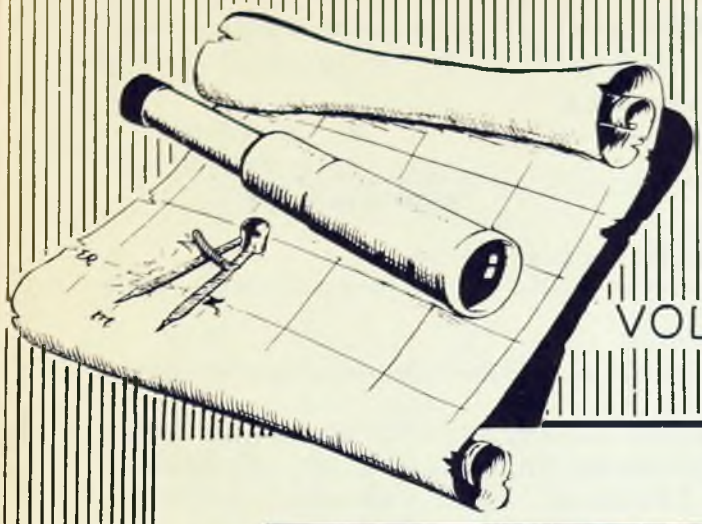

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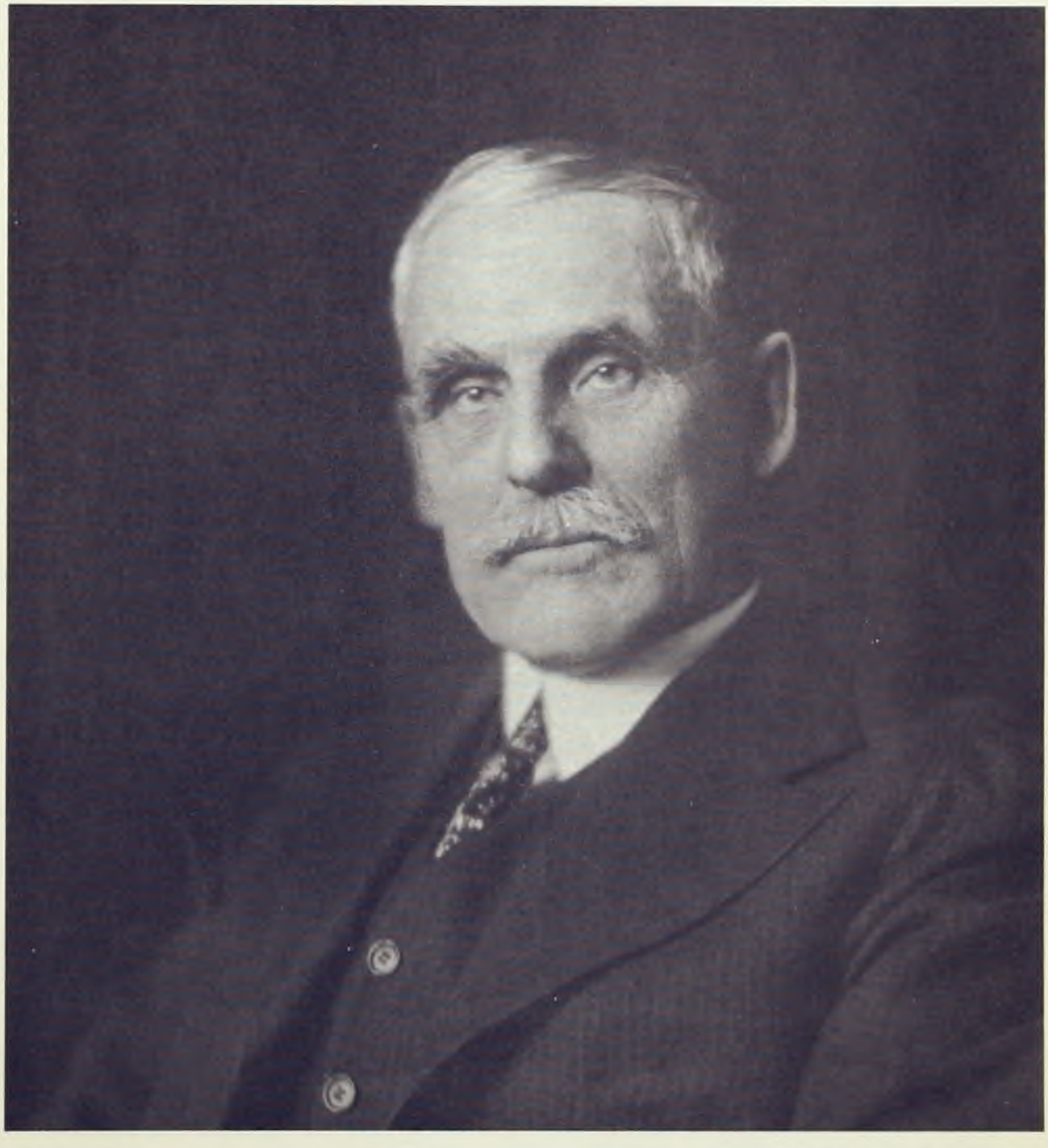

