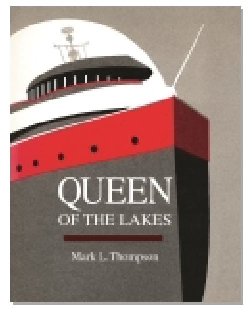
Queen of the Lakes

Mark L. Thompson



Published by Wayne State University Press

Thompson, Mark L.
Queen of the Lakes.
Wayne State University Press, 2017.
Project MUSE., <a href=" https://muse.jhu.edu/.

30

The Footers

In an article appearing in the May 5, 1898, edition of *Marine Review,* the author predicted what the Great Lakes shipping industry would be like in 1940: "What a change is here! Most of the fleet are 1,000-footers, some of them 100 feet wide and 50 feet deep."[1] Readers of the popular marine journal must have been astonished by the flamboyant prediction. At that time, the largest ship on the Great Lakes was the 450-foot-long by 50-foot wide *Superior City,* which had been launched less than a month before the article appeared. We can only speculate at how people in the industry would have reacted to the article, but it is safe to assume they might have questioned the author's sanity. They most certainly would have scoffed at his extravagant predictions. People in the Great Lakes shipping industry have generally not been regarded as a far-sighted lot. Most predictions they have made about the future of their industry have subsequently proven inaccurate.

Even by 1898, it was clear to most realists in the industry that historically there had been few real insights about the direction of shipping on the lakes. At the time, there were many so-called "experts" who claimed that the then-current generation of 450-foot ships would be the largest ever built on the lakes. And along comes some writer who prophesies an industry dominated by 1,000-foot leviathans!

By the time the 1940 shipping season rolled around, it's unlikely that many people remembered the article. If any did, they might have taken some satisfaction from pointing out that the largest ship on the lakes was then the 640-foot *Carl D. Bradley.* The prognosticator of 1898 had been way off base! In fact, if a similar prediction had been made in 1940—that there would be 1,000-foot freighters on the lakes in, say, 1980—that, too, would have been ridiculed. Few could envision that ships would ever reach the 1,000-foot mark. With the benefit of hindsight, however, we know that there was an uncanny accuracy to the predictions made by the writer in 1898. He got the outcome right, but erred on the time frame. He was off by about thirty years. The industry's first 1,000-foot ship wasn't launched until 1972. Today, they're a common sight on the lakes.

The debut of the first of the thousand-footers is rooted in the construction of a new lock on the St. Marys River at Sault Ste. Marie, Michigan. The first funds to study the possibility of building that lock were appropriated by Congress in 1958. At that time there were four locks at the Soo, the largest of which was the MacArthur. The MacArthur Lock had opened to vessel traffic early in World War II. It was 800 feet long, 80 feet wide, and had 30 feet of water over its sills. The Poe Lock of 1896 was 800 feet long and 100 feet wide, but it provided only 18 feet of water over its sills. Too shallow to accommodate most of the ships that were in operation on the lakes by the 1950s, the Poe was no longer being used. The other two locks, the Davis and Sabin, were twins. Opened to traffic in 1914 and 1919, respectively, they were both 1,350 feet long, 80 feet wide and had 24.5 feet of water over their sills. They were an improvement over the Poe Lock, to be sure, but many of the newest ships on the lakes had drafts exceeding the depth limits of the Davis and Sabin locks. Because of the shallowness of these passages, more than half of the ships then in operation could use only the MacArthur Lock.[2]

The growth in the size of ships on the lakes had already exceeded the design limits established when the MacArthur Lock had been built. It was originally intended to handle only ships of up to 660 feet in length. The longest ship in operation at the time the lock was designed was the 640-foot *Bradley.* By 1958, however, there were a number of ships longer than 660 feet. The new giant freighters would fit into the 800-foot lock, but not with the two safety booms in place.

