The five new German-built container ships that were delivered to APL in 1988 were big—61,926 gross registered tons, 899 feet long, with a carrying capacity of 4,340 TEUs. They exceeded the Econships Malcom McLean had put into service for United States Lines a year or so earlier in the way of gross tonnage—61,926 versus 57,075—but they were fifty-one feet shorter and could carry 274 fewer TEUs than the Daewoo dozen. The most telling statistical difference between McLean's Econships and the new APL vessels, though, involved their beam. The Econships measured 106 feet from side to side and were able to transit the Panama Canal. The new APL vessels measured 129.5 feet across and were the first container ships to be placed in service by any operator that were too big to use the famous waterway.

APL believed that its big new container ships would work transpacific trades exclusively, thus obviating any need to respect the Panama Canal's 110-foot width limitation. The first of the five, *President Polk*, was delivered by Bremer Vulkan in 1988 and drew considerable comment in the trade press because of its status as the world's first post-Panamax container ship. The four sister ships of *President Polk* included *President Adams*, also built by Bremer Vulkan, and *President Jackson*, *President Kennedy*, and *President Truman*, all turned out by Howaldtswerke–Deutsche Werft.[9]

The big new ships were part of a major $900 million capital upgrade at APL that included improved terminals as well as new rail cars for the company's steadily expanding land-bridge services that carried containers inland from West Coast ports aboard double-stack rail cars. But no sooner had the company substantially expanded its carrying capacity—and incurred new levels of debt in the process—than a worldwide economic downturn, coupled with the same transpacific rate wars that drove Malcom McLean's United States Lines into bankruptcy, left APL with excess capacity aboard its ships, and too little revenue to make a profit. To make matters a bit worse, the big new C-10s drew too much water to dock in the port of Oakland except at flood tide, and APL soon became tangled in disputes with environmental interests over plans to deepen the channel approach into Oakland.[10]

The five new ships would turn out to be the last APL newbuildings to sail under the stars and stripes. In the years after they were delivered—and more important, in the years after the United States Congress passed the Shipping Act of 1984—APL joined three other important container-ship operators in the Global Alliance and the nature of its operations would be forever altered. (See chapter 6 for additional treatment of the alliance era.)

APL's partners in the Global Alliance were Mitsui-OSK, Nedlloyd, and Orient Overseas Container Lines, and while the four members only committed seventy-seven vessels to the alliance from their combined fleets of 187 ships in 1995, the Global Alliance was second only to the 175-vessel alliance that had been earlier created by Maersk and Sea-Land Service.

APL, however, would not remain a permanent member of the Global Alliance. Major mergers and acquisitions were pending in the global container-ship industry, and these would substantially affect alliance affiliations. In 1996, after five years of behind-the-scenes negotiations, Great Britain's P&O Container Lines, a member of the Grand Alliance, announced that it was merging with Holland's Nedlloyd, of the Global Alliance. The merged entity, which called itself P&O Nedlloyd, chose to ally itself with the Grand Alliance.[11]

Less than a year later, the container-ship industry learned of yet another corporate realignment. APL, then ranked number fifteen among world container-ship operators as measured by TEUs transported, was steadily failing to meet its own revenue forecasts and the company was regarded as a likely acquisition target. What came as a surprise on April 13, 1997, though, was the announcement that Singapore-based Neptune Orient Lines would lay out $825 million and acquire APL. The two companies had no history of cooperative activities—APL's purchase of two NOL container ships in 1984 was a one-time transaction—and despite some efforts to call the pending deal a merger, in fact it was an out-and-out acquisition, and APL became a wholly owned subsidiary of NOL. APL shareholders were thoroughly pleased with the NOL offer, though, and a robust 99 percent of them voted their approval, thus creating the world's fifth-largest container-ship fleet.[12]

Interestingly, NOL recognized the value of the APL brand, and chose to identify its newly combined container-ship fleet solely under the APL name, while noncontainer ship operations of the corporation would be identified as NOL activities. Although there was some consideration that APL + NOL might choose to operate outside the structure of a formal alliance, in fact the new company cast its lot with the Global Alliance.

NOL divested itself of an important part of APL in 1999, when it sold off the latter's double-stack train operation to a New York investment house. Care was taken to ensure that the former subsidiary would still dispatch APL containers eastward from West Coast ports, and most in the industry believed the transaction was undertaken not because APL was turning its back on double-stack services, but to allow NOL to liquidate some of the debt it had incurred in its earlier acquisition of APL.

APL's acquisition by a Singapore-based company was not the first time a major U.S. steamship company had been taken over by a non-U.S. entity. CP Ships, a Canada-based company that was long known as Canadian Pacific, began to expand from a niche-market provider into a major force in the worldwide container-ship industry in the early 1990s; part of its expansion involved the acquisition of Lykes Brothers Steamship Company, a venerable U.S.-flag operator. Something that NOL + APL was able to orchestrate, but that CP Ships + Lykes was not, was the continued participation of APL vessels in MARAD's Maritime Security Program (MSP).

The structure that was established for such participation would later be used by Maersk-Sealand. Namely, formal ownership of a number of U.S.-flag vessels is transferred to a lending institution—in this case, the

Wilmington Trust Company, of Delaware—and the vessels are then bareboat-chartered to American Ship Management, a U.S. corporation. American Ship Management then arranges for the hiring of U.S. crews, serves as the vehicle for the receipt of MSP subsidies, and time-charters the fully crewed vessels to APL, who, in turn, operates them as part of its overall container-ship system. Because APL wanted to include four relatively new vessels in the MSP that had been registered in the Marshall Islands since they were delivered, APL arranged for their reflagging in the United States, a prerequisite, of course, of MSP participation.[13] Table 8.1 identifies the nine U.S.-flag container ships that APL enrolled in the MSP in 1997.

As expected, following APL's acquisition by NOL, the company's newbuildings would no longer be registered under the U.S. flag, and some older tonnage was also reflagged to take advantage of lower overseas wage rates. Recognizing, though, that there would be something singularly incongruent in having a foreign-built and Singapore-registered container ship named after a former president of the Untied States, APL adopted a new style of vessel nomenclature and the company's recent fleet additions bear names such as *APL Japan* and *APL Singapore*.

Because an NOL-controlled APL had no interest in operating any Jones Act–protected services—nor, for that matter, would it be legally qualified to do so—the company disposed of those vessels in its fleet that were eligible to work Jones Act trades. There were only six of these on the roster by 1996, and all were conveyed to the Matson Navigation Company for additional years of service under that company's house flag.[14]

The story of APL during the age of containerization provides a modest counterpoint to Sea-Land—many similarities, but also a few unique characteristics. Unlike Sea-Land, APL enjoys a heritage that extends back into the final decades of the nineteenth century, but the company followed a path that parallels that of Sea-Land in the final decades of the twentieth century and the company is today a wholly owned subsidiary of an overseas steamship company.

Evergreen Marine

Although it will not soon challenge the Maersk Line for title of the world's largest operator of container ships, Taiwan-based Evergreen Marine Corporation provides an interesting glimpse into the growing phenomenon of Asian steamship companies serving major international trades.

TABLE 8.1. *APL Fleet: Vessels Enrolled in the Maritime Security Program (MSP), 1997*

Off. No.	Name	Hull dimensions	GRT	Place built (year)	TEUs
936100	*President Adams*	902 × 130 × 41	61,926	Kiel, West Germany (1988)	4,340
934737	*President Jackson*	902 × 130 × 41	61,926	Kiel, West Germany (1988)	4,340
931613	*President Kennedy*	902 × 130 × 41	61,926	Kiel, West Germany (1988)	4,340
931612	*President Polk*	902 × 130 × 41	61,926	Bremen, West Germany (1988)	4,340
928562	*President Truman*	899 × 130 × 41	61,926	Bremen, West Germany (1988)	4,340
1061420	*APL Singapore*	906 × 132 × 46	64,502	Okpo, South Korea (1995)	4,832
1061429	*APL Korea*	906 × 132 × 46	64,502	Okpo, South Korea (1995)	4,832
1061430	*APL Thailand*	842 × 131 × 46	64,502	Kiel, West Germany (1995)	4,832
1061426	*APL Philippines*	906 × 132 × 46	64,502	Okpo, South Korea (1996)	4,832

Like Neptune Orient Line, Evergreen is no old-line steamship company. It was established in 1968 by a Taiwanese man named Yung-Fa Chang, and the company adopted as its initial mission the operation of conventional break-bulk cargo ships between the Far East and the Middle East. In fact, Chang and Evergreen begin operations with a single break-bulk cargo ship that was acquired secondhand in Japan.[15]

The same mid-1970s energy crisis that spelled the demise of Sea-Land's SL-7s prompted Evergreen to move in a new direction. The company began to acquire a fleet of fully cellular container ships, vessels it used to help transport the growing volume of manufactured products flowing out of Asia and destined for both Europe and North America.

Initially, Evergreen's container fleet consisted of a handful of combination cargo/container vessels, plus a few bulk carriers that had been converted into containers ships. Then, in 1975, Evergreen took delivery of its first fully cellular newbuildings, a four-vessel fleet that established a number of important themes for the company.

Evergreen's first true container ships were built in Nagasaki, Japan, by the Hayashikana Ship Building and Engine Company and were each driven by an eight-cylinder Mitsui diesel engine. Not large by later standards—or even by 1975 standards, for that matter—each of the four vessels accommodated 600 TEUs and was 528 feet long. A mere two years after joining the fleet, though, Evergreen increased their length by forty-four feet and expanded their carrying capacity to 878 TEUs.

The four vessels were called *Ever Spring*, *Ever Summit*, *Ever Superb*, and *Ever Shine*, and identified by Evergreen as the company's S class. As the fleet expanded, all Evergreen vessels would feature names that began with the word "Ever," and all members of a given class would have "second names" that started with the same letter—the letter of that particular class. Evergreen also developed a four-character alpha designation for each of its vessels. *Ever Diamond*, for instance, is identified as DMND, *Ever Useful* is USFL, *Ever Reward* is REWD, and so forth.

Between 1977 and 1979, Evergreen added seven V-class container ships to its growing fleet, 613 feet long with a carrying capacity of 1,214 TEUs. The V class was quickly followed by the five-vessel L class, 665 feet long and 1,810 TEUs.

In addition to getting bigger, the Evergreen fleet was also getting more efficient. When the S class was lengthened, for example, various onboard functions were automated, and each lengthened S-class vessel was able to operate with an onboard crew of twenty-four, while it required a larger crew of thirty to work the same vessels when they were considerably smaller. The V-class vessels were designed to operate with a crew of twenty-two, while the slightly larger L-class vessels were able to go to sea with a complement of only sixteen. Stated differently, for each crew member aboard an S-class container ship when the ships were delivered, the vessel could accommodate 20 TEUs. Five years later with the new L class, that number had increased to 113 TEUs.[16]

At this point, Evergreen was still a newcomer in the container-ship industry, but its rate of growth was something that caught the attention of maritime people the world over. Evergreen remained a privately held company—its founder and chairman, Yung-Fa Chang, owned something like a 95-percent interest in the firm—and with a clever combination of financing from Japan and support from the government on Taiwan, Evergreen was able "to find a cargo base for its operations and a funding source for its investments," in the words of container-ship authority, R. F. Gilbney, who also believes that the company's success can be traced to its making use of "all the entrepreneurial advantages that come from shopping abroad and registering under flags of convenience."[17]

The container trade in which Evergreen was making its mark was primarily defined by a growing tide of exports out of Far Eastern ports—primarily to Europe, but also to North America. By the spring of 1982, Evergreen had deployed twenty-two container ships on three major liner routes, as displayed in table 8.2.

Two years later in 1984, Evergreen took a step whose boldness shook the container-ship industry to its roots. With its fleet continuing to grow

TABLE 8.2. *Evergreen Marine: May 1982*

No. of vessels deployed	Frequency of service	Two-way TEUs (annually)	Round trip	Trade
7	Every 10 days	112,984	70 days	Various cities in the Far East to the channel ports of Europe via the Suez Canal and return
8	Every 10 days	84,446	70 days	Transpacific from Osaka to both the West Coast and East Coast of the United States and return
7	Every 10 days	61,631	70 days	Various cities in the Far East to Mediterranean points via the Suez Canal, and return

and the newest of its container ships now able to carry in excess of 2,000 TEUs, the company inaugurated a weekly service that sailed around the world—*in both directions*. Evergreen inaugurated this new service at the same time another container-ship operator was preparing to do much the same thing. Malcom McLean, then the principal factotum of the United States Lines, had ordered twelve super-large containerships from South Korea's Daewoo Shipyard and beginning in 1986 deployed his new vessels on a parallel globe-circling route. McLean, though, would dispatch his vessels in a single direction, west-to-east. Evergreen was inaugurating around-the-world service at the same weekly frequency as McLean, but its ships sailed in both directions.

Evergreen's plan was greeted with a fair degree of skepticism within the industry. Peter Goldman, the editor of the newsletter *Seatrade Weekly*, wrote that because of Evergreen's rapid expansion, "a rate war is inevitable."[18] And while a rate war would indeed soon erupt, it was a conflict that saw Evergreen emerge victorious, with Malcom McLean's United States Lines being the defeated party.

In September 1984, two Evergreen container ships kicked off the new service. One vessel set sail from Hong Kong and steamed eastbound across the Pacific, the other left Tokyo and headed westward.[19] Twenty-four ships were deployed on the new service venture, twelve eastbound and twelve westbound, and the schedules the company proudly announced called for each of the twenty-four vessels to sail around the world in eighty days.

It is reasonable to speculate that Evergreen's publicists took a little poetic license in describing the company's new service. Dispatching vessels on an around-the-world itinerary every seven days, and protecting the schedules with a dozen ships, works out to voyages that are eighty-four days in duration, not eighty. An Evergreen container ship would have brought Phineas Fogg home four days late.

We saw in chapter 6 how the strategy behind McLean's "Daewoo dozen" proved to be seriously flawed. Evergreen's initiative, on the contrary, was far from flawed, and it was the Taiwan company's ability to undercut McLean with respect to price, while offering substantially faster delivery times than United States Lines' slow-speed Econships that, as much as any other single factor, propelled Evergreen into a position at or close to the top of the container-ship pyramid, a role it would not surrender for many years.[20]

A notable characteristic of Evergreen's fleet maintenance policies has been the continual replacement of older vessels with newer tonnage, often long before a vessel even remotely approaches obsolescence. An Evergreen subsidiary, Uniglory Marine, often takes title to older tonnage from the parent company, although Evergreen has been known to order newbuildings for Uniglory service, as well. In 2005, the newest members of the Evergreen fleet were seven post-Panamax vessels—the U class—built in the late 1990s and early 2000s that can each accommodate 5,652 TEUs—and maintain twenty-five knots.

In recent years, Evergreen has moved into slot-charter arrangements with other operators as a means of improving its own efficiency, but the company has been notably reluctant to enter the kind of strategic alliances that so many other operators have embraced, and it has eschewed conference participation, as well. Whether Evergreen remains wedded to such an independent policy in future years remains to be seen. This much is clear, though: A company that was over a full decade away from being formed on the day *Ideal X* inaugurated container-ship service in 1956 is today one of the dominant forces in the new industry that developed in the way of that famous T-2 tanker.

Matson Navigation Company

In chapter 4, we learned a little about container services that the Matson Navigation Company inaugurated on the Pacific in the years immediately after Malcom McLean pioneered the idea of transporting cargo in "sea-land" containers. Matson would remain a specialized operation concentrating on service between the West Coast and Hawaii, with modest ventures into more distant markets, and so not for its impact on the worldwide industry, but rather because Matson remains an active container-ship operator under the U.S. flag in the twenty-first century, its history is worthy of some attention.[21]

Matson neither owns nor operates any of the post-Panamax container ships that are currently being used by the major liner operators. In the year 2005, its fleet consisted of thirteen seagoing vessels, with two more under construction; most were fully cellular container ships, while two were configured to transport both containers and roll-on, roll-off (ro/ro) traffic, a capability that is useful on the Hawaiian run since thousands of automobiles must be transported between the mainland and the island state each year.

Like many other U.S. flag steamship companies, Matson's first venture involved carrying containers as deck cargo aboard otherwise conventional break-bulk freighters. When a C-3 cargo ship that worked for the company as *Hawaiian Merchant* steamed under the Golden Gate Bridge on August 31, 1958, bound for Honolulu, it marked Matson's entry into the new trade. Five additional C-3s were also configured to transport containers as deck cargo, and this was all part of the company's first phase of containerization. While *Hawaiian Merchant* carried a mere twenty containers on its initial voyage in August 1958, fully laden the company's C-3s could transport as many as seventy-five containers as deck cargo.[22]

A second phase would soon follow, though. Demand for container service quickly outpaced the capacity of the six C-3s and so the company advertised for bids to convert another C-3 into a fully cellular vessel. The successful bid was submitted by the Portland, Oregon, yard of the Willamette Iron and Steel Company; Gibbs and Cox, of New York, handled design work; and on April 29, 1960, *Hawaiian Citizen* emerged as Matson's first true container ship. The vessel could accommodate 408 of the distinctive twenty-four-foot containers that Matson had decided were just the right size for the distinctive characteristics of its service. (The narrow streets of Hawaii, plus the fact that the state of California permitted two twenty-four-foot containers to be hauled in tandem by a single tractor, were among the factors Matson considered.) *Hawaiian Citizen* lacked onboard gantry cranes, but otherwise much resembled such early converted freighters as Pan-Atlantic's *Gateway City* and her five sister ships.

What Matson's first cellular container ship quickly demonstrated was that the speed at which its containers could be loaded and unloaded meant that *Hawaiian Citizen* could manage twenty-two round trips between California and Honolulu over a year's time, while a conventional C-3 in break-bulk service—with or without containers as deck cargo—was hard-pressed to manage twelve.

Paralleling a policy that Malcom McLean followed at Sea-Land, Matson quickly turned to surplus C-4 troop transports for conversion into container ships. Two C-4s were reconfigured later in 1960 and emerged as *Hawaiian* and *Californian*. (The two had been lengthened in 1954 by a previous owner for use as ore carriers.) In 1965 and 1966, two more C-4s—built in 1944 by Sun Shipbuilding in Chester, Pennsylvania, as *Marine Dragon* and *Marine Devil*—were sent to Alabama Dry Dock and Shipbuilding, lengthened by 110 feet, and emerged as *Hawaiian Monarch* and *Hawaiian Queen*, respectively. These two were later renamed *Maunawili* and *Maunalei* when Matson adopted its current policy of using native Hawaiian terminology to identify its vessels—or at least most of its vessels.

Because there was an imbalance in the Hawaiian trade, Matson configured many of its new container ships to perform double duty. Outbound from the mainland, vessels could accommodate containers as well as a number of standard automobiles. On return trips, container capacity was reduced so certain of the container-carrying cells could be used to carry a bulk commodity—namely, raw sugar, an important product of the island state.

Matson followed these acquisitions with the company's first container-carrying newbuildings. One of these, *Hawaiian Princess*, was turned out in 1966 by Bethlehem Steel at Beaumont, Texas, and was a smaller vessel—338 feet long with a capacity of 212 twenty-four-foot containers—designed for interisland feeder service. Because of its modest size, *Hawaiian Princess* was a good candidate for diesel propulsion during an era when most deepwater tonnage built in the United States continued to be powered by steam turbine engines; the engine room of *Hawaiian Princess* was thus equipped with two twelve-cylinder Caterpillar diesels.

The other vessel acquired during this era, *Islander*, was also intended for feeder service. Built at Bethlehem's Beaumont facility in 1963, *Islander* was an unpowered barge—but featured a shiplike hull and was designed for later conversion into a powered vessel. Matson hoped to reach agreement with various maritime labor unions to operate a self-propelled *Islander* with a reduced crew. Such approval was not forthcoming, though, and *Islander* remained as built.

In the early 1970s, believing that ro/ro traffic would continue to be an important market in the specialized Hawaiian trade, Matson acquired, under the terms of a lease, a pair of newbuildings that had been under construction at Sun Shipbuilding in Chester, Pennsylvania. The new vessels were given names that had graced classic company passenger liners of earlier years, *Lurline* and *Matsonia*. Unlike typical Matson-designed container tonnage that featured a forward deckhouse, the deckhouse on each of the newcomers was positioned well toward the stern. Acquiring such ro/ro vessels proved to be something of a miscalculation on Matson's part, though. Container-carriers, not ro/ros, were what Matson truly needed, and *Matsonia* and *Lurline* were removed from service and laid up less than a decade after entering service.

The next additions to the Matson container fleet were turned out in 1970 by Bethlehem Steel's Sparrows Point yard in Baltimore. Originally called *Hawaiian Enterprise* and *Hawaiian Progress*, the two could each accommodate 988 twenty-four-foot containers, and in a concession to what had by then become an industry-wide standard, 94 forty-footers. Following Matson practice—and unlike most Sea-Land vessels—the newcomers featured a deckhouse and pilothouse forward, with a second house at the stern. The pair were renamed *Manukai* and *Manulani* in later years and were still in service in the early years of the twenty-first century.

Another unfortunate instance of corporate misdirection would soon follow. A pair of container ships that Matson had ordered from West Germany's Bremer Vulkan yard, vessels that were launched in the early 1970s as *H. P. Baldwin* and *S. T. Alexander*, were intended for a West Coast–Far East service where the Jones Act requirement of domestic construction did not apply. (Matson has long been a subsidiary of Alexander and Baldwin, Inc., and the two new vessels memorialized that company's founders.) Matson had inaugurated container service to the Far East in 1967 with a pair of C-3 cargo vessels, *Pacific Trader* and *Pacific Banker*, that were converted into container ships in Japan at Mitsubishi Heavy Industries in 1967 and could each accommodate 464 twenty-four-foot containers. Once delivered, the two newbuildings from West Germany were to have replaced the converted C-3s, allowing the smaller vessels to be deployed in feeder service.

While the vessels were under construction, though, Matson management decided that such an expansion into Far East trades was unwise, preferring to concentrate corporate energies—and resources—on steamship service between Hawaii and the mainland, as well as various nonmaritime investments throughout the island state. The two new vessels were sold to Sea-Land before seeing any Matson service, a transaction that was discussed in chapter 6.

Two companion vessels that were built to the same general specifications as the Bremer Vulkan pair and were intended to upgrade Matson's Hawaiian service were under construction at Bethlehem Steel's Baltimore yard at roughly the same time. Fully compliant with provisions of the Jones Act, these vessels were to have been called *Hawaiian Enterprise* and *Hawaiian Progress*, and would have been identified as the company's O-71H class. The corporate cutbacks that resulted in the company's abandoning its recently established Far East service also impacted plans for upgrading the West Coast–Hawaii trade, though, and Matson sold these two vessels to the Pacific Far East Line (PFEL) before their construction was completed. PFEL quickly fell upon difficult days, though, and, as we learned earlier, these two vessels also wound up on the Sea-Land roster.

So, while Matson began construction of four newbuildings in the late 1960s, not one of these vessels ever entered company service as retrenchment and cost control became the rule. The cutbacks of the early 1970s proved effective, though, and as business conditions improved later in the decade, Matson was again ready to expand its container-carrying fleet.

Kauai was turned out by the Chester, Pennsylvania, yard of Sun Shipbuilding in 1980, while a sister ship, *Maui*, had been built in Bath, Maine, at the famous Bath Iron Works two years earlier.[23] Each could accommodate 1,118 twenty-four-foot containers and 94 forty-footers; the two are generally identified as the company's 071 class. The two newcomers were each powered by a pair of Delaval steam turbine engines geared to a single shaft—evidence, once more, of the fact that the U.S. merchant marine took much longer to adopt diesel technology for deepwater vessels than did their European and Asian equivalents.

Matson's next effort to upgrade its fleet and replace some of its older container-carrying tonnage was to take *Matsonia* and *Lurline* out of layup, send the two ships to the Sun Shipbuilding yard, and lengthen each hull by 126.5 feet. This produced combination vessels that could each carry 1,175 twenty-four-foot containers, as well as 422 automobiles. The rebuilt *Matsonia* and *Lurline* also include the capability of carrying 3,200 tons of bulk molasses, another important Hawaiian product.[24]

In their new configuration, the two vessels exhibit a rather unusual profile. Container-carrying cells are located between bow and deckhouse. (The addition was spliced into the hull immediately forward of the deckhouse.) To the rear of the deckhouse are a few additional rows of container cells, while at the very stern is a multistory "parking garage" where automobiles are loaded and unloaded in ro/ro fashion and transported on multiple decks that are exposed to the elements on all four sides.

Other than the interisland feeder vessel *Hawaiian Princess* of 1967, it was not until 1992 that the company took delivery of its first deepwater container ship that was not steam-propelled. The *R. J. Pfeiffer* is a modest-sized container ship with a capacity of 2,019 TEUs—larger than earlier Matson tonnage, surely, but modest by world standards of the early 1990s. Matson gave consideration to building a much larger vessel, since its trade did not require transit of the Panama Canal. But the factor that proved decisive in selecting the vessel's size was avoiding the need—and the expense—of expanding terminal facilities in both California and Hawaii to accommodate a post-Panamax hull. (By the 1990s, incidentally, Matson had largely converted its operation to more standard-size forty-foot containers.) *R. J. Pfeiffer* also deviated from earlier Matson design and featured a deckhouse close to the stern, not immediate abaft the bow. National Steel and Ship Building, of San Diego, would build the new vessel, with technical and engineering support provided by Odense Steel Shipyard of Odense, Denmark—the shipbuilding subsidiary of Moeller-Maersk.

The new vessel's price tag, though, is stark testimony to the extraordinary cost differential that contracting with a United States shipyard entails. When Matson took title to the vessel from National Steel and Ship Building, it paid the yard $129.4 million for its new vessel. It would be over a decade before container ship costs at non-U.S. shipyards broke through the $100 million mark, and for such a price, a buyer could expect to receive a post-Panamax vessel with a container capacity in the range of 8,500 TEUs—four times the size of Matson's *R. J. Pfeiffer*. In 2005, a German company ordered a number of 1,800-TEU container ships from a South Korean yard that are not all that different in size from the *Pfeiffer*. Their cost was approximately $50 million per vessel.[25]

R. J. Pfeiffer was also a brief departure from Matson's preference for using native Hawaiian terminology as vessel names. Roland J. Pfeiffer was a longtime chairman of Matson Navigation, and a man who enjoyed an effective working relationship with Malcom McLean during the early days of the industry. Pfeiffer was also largely responsible for adopting as Matson policy the use of native terminology for company vessels—a policy from which *R. J. Pfeiffer*, the vessel, stands as a one-time exception.

As mentioned earlier in treating American President Lines (APL), several units in Matson's current fleet were acquired when APL became a subsidiary of Neptune Orient in 1997, redeployed its services, and had no further need for vessels that were Jones Act–compliant. Matson thus took title to six former APL hulls, including the three Avondale-built container ships that were APL's first diesels, as well as the three converted LASH-type vessels that APL had acquired from PFEL and converted into cellular container ships. The sales contract between the two companies included a provision that gave APL eastbound slot-charter rights aboard five of the vessels from such mid-Pacific points as Guam and Saipan for a period of ten years, and they continued to be shown—under their new Matson names—among the vessels APL advertised as constituting its fleet. Matson signaled its intention to reconfigure its operation when the agreement with APL expired in early 2006, resuming transpacific routes between the United States and Asia.

As the twentieth century was drawing to a close, the Matson fleet was again in need of upgrading as older vessels were nearing the end of their useful lives. How and where Matson acquired its newest tonnage is itself an interesting story.

With considerable public assistance, Norway's Kvaerner had established a subsidiary on the grounds of the former U.S. Navy Yard in Philadelphia, and hull number 001 of Kvaerner Philadelphia Shipyard was a 2,890-TEU container ship that was delivered to Matson in 2003 and called *Manuki*, memorializing an older Matson vessel. A sister ship, *Maunawili*, was delivered in 2004—Kvaerner Philadelphia's hull number 002—and the pair, while more costly than comparable tonnage built in Europe or Asia, was each slightly less expensive, and considerably larger, than *R. J. Pfeiffer* a decade earlier. The *Pfeiffer* bore a price tag of $129.4 million in 1992; the Kvaerner duo each cost Matson $110 million.[26]

Kvaerner Philadelphia took a gamble and decided to turn out two additional Jones Act–compliant container ships following the delivery of *Manuki* and *Maunawili* in the hope that a buyer for the two vessels would soon materialize. After some speculation that the pair would be acquired by Horizon Lines, they, too, were conveyed to Matson and christened *Manulani* and *Maunalei*. The cost of the two vessels was reported to be more than $315 million. Meanwhile, Kvaerner Philadelphia underwent corporate reorganization, and the facility that occupies the site of the Philadelphia Navy Yard is now known as Aker Philadelphia Shipyard.

