THE GREAT LAKES ENGINEERING WORKS

THE SHIPYARD AND ITS VESSELS

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INTRODUCTION

The Great Lakes Engineering Works was a prominent shipbuilding company that operated for nearly 60 years in four locations in the central Great Lakes region: the Engine Works in Detroit (1902-1940s), the yard at Ecorse/River Rouge near Detroit (1903-1961), the ship yard on the St. Clair River near the city of St. Clair, MI (1904-1910), and the yard at Ashtabula, OH (1911-1961). GLEW, as the company was often referred to, developed innovative approaches to shipbuilding during the early 1900s, a time when steel shipbuilding was in its infancy, to successfully compete with other established yards that prevailed at the time. Furthermore, GLEW had a major impact on Great Lakes commerce, which contributed significantly to growth and welfare of the surrounding economies of its yards and throughout the region. GLEW survived two World Wars and their post war downturns as well as the Great Depression during which time the company found ways to keep their "doors open" when other shipbuilders failed or were absorbed by larger yards.

The Great Lakes Engineering Works launched an impressive variety of vessels including bulk freighters, magnificent passenger ships, luxurious yachts, 112 ocean cargo vessels that traveled the seven seas, a variety of barges, hydraulic dredges and diesel engine-driven coal barges. Furthermore, the yard conducted extensive maintenance and repair services. GLEW's Engine Works supplied the power for most of its own ships along with a variety of land-based businesses, most prevalently in refrigeration applications. Most of the GLEW-built bulk carriers had long and productive careers, two of which are the 1906-built ST. MARYS CHALLENGER and the 1929-built CALUMET, both of which operated in 2007. Furthermore, another GLEW bulker was one of the most admired and beloved on the Great Lakes, the 1958-built EDMUND FITZGERALD about which a popular ballad was written to immortalize her unfortunate demise. In addition, two classic GLEW straight deckers have been preserved as museums; the 1911-built WILLIS B. BOYER moored at Toledo and the 1925-built WILLIAM G. MATHER currently on display at Cleveland. Other innovations such as the launch of the first self-unloader WYANDOTTE in 1908, building sections of the Detroit River railroad tunnel that was completed in 1910 and is still in operation, and the construction of the first privately owned floating steel dry dock in 1904 are just a few accomplishments of pride produced by this historic yard. This book records the impact that GLEW has had on maritime history of the Great Lakes and its commerce.

For the achievements outlined above, the Marine Historical Society of Detroit felt it was important to chronicle the history of the Great Lakes Engineering Works. The formidable prospect of writing this book first surfaced in the middle of 2004, but the actual work began in August of 2005 under the sponsorship of the Society. Discussions on how best to portray the company and its yards focused on writing this book in two sections. The first section focuses on the origin and development of GLEW's four yards and how they progressed from river banks and marshlands to one of the most prestigious shipbuilding and repair yards on the Great Lakes. The second section records the history and fate of each hull built by GLEW. Furthermore, it was intended that this section provide as many photos as possible to complement important events or stages in the career of each hull, though some pictures proved impossible to obtain. Unfortunately, many corporate documents were not salvaged when GLEW closed in 1961, making research more difficult.

This is the fourth book on which Skip Meier and Wayne Garrett collaborated; the most notable was the two book series Ahoy & Farewell that was written in the 1990s. Their third book, Historic Lake Vessels in Color, plus the experience of producing the Society's annual color calendar, enhanced their ability to research and acquire photos of the vessels that are used in this book. In all, over 980 photos were obtained in the process to record the careers of GLEW-built vessels. In addition, over 70 pictures were added to GLEW's yard history bringing the total number of pictures in the book in excess of 1,050. Each picture is accompanied with a caption, which describes its scene. At the end of every caption are capital letters enclosed in brackets. These letters designate the persons who, or organizations that, submitted pictures specifically for this book. Please refer to the Photo Credit Key in the Acknowledgement section for the identity of our generous donors.

It must be emphasized that a book of this magnitude cannot be completed successfully without the input, cooperation and support of other contributors. Many knowledgeable historians and people directly connected with the shipping business have made valuable contributions to this book to whom we are truly thankful. Please refer to the Acknowledgment section that follows for the recognition and credits they so rightfully deserve.

ACKNOWLEDGEMENTS

This book was a titanic undertaking. Besides the immense amount of work required to complete it, a great deal of assistance was needed as well from others across the Great Lakes, without which would have been impossible to conclude. This help, which was rendered in a multitude of ways, needs to be acknowledged.

Numerous hours were spent researching this book at libraries, museums and universities. Equally important are the people who gave of their time and resources to help complete this project. Certainly, thanks need to be extended to Bob Graham and the Historical Collections of the Great Lakes at Bowling Green University in Ohio for providing vessel data sheets as well as numerous rare photos. Thanks to Scott Peters, Collections Historian at the Michigan Historical Museum in Lansing, MI for providing many helpful facts and articles about the yard and its personalities from rare 1900s periodicals. In addition, thanks to George Libbey, Associate Dean for Public Services at the University of Detroit Mercy for access to the Father Edward J. Dowling Great Lakes Shipping collection. Their contribution of images from this extensive photo collection and access to reference materials needs special mention. Historian William Schell must also be singled out for his invaluable help with the GLEW-built World War I Lakers that went into service on the world's oceans. He generously made data available from his authored works, Register of Merchant Ships (available through the World Ship Society) for our project. Further, Mark Goldberg must be given kudos for supplying rare and in-depth data on these "Lakers" from his personal records that he painstakingly assembled from numerous trips to the National Archives.

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Rick Nicholls provided valuable documentation, including a hull list compiled by the shipyard, hull data sheets from the shipyard and the rare c1916 Great Lakes Engineering Works promotional booklet, from Tom Stuart. These documents were instrumental in the development and therefore the completion of this work.

When writing a book such as this, a great deal of research is required, especially at the larger repositories. Not to be overlooked are the smaller local museums and historical societies that have very valuable information and records as well. The Ashtabula Marine Museum, the Fenton Historical Museum and the St. Clair Historical Museum need to be singled out for their generosity and cooperation in this regard.

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Special mention should be given to the following for providing an extraordinary number of excellent, and most valuable, photos from their extensive collections for this book: the Pete Worden collection provided by Mike Nicholls, the Father Dowling Collection at the University of Detroit Mercy, the Steffke Memorial Maritime Collection from Keith Steffke, again Bob Graham and the Historical Collections of the Great Lakes at Bowling Green, Ralph K. Roberts, Captain Bill Hoey, Karl Kuttruff, Paul C. LaMarre Jr. and Skip Meier. Also worthy of mention is that Skip Meier selected and digitally scanned over 1000 photos and slides that were used in this book.

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DW	*Dave Wetherald*
EG	*Emory Gulash*
EM	*Emory Massman*
EM-DM	*Emory Massman Photographer- Dave Michelson Collection*
FC-LB	*Frank Clapp Photo-Les Bagley collection*
FM	*Fenton Historical Museum*
GLEW BKLT	*The GLEW Booklet - Rick Nicholls from Tom Stewart*
GO	*Gene Onchulenko*
GPHS	*Grosse Pointe Historical Society*
GR	*Greg Rudnick*
HCGL	*Historical Collections of the Great Lakes*
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WG	*Wayne Garrett*
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Books, Publications & Organizations

50 Years of Huron Portland Cement

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An Episodic History of Fenton, Michigan

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Ahoy & Farewell II-MHSD

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Marine Review-(et al.) Various Years

Mariners' Museum in Newport News

MHSD Detroit Marine Historian

Michigan Archives-Lansing, MI

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Michigan State Ferries-Les Bagley

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New Orleans Public Library

Northeast Oakland Historical Museum-Oxford, MI

Penobscot Marine Museum

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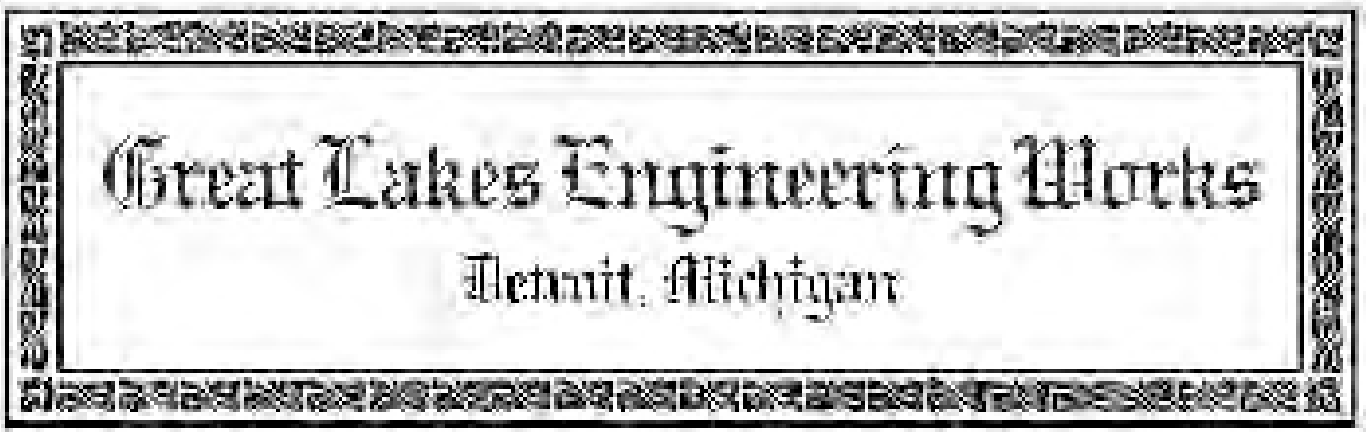
The Shipyard



THE ORIGIN OF THE SHIPYARD AND ITS EXPANSION

The Early Years

At its inception in 1902, the Great Lakes Engineering Works (GLEW), a Detroit River shipbuilding firm, set out on a course that would span fifty-nine years, would see them build 297 vessels of various types, and would leave an indelible mark on the Great Lakes maritime community. Their rise to prominence in the shipbuilding industry was set forth during a time when the industry was in need of renovation and primed for innovation; prospects difficult to achieve by many of the established yards. However, opening the yard is only part of the story; staying power and being able to make necessary adjustments in an ever-changing market was the real challenge. GLEW made those adjustments that left a legacy equaled by few yards.

The roots of shipbuilding on the Great Lakes can be traced back to 1678 when the French built three small sailing vessels of under 20 tons at Fort Frontenac, present day Kingston, and subsequently when Monsieur de LaSalle built the first known vessel on the Great Lakes above Niagara Falls; the 60 ton brig GRIFFON in 1679. Early ship construction sites were mostly single-purpose vessel yards that were located near abundant supplies of wood along shorelines of the Great Lakes. Water transportation was the easiest and safest way to travel throughout the Lakes during the 18th century due to the lack of roads. Early on, ships carried passengers west that populated water front communities or later connected with 19th century railroad terminals, which required reliable supply links. Therefore, immigration west, the necessity to supply those growing communities and the demand to transport bulk materials south to emerging lower lake industrial centers, ignited an expansion in shipbuilding to accommodate this development.

Due to inherent design limitations of wood, steel evolved as the material of choice for shipbuilding late in the 19th century because of its high tensile strength, greater longevity and non-flammable properties. Equally important was the discovery of vast metallic ore and limestone deposits in the upper Great Lakes region and the diminishing supply of quality lumber. This accelerated the reconfiguration and development of the Lakes' shipping fleet into one that was more suited to haul bulk materials and quickly eclipsed the schooner and lumber hooker fleets of the 19th century largely due to the demands that the Civil and Spanish-American Wars placed on the steel industry. The railroads also were expanding which required more steel for track, locomotives and rolling stock. The shipping companies compelled the shipbuilding industry to evolve by demanding larger vessels to haul bulk cargoes at a more profitable rate. Some yards were able to adjust to these demands, but many could not.

Strategically located on the Great Lakes and especially on the Detroit River, southeastern Michigan had emerged as a transportation hub and a major industrial center. Shipbuilding as well as shipping and manufacturing thrived in the Detroit area, which rapidly became a leader in these industries. The area attracted many of the top industrialists and engineers of the time, as they settled and built these businesses to compete with industries nation wide.

GLEW's first President and Chairman Antonio C. Pessano c1904 [GLEW BKLT]

Against this backdrop, a group of Detroit industrialists decided to enter the shipbuilding business. Led by John R. Russel and Antonio C. Pessano, they formed the Great Lakes Engineering Works on June 2, 1902 to purchase the Riverside Iron Works, the former Samuel F. Hodge Company of Detroit, in the summer of 1902. This generated such interest that the privately held company was quickly capitalized at $1.5 million by investors that included wealthy mid-Western magnates from the railroad, mining and shipping industries. Pessano was elected as President and General Manager because of his engineering background as well as his charismatic personality and was often identified as the driving force behind GLEW's rise to prominence. Also elected was George H. Russel as Vice President, who was a well-placed banker and brother to John R. Russel, the Secretary and Treasurer.

When GLEW took over the Riverside operation at the foot of Rivard Street in the city of Detroit in 1902, they obtained their yard, service docks as well as their engine contracts and this yard henceforth became known as the Engine Works. Riverside was the short-lived successor to the venerable S.F. Hodge Company, which was well known for quality steam engines and provided access not only to marine engine markets, but also to non-marine markets as well; not to mention that they would be the source for all their own vessels' power plants. Because of the Hodge Company, which was founded in 1863, and other companies like them, the Detroit River community had become a hot bed for steam engine development. This included early involvement with triple expansion and quadruple expansion engines as well as steam powered refrigeration equipment. In deed, this pioneering involvement with steam engines provided the Detroit area with a competitive edge and with a surplus commodity that was exported to regions beyond the Great Lakes. Along with this, came the well earned attraction and advancement of a sophisticated machining industry, which made Detroit a fertile ground for the development of the infant automotive industry.

Bird's-Eye View of Engine Plant of Great Lakes Engineering Works, Located at Foot of Rivard Street, Detroit, Michigan.

Engine Works at foot of Rivard in Detroit-former Hodge plant c1903 [GLEW BKLT]

James E. Davidson engine builders plate [PL]

After transferring the former Hodge 1874-built engine from the steamer V.H. KETCHUM to GLEW's first vessel, the R.W. ENGLAND, the Engine Works produced all of the reciprocating steam engines needed for GLEW's new construction. Starting with engine #308, presumably continuing Hodge's numbering sequence, the Engine Works provided a total of 288 steam engines for Hull #2 and all subsequent hulls requiring reciprocating steam plants as well as for refrigeration applications. In fact, the Engine Works built 43 steam engines for refrigeration

Early shot of yard being dredged. Note: R.W. England on ways 1904 [DP]

machinery up until 1912. Refrigeration machinery was delivered to companies such as the Brandon Ice Co., Sullivan Beef Co., Trenton Ice Co., Parke Davis, A.M. Brewing, Michigan Alkali, City Ice Delivery, Pioneer Iron Co. and Church Farm's Dairy to name a few. The last steam engines built by GLEW's Engine Works were of the triple expansion reciprocating type that were installed in two "Maritimers", the LEHIGH (Hull #295-Engine #600) at River Rouge in 1943 and the FRANK PURNELL (Hull #525-Engine #604) at Ashtabula also in 1943. After these engines, GLEW replaced the reciprocating steam engine with the steam turbine engine to power their ships in the 1950s. Though the steam turbine engine had been developed as early as 1884, the wide spread use of these engines expanded considerably during WWII, especially in military vessels. Electricity producers had developed extensive experience with this type of engine in their power generating plants and therefore emerged as pacesetters in this technology. Westinghouse Electric had been a pioneer in marine engine applications and therefore emerged as a leader and the supplier of choice for GLEW's engines.