The safety booms are designed to prevent a ship from crashing into and damaging the vital gates at each end of the locks. Before a ship enters the locks, a boom is lowered ahead of the forward lock gate so that if the ship cannot be stopped it will strike the boom and not the gate. Once the ship is stopped in the lock, a second boom is lowered behind it, so that the ship can't drift backward and hit the after gate.

To handle a ship of more than 660 feet in length, the vessel would be brought about halfway into the "Mac" under its own power with the safety booms up. The ship would then be stopped and secured by four steel mooring cables, two forward and two aft. Then the ship's mooring winches would be used to slowly inch the vessel ahead until the after lock gate could be closed. By following this procedure, ships of up to 730 feet long could be squeezed through the MacArthur Lock. By 1965, fifty-two ships exceeded the original 660-foot limits of the Mac and had to be locked through using the special procedure.[3]

By that time, work on a new, larger lock was already well-underway at the Soo. In 1960, the first contracts had been awarded for work on a new Poe Lock. The original plans were to build a lock that was 1,000 feet long, 100 feet wide, and with 32 feet of water over the sills. Work began on the lock in February of 1961—on the site of the 1896 Poe Lock—but the Corps of Engineers went back to the drawing boards the following year and made some changes to the previously adopted plans. At the urging of the Lake Carriers' Association, the Corps enlarged the new lock to 1,200 feet long and 110 feet wide.[4] Construction was completed in the summer of 1968, and after two months of testing, the 647-foot, AAA-class *Philip R. Clarke* made the first transit of the new lock in October.[5] By the time the new Poe Lock opened, construction had already begun at Erie, Pennsylvania, on a mammoth vessel that would revolutionize the shipping industry on the Great Lakes.

Construction of the new Poe Lock was only one of several factors that converged to set the stage for building the first of a new generation of super-carriers on the lakes. The shrinking of the U.S. fleet on the lakes, combined with steady increases in iron ore shipments, also played a role in the decision to build the big freighter. In 1950, there had been 266 U.S. ships that could operate in the iron ore trade, with a combined single-trip carrying capacity of 2.75 million gross tons. By 1965, the number had dropped to 160 vessels, with a carrying capacity of only 2.25 million gross tons.[6] No new ships had been added since the 1960 launching of the *Edward L. Ryerson* and the conversions of a number of former saltwater vessels brought into the lakes in 1962. The number of U.S. ships decreased a little each year, as aging freighters were disposed of by their owners.

At the same time, after dropping precipitously in the late 1950s, tonnages shipped on the lakes showed steady increases, beginning in 1961. Iron ore, representing the largest volume of cargo moved in the Great Lakes system, had shown dramatic rises. From a low of only 51 million tons during the 1959 season, shipments had increased to more than 78 million tons in 1965. A major portion of that expansion was attributable to steady growth in the shipments of pelletized iron ore, known as taconite.

Marble-sized taconite pellets had been developed in the early 1950s as a response to a widespread deterioration in the quality of iron ore being mined on the ranges in Michigan, Minnesota, and Wisconsin. In the pelletizing operation, low-grade ores are crushed, and iron is removed magnetically, or through a flotation process. The iron is then rolled into marble-sized balls and hardened by heating. The resulting pellets contain up to sixty-three percent iron. The first taconite pellets were shipped from the Davis Works of Reserve Mining at Silver Bay, Minnesota, on April 8, 1956, aboard the steamer *J. A. Campbell*.[7] Other pelletizing plants soon went into operation in Minnesota and Michigan. Steel mills around the lakes rapidly modified their operations to use the taconite pellets, which were far superior to the low-grade red ore they had grown used to. By 1965, about one-third of the iron ore moving down the lakes was taconite, and that percentage was expected to increase steadily in future years. Experts had predicted that total ore shipments would reach 97 million gross tons by 1990. That total was expected to be made up of 92 million tons of taconite pellets and only 5 million tons of natural ores.[8]