Telescope

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GREAT LAKES MODEL SHIPBUILDERS' GUILD

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Editorial

IT CAN HAPPEN AGAIN—To those who have been striving for the past ten years, and more, to bring together a comprehensive collection of Great Lakes maritime exhibit materials than to learn of some valuable object in this category being presented to some museum outside of this area.

Only recently we learned of a very fine model of a Great Lakes vessel, complete with protecting case, being offered to a museum of the Atlantic Coast which, in no sense considers itself to be a proper repository of Great Lakes materials. We can only presume that the donor did not know of the work being done by the Museum of Great Lakes History, in Detroit, to present in three dimensions, the complete story of the development of Great Lakes vessels. This is indeed regretable and we hope that every member of the Guild, and all of our friends who are not members, will help prevent a recurrance of such incidences. This can be done by telling the owners of good model ships or other significant objects that we are a going concern and always interested in acquiring all kinds of materials pertinent to Great Lakes history.

While we are not as old, and perhaps not as well publicized, as some of the coastal museums we are the oldest devoted entirely to the Great Lakes, and have by far the largest collections related to water transportation on these waters. We are the only public agency which is active in collecting or developing authentic plans of Lakes vessels, and with the fine cooperation of members of the Guild we are following through with the construction of models which from time to time are added to the continuity of one-scale models--one of our principal features.

All students of Great Lakes history realized the dearth of good historic materials, and deplore the loss, to the area, of any of it. While there are several very fine private collections in existence, the Museum of Great Lakes History contains the largest now in the hands of any public agency. The institution, operated by the Detroit Historical Commission is a permanent one. Help it prevent the loss of Great Lakes materials. **IT CAN HAPPEN AGAIN.**

Organized in 1952 to locate, acquire, and preserve information and objects related to the history of shipping on the Great Lakes and to make same available to the public through the Museum of Great Lakes History and the columns of Telescope. The construction of authentic scale models of Great Lakes ships is one of the prime objectives of the organization, which has brought into being the largest existing collection of models of these ships. The Museum of Great Lakes History, located at 5401 Woodward Avenue, Detroit 2, Michigan, is official headquarters for the organization and the repository of all of its holdings. The Guild is incorporated as an organization for no profit under the laws of the State of Michigan. No member receives any compensation for his services. Donations to the Guild are Deductible for tax income purposes.

NAVAL CONSTRUCTION ON THE GREAT LAKES

by Captain Marvin H. Gluntz,
U. S. Navy

A Reprint From:

UNITED STATES NAVAL INSTITUTE PROCEEDINGS

Vol. 83, No. 2 - February, 1957

PART TWO (CONCLUDED)

The last half of the nineteenth century saw naval shipbuilding activity on the Lakes at a standstill. From the War of 1812 up to the time of World War I, Great Lakes builders were credited with producing just one warship, the aforementioned MICHIGAN, while the coastal builders produced over 1,500,000 tons. However, this same period saw a tremendous increase of activity in the building of merchant ships, with the output coming to over 5,300,000 gross tons on the Great Lakes alone.