In 1993, Matson decided to emulate an innovation that was gaining popularity in the container-ship industry—hatchcover-less vessels. The company sent 1,600-TEU container ships, the 1978-built *Maui* and the 1980-built *Kauai,* to the Todd Pacific Shipyard where the conversion was carried out, and the company has been quite satisfied with the experiment. *Maui* and *Kauai* thus became the first U.S.-flag vessels to operate as hatchcover-less container ships, and the first in the world to be converted to such a status, rather than so designed from the keel up. Like Sea-Land's SL-7, *Maui* and *Kauai* feature a forward deckhouse, a design that provides a degree of added protection against green water crashing over the bow and into the exposed holds of the ship.

One important mechanical addition that a hatchcover-less container ship requires is more robust pumping machinery to remove any water that might flood over the gunwales into the hold. In more conventional container ships, boxes are stowed below deck inside steel guides, and then stacked atop the hatch covers with twist-locks securing the containers to each other, and cable lashings holding them down besides. A hatchcover-less design features vertical steel cell guides extending up from the tank tops to as high as containers are to be carried. Thanks to the absence of hatch covers, a vessel's carrying capacity is marginally increased, but the more important productivity gains involve increased speed and greater flexibility in the loading and unloading of containers. While the experiment was deemed successful, Matson has yet to expand the concept to other units of its fleet.[27]

(Sea-Land's initial experience with hatchcover-less design did not involve one of its own vessels. In the mid-1990s, while under CSX ownership, the company chartered the 1992-built *Atlantic Lady* from OOST Atlantic to gain experience with the new design. Sea-Land did not specify hatchcover-less design in subsequent fleet additions, though.)

Although schedules and itineraries would change once Matson resumed its Far East service early in 2006, the company long concentrated most of its resources on its West Coast-to-Hawaii services, dispatching vessels westbound from Portland, Seattle, Oakland, and Los Angeles once a week from the two Puget Sound ports, twice a week from Los Angeles, and twice a week from Oakland. Matson also operates connecting services out of Honolulu to other points in Hawaii, as well as to such mid-Pacific destinations as Kwajalein, Johnston Island, Guam, Saipan, and Tinian. Some of these connecting services utilize tug-and-barge technology, while others involve cooperative arrangements with APL that were established in 1996 when Matson took title to a half-dozen ex-APL vessels.

The Matson Navigation Company has been in the container-ship business since the earliest days of the industry, remains under the U.S. flag, and thus merits attention. Table 8.3 displays statistical information about the various cellular container ships that Matson has operated over the years.

TABLE 8.3. *Matson Container Fleet*

Off. No.	Name	Hull dimensions	GRT	Place built (year)	Notes
Retired Vessels					
252149	*Hawaiian Citizen* a) *Sea Wren* b) USS *Goodhue* (APA 107)	492 × 70 × 30	7,901	San Francisco, Calif. (1944)	1
249239	*Californian* a) *Mount Greylock* c) *California*	633 × 72 × 39	13,636	Vancouver, Wash. (1946)	2
249353	*Hawaiian* a) *Mount Rogers* c) *Eileen*	633 × 72 × 39	13,113	Vancouver, Wash. (1946)	2
246343	*Hawaiian Queen* a) *Marine Devil* c) *Maunalei*	630 × 72 × 26	17,504	Chester, Pa. (1944)	2
246984	*Hawaiian Monarch* a) *Marine Dragon* c) *Maunawili*	630 × 72 × 26	17,807	Chester, Pa. (1944)	2
292810	*Islander*	312 × 50 × 25	3,403	Beaumont, Tex. (1963)	3
506694	*Hawaiian Princess* b) *Mauna Kea*	338 × 52 × 28	3,934	Beaumont, Tex. (1967)	4
524219	*Hawaiian Enterprise* b) *Manukai*	720 × 95 × —	23,786	Baltimore, Md. (1970)	5
528400	*Hawaiian Progress* b) *Manulani*	720 × 95 × —	23,786	Baltimore, Md. (1970)	5
248741	*Pacific Trader* a) *Sea Pegasus* b) *Hawaiian Planter* d) *Oriental Enterprise*	544 × 70 × 31	14,246	Pascagoula, Miss. (1945)	1, 6

TABLE 8.3. *(Continued)*

Off. No.	Name	Hull dimensions	GRT	Place built (year)	Notes
247826	*Pacific Banker* a) *Marguerite Le Hand* b) *Hawaiian Craftsman*	544 × 70 × 31	14,161	Pascagoula, Miss. (1945)	1, 6
Container Fleet: 2005					
530138	*Chief Gadao* a) *Golden Bear* b) *President Grant*	788 × 100 × 35	30,877	Avondale, La. (1971)	7
530140	*Ewa* a) *Japan Bear* b) *President Tyler*	788 × 100 × 41	26,746	Avondale, La. (1971)	7
621042	*Kauai*	720 × 95 × 34	22,626	Chester, Pa. (1980)	8
530137	*Lihue* a) *Thomas E. Cuffe* b) *President Hoover*	790 × 100 × 35	26,746	Avondale, La. (1971)	7
549900	*Lurline*	826 × 105 × 31	24,901	Chester, Pa. (1973)	9
653424	*Mahimahi* a) *President Washington*	860 × 106 × 35	40,627	Avondale, La. (1983)	10
651627	*Manoa* a) *President Lincoln*	860 × 106 × 35	37,811	Avondale, La. (1982)	11
1141163	*Manukai*	712 × 106 × 36	32,575	Philadelphia, Pa. (2003)	12
1153166	*Maunawili*	712 × 106 × 36	32,575	Philadelphia, Pa. (2004)	12

TABLE 8.3. *(Continued)*

Off. No.	Name	Hull dimensions	GRT	Place built (year)	Notes
1168529	*Maunalani*	712 × 106 × 36	32,575	Philadelphia, Pa. (2005)	12
553090	*Matsonia*	760 × 106 × 33	19,301	Chester, Pa. (1973)	9
591709	*Maui*	719 × 95 × 34	24,544	Bath, Maine (1978)	13
655397	*Mokihana* a) *President Monroe*	860 × 106 × 35	37,811	Avondale, La. (1983)	11
979814	*R.J. Pfeiffer*	713 × 106 × 38	31,573	San Diego, Calif. (1992)	14
n/a	*Maunalei*	712 × 106 × 36	32,575	Philadelphia, Pa. (2006?)	12

Notes

Vessels are excluded that carried containers solely as deck cargo. Unless noted otherwise, all vessels are steam-powered.

1. C-3 cargo ship converted to cellular container ship, 1960, with capacity of 408 twenty-four-foot containers; powered by General Electric steam turbine.
2. Converted C-4 cargo or troopship.
3. Unpowered barge built for possible conversion to self-propelled vessel.
4. Matson's first container-carrying newbuilding, designed for interisland feeder service.
5. Built by Bethlehem Steel; powered by Bremer Vulkan steam turbine engines; carrying capacity of 988 twenty-four-foot and 94 forty-foot containers.
6. Lengthened by 53 feet and converted into cellular container ship by Mitsubishi Heavy Industries, Kobe, Japan, 1967.
7. Built as LASH-type vessel; converted to cellular container ship with capacity of approximately 2,000 TEUs; powered by De Laval steam turbine engine. Acquired from American President Lines, 1996.
8. Fully cellular container ship with capacity of 1,626 TEUs; powered by De Laval steam turbine engine and equipped with bow thruster.
9. Combination cellular container and ro/ro, with stern ramp; capacity of approximately 1,500 TEUs; powered by GE steam turbine engine, equipped with bow thruster.

10. Fully cellular container ship with capacity of 3,027 TEUs; powered by twelve-cylinder Sulzer diesel, equipped with bow thruster. Acquired from American President Lines, 1996.
11. Fully cellular container ship with capacity of 3,027 TEUs; powered by twelve-cylinder Allis Chalmers diesel, equipped with bow thruster. Acquired from American President Lines, 1996.
12. Fully cellular container ship with capacity of 2,890 TEUs; powered by eight-cylinder B&W diesel, equipped with bow thruster.
13. Fully cellular container ship with capacity of 1,635 TEUs; powered by De Laval steam turbine, equipped with bow thruster.
14. Fully cellular container ship with capacity of 2,019 TEUs; powered by eight-cylinder B&W diesel, equipped with bow thruster.

9 THE PRESENT—AND THE FUTURE

In the preceding chapters, I have attempted to tell the story of the first half-century of the container-ship industry by focusing on the rise and fall, after a fashion, of Sea-Land Service, with some incidental treatment of other lines and companies presented to provide context and contrast. Because it is impossible to bring the story of an active and dynamic industry to any kind of logical or definitive conclusion—as this is written in the early years of the twenty-first century, the container-ship industry is about as active and dynamic as any maritime sector ever has been, from the days of the Phoenicians to the present—let us substitute for a true "final chapter" of our story a brief look at some statistical tables that help define the scope of contemporary container-ship operations, as well as some admittedly subjective reflections on a variety of considerations that may impact the industry in years to come.

Statistics

A useful statistic for understanding the size and scope of the contemporary container-ship industry is the relative traffic that the major lines currently transport. The first table displays the number of containers, expressed in trailer equivalent units (TEUs), that the "top ten" container companies imported and exported from U.S. ports in the year 2003, the most recent full year for which statistics were available at this writing. Excluded from this tabulation is any and all traffic between U.S. ports—that is, Jones Act services—as well as containerized transport between and among countries other than the United States.[1]

The top ten companies carried slightly more than half of both import and export containers, while the number of containers exported from the United States was slightly more than half the number of containers that were imported. (Acres upon acres of empty containers are typically stored adjacent to major U.S. seaports—available for future exports or, more probably, waiting to be shipped overseas empty. Because they are empty, they will sometimes be stacked ten and twelve high—both to save space and to forestall theft.)

This imbalance in container traffic is not necessarily a precise indicator of foreign trade in general. The value, for example, of a single Boeing 777 aircraft exported to a foreign country equals thousands of inbound containers filled with teddy bears and garden tools. The fact remains that in terms of the basic cargo that is carried in seagoing containers, the United States imports almost twice as much as it exports.

Another important fact that table 9.1 displays is the extraordinary position that Maersk-Sealand holds with respect to trade with the United States. The Copenhagen-based company handled twice as many containers in 2003 as Hanjin Shipping Company, the line that was ranked second, and 12.9 percent of all containerized traffic moving to and from the United States. As the merger of Maersk-Sealand and P&O Nedlloyd announced in early 2005 moves forward, one can envision a day when the successor of Sea-Land Service will handle as many containers to and from the United States as its next three competitors combined. (Preliminary data for the first six months of the year 2004 reveal no change in the rank ordering of the world's container-ship operators as measured by traffic to and from the United States.)

Table 9.2 presents parallel information about the relative standing of the world's major container-ship operators by ranking companies not in terms of traffic in and out of U.S. ports, but rather in terms of their overall TEU capacity. This data represents a one-time "snapshot" of fleet capacity, and is not a measure of actual performance.[2]

CMA-CGM and K Line are among the top ten carriers when ranked by overall TEU capacity, but are not so ranked in terms of containerized cargo imported to and exported from the United States. OOCL and Hapag-Lloyd, on the other hand, rank seventh and tenth in terms of containerized cargo to and from the United States, but fail to make the top ten in terms of overall TEU capacity. Maersk-Sealand is first—and so by substantial margins—on both lists, while those ranked immediately below

TABLE 9.1. *Import and Export Containerized Cargo, 2003: Top 10 Steamship Companies*

Steamship Line	Containers Imported (000s of TEUs)	Containers Exported (000s of TEUs)	Total Containers (000s of TEUs)
Maersk-Sealand	1,802	940	2,742
Hanjin Shipping Co.	953	442	1,395
Evergreen Marine	966	405	1,371
APL, Ltd.	934	408	1,342
Mediterranean Shipping Co. (MSC)	609	402	1,011
P&O Nedlloyd	616	328	943
Orient Overseas Container Line (OOCL)	595	301	896
China Ocean Shipping Co. (COSCO)	594	251	845
Nippon Yusen Kaisha Line (NYK)	594	249	843
Hapag-Lloyd	494	325	819
Total: top 10 lines	8,157	4,051	12,207
Grand total: all lines	13,899	7,389	21,289
Top 10 lines as % of grand total	58.6	54.8	57

Note

Steamship lines are rank ordered on the basis of *total* containers, both import and export. Two lines not identified in the table carried more import containers than the ten lines shown: Hyundai Merchant Marine (536,000) and K Line (532,000).

Maersk-Sealand tend to place somewhat differently on the two tables. Mediterranean Shipping Company (MSC), a growing presence in the contemporary passenger cruise business, is second to Maersk-Sealand in overall TEU capacity, although it only ranks fifth when measured by traffic in and out of U.S. ports.

Another statistic that helps paint a picture of the contemporary container-ship industry is the relative traffic that moves through various

TABLE 9.2. *Carrying Capacity in TEUs, 2004: Top 10 Steamship Lines*

Steamship Line	Capacity (000s of TEUs)
Maersk-Sealand	920,051
Mediterranean Shipping Co. (MSC)	536,040
Evergreen Marine	454,843
Royal P&O Nedlloyd	415,817
CMA-CGM	319,180
Hanjin Shipping Co.	284,937
APL	277,684
Nippon Yusen Kaisha Line (NYK)	251,322
China Ocean Shipping Co. (COSCO)	236,399
K Line	203,753
Total: top 10 lines	3,900,026
Total: all lines	7,485,000
Top 10 lines as % of grand total	52.1

United States ports; such information is displayed in table 9.3. As with table 9.1, the data displayed reflect only containerized commerce between the U.S. and foreign ports.

The ratio of imports to exports is consistent with information in the first table, while the top ten U.S. ports dominated foreign trade by handling 86.1 percent of import containers, 78.5 percent of all exports. The Port of New York is clearly the most important on the East Coast. The second-ranked Atlantic port, Charleston, South Carolina, handles less than half as much traffic as New York. On the other hand, if one combines the three southern ports along the East Coast—Norfolk, Charleston, and Savannah—their cumulative traffic is roughly equal to that of New York. The southern trio imported 1,949,000 TEUs between them, as against New York's 1,965,000, and exported 1,518,000 TEUs, considerably more than New York's 838,000.

These numbers reflect several important facts. Wal-Mart, the largest single transpacific shipper of containerized cargo, routes considerable traffic through the port of Savannah to its inland distribution centers, while such other retail giants as Home Depot and Best Buy also make heavy use of southern ports. (Wal-Mart is so dominant a presence in the container-ship industry that the firm is often rumored to be on the verge of establishing its own container-ship line!) In addition, the fact that containers exported from the three southern ports stand as a robust 77.9 percent of containers imported is indicative of the fact that many kinds of manufacturing—needle trades, for example—still form an important part of the economies of southern states, while such activities are less common than they once were in areas adjacent to the port of New York, where export containers are a mere 29.2 percent of imports.[3]

The most dramatic data revealed in table 9.3, though, is the extraordinary level of traffic that moves through ports in southern California. Statistically, Long Beach and Los Angeles/San Pedro are listed as separate ports. A case could be made for regarding the two as one; they are adjacent to each other and are inland of a common breakwater. (In the port of New York, container terminals at Howland Hook and Port Elizabeth are in different states, yet are considered part of a single port.) In any event, between them, Los Angeles and Long Beach account for a massive

TABLE 9.3. *Import and Export Containerized Cargo, 2004: Top 10 U.S. Ports*

U.S. Port	Containers imported (000s of TEUs)	Containers exported (000s of TEUs)	Total containers (000s of TEUs)
Los Angeles, Calif. (San Pedro)	3,846	1,029	4,874
Long Beach, Calif.	2,951	812	3,764
New York, N.Y. (incl. New Jersey)	2,239	924	3,163
Charleston, S.C.	837	584	1,421
Savannah, Ga.	665	625	1,290
Norfolk, Va.	717	488	1,206
Oakland, Calif.	613	584	1,197
Houston, Tex.	532	565	1,098
Seattle, Wash.	681	368	1,049
Tacoma, Wash.	601	339	941
Total: top 10 ports	13,688	5,753	20,003
Total: all U.S. ports	15,805	8,045	23,851
Top 10 ports as % of grand total	86.6	71.5	83.9

36.5 percent of all containerized traffic moving in and out of the United States. (Popular press accounts typically round this number up to 40 percent.) By contrast, New York's share is a more modest 13.2 percent. Between them, the two southern California ports occupy a land area that is greater than Manhattan Island below 34th Street, and most studies predict that cargo volume through Los Angeles and Long Beach will triple over the next quarter-century.

Within the container-ship industry, there are some concerns about how Los Angeles/Long Beach will function in the years ahead. Both ports will continue to see annual traffic increases, and transpacific trade will likewise grow. Despite the popularity of land-bridge railroad services out of the southern California ports, it is entirely possible that in future years shippers will choose to specify an all-water route from the Far East to the East Coast. Despite the investment of many millions of public dollars in improved rail freight connections to and from Long Beach and Los Angeles—a massive project called the Alameda Corridor was recently completed that eliminated grade crossings between the twin ports and inland main line railroad connections in an effort to improve overall operations—landside congestion remains a serious problem in Southern California and some commentators believe that shippers could well decide that a dependable but slower East Coast arrival is better than a nominally faster one that entails too many delivery risks. In fact, given congestion in Long Beach and Los Angeles, a container ship can often deliver cargo from China to, say, Savannah, Georgia, faster by transiting the Panama Canal than by its relying on the Union Pacific Railroad to move containers out of southern California.

Another factor that could affect the growth of container traffic through Los Angeles and Long Beach is increasing concern among the California citizenry about air pollution. While the state has imposed very strict controls on emissions from conventional automotive traffic, railroad locomotives, container ships, and, rather interestingly, the hundreds of largely older trucks that move containers around the port area—and have no need either to venture onto state or local roadways or carry state license plates—are largely beyond the reach of the state's otherwise strict environmental standards.[4] (An oft-heard refrain throughout the container-ship industry is this: "Old trailer trucks never die—they're just converted into rigs for moving containers around seaports.")

Of course, something that will militate in favor of the dominance of Los Angeles and Long Beach is the continued construction of more and more post-Panamax container ships. Such vessels are too large to transit the Panama Canal, and thus cannot be used in direct transpacific trade between the Far East and the East Coast. As container ships get even larger—super post-Panamax, and even post-Suezmax, are terms that are sometimes used—such tonnage will necessarily find itself using West Coast ports at the end of transpacific voyages.

To understand the growth of containerized traffic in recent years, table 9.4 displays seven years of serial data for import containers into the same ten seaports depicted in table 9.3. The relative standing of the ten seaports one to another is subject to minor change over the seven-year interval, but in none of the seven years did any city not listed here earn designation among the top ten. (Among U.S. cities that typically ranked

TABLE 9.4. *Import Containerized Cargo, 1998–2004: Top 10 U.S. Ports*

U.S. Port	1998	1999	2000	2001	2002	2003	2004	% increase, 1998–2004
Los Angeles, Calif. (San Pedro)	1,673	1,912	2,429	2,614	3,194	3,642	3,846	129.8
Long Beach, Calif.	2,049	2,264	2,401	2,376	2,467	2,468	2,951	44
New York, N.Y. (incl. New Jersey)	1,213	1,362	1,512	1,588	1,879	1,965	2,239	84.6
Charleston, S.C.	482	554	618	612	676	721	837	73.7
Savannah, Ga.	271	317	382	431	561	595	665	145.5
Norfolk, Va.	365	409	438	454	551	633	717	96.4
Oakland, Calif.	374	387	419	419	482	517	613	64
Houston, Tex.	279	336	367	381	420	450	532	90.7
Seattle, Wash.	561	582	588	500	512	486	681	21.4
Tacoma, Wash.	278	327	391	356	491	594	601	116.2
Total: 10 ports	7,545	8,450	9,545	9,840	11,233	12,071	13,688	81.4
Total: all U.S. ports	8,919	9,960	11,087	11,268	12,916	13,899	15,805	77.2
Top 10 ports as % of grand total	84.6	84.8	86.1	87.3	87.0	86.8	86.6	———

just below the top ten are Miami and Port Everglades, Florida; Baltimore, Maryland; and Wilmington, Delaware.)

The extraordinary growth of containerized traffic in recent years is underscored by the fact that three of the ten cities displayed in table 9.4 experienced increases in excess of 100 percent over the short span of six years, while the only two ports with growth rates of less than 50 percent are both located relatively close to one of the ports whose increase must be recorded with three digits—Seattle and Tacoma, Long Beach and Los Angeles.

Another important statistic for understanding the dynamics of the international container-ship industry is the relative standing of the major trading partners of the United States. Once again, the information displayed in table 9.5 describes only cargo moving between the United States and foreign ports aboard container ships, not foreign trade in general.

The dominance of China (for statistical purposes, Hong Kong continues to be listed separately from it) is the most compelling fact displayed in the following table. China accounts for a robust 30.8 percent of all containerized traffic moving into the United States, with Japan in second place at 10.4 percent. Japan is also the only country among the top ten whose containerized imports from the United States exceed its exports destined for U.S. markets.

Perhaps the most interesting fact that emerges from table 9.5, though, is this: Among the top ten partners of the United States as measured by containerized trade, only one country, Germany, represents traditional traffic across the North Atlantic. One country from South America, Brazil, is one of the top ten, but all the other countries are located in Asia. This is not to say that some traffic between the United States and, say, India does not travel across the North Atlantic Ocean, but in terms of trade between East Coast points in North America and the traditional channel ports of Europe, only traffic to and from Germany keeps this venerable tradition alive. (Looking farther down the list beyond the top ten countries displayed here, one would find the United Kingdom ranked eleventh, Belgium and Luxembourg combined in the twelfth spot, the Netherlands at number fourteen, and France in eighteenth place.)

In 1972, when Malcom McLean put his magnificent SL-7s into service for Sea-Land, it was noteworthy that six of the eight new vessels were deployed in transpacific trade, while only two worked the North Atlantic. As has so often proven to be the case, McLean knew which way the wind was blowing.

TABLE 9.5. *Import and Export Containerized Cargo, 2004: Top 10 U.S. Trading Partners*

Trading partner	Containers exported to U.S. (000s of TEUs)	Containers imported from U.S. (000s of TEUs)	Total containers (000s of TEUs)
China	5,960	1,390	7,351
Japan	836	771	1,608
Hong Kong	313	1,138	1,452
South Korea	515	449	963
Taiwan	588	340	929
Germany	482	190	673
Brazil	476	177	654
Italy	480	132	612
Thailand	410	115	526
India	299	148	447
Total: top 10 countries	10,359	4,850	15,215
Total: all countries	15,805	8,045	23,850
Top 10 countries as % of grand total	65.5	60.3	63.7

The evolution of the container-ship industry during its first half-century has been nothing less than remarkable. From a pair of converted T-2 tankers, *Ideal X* and *Almena*, sailing between New York and Houston for the Pan-Atlantic Steamship Company in the spring of 1956—vessels that between them could carry a grand total of 116 thirty-three-foot containers—the world container-carrying fleet would grow in the mere span of five decades into one whose overall capacity would be in excess of 7.5 million TEUs.

In chapter 5, I calculated that, circa 1975, Sea-Land's containers, if placed end to end, would stretch from midtown Manhattan to the suburbs of Cleveland, Ohio. Three decades later, the containers required to exhaust the capacity of the world's deepwater container fleet would more than encircle the earth at the equator.

Reflections

Let us now reflect, albeit briefly, on a number of considerations that may help explain the remarkable half-century of growth the container-ship industry has experienced, and that may also point the way to what the future holds for this altogether remarkable maritime sector.

1. Globalization

The phenomenal growth of the container-ship industry has not occurred independent of other important economic and geopolitical trends. Whether container ships facilitated the shift of manufacturing from North America to Asia or were merely available to serve its inevitable needs is a question that need not be answered—and possibly can never be answered. The overwhelming fact remains, though, that the endless chain of massive container ships moving eastward across the Pacific Ocean day after day—and the explosive growth of the twin ports of Long Beach and Los Angeles/San Pedro to accommodate the inbound cargo these vessels are bringing to North America—represent as profound a change in world economics as has been experienced since the early days of the Industrial Revolution. Entire categories of retail products whose manufacture once provided jobs for thousands upon thousands of wage earners and breadwinners in cities large and small throughout the United States—from children's clothing to portable radios, from small appliances to lawnmowers, from baseball gloves to bicycles—are now produced overseas and shipped to the United States in vessels that sail for Maersk, Evergreen Marine, NOL + APL, and dozens of other lines.

Globalization, however defined, was certainly a factor in the demise of the Soviet Union. To the extent that the end of the Cold War both produced and was produced by freer trade between East and West, one could advance a plausible argument that the seagoing assets most responsible for the breakup of the Soviet monolith were not so much aircraft carriers and battleships as they were container ships gracefully plying their commercial trades.

Globalization, of course, has profound social and political implications and is a topic that can excite noble passions. It is difficult to imagine any situation, though, where the fundamental dynamics associated with the phenomenon of globalization—open markets, free trade, international corporations whose manufacturing facilities are continually shifted to countries where the costs of production are better able to be constrained—will not continue to prevail. To the extent that they do prevail, fleets of “box boats” will continue to be necessary to keep the process going and move product to market.

2. *Vessels*

With respect to container-carrying vessels, continued growth in carrying capacity appears inevitable. As we have seen in previous chapters, significant economies of scale can be realized by building larger and larger container-carrying vessels.

At this writing in late 2005, the largest container ship in service is a vessel called *Colombo Express*, rated at a difficult-to-imagine 8,749 TEUs and the first of a fleet of eight identical vessels ordered by Hapag-Lloyd from Hyundai Heavy Industries, of South Korea. *Colombo Express*, christened in Singapore in April 2005 and immediately put to work on a fifty-six-day circuit between the Far East and Europe, measures 1,099 feet from stem to stern, features a beam of 141 feet, and is flagged in Germany. To offer a comparison with a fleet of vessels discussed in some detail in previous chapters, *Colombo Express* has a carrying capacity that is more than double any of the twelve Econships that Malcom McLean acquired in 1984 for United States Lines service and that were the largest container ships of all time when they were built. (Each Econship accommodated 4,258 TEUs, and when *American New York* entered service in the summer of 1984, it wrested the designation of world’s largest container ship from Hapag-Lloyd’s *Hamburg Express*, a fleet predecessor of the current title holder.)

Something that can be said with certainty, though, is that *Colombo Express* will not retain its crown for long. Mediterranean Shipping Company (MSC), a Swiss company that has quietly catapulted itself into second place among world container-ship operators, is about to take delivery of a pair of newbuildings that will be the first to break the 9000-TEU mark. Built in South Korea by Samsung Heavy Industries, *MSC Pamela* and *MSC Susanna* are each 1,105 feet long, feature a carrying capacity of 9,200 TEUs, and will likely enter service in late 2005 or early 2006. But even these will not long reign. A state-owned company called China Shipping Container Line (CSCL) will shortly take delivery of an eight-vessel fleet of gigantic container carriers that will each be rated at 9,600 TEUs. Even larger vessels will surely follow.

While it may be difficult to speculate about exactly what dimensions future container ships will actually realize, there do appear to be finite limits that will constrain naval architects and container-ship operators.

Unlike ultra-large oil tankers of 500,000 deadweight tons and more, for example, which are able to transfer product to smaller vessels at offshore locations and avoid entering traditional harbors like New York, container ships must respect the limitations of the world's important ports. Such limitations affect draft, length, and beam and are inherent in the configuration of channels and berths. While some infrastructure expansion can be undertaken in this regard—New York has recently dredged the Kill van Kull and Newark Bay to a fifty-foot depth, for instance—there would appear to be limits associated with container-ship size that the industry is rather close to realizing. It would certainly seem that the once-unimaginable capacity of 10,000 TEUs will soon be eclipsed, but precisely how far beyond this mark future vessels might go remains to be seen.