With predictions of steady increases in iron ore shipments, and the size of the U.S. fleet slowly declining, the time was ripe in 1965 to begin planning for the construction of a new generation of ships on the lakes. U.S. Steel was the first shipping company to seize the moment. In 1966, America's largest steelmaker contracted with Marine Consultants and Designers (MC&D) of Cleveland, Ohio, to design a new freighter to take advantage of the new Poe Lock then under construction at Sault Ste. Marie. Based on the recommendations of MC&D personnel, officials at U.S. Steel's Great Lakes Fleet accepted a plan to build a new self-unloader that would be 858 feet long and 105 feet wide, with a carrying capacity of 44,500 tons. The giant freighter was scheduled for launching at American Ship Building's Lorain yard in July of 1971. On June 24, 1971, a fire swept through the stern section of the vessel while it was still being fitted-out. Four shipyard workers died in the blaze, which also seriously damaged the vessel's engines and other machinery. Repairs delayed completion of the U.S. Steel freighter until June 13, 1972.[9] When the diesel-powered *Roger Blough* went into service, it was the largest ship totally built on the Great Lakes, but it was far from being the Queen of the Lakes.

The builders of the *Stewart J. Cort* abandoned the streamlined stacks that had become popular on the lakes and outfitted the first of the thousand-footers with an almost square stack that matches the boxiness of the ship's hull. The cream-colored stack is topped with a black cap and sports the stylized "I" of the Bethlehem Steel fleet. (Author's collection)

M/V STEWART J. CORT

1,000'x105'x44'9"
Queen of the Lakes
April 1, 1972 to August 7, 1976

Shortly after U.S. Steel approached MC&D to begin design work for the *Blough,* the Cleveland-based firm was also contracted by Litton Industries to develop a ship design for them. Projections for dramatic increases in the amount of iron ore shipped on the lakes had not gone unnoticed by officials in Litton's Los Angeles headquarters. The multinational corporation, perhaps best known as the maker of microwave ovens, saw an opportunity to reap some significant profits by getting involved in the shipping industry on the Great Lakes. In 1966, the company purchased Wilson Marine Transit, an established fleet that operated ten bulk freighters.[10] Shortly after that, Litton announced plans to build a sophisticated automated ship assembly facility at Erie, Pennsylvania. That announcement was followed shortly by word of their decision to retain MC&D to design a ship for them. Litton was descending on the Great Lakes shipping industry in a storm.

The ship being designed by MC&D was not intended for Litton's Wilson fleet. Instead, Litton planned to convince another Great Lakes fleet to order the ship and have it built at their new shipyard in Erie. The staff at MC&D had been instructed to design the new freighter with the ultra-modern Litton yard in mind. They wanted the largest ship possible, within the constraints imposed by the new Poe Lock, the channels of the rivers and harbors the vessel would have to operate in, and the limitations of loading and unloading docks around the lakes.

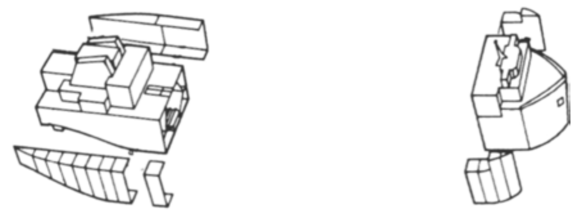
MC&D recommended to Litton the construction of a ship that would be 1,000 feet long, 105 feet wide, and with a depth of 46.5 feet. At maximum draft, the vessel would be capable of carrying 51,500 gross tons of iron ore. With a basic design in hand, Litton approached a number of Great Lakes shipping companies to determine their interest in the planned freighter. In April of 1968, officials at Bethlehem Steel's Great Lakes Steamship Division signed a contract with Litton to have a 1,000-foot vessel built at the Litton shipyard in Erie. At that juncture, MC&D personnel altered the design of the thousand-footer to meet Bethlehem's specific needs. Changes included deepening the hull to forty-nine feet so that the ship could operate at a draft of thirty feet, six inches if the harbors and channels on the Great Lakes were ever dredged to that depth. Actual construction of the ship began in 1968.[11]