1904 chart showing location of Ecorse yard 1904 [HMCP]

Engraving view of the Great Lakes Engineering Works c1904 [GLEW BKLT]

Realizing that the acquired Riverside plant had no room for expansion to accommodate building ways and having only limited service docks, it was announced that on January 8, 1903 that GLEW had acquired an 85 acre parcel of land with 1400 feet of Detroit River frontage in the downriver community of Ecorse, MI. It was located just downriver from the mouth of the Rouge River and the then well known Smith Coal Dock. The land was typical undeveloped shoreline that was a natural wetland, or marsh, and would require shoring with driven pilings to stabilize the land for its intended use as a shipbuilding berth. This work plus the dredging of a slip was done by L. P. & J. A. Smith of Cleveland, OH. The new state-of-the-art yard had four shipbuilding berths, 600 feet in length, next to which were two slips for side launching ships. The slips would be 125 feet wide and 150 feet wide with a depth of 14 feet and

The main office of the Superintendent and drafting rooms Ecorse yard c1904 [GLEW BKLT]

The main office of the Superintendent and drafting rooms Ecorse yard c1911 [HCGL]

30 feet respectively. Each berth was equipped with a dedicated traveling electric gantry crane that ran along a track next to each berth and throughout the yard becoming some of the first of this kind on the Lakes. These cranes carried plate steel and other components directly to their appointed berth and raised them safely in place for installation. All major building tools, including drills, chipping and riveting tools, ran on pneumatic pressure provided by yard compressors and boilers. The yard was serviced by both the Michigan Central and Detroit Southern railroads, which brought trackage into the yard and was reported completed in May, 1903.

Gantry crane at Ecorse yard c1911 [HCGL]

In a June 9, 1903 article, the Detroit Free Press reported the above details, but also announced that a sectional steel floating dry dock (Hull #4) would be constructed that could service the largest vessels of that time. This dry dock was unique to the industry on the Great Lakes and remained so because of a patent held by its English designers, Clark and Stanfield.

Early news came in the form of a contract to build GLEW's first vessel. The 377 foot long ship had her keel laid on January 14, 1904 and was named the R.W. ENGLAND (Hull #1). The steamer slid down the launch ways on May 5, 1904 with much fan fare and was delivered the following month to her new owners, the England Transit Company. This vessel represented the first of 95 conventional Lake bulk carriers the yard would build from canal size to 730 feet in length during its operation. While the ENGLAND was being delivered, Pessano secured the yard's second contract. It was to construct

R.W. England surrounded by throngs waiting for launch 1904 [DP]

a quadruple screw, double-ended harbor ferry for the Michigan Central Railroad Company. The keel of the DETROIT (Hull #2) was laid on July 30, 1904 and departed the yard on December 16th for cross-river service on the Detroit River between Detroit and Windsor, ON.

1908 chart showing St. Clair yard location [HMCP]

Early Expansion

With the R. W. ENGLAND, barely six months old, GLEW was confronted with an opportunity for expansion that was too good to turn down. The Columbia Iron Works of St. Clair, MI was experiencing financial difficulties. The under capitalized yard, incorporated in November of 1901 under Jenks Shipbuilding influences, had 1800 feet of St. Clair River frontage on 50 acres of land located just south of the Pine River in the city of St. Clair. After barely completing two bulk freighters, JOHN C. HOWARD and WINNEBAGO in 1903, Columbia went into receivership. Two additional steamers, identical in design, had been ordered by J. C. Gilchrist of Cleveland towards which he had advanced money that had been expended completing the first two non-Gilchrist vessels. When Gilchrist refused further capital, the Columbia yard ceased operations in September, 1903 with the new Gilchrist boats partially built and remained closed until GLEW exercised a lease to run the St. Clair yard one year later. Under GLEW management, the steamer GEORGE H. RUSSEL, named after GLEW's vice-President, was completed and assigned GLEW Hull #11, in sequence with the Ecorse hull numbering system. This


Approaching St. Clair yard from river [DP]

vessel was delivered to the Gilchrist Transportation Company on August 5, 1905. Subsequently, Pessano, et al, negotiated a favorable deal and purchased the yard outright later that month. Two months later the second vessel was delivered to Gilchrist as the FRANK J. HECKER (Hull #12) on October 19, 1905.

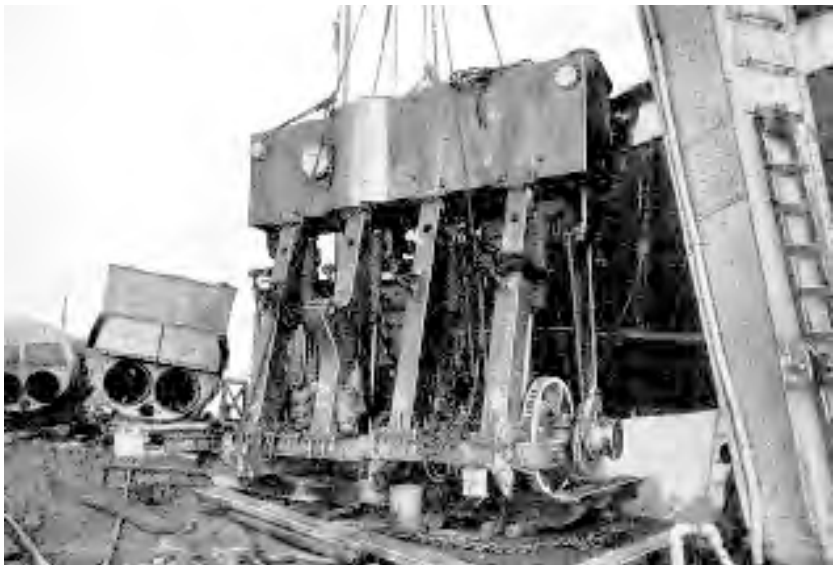
As 1905 came to an end, the Great Lakes Engineering Works balance sheet revealed a very strong performance for the first three years in business. They had purchased a respected engine plant, raised capital to open a state-of-the-art shipyard, gained ownership of a second yard at a discount and constructed eleven major vessels, all while generating a positive cash flow. Though success was attributed mostly to Pessano's leadership, investors were most satisfied with the entire board. This performance compared favorably with other shipyards on the Great Lakes, which meant GLEW had become a major competitor with other Lakes'


Placing stack on John J. Boland - Ecorse yard [GLEW BKLT]

Shear legs placing pilothouse on Jacob T. Kopp - Ecorse yard [GLEW BKLT]

yards. Significantly, the company had secured a sizeable market share in the shipbuilding industry in a relatively short period of time.

Furthermore, the present day American Steamship fleet can trace their roots back to a contract struck with GLEW during the 1906-07 winter. Operating as broker and manager for the single vessel fleet Yale Transit out of Buffalo, John J. Boland and Adam E. Cornelius formed the Boland & Cornelius (BoCo) partnership in 1904 to operate the steamer YALE. This venture was successful enough that they purchased the YALE late in 1906 and were in need of more carrying capacity. They contracted with GLEW in December, 1906 to build BoCo's first vessel, a 500 foot, 8500 ton capacity bulk carrier, the JOHN J. BOLAND (1) (Hull #31) for their newly formed York Steamship fleet. But before the BOLAND was launched at the Ecorse yard on August 31, 1907, they ordered a second steamer, the JACOB T. KOPP (Hull #32) of identical design, for another of their newly formed fleets the Pennsylvania Steamship Co., and was delivered on May 5 the following year. This set in motion two more contracts with GLEW to build three more steamers. The first was a single ship contract for the ADAM E.CORNELIUS (1) (Hull #53), a 441 foot, 7000 ton capacity steamer delivered in June, 1908; the only one of the five BoCo boats built at the St. Clair yard. Four months later, the Ecorse yard began laying the keel for the THEODORE H. WICKWIRE (Hull #56) followed the next month by the CLIFFORD F. MOLL (Hull # 57). Both of these vessels were delivered in the spring of 1909 to BoCo's American Steamship Co., which had been incorporated on March 11, 1907, and were identical in design; 465 feet overall with an 8400 ton capacity. So in a matter of nearly two and a half years, the fledgling BoCo fleet had added five new steamers. But BoCo wasn't done yet. They ordered three more vessels from the Great Lakes Engineering Works, two in 1910 and one in 1912 for their American Steamship fleet. The 1910 duo, the HARRY YATES (1) (Hull #77) and the THEODORE H. WICKWIRE JR. (Hull # 78) would be the last bulkers built at the St. Clair yard before it closed. BoCo eventually merged all of these vessels under the American Steamship Co. flag in 1915.



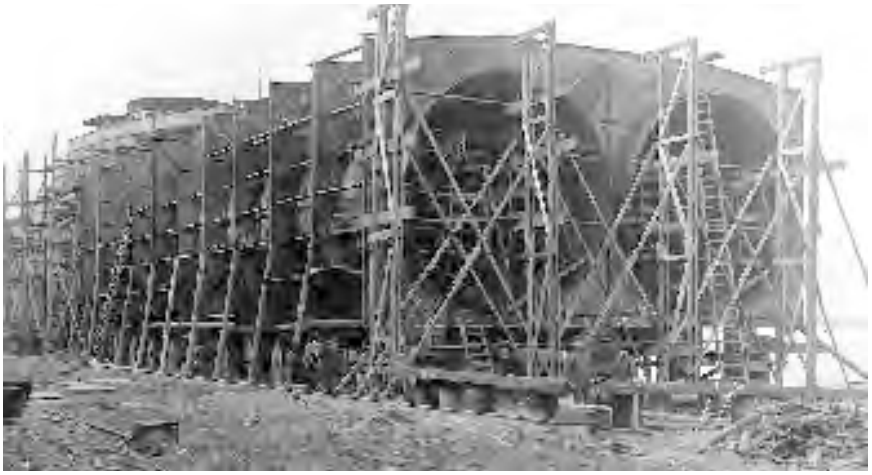
Moll engine and boilers ready for installation at the Ecorse yard 1909 [GLEW BKLT]

The St. Clair yard operated somewhat in the shadow of the Ecorse yard throughout most of its existence due, mostly, to its lack of a dry dock. This fact limited its repair business. However, they did produce eight bulk carriers, one rail ferry, two scows and two package freighters during its nearly six years of operation under GLEW's control. In addition, the St. Clair yard built all eleven sections of the Michigan Central Railroad tunnel (Hull #44) that ran under the Detroit River between Detroit and Windsor, ON. These sections were built, bulk-headed with wood and launched. The bulk heading allowed the sections to be floated and towed downriver to the Ecorse yard where they were prepared for placement. The sections then were towed into position, where they were sunk into a trench and secured to an adjacent section by divers. The placement

of the sections was completed in 1909 and the tunnel opened in 1910. With modifications, this rail tunnel remains in service as of the year 2007.

One bulk carrier built at the St. Clair yard inadvertently influenced the future of this site. When the NORMANIA (Hull #39) slid into the ice choked river on February 5, 1908, dignitaries of the Ashtabula Steamship Company were on hand in a driving snowstorm to witness the momentous event. The $350,000 steamer had been scheduled to hit the water on February 1st, but was delayed due to a heavy ice jam in the river. Amongst the dignitaries was a group of wealthy capitalists, led by Captain Oscar Olsen, R.P. Reidenbach and T.J. Rennick, who had designs of having a shipbuilding yard in their home city. After a series of negotiations, GLEW decided that there were advantages of owning a yard on the south shore of Lake Erie. It was reasoned that the addition of the Ashtabula yard would out weigh the burden of continuing the operation of the St. Clair yard. An enthusiastic investment group willing to make the needed improvements at Ashtabula would merit the move. The improvements included securing needed land and deep water frontage to accommodate a land based dry dock. As a result, the St. Clair yard closed in 1910 after the delivery of their last bulk carrier, THEODORE H. WICKWIRE JR. (Hull #78) in October plus the completion of the steel scow GOSSOON (Hull #80). The yard's machinery was moved to Ashtabula in 1911 where re-assembly was completed in time to build their first bulk carrier there in 1912.

Clifford F. Moll being removed from the floating dry dock 1909 [DC]

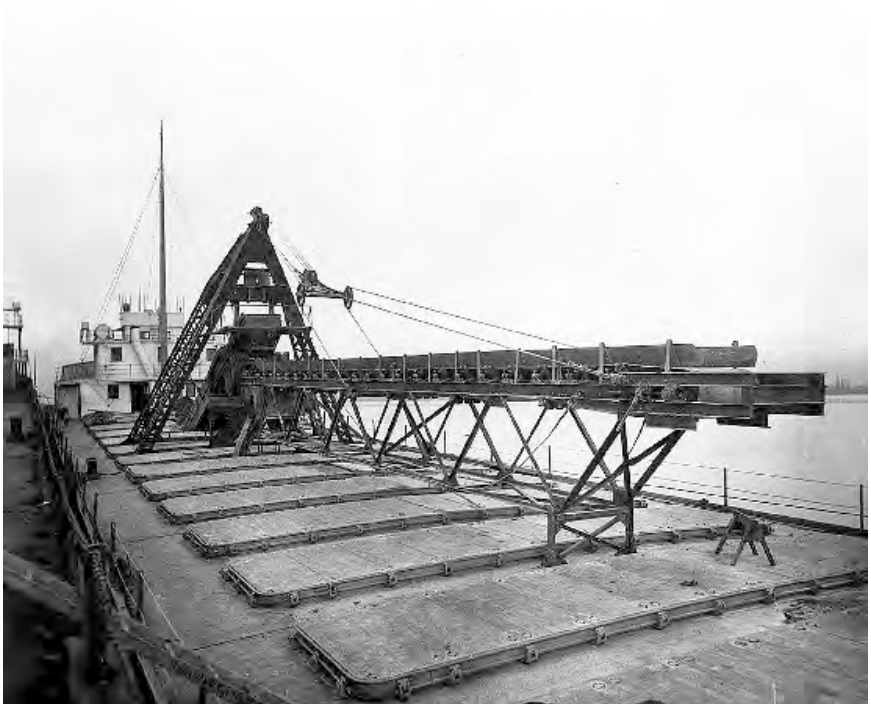


Tunnel section ready for launch at St. Clair yard [SCHM]

Normania ready to depart St. Clair yard for delivery 1908 [SCHM]

Lessons Learned Before World War I

During the first decade of operation, GLEW produced forty-nine bulk carriers, eight package freighters, thirteen salt-water cargo carriers plus rail ferries and passenger boats, totaling 116 vessels built during that time. This ship production was second only to that of the American Ship Building (Amship) conglomerate during this same time period. Of the GLEW vessels produced, a few would have a dramatic impact, not only on the Great Lakes maritime community, but also on future markets with which GLEW would gain valuable experience.



Wyandotte showing original self unloading system [PW]

The shipbuilding boom of GLEW's first decade was driven by the country's sound economy and the push by shipping fleets to expand their hauling capacity. Expansion was attained by the merger of many fleets and building the largest ships of that time. This demand also challenged the shipbuilding yards to develop innovations that would help their clients become more efficient and therefore more profitable. One innovation was the development of the self-unloader; an unloading system that would convey bulk cargoes, primarily stone and coal initially, from a cargo hold onto a rotating boom that discharged onto the dock. A self-unloading system was first retrofitted on the steamer HENNEPIN, which proved a success in speeding up the unloading procedure. Though there are different claims as to who first designed the system, it is certain that the GLEW-built WYANDOTTE (1) (Hull #54) was the first vessel launched as a self-unloader in 1908.

Developing a reputation of building quality vessels at a competitive price was a significant step in obtaining repeat contracts that would only occur from satisfied clients. GLEW had made great progress within the industry. One valuable association grew with the largest fleet on the Lakes, the Pittsburgh Steamship Company. Their order of the THOMAS F. COLE (Hull #27) in 1907 was well received, which subsequently led to additional business from this fleet. In 1901, the Steel Trust had grown to 112 vessels after its multiple mergers. Many of their vessels were old and outdated, which the company wanted to purge in order to upgrade their fleet. GLEW had earlier experience in refitting purged whaleback bulkers for East Coast service in the coal trade. Pittsburgh Steamship's seven remaining whaleback barges were transferred to GLEW in 1910 as partial payment for three new bulk carriers; WILLIAM J. OLCOTT (Hull #74), WILLIAM B. DICKSON (Hull #75) and WILLIAM P. PALMER (Hull #76). Of the three new "Tin stackers", naval architect, Joseph Isherwood convinced the fleet owner to build the PALMER with his patented longitudinal framing system. It would be the first of its kind, which could save nearly four hundred tons of steel in its construction, thus increasing the carrying capacity. However, it proved to be ineffective, as her sides were too tender to handle the stress of striking lock walls and concrete docks during normal operation. Soon after completion, stiffeners were added to counter this, which negated the cargo savings.