A 1999 study published at the University of Delft, in the Netherlands, explored the matter of container-ship size from the perspective of the largest container-carrying hull that state-of-the art developments in metallurgy and engine performance could accommodate.[5] The resultant design has been called Malacca-max, a hull that, while big, is not so large as to prohibit transiting the Straits of Malacca, a critical Asian waterway to the north of Singapore that separates Indonesia from the Malaysian peninsula. This Malacca-max design effort postulated a vessel that could accommodate 18,154 TEUs in a hull 1,300 feet long, with a draft of almost 70 feet and a beam of 196 feet; dual engines driving twin screws would propel the gigantic vessel at a speed of twenty-five knots.

Of the values cited in this Malacca-max design, the ones that would prohibit such vessels from using most world ports today are the proposed 70-foot draft, as well as the 196-foot beam. Such a massive beam raises problems with respect to the "reach" of shore-side gantry cranes necessary for the loading and unloading of containers. When Maersk Line put the *Regina Maersk* in service in 1996, it was not only the first container ship to break the 6,000-TEU mark, it was also the first to carry containers nineteen across, and major ports had to deploy a new generation of gantry cranes to service the giant vessel and its several fleetmates. The proposed Malacca-max design would require gantry cranes with the ability to "reach" containers that would be stored thirty or so across.

Coincident with this theoretical study conducted under the auspices of the University of Delft, *Lloyd's Register* addressed the same general question, but from the perspective of what might be the largest container ship that present and likely future developments in port and shore-side facilities at major world harbors could accommodate, a set of constraints that the Netherlands study did not feel bound to observe.[6]

The *Lloyd's Register* study, conducted in conjunction with Ocean Shipping Consultants, Ltd., developed a design that has generally been called the ultra-large container ship (ULCC). Such a ULCC would accommodate 12,500 TEUs and could maintain twenty-five-knot speed, but unlike the Malacca-max design, its sixty-foot draft would permit navigation into a number of important world harbors—either in their current or likely future configuration.

Theoreticians will continue to explore ways of building bigger and bigger container ships. One concept that is not new—Malcom McLean adopted such a strategy for his fast SL-7s in the early 1970s—would be to run ULCCs, or perhaps even Malacca-max, container ships on restricted routes between a handful of major, deepwater transfer ports, and utilize smaller vessels for service between such hubs and other more conventional ports. As envisioned by some in the United Kingdom, the famous Royal Navy anchorage off northern Scotland at Scapa Flow could become one such transfer port, giving new meaning to the biblical injunction about swords and ploughshares.

In any event, in early 2005, the world container-ship fleet consisted of 3,478 vessels with an aggregate capacity of 7,708,524 TEUs. Rather remarkably, 62 of these vessels featured carrying capacity in excess of 7,500 TEUs. Stated differently, a mere 1.8 percent of the world fleet accounted for 6.5 percent of total capacity. Looking to the future by examining shipyard order books reveals the even more remarkable fact that, in mid-2005, 1,219 new container ships were under design or construction at various world shipyards, vessels with an overall capacity of 4,529,625 TEUs. In percentage terms, in the summer of 2005, steamship companies were preparing to acquire new container-carrying tonnage whose capacity equaled 58.8 percent of the then-active fleet, with 33.1 percent of this new capacity—or 171 hulls—in the 7,500 or above TEU range.[7]

Some of these new vessels will, of course, replace older hulls and so the pending increase in the overall size of the world fleet cannot be estimated by adding the new vessels to the sum of existing ones. But since the industry has been experiencing year-to-year growth in recent years of approximately 15 percent, it seems safe to predict that the newbuildings on order in 2005 will allow such growth to continue.

Despite steady increases in container-ship size, the industry will continue to require fleets of smaller vessels to operate various feeder services. Many of these smaller hulls continue to include hardware that was a major feature of such older container ships as Pan Atlantic's *Gateway City* of 1957, namely onboard cranes for hoisting containers on and off ship. Container ships that are equipped with onboard cranes for loading and unloading are typically referred to as "geared," while those that are not—and this is the great bulk of the industry's liner fleet—are identified as gearless.

Size is not the only quantitative vessel category where the industry can expect to experience change. There has even been some movement in the way of designing super-fast container ships, vessels that could maintain forty-knot speed at sea—perhaps more—and fault the rather dogmatic assertions advanced in chapter 5 that Sea-Land's SL-7 of 1972 will forever retain the title of the world's fastest container ship.

A Philadelphia-based company called FastShip, Inc., is moving ahead with such a business plan and hopes to have a fleet of three water-jet propelled vessels—driven by Rolls-Royce gas turbine engines—in service by the year 2008. The initial trade the new vessels are expected to work will be a transatlantic route between Philadelphia, Pennsylvania, and Cherbourg, France. FastShip will not challenge any records for carrying capacity, as the vessels the company plans to build at a shipyard in Europe will accommodate in the range of 1,400 TEUs. (The speedsters will also be able to handle a mix of containers and ro/ro cargo.) At 870 feet long, though, the sleek-looking new vessels will be substantial oceangoing tonnage, not high-speed novelties. FastShip sees its proposed service as providing a useful compromise between the high cost of air freight and the relatively slow speed of conventional container ships in transatlantic service, where much high-value cargo is transported.[8]

Another niche market that a container-ship company called Ivaran Lines recently tried to enter recalls the days after World War II, when Pan Atlantic's C-2 cargo ships carried a handful of passengers in addition to basic cargo. In the late 1980s Ivaran took delivery of a 19,500-GRT container ship with a larger-than-normal deckhouse and that bore the name *Americana*. Ivaran's specialty was container service between the United States and a number of South American ports, but what made *Americana* unique was the vessel's ability to carry a hundred passengers in deluxe stateroom accommodations. Alas, Ivaran's venture in carrying passengers proved to be less than successful, and the company no longer markets such services.

In summary, the maritime revolution that Malcom McLean began fifty years ago on April 26, 1956, shows no sign of losing any momentum.

3. Safety and Security

Another family of considerations that will help shape the industry as it enters its second half-century are the dual matters of safety and security. As a general matter, container ships have maintained excellent records in the way of safety at sea. While container ships have been involved in their fair share of groundings and fires and collisions over the years, there are no container-ship names that have earned the notoriety one associates with, say, *Titanic* and *Andrea Doria*, or *Exxon Valdez* and *Torrey Canyon*.

Heavy seas have been known to dislodge containers from their above-deck securement devices, and oceangoing yachts have experienced difficulty, from time to time, when such containers fail to sink. Some recent incidents involving contemporary container ships include the following:

In November 1998, the 5,316-TEU *APL China* was on a transpacific voyage bound for Seattle when the vessel ran smack into Typhoon Babs. Several containers were lost, and many that remained on deck were badly damaged. But *APL China* survived the heavy weather with modest damage.

An incident that merited more than passing interest in the popular press happened on August 23, 1999, in the English Channel. Norwegian Cruise Line's *Norwegian Dream* was en route to Dover at the end of a Baltic cruise when it collided with Evergreen Marine's 1997-built *Ever Decent*, bound for Zeebrugge. When the cruise liner was escorted into Dover, several Evergreen containers were still attached to her foredeck, while a fire that broke out aboard the container ship was regarded as especially hazardous, since among *Ever Decent*'s containerized cargo were cylinders of cyanide.

In November 2002, the recently built *Hanjin Pennsylvania* was eighty-eight miles off Sri Lanka, bound for Europe from Singapore via the Suez Canal. A fire broke out in one of the vessel's holds, and among the cargo that proved to be especially vulnerable were several containers filled with fireworks. Two crewmembers lost their lives, and *Hanjin Pennsylvania* was at first thought to be a total loss. The vessel was later rebuilt—an expense that almost equaled its initial construction cost—and returned to sea some months later as *Norasia Bellatrix*.

In November 1997, Mediterranean Shipping Company's *MSC Carla* was en route to Boston from Le Havre when the vessel broke in two in heavy seas off Portugal. The bow section sank, while the stern was salvaged and towed to the Azores.

Finally, a Sea-Land D-9 class vessel, *Sealand Express,* ran aground near Cape Town, South Africa, on August 19, 2003. (The fact that the vessel was called *Sealand Express*, and not *Sea-Land Express*, signifies that the accident happened after the company had been acquired by Moeller-Maersk.) *Sealand Express* was eventually refloated and returned to service, but removal of its cargo proved to be especially challenging.

But if the industry's record with respect to basic safety at sea has been rather good, new concerns over matters of security have been raised in the light of threats posed by the specter of world terrorism. The very same feature that quickly became such an important selling point during the industry's early years of growth—the ability to dispatch a sealed container from origin to destination with no intermediate handling of the cargo it contains—can quickly become a terrible liability if a sealed container is used to deliver a lethal cargo.

The sheer volume of containers imported into the United States each year—in excess of 15,000 TEUs in 2004, for instance, a figure that is typically understated in popular press accounts as "seven million containers a year"—certainly suggests vulnerability. There have been several well-documented instances of seagoing containers being used to transport illicit human cargo—often with fatal results—and speculation has been continuous about the vulnerabilities associated with the flow of ordinary commerce as containerized cargo.

New systems of surveillance are being developed and deployed at world seaports, and perhaps more importantly, better and more detailed documentation of inbound cargo before its arrival at U.S. seaports are all reasonable steps to take in the light of the horror that world terrorism represents.

The fact remains, however, that some of the very same factors and efficiencies that were responsible for the growth of containerization over the past fifty years can quickly become liabilities in a world where some people believe that flying airplanes into skyscrapers is an acceptable form of political expression.

4. On the Waterfront

The full story of how labor-management relations along various U.S. and world waterfronts evolved to acknowledge and incorporate the benefits of containerization would itself provide subject matter for several studies and books. A fascinating difference that emerges between labor-management relations on the East Coast—namely, Malcom McLean and

Sea-Land Service—and the West Coast—namely, R. J. Pfeiffer and Matson Navigation Company—involves the fact that in Atlantic and Gulf ports, the principal bargaining agent is the International Longshoremen's Association (ILA), while a different union, the International Longshoremen's and Warehousemen's Union (ILWU), prevails at West Coast ports.

While the ILA managed to reform itself in fundamental ways in the wake of Malcolm Johnson's explosive series of articles that ran in the *New York Sun* in 1948, the specter of criminality—and continual associations with organized crime—is something the ILA has never been quite able to rid itself of entirely.[9]

On the West Coast, the principal bargaining agent for longshoremen has long been the International Longshoremen's and Warehousemen's Union (ILWU), a bargaining agent that was founded by Australian-born Harry Bridges. Pfeiffer, and other West Coast operators, found Bridges an honorable man to bargain with, and ties between waterfront labor and organized crime were far less an issue on the West Coast than along the Atlantic seaboard. The association that cast a pall over the ILWU, though, was Bridges's political affiliations, namely his relationship with various organizations that were overt in their espousal of Communist ideology. Bridges himself had earlier been a member of the International Workers of the World—the infamous Wobblies—and when he orchestrated the creation of the ILWU in the late 1930s, he received considerable assistance from elements within the Communist Party. Something that would later become a virtual cliché among container-ship operators when discussing the differences between labor-management relations with the ILWU and the ILA would be some version of the following: Who would you prefer to deal with, an honest Communist or a crooked patriot?[10]

Today, while the U.S. workforce of longshoremen is a small fraction of what it was in the days of break-bulk cargo operations, the skill levels that workers must possess and master are substantially different from those that were needed a half-century ago.

Approaching a typical container port today from the land side brings one to what looks like a toll plaza on a major highway. Teamsters drive up to the various booths in the plaza with a container in tow and there they encounter a longshoreman who proceeds to enter an identification code of the container into a computerized system.[11] Then, after reading on their computer screens where in the sprawling portside yard the driver should take his or her inbound cargo, the longshoremen direct the teamsters to the proper location.

Some years ago, Maryland Public Broadcasting produced a documentary that included extensive interviews with contemporary longshoremen. What may well have been the program's most revealing insight involved older longshoremen whose principal job skill at the start of their careers was mastery of a simple baling hook, but who were approaching retirement as individuals who spent their days working with keyboards and computer monitors. Today's longshoremen still repair to the same watering holes as their fathers and grandfathers after a day's work, though, and swap stories about life on the Baltimore waterfront, past and present.

A parallel issue, of course, that would be an appropriate subject for yet another extensive analysis is the degree to which the growth of the container-ship industry over the past fifty years would have been impossible without the parallel development of powerful computer systems to keep track of containers, develop stowage plans for their placement aboard ship, and ensure that when a 7,500-TEU vessel puts out to sea, all of its containers are properly positioned to ensure the vessel's stability—and, not incidentally, keep customers informed about when their container of men's socks, or pots and pans, or automobile parts will be delivered.

5. The U.S. Merchant Marine

How does one begin to deal with the fact that the first fifty years of the container-ship industry have also seen the near-total decline of the U.S. merchant marine as an effective commercial enterprise? The story of Sea-Land Service is a telling account of an enterprise that grew—and grew quickly—into the largest and most dominant force in the U.S. merchant marine. Indeed, wartime cargo fleets excepted, Sea-Land may well have been the largest and most dominant force in the entire history of the U.S. merchant marine, granted that there are surely passionate advocates who would advance the same claim for, say, United States Lines, Grace Line, or Moore-McCormack. What cannot be denied, though, is that while Sea-Land earned whatever distinctions it achieved without the benefit of any subsidies from the federal government, it was eventually forced to recognize the realities of world economics and convert itself into an enterprise whose only links to the U.S. flag under which it began are a handful of vessels that a Copenhagen-based conglomerate has technically transferred to a nominally U.S. subsidiary in order to qualify for lucrative military traffic.

Fifty years ago, in 1956—the year *Ideal X* set sail from Port Newark on a voyage to Houston, Texas—the U.S. merchant fleet included 3,083 deepwater vessels of 1,000 GRT or more and was ranked as the largest in the world. In 2005, by contrast, the number of U.S.-flag oceangoing hulls in excess of 1,000 GRT was a mere 412, a figure that ranks twelfth among world merchant fleets if measured by total deadweight tonnage, fifteenth if measured by number of vessels.[12]

But even these figures can be misleading. If one factors out U.S. flag vessels that are used in protected Jones Act trades (over 25 percent of the 412), and if one also ignores those merchant ships whose presence under the U.S. flag is a mere technical exercise to maintain enrollment in the MSP (something that involves another thirty or so vessels), and if one ignores, as well, government-owned merchant ships that are maintained by the Maritime Administration in its Ready Reserve Force (some sixty-eight hulls), then the oceangoing U.S. merchant marine, as an active commercial enterprise, assumes a posture that one may charitably describe as statistically insignificant.[13] Once upon a time, we were number one. We're not even in the game any more. *Sic transit gloria mundi*.

6. The Port of New York

Two related factors have contributed to what can only be described as healthy trends in and for the port of New York. After an extensive evaluation of alternative East Coast ports for its North American operations—Halifax, Baltimore, and New York were the three finalists—in the early months of the new century, Maersk-Sealand decided to sign a long-term contract with the Port Authority of New York and New Jersey and expand its shoreside facilities at Port Elizabeth. The company's plans include construction of adequate cranes to handle the largest of its newest post-Panamax container ships, and so vessels with distinctive light-blue hulls—some of which even retain their original Sea-Land names—will remain a presence in the port that launched the container-ship revolution a half-century ago.

In addition, just as city officials in Newark, New Jersey, were able to prevail on the U.S. government in 1915 to dredge the channel approaches to Port Newark before their new municipal seaport could welcome its first cargo ships, so has the Port Authority of New York and New Jersey taken the lead in securing federal participation in a massive upgrade of the channel approaches to Newark Bay. A two-phase project got under way in 1987 that saw the approach to Port Elizabeth—from the Narrows, through Kill van Kull, and on into Newark Bay—dredged to a channel depth of forty-five feet by 1995, fifty feet by 2004.[14] The cost of the massive project was in excess of $2 billion; among recent projects managed by the U.S. Army Corps of Engineers, only the restoration of the Florida Everglades carried a higher price tag.

Expansion of container-ship facilities in the port of New York between 1956 and 2006 has not been without some unfortunate misdirection, though. A view long held by factions within the City of New York that the Port Authority has continually favored the state of New Jersey when making capital investment decisions continued to find resonance. Consequently, in the late 1970s, the municipal government invested many millions of dollars in building container ports of its own—in the Red Hook section of Brooklyn, for example, and the Howland Hook facility on Staten Island. Despite the use of Howland Hook by United States Lines for several seasons, these municipal investments proved to be especially wasteful, since Port Newark and Elizabethport continued to be the terminals of choice for most deepwater steamship companies. As Newark civic officials correctly foresaw in the years before World War I, waterfront facilities in the state of New Jersey provide more ready access to inland points in the United States than any similar facilities on the New York side of the state line possibly can, a geographic advantage that has become all the more important in the era of containerization.

Finally, this reflection: When a wonderful new passenger liner called RMS *Queen Mary* steamed into New York Harbor for the very first time on June 1, 1936, and was given an enthusiastic welcome by FDNY fireboats and other harbor craft, as the vessel steamed up the Hudson River from the Battery to her berth at North River Pier 90, the new Cunarder passed no fewer than thirty different finger piers along the Manhattan shoreline. Cargo ships from countries the world over were moored at most of these piers. Longshoremen who were hard at work unloading the wares the ships had delivered to New York and reloading the vessels with U.S. exports destined for countries the world over undoubtedly paused for a few moments to steal a glance at the new superliner.

On April 22, 2004, a new *Queen Mary 2* made her initial visit to New York, and while her harbor welcome was perhaps as enthusiastic as that given her illustrious predecessor sixty-eight years earlier, the Hudson River waterfront between the Battery and the vessel's ultimate berth at Pier 92 had changed dramatically. Whereas RMS *Queen Mary* passed pier after pier where freighters of all shapes and sizes were loading and unloading cargo, *Queen Mary 2* passed none.[15] Some of the old piers remain in place, but they have been converted, over the years, and now are used for such diverse purposes as golf-driving ranges, restaurants, and storage garages for city transit buses.

What *Queen Mary 2* did not pass, though, was the Port Authority of New York and New Jersey's huge container terminal on the western shore of nearby Newark Bay. Because while Hudson River cargo piers along the Manhattan waterfront disappeared in the years after *Ideal X* inaugurated the container-ship era a half-century ago, it was the availability of spacious and efficient docking facilities at Port Newark and Elizabethport—and the Port Authority's foresight in developing and expanding these facilities to meet present and future needs—that has enabled New York to remain dominant as a major world seaport.

The new *Queen Mary 2* is designed for a totally different trade from that of her famous namesake. The 1936 vessel was built to transport passengers across the world's most hostile ocean, while *QM2* is a leisure-oriented cruise ship, albeit one that has been designed to make the classic North Atlantic crossing between New York and Southampton something of an ultimate cruise experience. The container ships that move in and out of Elizabethport each day are every bit as different from the break-bulk cargo ships of 1936 as the new *QM2* is from RMS *Queen Mary* of yesteryear.

EPILOGUE

THE U.S. NAVY'S T-AKR-CLASS FAST SEALIFT SHIPS

The full story of the logistical effort behind the invasion of Iraq by Allied forces in the spring of 2003 will likely not be known in full for many years; perhaps all the details will never be known. One important fact at the conclusion of the Sea-Land story is that a major role in transporting equipment and supplies from the United States to the Middle East fell to an eight-vessel fleet of supply ships that the U.S. Navy designates its T-AKR class of fast sealift ships.

When they were built in 1972, they bore names like *Sea-Land McLean* and *Sea-Land Galloway*. The Navy acquired the eight ships during two different fiscal years, six in fiscal year 1981 and two in fiscal year 1982. One can likely conclude that were it not for the Reagan administration's policy of making substantially increased funds available for defense expenditures during the early 1980s, a more budget-minded Navy might have been less inclined to purchase the high-speed container ships. Once the ships were conveyed to the Navy, a major rehabilitation program was developed to adapt the vessels for their new role.

Basically, they were converted from cellular container ships into roll-on, roll-off (ro/ro) equipment carriers, with multiple decks, linked by ramps, built in open hull spaces where containers were once stowed. Four onboard cranes were also installed to hoist equipment on and off ship, while the deck area between the dual superstructures was configured so it could serve as a landing pad for helicopters. Three U.S. shipyards handled the conversions: National Steel and Shipbuilding in San Diego, California; Pennsylvania Shipbuilding in Chester, Pennsylvania; and Avondale Shipyards in New Orleans, Louisiana. Despite all this heavy reconstruction, though, the eight ships have retained the same basic profile they featured when they entered Sea-Land service in 1973.

The vessels are owned by the Navy but operated by contract civilian crews for the Navy's Military Sealift Command (MSC). Bay Ship Management currently holds the management contract for the ex-SL-7s. One can distinguish civilian-operated MSC Navy ships from other Navy tonnage by the blue and yellow bands painted atop their funnels. Other shapes and styles of cargo and supply vessels that are painted "Navy gray" but feature red, white, and blue funnel bands are owned by the Maritime Administration and are part of a sixty-eight-vessel Ready Reserve Force that the federal government also maintains for defense-related assignments.

Each of the eight former SL-7s is typically maintained in layup status by a permanent crew of eighteen but is capable of being fully activated in ninety-six hours. The eighteen permanent crewmembers are then supplemented by twenty-four others for a full complement of forty-two. It has been estimated that because of both its carrying capacity and its speed, a single T-ARK can perform sealift work that would require the services of 116 smaller and slower World War II–era Liberty ships.

In keeping with Navy traditions, the eight T-AKR vessels are identified by the name of the first vessel of the class to be commissioned. The former SL-7s are thus called the Algol class—USNS *Algol* itself being the former *Sea-Land Exchange*, the SL-7 that still holds the transatlantic speed record for cargo ships, and is second only to the *United States* for the fastest crossing by any conventional merchant ship.

To give a sense of the kind of missions the Navy has asked the former SL-7s to carry out, the following examples are instructive:

In early 1999, USNS *Antares*—the former *Sea-Land Galloway*—called at Beaumont, Texas, and there loaded fifty-four pieces of rolling stock, twenty-five helicopters, and a number of military containers. The vessel then steamed north to Wilmington, North Carolina, and took on more containers, plus nine pieces of rolling stock and fifteen additional helicopters. On February 12, 1999, *Antares* put to sea and arrived in the port of Rijeka, Croatia, on February 28. The supplies the vessel was carrying were to support U.S. troops participating in Operation Joint Command in Bosnia and Herzegovina.

In early January 2003, USNS *Denebola*—the former *Sea-Land Resource*—was activated and later that month made a voyage from Wilmington, Delaware, to the Persian Gulf with supplies for the Second Marine Expeditionary Force. *Denebola* then steamed quickly back to Jacksonville, Florida, picked up additional military equipment, and made a second voyage to the Persian Gulf, this time carrying equipment for the 101st Airborne Division.

The following table identifies the eight vessels, shows where their conversions were carried out, and also indicates the U.S. port where each vessel is moored when its services are not required.

U.S. Navy T-AKR-Class Vessels

Sea-Land name	USN number	USN name	Where converted	Home port	Date commissioned
Sea-Land McLean	T-AKR 293	*Capella*	Chester, Pa.	Baltimore, Md.	June 1984
Sea-Land Galloway	T-AKR 294	*Antares*	Chester, Pa.	Baltimore, Md.	November 1985
Sea-Land Exchange	T-AKR 287	*Algol*	San Diego, Calif.	New Orleans, La.	June 1984
Sea-Land Commerce	T-AKR 292	*Regulus*	San Diego, Calif.	New Orleans, La.	August 1985
Sea-Land Resource	T-AKR 289	*Denebola*	Chester, Pa.	Originally Bayonne, N.J., now Norfolk, Va.	October 1985
Sea-Land Market	T-AKR 290	*Pollux*	New Orleans, La.	New Orleans, La.	March 1986
Sea-Land Trade	T-AKR 288	*Bellatrix*	San Diego, Calif.	New Orleans, La.	September 1984
Sea-Land Finance	T-AKR 292	*Altair*	New Orleans, La.	Norfolk, Va.	July 1984

APPENDIX A: VESSEL ROSTER

Although tracing the history of the Sea-Land fleet does not require searching through musty nineteenth-century archival materials, a number of factors have combined to complicate the task. One involves various subsidiary and allied corporations that were established to serve as the formal owners of vessels whose inclusion in the Sea-Land fleet thus becomes difficult to determine. Another source of ambiguity is the not infrequent chartering of vessels, both by others to Sea-Land and by Sea-Land to other companies. Sea-Land also established cooperative working agreements with other container-ship companies over the years, raising yet another series of questions as to the criteria for including vessels in this roster. Finally, as noted in the text, Sea-Land raised to an art form the practice of mixing and matching the bow of one vessel with the stern of another to create a new and different container ship, but one whose continuity becomes a little difficult to follow.

The roster includes container-carrying vessels that were operated in liner service by Sea-Land itself and owned by Sea-Land, a predecessor or subsidiary company, or a leasing agency. Vessels used in Sea-Land service between 1956 and 1999 were formally owned by a number of different entities, including Pan-Atlantic Steamship Company; Waterman Steamship Company; Sea-Land Service, Inc.; Coastal Ship Corp.; Beauregard; Containership Chartering Service; Madison Transportation Company; Litton Industries Leasing Corp.; Donmac Corp.; Reynolds Leasing Corp.; and various other lending institutions, as well as individual corporations for each D-9–class vessel. No effort has been made to specify these formal owners in this roster.

Vessels are arranged chronologically under the various classes Sea-Land used to identify its fleet. A class of vessels that was delivered in 2000, after the 1957–1999 limits nominally assigned to this roster, is included because they were designed and ordered within the proscribed limits. I acknowledge that the roster, as here presented, is undoubtedly less than perfect; corrections are both welcome and encouraged.

Column 1: For all U.S.-registered vessels, an "official number" is issued by the Coast Guard—in times past, by the Treasury Department—and is unique to each vessel. For vessels registered in countries other than the United States, this column identifies the flag under which the vessel is registered. Sea-Land vessels that were originally registered in the U.S. and later transferred to foreign registry show their U.S. official number in this column, with foreign registry identified in a note.

Column 2: Any different names by which a given vessel may have been known over its lifetime are identified, sequentially, by lowercase letters. The principal name by which the vessel was known during its Sea-Land career is cited first, while any "missing letter" in a sequence of names means this is where the vessel's principal name belongs.

Column 3: "GRT" stands for gross registered tonnage, a common statistic for expressing the overall size of a merchant vessel. It is a cubic measure of a vessel's revenue-producing space, with 100 cubic feet equaling one gross ton. "DWT" is deadweight tonnage, an approximate measure of a vessel's carrying capacity.

Column 4: "Dimensions" indicate the length, breadth, and draft of a vessel's hull. The statistic identified as a vessel's length often causes confusion, since any given ship has a number of different lengths—all at the same time. There is overall length, molded length, waterline length, length between perpendiculars, and in an especially well-turned qualification found in *The Record* of the American Bureau of Shipping, "length as given in the official register of the government with which the vessel is registered." The following roster has attempted to display each vessel's overall length, although it is likely that in certain cases, some "other length" is shown for a particular vessel. All values are expressed in feet, rounded to the nearest whole number.

Columns 5 and 6: These indicate the city where a vessel was built, the year of its construction, the shipyard that built the vessel, and the hull number used by the yard. The abbreviation S/B means shipbuilding company, while D/D means drydock company. With respect to vessels that became Sea-Land container ships only after extensive renovation work, this column provides information about the original hull, not its subsequent conversion.

Column 7: Engines are identified by their design, not necessarily their manufacture. While the Mitsubishi Corporation, for example, may have built the diesel engine in a particular vessel, the fact that it was constructed under license to standards and specifications of the Sulzer Corporation means it is properly referred to as a "Sulzer diesel." Unless noted otherwise, all vessels feature single-screw propulsion with a fixed-pitch propeller. The abbreviation C/P indicates a controllable-pitch propeller. This column also identifies the presence of bow or stern thrusters.