Many things about the new Bethlehem freighter were unique, but none moreso than the way in which the vessel was built. The long midbody of the ship, containing the four cargo holds, was built at Litton's new facility at Erie. The bow and stern sections, however, were built several thousand miles away, at Ingalls Nuclear Shipbuilding in Pascagoula, Mississippi. When the bow and stern had been completed, the two ends of the ship were welded together for the long trip around the U.S. coast and down the St. Lawrence Seaway to the Litton shipyard. The odd-looking 184-foot vessel, officially named *Hull 1173,* but nicknamed "Stubby," made the trip under its own power. Because of the size restrictions of locks in the Seaway, the bow and stern sections could be only 75 feet wide, even though the finished ship would have a beam of 105 feet. The bow and stern sections arrived at Erie in June of 1970.[12]

Waiting at the Litton yard in Erie was the long midbody portion of the ship. It had been built on a virtual assembly line at the ultramodern shipyard. Steel fed into the system at one end moved along the assembly line where it was cut, shaped, and welded into panels and frames of specified dimensions by numerically controlled machines. The finished panels—each forty-eight feet long and ninety inches wide—and web frames were then moved to an assembly building to be welded together into subassemblies using state-of-the-art equipment. Each subassembly was made up of three of the panels, with necessary web frames welded into place. When it was finished, each subassembly was lowered onto a special building platen on the floor of the massive Litton drydock where the hull was being built. There the subassemblies were joined together and welded to form a hull module forty-eight feet long. To give welders access to all the seams in the hull plating, the hull modules were built standing on end. When each module had been completed, a hydraulically operated launch platen tipped the 1,000-ton module until it was in an upright position on the graving dock floor and ready to be welded to the growing midbody. Air winches and chain falls were used to move each module into position against the midbody. Proper alignment was accomplished by using a laser theodolite. In that way, all seventeen midbody modules were joined together. After each newly-completed module was attached, the drydock would be flooded and the hull moved forty-eight feet to made ready for attachment of the next module. From start to finish, it took two weeks to build each of the modules.[13]

When the entire midbody had been completed, it was floated out of the drydock. The still-joined bow and stern sections of the vessel were backed into the drydock, followed by the midbody. The bow and stern units were then cut apart,[14] and the bow section was rotated 180 degrees and attached to the end of the midbody. The bow and midbody were then floated out of the drydock, turned around, and floated back in so that the other end of the midbody was adjacent to the stern unit. The stern was then welded to the midbody, and sponsons were added to the bow and stern to bring them out to the full 105-foot width of the midbody.[15] After long months in the construction process, the Bethlehem freighter was finally in one piece. In January of 1971 it was floated out of the drydock, ready for sea trials.

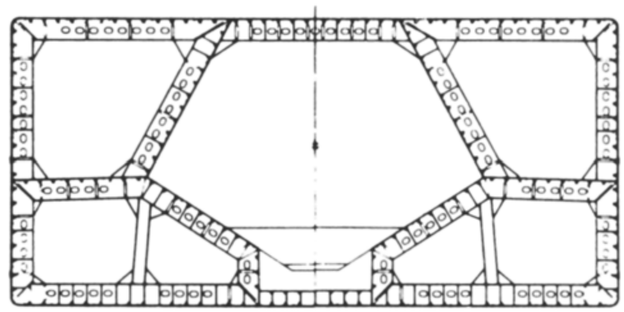
Christened the *Stewart J. Cort* in honor of the former vice president and director of Bethlehem Steel who had died in 1958, the immense freighter looks much like a classic Great Lakes straight-decker—with a serious gland problem. It has its pilothouse and cabins forward, with a second set of cabins over the engine room at the stern and an unbroken expanse of deck in between. But in the case of the *Cort,* its looks are deceiving. All crew accommodations aboard the *Cort,* including the galley and dining rooms, are located in the forward cabin. It is the only ship on the lakes with such an arrangement. The large superstructure over the engine room at the stern does not contain cabins for crewmembers, as would be the case on a traditional laker. Instead, it encloses part of the ship's unique self-unloading system.