The rivers in the Great Lakes domain were also producing merchant ships. If their 2,000,000 tons are added to the Lakes output, we find that the Great Lakes Trading Area can take credit--thanks largely to the steel industry's dependence on water transportation--for producing about one-third of the country's entire merchant ship construction up to the start of World War I.

Although merchant ship construction on the Lakes and rivers declined drastically during World War II, naval construction took up any excess capacity as rapidly as it developed.

The drop in merchant ship construction resulted from the inability of inland shipbuilders to deliver big ships through the restrictive locks and channels leading to the sea, but the inland builders were not prevented from constructing and delivering many of the smaller, urgently needed types of naval vessels. They attacked this task with vigor and with the help of assembly line techniques which Henry Ford proved during World War I could be successfully applied to ship construction.

During that war Ford mass-produced 55 Eagle Boats on the Rouge. Applying his car-manufacturing experience he set up three assembly lines of seven stations each; through them three hulls proceeded simultaneously. In this endeaver Ford proved the feasibility of transferring hulls almost at will from location to location within a fabricating and assembly area. He showed that through simplified ship designs, jigged assemblies, and other forms of standardization in repeat production, the industry could stretch to the utmost the services of the relatively few full - trained shipfitters, boilermakers, and coppersmiths, and could make maximum use of unskilled labor.

The Ford idea was aggressively exploited during World War II. Inland builders led the parade. Shipyards emerged in the midst of waterfront farm lands on which crops were still under cultivation. On several of these sites, corn was being harvested on one side of a hastily-erected shipyard fence while LST's and other hulls on the inside began to hit the water at a rate which forecast defeat for the Axis powers.

By the war's end, thirty Great Lakes shipbuilders had turned out forty-seven different types of naval vessels totaling 600,000 tons. Included in these types were submarines, destroyer escorts, minesweepers, LST's, and cargo vessels, as well as various amphibious, harbor, and partrol craft. At the same time, eleven builders located along the Mississippi, Missouri, Ohio, and Illinois Rivers had delivered eight different types (above 100 tons each) of naval vessels totaling 900,000 tons. They included small oilers, LST's and LCT's, towboats, and several types of cargo barges.

Having summarized the history of ship construction on the Great Lakes, it is now possible to discuss in some detail the current problems of the Lakes shipbuilders. From 1900 to 1909, nearly 45 per cent of all United States merchant ship tonnage

was being turned out by them. Then came a decline which was not halted until World War II, and only recently has the peacetime picture begun to brighten. The reasons for the extent of the decline are not altogether clear. Obviously the two World Wars and the depressions contributed substantially to the total decline. We can also surmise, however, that the product was too good-built to last a long long time. Could it be too long? Quality has always been uppermost in the shipbuilding industry. After all, safety of life and limb--even the fate of a battle--can hinge on the quality aspects of a vessel and its performance. But is it profitable to have a MICHIGAN last 100 years while reaching obsolescense in just a fraction of that time?

Back in 1813, Noah Brown offered some good advice to a perfectionist working on the LAWRENCE and NIAGARA at Presque Isle. He said: "We want no extras; plain work, plain work is all we want. They are only required for one battle; if we win, that is all that will be wanted of them. If the enemy is victorious, the work is good enough to be captured."

Brown was not advocating slipshod work but was cautioning against "gilding the lily." Can we today afford to gild the lily when technological changes are coming so rapidly that new vessels are likely to be white elephants fifteen years hence? Can we afford the luxury of 100-year hulls? Should we not enlist the aid of value engineering to help guard against such costly luxury? The Navy's Bureau of Ships has taken positive action in this direction, and the results are encouraging, considering the newness of the program and the small number of full-time value engineers employed.