Aerial view of Ecorse yard 1908 [GLEW BKLT]

Pessano found the demand for East Coast colliers still existed and, in fact, was able to secure a contract for four new salt water colliers, the first of that type built by the Works, in addition to the seven refitted whalebacks. This was a bonanza for the yard as they were able to extend the good working relationship with

Col. James M. Schoonmaker at launching ceremony [PL]

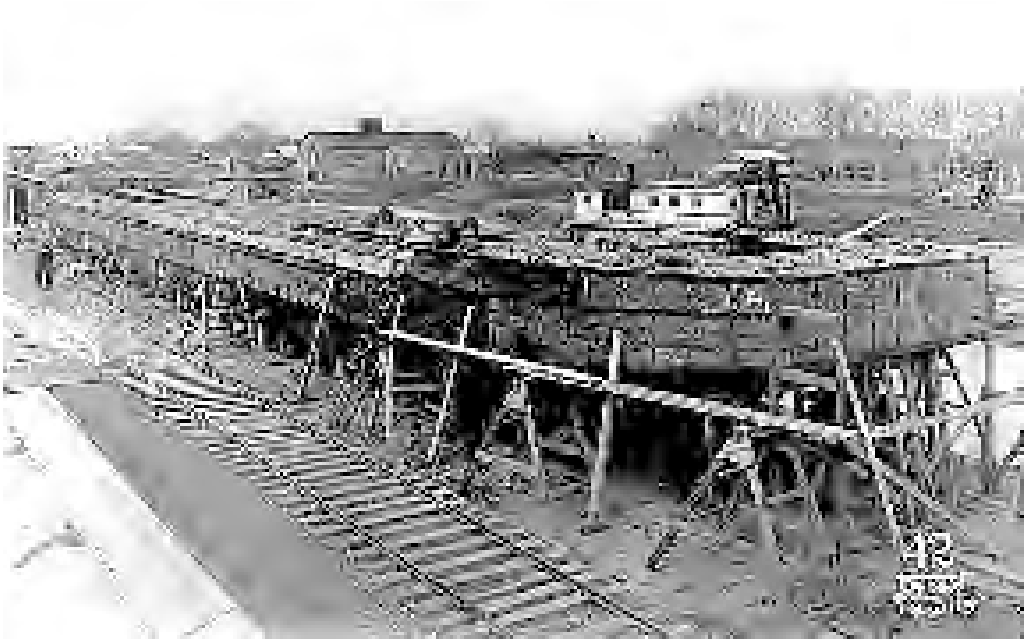
the largest fleet on the Lakes and also establish contacts outside of the Lakes maritime community for more business. Experience with the nuances of building for salt-water service would be helpful in the near future. The four new saltwater colliers, the PENOBSCOT (Hull #84), SEACONNET (Hull #85), M. E. HARPER (Hull #86) and F. J. LISMAN (Hull #87), were completed in 1911. The whalebacks (Hulls #88-94) were refitted for saltwater duty. They were shortened to fit the locks for passage down the Seaway. This refit fully utilized the capabilities of the

World's largest bulk carrier [PL]

floating dry dock. When completed, the seven whalebacks were towed by the four colliers down the Seaway for service on the Eastern Seaboard.

Another significant vessel built at the Ecorse yard was the COL. JAMES M. SCHOONMAKER (Hull #82). Built in 1911, this was the fourth bulker built by GLEW for the Shenango Furnace Company, and was to be a twin to the WILLIAM P. SNYDER JR. (Hull #83) that followed in 1912. At 617 feet long, these vessels were the longest on the Lakes and remained the longest of any U.S. vessel until 1927 when the CARL D. BRADLEY entered service. Also, the SCHOONMAKER had the distinction of the first hull built with both longitudinal and transverse framing. Renamed WILLIS B. BOYER, this favorite of many enthusiasts, remains a well-kept museum at Toledo, OH: a must for everyone to visit.

Col. James M. Schoonmaker builder's plate [PL]

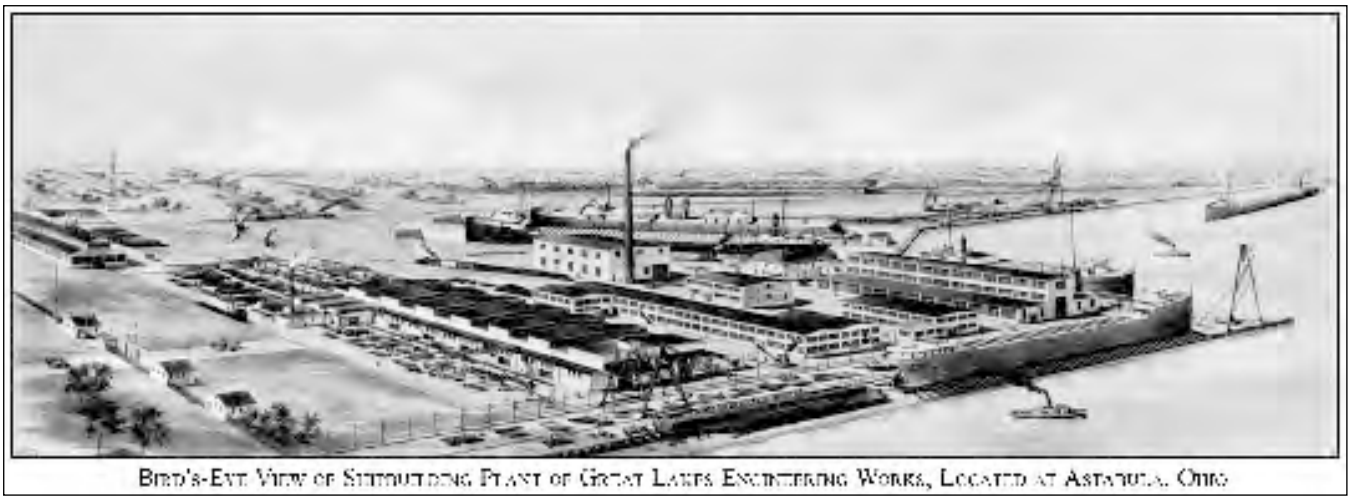


GLEW yard at Violet showing barge being built [JNT]

As a result of experience gained building saltwater colliers, valuable contacts were initiated with coal industry magnates on the East Coast. GLEW joined with a group of these coal men led by John H. Bernard, an engineer from Amsterdam, to open a small shipyard in 1912 on the Mississippi River at Violet, LA eleven miles south of New Orleans. At this yard, GLEW built a series of self-propelled coal barges for the Alabama & New Orleans Transportation Company (A. & N.O.T. Co.) to transport coal from fields in Alabama via a system of rivers and canals to Violet. Based on a design by John Bernard, the barges (Hull #108-113) were powered by a 75 hp engine that ran at no fuel cost on coke breeze, a by-product in the manufacture of coke. The coal was to supply fuel to an anticipated increase of ships at New Orleans for transiting the Panama Canal that was scheduled to open in 1914, as well as to service the increased presence of the US Navy's Southern Fleet stationed in the area to counter the escalation of hostilities world-wide. This venture collapsed after seven coal barges were built and were found to be underpowered for their intended service. GLEW sold the yard in 1914 to the A. & N.O.T. Co., which continued to operate their barges in other trades using the yard as a home base for their fleet. A. & N.O.T. Co. also built three tankers, the MEXOIL, PANOIL and CRUDOIL, all of which eventually operated on the Great Lakes. The yard was ordered by the US District Court to be sold in 1919 and was purchased by the National Shipbuilding Company.

North and South American at Holland, MI May, 1937 [PW]

With less than satisfactory results from the coal barge venture, GLEW refocused their attention to their core business of Great Lakes shipbuilding. Two jewels, the NORTH AMERICAN (Hull #107) and the SOUTH AMERICAN (Hull #133) were built in 1913 and 1914 respectively for the Chicago, Duluth & Georgian Bay Line. They were the only truly palatial over night passenger boats that GLEW would build. The steamers carried no freight and all the passenger accommodations were outside staterooms. They were painted all white except for their red boot top. These vessels became fan favorites as they represented a change in pattern of passenger travel on the Lakes. Instead of fixed destination travel, they represented a leisurely approach to the idea of "Cruising the Great Lakes" for fun. Competition for tourism from the railroads and the mobility that automobiles afforded the public posed a threat to the success of these boats. In spite of this, they sailed into the 1960s when passenger travel bottomed out because of cost and regulations initiated by the NORONIC disaster of September 17, 1949. These historic vessels were not only unique to GLEW, but they also were the last over night passenger boats to operate regular schedules on the Lakes.

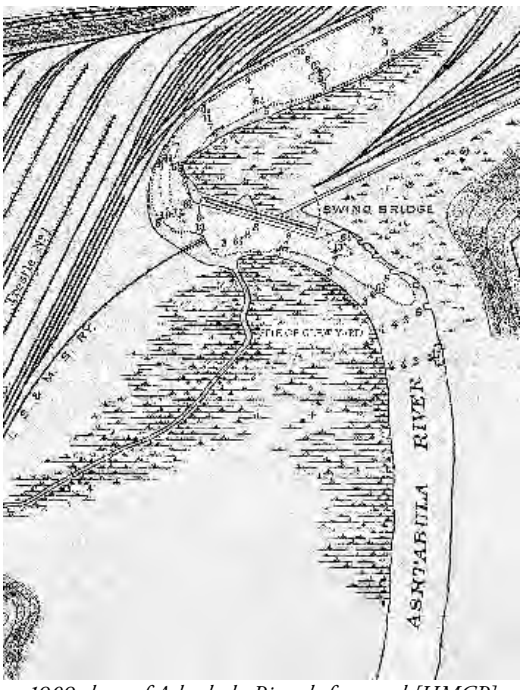


Engraving of Ashtabula yard c1914 [GLEW BKLT]

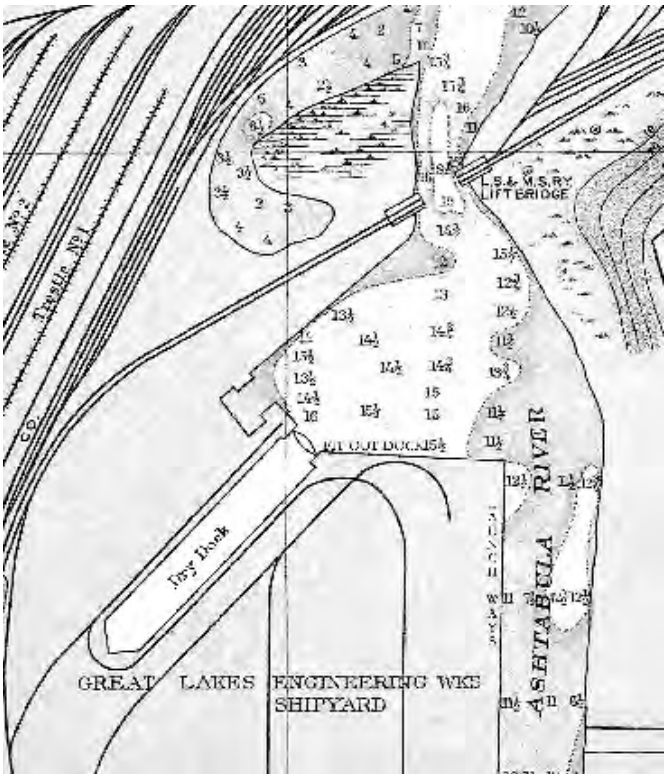
The Ashtabula Expansion

The officers at GLEW recognized the advantages that Ashtabula, OH held over the St. Clair yard, which made the move all the more logical. First and foremost, much of the land acquisition and development costs were accommodated by Ashtabula's city fathers. The land was acquired in two parcels. The first was a thirty-six acre plot that was obtained from the Pennsylvania Railroad in exchange for a valued .7 acre lot at the lake front that the city had obtained for twenty dollars. The second was a twelve-acre plot that the city again purchased, this time for one dollar from the Lake Shore & Michigan Southern Railroad. The shipyard property was located about two miles up the Ashtabula River from Lake Erie and consisted of these properties totaling forty-eight acres. The "L" shaped property had approximately 900' of river frontage, which included a 600' long berthing dock for ships to be launched sideways into the river. There was also a 300' fit out dock that was perpendicular to the northerly end of the berthing dock and angled in an east-west line. At the western end of the fit out dock was the entrance to the 650' graving dock (dry dock). Costs for improving the site included dredging the river and moving the Lake Shore & Michigan Southern swing bridge to straighten the river for bigger vessel traffic and amounted to $390,000 that the city of Ashtabula financed with the issuance of municipal bonds. Another advantage, there was ample room for two land-based dry docks, though only one was ever built, an asset St. Clair was never able to realize. The move of the St. Clair machinery started in 1910 and was mostly completed by the fall of 1911 in time to begin their first construction. Simultaneously, the Ecorse yard began construction on a steel dry dock gate (Hull #81) on December 13, 1910 that was completed by the following May. It was towed to Ashtabula where it was installed at the entrance to the graving dock in October 1911. Subsequently, the keel for the first

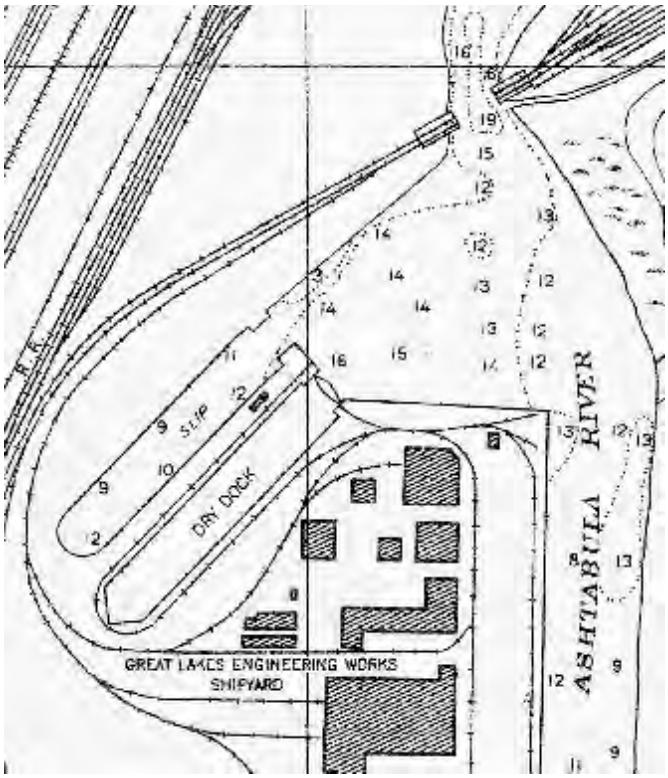
Throng looks on as Louis R. Davidson is ready for launch at Ashtabula 1912 [AM]



1909 chart of Ashtabula River before yard [HMCP]

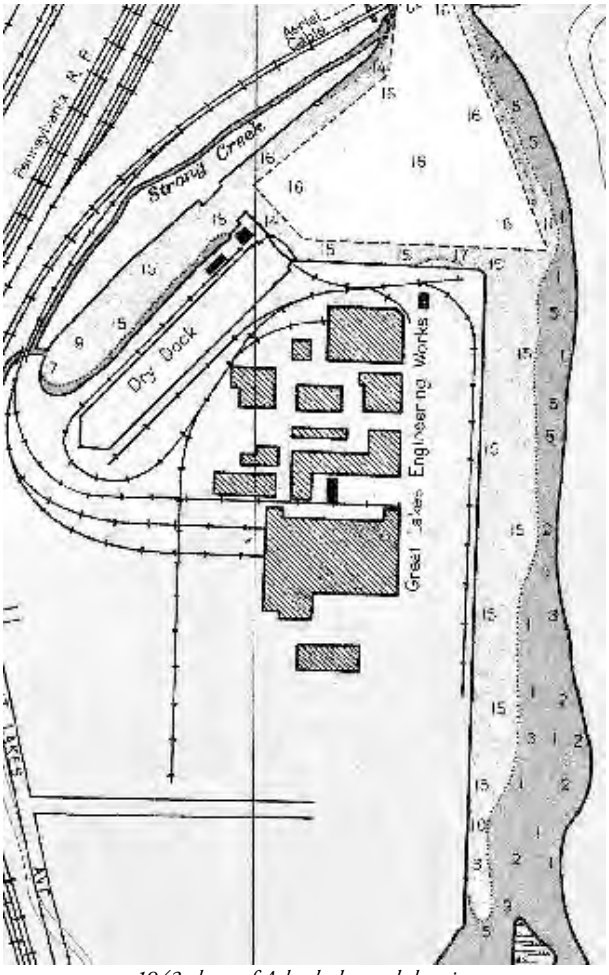


1913 chart of Ashtabula yard in original setup [HMCP]



1934 chart of Ashtabula yard showing added wet dock [HMCP]

vessel built at Ashtabula was laid on October 30, 1911, which was launched as the LOUIS R. DAVIDSON (Hull #95) on April 6, 1912 with much fan fare as the entire city turned out for the momentous event. The yard's first superintendent was Fred C. Pahlow, who held that position until 1941.