Because the bow and stern sections of the *Cort* were built at a shipyard on the Gulf of Mexico and had to be brought into the lakes by way of the St. Lawrence River, the sections were limited to a maximum beam of seventy-five feet. Sponsons were later added to the bow and stern to fair them out to the 105-foot width of the vessel's midbody. (Author's collection)

At first glance, the *Cort* appears to be a straight-decker. There is no telltale self-unloading boom on deck. Instead of a traditional skeleton-like boom on deck, the *Cort* has a smaller, ninety-nine-foot shuttle conveyor running the width of the hull just above the main deck. The boom can be extended out the side of the ship to a maximum distance of forty feet. It is designed to feed pellets into shoreside hoppers at ports served by the Bethlehem freighter. The enormous superstructure located over the engine room was needed to enclose the vessel's unique rotary elevator. Most self-unloaders on the lakes use bucket or loop belt elevators to raise cargo from the conveyor belt that runs under the cargo hold to the level of the unloading boom. On the *Cort,* however, the cargo is elevated by the rotary elevator, which looks much like a giant waterwheel. The conveyor belt carrying cargo from the ship's holds wraps around the wheel, and cargo is trapped between the belt and compartments around the outside of the wheel. As the rotary elevator turns at about five revolutions a minute, the cargo is carried up to the top of the wheel, where it falls into a hopper that feeds the shuttle boom. No other self-unloader has ever been built with an elevator like the one aboard the *Cort.*

Beneath the cargo hold, a steel-corded rubber conveyor belt ten feet wide carries cargo the length of the hold to the rotary elevator. Cargo flows out of the hold and onto the belt through 105 metered gates which are opened and closed by hydraulic cylinders operated from a central control station located atop the stern superstructure. On other Great Lakes self-unloaders, crewmen in the unloading tunnel below the cargo hold operate the gates during an unload. Until the conveyor belt is carrying the desired load, only a few gates are opened at a time. On the *Cort,* however, the entire operation is handled by a crewman in the central control station, and all 105 gates are opened simultaneously. Six scales spaced out along the length of the conveyor belt measure the amount of cargo falling



A cross section drawing of the *Stewart J. Cort* shows that the cargo hold takes up only about half of the midbody. Massive ballast tanks, capable of holding almost forty thousand tons of water, are located on each side of the cargo hold just beneath the level of the main deck. Beneath each ballast tank is a void area used primarily for storage and to move between the bow and stern sections of the *Cort*. Directly below the cargo hold is the tunnel housing the ship's self-unloading system. (Author's collection)

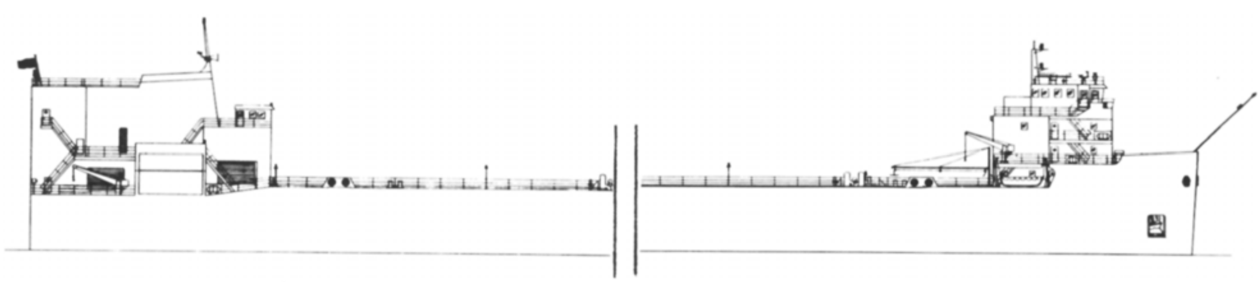
onto the belt and automatically adjust the gate openings until the desired load is reached. The distinctive unloading system was designed by a subsidiary of Litton. It was intended to unload up to 20,000 tons of cargo per hour, double that of any other self-unloaders, but the system has never achieved that rate of discharge.[16]