Column 8: For most early Sea-Land vessels and unless noted otherwise, container capacity is expressed in the maximum number of thirty-five-foot containers a vessel accommodated. The abbreviation TEU indicates the number of twenty-foot trailer equivalent units a vessel can accommodate, a more common notation in the industry, and one that Sea-Land later adopted. A vessel's carrying capacity can change over its lifetime, even without major structural alterations. The values shown in this column are accurate for some point in the life of each vessel.

Column 9: Supplementary information about individual vessels, as well as entire classes of vessels, is provided through notes.

SEA-LAND VESSEL ROSTER, 1956–1999

(1) U.S. Off. No. (or flag)	(2) Names	(3) GRT (DWT)	(4) Dimensions (feet, rounded)	(5) Place built (year)	(6) Yard (hull no.)	(7) Propulsion	(8) Container capacity	(9) Notes
T2 Class 1956								1
247155	*Ideal X* a) *Potero Hills* b) *Capt. John D.P.* c) *Potero Hills* e) *Elemir*	10,572 (16,460)	524 × 68 × 30	Sausalito, Calif. (1945)	Marinship Corp. (68)	Elliott Company steam turbine; electric propulsion	58 (33-foot)	2
247292	*Almena* a) *Whittier Hills*	10,544 (16,623)	524 × 68 × 30	Sausalito, Calif. (1945)	Marinship Corp. (71)	Elliott Company steam turbine; electric propulsion	58 (33-foot)	3
248800	*Maxton* a) *Black River* b) *Ponca City* c) *Marine Leader* e) *Potomac*	10,516 (16,669)	504 × 68 × 30	Mobile, Ala. (1945)	Alabama D/D (353)	GE steam turbine; electric propulsion	58 (33-foot)	4
246810	*Coalinga Hills*	10,573 (16,460)	504 × 68 × 30	Sausalito, Calif. (1944)	Marinship Corp. (61)	Elliott Company steam turbine; electric propulsion	58 (33-foot)	5

(1) U.S. Off. No. (or flag)	(2) Names	(3) GRT (DWT)	(4) Dimensions (feet, rounded)	(5) Place built (year)	(6) Yard (hull no.)	(7) Propulsion	(8) Container capacity	(9) Notes
C2-C Class 1957								6
251506	*Gateway City* a) *Iberville* b) *Sumter* (USN) c) *Iberville*	9,006 (8,410)	469 × 72 × 25	Chickasaw, Ala. (1943)	Gulf S/B (5)	2 GE steam turbines; geared	226	7
243436	*Azalea City*	9,014 (8,510)	469 × 72 × 24	Chickasaw, Ala. (1943)	Gulf S/B (8)	2 GE steam turbines; geared	226	8
243438	*Bienville*	9,014 (8,384)	469 × 72 × 24	Chickasaw, Ala. (1943)	Gulf S/B (9)	2 GE steam turbines; geared	226	9
242073	*Fairland*	9,014 (8,490)	469 × 72 × 27	Chickasaw, Ala. (1943)	Gulf S/B (3)	2 GE steam turbines; geared	226	10
242074	*Raphael Semmes*	9,014 (8,581)	469 × 72 × 27	Chickasaw, Ala. (1942)	Gulf S/B (4)	2 GE steam turbines; geared	226	11
251508	*Beauregard* a) *Afoundria* b) *Wayne* (USN) c) *Afoundria*	9,016 (7,865)	469 × 72 × 27	Chickasaw, Ala. (1943)	Gulf S/B (7)	2 GE steam turbines; geared	226	12

T-3 Class 1962								13
242557	*Elizabethport* a) *Esso New Orleans* b) *Housatonic* c) *New Orleans*	16,395 (15,770)	627 × 78 × 27	Chester, Pa. (1942)	Sun S/B (235)	2 GE steam turbines; geared	476	14
241153	*Los Angeles* a) *Esso Albany* b) *Esso Bethlehem*	16,395 (15,609)	620 × 78 × 30	Chester, Pa. (1941)	Sun S/B (217)	2 GE steam turbines; geared	476	15
241220	*San Francisco* a) *Esso Trenton* b) *Chicopee* c) *Esso Trenton* d) *Esso Chattanooga*	16,401 (15,813)	630 × 79 × 27	Chester, Pa. (1941)	Sun S/B (218)	2 GE steam turbines; geared	476	16
242653	*San Juan* a) *Esso Raleigh*	16,395 (15,770)	630 × 79 × 27	Chester, Pa. (1942)	Sun S/B (237)	2 GE steam turbines; geared	476	17
C-3 Class 1962								
239692	*Detroit* a) *Sea Arrow* b) *Tangier* (USN)	10,391 (10,665)	469 × 70 × 20	Oakland, Calif. (1940)	Moore D/D (195)	2 De Laval steam turbines; geared	automobile carrier	18
T-2 Class 1963								
243658	*Summit* a) *Jalapa* b) *Gulflight*	7,813 (9,394)	524 × 68 × 23	Chester, Pa. (1943)	Sun S/B (285)	Westinghouse steam turbine; electric propulsion	226	19

(1) U.S. Off. No. (or flag)	(2) Names	(3) GRT (DWT)	(4) Dimensions (feet, rounded)	(5) Place built (year)	(6) Yard (hull no.)	(7) Propulsion	(8) Container capacity	(9) Notes
C4-M Class 1965								20
247275	*Seattle* a) *Marine Fox* b) *Dorothy* c) *Mobile*	11,724 (n/a)	497 × 72 × 33	Chester, Pa. (1945)	Sun S/B (347)	2 GE steam turbines; geared	360	21
246736	*Anchorage* a) *Marine Panther* b) *Alicia* c) *New Orleans*	11,737 (n/a)	497 × 72 × 33	Chester, Pa. (1944)	Sun S/B (345)	2 GE steam turbines; geared	360	22
C2-L Class 1965								23
245544	*Ponce* a) *Santa Leonor* b) *Land*	10,485 (7,413)	505 × 75 × 26	Wilmington, N.C. (1944)	North Carolina S/B (118)	2 GE steam turbines; geared	274	24
245546	*Mayaguez* a) *White Falcon* b) *Santa Eliana* c) *Sea*	10,485 (8,514)	504 × 74 × 26	Wilmington, N.C. (1944)	North Carolina S/B (114)	2 GE steam turbines; geared	274	25
C2-X Class 1965								26
251507	*Arizpa* a) *Jean Lafitte* b) *Warren* (USN)	8,673 (10,840)	469 × 63 × 27	Chickasaw, Ala. (1943)	Gulf S/B (6)	2 GE steam turbines; geared	225	27

245189	*Wacosta*	8,673 (10,368)	469 × 63 × 27	Chickasaw, Ala. (1944)	Gulf S/B (24)	2 GE steam turbines; geared	225	28
243815	*Warrior*	8,673 (n/a)	469 × 63 × 27	Chickasaw, Ala. (1943)	Gulf S/B (10)	2 GE steam turbines; geared	225	29
244018	*Afoundria*	8,673 (10,672)	469 × 63 × 27	Chickasaw, Ala. (1943)	Gulf S/B (14)	2 GE steam turbines; geared	225	30
C4-J Class 1966								31
248240	*Long Beach* a) *Marine Flasher*	17,184 (16,977)	685 × 79 × 31	Vancouver, Wash. (1945)	Kaiser (505)	2 Joshua Hendy steam turbines; geared	609	32, 33
248239	*Trenton* a) *Marine Falcon* c) *Borinquen*	17,189 (16,977)	685 × 79 × 31	Vancouver, Wash. (1945)	Kaiser (504)	2 Joshua Hendy steam turbines; geared	609	32, 34
248241	*Panama* a) *Marine Jumper*	17,184 (16,977)	685 × 79 × 31	Vancouver, Wash. (1945)	Kaiser (506)	2 Joshua Hendy steam turbines; geared	609	32, 35
248076	*Oakland* a) *Marine Tiger*	17,184 (16,977)	658 × 78 × 30	Vancouver, Wash. (1945)	Kaiser (501)	2 Joshua Hendy steam turbines; geared	609	32, 36
248238	*Baltimore* a) *Marine Cardinal*	11,389 (10,020)	523 × 72 × 30	Vancouver, Wash. (1945)	Kaiser (503)	2 Joshua Hendy steam turbines; geared	360	37
C4-X Class 1966								31
248095	*Charleston* a) *Marine Shark*	11,389 (8,854)	520 × 72 × 30	Vancouver, Wash. (1945)	Kaiser (502)	2 Joshua Hendy steam turbines; geared	325	38

(1) U.S. Off. No. (or flag)	(2) Names	(3) GRT (DWT)	(4) Dimensions (feet, rounded)	(5) Place built (year)	(6) Yard (hull no.)	(7) Propulsion	(8) Container capacity	(9) Notes
MV Class 1976								39
283030	*New Yorker* b) *Aleutian Developer*	4,631 (2,189)	361 × 52 × 16	Baltimore, Md. (1960)	Maryland S/B (136)	2 8-cyl. Enterprise diesels; twin screw	ro/ro	40
282733	*Floridian* b) *Pan-Antilles* c) *Freeport Express*	4,631 (2,189)	361 × 52 × 16	Baltimore, Md. (1960)	Maryland S/B (135)	2 8-cyl. Enterprise diesels; twin screw	ro/ro	41
T2-M Class 1967								42
245186	*Jacksonville* a) *Mission Solano*	11,601 (n/a)	524 × 68 × 31	Sausalito, Calif. (1944)	Marinship Corp. (34)	GE steam turbine; electric propulsion	332	43
245542	*Houston* a) *Mission Carmel*	11,601 (13,050)	524 × 68 × 31	Sausalito, Calif. (1944)	Marinship Corp. (39)	GE steam turbine; electric propulsion	332	44
T2-M1 Class 1969								
245726	*Tampa* a) *Mission Dolores*	11,601 (13,381)	524 × 68 × 31	Sausalito, Calif. (1944)	Marinship Corp. (42)	GE steam turbine; electric propulsion	332	45

C4 Class 1968

516542	*Chicago* a) *Gen. C. H. Muir* c) *San Juan*	18,455 (17,897)	695 × 78 × 31	Richmond, Calif. (1945)	Kaiser (23)	2 Westinghouse steam turbines; geared	622	46
515620	*Saint Louis* a) *Gen. M. L. Hersey* b) *Pittsburgh*	18,455 (15,691)	685 × 78 × 31	Richmond, Calif. (1943)	Kaiser (13)	2 Kaiser steam turbines; geared	622	47
248242	*Galveston* a) *Marine Serpent*	11,389 (10,020)	523 × 72 × 30	Vancouver, Wash. (1945)	Kaiser (507)	2 Joshua Hendy steam turbines; geared	360	48
511485	*Boston* a) *Gen. M.M. Patrick*	11,522 (9,317)	523 × 72 × 31	Richmond, Calif. (1944)	Kaiser (16)	2 Westinghouse steam turbines; geared	360	49
513557	*Brooklyn* a) *Gen. C.C. Ballou* c) *Humacao* d) *Eastern Light*	10,958 (8,035)	523 × 72 × 31	Richmond, Calif. (1945)	Kaiser (28)	2 Westinghouse steam turbines; geared	360	50
516541	*Philadelphia* a) *Gen. A. W. Brewster USMC*	10,979 (9,357)	523 × 72 × 31	Richmond, Calif. (1945)	Kaiser (26)	2 Westinghouse steam turbines; geared	360	51
511487	*Portland* a) *Gen. D. E. Aultman*	12,521 (9,702)	523 × 72 × 31	Richmond, Calif. (1945)	Kaiser (27)	2 Westinghouse steam turbines; geared	360	52

SEA-LAND VESSEL ROSTER, 1956–1999 (CONTINUED)

(1) U.S. Off. No. (or flag)	(2) Names	(3) GRT (DWT)	(4) Dimensions (feet, rounded)	(5) Place built (year)	(6) Yard (hull no.)	(7) Propulsion	(8) Container capacity	(9) Notes
511486	*Newark* a) *Gen. H.B. Freeman*	11,522 (9,344)	523 × 72 × 31	Richmond, Calif. (1945)	Kaiser (24)	2 Westinghouse steam turbines; geared	360	53
516540	*New Orleans* a) *Gen. E.T. Collins* c) *Guayama* d) *Eastern Kin*	11,400 (9,100)	523 × 72 × 31	Richmond, Calif. (1944)	Kaiser (11)	2 Westinghouse steam turbines; geared	360	54
513556	*Mobile* a) *Gen. Stuart Heintzelman*	11,307 (9,406)	523 × 72 × 31	Richmond, Calif. (1944)	Kaiser (30)	2 Westinghouse steam turbines; geared	360	55
C4-JC Class 1969								
246736	*Rose City* b) *Arecibo*	11,737 (15,096)	520 × 72 × 33	Chester, Pa. (1944)	Sun S/B (345)	2 GE steam turbines; geared	602	56
248238	*San Pedro*	18,420 (17,897)	695 × 78 × 30	Vancouver, Wash. (1945)	Kaiser (503)	2 Joshua Hendy steam turbines geared	602	57
247275	*Pittsburgh*	18,024 (15,959)	695 × 78 × 30	Chester, Pa. (1945)	Sun S/B (347)	2 GE steam turbines; geared	602	58
C-4 + T-2 reconversion 1970								59
245025	*Seattle* a) *Hanging Rock* b) *Petrolite*	11,499 (10,529)	471 × 72 × 30	Chester, Pa. (1944)	Sun S/B (390)	Westinghouse steam turbine; electric propulsion	342 35-foot; 12 40-foot	60

243850	*Anchorage* a) *Bull Run*	11,476 (8,712)	471 × 72 × 30	Chester, Pa. (1943)	Sun S./B (287)	GE steam turbine; electric propulsion	354	61
246103	*Baltimore* a) *Roanoke* b) *Esso Roanoke*	10,948 (9,036)	497 × 72 × 30	Chester, Pa. (1945)	Sun S/B (416)	Westinghouse steam turbine; electric propulsion	325	62
SL-7 Class 1972								63
542200	*Sea-Land Galloway* b) USNS *Antares*	41,127 (28,095)	946 × 106 × 35	Bremen, West Germany (1972)	A. G. Weser (1,382)	4 GE steam turbines; geared, twin screw	896; plus 400 TEU	
540413	*Sea-Land McLean* b) USNS *Capella*	41,127 (28,077)	946 × 106 × 35	Rotterdam (1972)	Rotterdam Dockyard (330)	4 GE steam turbines; geared, twin screw	896; plus 400 TEU	
545200	*Sea-Land Commerce* b) USNS *Regulus*	41,127 (27,728)	946 × 106 × 35	Bremen, West Germany (1973)	A. G. Weser (1,383)	4 GE steam turbines; geared, twin screw	896; plus 400 TEU	
546383	*Sea-Land Exchange* b) USNS *Algol*	41,127 (29,829)	946 × 106 × 35	Rotterdam (1973)	Rotterdam Dockyard (331)	4 GE steam turbines; geared, twin screw	896; plus 400 TEU	
550723	*Sea-Land Resource* b) USNS *Denebola*	41,127 (27,776)	946 × 106 × 35	Rotterdam (1973)	Rotterdam Dockyard (332)	4 GE steam turbines; geared, twin screw	896; plus 400 TEU	
550721	*Sea-Land Market* b) USNS *Pollux*	41,127 (27,728)	946 × 106 × 35	Bremen, West Germany (1973)	A.G. Weser (1,384)	4 GE steam turbines; geared, twin screw	896; plus 400 TEU	

SEA-LAND VESSEL ROSTER, 1956–1999 (CONTINUED)

(1) U.S. Off. No. (or flag)	(2) Names	(3) GRT (DWT)	(4) Dimensions (feet, rounded)	(5) Place built (year)	(6) Yard (hull no.)	(7) Propulsion	(8) Container capacity	(9) Notes
545201	*Sea-Lane Trade* b) USNS *Bellatrix*	41,127 (29,293)	946 × 106 × 35	Emden, West Germany (1973)	Rheinstahl Nordseewerke (430)	4 GE steam turbines; geared, twin screw	896; plus 400 TEU	
550722	*Sea-Land Finance* b) USNS *Altair*	41,127 (27,727)	946 × 106 × 35	Emden, West Germany 1973)	Rheinstahl Nordseewerke (431)	4 GE steam turbines; geared, twin screw	896; plus 400 TEU	
SL-18M Class 1973								64
532410	*Sea-Land Economy* a) *H.P. Baldwin* b) *SL 181*	24,774 (25,696)	720 × 95 × 34	Bremen-Vegesack, West Germany (1971)	Bremer Vulkan (957)	Bremer Vulkan steam turbine; geared	737	
531478	*Sea-Land Venture* a) *S.T. Alexander* b) *SL 180*	24,774 (25,937)	720 × 95 × 34	Bremen, West Germany (1970)	Bremer Vulkan (958)	2 Bremer Vulkan steam turbines; geared	735	
SL-18P Class 1974								65
552819	*Sea-Land Producer* a) *New Zealand Bear* c) *CSX Producer* d) *Horizon Producer*	23,510 (27,051)	720 × 95 × 34	Sparrows Point, Md. (1974)	Bethlehem Steel (4,660)	2 DeLaval steam turbines; geared	1,664 TEU	

552818	*Sea-Land Consumer* a) *Australia Bear* c) *CSX Consumer* d) *Horizon Consumer*	23,763 (27,051)	721 × 95 × 32	Sparrows Point, Md. (1973)	Bethlehem Steel (4,639)	2 DeLaval steam turbines; geared	1,664 TEU	
D-6 Class 1977								
594374	*Sea-Land Leader* b) *Sea Leader*	17,618 (15,417)	662 × 78 × 39	Kobe, Japan (1977)	Mitsubishi Heavy Industries (6,451)	6-cyl. Sulzer diesel; bow thruster	1,346 TEU	66
594375	*Sea-Land Pioneer* b) *Sea Pioneer*	17,618 (15,417)	662 × 78 × 39	Kobe, Japan (1978)	Mitsubishi Heavy Industries (6,452)	6-cyl. Sulzer diesel; bow thruster	1,346 TEU	67
593980	*Sea-Land Pacer*	17,618 (15,417)	662 × 78 × 39	Kobe, Japan (1978)	Mitsubishi Heavy Industries (6,453)	6-cyl. Sulzer diesel; bow thruster	1,346 TEU	68
594073	*Sea-Land Adventurer* b) *Sea Adventure* c) *Maersk Constantza* d) *Sea Adventure* e) *Maersk Koper*	17,618 (15,417)	662 × 78 × 39	Kobe, Japan (1978)	Mitsubishi Heavy Industries (6,454)	6-cyl. Sulzer diesel; bow thruster	1,346 TEU	69
D-9 Class 1980								70
604246	*Sea-Land Defender*	25,224 (23,749)	745 × 101 × 33	Tomano, Japan (1980)	Mitsui Engine & S/B (1,198)	9-cyl. Sulzer diesel	1,678 TEU	

SEA-LAND VESSEL ROSTER, 1956–1999 (CONTINUED)

(1) U.S. Off. No. (or flag)	(2) Names	(3) GRT (DWT)	(4) Dimensions (feet, rounded)	(5) Place built (year)	(6) Yard (hull no.)	(7) Propulsion	(8) Container capacity	(9) Notes
604247	*Sea-Land Developer*	25,224 (23,732)	745 × 101 × 33	Kobe, Japan (1980)	Mitsubishi Heavy Industries (1,107)	9-cyl. Sulzer diesel	1,678 TEU	
606062	*Sea-Land Endurance*	25,224 (23,250)	745 × 101 × 33	Ulsan, South Korea (1980)	Hyundai Heavy Industries (123)	9-cyl. Sulzer diesel	1,678 TEU	
604248	*Sea-Land Explorer*	25,224 (23,702)	745 × 101 × 33	Nagasaki, Japan (1980)	Mitsubishi Heavy Industries (1,852)	9-cyl. Sulzer diesel	1,678 TEU	
604249	*Sea-Land Express*	25,225 (23,676)	745 × 101 × 33	Tomano, Japan (1980)	Mitsui Engine & SB (1,199)	9-cyl. Sulzer diesel	1,678 TEU	
606065	*Sea-Land Freedom*	25,225 (23,352)	745 × 101 × 33	Nagasaki, Japan (1980)	Mitsubishi Heavy Industries (1,854)	9-cyl. Sulzer diesel	1,678 TEU	
606061	*Sea-Land Independence*	26,500 (22,957)	745 × 101 × 33	Nagasaki, Japan (1980)	Mitsubishi Heavy Industries (1,153)	9-cyl. Sulzer diesel	1,678 TEU	
606064	*Sea-Land Innovator*	26,500 (23,250)	745 × 101 × 33	Ulsan, South Korea (1980)	Hyundai Heavy Industries (124)	9-cyl. Sulzer diesel	1,678 TEU	
604245	*Sea-Land Liberator*	25,225 (23,676)	745 × 101 × 33	Nagasaki, Japan (1980)	Mitsubishi Heavy Industries (1,851)	9-cyl. Sulzer diesel	1,678 TEU	

606066	*Sea-Land Mariner*	25,224 (23,780)	745 × 101 × 33	Tomano, Japan (1980)	Mitsubishi Engine & SB (1,200)	9-cyl. Sulzer diesel	1,678 TEU	71
604244	*Sea-Land Patriot*	24,867 (23,682)	745 × 101 × 33	Kobe, Japan (1980)	Mitsubishi Heavy Industries (1,106)	9-cyl. Sulzer diesel	1,678 TEU	
606063	*Sea-Land Voyager*	26,500 (22,963)	745 × 101 × 33	Kobe, Japan (1980)	Mitsubishi Heavy Industries (1,108)	9-cyl. Sulzer diesel l	1,678 TEU	
C-6 Class 1987								72
544303	*Sea-Land Expedition* a) *Austral Ensign* b) *American Marketer* c) *Sea-Land Marketer* e) *CSX Expedition* f) *Horizon Expedition*	21,687 (19,845)	668 × 90 × 37	Pascagoula, Miss. (1973)	Ingalls S/B (1181)	2 Westinghouse steam turbines; geared; bow thruster	1,476 TEU	
547288	*Sea-Land Hawaii* a) *Austral Endurance* b) *American Merchant* d) *CSX Hawaii* e) *Horizon Hawaii*	21,687 (19,842)	668 × 90 × 35	Pascagoula, Miss. (1973)	Ingalls S/B (1182)	2 Westinghouse steam turbines; geared; bow thruster	964 TEU	

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C-7 Class 1987								73
515155	*Sea-Land Challenger* a) *American Legion* b) *Sea-Land Legion* d) *Horizon Challenger*	19,157 (22,493)	700 × 90 × 32	Chester, Pa. (1968)	Sun S/B (641)	2 GE steam turbines; geared	695 TEU	
518444	*Sea-Land Crusader* a) *American Lark* b) *Sea-Land Lark* d) *CSX Crusader* e) *Horizon Crusader*	19,203 (20,904)	700 × 90 × 32	Chester, Pa. (1969)	Sun S/B (644)	2 GE steam turbines; geared	1,028 TEU	
516464	*Sea-Land Discovery* a) *American Liberty* b) *Sea-Land Liberty* d) *CSX Discovery* e) *Horizon Discovery*	18,894 (22,013)	700 × 90 × 32	Chester, Pa. (1968)	Sun S/B (642)	2 GE steam turbines; geared	988 TEU	

C-8 Class 1987

541868	*Sea-Land Navigator* a) *Austral Envoy* b) *American Envoy* d) *CSX Navigator* e) *Horizon Navigator*	28,087 (28,200)	812 × 78 × 36	Pascagoula, Miss. (1972)	Ingalls S/B (1180)	2 Westinghouse steam turbines; geared	2,139 TEU
612085	*Sea-Land Pacific* a) *Austral Pioneer* b) *American Pioneer* d) *CSX Pacific* e) *Horizon Pacific*	28,095 (30,093)	813 × 90 × 33	Baltimore, Md. (1979)	Bethlehem Steel (4650)	2 Westinghouse steam turbines; geared; bow thruster	2,407 TEU
552706	*Sea-Land Trader* a) *Austral Entente* b) *American Entente* d) *CSX Trader* e) *Horizon Trader*	28,087 (31,495)	813 × 90 × 37	Pascagoula, Miss. (1973)	Ingalls S/B (1183)	2 Westinghouse steam turbines; geared	2,139 TEU

SEA-LAND VESSEL ROSTER, 1956–1999 (CONTINUED)

(1) U.S. Off. No. (or flag)	(2) Names	(3) GRT (DWT)	(4) Dimensions (feet, rounded)	(5) Place built (year)	(6) Yard (hull no.)	(7) Propulsion	(8) Container capacity	(9) Notes
623168	*Sea-Land Enterprise* a) *Austral Puritan* b) *American Puritan* d) *CSX Enterprise* e) *Horizon Enterprise*	28,095 (30,976)	813 × 90 × 34	Baltimore, Md. (1980)	Bethlehem Steel (4651)	2 Westinghouse steam turbines; geared; bow thruster	2,407 TEU	
Atlantic Class 1988								74
665786	*Sea-Land Atlantic* a) *American Oklahoma* b) *Karen H.*	57,075 (58,943)	950 × 106 × 38	Okpo, South Korea (1985)	Daewoo Heavy Industries (4008)	7-cyl. Sulzer diesel	4,614 TEU	
665783	*Sea-Land Integrity* a) *American Virginia* b) *Jacqueline J.* c) *Virginia*	57,075 (58,943)	950 × 106 × 38	Okpo, South Korea (1985)	Daewoo Heavy Industries (4005)	7-cyl. Sulzer diesel	4,614 TEU	

665223	*Sea-Land Motivator* a) *American New Jersey* b) *Elizabeth L.* c) *Raleigh Bay* e) *Sealand Motivator*	57,075 (47,171)	950 × 106 × 38	Okpo, South Korea (1984)	Daewoo Heavy Industries (4002)	7-cyl. Sulzer diesel	4,614 TEU	75
665790	*Sea-Land Performance* a) *American Washington* b) *Ruth W.*	57,075 (58,869)	950 × 106 × 38	Okpo, South Korea (1985)	Daewoo Heavy Industries (4012)	7-cyl. Sulzer diesel	4,614 TEU	
665784	*Sea-Land Pride* a) *American Kentucky* b) *Mary Ann* c) *Galveston Bay* e) *Sealand Pride*	57,075 (47,171)	950 × 106 × 38	Okpo, South Korea (1985)	Daewoo Heavy Industries (4006)	7-cyl. Sulzer diesel	4,614 TEU	75
665787	*Sea-Land Quality* a) *American Illinois* b) *Patricia M.*	57,075 (58,869)	950 × 106 × 38	Okpo, South Korea (1985)	Daewoo Heavy Industries (4009)	7-cyl. Sulzer diesel	4,614 TEU	
665782	*Sea-Land Achiever* a) *American Alabama* b) *Leyla A.* d) *Galveston Bay* e) *Sea-Land Achiever*	57,075 (58,943)	950 × 106 × 38	Okpo, South Korea (1984)	Daewoo Heavy Industries (4004)	7-cyl. Sulzer diesel	4,614 TEU	

SEA-LAND VESSEL ROSTER, 1956–1999 (CONTINUED)

(1) U.S. Off. No. (or flag)	(2) Names	(3) GRT (DWT)	(4) Dimensions (feet, rounded)	(5) Place built (year)	(6) Yard (hull no.)	(7) Propulsion	(8) Container capacity	(9) Notes
665788	*Sea-Land Commitment* a) *American California* b) *Marguerete* d) *CGM Ile de France* e) *OOCL Inspiration* f) *Sea-Land Commitment*	57,075 (58,869)	950 × 106 × 38	Okpo, South Korea (1985)	Daewoo Heavy Industries (4010)	7-cyl. Sulzer diesel	4,614 TEU	
665789	*Newark Bay* a) *American Utah* b) *Irene D.* c) *Utah* e) *LTC John U.D. Page*	57,075 (58,869)	950 × 106 × 38	Okpo, South Korea (1985)	Daewoo Heavy Industries (4011)	7-cyl. Sulzer diesel	4,614 TEU	
665781	*Sea-Land Value* a) *American Maine* b) *Kim D.*	57,075 (47,171)	950 × 106 × 38	Okpo, South Korea (1984)	Daewoo Heavy Industries (4003)	7-cyl. Sulzer diesel	4,614 TEU	76