1943 chart of Ashtabula yard showing expansion past Kelley Island dock [HMCP]

The Ashtabula yard was used primarily for overflow of new construction that the Ecorse yard couldn't handle as well as valuable repair and maintenance work. During the balance of 1912, one steel barge (Hull #100) and two salt water stem-winder colliers, the EDISON LIGHT (Hull #104) and GEORGE HAWLEY (Hull #105), were built. The year of 1913 was even slower, only one small sand sucker, the CHARLES HEIDEN (Hull #127) and a grain lighter (Hull #126) were built. During the same period, the Ecorse yard built four salt-water stem-winders, one package freighter and the NORTH AMERICAN (Hull #107).

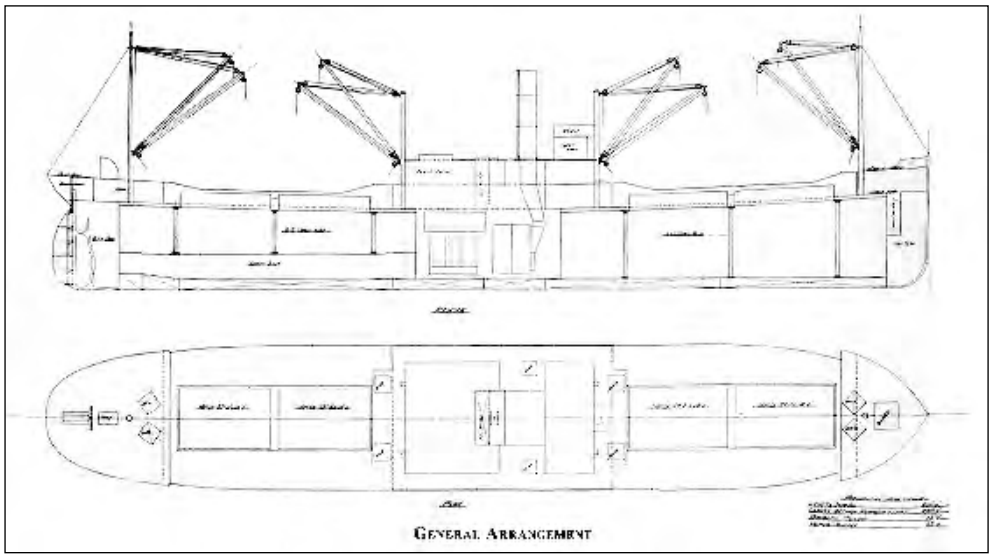
World War I and the "Laker" Program

A new direction was beginning for GLEW as the demand for Lake bulk carriers had slowed considerably. There was a shift toward building canal size salt-water cargo vessels of approximately 260 feet in length. These were commonly referred to as WWI "Lakers", named for the fact that they were built on the Lakes and often had Lake names. The shift to this style of construction was due to two factors. First, the start of WWI in Europe had increased the demand for more ships that could be filled by US coastal shipyards, which resulted in a backlog of demand that overflowed to the Great Lakes. Secondly, this backlog was filled with vessels of a size that could transit the lock systems of the Seaway. Early on, GLEW was engaged in contracts to supply cargo ships

mainly to the British Government via the Cunard Steamship Line and were given names that were prefixed with "WAR". Most of these however were requisitioned by the USSB and renamed before being put into service when the US became involved in the war.

At the beginning of WWI in 1914, the US was initially neutral. When the US entered the war in 1917 on the side of the Allies, the demand for ships increased tremendously to deliver supplies to both England and the war fronts in Europe. The Allied nations were losing a large number of ships to the Central Power's blockade successes. The most effective menace was the German submarine, known as the "U-Boat", which greatly disrupted Allied shipping.

Early on, the Germans realized that the Allied maritime supply line could have a devastating affect against them on the battlefields of Europe. To counter this, the Germans poured immense resources into the development of their U-boat fleet, which included adding 345 submarines to their pre-war total of 20. So new to naval warfare, the U-boats operated with impunity against Allied shipping and were virtually unstoppable using conventional naval tactics early in the war. As diplomacy vacillated in the early stages of the war, the Germans focused their submarine warfare policy on Allied merchant vessels with the intent to eliminate this floating supply line and win the war of attrition. The devastating result was that the Allies lost over 1350 merchant ships in the first two years of the war.



Drawing of Fredrikstad WWI "Laker" [GLEW BKLT]

The effect this had on the Great Lakes Engineering Works dramatically changed the product mix of the yard forcing them to adapt to a changing market. From 1914 until America's entry into the War in 1917, GLEW produced thirty-three vessels of 1400 gross registered tons or larger (all but three were larger than 2300 tons). Of these, only eight were Lake bulk carriers, while twenty-two were salt-water cargo carriers. This mix would become even more profound as the war stagnated into trench warfare in France and Western Europe. The conflict had been reduced to a war of attrition and defending supply lines, in which the Central Powers hoped the U-boat would play a major role in determining the outcome. By the end of 1916, only about one quarter of the ships lost were being replaced by shipbuilders around the world.

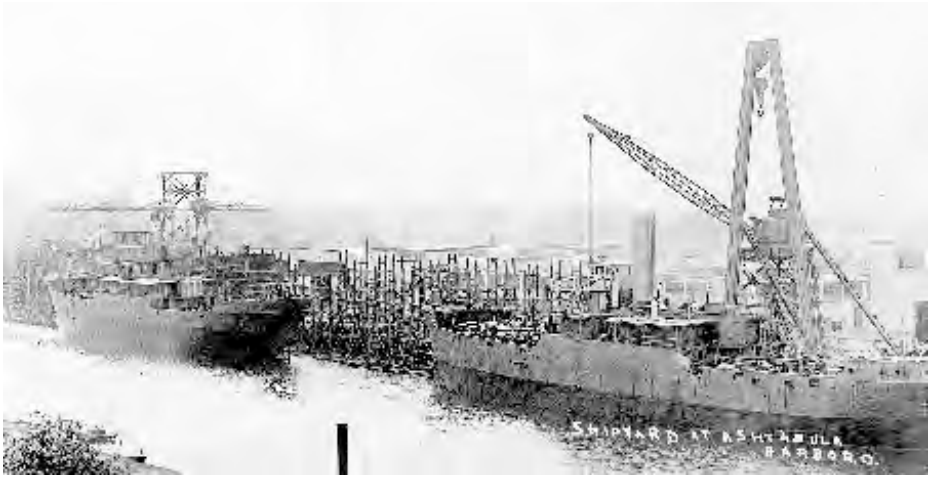
One major event shocked the country, and indeed, the free world, when the luxury liner LUSITANIA was sunk by the German submarine, U-20, on May 5, 1915. With 1198 innocent passengers lost, of whom 128 were Americans, the US sentiment dramatically shifted away from neutrality. By 1917, Germany recognized this fact and stepped up the pressure by declaring on February 1st unrestricted submarine warfare against all Allied vessels as well as all neutral merchant vessels supplying the Allies in the hope of forcing Great Britain into submission.

This strategy failed, as Britain remained steadfast and the United States entered the war on April 6, 1917 on the side of the Allies. What resulted was the virtual nationalization of all shipbuilding in the US under the direction and control of the United States Shipping Board (USSB), which was created by the Shipping Act of 1916 and formally organized on January 30, 1917 by Congress to regulate all aspects related to the American Merchant Marine. The Emergency Fleet Corporation (EFC) was created on April 16, 1917 by the USSB to build, crew, and manage ships to provide "a Bridge to France" for transporting troops and supplies. The first step took place on June 15, 1917 when Congress passed the Urgent Deficiencies Act, which allowed the USSB to seize any steel vessel over 2500 deadweight tons (capacity) for the war effort, including ships still on the building ways. This directed GLEW to hand over contracts for all of their salt-water cargo vessels slated for both foreign and

domestic owners. Of the vessels being built, many of their names were changed while still on the building ways. By August 20, 1917, all shipbuilding was commandeered for a massive and progressive building program funded by the US.

Launch of the Lake Elrio at Ashtabula 1919 [AM]

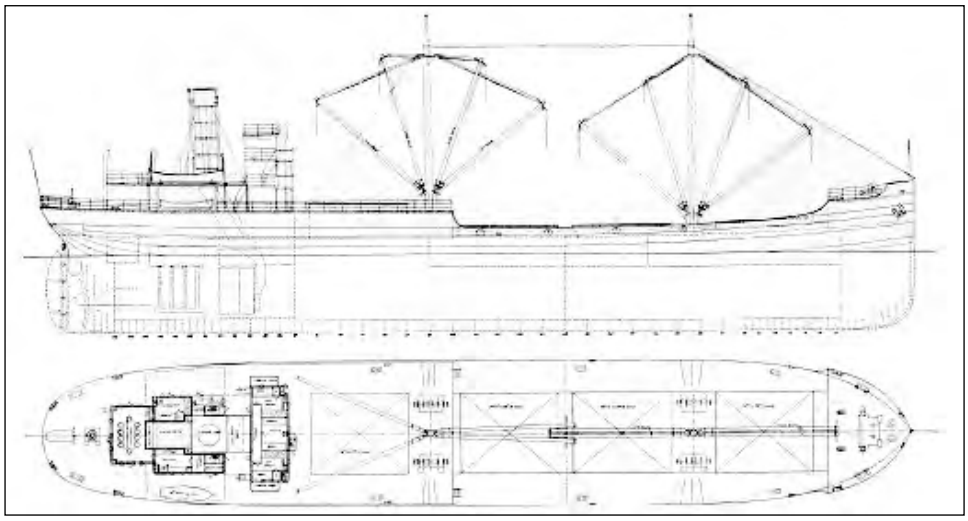
In May, 1917 GLEW lost board member and first Vice President, George H. Russel, who passed away. With the threat of war in the spring of 1917, GLEW's board and stockholders elected Antonio C. Pessano Chairman of the Board, a newly created position. Pessano retained his title as President for the time being, which he had held since the inception of the shipyard. Late in the fall of 1917, action again was taken to elect John R. Russel as President, freeing Pessano from the rigors of handling the day-to-day activities of the yard allowing him to concentrate on national issues that affected the shipyard. This action, it was felt, would better position GLEW to withstand the onslaught of pressures associated with the war.



WWI "Lakers" being fitted out at Ashtabula yard 1918 [AM]

Ramping up the shipbuilding program was a logistical nightmare initially as designs, supplies, yard labor and ship crews had to be procured, trained and coordinated. At the start of the war, the US had less than 50,000 shipyard workers nationwide, but by war's end it had ballooned to 350,000. In addition, the USSB trained 42,000 men to crew the vessels that were built. The Allies were deeply feeling the German escalation of submarine warfare by the end of 1917 as more than 2400 Allied merchant vessels had been sunk by submarines alone, with another 230 lost by mines, air attacks, surface ships and other means. But the Allies were undaunted as they stepped up the building program to counter these losses. Different ship designs were assigned to various shipyards throughout the country. The Fredrikstad class, a three island cargo vessel, and the Stemwinder class, a cabins aft vessel, were common designs of which many shipbuilders had building experience and therefore the easiest to get into production; designs GLEW had built leading up to the war. The

Dry dock at Ashtabula with WWI "Laker" behind in dazzle paint c1918 [AM]



Drawing of stemwinder class "Laker" [GLEW BKLT]

challenge to the USSB was to initiate a shipbuilding program to reach full production as soon as possible. The Allies' success depended on a well-coordinated operation.

The USSB, as well as GLEW, was successful in gearing production at an accelerated pace that started to blunt German successes. By war's end in November, 1918 (and as late as 1920), GLEW produced 82 vessels (Hulls #172 – 238 and #501 – 515) towards the national shipbuilding goal, 27 of which were built at Ashtabula. Two examples that demonstrated the urgency and importance of the shipbuilding program can be seen by the impact the following events had on the national psyche. The first was when the USSB declared that every shipyard in the nation should launch every possible ship on July 4, 1918 in recognition of national "Shipping Independence Day" to show our manufacturing might. This created an immense flow of the national pride that buoyed the peoples' morale as 95 vessels slid down the launchways nationwide. GLEW contributed four "Laker" launches (Lakes Janet, Pearl, Silver, and Pleasant). It was also meant to catch the attention of the Central Power to show that we were undaunted by their attempt to cut the supply line to Europe, and through American resolve, the Allies would persevere. The second example, that demonstrated how far our production capabilities had progressed, occurred with the building of the WWI "Laker" CRAWL KEYS (Hull #204). Her keel was laid on June 11, 1918 and she was launched fourteen workdays later on July 27. Furthermore, after 29 working days, the CRAWL KEYS was delivered to the USSB as the fastest vessel built and delivered during the war. This was another resonant boost to the national spirit.

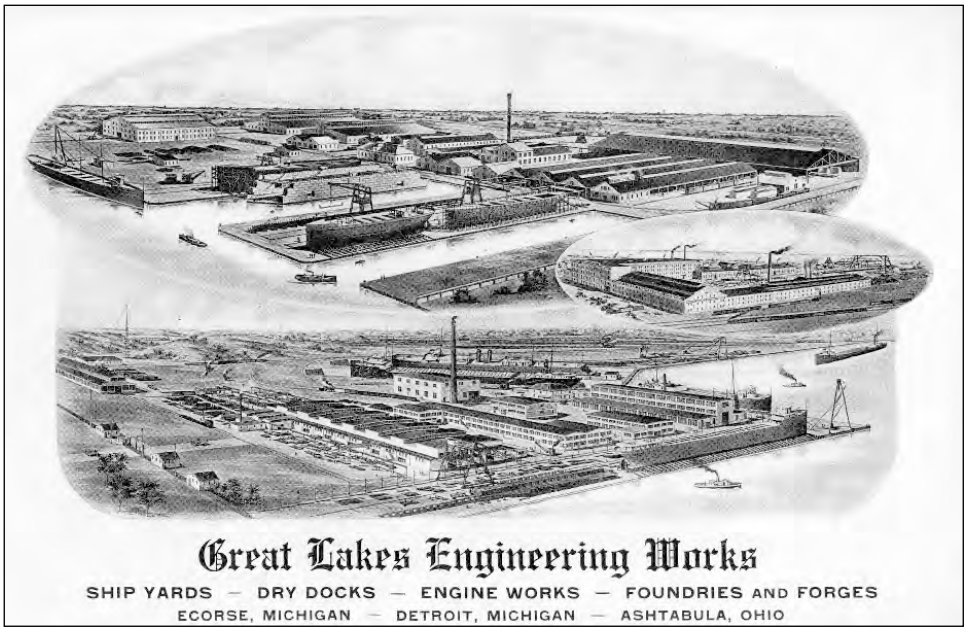
At the signing of the Armistice on November 11, 1918, the national shipbuilding program was functioning at a high rate. In the two years that the US was involved with the war, the shipbuilding program in this country produced 3000 ships at a cost of $5 billion in 150 shipyards that employed 300,000 workers. Additionally, late in the war the Allies had effectively reduced their losses to U-boat attacks due to improved defenses, which included convoying all merchant vessels, balloon surveillance, the use of hydrophone detection devises, more effective depth charge operations and to a certain extent the camouflage paint scheme, known as Dazzle that was employed early in 1918. As a result, a surplus of merchant vessels quickly developed. A small number of these surplus ships were sold off, but many of these government owned ships were minimally operated, if at all, before laying up in one of the vast post war reserve fleet's coastal moorings. Though the pressure to meet production quotas and deadlines was relaxed once hostilities ended, the building program still continued.

The Great Lakes Engineering Works, along with other shipyards involved in wartime production, had to adjust to the reduced production at war's end. Government supported employer programs were eliminated and labor was drastically cut. Hourly wages were cut as well. Shipping fleets experienced large reductions in cargoes with the decreased demand after the war. Orders for new ships were non-existent except for the lingering Government sponsored program.

Post World War I and the Roaring Twenties

The end of WWI set in motion a series of events that would have a grave impact on the post war economy for the shipbuilding industry. Production that reached a feverish pace by war's end now had to be significantly scaled back. The millions of repatriated military men needed reinsertion into the job market, which resulted in high unemployment to those who were replaced. Demand for raw bulk materials, needed so desperately during the war, dried up and resulted in post-war malaise.