What is the current status of Great Lakes shipbuilding? The Korean conflict gave a new impetus to naval construction on the Great Lakes and called attention once again to its limitations as well as to its potentialities. When the North Koreans started south in 1950, our most pressing needs included new minesweepers and small amphibious vessels. This work was in the main taken on by the smaller shipbuilders around the country. Although there was a large number of vessels under contract, their individual and total tonnage was comparatively small. Of the 880,000 tons built and building in the United States between 1950 and 1956, some twenty Great Lakes builders have accounted for 67,000 tons, including various types of vessels and small craft. The latter were built for the various services-Navy, Army, and Air Force--under the Navy's supervision in accordance with the Single Service Procurement Program.

After getting those smaller vessels underway, the Navy shifted its emphasis to FORRESTAL-type carriers. NAUTILUS-type submarines, missile-firing ships, and various other prototype vessels, as well as to the modernization of existing combatant ships. In this phase, fewer but heavier vessels are being worked on; spectacular technological advances like the nuclear power plant, the angled-deck aircraft carrier, the guided missile, the use of increased steam temperatures and pressures, the application of plastics in small boat construction, fittings, and components, the lamination of wood structural members, and phenomenal advances in electronics are being made with breath-taking speed.

The Great Lakes builders have contributed to this technological revolution. The Defoe Shipbuilding Company has made a major contribution to the art of plastic boat construction. In June, 1956, this company finished a 56-foot MSB which, at the time of award and even up to 1956, was the largest known plastic boat ever attempted. During the past two to four years, plastic dinghies have been produced for the Navy at Toledo, Ohio, while in Manitowoc and Sturgeon Bay, Wisconsin, shipbuilders have become proficient in laminating wooden structural members for our various minesweepers.

Nevertheless, the tonnage of Great Lakes naval shipbuilding relative to total United States production during the period of 1951 to 1956 has been relatively small -

about 5 percent. At least two important factors help to account for this situation. One has been the reluctance on the part of some of the larger Great Lakes shipbuilders, who were experiencing a revival of merchant ship construction, to compete for Navy contracts during the early months of the Korean conflict. The other factor boils down again to those old familiar obstacles--locks and channels leading to the sea being too short and narrow for many of our combatant and large auxiliary vessels. Nevertheless, the percentage of combatant vessel construction relative to total naval construction has steadily increased on the Lakes for the whole period between World War I and the present. More and varied naval silhouettes will be seen framed against our Great Lakes horizons as this trend continues, and it is bound to continue because we are doing something now to eliminate, or at least reduce the restrictive influence of the navigational bottlenecks which have plagued our Great Lakes shipbuilders throughout the past.

By 1959, the many short locks--some as small as 252 feet long, 44 feet wide, and 14 feet deep--now found between Ogdensburg. New York and Montreal, Canada, will have been replaced by fewer but bigger locks. The new ones will be at least 800 feet long by 80 feet wide and 30 feet deep over the sill. Channels between Lake Ontario and Montreal will be deepened to 27 feet minimum and several bridges will be replaced or modified to give greater masthead clearance. (2). Some restrictive navigational features will still be with us after 1859, but the position of the Great Lakes shipbuilder will certainly have been greatly improved for the delivery of many types of larger naval vessels.

In October, 1954 the Chief of the Bureau of Ships recommended to the Chief of Naval Operations that the depth of the entire waterway outside the locks be at least 32 feet in lieu of 27 feet, that the locks have a width of at least 100 feet in lieu of 80 feet, and that bridge vertical clearance be at least 140 feet in lieu of 120 feet. He stated that these increases would expand substantially the shipbuilding, ship repair, and water transportation capabilities of the Great Lakes area, particularly in event of mobilization. Specifically, such changes would permit the transit of vessels otherwise excluded, generally expedite the movement of vessels, and reduce the likelihood of damage to vessels in transit. Other activities are also on record as favoring even larger dimensions. The Detroit Chamber of Commerce, for example, in late 1954 advocated 35-foot depths. Regardless of the dimensions finally reached, the improvements being made right now are so substantial that we could probably use a breathing spell before going on to new achievements.