665222	*Nedlloyd Holland* a) *American New York* b) *Catherine K.* d) *Sea-Land Florida*	57,075 (58,943)	950 × 106 × 38	Okpo, South Korea (1984)	Daewoo Heavy Industries (4001)	7-cyl. Sulzer diesel	4,614 TEU	77
665785	*Nedlloyd Hudson* a) *American Nebraska* b) *Susan C.* c) *Nebraska* e) *OOCL Innovation* f) *Sealand Oregon* g) *SSG Edward A. Carter, Jr.*	57,075 (58,620)	950 × 106 × 38	Okpo, South Korea (1984)	Daewoo Heavy Industries (4007)	7-cyl. Sulzer diesel	4,614 TEU	77
D-7 class 1987								78
910306	*Sea-Land Anchorage* b) *CSX Anchorage* c) *Horizon Anchorage*	20,965 (20,668)	710 × 78 × 34	Sturgeon Bay, Wis. (1987)	Bay S/B (735)	7-cyl. B&W diesel; single screw (C/P); jet pumps bow & stern	1,412 TEU	
910803	*Sea-Land Kodiak* b) *CSX Kodiak* c) *Horizon Kodiak*	20,965 (20,668)	710 × 78 × 34	Sturgeon Bay, Wis. (1987)	Bay S/B (737)	7-cyl. B&W diesel; single screw (C/P); jet pumps bow & stern	1,412 TEU	

(1) U.S. Off. No. (or flag)	(2) Names	(3) GRT (DWT)	(4) Dimensions (feet, rounded)	(5) Place built (year)	(6) Yard (hull no.)	(7) Propulsion	(8) Container capacity	(9) Notes
910307	*Sea-Land Tacoma* b) *CSX Tacoma* c) *Horizon Tacoma*	20,965 (20,668)	710 × 78 × 34	Sturgeon Bay, Wis. (1987)	Bay S/B (736)	7-cyl. B&W diesel; single screw (C/P); jet pumps bow & stern	1,412 TEU	
LASH Class 1990								79
624457	*Sea-Land Spirit* a) *Benjamin Harrison* c) *CSX Spirit* d) *Horizon Spirit*	29,965 (45,795)	893 × 100 × 41	Avondale, La. (1980)	Avondale Shipyards (2307)	2 DeLaval steam turbines; geared; Bow thruster	2,100 TEU	
625873	*Sea-Land Reliance* a) *Edward Rutledge* c) *CSX Reliance* d) *Horizon Reliance*	29,965 (45,795)	893 × 100 × 41	Avondale, La. (1980)	Avondale Shipyards (2308)	2 DeLaval steam turbines; geared; bow thruster	2,100 TEU	
Champion Class 1995								
Marshall Islands	*Sea-Land Champion* b) *Sealand Champion*	49,985 (59,840)	958 × 106 × 43	Chita, Japan (1995)	Ishikawajima-Harima (3055)	9-cyl. B&W diesel	4,065 TEU	80

Marshall Islands	*Sea-Land Charger* b) *Sealand Charger* c) *Sea-Land Charger*	49,985 (59,961)	958 × 106 × 43	Chita, Japan (1997)	Ishikawajima-Harima (3077)	9-cyl. B&W diesel	4,065 TEU	81
Marshall Islands	*Sea-Land Comet* b) *Sealand Comet* c) *Sea-Land Comet*	49,985 (58,840)	959 × 106 × 43	Chita, Japan (1995)	Ishikawajima-Harima (3056)	9-cyl. B&W diesel	4.082 TEU	82
Marshall Islands	*Sea-Land Eagle* b) *Sealand Eagle*	49,985 (48,151)	959 × 106 × 43	Chita, Japan (1997)	Ishikawajima-Harima (3078)	9-cyl. B&W diesel	4.082 TEU	80
Marshall Islands	*Sealand Intrepid* a) *Sea-Land Intrepid*	49,985 (59,840)	959 × 106 × 43	Kure, Japan (1997)	Ishikawajima-Harima (3079)	9-cyl. Sulzer diesel	4,082 TEU	83
Marshall Islands	*Sealand Lightning* a) *Sea-Land Lightning*	49,985 (58,840)	958 × 106 × 43	Kure, Japan (1997)	Ishikawajima-Harima (3080)	9-cyl. Sulzer diesel	4,082 TEU	84
Marshall Islands	*Sea-Land Mercury* a) *Sea-Land Mercury* b) *Sealand Mercury*	49,985 (59,961)	958 × 106 × 43	Kure, Japan (1995)	Ishikawajima-Harima (3057)	9-cyl. Sulzer diesel	4,082 TEU	80
Marshall Islands	*Sea-Land Meteor* b) *Sealand Meteor* c) *Sea-Land Meteor*	49,985 (59,940)	958 × 106 × 38	Chita, Japan (1996)	Ishikawajima-Harima (3058)	9-cyl. Sulzer diesel	4,082 TEU	85

SEA-LAND VESSEL ROSTER, 1956–1999 (CONTINUED)

(1) U.S. Off. No. (or flag)	(2) Names	(3) GRT (DWT)	(4) Dimensions (feet, rounded)	(5) Place built (year)	(6) Yard (hull no.)	(7) Propulsion	(8) Container capacity	(9) Notes
Marshall Islands	*Sea-Land Racer* b) *Sealand Racer*	49,985 (59,964)	958 × 106 × 43	Kure, Japan (1996)	Ishikawajima-Harima (3059)	9-cyl. Sulzer diesel	4,082 TEU	80
Undesignated 2000								
Greece	*Sealand New York*	74,583 (81,462)	998 × 132 × 46	Ulsan, South Korea (2000)	Hyundai Heavy Industries (1208)	9-cyl. Sulzer diesel	6,250 TEU	
Greece	*Sealand Virginia* b) *Safmarine Himalaya*	74,583 (81,594)	998 × 132 × 46	Ulsan, South Korea (2000)	Hyundai Heavy Industries (1209)	9-cyl. Sulzer diesel	6,250 TEU	
Greece	*Sealand Washington*	74,583 (81,556)	998 × 132 × 46	Ulsan, South Korea (2000)	Hyundai Heavy Industries (1210)	9-cyl. Sulzer diesel	6,250 TEU	
Greece	*Sealand Michigan*	74,583 (81,574)	998 × 132 × 46	Ulsan, South Korea (2000)	Hyundai Heavy Industries (1211)	9-cyl. Sulzer diesel	6,250 TEU	
Greece	*Sealand Illinois*	74,583 (81,577)	998 × 132 × 46	Ulsan, South Korea (2000)	Hyundai Heavy Industries (1212)	9-cyl. Sulzer diesel	6,250 TEU	

NOTES

1. T-2 tankers equipped with temporary spar decks, not cellular container ships.
2. Acquired by Pan-Atlantic, 1955; conveyed to Oceanic Tankers Corp, 1959; sold to overseas interests for scrapping, 1965; scrapped in Japan, 1967.
3. Acquired by Pan-Atlantic from National Bulk Carriers, 1955; conveyed to U.S. Tanker Corp., 1960; scrapped in Spain, 1972.
4. Chartered by Pan-Atlantic from Waterman Steamship; sold to Empire Transportation ca. 1958; scrapped, 1983.
5. Chartered by Pan-Atlantic from Sword Line; returned to tanker service, 1957; scrapped Hong Kong, 1963.
6. C-2 cargo ships built for Waterman Steamship.
7. Scrapped Hong Kong, 1978.
8. Scrapped Vigo, Spain, 1976.
9. Damaged on voyage from Kobe, Japan, to Busan, South Korea, 1975; scrapped Busan, 1976.
10. Scrapped Hong Kong, 1975.
11. Scrapped Hong Kong, 1978.
12. Laid up Hong Kong, 1975; scrapped Kaohsiung, 1977.
13. T-3 tankers converted to cellular container ships with newly built midbody spliced between original bow and stern.
14. Midbody built in Hamburg, West Germany, by Schlieker Werft and towed across the North Atlantic by seagoing tug *Smit Thames*; conversion performed at Todd Shipbuilding, Hoboken, N.J.
15. Midbody built in Hamburg, West Germany, by Bloom and Voss; conversion performed at Bethlehem Steel, Hoboken, N.J.
16. Midbody built in Hamburg, West Germany, by Bloom and Voss; conversion performed at Bethlehem Steel, Baltimore, Md.
17. Midbody built in Hamburg, West Germany, by Schlieker Werft and towed across the North Atlantic by seagoing tug *Smit Mississippi*; conversion performed at Bethlehem Steel, Hoboken, N.J.
18. Converted from dry cargo carrier, 1962; not cellular container ship; scrapped Valencia, Spain, 1974.
19. T-2 tanker converted at Alabama Shipbuilding, Mobile, Ala., 1962.
20. C-4 cargo ships converted to container ships by Bull Line; acquired by Sea-Land during conversion. Initially configured to carry 166 containers and break-bulk cargo; converted to full container ships by Sea-Land.
21. Portions of vessel later reconverted into C4-JC class container ship *Pittsburgh*; remains in documentation in 2005 as unpowered barge.
22. Portions of vessel later reconverted into C4-JC class container ship *Rose City*; remains in documentation in 2005 as unpowered barge.
23. C-2 cargo ships converted to container ships by Grace Line at Maryland Shipbuilding, Baltimore; later acquired by Sea-Land.
24. Scrapped Hong Kong, 1978.
25. Scrapped Kaohsiung, Taiwan, 1979.
26. C-2 cargo ships formerly in the Waterman fleet. Unlike C2-C class, conversion involved no alteration to hull geometry.
27. Acquired from U.S. government in exchange for C-2 cargo ship *Chatham*; scrapped Brownsville, Tex., 1977.
28. Acquired from U.S. government in exchange for C-2 cargo ship *Fanwood*; scrapped Bilbao, Spain, 1978.
29. Acquired from U.S. government in exchange for C-2 cargo ship *Colorado*; scrapped Bilbao, Spain, 1978. *Arizpa*, *Wacosta*, and *Warrior* were involved in dual transactions with the U.S. government. The three ex-Waterman C-2s were traded in when Sea-Land acquired the C-4 troop ships *Marine Flasher*, *Marine Falcon*, and *Marine Tiger*, respectively, then

reacquired by Sea-Land. *Chatham* (252493), *Fanwood* (252355), and *Colorado* (252492) had been acquired from Matson Navigation, where they bore the names *Hawaiian Wholesaler*, *Hawaiian Banker*, and *Hawaiian Trader*, respectively.

30. Sold to New York shipbreakers, 1979.
31. Converted from C-4-style troopships. C-4 Class vessels are displayed, by groups, in the approximate order of their conversion. Sea-Land subclassifications not specified in roster tables include: Class C4-J1: *Chicago* and *Rose City*; Class C4-X3: *Galveston*, *Brooklyn*, *Philadelphia*, *New Orleans*, and *Mobile*; Class C4-J2: *San Pedro*, *Pittsburgh*, and *Saint Louis*.
32. Vessel remains in documentation in 2005 as unpowered barge.
33. Chartered to United States Lines, 1946–49; acquired from U.S. government in exchange for C-2 cargo ship *Arizpa.* (See note 29.) Converted to container ship at Ingalls Shipbuilding, Pascagoula, Miss.
34. Converted to container ship at Ingalls Shipbuilding, Pascagoula, Miss.
35. Chartered to United States Lines, 1947–48, and also known to have worked for Moore-McCormack; acquired from U.S. government in exchange for C-2 cargo ship *Jean Lafitte.* Converted to container ship at Ingalls Shipbuilding, Pascagoula, Miss.
36. Operated in postwar passenger, under charter, by Atlantic Gulf and West Indies Steamship Lines (AGWI); acquired from U.S. government in exchange for C-2 cargo ship *Warrior*. (See note 29.) Converted to container ship at Ingalls Shipbuilding, Pascagoula, Miss.
37. Acquired from U.S. government in exchange for C-2 cargo ship *Claiborne*.
38. Chartered to United States Lines, 1948–49, and also known to have worked for American-Export; acquired from U.S. government in exchange for Liberty ship *La Salle.* Converted to container ship Maryland Dry Dock, Baltimore, Md.
39. Diesel-powered ro/ro vessels built for Erie and St. Lawrence Corporation, and later worked for Bull Line; not cellular container ships.
40. Reconfigured in 1975 at Willamette Iron and Steel in Portland, Oregon, for service as a feeder ship in Alaska.
41. Sold to Pan Antilles Ship Corp. ca. 1977; reflagged Liberian.
42. Converted from Class T-2 tankers originally built for U.S. Navy with 10,000-hp turbo-electric propulsion system, rather than 6,000-hp system of more conventional T-2 tankers.
43. Acquired from U.S. government in exchange for C-1 cargo ship *California Sword*; converted to container ship at Todd Shipbuilding, Galveston, Texas.
44. Acquired from U.S. government in exchange for C-1 cargo ship *Oregon Sword*; converted to container ship at Todd Shipbuilding, Galveston, Texas.
45. Acquired from U.S. government in exchange for bulk carrier *Philip Minch*; converted to container ship at Todd Shipbuilding, Galveston, Texas.
46. Acquired from U.S. government in exchange for Liberty ship *Losmar*; converted to container ship at Todd Shipbuilding, San Pedro, Calif.
47. Acquired from U.S. government in exchange for bulk carrier *Edward Y. Townsend*; converted to container ship at Todd Shipbuilding, San Pedro, Calif.
48. Acquired from U.S. government in exchange for Delaware River ferryboat *Delaware*; converted to container ship at Todd Shipbuilding, Galveston, Texas.
49. Acquired from U.S. government in exchange for New York excursion boat *John A. Meseck*; converted to container ship at Todd Shipbuilding, Galveston, Texas.
50. Acquired from U.S. government in exchange for Lake Erie excursion boat

Canadiana; converted to container ship at Bethlehem Steel, Hoboken, N.J.; later conveyed to Puerto Rican interests.

51. Acquired from U.S. government in exchange for Liberty ship *Alamar*; converted into container ship at Bethlehem Steel, Baltimore, Md.
52. Acquired from U.S. government in exchange for Jersey Central R.R. ferryboat *Wilkes-Barre*; converted to container ship at Willamette Iron and Steel, Portland, Ore.
53. Acquired from U.S. government in exchange for Great Lakes bulk carrier *Peavey Pioneer*; converted to container ship at Todd Shipbuilding, Galveston, Tex.
54. Acquired from U.S. government in exchange for bulk carrier *Frank E. Taplin*; converted to container ship at Willamette Iron and Steel, Portland, OR; later conveyed to Puerto Rican interests.
55. Acquired from U.S. government in exchange for Delaware, Lackawanna and Western R.R. ferryboat *Lackawanna*; converted to container ship at Alabama Drydock, Mobile, Ala.
56. Constructed from stern and machinery of Sea-Land's *Anchorage* (246736); conveyed to Puerto Rican interests ca. 1974.
57. Constructed from stern and machinery of Sea-Land's *Baltimore* (248238); remains in documentation in 2005 as unpowered barge.
58. Constructed from stern and machinery of Sea-Land's *Seattle* (247275); remains in documentation in 2005 as unpowered barge.
59. Vessels constructed by combining stern and machinery of surplus T-2 tankers with forebodies of earlier Sea-Land container ships.
60. Utilizes bow and midbody of *Seattle* (247275); converted at Todd Shipbuilding, Alameda, Calif.
61. Utilizes bow and midbody of *Anchorage* (246736); converted at Todd Shipbuilding, Seattle, Wash.
62. Utilizes bow and midbody of *Baltimore* (248238); converted at Todd Shipbuilding, San Pedro, Calif.
63. First class of Sea-Land-designed newbuildings; conveyed to U.S. Navy 1981–82.
64. Designed and built by Matson Navigation Company; acquired by Sea-Land before entering Matson service.
65. Designed by Matson Navigation Company and construction begun by Matson; conveyed to Pacific Far East Line during construction; acquired by Sea-Land before entering service.
66. Contains midbody section from *Elizabethport*. Conveyed to InterSea, a Bermuda-based Sea-Land affiliate in 1988 and reflagged Bahamian; transferred to the Maersk Company in 1999 at time of Sea-Land's acquisition by Moeller-Maersk. Reflagged United Kingdom, 2002; Marshall Islands, 2002; Gibraltar, 2002.
67. Contains midbody section from *Los Angeles*. Conveyed to InterSea, a Bermuda-based Sea-Land affiliate in 1988 and reflagged Bahamian; transferred to the Maersk Company in 1999 at time of Sea-Land's acquisition by Moeller-Maersk. Reflagged United Kingdom, 2002; Marshall Islands, 2002; Gibraltar, 2002.
68. Contains midbody section from *San Juan.* Reflagged Marshall Islands, 2002; Singapore, 2002.
69. Contains midbody section from *San Francisco*. Conveyed to InterSea, a Bermuda-based Sea-Land affiliate in 1988 and reflagged Bahamian; transferred to the Maersk Company in 1999 at time of Sea-Land's

acquisition by Moeller-Maersk. Reflagged United Kingdom, 2002; Marshall Islands, 2002; Gibraltar, 2002.

70. Entire class lengthened by Mitsubishi Heavy Industries in 1985 to these dimensions: 845 feet long, 32,629 GRT, container capacity of 2,472 TEUs; redesignated D-9J Class.
71. Reflagged Marshall Islands, 2002.
72. Designed and built by Farrell Lines; later conveyed to United States Lines; acquired by Sea-Land ca. 1987.
73. Designed and built by United States Lines; acquired by Sea-Land ca. 1987.
74. Designed and built by United States Lines; acquired by Sea-Land ca. 1988.
75. Reduced in length by Bloom and Voss, 1994, to these dimensions: 856 feet long, 47,667 GRT, carrying capacity of 3,918 TEUs. Reflagged Marshall Islands, 2001; Singapore, 2001; United States, 2002.
76. Reduced in length by Bloom and Voss, 1994, to these dimensions: 856 feet long, 47,667 GRT, carrying capacity of 3,918 TEUs. Reflagged Marshall Islands, 2001; Singapore, 2001.
77. Identified with Nedlloyd name after being acquired by Sea-Land since vessel was used in joint service with Nedlloyd.
78. Only Sea-Land newbuildings to be constructed in U.S. shipyard.
79. Constructed as LASH-type barge carriers for Waterman Steamship; acquired by Sea-Land 1990-'91 and converted to fully cellular container ships.
80. Reflagged United Kingdom, 2003.
81. Reflagged United Kingdom, 2003; United States, 2003 (Off. No. 1163273).
82. Reflagged United Kingdom, 2003; United States, 2003 (Off. No. 1163271).
83. Reflagged Singapore, 2003; United States, 2003 (Off. No. 1163268).
84. Reflagged Singapore, 2003; United States, 2003 (Off. No. 1163272).
85. Reflagged United Kingdom, 2003; United States, 2003 (Off. No. 1163267).

Sources

Lloyd's Register of Shipping, *The Record* of the American Bureau of Shipping (ABS) and *Merchant Vessels of the United States* are the three most critical primary sources. The first is published annually in book form. *Merchant Vessels of the United States* is no longer published regularly, but equivalent current data is available online from the U.S. Coast Guard at www.st.nmfs.gov/st1/CoastGuard/VesselByName.html. A different Coast Guard database geared to vessel inspections includes information on U.S.-flag as well as foreign-flag vessels: http://cgmix.USCG.mil/PSIX/PSIX2/VesselSearch.asp. *The Record* has not been published conventionally since 1999, but updated information is available online at http://absapps.eagle.org/unsecured/record/record_vesselsearch.

Two additional sources that are of a secondary nature, but extremely helpful in many cases, include an annual list of U.S.-flag merchant vessels that was long published by the trade journal *Marine Engineering/The Log*, plus a series of books edited by David Hornsby and published periodically under the title *Ocean Ships* (Shepperton, England: Ian Allan Publishing).

Sea-Land produced internal vessel rosters over the years that are not readily available but are extremely useful. See, for example, *Vessel Standards* (Elizabeth, N.J.: Sea-Land Service), 1972; *Sea-Land Vessel Standards* (Edison, N.J.: Sea-Land Service, 1990).

APPENDIX B: SEA-LAND LINER SERVICES, 1999

Frequency	*Port of origin (General service description)*	*Ports of call*	*Cooperative aspects*
Fixed day; weekly	Tacoma, Wash. (transpacific)	Oakland, Calif.; Honolulu, Hawaii; Apra, Guam; (transpacific) Kaohsiung, Taiwan; (transpacific) and return to Tacoma, Wash.	Operated in alliance partnership with Maersk
Fixed day; weekly	Charleston, S.C. (Panama Canal and transpacific)	San Juan, Puerto Rico; Puerto Manzanillo, Costa Rica; (Panama Canal) Long Beach, Calif.; Oakland, Calif.; Dutch Harbor, Alaska; (transpacific) Yokohama, Japan; Nagoya, Japan; Busan, South Korea; Kaohsiung, Taiwan; Naha, Okinawa; Shanghai, China; Busan; Yokohama, Japan; (transpacific) Long Beach, Calif.; (Panama Canal) Puerto Manzanillo, Costa Rica; Freeport, Bahamas; Miami, Fla.; and return to Charleston, S.C.	Operated in alliance partnership with Maersk
Fixed day; weekly	Charleston, S.C. (transpacific and transatlantic circuit via Panama Canal)	Miami, Fla.; Puerto Manzanillo, Costa Rica; (Panama Canal) Long Beach, Calif.; Oakland, Calif.; (transpacific) Yokohama, Japan; Kobe, Japan; Hong Kong; Kaohsiung, Taiwan; Kobe, Japan; Nagoya, Japan; Yokohama, Japan; (transpacific) Oakland, Calif.; Long Beach, Calif.; (Panama Canal) Puerto Manzanillo, Costa Rica; Miami, Fla.; Charleston, S.C.; Norfolk, Va.; Port Elizabeth, N.J.; (transatlantic) Le Havre, France; Felixstowe, England;	Operated in alliance partnership with Maersk

Frequency	*Port of origin (General service description)*	*Ports of call*	*Cooperative aspects*
		Bremerhaven, Germany; Rotterdam, Netherlands; (transatlantic) Halifax, Nova Scotia; Port Newark; Norfolk, Va.; and return to Charleston, S.C.	
Fixed day; weekly	Long Beach, Calif. (transpacific and Middle East)	Oakland, Calif.; (transpacific) Kaohsiung, Taiwan; Hong Kong, China; Singapore, Malaysia; Dubai, United Arab Emirates; Shuwaikh, Kuwait; Dammam, Saudi Arabia; Mina Sulman, Bahrain; Port Muhammad Bin Qasim, Pakistan; Colombo, Sri Lanka; Singapore; Hong Kong; Kaohsiung; (transpacific) and return to Long Beach, Calif.	Operated in alliance partnership with Maersk
Fixed day; weekly	Halifax, Nova Scotia (transatlantic and transpacific via Suez Canal)	Port Elizabeth, N.J.; Norfolk, Va.; Charleston, S.C.; (transatlantic) Algeciras, Spain; Gioia Tauro, Italy; (Suez Canal) Jeddah, Saudi Arabia; Dubai, United Arab Emirates; Port Klang, Malaysia; Singapore, Malaysia; Yantian, China; Hong Kong, China; (transpacific) Long Beach, Calif.; Tacoma, Wash.; (transpacific) Yokohama, Japan; Shimizu, Japan; Kobe, Japan; Kaohsiung, Taiwan; Hong Kong; Yantian, China; Singapore; Port Klang; Colombo, Sri Lanka; (Suez Canal) Gioia Tauro, Italy; Algeciras, Spain; (transatlantic) and return to Halifax, Nova Scotia	Operated in alliance partnership with Maersk; also slot charters to P&O Nedlloyd

Frequency	*Port of origin (General service description)*	*Ports of call*	*Cooperative aspects*
Fixed day; weekly	Bremerhaven, Germany (transatlantic; multiple crossings)	Felixstowe, England; Rotterdam, Netherlands; Le Havre, France; (transatlantic) Boston, Mass.; Port Elizabeth, N.J.; (transatlantic) Rotterdam, Netherlands; Bremerhaven, Germany; Felixstowe, England; Rotterdam, Netherlands; Le Havre, France; (transatlantic) Boston, Mass.; Port Elizabeth, N.J.; Norfolk, Va.; (transatlantic) Rotterdam, Netherlands; (transatlantic) Port Elizabeth, N.J.; Norfolk, Va.; (transatlantic) Rotterdam; and return to Bremerhaven, Germany	Operated in partnership with OOCL and P&O Nedlloyd; also slot charters to Maersk
Fixed day; weekly	Rotterdam, Netherlands (transatlantic)	Bremerhaven, Germany; Felixstowe, England; (transatlantic) Charleston, SC; Port Everglades, Fla.; Houston, TX; Jacksonville, Fla.; Charleston, S.C.; (transatlantic) Rotterdam, Netherlands; Bremerhaven, Germany; Felixstowe, England; and return to Rotterdam	Operated in partnership with OOCL and P&O Nedlloyd; also slot charters to Maersk
Fixed day; weekly	Le Havre, France (transatlantic)	Felixstowe, England; Bremerhaven, Germany; Rotterdam, Netherlands; (transatlantic) Port Elizabeth, N.J.; Norfolk, Va.; Charleston, S.C.; Miami, Fla.; Charleston, S.C.; Baltimore, Md.; Port Elizabeth, N.J.; (transatlantic) and return to Le Havre, France	Operated in partnership with OOCL and P&O Nedlloyd; also slot charters to Maersk
Fixed day; weekly	Felixstowe, England (transatlantic; St. Lawrence)	Bremerhaven, Germany; Rotterdam, Netherlands; (transatlantic) Montreal,	Operated in alliance partnership with Maersk; also slot

Frequency	*Port of origin (General service description)*	*Ports of call*	*Cooperative aspects*
		Quebec; (transatlantic) and return to Felixstowe, England	charters to P&O Nedlloyd
Fixed day; weekly	Port Everglades, Fla. (transatlantic; Caribbean and Mediterranean)	Freeport, Bahamas; Charleston, SC; (transatlantic) Algeciras, Spain; Gioia Tauro, Italy; Genoa, Italy; Valencia, Spain; Algeciras, Spain; (transatlantic) Charleston, S.C.; Freeport, N.J.; Miami, Fla.; Veracruz, Mexico; Houston, Tex.; and return to Port Everglades, Fla.	Operated in alliance partnership with Maersk; also slot charters to P&O Nedlloyd
Fixed day; weekly	Le Havre, France (Europe–Far East via Suez Canal)	Rotterdam, Netherlands; Hamburg, Germany; Felixstowe, England; Rotterdam, Netherlands; Gioia Tauro, Italy; (Suez Canal) Jeddah, Saudi Arabia; Port Klang, Malaysia; Singapore, Malaysia; Hong Kong; Hakata, Japan; Busan, South Korea; Kwangyang, South Korea; Shanghai, China; Yantian, China; Hong Kong; Singapore; (Suez Canal) Gioia Tauro, Italy; and return to Le Havre, France	Operated in alliance partnership with Maersk
Fixed day; weekly	Felixstowe, England (Europe–Middle East via Suez Canal)	Rotterdam, the Netherlands; Bremerhaven, Germany; Algeciras, Spain; (Suez Canal) Dubai, United Arab Emirates; Jawaharlal Nehru, India; Colombo, Sri Lanka; Jeddah, Saudi Arabia; (Suez Canal) Algeciras, Spain; and return to Felixstowe, England	Operated in alliance partnership with Maersk
Fixed day; weekly	Algeciras, Spain (transatlantic; Europe–South America)	Antwerp, Belgium; Rotterdam, Netherlands; Le Havre, France; Algeciras, Spain; (transatlantic) Rio de	Operated in alliance partnership with Maersk