Though it was clear that even more cut backs would soon be necessary, GLEW and the shipbuilding industry initially had a reprieve regarding their contract with the USSB. After the Armistice, GLEW's last "WWI Lakers" were completed early in 1920, 15 months after hostilities ceased; the LAKE ELMWOOD (Hull #238) and LAKE ELWIN (Hull #515) were delivered in February from Ecorse and in March from Ashtabula, respectively. At this time frame, GLEW decided to revise their hull numbering system. The last vessel built at Ashtabula under the old numbering system was "Laker" CRATHORNE (Hull #203), which was delivered to the US Shipping Board in November, 1918. The next vessel launched at Ashtabula was the "Laker" COWANSHANNOCK that was assigned Hull #501, starting a new sequence of hull numbers for Ashtabula-built boats. Hull #501 was delivered to the Shipping Board in February, 1919. Thereafter, all Ashtabula built vessels were numbered in the 500 series. The Detroit River yard maintained its numbering sequence as before.

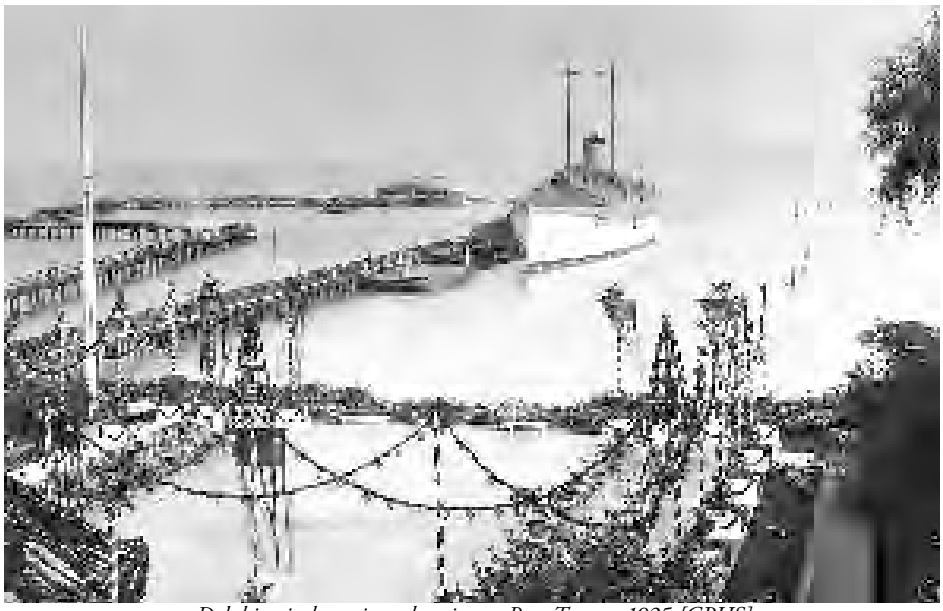


Engraving of three GLEW yards - Ecorse (top) - Detroit (middle) - Ashtabula (bottom) [GLEW BKLT]

The decade before WWI was one of the strongest economic periods in US history. The growth of this period continued into the war years and increased during the war, then the post war economy declined rapidly. But for the Government subsidized shipbuilding program, GLEW might have been forced to close in 1919. Public pressure mounted calling for an end of the ship building program in 1920, the shipbuilding business dried up. Coinciding with this eroding business climate came the news that GLEW's Vice President Henry Russel had passed away early in 1920. As a result, according to the contemporary publication, The Michigan Investor, the Russel family withdrew financial support of the company and the board voted to liquidate the shipyard. This compounded the economic effect on the shipyard and forced its reorganization that was completed by October, 1920. According to another contemporary publication, The Manufacturer and Financial Record, the GLEW employees purchased one-third of the company. A statement issued by the company described the event as: "The most remarkable part of the company's recent organization is that the employees of the company on their own initiative subscribed and paid for immediately in cash over one-

1921 chart showing the River Rouge yard [HMCP]

third of the entire capital stock of the company, which they were allowed to take at the exact cost price paid for the properties. Possibly nowhere in the entire shipbuilding industry of the world has this been equaled." Pessano was retained as Chairman of the Board and John A. Ubsdell was elected President and General Manager. Another notable elected to the board as Secretary-Treasurer, was Frederick G. Morley, who would become the third President of GLEW in 1933.



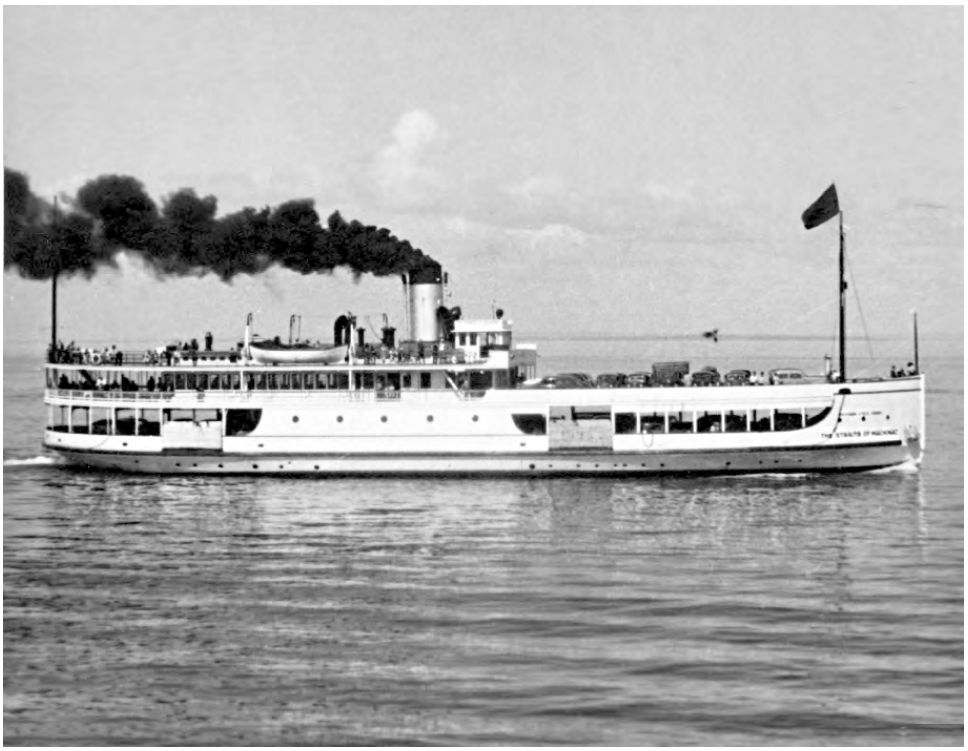
Delphine in her winter housing at Rose Terrace 1925 [GPHS]

At the time of these events, the Great Lakes Engineering Works adopted the city of River Rouge as the yard's corporate address. Always located in the same location since its inception, a portion of the yard had originally been located in Ecorse Township and in a portion in River Rouge Township. Since the yard straddled the boundary between the two townships, it was decided by the officers to use River Rouge as the yard's official address primarily because River Rouge's industrial development and identity more accurately reflected their desired business image. From late 1920, or after Hull #239, River Rouge became the yard's official address.

Immediately following the war, the economy slowed to a period of recession. US factories, nevertheless, retooled for the peacetime economy to manufacture automobiles, radios, refrigerators and other consumer goods. Women left their wartime jobs, which allowed returning service men to reenter the work force. This resulted in a surplus of labor that caused a drastic drop in wages. Lower wages, however, helped save jobs, which many economists believed, helped drive an economic recovery that began late in 1921 and blossomed into the robust economy of the 1920s.

The newly reorganized GLEW began its post war recovery slowly. The Dodge family, which had made a sizeable fortune in manufacturing during the war, provided the beginning of GLEW's first post war construction. Horace C. Dodge ordered a steel yacht, 260 feet in length, which was lavishly appointed and aesthetically attractive. The DELPHINE (Hull #239), powered by two quadruple expansion steam engines was easily recognized by her all white paint scheme and her attractive classic bow. The DELPHINE was Horace's special vision. Unfortunately, he passed away before the yacht was completed. His widow, Anna C. Dodge, however, would see the project through to its completion as well as to invest unprecedented amounts of capital into the yacht to preserve it as a monument to her husband.

After building only two barges at the River Rouge yard during the balance of 1921, the yard secured a major contract with the Wilson Transit Company to build the steamer JAMES MacNAUGHTON (Hull #242) in 1922. This news was a great relief to the investors and the investor-employees. Yard repair work was all that sustained both yards during this time. In 1923, the first major build took place at the Ashtabula yard, with the construction of the "TWINS." Identical in every respect, the New York State Barge Canal sized bulk carriers were built for the Minnesota-Atlantic Transit Company to transport bulk cargoes east and finished goods back to the Lakes. The size and design was dictated by the dimensions of the Barge Canal. They were 258 feet in length overall with a 42' beam and a ten foot draft that met canal restrictions. These were the TWIN PORTS (Hull #516) and TWIN CITIES (Hull #517). Each was equipped with diesel-electric engines driving twin screws needed for maneuverability in the canal and was equipped with low profile pilothouses and masts that were lowered for bridge clearance. Although these vessels were successful, Ashtabula received few building contracts other than two barges and a fish tug, the MAVRET H. (Hull #520) built in 1927. Surviving on repair work, this was that yard's plight until the advent of WWII.



The Straits of Mackinac with second deck [DC]

At the River Rouge yard, there was considerably more activity in the 1920s. From 1923 through 1929, four auto-passenger ferries, ten bulk carriers, fourteen steel barges or scows and some miscellaneous vessels were built. The four ferries marked a new type of construction for GLEW. These vessels were the result of social changes in public behavior. The public became more mobile with the advent of more affordable automobiles and improved roads. Long distance travel, which had been dominated by rail and ships, gave way to the choice of flexibility and independence available with the automobile.

Two passenger/car ferries, the WAYNE (Hull #243) and the HALCYON (Hull #252), were built in 1923 and 1925 respectively for the Walkerville & Detroit Ferry Company. They were nearly identical. They transported automobiles and passengers across the Detroit River between Detroit and Walkerville, ON. The third GLEW-built ferry was the CADILLAC (Hull #260), similar to the Walkerville pair only larger. It serviced similar passenger-auto cross-river passages down stream on the Detroit River starting in 1928 just before the Detroit-Windsor tunnel and the Ambassador Bridge were completed. A fourth ferry was built for the State of Michigan Highway Department for transporting passengers and automobiles across the Straits of Mackinac. Named THE STRAITS OF MACKINAC (Hull #261), it was built in 1928 to accommodate the huge demand for travel to Michigan's Upper Peninsula (the UP). Sportsmen and tourists alike crowded aboard the State owned ferries. Particularly during the hunting season, the demand for crossing the Straits to the UP was often overwhelming, as the line of cars waiting to cross would stretch for many miles. The State initially reacted to the over crowding by contracting GLEW in the mid-1920s to lengthen and widen their two existing Straits ferries, the MACKINAC CITY and SAINTE IGNACE. However, the increase in traffic far exceeded the ability of the two car ferries to meet the demand. As a result, the construction of the new STRAITS ferry was completed in 1928. The ferries all had something in common. Though loved for their memories, they were unable to handle the volume of traffic at their respective locations and eventually were replaced by bridges.

Ford's Eagle boats in the Rouge River slip spring, 1919 [FMC]

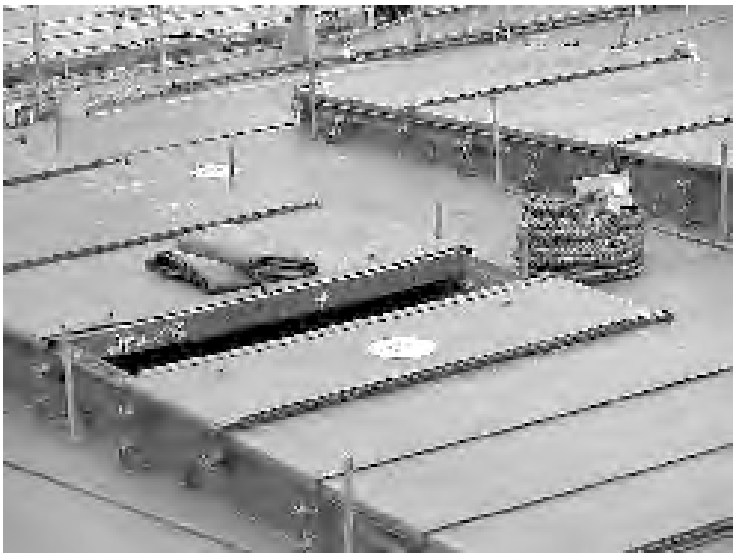
Still early in the decade of the 1920s, the Great Lakes Engineering Works lost its second but most revered founder. Antonio C. Pessano passed away at the age of 66 on December 8, 1923 after being in poor health. Later in life, he became less active in the daily

operation of the company. R. L. Polk's 1917-18 Michigan State Gazetteer and Business Directory listed John R. Russel as President, a position he was elected to late in 1917, and Pessano as Chairman of the Board, underscoring his reduced daily activity with the shipyard from that time on. His loss was deeply felt by all the employees and the business community. His charisma and leadership was greatly missed. Subsequently, as before mentioned, John Russel was to serve as President until his brother, Henry, died in 1920 when the Russel family withdrew their capital and GLEW reorganized with John A. Ubsdell as President.

Benson Ford (1) splashes down at the River Rouge yard [FMC]

The Detroit area was flourishing as a manufacturing hub, which included the automotive industry that was on the leading edge of economic growth for this period. Auto magnate Henry Ford purchased a 2,000-acre plot of land on the Rouge River in 1915 to build a major manufacturing complex. Two years later he began building Eagle Boats there at the request of the Undersecretary of the Navy, Franklin D. Roosevelt. Sixty boats were built of wood designed to hunt submarines in WWI, though none of these boats ever saw action in the war. Nevertheless, this project allowed Ford the opportunity to further develop his complex at the Rouge River not only for the Eagle boats, but more importantly, the dredging and land removal that would enable ore boats access to his property. Ford's vision of "ore to final assembly" included provisions for ore docks, blast furnaces, foundries, rolling mills and assembly plants in his attempt to develop a self-sufficient complex. Also included was his vision to own his own fleet of cargo carriers. This would allow him to supply and operate his own steel mills and power plants. He ordered two ore carriers in 1923, the HENRY FORD II from the American Ship Building Company at Lorain, OH and the BENSON FORD (Hull #245) built by, his neighbor, the Great Lakes Engineering Works for delivery in 1924. Specified to power these bulkers was a 3,000 bhp Sun Doxford opposed piston diesel engine, the first on the Great Lakes. Not equipped with large steam boilers, the ancillary equipment had to be powered by electricity. A.A. Johnson was retained to design an electric winch for GLEW capable of constant tension up to 20,000 pounds. This GLEW driven innovation became standard on the lakes. An interesting aspect of the Sun Doxford engines that powered these boats

Axe man ready to sever launch ropes [GLEW BKLT]



Telescoping hatch covers [DL]

was the unique sound they produced. Capable of being heard for some distance, they resonated what sounded like a lively throbbing drumbeat to the rhythm of "making money". Henry Ford was so satisfied with the BENSON FORD and the vessel's quality of construction that a long and beneficial relationship was cemented with the yard assuring more business in the future.

Another innovation for the shipyard was the method with which the BENSON FORD was launched. For the benefit of Henry Ford's grandson, Benson, an electrical system was devised that actuated a series of knives, which would sever a dozen or so lines that held the ship on the launch ways. By a simple flick of a switch by young Benson, the knives would sever simultaneously the lines holding ship in place. Rather than the dangerous task of men wielding axes simultaneously, the electrical system worked to perfection and to the safety of the axe wielding men. The electrical launch system was universally adopted from that time onward.

Vessels worthy of note built at the River Rouge yard later in the Roaring Twenties include the WILLIAM C. ATWATER (Hull #249) built in 1925 for the Wilson Transit Company. This ship was the first Great Lakes bulk carrier built with single piece steel hatch covers. A traveling hatch crane was also devised to remove the heavy steel hatch covers, weighing as much as 7 tons, from the hatch coaming, or hatch opening, and stack them on the deck between the hatches and then reinstall them. Great Lakes bulk carriers previously were equipped with wood or steel telescoping hatch covers, which required tarpaulins to seal. The wood hatch covers were laborious and time consuming to batten down with tarps and could be dislodged by heavy wave action; the cause of many ships to founder. Steel telescoping hatch covers were operated by winches to fold the overlapping leaves at the outer edge of the hatch opening but were susceptible to corrosion and deformation and could be difficult to operate in icy conditions. The single piece hatch cover concept, known as the Wood Patent Hatch Cover, was created by Wilson Transit's president, Joseph S. Wood. Single piece hatch covers are still in use on most bulkers today, but still need to be "dogged down" with clamps in order to seal them.