The Great Lakes shipbuilder is soberly award of the fact that when the new seaway is opened, his own competitive strength rather than navigational obstacles will determine his naval construction workload. He realizes that his plant may need some refurbishing. His shears, his milling and boring machines, his rolls and brakes, his drills, and his overhead and mobile cranes may need to be reappraised with respect to thicker shell plating, to STS armor, to subassembly weights, and other heavier and larger construction materials. In addition to this physical refurbishing, he wonders how much his know-how with ordnance equipment, with electronics, and, yes, with nuclear power plants needs to be increased.

Our Great Lakes shipbuilder also finds his position improved because he sees additional navigational projects encountering less and less

(2) When the program is completed, the controlling navigational features along the 2,300 mile route from Chicago or Duluth to the sea will be:

a. Depth-1. From Chicago or Duluth 25'. (Upbound to Chicago or Duluth 21'.) 2. To and from Lake Erie 27'.
b. Width 80'.
c. Length 800'.
d. Vertical clearance 120'.

Continued on Page Ten

MUSEUM NOTES

Major undertakings connected with our expansion into a new area in the main building of the Detroit Historical Museum prevented us from putting on much in the way of special exhibits during the first half of the year but now we are getting back to routine matters. Our current exhibit in the special events area is one for which we have had materials since 1948 but no time for its preparation.

The principal objects are water-colors of interior views of the STR. GREATER DETROIT. These were painted before the vessel was built, and were used as guides for the interior decorators created the luxurious accomodations. They are beautifully done and now that the vessel is gone they constitute a very fine record of elegance of the period.

Two oils shown in this collection are also very interesting, one being the artist's preliminary sketch for one of the large murals. This sketch was taken up on the scaffold by the artist and reproduced in full scale on the permanent panel. The other shows two D & C steamers racing,neck and neck across the Lakes, with a view of one of the elegant dining rooms as a sort of vignette. It was painted for use as an advertisement of some long-forgotten brand of interior paint but being done in minute detail, even to the tableware , it constitutes a record which we are very happy to have.

Also included is a blueprint of some of the intricate ornamentation of the cabins of the CITY OF CLEVELAND III. A three-dimensional cut-away model, done by Gordon P. Bugbee is used to show how these ornaments were applied, and also the cellular type of construction employed by the famous naval architect,Frank E.Kirby to produce tremendous but light superstructures on his Lake Erie sidewheelers.

NEW ACCESSIONS

From Prof. Louis A. Baier, of the University of Michigan, Department of Naval Architecture and Marine Engineering: A large oil painting of the STR. MARYLAND, by H. F. SPRAGUE; plans of a concrete ship; a group of educational slides; a booklet describing the "New" Sidewheeler SEEANDBEE; and other items of interest to the nautically-minded.

From The American Shipbuilding Co. of Cleveland, Ohio: Sixteen tubes of ship plans, not yet all inspected.

From Mrs. E. G. Boyes, of Detroit: A set of 38 old postcards showing many Lakes scenes in color,--almost as good as a tour of the region.

From Mr. Campbell McCormack, of Detroit: A piece of mass copper from the wreck of the STR. PEWABIC. Two pages from the engineer's log book of the STR. GREATER BUFFALO, one being for her first trip and the other from her last.

NOTICE OF MEETING

The Third Quarterly Meeting of the Board of Directors of the Guild will be held at the Detroit Historical Museum, Woodward and West Kirby, at

7-00 P.M.

Thursday,September 26,

1957.

While this is a business meeting of the Board, all members are invited to attend. Now that we meet quarterly,instead of monthly,more business accumulates on the agenda. Let's all be in there pitching.

Under our new method of operating it will be necessary, at this meeting to consider nominations for officers for the year 1958;

Constitution revission is another matter requiring attention,--- along with other important items.

FRANK E. KIRBY

Since we are, in this issue, presenting the first sheet of our forthcoming set of plans of the City of Cleveland III, it is fitting that we have a few words to say about the man who designed her, Frank E.Kirby.