Frequency	*Port of origin (General service description)*	*Ports of call*	*Cooperative aspects*
		Janeiro, Brazil; Santos, Brazil; Buenos Aires, Argentina; Rio Grande, Brazil; Sao Francisco do Sul, Brazil (alternate sailings only); Paranagua, Brazil; Santos, Brazil; (transatlantic) and return to Algeciras, Spain	
Fixed day; weekly	Rotterdam, Netherlands (transatlantic; Europe–Central and South America)	Bremerhaven, Germany; Le Havre, France; (transatlantic) Charleston, S.C.; Freeport, Bahamas; Miami, Fla.; Cartagena, Colombia; Puerto Manzanillo, Costa Rica; (Panama Canal) Buenaventura, Colombia; Manta, Ecuador; Callao, Peru; Arica, Chile; San Antonio, Peru; Callao, Peru; Guayaquil, Ecuador; Buenaventura, Colombia; (Panama Canal) Puerto Manzanillo, Costa Rica; Puerto Limon, Costa Rica; Freeport, Bahamas; Miami, Fla.; Charleston, S.C.; (transatlantic) and return to Rotterdam, Netherlands	Operated in alliance partnership with Maersk
Fixed day; weekly	Bremerhaven, Germany (Europe–Far East via Suez Canal)	Goteborg, Sweden; Felixstowe, England; Rotterdam, Netherlands; Algeciras, Spain; (Suez Canal) Singapore, Malaysia; Hong Kong, China; Kaohsiung, Taiwan; Kobe, Japan; Nagoya, Japan; Yokohama, Japan; Kaohsiung, Taiwan; Hong Kong; Singapore; (Suez Canal) Algeciras, Spain; Felixstowe, England; Rotterdam, Netherlands; and	Operated in alliance partnership with Maersk

Frequency	*Port of origin (General service description)*	*Ports of call*	*Cooperative aspects*
		return to Bremerhaven, Germany	
Weekly	Freeport, Bahamas (Caribbean)	Miami, Fla.; Puerto Cortes, Honduras; Santo Tomas de Castilla, Guatemala; and return to Freeport, Bahamas	Operated in alliance partnership with Maersk
Weekly	Port Elizabeth, N.J. (Caribbean and Puerto Rico)	San Juan, Puerto Rico; Rio Haina, Dominican Republic; Kingston, Jamaica; New Orleans, La.; San Juan, Puerto Rico; Rio Haina, Dominican Republic; and return to Port Elizabeth, N.J.	Operated by Sea-Land alone
Weekly	Port Elizabeth, N.J. (Puerto Rico)	San Juan, Puerto Rico; Jacksonville, Fla.; and return to Port Elizabeth, N.J.	Operated by Sea-Land alone
Fixed day; weekly	New Orleans, La. (Caribbean and Puerto Rico)	San Juan, Puerto Rico; Rio Haina, Dominican Republic; and return to New Orleans, La.	Operated by Sea-Land alone
Fixed day; weekly	Port Everglades, Fla. (Caribbean circuit)	Jacksonville, Fla.; Miami, Fla.; Freeport, Bahamas; Rio Haina, Dominican Republic; La Guaira, Venezuela; Puerto Cabello, Venezuela; Rio Haina, Dominican Republic; and return to Port Everglades, Fla.	Operated in alliance partnership with Maersk
Weekly	Port Elizabeth, N.J. (South America; East Coast) America	Norfolk, Va.; Jacksonville, Fla.; Freeport, Bahamas; Miami, Fla.; Puerto Cabello, Venezuela; Rio de Janeiro, Brazil (alternate sailings only); Santos, Brazil; Buenos Aires, Argentina; Rio Grande, Brazil; Rio de Janeiro (alternate sailings only); Puerto Cabello, Venezuela; Freeport, Bahamas; and return to Port Elizabeth, N.J.	Operated in alliance partnership with Maersk

Frequency	*Port of origin (General service description)*	*Ports of call*	*Cooperative aspects*
Weekly	Port Elizabeth, N.J. (South America; West Coast via Panama Canal)	Baltimore, Md.; Norfolk, Va.; Jacksonville, Fla.; Charleston, S.C.; Miami, Fla.; Kingston, Jamaica; Cartagena, Colombia; (Panama Canal) Buenaventura, Colombia; Callao, Peru; Arica, Chile; Iquique, Chile; San Antonio, Peru; Callao, Peru; Buenaventura, Colombia; (Panama Canal) Cristobal, Panama; Kingston, Jamaica; Miami, Fla.; Jacksonville, Fla.; Charleston, S.C.; and return to Port Elizabeth, N.J.	Operated by Sea-Land alone
Weekly	Houston, Tex. (Central and South America via Panama Canal)	New Orleans, La.; Miami, Fla.; Kingston, Jamaica; Cartagena, Colombia; Cristobal, Panama; (Panama Canal) Buenaventura, Colombia; Callao, Peru; Iquique, Chile; San Antonio, Peru; Callao, Peru; Buenaventura, Colombia; (Panama Canal) Cartagena, Colombia; Kingston, Jamaica; Veracruz, Mexico; and return to Houston, Tex.	Operated by Sea-Land alone
Two sailings per week	Tacoma, Wash. (Alaska)	Anchorage, Alaska; Kodiak, Alaska; and return to Tacoma, Wash.	Operated by Sea-Land alone
Fixed day; weekly	Long Beach, Calif. (Central and South America; West Coast)	Manzanillo, Mexico; Puerto Quetzal, Guatemala; Guayaquil, Ecuador; Callao, Peru; San Antonio, Peru; Iquique, Chile; Puerto Ilo, Peru; Callao, Peru; Paita, Peru; Guayaquil, Ecuador; and return to Long Beach, Calif.	Operated in alliance partnership with Maersk

APPENDIX C: MARITIME ACTIVITY AT THE PORT OF NEW YORK, THURSDAY, APRIL 26, 1956

To give some sense of the scope and style of maritime operations in the Port of New York in the days before containerization, the following tables display information about the arrival and the departure of deepwater vessels on April 26, 1956, the same day Pan-Atlantic's *Ideal X* cast off from Port Newark bound for Houston, Texas.

ARRIVALS

VESSEL	TYPE	COMPANY (FLAG)	ARRIVED FROM (1)	BERTH (2)
Saturnia	passenger	Italian Line (Italy)	Trieste, Italy	Pier 84 (North River)
General G.M. Randall	troopship	Military Sea Transport Service (USA)	Bremerhaven, West Germany	58th Street (Brooklyn)
Pvt. W.W. Thomas	troopship	Military Sea Transport Service (USA)	San Juan, Puerto Rico'	58th Street (Brooklyn)
Santa Olivia	cargo	Grace Line (USA)	Cristobal, Panama	Java Street (Brooklyn)
Mormachawk	cargo	Moore-McCormick (USA)	Philadelphia, Pa.	Pier 32 (North River)
Biokovo	cargo	Yugoslav Line (Yugoslavia)	Gibraltar	Erie Basin (Brooklyn)
Amstelpark	cargo	N.V. Reederij Amsterdam (Holland)	Bremen, West Germany	5th Street (Hoboken)
Excellency	cargo	American-Export (USA)	Norfolk, Va.	Pier F (Jersey City)
Horta	cargo	Cia. De Nav. Carregadores Acoreanos (Portugal)	Puerto Delgato (Azores), Portugal	Pier 16 (East River)
Athelfoam	tanker	Athel Line (UK)	La Romana, Dominican Republic	(4)
Edward Luckenbach	cargo	Luckenbach (USA)	Cristobal, Panama	35th Street (Brooklyn)
Nicoline Maersk (3)	cargo	A.P. Moeller (Denmark)	Providence, R.I.	Clark Street (Brooklyn)

VESSEL	TYPE	COMPANY (FLAG)	ARRIVED FROM (1)	BERTH (2)
Mormacyork	cargo	Moore-McCormick (USA)	Buenos Aires, Argentina	Erie Basin (Brooklyn)
Yucatan	cargo	West India Fruit & Steamship (Liberia)	Nicaro, Cuba	Pier 34 (North River)
Para (3)	cargo	Lloyd Brasileiro (Brazil)	Avonmouth (Bristol), England	29th Street (Brooklyn)
American	cargo	American-Hawaiian (USA)	West Coast	Pier 88 (North River)
Metapan	cargo	United Fruit (USA)	Puerto Cortes, Honduras	Weehawken Interchange Terminal (North River)
Nebraska	cargo	Swedish-American (Sweden)	Goteborg, Sweden	45th Street (Brooklyn)
Quirigua	cargo	United Mail Steamship (USA)	Philadelphia, Pa.	Pier 3 (North River)
Steel Rover	cargo	Isthmian (USA)	Boston, Mass.	Erie Basin (Brooklyn)
Ciudad de Cali	cargo	Grancolombiana (Colombia)	Baltimore, Md.	Atlantic Avenue (Brooklyn)
Havmann	cargo	A/S Havbo (Norway)	Hamburg, West Germany	Joralemon Street (Brooklyn)
Villamartin (3)	cargo	Cia. Frutero-Valenciana de Navegacion (Spain)	n/a	n/a
Mabay	tanker	Empresa Hondurena de Vapores (Hondurus)	n/a	(4)
Antonia	tanker	Royal Dutch Shell (Holland)	n/a	(4)
Jakara	cargo	A/S Kosmos (Norway)	Camden, N.J.	Columbia Street (Brooklyn)
Jersbek	cargo	Jersbeck Partners (West Germany)	Jacksonville, Fla.	Pier 16 (East River)
Seatrain New York	railroad car carrier	Seatrain (USA)	Savannah, Ga.	Seatrain Terminal (Edgewater)
Keytanker	tanker	Keystone Tankship (USA)	Houston, Tex.	(4)
Jeanette	tanker	Grancargo S.A. (Costa Rica)	Jacksonville, Fla.	Erie Basin (Brooklyn)

VESSEL	TYPE	COMPANY (FLAG)	ARRIVED FROM (1)	BERTH (2)
President Madison	cargo	American President Lines (USA)	Boston, Mass.	Pier 9 (Jersey City)
Godafoss	cargo	Iceland Steamship (Iceland)	Reykjavik, Iceland	Erie Basin (Brooklyn)
St. Malo	cargo	French Line (France)	Le Havre, France	45th Street (Brooklyn)
Olympic Sky	tanker	Liberty Transportation (Liberia)	Amuay Bay, Tex.	(4)
Shinnecock Bay	cargo	Veritas Steamship (USA)	Philadelphia, Pa.	n/a
Moline Victory	cargo	Prudential (USA)	Mediterranean ports	Pier 20 (East River)
Almena	container ship-tanker	Pan-Atlantic Steamship Co. (USA)	(5)	Port Newark

DEPARTURES

VESSEL	TYPE	COMPANY	DESTINATION (1)	BERTH (2)
Ideal X	container ship-tanker	Pan-Atlantic Steamship Co. (USA)	Houston, Tex.	Port Newark
Liberte	passenger	French Line (France)	Le Havre, France	Pier 88 (North River)
Brazil	passenger	Moore-McCormick (USA)	Buenos Aires, Argentina	Pier 32 (North River)
Copan	cargo	Empresa Hondurena de Vapores (Honduras)	Puerto Cortez, Honduras	Pier 3 (North River)
Elizabeth	cargo	Bull Line (USA)	San Juan, Puerto Rico	21st Street (Brooklyn)
Panama	passenger	Panama Canal Company (USA)	Cristobal, Panama	Pier 64 (North River)
Trevince	cargo	Hain Steamship (UK)	Melbourne, Australia	42nd Street (Brooklyn)
Shomron	cargo	Zim Israel (Israel)	Haifa, Israel	Java Street (Brooklyn)
Santa Ines	cargo	Grace Line (USA)	Cristobal, Panama	Java Street (Brooklyn)
Antonina	cargo	Rederi A/B Poseidon (Sweden)	Rio de Janeiro, Brazil	n/a
Bella Dan	cargo	J. Lauritzen (Denmark)	Cristobal, Panama	n/a

VESSEL	TYPE	COMPANY	DESTINATION (1)	BERTH (2)
Osiris	cargo	Royal Netherlands (Holland)	Curacao, Netherlands West Indies	31st Street (Brooklyn)
Kimikawa Maru	cargo	Kawasaki Kisen K.K. (Japan)	Yokohama, Japan	n/a
Nicoline Maersk (3)	cargo	Maersk Lines (Denmark)	Manila, the Philippines	Clark Street (Brooklyn)
Texan	bulk carrier	Ore Transport, Inc. (USA)	Sept Isles, Quebec	n/a
Gulfkey	tanker	Gulf Oil (USA)	Caripito, Venezuela	(4)
Black Osprey	cargo	Black Diamond Line (Norway)	Antwerp, Belgium	Smith Street (Brooklyn)
Samuel Q. Brown	tanker	Tidewater Associated Oil (USA)	Houston, Tex.	(4)
President Garfield	cargo	American President Lines (USA)	n/a	Pier 9 (Jersey City)
Steel Admiral	cargo	Isthmian (USA)	n/a	n/a
Seatrain Georgia	railroad car carrier	Seatrain (USA)	Savannah, Ga.	Seatrain Terminal (Edgewater)
American Banker	cargo	United States Lines (USA)	Bilbao, Spain	Pier 60 (North River)
American Manufacturer	cargo	United States Lines (USA)	Boson, Mass.	n/a
Pioneer Cove	cargo	United States Lines (USA)	Brisbane, Australia	Pier 60 (North River)
American Scout	cargo	United States Lines (USA)	n/a	n/a
E. Storil	n/a	n/a	Newport News, Va.	n/a
Chemical Transporter	tanker	Chemical Transporter, Inc. (USA)	n/a	(4)
Kehrea	cargo	T.N. Epiphaniades Shipping (Greece)	n/a	n/a
Farovi	tanker	Compania de Transporte Mar. Caribe S.A. (Cuba)	Havana, Cuba	(3)
E. H. Blum	tanker	Atlantic Refining (USA)	Atreco, Tex.	(4)
Black Heron	cargo	Black Diamond Line (Norway)	Antwerp, Belgium	Smith Street (Brooklyn)

VESSEL	TYPE	COMPANY	DESTINATION (1)	BERTH (2)
Cheyenne	n/a	n/a	Kingston, Jamaica	n/a
Para (3)	cargo	Lloyd Brasileiro (Brazil)	Philadelphia, Pa.	29th Street (Brooklyn)
Villamartin (3)	cargo	Cia. Frutero-Valencian de Nav. (Spain)	Bilbao, Spain	n/a
Kota Agoeng	cargo	N.V. Koninklijke Rotterdamsche Lloyd (Holland)	Galveston, Tex.	Bush Terminal (Brooklyn)
Sloterdyk	cargo	Holland America (Holland)	Antwerp, Belgium	n/a
La Brea Hills	tanker	Trinidad Corporation (USA)	Lake Charles, La.	(3)
Esparta	cargo	United Fruit (USA)	Puerto Barrios, Guatemala	Weehawken Interchange Terminal (North River)
New York	tanker	Texas Company (USA)	Port Arthur, Tex.	(4)
Esso Brooklyn	tanker	Esso Shipping (USA)	Jacksonville, Fla.	(4)

Notes

1. Principal origin or destination shown, not all ports served. In some cases, however, only a vessel's first (or last) port of call is indicated. Foreign-flag vessels showing a U.S. port as either its origin or destination were necessarily working longer international itineraries, since the Jones Act precludes such vessels from serving domestic trades.
2. Manhattan berths along the Hudson (North) River and the East River, as well as berths in Jersey City, are identified by pier number. Because the Brooklyn waterfront includes a variety of numbering sequences, berths in Brooklyn are identified by the street where they are located.
3. Vessel arrived early on April 26 and departed later that evening.
4. Tankers typically docked at various private oil terminals located along the Kill Van Kull and the Arthur Kill. Precise berthing information is not included in routine published information about maritime activity in the port.
5. Almena arrived in port on April 26 following a one-day trial trip. Vessel sailed from Port Newark bound for Houston, Tex., on May 3, 1956, Pan-Atlantic's second container-ship departure.

NOTES

NOTES TO INTRODUCTION

1. In 1956, Pan-Atlantic's *Ideal X* carried fifty-eight custom-built containers that were thirty-three feet long, a common dimension for over-the-road trailers of that era. Trailers and containers today come in a variety of sizes, and most jurisdictions in the United States permit trailers up to fifty-three feet in length, with eleven states allowing even longer fifty-seven-foot rigs under certain conditions. For purposes of vessel quantification and comparison, though, the capacity of a contemporary container ship is typically expressed in something called "trailer equivalent units," or TEUs. One TEU equals a trailer that is twenty feet long, the smallest ordinary container in common use, and the capacity of a container ship is routinely expressed in TEUs. Thus "nine thousand containers per trip" is more correctly 9,000 TEUs.

2. Although few merchant ships in the world fleet today are powered by steam engines, the term *steamship line* remains in popular usage as a generic description of oceangoing transport companies. Likewise, it is perfectly ordinary to speak of a vessel's "steaming" from one port to another, even if its propulsion power is being generated by a diesel engine.

NOTES TO CHAPTER 1

1. See Richard Pollak, *Colombo Bay* (New York: Simon & Schuster, 2004).

2. For additional information about the United States Shipping Board, written by the man who chaired the organization during its early years, see Edward N. Hurley, *A Bridge to France* (Philadelphia: J. B. Lippincott, 1927). See also Darrell Hevenor Smith and Paul V. Betters, *The United States Shipping Board: Its History, Activities and Organization* (Washington, D.C.: Brookings Institution, 1931). The Hog Island name comes from a waterfront location along the Delaware River where such vessels were built.

3. This ranking would continue until World War II. In 1939, for example, the merchant fleet of the United Kingdom totaled 24,054,000 deadweight tons; that of the United States was 11,382,000, while Japan was in third place with 7,145,000 deadweight tons. William A Lovett, ed., *United States Shipping Policies and the World Market* (Westport, Conn.: Quorum Books, 1996), 60.

4. For an analysis of the Merchant Marine Act of 1936 and its impact on subsequent cargo-ship construction in the United States, see E. Scott Dillon, Ludwig C. Hoffman, and Donald P. Roseman, "Forty Years of Ship Designs Under the Merchant Marine Act, 1936–1976," *Proceedings of the Society of Naval Architects and Marine Engineers* 84 (1976): 169–207. See also Frederic C. Lane, *Ships for Victory: A History of Shipbuilding Under the U.S. Maritime Commission in World War II* (Baltimore: Johns Hopkins University Press, 2001).

5. For additional information about the C-2, including a brief history of each vessel, see L. A. Sawyer and W. H. Mitchell, *From America to United States* (Kendal, England:

World Ship Society, 1981). See also John H. La Dage, *Ships: A Pictorial Study* (Cambridge, Md.: Cornell Maritime Press, 1955), 32–46; Dillon, Hoffman, and Roseman, "Forty Years of Ship Designs," 173–174.

6. For purposes of this narrative, it will not be necessary to identify various subclassifications that were appended to the C-2 designation, such as C2-S-B1, for example. In this case, S designates steam-powered, while B1 identifies distinctive features of hull and superstructure. In addition to the basic C-2 specification, there were nineteen subclasses. Many C-2s built during the final years of World War II looked ahead to postwar commerce and reflected specifications that were tailored to the trading needs of specific U.S. steamship companies. The C2-S-E1 subclass cited as an example in the text, for instance, identifies a fleet of thirty hulls built to meet requirements of the Waterman Steamship Company; these vessels would figure prominently in the early history of the containership industry. For additional information, see Charles R. Cushing, "Break-Bulk and Containerships," in *A Half Century of Maritime Technology: 1943–1993*, ed. Harry Benford and William A. Fox (Jersey City, N.J.: Society of Naval Architects and Marine Engineers, 1993), 209–226.

7. What would become the Maritime Commission's C-4 design was originated by a private company, the American Hawaiian Steamship Company, but the onset of war precluded the completion of any such vessels for this carrier. The wartime production of C-4s included seventy-five vessels: the forty-five troop transports noted in the text, ten all-cargo ships, one tank carrier, five combination cargo-transport vessels, and fourteen hospital ships. See Sawyer and Mitchell, *From America to United States*, 63–85.

8. For detailed information about the T-2 tanker, see L. A. Sawyer and W. H. Mitchell, *Victory Ships and Tankers* (Newton Abbot, England: David and Charles, 1974), 88–218. Chris Nutton describes the T-2 in some detail, but focuses on those vessels that operated under British registry, in "Workhorse Tankers," *Ships Monthly* 37 (April 2002): 16–19. An interesting treatment of the T-2 is an article written by naval architect David R. Dorn in defense of the design, *New York Times*, January 1, 1961.

9. For information about the Liberty Ships, see L. A. Sawyer and W. H. Mitchell, *The Liberty Ship* (Cambridge, Md.: Cornell Maritime Press, 1970); John G. Bunker, *Liberty Ships: The Ugly Ducklings of World War II* (Annapolis, Md.: Naval Institute Press, 1972); Lane, *Ships for Victory*, 72–100. For a treatment of the Victory Ships, see Sawyer and Mitchell, *Victory Ships and Tankers*, 15–87; Lane, *Ships for Victory*, 574–607; James A. Pottinger, "Victory Ships of World War II," *Ships Monthly* 34 (November 1999): 18–21.

10. Rene De La Pedraja, *The Rise and Decline of U.S. Merchant Shipping in the Twentieth Century* (New York: Twayne, 1992), 147. Serial statistics about the U.S. merchant fleet from 1943 through 2003, by vessel type, are to be found on a public website maintained by the U.S. Maritime Administration at www.marad.dot.gov/MARAD_statistics/index.html.

11. *Containerization Oral History Collection: 1999–2000* (Washington, D.C.: National Museum of American History), Scott Morrison interview, 61. This oral history project was supervised by Arthur Donovan, a distinguished maritime historian, and recorded under the sponsorship of the Jerome and Dorothy Lemelson Center for the Study of Innovation. It may be found in the Archives Center at the National Museum of American

History of the Smithsonian Institution in Washington. Original tapes are not available for research purposes, but written transcripts are. Citations to this resource will identify the individual being interviewed and the page number of the written transcript.

12. A more precise estimate suggests that an average C-2 cargo ship spent 55 percent of its days at sea, the rest in port. See E. Scott Dillon, Francis G. Ebel, and Andrew R. Goobeck, "Ship Design for Improved Cargo Handling," *Transactions of the Society of Naval Architects and Marine Engineers* 70 (1962): 634–748; the statistic is found at 649.

13. McLean would frequently retell this story over the years, identifying the waterfront as that of Hoboken, New Jersey. It is a good deal more likely, however, that McLean's patience was tried—and the seeds of a later transport revolution were sown—at the foot of Exchange Place in Jersey City, under the famous Colgate clock. The vessel his cargo was eventually placed aboard was more than likely American Export's *Examelia*, a cargo ship that departed for the Mediterranean on Wednesday, November 24, and was scheduled to reach Istanbul on December 18, 1937. *Examelia* would become a wartime casualty when it was torpedoed and sunk twenty miles south of the Cape of Good Hope on October 9, 1942.

14. The formal citation of the Jones Act is 46 USC 862–889. For an incisive treatment of this statute, albeit from the perspective of changes advocated by the authors, see Warren G. Leback and John W. McConnell Jr., "The Jones Act: Foreign-Built Vessels and the Domestic Shipping Industry," *Proceedings of the Society of Naval Architects and Marine Engineers* 91 (1983): 169–193.

15. The 165 vessels operating intercoastal in 1939 had a combined deadweight tonnage of 1,641,000, while the 543 in coastwise trade totaled 4,360,000. In 1954, the 57 vessels operating intercoastally had a combined deadweight tonnage of 573,000 and included 6 tankers and 51 dry cargo ships, while the 283 vessels working coastwise included 53 dry cargo ships and 230 tankers and totaled 4,115,000 deadweight tons. *New York Times*, January 13, 1955.

16. For an account of Nazi submarine activity off the East Coast during the early war years, see Michael Gannon, *Operation Drumbeat* (New York: Harper & Row, 1990).

NOTES TO CHAPTER 2

1. "Pan-Atlantic Steamship Corporation, Mobile, Alabama; Agency Agreement for Managing and Operating Vessels," unpublished document from the Waterman Steamship Corporation Records; University of South Alabama Archives, box 6, file 38. Additional background on Waterman and Pan-Atlantic may be found in "History of Waterman Steamship Corporation," unpublished paper in the holdings of the McLean Foundation, Alexandria, Va. See also John L. Hazard, *Crisis in Coastal Shipping* (Austin: University of Texas, 1955), 156–161.

2. "History of Waterman Steamship Corporation," 8. For an account of Waterman's efforts at establishing an airline, see John L. Marty Jr., "Steamship Airline," *Airways* 12 (July 2005): 53–57; (August 2005): 55–59. Though it was unable to secure permanent rights to operate scheduled service, Waterman Airlines did make some impressive achievements in charter work, including the first commercial air service between the United States and South Africa.

3. The era following World War I saw the emergence of three important U.S. steamship companies that were Gulf Coast–based: Waterman (along with its subsidiaries), the Lykes Brothers Steamship Company, and the Delta Line. For additional details, see Rene De La Pedraja, *The Rise and Decline of U.S. Merchant Shipping in the Twentieth Century* (New York: Twayne, 1992), 79–93.

4. *Pan Royal* and *Panama City* from 1936 were still on the Pan-Atlantic roster in 1941–42, but the original *Pan Atlantic* had been replaced by a different ship of the same name, while three additional vessels, *Pan Orleans*, *Pan Gulf*, and *Pan Kraft*, had joined the fleet. Pan-Atlantic briefly owned yet another vessel called *Pan Atlantic* (Off. No. 217436). It was acquired from Christenson Steamship in 1938 but was quickly transferred to the roster of parent Waterman and renamed *DeSoto*. The *Pan Atlantic*, also acquired from Christenson, spent an equally short tenure on the Waterman roster under the name *DeSoto*.

5. A sister-ship of *El Dia* and *El Valle* was involved in a critical incident in New York Harbor during World War II. On April 24, 1943, fire broke out in the hold of the *El Estero* (Off. No. 220829) while the vessel was loading ammunition along the New Jersey waterfront. With devastating explosion an imminent threat, fireboats of the New York Fire Department poured water onto the burning ship as it was towed away from its berth and safely scuttled. For additional details, see Brian J. Cudahy, *Around Manhattan Island and Other Maritime Tales of New York* (New York: Fordham University Press, 1997), 96–99.

6. "History of Waterman Steamship Corporation," 8.

7. *New York Times*, October 11, 1948.

8. Hazard, *Crisis in Coastal Shipping*, 156–157. See also *New York Times*, November 15, 1948.

9. *New York Times*, October 1, 1951.

10. Ibid., November 7, 1948.

11. For a detailed account of the development of piggyback service by American railroads, see David J. DeBoer, *Piggyback and Containers* (San Marino, Calif.: Golden West, 1992).

12. For a treatment of the ICC, see Marvin L. Fair, *Economic Considerations in the Administration of the Interstate Commerce Act* (Cambridge, Md.: Cornell Maritime Press, 1972.

13. For additional insights into the workings of the ICC, told informally, see Frank N. Wilner, *Comes Now the Interstate Commerce Practitioner* (Gaithersburg, Md.: Association of Transportation Practitioners, 1993).

14. Quoted in the *New York Times*, September 18, 1953.

15. Hazard, *Crisis in Coastal Shipping*, iii.

16. For autobiographical details about Malcom McLean, see *McLean Foundation Oral History Collection*, Malcom McLean interview, 6–13. This is a second oral history of the container-ship industry, and it was complied under the auspices of a foundation, headquartered in Alexandria, Virginia, that has been established by McLean's descendants. The collection includes both videotapes and a written transcript; citations will identify

the person being interviewed and the page number of the written transcript. Arrangements for public access to this resource have yet to be made.

17. *Containerization Oral History Collection: 1999–2000* (Washington, D.C.: National Museum of American History), Paul Richardson interview, 10.

18. "LST's Converted to Trailerships," *Marine Engineering* 52 (August 1947): 76–78. See also *New York Times*, January 6, 1955.

19. For additional information about *Carib Queen*, see Robert A. Levey, "Best Service Till They Build a Bridge," *Ships and the Sea* 7 (Winter 1958): 26–28, 54–57; see also, "First Test for Transatlantic Roll-On," *Marine Engineering* 62 (March 1957): 76–77.