William C. Atwater showing single piece hatch covers and hatch crane. [AMK]

Another noteworthy vessel built by GLEW, the WILLIAM G. MATHER (2) (Hull #250) was also delivered in 1925. Its namesake was the president of Cleveland-Cliffs Iron Company. This was the second GLEW built bulker with that name; the first was built in 1906 as Hull #9 and was still in service in 2007 as the ST. MARYS CHALLENGER. The relationship with William G. Mather had long endured since GLEW's inception. He was an investor in the shipyard's initial stock offer. His relation with the yard was such that Cleveland-Cliffs became the second largest customer for the Great Lakes Engineering Works, second only to the Steel Trust fleet. The MATHER, which served as the Cliff's flagship, had lavishly appointed owner and guest accommodations.

The ship was powered by a quadruple expansion steam engine, the last so built on the Great Lakes. The MATHER surrendered her flagship status when the EDWARD B. GREENE entered service in 1952. The MATHER was laid up in the 1980s and is now preserved as a museum ship at Cleveland, OH; the second such preserved GLEW built Cliff's boat.

Philadelphia layup fleet c1925 [WG]

In the early 1920s, the nation was engrossed in a rapidly expanding economy and the struggles of Prohibition. The Volstead Act passed on October 28, 1919 gave the Federal Government the authority to enforce the 18th Amendment, which prohibited the sale or distillation of alcoholic beverages. When the Act went into effect on January 16, 1920, the Detroit and St. Clair Rivers soon became the domain of rumrunners crossing between the US and Canada where alcoholic beverages were readily available and legally sold. GLEW built a steel-hulled motor boat (Hull #257) for the Detroit Police Department in 1927 for border patrol and enforcement duties. After nearly a decade of rampant disregard for the liquor laws, smuggling, underworld chaos and loss of life, the unpopular amendment was repealed in 1923 when the 21st Amendment was passed. Interestingly, the 18th Amendment is the only amendment that has ever been repealed and was the only law that restricted freedoms, rather than ensuring them.

Later in the "Roaring Twenties", GLEW built the A. F. HARVEY (Hull #255) and the S. T. CRAPO (Hull #256); both completed in 1927. The HARVEY was ordered by the Pittsburgh Steamship Company, which was modernizing its fleet. By 1927, fifty-six vessels were sold, four were lost to natural causes, eleven were purchased from other fleets and twenty-nine were newly built for this fleet, which brought their total to 89 bulk carriers. The HARVEY, a straight decker, was nearly 604 feet in length overall and was powered by a 2200 ihp triple expansion steam engine. At the end of the 1956 season, she was converted to a self-unloader to help meet the increased demand for limestone. The following spring she came out with a new coat of Bradley gray paint and renamed CEDARVILLE. Her career was to be short lived, however, because on May 7, 1965, the salty TOPDALSFJORD, in heavy fog, struck her a mortal blow in the Straits of Mackinac. The CEDARVILLE sank in 110 feet of water with a loss of ten lives. This sent shock waves throughout the Great Lakes, especially in the Bradley fleet, for the CEDARVILLE was the second Bradley self-unloader sunk in seven years. The first was the former fleet mate CARL D. BRADLEY (2), which, in 1958, sank in a storm on Lake Michigan.

"Laker" being towed to Ford scrap yard 10/04/1926 [WG]

Ford dry dock in the Ford slip on the Rouge River c1927 [WG]

Also, in the late '20s, Henry Ford signed a contract for a 250' floating dry dock (Hull #254), which was designed for use during their scrapping program of 199 WWI Shipping Board cargo vessels. Widespread public sentiment felt the government building program should have immediately stopped at the cessation of hostilities, but the USSB decided that abrupt closure would cause irreparable damage to the shipbuilding industry. The Board also felt the US needed to continue exporting food to Europe during the post war reconstruction as well as transport troops home from the European theater. Even so there was a need, indeed an outcry, to dispose of the surplus cargo ships that accumulated by war's end and during the slow culmination of the shipbuilding program after WWI. Attempts to sell them were slow and these vessels became an unnecessary expense to the US Government as well as an eyesore in locations around the country. The Ford Motor Company secured a contract on August 25, 1925 to scrap 199 of these surplus vessels and arranged to have them towed to the Ford Dearborn plant on the Rouge River where a "production line" scrapping facility was located. There became a need to acquire a small dry dock to complete the final step of scrapping ships that were cut down to a reduced floating hull. The dry dock was built to raise the hull remnant, called "the canoe", out of the water in order to complete a final step of the scrapping process. Ironically, some of these scrappers that had been built by GLEW only ten years before were being brought "home" for scrapping, a process that was completed by the end of 1927.

Myron C. Taylor launch at River Rouge yard before throng of onlookers 07/15/1929 [JS-BL]

The Depression and the Quiet '30s

The Great Lake Engineering Works' fortunes reflected the highs and lows of the US economy. The Rouge yard did well for the most part, but the Ashtabula yard never received much of the new construction work after the WWI cargo vessel program ended. The Ohio yard was employed mainly for repair work.

The business environment seemed favorable when the MYRON C. TAYLOR (Hull #269) was delivered to the Pittsburgh Steamship fleet in August of 1929 by the Rouge yard. The rapid increase in industrialization during

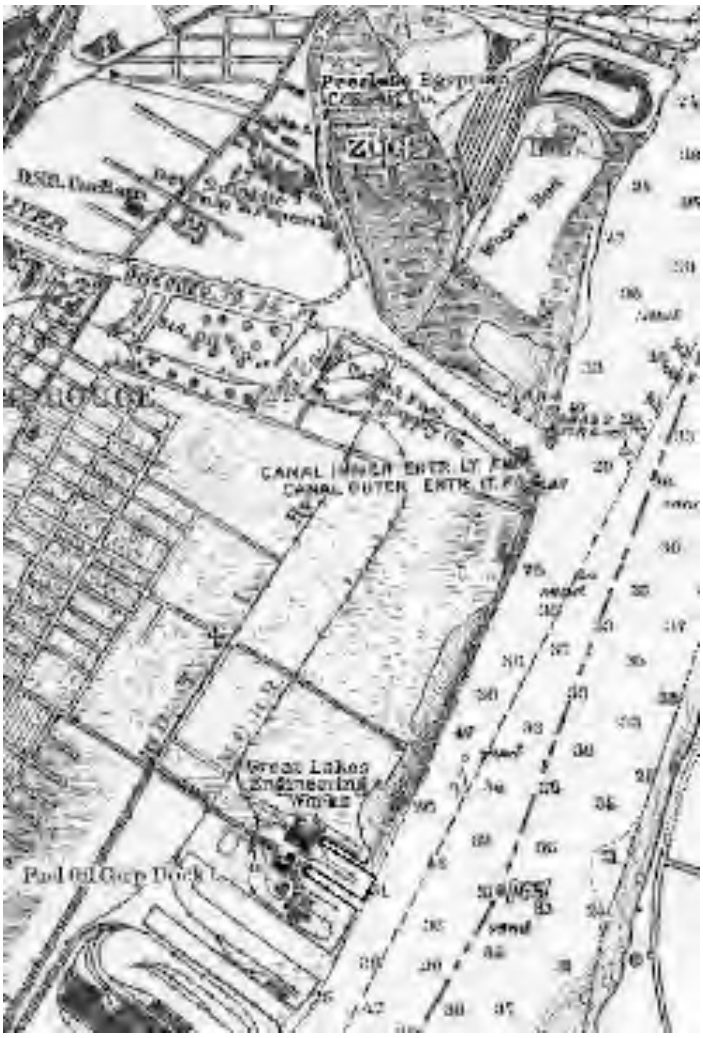
the 1920s was fueling growth in the economy, and technology improvements had the leading economists believing that the upswing would continue. During this boom period, wages increased along with consumer spending, and stock prices began to rise as well. Countless speculators had bought stocks on margin during the economic euphoria of the late 1920s when the market began to correct. Complicating matters was the fact that banks had loaned huge sums for these margin purchases. Shortly after, however, "Black Tuesday" occurred on October 29, 1929, the day the New York Stock Exchange crashed. This resulted in a massive margin call on stocks, which caught many investors without funds to meet the crisis forcing them to default on their margin call or on their loans. Consequently many suffered great losses causing a run on money that many banks couldn't meet. This forced numerous banks to close initiating the beginning of the Great Depression in the United States.

Eugene P. Thomas on building ways at Rouge yard 03/08/1930 [JS-BL]


1930s aerial view of River Rouge yard [PW]

There was a short-lived recovery as the stock market turned upward during the early months of 1930, before returning to the collapsed levels of 1929. Furthermore, US businesses were indeed spending money by mid 1930 at levels that exceeded the same period in 1929. GLEW received, in August 1929, another order from the Pittsburgh Steamship Company to build the EUGENE P. THOMAS (Hull #274); shortly after delivering the TAYLOR. The Rouge yard responded quickly and delivered her to the Steel Trust Fleet in April, 1930. But, this was just the "eye of the storm" that appeared in 1930. Consumers, who had suffered losses when the stock market crashed, cut back spending drastically. This, coupled with a devastating drought that ravaged agriculture in the Great Plain states during the 1930s (The Dustbowl), adversely affected the economy. As consumer spending faltered, the job market contracted. The Federal Reserve failed to supply enough money to the banks, which resulted in even more bank closures. As a result, confidence in banking plummeted, which compounded the declining economy. Storing cash in a mattress seemed safer than banks.

While production of goods continued to drop, businesses began to protest against the importation of foreign products and their negative effect on the domestic economy. As a result, the US Congress passed the Smoot-Hawley Tariff Act of 1930 that put a tariff on all imported products. This had the opposite and unintended



1934 chart showing GLEW River Rouge yard [HMCP]

effect that resulted with foreign governments in turn taxing imports of US goods. This contributed further to the US economy bottoming out in March of 1933.

During these hard times, GLEW's two yards struggled to survive any way they could. They took on any repair or small contracts available. From 1930, not a single dry bulk carrier over 2,000 gross tons was built on the Lakes until 1938, certainly a dark period for Great Lakes shipbuilding. GLEW, though, was fortunate for the close relationship developed with Henry Ford and the nearby Ford Motor Company. Out of this relationship came contracts in the 1930s to build four New York State Barge Canal cargo vessels, a tug, a yacht for Henry Ford's close associate, Harry Bennett, and several contracts to lengthen Ford's "Laker" barge fleet.

The four New York Barge canallers were built in pairs and had many of the innovations set forth in the "TWINS" built by the Ashtabula yard in 1923. The first two, the EDGEWATER (Hull #276) and CHESTER (Hull #277), were built in 1931 at the River Rouge yard. They were 300 feet long, equipped with twin-screws and powered by steam turbines. These 1800 gross ton canallers were built to transport Ford assembly parts between their East coast plants and the Rouge complex via the New York State Barge Canal. These were the largest vessels built to transit the New York canal system and were the first turbine powered boats of their type on the Great Lakes. These boats were the start of Ford's "Mosquito Fleet" and were considered innovative.

Dunbar & Sullivan, which had been a loyal customer of GLEW dating back to 1904 with the delivery of the dump scow, EARTHQUAKE (Hull #3), ordered the tug, R. H. GOODE (Hull #278) and the dredge, EMPIRE (Hull #279) in 1931-32. This didn't represent a large amount of revenue, as was the case for most Dunbar contracts, but these orders kept the yard busy for at least a short period of time.

Taylor, Thomas, Affleck laid up at River Rouge yard 1930s. Note: Little dry dock [JS-BL]

Ford's order in 1932 was welcome news with a contract for a small harbor tug, the DEARBRON (Hull #280). The tug was built to tow Ford's barge fleet of ex-WWI "Lakers" to and from their Rouge River plant. Larger Shipping Board tugs Ford purchased for the WWI Laker scrap program dropped off fully loaded "Laker" barges at the mouth of the Rouge River and towed away the empty ones to secure more cargoes. In the mean time, the DEARBORN towed the loaded barges up the Rouge to the Ford complex where they were unloaded and returned empty to the river mouth to be towed away.

In 1933, GLEW lost their third president, John Ubsdell, who passed away in the spring of that year. In a meeting of the Board of Directors on May 20, 1933, Frederick G. Morley was elected as GLEW's fourth president. Morley continued his duties as Treasurer and George Turnbull was elected Vice President and Manager. It would be Morley's task to lead the shipyards through one of the country's most difficult times. He quickly set about to secure work wherever he could find it. According to the Michigan Manufacturing and Financial Record, the Great Lakes Engineering Works was the low bidder to build a lighthouse tender with an offer of $66,566. This diesel powered, 81 foot vessel was named DAHLIA (Hull #282) and was delivered to the US Lighthouse Service in August, 1933 to replace an outdated tender cited unfit for service. This was not a large contract, but was welcomed non-the-less.

Green Island on the ways 05/14/1937 [WG]

By 1933, unemployment in the US had reached the worst ever level of 25%. Desperate for some kind of relief, President Franklin D. Roosevelt proposed his controversial "New Deal" of Relief, Recovery and Reform (The Three R's) to the American people and businesses. He tried to convince the country that "We have nothing to fear, but fear itself." His program was to provide relief with monetary programs such as unemployment insurance and Social Security to help spur the economy. Work programs were introduced to help the unemployed. Finally, reforms in stock market practices and monetary policies were implemented to limit buying schemes and promote banking safe guards designed to prevent events such as the Panic of 1929 and the consequences of the Depression. There was, however, a mild recovery leading to 1937, though followed by a dip in the economy that lasted through most of 1938.

Wet dock slip being dredged and pilings driven at Ashtabula [AM]

Fortunately, GLEW received Ford's order for two more New York State Barge canallers. They were similar to their 1931 built canallers with regard to size and low profile design, but these, however, would differ by having all welded steel hulls and superstructures, without use of rivets. These also were twin screw, but powered by diesel engines rather than the previously equipped steam

turbines and were named GREEN ISLAND (Hull #283) and NORFOLK (Hull #284). The nearly one million-dollar order brought new life to the yard, which hadn't built a major vessel for six years.

Shortly after the Ford canallers were delivered in mid-1937, GLEW bid on and received orders for two Great Lakes bulk carriers from the esteemed Pittsburgh Steamship Company. The two new freighters were 611 feet overall in length with a capacity of 15,000 gross tons and were delivered the following year, 1938, for the total price of $2.6 million. These bulkers were two of a class of four built in 1938 on the Great Lakes and were known as the "Governor Miller" class. They were named RALPH H. WATSON (Hull #285) and JOHN HULST (Hull #286). The other two bulkers in the Governor Miller class were built by the American Ship Building Company; the GOVERNOR MILLER and the WILLIAM A. IRVIN. The WATSON and HULST featured innovations unique to the Great Lakes. They were the first powered by a cross-compound steam turbine driving a propeller through a reduction gearbox. They were the first freighters built with passageways, or tunnels, under the spar deck, which allowed safe access fore and aft in foul weather conditions. These boats were equipped with single piece hatch covers and traveling hatch cranes. The hulls were mostly of welded construction with some riveting as required. Although the HULST was the last of the four Miller class boats launched, she was first to enter service in May, 1938.

The four "Miller Class" boats were the first ore carriers built on the Great Lakes since 1930. Other than the Ford canallers, the tanker RED CROWN, built in 1937 at Manitowoc, WI, was the only vessel over a thousand gross tons built on the Great Lakes between 1930 and 1938. During this time, shipyards on the Great Lakes survived by doing repair work on the few vessels running or went out of business. Fleet owners took risks during this time by over loading their vessels beyond safe conditions. As a consequence, load line regulations were introduced on August, 27, 1935 to be enforced and regulated by the US Coast Guard, the American Bureau of Shipping and Lloyds of London beginning the following year. This actually had a positive effect on the repair business for shipyards because it forced ship owners to keep their boats in the highest level of seaworthiness, if they wanted to operate their vessels. The Great Lakes fleet as a whole, however, laid up a sizeable portion of their boats for a lack of cargoes.