Frank E. Kirby was born at Cleveland, Ohio, July 1, 1849, the son of Captain Stephen R. Kirby, who later became a builder of ships. (*)

The Kirbys moved to Saginaw, Michigan, where Frank spent his early boyhood and received his first years of schooling, among scenes which may have supplied much inspiration for his career as a naval architect. The Saginaw River was crowded with all types of vessels, coming and going at all hours of the day and night. With all this, and a father who encouraged his interest in naval architecture Frank had no major obstacle in the way of his early-manifested ambition. He entered the naval architecture school at Cooper Institute, and finished his work there in three years. This was followed by study in Europe, principally at Glasgow where so many fine ships were being built.

Returning to America he worked with his brother on the building of the Eber B. Ward plant at Wyandotte, Michigan. This became a part of the Detroit Dry Dock Company's works, which later was managed by the very able brother, and where Frank served for many years as Chief Engineer and the designer of the most famous vessels built there.

Among those vessels were the sidewheelers of the D & C, and the C & B fleets, so ably described by Gordon P. Bugbee in his "Sidewheel Steamers of Frank E. Kirby." Besides these he was largely responsible for the development of ice-breaking vessels on the Great Lakes, and for use in the harbor at Archangel, Russia. His talent was drawn upon for the perfection of the Hudson River Day Line's palatial steamers, and many less-glamorous Great Lakes freight steamers.

As a consultant he served the Government of the United States during the Spanish American War and World War I., and the Chinese government on some of their problems of river navigation, and still found time to design industrial plants ashore.

It would not be possible here to describe all of the innovations for which he was wholly or largely responsible, still, he was always an advocate of sidewheel propulsion for comfortable water travel.

Kirby left Detroit in 1922 and for the last seven years of his life lived in Bronxville, N.Y. where he died, August 25th, 1929, at the age of 80.

Although the last three years of his life brought him poor health he was remarkably active in his profession right up to the end.

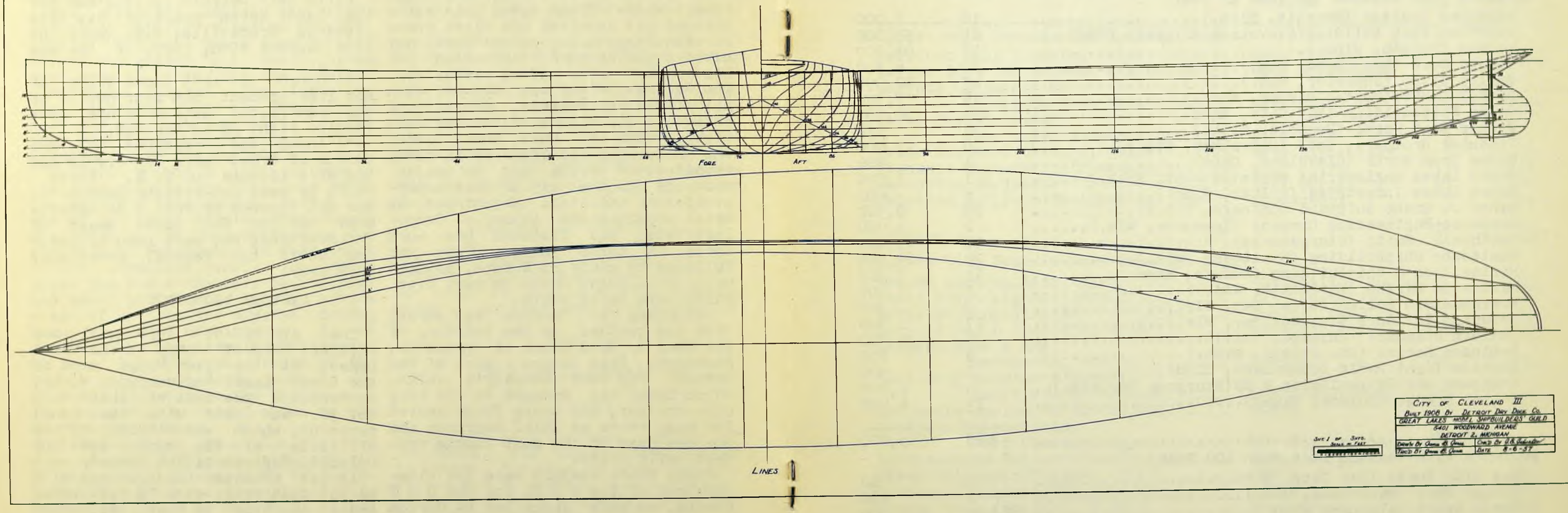
(*) Among the treasures of the Museum of Great Lakes History is the Master's License of S. R. Kirby which is most interesting because it was not issued by the U.S. Government but by The Lakes Board of Underwriters, who were issuing their own until the Federal Government took over.