In addition to its unique unloading system, the gigantic Bethlehem ship also has a propulsion system unlike that found on any other vessel on the lakes. The *Cort* has two engine rooms, separated by the massive rotary elevator. Each engine room houses two 3,500-horsepower diesel engines, one mounted on each side of a propeller shaft. Each shaft drives a controllable pitch propeller eighteen feet in diameter. The Cort's twin screws can push the ship along at an average speed of about 16.5 miles an hour.[17]

The four main engines also supply power to electric motors that drive two 750-horsepower bow thrusters and two similar stern thrusters. The powerful thrusters are used to move the ship sideways when docking. Most ships on the Great Lakes have bow thrusters, and a few are also equipped with stern thrusters, but the *Cort* is the only vessel to have two of each. Designers of the *Cort* used two thrusters at each end of the ship so that the thruster tunnels could be made small enough to remain submerged when the vessel was not loaded. Use of a single thruster would have required a larger diameter thruster tunnel, which would not have been completely submerged when the ship was light.[18]

The hatches on the *Cort* are also different than those found on other lake freighters. The eighteen hatches down the center of its deck are only about 21 feet, 6 inches long and 11 feet, 6 inches wide. By comparison, most of the 647-foot AAA-class freighters were built with nineteen hatches, and they're each 46 feet long and 11 feet wide. The diminutive hatches on the *Cort* were possible because the ship was designed to load only at docks with conveyor belt loading shuttles that can extend out to the vessel's centerline. In order for the big ship to fit under the loading shuttles, its hatch coamings are only eight inches high, much shorter than on more conventional lakers.

This drawing of the bow and stern sections of the *Stewart J. Cort* shows the significant degree to which the landmark freighter resembled the traditional Great Lakes bulk freighters dating back to the 1869 launch of the *R. J. Hackett*. The resemblance is deceiving, however, because the stern superstructure does not contain the galley and crew cabins that would normally be found on a laker. The imposing structure merely encloses the ship's one-of-a-kind, self-unloading system. All crewmembers aboard the *Cort* are housed in the large deckhouse at the bow. (Author's collection)



The *Stewart J. Cort* backing into Taconite Harbor, Minnesota, on her maiden voyage. Most of the ship's hydraulically controlled hatch covers have already been removed, but one hatch in the midship area is just in the process of being rotated back to the open position. Lining each side of the deck are the *Cort*'s thirty-six ballast pumps. On most other Great Lakes ships, the ballast pumps are located in the engine room or within the ballast tanks. (Institute for Great Lakes Research, Bowling Green State University)

Because of the arrangement of its hatches, the *Cort* cannot be loaded at a chute-type ore dock.

The *Cort*'s hatch covers are also different than those on other lakers. Virtually all of the other freighters have single piece steel hatch covers that are removed and replaced by a hatch crane. These hatch covers are secured to their coamings by scores of hatch clamps that must be taken off by crewmembers before the ship loads or unloads. The *Cort,* on the other hand, has single piece hatch covers that are hydraulically operated. The hatch covers are hinged along their forward edge: they can be tipped back out of the way by actuating the hydraulic units. Similarly, the hatch covers are secured in place by hydraulically operated pins, instead of by the more traditional hatch clamps. The system greatly reduces the amount of manual labor needed to remove or replace hatch covers, much to the delight of the deckhands who serve aboard the *Cort*.[19]

To get to their jobs, engine room personnel aboard the *Cort* must travel the full length of the ship's long deck. The author of the 1898 article predicting the use of thousand-footers on the lakes had foreseen such a problem. He had envisioned the use of a trolley to move personnel between the bow and stern sections of the ship. He wasn't far off. Crewmembers on the *Cort* travel from bow to stern, not on foot, but riding in electric golf carts!