The Ashtabula yard, during this period, had very little business other than ship repairs and revenue from dockage fees, not unlike other shipyards. Even this was challenging as the Great Lakes were experiencing record low water levels making the Ashtabula River difficult to navigate for intended service seekers. The need to dredge the ever silting river was even more evident and would haunt the yard its entire existence. Attempts to sell the yard were unsuccessful because other yards were also experiencing financial hardships and were not looking to expand. Two barges (Hulls #518 and #519) built in 1924, the fish tug MAVRET H (Hull #520) built in 1927, the small motor boat G.L.E. WKS. (Hull #270) built in 1930 and the supply boat SANDY (Hull #521) built for old friend Pittsburgh Steamship in 1940 were the only new constructions at Ashtabula from 1923 to the "Maritimer" program in 1943. The yard saw its first superintendent, Fred C. Pahlow, replaced in 1941 after thirty years of faithful service. He was replaced by Edward MacKenzie who held that position until 1955.

J.F. Durston at Ashtabula for repairs 1944 [AM]

Another World War: A Reprieve for the Yard

The condition of the Great Lakes fleet had drastically deteriorated in the 1930s. When the war in Europe started in 1939, the economic climate in the United States began to move in a positive direction. News of Neutrality Acts and the Munich Pact after Hitler invaded Poland were concerns for America. A large part of the 1940 Presidential election campaign between Republican Wendell Wilkie and President Roosevelt was concerned with the war in Europe. Wilkie claimed that America must prepare for war, while the President stated that, "Our boys will never set foot on foreign soil." It wasn't long after that claim, when on

62 Years of Great Lakes Commerce

YEAR	IRON ORE	COAL	STONE	TOTAL
1900	20,798,753	8,907,663	Unavailable	29,706,416
1901	22,576,425	9,819,615	Unavailable	32,396,040
1902	30,283,870	9,196,039	Unavailable	39,479,909
1903	26,487,496	13,351,291	Unavailable	39,838,787
1904	23,773,782	12,370,023	Unavailable	36,143,805
1905	37,494,133	14,401,199	Unavailable	51,895,332
1906	42,015,220	17,273,718	Unavailable	59,288,938
1907	46,245,594	21,486,927	Unavailable	67,732,521
1908	28,478,346	19,288,098	Unavailable	47,766,444
1909	46,685,631	18,617,396	Unavailable	65,303,027
1910	47,733,009	26,478,068	Unavailable	74,211,077
1911	35,986,061	25,700,104	Unavailable	61,686,165
1912	53,128,064	24,673,210	Unavailable	77,801,274
1913	54,958,936	33,362,379	Unavailable	88,321,315
1914	35,864,525	27,281,228	Unavailable	63,145,753
1915	51,877,061	26,220,000	3,854,106	81,951,167
1916	72,502,302	28,440,483	5,553,927	106,496,712
1917	69,998,770	31,192,613	6,748,801	107,940,184
1918	68,495,540	32,102,022	7,467,776	108,065,338
1919	52,838,682	26,424,068	6,091,703	85,354,453
1920	65,550,494	26,409,710	6,736,348	98,696,552
1921	24,976,814	26,660,652	12,470,405	64,107,871
1922	47,726,766	19,868,925	14,267,020	81,862,711
1923	66,121,109	33,137,028	11,850,446	111,108,583
1924	47,738,401	25,860,515	15,222,787	88,821,703
1925	60,571,054	28,048,538	13,320,436	101,940,028
1926	65,562,398	31,011,290	12,087,316	108,661,004
1927	57,239,993	34,794,291	14,692,536	106,726,820
1928	60,458,579	34,823,002	16,372,098	111,653,679
1929	73,029,152	39,254,578	10,021,099	122,304,829
1930	52,172,940	38,072,060	9,851,229	100,096,229
1931	26,283,921	31,176,359	9,479,640	66,939,920
1932	3,996,144(a)	24,857,369	8,890,409	37,743,922
1933	24,218,766	31,776,654	8,713,127	64,708,547
1934	24,919,552	35,476,575	7,951,145	68,347,272
1935	31,765,852	35,289,135	6,750,261	73,805,248
1936	50,200,666	44,699,443	7,433,967	102,334,076
1937	70,110,697	44,318,765	5,829,399	120,258,861
1938	21,574,573	34,623,287	10,679,125	66,876,985
1939	50,481,451	40,368,121	11,172,079	102,021,651
1940	71,358,540	49,319,604	9,644,950	130,323,094
1941	89,730,324	53,535,365	11,387,480	154,653,169
1942	103,125,995	52,533,792	8,501,586	164,161,373
1943	94,533,435	51,969,459	11,810,116	158,313,010
1944	90,911,003	60,163,330	16,228,880	167,303,213
1945	84,800,520	55,246,197	18,717,773	158,764,490
1946	66,479,522	53,726,531	10,197,850	130,403,903
1947	87,245,858	58,059,884	11,409,228	156,714,970
1948	92,889,655	60,563,530	9,876,880	163,330,065
1949	77,903,022	40,929,565	12,542,565	131,375,152
1950	87,590,263	57,640,222	23,395,011	168,625,496
1951	99,783,054	50,945,656	25,871,319	176,600,029
1952	83,900,094	46,284,192	23,277,942	153,462,228
1953	107,345,783	51,034,713	26,999,207	185,379,703
1954	68,088,941	46,367,167	24,975,440	139,431,548
1955	99,870,370	53,378,385	29,722,293	182,971,048
1956	89,819,441	57,374,685	30,753,412	177,947,538
1957	97,752,273	56,779,772	30,439,375	184,971,420
1958	61,361,977	44,949,995	22,496,239	128,808,211
1959	57,624,819	47,228,449	26,159,660	146,732,101
1960	81,841,820	46,701,235	27,179,458	172,500,075
1961	68,205,051	43,969,565	25,418,364	157,781,443

Bulk commodity shipping table [LC]

December 7, 1941 Japan attacked Pearl Harbor, the US was in the war, raising a challenge to America's slightly rusty industrial might.

At the start of the war, steel became one of the essential commodities for building an arsenal of weapons. Iron ore shipments on the Great Lakes had dropped from a high of 65 million tons in 1929 down to 3.5 million tons in 1932, according to a Lake Carriers report. The report also stated that the 1932 figure was the lowest since the early days of the 1880s. Furthermore, the report stated that only 227 of 405 vessels fitted out that year with many making only one or two trips before laying up for the season. The same ominous condition existed for shipments of other bulk materials. Coal shipments were the lowest since 1922 and grain shipments were even worse since 1920. However, the economy gradually improved so that in 1937 the Great Lakes fleet transported 62.6 million tons of iron ore.

The US Maritime Commission (USMC) was created by the Merchant Marine Act of 1936. Consequently, the US Shipping Board of World War I was replaced. The new agency's role was to initiate a national merchant shipbuilding program of 500 modern, fast cargo vessels over the following ten years to replace WWI vintage vessels laid up and rusting in post war reserve fleet coastal anchorages. Another important responsibility of the USMC was to administer a system that would subsidize the cost differential between building new vessels at foreign shipyards versus those of domestic yards. Further, any operating cost differences of domestic fleets compared with foreign fleets would be also offset.

As the world became further embroiled in hostilities, it became apparent that the domestic fleet also needed help. The Cleveland Plain Dealer reported in 1940 that 100% of the Great Lakes bulk fleet transported a total of 145 million net tons of iron ore, coal, grain and limestone. Impressive as that was, the demand for steel exceeded the ore carrying capacity of the existing bulk carrier fleet. The "Arsenal of Democracy" accepted the challenge to manufacture war materials needed for America's defense. America's manufacturing industry and especially Detroit rapidly retooled for war production.

Shipbuilding on the Great Lakes had been restricted from building military vessels dictated by the Rush-Bagot Agreement of 1817 with Great Britain. Periodically this agreement was lifted, as was the case late in 1940. The shipyards of Manitowoc, Defoe, Superior, Bay Shipbuilding, Peterson Boat Works and Leatham D. Smith became inundated with military contracts. By 1941, the demand for steel reached unprecedented heights. Steel was needed for war production including shipbuilding. After the US entered the war in December, 1941, the US Maritime Commission was given the ultimatum to increase ore shipments to steel mills in order to meet the increased demand. Even with incentives offered by the Merchant Marine Act, Great Lakes fleet owners were reluctant to spend their hard earned capital to expand their fleets, because of fears of an uncertain economy after WWII ended. To address their concerns, additional tax incentives were added late in 1940 to help increase fleet capacity, but it wasn't until late in 1941 that the USMC gave the ore carrier owners an ultimatum to meet the projected 1942 quota of 88 million gross tons of ore under the threat of Governmental intercession.

By mandate, the fleets had to expand. Pittsburgh Steamship was the first and only fleet to respond. They announced in March, 1941 that contracts were awarded to the Great Lakes Engineering Works and the American Ship Building Company for five new "super" ore carriers. GLEW was awarded three of these vessels. They were to be 640 feet in length overall with a 65-foot beam capable of transporting

Leon Fraser on building ways at Rouge yard before receiving painted name 1942 [UWS]

General Markham in the dry dock next to the Charles Hebard at Ashtabula 02/10/1942 [AM]

17,500 gross tons, and propelled by a steam turbine. The five new ships would be known as the "Fraser Class" (also referred to as the "Supers"). The three GLEW carriers were the LEON FRASER (Hull #287), ENDERS M. VOORHEES (Hull #288) and A. H. FERBERT (Hull #289). All three were delivered by the summer of 1942 in time to exceed the Government's quota with a record 92 million tons of iron ore for the season.

However, the government's ore carrying quota needed to be increased further. The demand for steel continued to escalate to supply the needs for two theaters of war; Europe and the Pacific. The USMC mandated that the ore carrying capacity had to be expanded, which led to further incentives for the fleet owners. Devised was a plan that allowed owners to trade in their obsolete vessels to the Maritime Commission for credit toward the purchase of new vessels with equivalent gross tonnage carrying capacity; as it turned out, generally two or three older boats equaled the carrying capacity of one new vessel. The trade-in credit was set at nearly $64.00 per gross ton of ore carrying capacity. In turn, these obsolete vessels would be leased back to the fleet owner for $2.50 per ton capacity. The fleet owner then would operate the obsolete boats and keep the revenue for the duration of the war. At the end of the war, the older boats would be returned to the USMC for scrapping. This trade in/lease arrangement amounted to approximately a 40% down payment toward the set cost of the new vessel, the balance of which was backed by Government financed loans at 3.5%.

Ashtabula yard aerial view 1940. Note: 28 vessels laid up in river [BP]

Although this appeared attractive to the fleet owners, the shipbuilding companies were reluctant to set a fixed price, because steel prices and labors costs had been so erratic. The shipbuilders demanded a cost escalator guarantee that would be passed on to the ship owners. This was agreed upon by the Maritime Commission. However the fleet owners balked at this and would not agree, attempting to block the approval.

Undaunted, the USMC contracted directly with two shipbuilders, GLEW and American Ship Building Company, to construct sixteen ore carriers similar in design to the "Fraser Class", but would be 20 feet shorter in overall length, and five feet narrower in beam. The ore carrying capacity would be 15,000 gross tons, rather than 17,500 gross tons. Besides the smaller size, another deviation from the "Supers" was the power plant;

reciprocating steam engines were installed rather than steam turbines. This was because steam turbines had been allocated to high priority military vessels; consequently, steam turbine manufacturers couldn't meet the demand for both applications. The cost of these ore carriers was set at $1,955,000 each, and according to the agreement was not to exceed $1,986,000. These new ore carriers were also known as "Maritimers." Ten of the Maritimers were contracted to GLEW on October 14, 1941. The six others of the class were assigned to the American Ship Building Company. The contract also stipulated that the sixteen were to be completed by the summer of 1943.

"Maritimer" being built at Ashtabula Yard 1943 [HCGL]

Some fleet owners readily accepted the Maritime Commission's shipbuilding terms, while other fleet owners hesitated to commit to these terms. When the USMC gave an ultimatum for the program to proceed, the hesitant owners found it difficult to accept the alternative of competing with government appointed agents who would operate the new vessels anyway if they didn't capitulate. There was one person who was instrumental in settling this issue. Alexander T. Wood, president of the Lake Carriers Association and Vice-president of Wilson Transit, was selected as special advisor and assistant director of the Office of Defense Transportation.

"Maritimer" Pilot Knob being launched at Ashtabula 1943 [AM]

The ODT was organized ten days after the US entered the war and had authority, under direct control of the President, over all transportation systems in the United States. Wood, who had major input in this building program by helping estimate the number of vessels needed to meet the ore carrying target, used his influence to bring consensus among nine fleet operators to trade in 36 obsolete vessels towards the purchase of the sixteen "Maritimers".

The USMC's program brought more than $20 million in much needed revenue to GLEW. Six hulls were assigned to the River Rouge yard, and four to Ashtabula. At the conclusion of the "Maritimer" program, two stipulations of the contract were not met by GLEW. First, the ships were not completed by the deadline date of July, 1943. Second, the cost exceeded $1.955 million per carrier, and was over budget, which had been a concern during the program. However, after an investigation by USMC, it was found that the contract deadline was delayed by slow delivery of essential materials (especially steel) and equipment as well as delays caused by contract changes. All of this, in addition to the inflation of steel prices, accounted for the increase in price per vessel. The Maritime Commission gave its approval on May 25, 1944 to accept the cost over run and considered the contract obligation met.

Ashtabula welcomed the much needed work but in order for the yard to participate in this building program two issues had to be resolved. First, the Ashtabula River needed to be dredged to a depth of sixteen feet to

launch the big bulk carriers. This was funded by the USMC because of the importance of this building program to succeed. Additionally, the yard needed to acquire more river frontage to accommodate the 620-foot bulkers. This was accomplished by acquiring the Kelly Island Lime and Transport dock directly south (upriver) which would allow for a second building berth. This rebirth of new construction at Ashtabula began under the direction of new superintendent Edward MacKenzie. Furthermore, the workforce, which normally totaled about 250 employees during the winter months for the repair and maintenance season work that was typical since WWI, expanded to 1000 for this new work.

A list of ten of the L6-S-B1 Design Maritimers built by GLEW

GLEW HULL	NAME OF SHIP	USMC HULL	OPERATOR	KEEL LAID	DELIVERED	OFFICIAL NUMBER	DAYS TO BUILD
290	Adirondack/Rich. Reiss	MC-579	Reiss SS	03/09/1942	05/22/1943	243406	439
291	Lake Angelina/Cadillac	MC-580	Cleveland-Cliffs SS	04/16/1942	06/18/1943	243423	428
292	Hill Annex/Geo. Sloan	MC-581	Pittsburgh SS	05/28/1942	07/22/1943	243416	420
293	McIntyre/Fr. Purnell	MC-584	Interlake SS	09/24/1942	08/28/1943	243587	337
294	Robert C. Stanley	MC-585	Pittsburgh SS	11/04/1942	09/30/1943	243843	329
295	Mesabi/Lehigh	MC-586	Bethlehem Steel	12/29/1942	10/29/1943	244505	304
522	Pilot Knob/Fr. Armstrong	MC-582	Interlake SS	02/02/1942	05/31/1943	243425	483
523	Clarence B. Randall	MC-583	Pioneer SS	03/16/1942	07/19/1943	243412	447
524	J.H. Hillman Jr	MC-587	Great Lakes SS	10/22/1942	09/24/1943	243911	337
525	Pilot Knob/Steelton	MC-588	Bethlehem Steel	12/28/1942	11/10/1943	244507	317
CONTRACT DATE	All contracted 10/14/1941						
CONTRACT PRICE	$1,955,000						
FINAL PRICE	$2,265,000						

George A. Sloan departing MacArthur lock c1943 [JS-BL]

The US Government, with the urging of the Lake Carriers Association, acknowledged that there was a need to update the locks at Sault Ste. Marie, especially because of the addition of twenty-one new bulk carriers. It was decided in 1942 to expand the 1881-built Weitzel lock, which had not been used for some time as it was too small for current use. The new lock, constructed on the Weitzel lock site, was 800 feet long, eighty feet wide and thirty feet deep. When it opened in July, 1943, it was dedicated to its namesake, General Douglas MacArthur.

The positive outcome of WWII for the Allies can be attributed to many aspects, of which the ability of the United States to adapt and expand its industrial might must be included. After the Germans acquiesced in May, 1945, the final blow in the Pacific theater came in the form of two atomic bombs dropped on Japan, the first and only such weapon deployed and detonated against an enemy. The result of which was Japan's surrender in September, 1945. The war was finally over.