ANOTHER "LONGEST"

The spring of 1958 will see another "longest" ship on the Great Lakes. At the River Rouge yard of the Great Lakes Engineering Works, on August 8 the keel of their Hull No. 301 was laid with the usual ceremony, which was attended by top officials of the yard and the Columbia Transportation Company.

As yet un-named this vessel will be 729 feet long, with 75 feet beam, and a depth of 39 feet. Estimated draft,27 feet,for a carrying capacity of approximately 26,800 long tons. She will have a 7500 SHP turbine and coal-fired boilers designed to give her a speed of 16 miles per hour.

The vessel is being built for The Northwestern Mutual Life Insurance Company and will be chartered for a period of 25 years to the Columbia Transportation Company who will operate her as a part of their fleet.


FORE
AFT
LINES
CITY OF CLEVELAND III
BUILT 1908 BY DETROIT DRY DOCK CO.
GREAT LAKES WORLD SHIPBUILDERS' GUILD
5401 WOODWARD AVENUE
DETROIT 2, MICHIGAN
DRAWN BY GIBBS & CRANE
TRACED BY GIBBS & CRANE
CHKD BY H.A. Gabrielson
DATE 8-6-37

Continued from Page Five

opposition. One of the most important of these future projects is the deepening of the connecting channels between Lake Erie and Lake Huron and at the Straits of Mackinac to a depth of 27 feet. This work will cost about $100,000,000, but it will save an estimated $10,000,000 per year in transportation costs. Congressional authorization for this work has progressed far already. H. R. 2552 has been approved by the House, and the Wiley bill (S. 171) is receiving Senate consideration.

Great Lakes Naval Construction During World War II Period

	Vessels No.	Tonnage (Approx.)
Builders with Vessels 100 Tons or Over		
American Cruiser (Detroit, Mich.)	10	1,000
American Ship Building (Cleveland & Lorain, Ohio)	65	53,000
Barnes (Duluth, Minn.)	38	95,000
Burger Boat (Manitowoc, Wis.)	20	6,500
Butler Globe (Superior, Wis.)	47	92,000
Dachel Carter (Benton Harbor, Mich.)	19	7,300
Defoe Shipbuilding (Bay City, Mich.)	154	70,000
Fisher Boat Works (Detroit, Mich.)	3	330
Froeming Brothers, Inc. (Milwaukee, Wis.)	16	23,400
Globe Iron Works (Cleveland, Ohio)	1	800
Great Lakes Engineering Works (Detroit, Mich.)	1	1,500
Great Lakes Industries (Duluth, Minn.)	5	600
Henry C. Grebe Shipyard (Chicago, Ill.)	29	8,500
Kewaunee Engineering Company (Kewaunee, Wis.)	2	1,000
Leathem D. Smith (Sturgeon Bay, Wis.)	90	91,000
Manitowoc Shipbuilding (Manitowoc, Wis.)	79	63,000
Marine Iron & Shipbuilding (Duluth, Minn.)	11	5,200
Marinette Marine (Marinette, Wis.)	5	3,100
Northeastern Boiler (Green Bay, Wis.)	3	300
Peterson Builders (Sturgeon Bay, Wis.)	17	1,700
Pullman Standard (Chicago, Ill.)	34	20,500
Robinson Marine (St. Joseph, Mich.)	8	800
Stadium Yacht Basin (Cleveland, Ohio)	2	500
Sturgeon Bay Shipbuilding & DD (Sturgeon Bay, Wis.)	4	2,000
Zenith Dredge (Duluth, Minn.)	13	6,400
Totals	678	555,000
Builders with Vessels Less than 100 Tons		
Bay City Boats (Bay City, Mich.)	1	60
Burger Boat (Manitowoc, Wis.)	2	180
Chris Craft (Algonac, Mich.)	13,460	141,000
Fisher Boat Works (Detroit, Mich.)	18	1,400
Great Lakes Boat Building, (Chicago, Ill.)	2	120
Henry C. Grebe (Chicago, Ill.)	19	1,300
Matthews Company (Port Clinton, Ohio)	2	80
Victory Shipbuilding (Holland, Mich.)	6	630
Totals	13,510	145,000