20. See, for example, "What Is Being Done About Roll-On/Off?" *Marine Engineering* 62 (November 1957): 91–92.

21. *New York Times*, February 17, 1954.

22. One of Loveland's 1888-built tugboats was *Active* (Off. No. 106586), constructed in Port Jefferson, New York, while the other was *William J. Scott*, a) *Erie* (Off. No. 135978), built in Sandusky, Ohio.

23. *New York Times*, October 7, 1954.

24. McLean Securities, a Delaware corporation, was established on January 14, 1955. It would later be renamed McLean Industries. See *Wall Street Journal*, January 24, 1955.

25. For information about McLean's acquisition of Waterman Steamship, see *New York Times*, April 2, 1955; *Mobile Register*, April 2, 1955. The latter includes the full text of the letter McLean sent to Waterman stockholders.

26. *New York Times*, May 5, 1955.

27. Ibid., May 7, 1955.

28. *McLean Foundation Oral History,* Malcom McLean interview, 1–2.

29. *New York Times*, June 15, 1957.

30. *McLean Foundation Oral History*, Malcom McLean interview, 5.

31. *New York Times*, September 24, 1955.

32. McLean began to develop plans and specifications for new ships even before he acquired Pan-Atlantic in 1955. See, for example, "Coastwise Shipping to Be Revived?" *Marine Engineering* 59 (April 1954): 47–48, 60, which includes drawings of the proposed vessels and speaks of the venture as a joint undertaking of McLean Trucking and the S. C. Loveland Company.

33. "Agreement Reached with MA on New Roll-On/Off Ships by Pan Atlantic," *Marine Engineering* 61 (June 1956): 95.

34. *New York Times*, November 7, 1955.

35. "Dual Cargo Ships," *Maritime Reporter* 18 (March 1, 1956): 13; "T-2's Will Piggy Back Truck Trailers," *Marine Engineering* 61 (April 1956): 85. See also *New York Times*, February 20, 1956; *Wall Street Journal*, February 20, 1956.

36. *Almena* returned to Port Newark from what was likely a trial voyage of some sort or other on April 26, 1956, the same day *Ideal X* departed for Houston. *Almena* then set sail for Houston a week later on May 4, 1956. *Ideal X* returned to Port Newark from Houston on May 9, and departed again the following day.

37. *McLean Foundation Oral History*, Charles Cushing, Ronald Katims, and Paul Richardson joint interview, 52.

38. *New York Times*, April 27, 1956; *Houston Post*, May 3, 1956.

39. See "Third Vessel to Enter Sea-Land Service," *Marine Engineering* 61 (May 1956): 118; *New York Times*, April 6, 1956; "Fourth T-2 Conversion Underway at Mobile," *Marine Engineering* 41 (September 1956): 105. A detailed study of the technicalities involved in installing spar decks on T-2 tankers to convert them into container-carrying ships was written specifically about the vessel that emerged as *Maxton*. See "Simplifying Piggy Back Conversion," *Marine Engineering* 61 (November 1956): 70–71.

40. Documentation certificates of U.S.-flag vessels of this era are available for inspection at the National Archives in Washington, D.C.

41. Personal letter to the author from Captain Warren G. Leback, November 22, 2004.

42. *New York Times*, October 9, 1956.

43. See "Pan Atlantic Changes Plans For Roll-On Ships," *Marine Engineering* 61 (December 1956): 112.

44. The Sharp firm regards this project as sufficiently important that a likeness of one of Pan-Atlantic's converted C-2s is among a half-dozen photographs displayed on the company's website.

45. See, "Lift Off . . . for Faster Cargo Service," *Maritime Reporter* 19 (November 1, 1957): 22; "Full Scale Container Ship Proves Itself," *Marine Engineering* 62 (December 1957): 67–69; "Gateway City, Pan-Atlantic's Container Ship," *Marine Engineering* 63 (March 1958): 103–116.

46. *McLean Foundation Oral History,* Keith Tantlinger interview, 19–20.

47. *Maritime Reporter* 19 (November 1, 1957): 7.

48. *New York Times*, November 15, 1958.

49. "Distinctive Ships: Gateway City, P-A's Container Ship," *Marine Engineering* 63 (May 1958): 103, 116.

50. *Miami Herald*, October 7, 1957.

51. *New York Times*, December 8, 1957.

52. Ibid., November 23, 1958.

53. Ibid.

54. "Pan-Atlantic Does It with Cranes," *Ships and the Sea* 8 (Summer 1958): 26–28, 46–48.

55. *New York Times*, October 5, 1957; see also *Newark Star-Ledger*, October 5, 1957.

56. *McLean Foundation Oral History,* Malcom McLean interview, 47–48.

57. How containerization affected labor relations with dockworkers is summarized in chapter 9.

58. For details about container design, see James J. Henry and Henry J. Karsch, "Container Ships," *Transactions of the Society of Naval Architects and Marine Engineers* 74 (1966): 305–355. This article is an important resource and represents a definitive account of the first ten years of the container-ship industry. For information about containers and their corner castings, see 309–313.

59. For additional information about corner castings, see ibid., 5–6; see also *Containerization Oral History*, Charles Cushing interview, 7–8.

60. *McLean Foundation Oral History,* Keith Tantlinger interview, 1–2. See also Matt Baratz, "Fantastic Voyage," *Via Port of New York–New Jersey* 48 (March/April 1996): 20–23.

61. "Full-Scale Container Ship Proves Itself," *Marine Engineering* 62 (December 1957): 67.

62. *Wall Street Journal*, April 13, 1956.

63. "The achievement is comparable with that of the American railroads decades ago in setting a standard gauge for track." *Journal of Commerce*, October 5, 1965.

NOTES TO CHAPTER 3

1. Hollywood filmmakers whose concern for accuracy has assumed legendary proportions rarely get it right in depicting a voyage past the Statue of Liberty. When the little boy who would later be known as Vito Corleone first gazes up at the statue in *Godfather II*, his supposedly inbound ship is actually heading out to sea, and when the woman who then called herself Rose Dawson sailed past the statue aboard RMS *Carpathia* in the film *Titanic*, the vessel is on a course that would have taken it straight into nearby Ellis Island.

2. Oceangoing vessels can reach New York Harbor through Long Island Sound and the East River, while the second approach that bypasses the Narrows enters Arthur Kill at the southern extreme of Staten Island.

3. An extension of the New Jersey Turnpike that links Exit 14 on the main line with the Holland Tunnel includes a steel-arch bridge that crosses Newark Bay just to the north of its midpoint. A relaxing spot to view shipping activities on the bay is a waterfront park maintained by the city of Bayonne at the foot of West 16th Street.

4. On June 16, 1966, there was an unfortunate accident off Bergen Point where Newark Bay empties into Kill Van Kull. The tanker *Texaco Massachusetts* was outbound from Newark Bay in perfectly clear weather when it collided with the inbound tanker *Alva Cape*, the latter carrying 5.6 million gallons of naphtha. Thirty-four people lost their lives in an ensuing explosion and fire. For additional details, see Brian J. Cudahy, *Around Manhattan Island and Other Maritime Tales of New York* (New York: Fordham University Press, 1997), 108–111.

5. Passenger train service over these bridges and into the Jersey Central's waterside terminal in Jersey City, where commuters bound for Manhattan boarded ferryboats to cross the Hudson River, was eliminated in 1967. Jersey Central passenger trains were then rerouted into a station in Newark that was once part of the Pennsylvania Railroad, where all-rail options are available for reaching Manhattan. The Newark Bay lift bridges, built new in 1926, were then dismantled since the Jersey Central main line between Elizabeth and Jersey City was no longer active.

6. Garnault Agassiz, "The Port of New York Authority," *Barron's National Business and Financial Weekly*, January 2, 1933.

7. Carl W. Condit, *The Port of New York* (Chicago: University of Chicago Press, 1981), 310.

8. For a detailed treatment of such proposals, see ibid., 129–140.

9. In creating the Port Authority, the state legislatures of New York and New Jersey "had commanded the agency as its first priority to prepare a detailed set of proposals to improve the railroad freight system, and thereby to help reverse New York's deteriorating position in international trade." Jameson W. Doig, *Empire on the Hudson* (New York: Columbia University Press, 2001), 79.

10. For a photographic treatment of New York Cross Harbor, see Jay Bendersky, *Brooklyn's Waterfront Railways* (East Meadow, N.Y.: Weekend Chief, 1988). See also Carl G. Perelman and John P. Krattinger, "The Cross Harbor: Big Apple Shortline Railroading," *Railpace* 11 (September 1992): 20–31.

11. James M. Reilly, *Port Newark Terminal* (Newark, N.J.: Newark Board of Trade, 1915), 5.

12. Ibid., 7.

13. "A delegation from Newark was before the House Rivers and Harbors Committee to-day and urged the dredging of Newark Bay to a depth of twenty-five or thirty feet." *New York Times*, April 9, 1914.

14. For accounts of the early development of Port Newark, see *New York Times*, June 13 and July 27, 1915.

15. See *New York Times*, October 30, 1917. There was a serious fire at the Port Newark facility on January 26, 1918, and while it did not cause any substantial damage, it did raise fears of enemy sabotage. See, for example, "Port Newark Fire Seen as Part of Wide German Plot," *New York Times*, January 27, 1918.

16. Ibid., February 10 and March 11, 1918.

17. Ibid., September 2, 1936.

18. Production at Federal's Port Newark facility during the Second World War included thirty-six LCI(L) landing craft, forty-two LSM landing ships, fifty-two destroyer escorts, and ten Gearing Class destroyers.

19. *New York Times*, March 11, 1948.

20. Ibid., November 18, 1948.

21. "Work on the last three terminals, which the Waterman Steamship Corporation already has agreed to lease, will get under way in the next few months, and is expected to be completed in the spring of 1954." Ibid., April 9, 1952.

22. For the commission's report and recommendations, see *Joint Report with Comprehensive Plan and Recommendations: New York, New Jersey Port and Harbor Development Commission* (Albany, 1920). For a review and analysis, see Doig, *Empire on the Hudson*, 27–46.

23. For the text of the Port Compact of 1921, see John I. Griffin, *The Port of New York* (New York: City College Press, 1959), 135–139.

24. *New York Times*, May 1, 1921.

25. While the Port Authority's territory is commonly said to lie within a circle drawn with the Statue of Liberty at its center, the Compact is a good deal more precise and the true boundary of its jurisdiction is hardly circular. Article II of the Compact defines the district in a single sentence that is 916 words long and includes such marvelous language as "thence due south twelve and sixty-five-hundredths miles more or less on a line passing about one mile west of the business center of the city of New Brunswick to a point H of latitude forty degrees and twenty-six minutes north and longitude seventy-four degrees and twenty-eight minutes west, said point being about four and five-tenths miles southwest of the city of New Brunswick." Quoted in Griffin, *The Port of New York*, 136.

26. Doig, *Empire on the Hudson*, 77.

27. Those who enjoy Irish folk music may be forgiven for thinking that the Holland Tunnel was named after a turn-of-the-century Irish inventor by the name of John Holland. John Holland is rightly credited with inventing the contemporary submarine—battery power underwater, internal combustion power on the surface—and it was he who built the U.S. Navy's first submarine, a vessel known as USS *Holland*, SS-1. See Richard K. Morris, *John P. Holland* (Annapolis, Md.: United States Naval Institute, 1966). In extolling the man's achievements, the folk song maintains that "your name it is written on tunnels and on slips." The name Holland is indeed written on an important New York tunnel. But it honors Clifford Holland, not John.

28. For details about the Port Authority's comprehensive plan, see Erwin Wilkie Bard, *The Port of New York Authority* (New York: Columbia University Press, 1942), 35–62.

29. *New York Times*, July 1 and August 1, 1948.

30. The bill to create a city airport authority was passed by the state legislature in late March of 1946 and signed into law by Governor Dewey in early April. Ibid., March 27 and April 4, 1946. Editorially, the *Times* opposed creation of a city airport authority and favored the Port Authority's assuming managerial control of all regional airfields. Ibid., January 13 and 28, February 7, 1946.

31. For a comprehensive if critical biography of Moses, see Robert A. Caro, *The Power Broker: Robert Moses and the Fall of New York* (New York: Random House, 1974). The *New York Times* continues to denigrate Robert Moses, recently characterizing him, in a news article, as "the city's imperious planner," and referring to his "megalomaniacal plans." *New York Times*, June 28, 2005.

32. *New York Times*, July 25, 1946.

33. Caro, *The Power Broker*, 767.

34. *New York Times*, April 18, 1947.

35. The Port Authority took over three municipal airports from the City of New York in 1947, the third being Floyd Bennett Field in Brooklyn, six miles west of Idlewild on the shore of Jamaica Bay. Built by the city in 1931 and used as a Naval Air Station during World War II and afterward, Floyd Bennett would never become a major commercial airport and is no longer part of the Port Authority's responsibilities. *New York Times*, June 1, 1947.

36. *Barron's National Business and Financial Weekly*, September 6, 1948.

37. *New York Times*, March 11, 1948.

38. See "Boss Stevedore Shot Leaving Inwood Home," *New York Sun*, April 29, 1948.

39. Malcolm Johnson's son would follow his father into journalism and would also earn a Pulitzer Prize for his work. Malcolm and Haynes Johnson are the only father and son to earn this honor.

40. For references to specific underworld figures, see the twentieth article in Johnson's twenty-four-part series, *New York Sun*, December 6, 1948.

41. For a summary excerpt of the findings of the New York Waterfront Commission, see "Legislative Recommendations of the New York Waterfront Commission," *Monthly Labor Review* (May 1961): 510.

42. For an additional perspective on waterfront corruption in New York, see Donald Goddard, *All Fall Down* (New York: Times Books, 1980).

43. Allen Raymond, *Waterfront Priest* (New York: Henry Holt, 1955), 64.

44. Ibid., 62.

45. See John I. Griffin, *The Port of New York* (New York: City College Press, 1959), 103.

46. *New York Sun*, November 10, 1948.

47. See Edward E. Swanstrom, *The Waterfront Labor Problem* (New York: Fordham University Press, 1938).

48. Ibid., 7–48.

49. Raymond, *Waterfront Priest*, 59–61.

50. Ibid., 208.

51. *New York Sun*, December 9, 1948.

52. Swanstrom, *The Waterfront Labor Problem*, 49–60.

53. Ryan had been elected president of the ILA in 1927. In expelling the ILA from the AFL in 1953, George Meany called the renegade union "the tools of the New York waterfront mob." See *Waterfront Corruption: Report Made by the Permanent Subcommittee on Investigations of the Committee on Governmental Affairs, United States Senate* (Washington, D.C.: U.S. Government Printing Office, 1984), 18.

NOTES TO CHAPTER 4

1. Matson's decision to experiment with containerized transport was the result of a lengthy and detailed management evaluation and can be regarded as something that developed independently of Malcom McLean and Pan-Atlantic. See L. A. Harlander, "Engineering Development of a Container System for the West Coast—Hawaiian Trade," *Transactions of the Society of Naval Architects and Marine Engineers* 68 (1960): 1052–1088. For a brief treatment of Matson's early container operations, see James L. Shaw, "Three Decades of Containerization on the Pacific," *Steamboat Bill* 196 (Winter 1990): 277–279.

2. *Containerization Oral History Collection; 1999–2000* (Archives Center; National Museum of American History), Wayne Horvitz interview, Part 1, 13.

3. *New York Times*, January 13, 1960.

4. *McLean Foundation Oral History Collection*, Robert J. Pfeiffer interview, 29.

5. For additional details about these conversions, see "The Santa Eliana," *Maritime Reporter* 22 (February 1, 1960): 9, 11, 13; see also *New York Times*, January 13, 1960.

6. "Breakthrough 1960," *Via Port of New York* 12 (March 1960): 2. The full article runs from pages 2 through 5.

7. See *New York Times*, January 30, 1960.

8. Ibid., February 20, 1960.

9. Ibid., March 21, 1958.

10. Ibid., July 18, 1958.

11. For a general description of this unique service, see "The Railway-Car Ferry Seatrain," *Marine Engineering* 34 (January 1929): 30.

12. Seatrain extended service north to New York in 1932, using a facility in Hoboken to load and unload railroad cars. After World War II Seatrain shifted its New York operations upriver to Edgewater, New Jersey, where the New York, Susquehanna and Western Railroad delivered freight cars over a branch line that ran between Edgewater and the

railroad's main line at Little Ferry. For a recent treatment of Seatrain, see David Hendrickson, "From Boxcars to Boxships: The Ships of Seatrain Lines," *Steamboat Bill* 254 (Summer 2005): 89–102. For an earlier treatment, see John L. Hazard, *Crisis in Coastal Shipping* (Austin: University of Texas Press, 1955), 161–171.

13. For a treatment of this unusual company, see "Seagoing Warehouse," *Via Port of New York* 12 (October 1960): 2–6.

14. "After long and careful consideration, Waterman's top management, during the latter part of 1956, decided that Waterman would make application for such a Government operating-differential subsidy. Mr. J. K. McLean, Waterman President, pointed out a number of factors considered in making the decision. The ever increasing cost of operating vessels in foreign trade in competition with foreign flag lines operating at a much lower rate was a primary reason." "History of Waterman Steamship Company," 28. Unpublished paper in the holdings of the McLean Foundation, Alexandria, Va. See also *New York Times,* May 21, 1958.

15. *New York Times*, February 21, 1961. Three months earlier, Luckenbach had talked about converting its intercoastal service into a containerized operation and identified a trio of vessels for rebuilding into the company's first container ships. Two were ex–USN auxiliary aircraft carriers—USS *Chenango* (CVE 28) and USS *Suwanee* (CVE 27)—World War II veterans that had earlier been converted into "baby flattops" from fleet oilers. The third vessel was a T-2 tanker, *Tatarrax,* a) *Conestoga*, that was previously owned by Mobil Oil. See *New York Times*, November 26, 1960.

16. *New York Times*, February 22, 1961; *Wall Street Journal*, April 4, 1961.

17. See *New York Times*, March 17, July 8, September 9, 1962. See also *Marine Engineering* 67 (October 1962): 114.

18. See *New York Times*, August 11, 1962.

19. For a treatment of Sea-Land's new terminal and office complex, see "A New Look at Elizabethport," *Marine Engineering* 68 (October 1963): 56–57; "From Cattails to Containers," *Via Port of New York* 14 (September 1962), 2–4; *New York Times*, November 30, 1962; July 19, 1964.

20. *Containerization Oral History,* Ronald Katims interview, 50.

21. For additional details, see "Sea-Land's Columbia Built by St. Louis Ship Transports Trailers from Oregon to California," *Maritime Reporter* 25 (August 1, 1963): 6.

22. See *The Ships of Sea-Land Service* (privately published company paper), Pt. II, 2.

23. See *New York Times*, July 26, 1961.

24. For a biography of Ludwig, including information about his relationship with Malcom McLean, see Jerry Shields, *The Invisible Billionaire: Daniel Ludwig* (Boston: Houghton Mifflin, 1986), esp. 203–224. See also *Wall Street Journal*, March 31, 1965; June 2, 1967.

25. *McLean Foundation Oral History,* Keith Tantlinger interview, 8.

26. *Containerization Oral History,* Paul Richardson interview, 12–13.

27. Personal letter to the author from Captain Warren G. Leback, August 5, 2004.

28. *McLean Foundation Oral History,* combined interview with Charles Cushing, Paul Richardson, and Ronald Katims, 24–25.

29. *New York Times*, May 8, 1961.

30. *New York Times,* April 23, 1962. See also "Bull Line Sold to Kulukundis Interests," *Marine Engineering* 66 (May 1961): 84.

31. See *New York Times*, April 23, 1962.

32. *Containerization Oral History*, Ronald Katims interview, 64.

33. The vessel involved was *Mobile* and it departed Baltimore on April 9, 1963. See *New York Times*, April 15, 1963.

34. See *Marine Engineering* 69 (March 1964): 66; (April 1964): 82; (May 1964): 66. For background on the development of Alaska Steamship, see S. G. Hayman, "Cribs, Guards and Trailer Vans—'Package Freight to Alaska,'" *Ships and the Sea* 7 (Fall 1957): 12–15.

35. What was likely the first intermodal containerized transport in North America, possibly the world, involved steamship service between Vancouver, British Columbia, and Skagway, Alaska, with continuation inland over the narrow-gauge White Pass and Yukon R.R. The 3,000-GRT motor ship *Clifford J. Rogers*, built in Montreal and operated by British Yukon Ocean Services, began sailing between Vancouver and Skagway in 1955, and may well be the first vessel in the world to be outfitted with below-deck cells for carrying containers, granted that the containers used in this service were a good deal smaller than the containers that would later be used by Sea-Land and other companies. For additional details, see R. Carpenter, *Container Ships* (Hemel Hempstead, England: Model and Allied Publications, 1971), 16; *Wall Street Journal*, February 16, 1956.

36. See *New York Times*, March 19, 1966.

37. The six converted C-4s were all built at Ingalls Shipbuilding in Pascagoula, Mississippi, between 1964 and 1965, measured 7,247 gross registered tons, and were 551 feet long. They included *Mormacargo* (Off. No. 296216); *Mormacaltair* (298129); *Mormadraco* (299008); *Mormaclynx* (296947); *Mormacrigel* (297384); and *Mormacvega* (296632). As is the case with so many U.S.-flag steamship companies, very little has been written about Moore-McCormack. For a brief treatment published by the company to commemorate its fiftieth anniversary, see *A Profile of Maritime Progress: 1913–1963* (New York: Moore-McCormack Lines, 1963). Another short treatment of Moore-McCormack is available in "The U.S. Merchant Fleet: Modern Ships, First-Class Service," *Marine Engineering* 83 (May 1978): 46–59. See also Rene De La Pedraja, *A Historical Dictionary of the U.S. Merchant Marine and the Shipping Industry* (Westport, Conn.: Greenwood, 1994), 409–413.

38. See *New York Times*, April 24, 1966.

39. *Containerization Oral History,* Scott Morrison interview, 20.

40. Ibid., 21.

41. Ibid., 20.

42. *McLean Foundation Oral History,* Malcom McLean interview, 33. For additional perspectives on the onset of transatlantic container service, see "Containers Race Across Atlantic," *Business Week* (February 19, 1966), 16; "Containers Widen Their World," *Business Week* (January 7, 1967), 88–90.

43. Sea-Land would terminate intercoastal container service in late 1977. See *Wall Street Journal*, December 12, 1977. Historian Arthur Donovan sees McLean's entry into transatlantic trade as a desire to avoid the oppressive regulatory situation the ICC still perpetuated in U.S. domestic markets. McLean could agree to observe the transatlantic conference structure that equalized rates among rival steamship companies, Donovan maintains, and compete with traditional liner companies on the basis of the cost savings that containerization produced. See Arthur Donovan, "Regulatory Regimes, Technological Innovation, and the Origins of Containerization," paper prepared for the Second Conference on Railroad Industry Structure, Competition and Investment, Northwestern University, October 2004.

44. See *Marine Engineering* 70 (May 1965): 64.

45. For information on Grace Line's "second generation" container ships, see "Grace Line Introduces Unique New Ship as Port Newark Hears New Call," *Via Port of New York* 15 (February 1963): 2–3.

46. An important contribution to the literature of the container-ship industry was written on the occasion of its tenth anniversary. See James J. Henry and Henry J. Karsch, "Container Ships," *Transactions of the Society of Naval Architects and Marine Engineers* 74 (1966): 305–355. Henry and Karsch provide information on all known U.S.-flag container ships of the era, as well as general developments about the industry.

47. See "MarAd Allocates 18 C-4's for Exchange to Private Operators," *Marine Engineering* 69 (March 1964): 70. See also *New York Times*, November 11, 1964.

48. See *Wall Street Journal*, March 31, 1965.

49. For some reflections on issues associated with the installation of shoreside gantry cranes, see *Containerization Oral History*, Charles Cushing interview, 7–8.

50. For additional details, see "Reach for the Sky," *Via Port of New York–New Jersey* 33 (October 1982): 5.

51. See "Mini-Containership Delivered to Slater Boat Service by Halter Marine," *Marine Engineering* 73 (November 1968): 80–81. *Rio Haina* was later acquired by Cross Sound Ferries, renamed *North Star*, and used in that company's service between New London, Connecticut, and Greenport, New York.

52. *Containerization Oral History*, Scott Morrison interview, 4.

53. Ibid. In a recent work, author Frank Broeze maintains that the alliance system of cooperation among container-ship operators is another maritime innovation that the airline industry later adopted. Broeze, *Globalisation of the Oceans* (St. John's, Newfoundland: International Maritime Economic History Association, 2002), 132.

54. See *Wall Street Journal*, May 12, 1965. For a brief historical account of Waterman Steamship, see "Ocean Carriers Spotlight on . . . Waterman Steamship Corporation," *Via Port of New York* 27 (December 1975): 2–4. See also De La Pedraja, *Historical Dictionary of the U.S. Merchant Marine and the Shipping Industry*, 653–655.

55. Cargo ships offering liner service operate between fixed ports of call on a published schedule, much like an intercity bus line. Retaining the analogy, tramp service is akin to charter bus operations, where a vessel is available to haul cargo between any ports on an as-needed basis.

NOTES TO CHAPTER 5

1. *New York Times*, October 24, 1965.

2. For information about these C-4 conversions, see "Speedy Conversion Pays Off for Owner," *Marine Engineering* 75 (January 1970): 66–67; "Trooper Converted Into Big Container Carrier," *Marine Engineering* 75 (December 1970): 91.

3. For information about *Atlantic Span*, see "M. V. Atlantic Span," *Maritime Reporter* 29 (October 15, 1967): 6, 8.

4. Ibid.

5. For information about *C. V. Lightning*, see Frank O. Braynard, *Famous American Ships*, rev. ed. (New York: Hastings House, 1978), 205–206; see also *Marine Engineering* 74 (April 1969): 80. For information about *Encounter Bay*, see "Ships Have to Carry a Cargo of Feathers," *Marine Engineering* 74 (September 1969): 74–77.

6. "Ships Have to Carry a Cargo of Feathers," 75.

7. "U.K. and U.S. Container Ships Compared," *Fairplay International Shipping Weekly* 254 (March 6, 1975): 7.

8. For information about Manchester Liners, see R. Carpenter, *Container Ships*, (Hemel Hempstead, England: Model and Allied Publications, 1971), 24–25.

9. See "Contracts for 199 Vessels," *Marine Engineering* 74 (September 1969): 77–80.

10. *Containerization Oral History Collection: 1999–2000* (Washington, D.C.: National Museum of American History), Ronald Katims interview, 22–23.

11. Ibid., 23.

12. Ibid., Paul Richardson interview, 16.

13. See *New York Times*, May 26, 1966; *Wall Street Journal*, May 26 and December 27, 1966.

14. See *Containerization Oral History*, Ronald Katims interview, 27.

15. See, for example, "Containers Break Vietnam Bottleneck," *Marine Engineering* 72 (November 1967): 64.

16. *McLean Foundation Oral History Collection*, Malcom McLean interview, 60–61.

17. *Wall Street Journal*, May 28, 1975.

18. For additional information about the *Mayaguez* incident, see Roy Rowan, *The Four Days of Mayaguez* (New York: Norton, 1975). A detailed account of the *Mayaguez* incident, including the identification of various crewmembers, is available at www.usmm.org/mayaguez.html. Audiotapes and printed transcripts of interviews with crewmembers of the *Mayaguez* are available at the Gerald R. Ford Library, in Ann Arbor, Michigan.

19. "The Ships of Sea-Land Service," unpublished paper prepared by the Sea-Land Company, ca. 1975, pt. II, 16.

20. *McLean Foundation Oral History*, John Boylston interview, 8.

21. See *New York Times*, May 17, 1969; *Wall Street Journal*, May 19, 1969.

22. "The Ships of Sea-Land Service," pt. II, 12.

23. *Containerization Oral History*, John Boylston interview, 27.