The Post War and the Korean Conflict

Frederick Morley had served as president of GLEW through the war years until 1947, when he was replaced by Charles Haskill, the company's fifth and last president. Haskill was challenged with leading the yard through yet another post war recovery. Although many economists were predicting a return to same dire economic conditions that existed prior to the war, just the opposite occurred. Pent up demand for durable goods during the malaise of the 1930s was diverted during rationing of WWII, which subsequently emerged and sparked stronger post war economic growth than expected. Led by the automotive industry, America's factories soon converted back to peacetime production. Aviation, electronics and housing also led the post war boom. However, it was a different story for the shipbuilding industry. Consequently, GLEW would not receive

another contract to build any vessel until 1952, except for the small supply vessel, OJIBWAY (Hull #526) in 1946. OJIBWAY was a supply boat, 64 feet long, built for US Steel's Pittsburgh Steamship Company to supply their vessels that passed through Sault Ste. Marie. The OJIBWAY was the last vessel built at the Ashtabula yard, which thereafter was relegated as a ship repair yard.

WWII placed heavy demands on the steel industry, especially on the iron ore mines of the Lake Superior region. Mining of high-grade iron ore was showing signs of depletion. Exploration for alternate sources led to the vast Labrador ore deposits of Eastern Canada where initial development began in 1949 and early 1950s.

In 1948, the Inland Steel Company solicited bids for a 20,000-ton capacity bulk carrier, the first post war US vessel to be built. GLEW lost the bid to the American Ship Building Company, which was awarded the contract to build the WILFRED SYKES for $5 million. The design had been developed in 1947 by Amship with the Pittsburgh Steamship Company. When the Steel Trust Fleet decided to delay construction, Amship used the design to build the WILFRED SYKES. At the time the SYKES entered service in the spring of 1950, the United States was embroiled in another world conflict. On June 25, 1950, South Korea requested help from the United Nations for help in combating North Korea's invasion into South Korea in an attempt to unite the Korean peninsula under Communist rule. Under the UN charter, the US mobilized its military, along with other UN countries, to enter the conflict.

The Great Lakes Engineering Works had been without a contract for any major construction since 1943. The State of Michigan, in December, 1948, requested bids on the construction of an auto ferry for year around service, which GLEW gladly won. At 360 feet of length overall, a capacity of 150 automobiles and 650 passengers, the vessel was equipped to travel through heavy ice conditions in the Straits of Mackinac between Michigan's two peninsulas. Many names were considered initially, such as the STATE OF MICHIGAN, but the decision was made to name the ferry VACATIONLAND (Hull #296). She was the largest double-ended ferry in the world when she entered service, in January, 1952.

In the mean time, US Steel's Pittsburgh Steamship fleet management was scrutinizing the performance of the SYKES design. With a capacity of 20,000 tons and a service speed of sixteen knots, and feeling the effects of Korean War driven demand for steel, they decided to order three vessels of similar design. One ship was built by GLEW (CALLAWAY) and two were built by the American Ship Building Company (ANDERSON and CLARKE). All three were the first of the "Pittsburgh Class", or "AAA Class". This group eventually totaled eight bulkers that sailed for five fleets.

GLEW's first contribution to the "AAA" fleet was the CASON J. CALLAWAY (Hull #297), launched March 22, 1952 and delivered to the Pittsburgh Steamship Company in September of that same year. After the CALLAWAY, the yard built three more "Triple A's", the J. L. MAUTHE (Hull #298) for Interlake Steamship in 1952, the RESERVE (Hull #299) for the Oglebay Norton Company in 1953, and the WILLIAM CLAY FORD (Hull #300) for their good neighbor, the Ford Motor Company, also in 1953. These "Triple A's" were 647 feet overall in length with a beam of 70-feet that had a carrying capacity of 20,150 gross tons. These ships were powered by 7,700 shp steam turbines and oil-fired Scotch boilers. A total of eight "Triple A's" were built by both yards. The success of this design is demonstrated by the fact that seven of the eight ships are still operating in 2008. Although they have been altered or rebuilt during their careers, it is a testimony to their excellent design.

Cliffs Victory on delivery tow at Chicago 05/08/1951 [PW]

As the Korean conflict expanded, the Office of Defense Mobilization called for a boost in domestic steel production. It followed that increased iron ore shipments were necessary to meet this aim. The Great Lakes fleets at that time, though, were struggling to meet the increase in demand for iron ore. Shipyards were full

to capacity with new orders, and could not meet the need for more Lake bulk carriers. The US Government enacted the Great Lakes Vessel Sales Act in September, 1950 to help alleviate the ship shortage. Great Lakes fleets were allowed to purchase up to ten surplus vessels from the government lay-up fleet by December 31, 1951 and receive a 90% cost subsidy to refit them for use on the Great Lakes. Cleveland-Cliffs was the first fleet to take advantage of this program. The first vessel converted was a WWII Victory Class cargo ship, the NOTRE DAME VICTORY, which had been laid up in the James River near Norfolk, VA. The ship was towed to the Bethlehem Shipyard in Baltimore, MD where the conversion was mostly completed in less than three months. Emerged in the spring of 1951, was the CLIFFS VICTORY with a carrying capacity of 14,500 gross tons. The VICTORY was towed up the Mississippi River and given her final fit out at Chicago, IL in preparation for Great Lakes service. She was the first of six ore carriers to be similarly converted under the Great Lakes Vessel Sales Act. However, she was the only conversion from a Victory Class ship. Lake carrier owners recognized the value of these war surplus vessel conversions as ten more were converted by the early 1960s.

As more ore carriers were added to the Great Lakes fleet, the drain on high-grade ore deposits became even more severe. However, there was an ample quantity of low-grade ore, called taconite, in the upper Great Lakes area. The meager content of iron in this low-grade ore had been too costly to transport to the steel mills. Furthermore, the processing of low-grade ore, taconite, into steel forms, or plate, at the mills was less efficient and costly. A process called beneficiation was developed as early as the 1920s to separate the taconite from waste material. Improvement in the beneficiation process resulted in a high iron content pellet. Also, these taconite pellets were easier to transport and unload than natural ore, which led to the efficient and cost saving use of self-unloading equipment on ore carriers. As a consequence, ore mining in the Lake Superior region regained its vital role in being a valuable source of iron.

When the Great Lakes Engineering Works delivered the WILLIAM CLAY FORD to the Ford fleet in August, 1953, a cease-fire in the Korean Peninsula was barely two weeks old. Though the Korean War ended in a stalemate, hostilities eventually ended allowing the US to return to a peace time economy. Further, the delivery of the CLAY FORD marked the end of the "Triple A" build program. Though this ship was a valuable carrier for Ford, ironically it was the first "Triple A' to meet the scrapper's torch. Unfortunately this was the last new construction for the GLEW yard until 1958.

The End of an Era - The End of a Yard

After the truce was signed in Korea, the demand for steel remained strong. Moreover, the Labrador ore deposits proved to be extensive. The United States and Canada reached an agreement in May, 1954, after great pressure from Canada, to expand the Seaway System from Montreal to the Soo Locks. This joint Canadian-American venture, called the St. Lawrence Seaway, would allow vessels 730 feet long, 75 feet wide, and 27 feet in draft to travel distances never before accessible to ships this size.

Edmund Fitzgerald being built River Rouge yard 1957 [GLMI]

A shipbuilding boom on the Canadian side was initiated as a result of the agreement in order to meet the demand for Labrador ore. Eighteen new Canadian canallers 260 feet long were built in the mid-1950s plus 23 more vessels of up to 730 feet in length were completed by the early 1960s. On the US side, only thirteen ships 600 feet in length, or longer, were completed between 1954 and 1960 of which three were built by GLEW.

As new Great Lakes ships grew in length, the dry docks at both GLEW yards proved inadequate to service these new larger ships as they were never expanded to keep in step with the domestic fleet. This was an era also of lengthening existing vessels and the conversion to self-unloaders. During this time, GLEW had to search for repair work specifically on smaller vessels. It had been nearly three and a half years since the last bulker, the WILLIAM CLAY FORD, was delivered. Then, on February 1, 1957, a contract was signed with the Northwest Mutual Life Insurance Company to build a maximum Seaway size ore carrier with a capacity of 26,000 gross tons

Edmund Fitzgerald showing side tanks & tank top River Rouge yard 11/29/1957 [GLMI]

that would be chartered by Oglebay Norton's Columbia Transportation Division. The ship's keel was laid August 8, 1957 and was christened with great fanfare on June 7, 1958 as the EDMUND FITZGERALD (Hull #301). When she came out, she was a great favorite of thousands of boat watchers. At 729 feet overall and 75 feet wide, she was the first ship built to the maximum Seaway size and was the biggest ship on the Great Lakes at the time. Affectionately called "The FITZ", she was the largest vessel built to date by GLEW and would generate much needed revenue for the yard, but not enough to stem the financial problems the company was experiencing.

While the "FITZ" was making headlines about her launch and record carrying capacity, the Michigan Manufacturer and Financial Record reported that negotiations were initiated between the Great Lakes Engineering Works and the American Ship Building Company regarding the sale of the River Rouge yard. The June, 1958 issue reported; "Discussions leading to the sale of Great Lakes Engineering Works, River Rouge, to the American Ship Building Company, Cleveland, OH, are in a "highly tentative stage, according to Charles Haskill, president of the River Rouge firm." The talks fell through, but the report gave a sense of the health of the yard and its future.

GREAT LAKES ENGINEERING WORKS
1000 EAST GREAT LAKES AVENUE
RIVER ROUGE, MICHIGAN

ADMIT .....

TO WITNESS THE LAUNCHING OF THE
S. S. EDMUND FITZGERALD
ON SATURDAY, JUNE 7, 1958 AT 12 O'CLOCK NOON, E.S.T.
UNDER CONSTRUCTION FOR
THE NORTHWESTERN MUTUAL LIFE INSURANCE COMPANY—OWNER
AND
OGLEBAY NORTON COMPANY
COLUMBIA TRANSPORTATION DIVISION—CHARTERER

SPONSOR: MRS. EDMUND FITZGERALD ADMITTANCE TIME: 11:15 A.M. E.S.T.

Edmund Fitzgerald launch ticket [GLMI]

The Ashtabula shipyard, because of its upriver location, had been plagued by the need for dredging during its entire existence. The city had financed the initial dredging at the inception of the yard. Again in 1942, the US government agreed to dredge the river to accommodate the "Maritimer" program. But then support waned for further dredging. GLEW's President Charles Haskill and yard superintendent Edward MacKenzie petitioned the government repeatedly for assistance with no success. It reached the point where GLEW was forced to close the yard on June 24, 1955 stating that a lag in business, lack of dredging, and sharp turns in the Ashtabula River were the primary causes. The shipyard laid in ordinary for almost two years before reopening in May, 1957 after the US Army Corps of Engineers dredged the shipyard frontage and the river down to where it empties into Lake Erie. Immediate work in the form of repairs on the steamer JOLIET was welcomed by the newly appointed yard superintendent, Ralph Brandt, who was charged with restoring the yard. Brandt told Ashtabula's Star Beacon newspaper that, when the river is navigable, winter repair work

Edmund Fitzgerald [BH]

Aerial view of the Ashtabula Harbor early 1950s [AM]

was expected to be quite strong. He stated that normally twenty to thirty ships could winter at Ashtabula annually. But only eight in 1956 and nine in 1957 laid up there for the winter while the yard was closed.

GLEW did acquire a well publicized contract from the Huron Transportation Company to lengthen their motor vessel PAUL H. TOWNSEND, which was short enough to fit in Ashtabula's dry dock. The contract specified the cement carrier be lengthened 108 feet and the pilothouse moved from her stern to her bow. This work was assigned to the Ashtabula yard and was completed by the spring of 1958. That was the last major work completed by the Ashtabula yard after nearly fifty years of service.

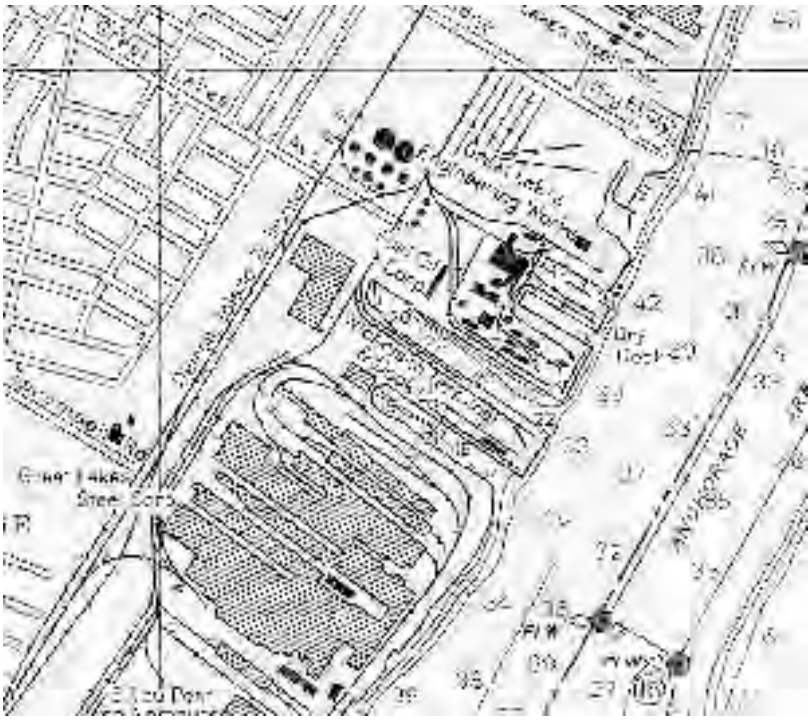
When the TOWNSEND entered the dry dock, it was announced that GLEW had secured a contract to build a 689-foot steamer for the Interlake Steamship fleet. The keel was laid for the HERBERT C. JACKSON (Hull #302) at the River Rouge yard on June 28, 1958 and was launched eight months later. This handsome "little" steamer was powered by a 6,600 shp cross-compound steam turbine and has remained a staunch carrier for Interlake since then. The press hardly noticed when the JACKSON entered service in mid-May because all attention was focused on the opening of the St. Lawrence Seaway on April 25, 1959 and all of the pomp and ceremony surrounding it. Vessels up to 730 feet long were then able to transit the Seaway from Lake Superior ports to Montreal and beyond. Furthermore, US fleets then had access to the Labrador ore range.

The last ship that the Great Lakes Engineering Company built was the ARTHUR B. HOMER (Hull #303). Her contract was secured late in 1958 and the HOMER's keel was laid on March 18, 1959 at the River Rouge yard. After thirteen months, the HOMER entered service in the spring of 1960 for the Bethlehem Transportation fleet as the largest vessel, at that time, to enter service in a US Great Lakes fleet. With 730 feet in length and a 75-foot beam, the HOMER was anointed as the flagship of Bethlehem's fleet. The HOMER was built to the similar design specifications as the EDMUND FITZGERALD but with slight variations; such as the HOMER was one foot longer. In fact, they were so similar that when the US Coast Guard and the NTSB (National Transportation Safety Board) were investigating the sinking of the "FITZ", they used the HOMER to compare design properties under severe storm conditions. In a final bit of irony, 1960 was the year that GLEW built their last ship and also the year that their first ship built, the R. W. ENGLAND (Hull #1), was scrapped as the FONTANA at Hamilton, ON.

Herbert C. Jackson builder's plate [PL]

For sale since the late 1950s, an offer from the Great Lakes Steel Corporation to buy the Great Lakes Engineering Works was accepted early in 1961 for $3.5 million for the property at the River Rouge yard. It was reported in the May, 1961 issue of the Michigan Manufacturer and Financial Record that GLEW's stock holders

voted to dissolve the company and sell it to Great Lakes Steel. The latter's interest was in the real estate for expansion of the steel plant and had no intention of operating the shipyard. Finally, Amship purchased all of GLEW's patterns and drawings, the floating dry dock and the shipyard at Ashtabula, which was dismantled and sold to the city of Ashtabula. The floating dry dock (Hull #4) was towed to Amship's Toledo yard where it laid idle for seventeen years near Toledo's Bayview Park. Then in 1978 it was towed down the Mississippi River to the Gulf of Mexico. So, closed what was Detroit's last major shipyard and chief competitor to the giant American Ship Building Company.



1961 chart of River Rouge yard showing Great Lakes Steel location [HMCP]

The saga of the Great Lakes Engineering Works and its vessels can be seen as a metaphor for Darwin's "Survival of the Fittest" and adaptability. As one of the Great Lakes' most memorable shipbuilders, it endured nearly sixty years with practical application of engineering and sound business practices. They will be remembered for transforming an Ecorse marshland into a state-of-the-art shipbuilding yard that would compete with the industry giants and for their vessels that will remain in the hearts of sailors and enthusiasts alike.

Arthur B. Homer slides down the launchway as crowd witnesses an end of an era [BH]