No vessel in the long history of shipping on the Great Lakes has been built with as many innovative features as the *Cort.* In conceiving a ship twice as large as any previous vessel on the lakes, designers were confronted with innumerable problems. In virtually every instance, they formulated truly innovative solutions to those challenges. While they were guided by what had been done previously, they didn't feel bound by many of the conventions assiduously subscribed to by other Great Lakes boatbuilders. The creative staff at MC&D had to believe that they were taking the classic design of the Great Lakes ore freighter to a new level. In the *Cort,* the design that had been evolving for a century moved closer to perfection.

The *Cort* was Queen of the Lakes for just over four years. Beginning in 1976, a series of ships was built slightly larger than the Bethlehem freighter. These vessels looked nothing like the *Cort,* however. By then, ship owners on the lakes had adopted the saltwater design of stemwinders, or stern-enders, with pilothouses and all accommodations at their sterns. The *Cort* was the last Queen of the Lakes that looked like the classic lake freighters which had been evolving since the launching of Eli Peck's *R. J. Hackett* a century earlier.[20]

M/V PRESQUE ISLE

1000'x104'7"x46'6"
Queen of the Lakes
1973 to August 7, 1976

A little more than a year after the *Cort* went into service, Erie Marine launched a second thousand-footer that was even more unusual than the pioneering Bethlehem freighter. The *Presque Isle* was built as an integrated tug-barge (ITB), the first to operate on the lakes. Unlike the barge consorts that had previously been common in the industry, the barge portion of the *Presque Isle* was not intended to be towed by its tug. Instead, the tug unit is securely mated into a notch at the stern of the barge by hydraulic pins, and the two units are seldom separated. In fact, with the tug painted to match the barge, it's difficult to tell that the ITB is not a freighter with its pilothouse on the stern.

The process of building the *Presque Isle* was even more complicated than that of the *Cort*. The ITB was assembled in three different shipyards, two on the Great Lakes and one on the Mississippi River. As in the case of the Bethlehem freighter, the rectangular midbody of the *Presque Isle* was built at Litton's sophisticated yard at Erie. The rounded bow section was built at Defoe Ship Building in Bay City, Michigan, and towed to Erie to be joined to the midbody. The tug unit was a product of Halter Marine in New Orleans.

While the *Presque Isle* looks like most of the other thousand-footers on the lakes, it is actually an integrated tug-barge. Shown here waiting to enter the Poe Lock at Sault Ste. Marie, the unique freighter bears the familiar logo on its bow of the owners, Litton Corporation, better known as a manufacturer of microwave ovens. The scraped paint on the hull of the *Presque Isle* is the result of operating in early spring ice. (Author's collection)

Built as a self-unloader with a conventional unloading boom on deck, the *Presque Isle* was intended to operate as part of Litton's Wilson Transit fleet. In fact, the unloading boom for the ITB was built at Duluth, Minnesota, and brought down the lakes to Erie on the deck of Wilson's *A. T. Lawson,* which was bound for Ashtabula, Ohio, with a load of iron ore pellets. The 606-foot *Lawson* had been launched in 1909 as the *Shenango* and had reigned as Queen of the Lakes for several years. Before the *Presque Isle* was completed, however, Litton sold the ten-ship Wilson fleet to George Steinbrenner's American Ship Building. The vessels were intended to be operated as part of Steinbrenner's Kinsman Marine. The *Presque Isle* was not included in that transaction. When the ITB was ready to go into service, Litton formed Litton Great Lakes Corporation to operate the vessel in the iron ore trade under charter to U.S. Steel.

In designing the *Presque Isle,* Litton again dramatically deviated from long-established conventions for vessels on the lakes. The company obviously thought that the ITB represented the freighter of the future. As a tug-barge, the *Presque Isle* would come under the Coast Guard's crew standards for tugs, which were much more lenient than those for ships. That would allow Litton to operate the vessel with a much smaller crew than was required on conventional lakers. While most lake freighters carried about thirty crewmembers, the ITB might get by with as few as fifteen. The savings on salaries and fringe benefits would total in the neighborhood of $1 million a year for Litton and give them a competitive advantage in the ore trade.