24. Ibid., 29.

25. Personal letter to the author from William du Barry Thomas, April 16, 2004.

26. For a detailed study of the design and construction of the SL-7, see J. W. Boylston, D. J. deKoff, and J. J. Muntjewerf, "SL-7 Containerships: Design, Construction, and Operational Experience," *Transactions of the Society of Naval Architects and Marine Engineers*

82 (1974): 427–479. For more concise treatments, see "New Speed Queens for the North Atlantic," *Marine Engineering* 77 (November 1972): 56–57, 131–132; "The Sea-Land McLean and Sea-Land Galloway," *Maritime Reporter* 34 (November 1, 1972): 7, 9; "Fastest Merchant Ships in the World," *Marine Engineering* 77 (December 1972): 62, 122–123. See also *New York Times*, September 18, 1972.

27. *Containerization Oral History*, John Boylston interview, 30.

28. For information about the SL-7's power plant, see Boylston, deKoff, and Muntjewerf, "SL-7 Containerships," 446–448.

29. The U.S. Navy's Essex Class carriers were twin-screw vessels with measurements comparable to the SL-7. Essex Class carriers had a displacement tonnage of 27,100 vs. the 27,000-to-29,000 deadweight tonnage of the SL-7. The warships were rated at 150,000 horsepower, while the container ships were 120,000. Some sources put the top speed of an Essex at thirty-five knots, but others claim it was thirty-three knots—exactly the same as McLean's first class of newbuildings.

30. *Containerization Oral History*, John Boylston interview, 35–36. I repeat this story from the *Oral History* for its general interest. I must report, however, that in a personal letter to me dated December 30, 2004, Warren Leback recalls the sea trials of both vessels as taking place on separate days along the same measured mile in Oslo Fjord. Leback also has no recollection of the quotation Boylston attributes to him.

31. Ibid., 36–37.

32. Boylston, deKoff, and Muntjewerf, "SL-7 Containerships," 455; *Containerization Oral History*, John Boylston interview, 43.

33. Boylston, deKoff, and Muntjewerf, "SL-7 Containerships," 458.

34. See *New York Times*, September 23 and October 1, 1972.

35. For additional details on upgrades that were made to Sea-Land's portion of the Elizabethport facility, see "Satisfaction Guaranteed," *Via Port of New York–New Jersey* 31 (January 1979): 2–3.

36. *New York Times*, May 14, 1969; *Wall Street Journal*, May 14, 1969.

37. *Containerization Oral History*, John Boylston interview, 26–27.

38. *Containerization Oral History*, Scott Morrison interview, 67–69.

39. For additional information about these four vessels, see Fred A. Stindt, *Matson's Century of Ships* (Modesto, Calif.: privately published, 1982), 172–173, 277–278.

40. For information about this feature of the Matson-designed vessels, see *Containerization Oral History*, Les Harlander interview, 21–23.

41. "Marine superintendents calculated that the achievement of *Mauretania*'s final two knots required as much coal as the first twenty-two." John Maxton-Graham and Bard Kollveit, *Under Crown and Anchor* (Miami Beach, Fla.: OnBoard Media, 1995).

42. Boylston, deKoff, and Muntjewerf, "SL-7 Containerships," 448.

43. For additional details, see R. F. Gibney, *Container Lines: The Strategy Game* (London: Lloyd's of London Press, 1984), 41–43.

44. See "Conversions of Distinction for the Navy's Military Sealift Command," *Marine Engineering* 89 (October 1984): 66–68.

45. In calling this effort Sea-Land's first venture in diesel propulsion, there is no intention of slighting the status of *New Yorker* and *Floridian*, two vessels that were built in

1960 for the Erie and Saint Lawrence Corporation and acquired by Sea-Land in 1962, largely for feeder service in and around Puerto Rico. The vessels were primarily ro/ro vessels that could accommodate a few containers as deck cargo. New Yorker was later renamed *Aleutian Developer* and deployed in Alaskan feeder service by Sea-Land, while *Floridian* had a much shorter tenure with Malcom McLean's company. The vessels were, indeed, Sea-Land's first diesel-powered tonnage—but they were certainly not cellular container ships.

46. Personal letter to the author from Captain Warren Leback, October 7, 2004.

47. For detailed information about the D-9 Class, see Richard J. Baumber, Toshio Watanabe, and Hiroshi Huzimura, "Sea-Land's D9 Containerships: Design, Construction, and Performance," *Transactions of the Society of Naval Architects and Marine Engineers* 91 (1983): 225–255. For a more concise treatment, see "Cost Efficiency Is Key Factor in New Sea-Land Ship," *Marine Engineering* 85 (March 1980): 85.

48. For details about Sea-Land's chartering-in tonnage to supplement its new D-9 Class, see Gibney, *Container Lines*, 45.

NOTES TO CHAPTER 6

1. *Wall Street Journal*, May 1, 1980.

2. For a recent summary history of United States Lines, with emphasis on the company's cargo operations, see Roy Fenton, "American Pioneers and Presidents," *Ships Monthly* 39 (June 2004): 14–17; see also "Ocean Carriers' Spotlight on . . . United States Lines, Inc.," *Via Port of New York–New Jersey* 33 (July 1981): 10–11; Rene De La Pedraja, *A Historical Dictionary of the U.S. Merchant Marine and the Shipping Industry* (Westport, Conn.: Greenwood, 1994), 624–627.

3. For information about the *United States* and additional background on United States Lines, see Frank O. Braynard, *The Big Ship* (Newport News, Va.: The Mariners' Museum, 1981), esp. 1–37.

4. For information about Lancer Class ships, see Fenton, "American Pioneers and Presidents," 17; R. J. Carpenter, *Container Ships* (Hemel Hempstead, England: Model and Allied Publications, 1971), 32–33.

5. See *New York Times*, November 1, 1969.

6. See *Wall Street Journal*, October 6 and 28, 1969.

7. *New York Times*, November 10, 1970.

8. Ibid., February 13, 1973.

9. *Wall Street Journal*, August 18, 1976.

10. Some accounts claimed the transaction was for $110.8 million. See *New York Times*, April 13 and June 7, 1978.

11. For additional information, see "American New York," *Marine Engineering* 89 (August 1984): 59–61.

12. Kelly is quoted in *Journal of Commerce* (September 26, 1986), 1; *Forbes* (March 23, 1987), 33.

13. *Wall Street Journal*, September 26, 1986.

14. "American New York," *Marine Engineering* 89 (December 1984): 71.

15. Duffy made this allusion not in *Tow Line*, but in a news column he writes for a maritime history journal. See *Steamboat Bill* 172 (Winter 1984): 269.

16. For general information about the Howland Hook facility—which United States Lines shared with Farrell Lines—see "Designed for the Future," *Via the Port of New York–New Jersey* 31 (February 1979): 6–7. See also *New York Times*, April 17, 1985.

17. *Containerization Oral History Collection: 1999–2000* (Washington, D.C.: National Museum of American History), Charles Cushing interview, 62.

18. "American Ohio," *Marine Engineering* 90 (November 1985): 39, 41; "American North Carolina," *Marine Engineering* 90 (December 1985): 58–59.

19. See "Facsimile System Speeds Container Operations for United States Lines," *Marine Engineering* 83 (September 1978): 52.

20. *Wall Street Journal*, September 26, 1986.

21. R. F. Gibney, *Container Lines: The Strategy Game* (London: Lloyd's of London Press, 1984), 1.

22. See *Wall Street Journal*, November 25, 1986; *New York Times*, November 25, 1986. For additional perspective on this action, see Allan D. Frank, "Malcom McLean's Pirate Ships," *Forbes* (March 23, 1987), 32–33.

23. *Wall Street Journal*, November 25, 1986.

24. See *Los Angeles Times*, January 14, 1986.

25. For analysis of Sea-Land's emergence from R. J. Reynolds's control, see Gibney, *Container Lines*, 1–2.

26. See *Sea-Land Vessel Standards* (Edison, N.J.: Sea-Land Service, 1990), S–220, S220A. The company published vessel standard books at various intervals.

27. In November 1986, six Econships found temporary refuge at the Passenger Ship Terminal along the Hudson River in New York. The advent of the 1987 cruise season forced them to be moved, though, and several were tied up along the Brooklyn waterfront opposite lower Manhattan. *American Oklahoma*, *American New Jersey*, and *American New York* were tied up in Singapore, *American California* found itself in Hong Kong when United States Lines suspended operations, and other Econships found temporary refuge in Tacoma, Washington. *Wall Street Journal*, August 5, 1987.

28. *New York Times*, February 9, 1988.

29. See *Wall Street Journal*, January 3, 1986.

30. Ibid., April 22 and 28, 1986.

31. For additional information about American railroads, including the criteria for qualification as a Class One carrier, see John F. Stover, *The Life and Decline of the American Railroad* (New York: Oxford University Press, 1970). One interesting factor that might affect the future corporate alignment of U.S. railroads, and fault assertions about there being "four major carriers," is the entry of two major Canadian railroads, Canadian National and Canadian Pacific, into U.S. markets through merger and acquisition.

32. Brian Solomon, *CSX* (St. Paul, Minn.: MBI, 2005).

33. Paul K. Withers, *Conrail, the Final Years: 1992–1997* (Halifax, Pa.: Withers, 1997).

34. *New York Times*, July 25, 1984.

35. For details about problems CSX faced after acquiring substantial Conrail mileage, see William C. Vantuono, "Turnaround Time at CSX," *Railway Age* 202 (August 2001): 29–30; Tom Murray, "Looking for a Silver Bullet," *Trains* 65 (September 2005): 28–35.

36. Terminology used to describe various kinds of intermodal operations can be confusing, particularly since, in practice, many terms are used interchangeably, even though they have more restricted meanings. The designation "land bridge," for instance, should be reserved for a container shipment that includes separate ocean movements on each end, with a rail segment in between. An example would be a container that travels from Hong Kong to Rotterdam, with an intermediate leg across the United States from Long Beach to Savannah by train. On the other hand, the term "mini-bridge" properly refers to a container shipment that reaches its destination thanks to a sea leg, plus a land leg aboard a connecting rail service. An example might be a shipment from Singapore to Elizabethport, New Jersey, that travels across the Pacific by ship and then eastward from the West Coast by train. The less-used term "micro-bridge" refers to a service that is similar to a mini-bridge, except that its origin or destination is not a seaport, like Elizabethport, but an inland location, such as Denver. The term "rail bridge," while not commonly used, is somewhat generic and refers to all styles of intermodal container shipments involving both ships and trains.

37. The couplers in a conventional freight car include a certain amount of "slack"—fore-and-aft movement that is critical to the operation of a long train. When an engineer engages the throttle in a locomotive and sets a freight train in motion, this slack is gradually let out and the train begins to roll, effectively, one car at a time. Once in motion, a mile-long train may have some of its cars moving uphill and some downhill at the same time, so there is a constant "whipping action" as slack is let out and taken up, and it is this action that may inflict damage to cargo inside freight cars—or containers. Five-section double-stack cars have fewer couplers and so reduce the amount of slack in a container train, thus ensuring a much smoother ride. It has been said that one rail-bridge advocate demonstrated how effective the new rolling stock was in eliminating en route damage by setting a dinner table with fine china and glassware inside a container, and when he opened the doors of the container at journey's end, nothing on the table had been even slightly damaged. The truth of this anecdote is subject to some question, though, since the same story was told during the days when *Gateway City* was running sea trials.

38. *McLean Foundation Oral History Collection*, Malcom McLean interview, 29.

39. One can find various estimates for the time advantage of a rail bridge over an all-water route from the Far East to the East Coast, ranging from as little as four days to as much as two weeks. Each mode of transport is subject to its own unique kinds of delays, though. Lower than average rainfall in the mountains of Panama can reduce water levels in the Panama Canal and prohibit vessels of certain draft from using the waterway, while congestion at West Coast seaports can also affect the ability of railroads to speed double-stack trains to inland points.

40. See David J. DeBoer, *Piggyback and Containers* (San Marino, Calif.: Golden West, 1992), 151–165.

41. The Maersk color scheme that was rendered on Santa Fe diesel locomotive No. 146—a GP-60 model manufactured by the Electro-Motive Division—also proved attractive to model railroaders and a version of the locomotive was produced in HO gauge to speed containers along model rights-of-way in basements and attics from coast to coast.

42. For a history of this railroad, see Robert E. Mohowski, *The New York, Susquehanna and Western Railroad* (Baltimore, Md.: Johns Hopkins University Press, 2003).

43. A branch line formerly left the Susquehanna main line at Little Ferry and proceeded east to the banks of the Hudson River at Edgewater, New Jersey. This three-mile line included a 5,069-foot-long tunnel under the New Jersey Palisades that was opened in 1894. It is of interest because, starting in 1947, it was used to move freight cars to a Seatrain facility in Edgewater, where they would be hoisted aboard Seatrain ships for voyages to Havana (until 1959), as well as various U.S. coastal cities. Seatrain declared bankruptcy in 1980, and the Susquehanna's Edgewater branch is no longer active.

44. See "Speed at the Track," *Via Port of New York–New Jersey* 47 (March–April 1995): 18–19, 27.

45. For information about the origins of rail-bridge service along the Trans-Siberia railroad, see "Landbridge Speeds East-West Trade," *Fairplay International Shipping Weekly* 254 (February 13, 1975): 47, 49, 51–52, 58. Evidence of the interest the Soviet Union had in container operations can be found in an international conference on the subject that was held in Leningrad in 1972. See *Marine Engineering* 77 (January 1972): 86.

46. For a concise treatment of conferences, see De La Pedraja, *Historical Dictionary*, 144–145. For more detailed information, see Lane Kendall and James Buckley, *The Business of Shipping*, 7th ed. (Centreville, Md.: Cornell Maritime Press, 2001).

47. Mary Brooks, *Sea Change in Liner Shipping* (Amsterdam: Pergamon, 2000), 3.

48. See *New York Times*, June 1, 1958.

49. The first proposal to establish a conference composed solely of container-ship operators was submitted to the Federal Maritime Commission for approval in August 1969. The conference's membership was to include American Export–Isbrandtsen Lines, Atlantic Container Lines, Dart Container Line, Hamburg American Line, Moore-McCormack, United States Lines, North German Lloyd, and Sea-Land Service. *New York Times*, August 28, 1969.

50. For recent accounts of the increasing size of contemporary container ships, see Oliver Sesemann, "March of the Big Box Boats," *Ships Monthly* 39 (February 2004): 30–33. The largest container ship in service when Sesemann prepared his report was Hapag-Lloyd's 7,506-TEU *Hamburg Express*, but even larger ships were then on the horizon and have since entered service. See also Jim Shaw, "Rise of the Box Boats," *Ships Monthly* 40 (August 2005): 34–37.

51. Kendall and Buckley, *The Business of Shipping*, 296–297.

52. *New York Times*, October 4, 1984.

53. Brooks, *Sea Change in Liner Shipping*, 166–169.

54. The history of evolving cooperation among European countries is complex, but in simplified terms, one can identify the creation of the Common Market with the Treaty of Rome that was executed in 1957, and the European Union with the Maastricht Treaty of 1993.

55. Brooks, *Sea Change in Liner Shipping*, 17–19.

56. Ibid., 167.

57. Ibid., 168.

58. For details about this unusual conversion project, see Hugh Stephen Ryan, Eugene A. Van Rynbach, and Hans G. Nilsen, "New Ships from Old: An Innovative Approach to Fleet Enhancement," *Transactions of the Society of Naval Architects and Marine Engineers* 103 (1995): 209–235.

59. Letter to the author from William du Barry Thomas, September 20, 2004.

60. "Sea-Land Anchorage, Tacoma and Kodiak," *Marine Engineering* 92 (December 1987): 19. The hulls of these three vessels were ice-strengthened out of respect for the northern trades they would work. See also *Wall Street Journal*, January 25, 1984.

61. An important "convenience" associated with registering vessels under a flag of convenience is that the country of registry recognizes maritime licenses issued by multiple countries and does not require ships flying its flag to be operated by its own nationals and/or by individuals holding licenses it has issued. Liberia has long maintained such an open registry, and even takes pains to ensure that routine dealings associated with vessel registrations can be conducted with—well, convenience. Filing of documents does not require jumping aboard an airplane and flying to Monrovia, since the Liberian vessel registry is managed out of an office park in Reston, Virginia.

62. *Wall Street Journal*, February 15, 1995.

63. *Sea-Land Motivator* and *Sea-Land Pride* were later returned to U.S. registry, while *Sea-Land Navigator* and *Sea-Land Pacer* "took their place" among the vessels reflagged in the Marshall Islands.

64. See *Journal of Commerce*, November 23, 1998.

NOTES TO CHAPTER 7

1. See *New York Times*, March 17, 1999.

2. "CSX Corp. to Split Sea-Land Unit," Bloomberg News Service, March 16, 1999; *Journal of Commerce*, January 29, 1999.

3. *CSX Annual Report* (1997), 9.

4. Ibid., 25.

5. Ibid.

6. *Journal of Commerce*, November 1, 1988.

7. Ibid.

8. Ibid. For a citation to CSX displeasure with Sea-Land earnings, see *Journal of Commerce*, January 21, 1999.

9. Mandl resigned from Sea-Land and CSX in 1991 and has since held a number of positions in the communications industry.

10. See *Journal of Commerce*, October 26, 1998.

11. For an analysis of the entire transaction, see Jim Hanscom, "Sea-Land Purchase Puts Maersk Way Out in Front," *Seatrade Review* 28 (September 1999): 19, 21.

12. See *Journal of Commerce*, February 28, 2003.

13. See *New York Times*, May 25, 2004; *Wall Street Journal*, May 25, 2004; *Journal of Commerce*, May 24, 2004.

14. *Honolulu Advertiser*, online edition, March 3, 2005.

15. *Journal of Commerce*, September 8, 2003.

16. For an interesting account of a trip from Seattle to Anchorage and Dutch Harbor aboard *Horizon Anchorage*, see Brian Gauvin, "Crack Crew: When a Cylinder Fails, Engineers Still Keep Ship on Schedule," *Professional Mariner* 78 (February–March 2004): 24–28.

17. Before the 1999 transactions, Safmarine had a total TEU capacity of 55,584, placing it twentieth among world container-ship operators. By contrast, Maersk Line was ranked first with 346,123, while Sea-Land was in sixth place with 211,358. *Containerization International Yearbook: 1999* (London: Emap Business Communications, 1999), 7.

18. *World Shipping Directory: 2004–2005*, ed. Maggie Eacott (Redhill, England: Lloyd's Register-Fairplay Limited, 2004), 1–107, 1–108.

19. *American Heritage* 45 (December 1994): 90, 92.

20. For additional information about TrailerBridge, see *Wall Street Journal*, January 31, 1992; see also "TrailerBridge gets Title VI Loan Guarantees," *Professional Mariner* 30 (February–March 1998): 50.

21. For obituaries of Malcom McLean, see *New York Times*, May 29, 2001; *Washington Post*, May 27, 2001; *Professional Mariner* 58 (August–September 2001): 78–80.

22. Charles R. Cushing, "Eulogy for Malcom McLean," May 30, 2001; unpublished paper in the holdings of the McLean Foundation, Alexandria, Va.

NOTES TO CHAPTER 8

1. The legal citation to the Maritime Security Program is PL 104-239. For additional information, see Stephen J. Thompson, "The Maritime Security Program (MSP) in an International Commercial Context: A Discussion" (Congressional Research Service Report 98-864).

2. For a comprehensive history of American President Lines, see John Niven, *The American President Lines and Its Forebears: 1848–1984* (Newark: University of Delaware Press, 1987). For a shorter treatment of the company's adoption of container technology, see Charles R. Cushing, "Break-Bulk and Containerships," in *A Half-Century of Maritime Technology: 1943–1993*, ed. Harry Benford and William A. Fox (Jersey City, N.J.: Society of Naval Architects and Marine Engineers, 1993), 218–220. See also Rene De La Pedraja, *A Historical Dictionary of the U.S. Merchant Marine and the Shipping Industry* (Westport, Conn.: Greenwood, 1994), 41–46.

3. As originally built, APL's Seamasters could transport "143 large cargo vans," but they were not at this point cellular container ships. See "President Van Buren, Ship of Innovations, Launched by Ingalls Shipbuilding," *Marine Engineering* 72 (February 1967): 74.

4. See "President Jefferson: First of APL's Pacesetters," *Marine Engineering* 78 (March 1973): 37–39.

5. See *Marine Engineering* 78 (May 1973): 138. For additional information about *Austral Envoy* and its sister ships, see Frank O. Braynard, *Famous American Ships*, rev. ed. (New York: Hastings House, 1978), 214–215.

6. For additional details, see Niven, *American President Lines and Its Forebears*, 230–260.

7. See David J. DeBoer, *Piggyback and Containers* (San Marino, Calif.: Golden West, 1992), 151–157.

8. For information about these vessels, see Eugene K. Pentimonti, "What APL Expects Out of Its Diesel-Powered Containerships," *Marine Engineering* 87 (April 1982): 82–86, 88, 90. See also "Diesel Containership President Lincoln," *Marine Engineering* 87 (December 1982): 57–59.

9. For additional information about these vessels, albeit from a rather detailed technical perspective, see William K. Blake, K. Meyne, Justin E. Kerwin, E. Weiendorf, and J. Friesch, "Design of APL C-10 Propeller with Full-Scale Measurements and Observations Under Service Conditions," *Transactions of the Society of Naval Architects and Marine Engineers* 98 (1990): 77–111.

10. For a sense of the complex political issues involved in increasing the depth of channels around Oakland, see *San Francisco Chronicle*, April 27, 1992.

11. For a recent account of P&O Nedlloyd, see Jim Shaw, "The Dutch Connection," *Ships Monthly* 39 (December 2004): 40–43.

12. See *New York Times*, April 14, 1997.

13. "Add Four to the United States Merchant Fleet," *Professional Mariner* 31 (April–May 1998): 13; see also "APL Joins Newly Subsidized Marad Fleet," *Professional Mariner* 24 (April–May 1997): 22–23.

14. The six vessels were *President Grant* (Off. No. 530138), *President Tyler* (530140), *President Hoover* (530137), *President Washington* (653424), *President Lincoln* (651627), and *President Monroe* (655397).

15. Evergreen's first vessel was a 2,144-GRT break-bulk cargo ship that was built in Japan by Mitsui Zosen in 1948 as *Takaosan Maru*, acquired by Evergreen Marine in 1968, and renamed *Everlite*.

16. R. F. Gibney, *Container Lines: The Strategy Game* (London: Lloyd's of London Press, 1984), 36.

17. Ibid., 37.

18. *Wall Street Journal*, September 6, 1984.

19. Ibid.

20. Ibid., November 25, 1986.

21. For information about Matson, see William L. Worden, *Cargoes: Matson's First Century in the Pacific* (Honolulu: University Press of Hawaii, 1981); Fred A. Stindt, *Matson's Century of Ships* (Modesto, Calif.: Privately published, 1982); De La Pedraja, *Historical Dictionary*, 379–382.

22. For information about management studies that Matson undertook before casting its lot with containerization, see Leslie A. Harlander, "Engineering Development of a Container System for the West Coast–Hawaiian Trade," *Transactions of the Society of Naval Architects and Marine Engineers* 68 (1960): 1052–1088; Harlander, "Further Developments of a Container System for the West Coast–Hawaiian Trade," *Transactions of the Society of Naval Architects and Marine Engineers* 69 (1961): 5–41.

23. Bath Iron Works is a venerable U.S. shipyard that has played a relatively minor role in turning out container-carrying tonnage, either newbuildings or conversions. The

yard can be credited, though, with the first purpose-built container ship to be built in the United States, a four-vessel class of steam-powered vessels that worked for American Export. The first of the quartet was *C. V. Lightning*, delivered in 1967. For additional details, see Braynard, *Famous American Ships*, 205–206.

24. For a detailed account of this reconversion, see Ronald F. Briggs, Peter A. Fisher, and Christopher T. Clement, "The Reconstruction of SS *Matsonia*: Trailership to a Combination Container and RO/RO Ship," *Transactions of the Society of Naval Architects and Marine Engineers* 96 (1988): 365–394.

25. For detailed information about the design and construction of the *R. J. Pfeiffer*, see Arthur J. Haskell, "Contracting for the Building of a Containership in the U.S.—A Buyer's Story," *Transactions of the Society of Naval Architects and Marine Engineers* 101 (1993): 195–213.

26. For additional information, see Richard O. Aichele, "Matson's 'Bird of the Sea' Takes Wing, *Professional Mariner* 76 (2003–4): 10–14; Aichele, "*Maunawili* Joins Its Successful Sister, *Manukai*, on Matson's Hawaii Service," *Professional Mariner* 84 (2004–5): 36–39.

27. For additional information, see "After A Year of Service, Matson Officials Praise Their Hatchcoverless Ship Design," *Professional Mariner* 17 (February–March 1996): 30–32; Philip Alman, "The Open-Top Containership—A U.S. Experience," *Transactions of the Society of Naval Architects and Marine Engineers* 103 (1995): 189–205; H. B. Bendall and A. F. Stent, "Hatchcoverless Container Ships: Productivity Gains From a New Technology," *Maritime Policy and Management* 23 (1996): 187.

NOTES TO CHAPTER 9

1. Unless noted otherwise, information displayed in all tables has been taken from a public website maintained by the U.S. Maritime Administration. See www.marad.dot.gov/MARAD_statistics/index.html.

2. Data for this table were derived from an annual report of the Institute of Shipping Economics and Logistics entitled "ISL Shipping Statistics and Market Review," available at www.isl.org/infoline.

3. For a delightful book about harbor and docking pilots in Savannah and how they guide container ships in and out of port told by a former pilot dispatcher, see O. Kay Jackson, *Waking Up Men* (Savannah, Ga.: Privately published, 2004). Both Savannah and Charleston have recently built new highway bridges across the rivers that lead to their respective container ports. While the new spans were justified on the grounds of the increased automotive traffic they will handle, both include additional "air draft" so even larger vessels can safely pass beneath them.

4. *New York Times*, August 3, 2005.

5. N. Wijnolst, M. Scholtens, and F. Waals, *Malacca-max: The Ultimate Container Carrier* (Delft, Netherlands: University of Delft Press, 1999).

6. "Ultra-large Container Ships (ULCS): Designing to the Limit of Current and Projected Terminal Infrastructure Capabilities," Lloyd's Register Technical Association (2002).

7. Jim Shaw, "Rise of the Box Boats," *Ships Monthly* 40 (August 2005): 34–37.

8. For additional information, see the company's Web site, www.fastshipatlantic.com.

9. *New York Times*, June 30, 2005.

10. Bridges established the ILWU because of worker dissatisfaction with the ILA as a bargaining agent for West Coast longshoremen. For additional information on a fascinating chapter in U.S. labor history, see Charles P. Larrowe, *Harry Bridges: The Rise and Fall of Radical Labor in the United States* (New York: L. Hill, 1972).

11. Containers are identified by an alphanumeric system that uses a four-letter code to specify a container's owner, followed by appropriate numerals. Containers owned by container-ship companies have letter codes that end in U. The code for Sea-Land was SEAU, while United States Lines was assigned USLU. For additional information, see "How to Read Container Numbers," *Via Port of New York and New Jersey* 38 (May 1986): 6.

12. See "Number and Size of the U.S. Flag Merchant Fleet and Its Share of the World Fleet," published annually by the Bureau of Transportation Statistics of the U.S. Department of Transportation and available at www.bts.gov.

13. Additional information about the Ready Reserve Force is available at the Maritime Administration's Web site, www.marad.dot.gov.

14. For a description of New York's efforts at deepening channel approaches to Newark Bay from thirty-five feet to forty feet in the mid-1980s, see "Geared for Navigation," *Via Port of New York and New Jersey* 38 (August 1986): 6–7. For an account of the kinds of dredgers currently in use at major world harbors, see Jim Shaw, "Digging Deeper," *Ships Monthly* 40 (July 2005): 36–39.

15. Among the FDNY fireboats that greeted RMS *Queen Mary* in 1936 was what was then the flagship of the municipal firefighting fleet, the 1931-built *John J. Harvey*. The very same *John J. Harvey*, now owned by a dedicated group of preservationists, spooled up her engines and tossed streams of water skyward to welcome *Queen Mary* 2 in 2004.

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GENERAL INDEX

VESSEL INDEX

Roman numerals after multiple vessels with the same name merely distinguish those vessels that are mentioned in the text; not all vessels with that name that may have operated for a given company over its full history. In addition, page numbers shown in **bold face** indicate photographs.