To the obvious dismay of officials at Litton, when the Coast Guard inspected the *Presque Isle* they concluded that it did not qualify for the lenient crewing standards established for tugs. The tug portion of the *Presque Isle,* they argued, was not designed to operate independent of the barge unit. Separated from the barge, it wasn't even very seaworthy. With its stubby bow and the pilothouse and four accommodation decks towering above the spar deck, the tug unit was top heavy. In issuing the vessel's Certificate of Inspection, the Coast Guard inspectors set crewing standards virtually identical to those in place for conventional freighters. Litton's hopes for big savings in crew costs were dashed. If the ITB was the freighter of the future, it would have to prove that in head-to-head competition with other ships in the ore trade.

The launching of the *Presque Isle* did not prompt any shift to the use of ITBs by shipowners on the Great Lakes. It was the only ITB on the lakes until the *Joseph H. Thompson* went into service during the 1991 shipping season. The *Thompson,* a converted C4 saltwater cargo ship, was brought into the lakes during the Korean War and operated as part of the M. A. Hanna fleet. The 714-foot freighter was then the longest ship in the industry and the Queen of the Lakes. When that long-established shipping company abandoned its marine operations during the shipping recession of the 1980s, the *Thompson* was purchased by Upper Great Lakes Shipping of Escanaba, Michigan, and converted to a self-unloading barge. It is pushed by the tug *Joseph H. Thompson, Jr.,* which was specially built for that role. Officials at Upper Great Lakes Shipping obviously learned from the experience their peers at Litton had with Coast Guard regulations. Unlike the *Presque Isle,* the *Thompson* is crewed as a tug.

Notes

1. Quoted without further reference in Harry Benford, Kent Thornton, and E. B. Williams, "Current Trends in the Design of Iron-Ore Ships," paper presented at the meeting of the Society of Naval Architects and Marine Engineers, June 21–22, 1962,19.
2. John W. Larson, *Essayons: A History of the Detroit District, U.S. Army Corps of Engineers* (Detroit: U.S. Army Corps of Engineers, 1981), 151.
3. Ibid., 151.
4. Ibid., 152.
5. Ibid., 153.
6. C. E. Tripp and G. H. Plude, "One Thousand Foot Great Lakes Self-Unloader—Erie Marine Hull 101," paper presented to the Great Lakes and Great Rivers Section, Society of Naval Architects and Marine Engineers, January 21, 1971.
7. John O. Greenwood, "The Era of the Leviathans," paper presented at the 44th Annual International Joint Conference of the Dominion Marine Association and the Lake Carriers' Association, February 17, 1981.
8. Tripp and Plude, 1. The actual tonnages of iron ore shipped in 1990 fell far short of the prediction, but the projected ratio of taconite to natural ore was extremely accurate.
9. James Clary, *Ladies of the Lakes* (Lansing, MI: Michigan Natural Resources Magazine, 1981), 138–39.
10. Alexander C. Meakin, *Master of the Inland Seas* (Vermilion, OH: Great Lakes Historical Society, 1988), 297.
11. Tripp and Plude, 3.
12. Ibid., 37–39.
13. Ibid., 21–27.
14. To help workers at Erie, personnel at Pascagoula had painted a vertical line on the side of the hull where it was to be separated. Next to the line was the tongue-in-cheek instruction: "Cut here."
15. Tripp and Plude, 22.
16. Ibid., 59–62.
17. Ibid., 43.
18. Ibid., 14.
19. Ibid, 35–36.
20. If completion of the *Roger Blough* had not been delayed by fire, the *Cort* would have been the last double-ended freighter to go into service on the U.S. side of the lakes. All U.S. ships built since the *Blough* have been stern-enders.