Note: The types of vessels constructed included: SS, DE, AK, AM, AG, AN, AP, LCU, LCVP, ATR, PCE, PF, PG, YD, YW and many other variations of the foregoing. In addition, seven Great Lakes Builders produced 306 craft for the Army and Coast Guard totaling about 39,000 tons.

The second, and almost equally important project, is to build a twin set of locks for the five single locks in the Welland Canal. When that is done, all of the eight locks will have counterparts, and the canal's potential will be increased by an estimated 16,000,000 tons annually. Since the canal is located entirely in Canadian territory, this project depends on Canadian approval. In spite of the estimated $100,000,000 price tag for the job, most authorities feel that Canada will act affirmatively in time so that Welland will not be the bottleneck some shipping circles have predicted it will be in a decade or two.

How will we use the seaway that is now being built? An increasing

Great Lakes Naval Construction for Army, Navy and Air Force from 1951 to 1956

	Type	No.	Tons
Builders with Vessels 100 Tons or Over			
American Ship (Lorain, Ohio)*.....	Navy LST's	2	8,300
Burger Boat (Manitowoc, Wis.).....	Navy Minesweeps	7	4,100
Christy Corporation (Sturgeon Bay, Wis.).....	Navy LST's	5	14,200
Defoe Shipbuilding (Bay City, Mich.).....	Navy DE's	2	2,800
Grebe Shipyard(Chicago, Ill.).....	Navy Minesweeps	3	1,000
Kewaunee Engineering(Kewaunee,Wis.)..	Army LCT's	33	10,100
Marinette Marine(Marinette,Wis.).....	Army Barges	10	2,500
Peterson Builders(Sturgeon Bay,Wis.).	Minesweeps	9	7,100
Totals.....		71	50,100/
Builders With Vessels Less than 100 Tons			
Beacon Boat(Holland, Mich.).....	40' Utility Boats	26	200
Chris Craft(Algonac, Mich.).....	52' Rescue Boats	2	40
Defoe Shipbuilding(Bay City,Mich)....	Plastic (MSB)	1	30
Detroit Basin (Detroit, Mich.).....	Aircraft Rescue	15	500
Kargard Boat & Eng. (Marinette, Wis.).....	Barges	115	7,500
Lock City Machine & Marine (Sault Ste.Marie,Mich.).....	LCM's & Utility	104	2,130
Marinette Marine(Marinette,Wis.).....	LCM's	151	3,900
Matthews Shipbuilding (Port Clinton, Ohio).....	40' Utility Boats	47	400
Northeastern Boiler(Green Bay,Wis.)..	Cargo Barges	15	975
Olson Shipyards(Chicago, Ill.).....	LCM's	7	470
Peterson Builders(Kewaunee,Wis.).....	LCU's	5	200
Roamer Boat (Holland, Mich.).....	Steel Tugs	31	800
Rogers Boat Yard(Northport,Mich.)....	35' M B's	3	30
Ray Greene (Toledo, Ohio).....	Plastic Dinghys	106	21
Hacker Boat (Mt.Clemens, Mich.).....	45' Picket Boats	9	153
Huron Charlevoix(Charlevoix,Mich.)...	Rescue Boats	1	24
Totals.....		638	17,400/

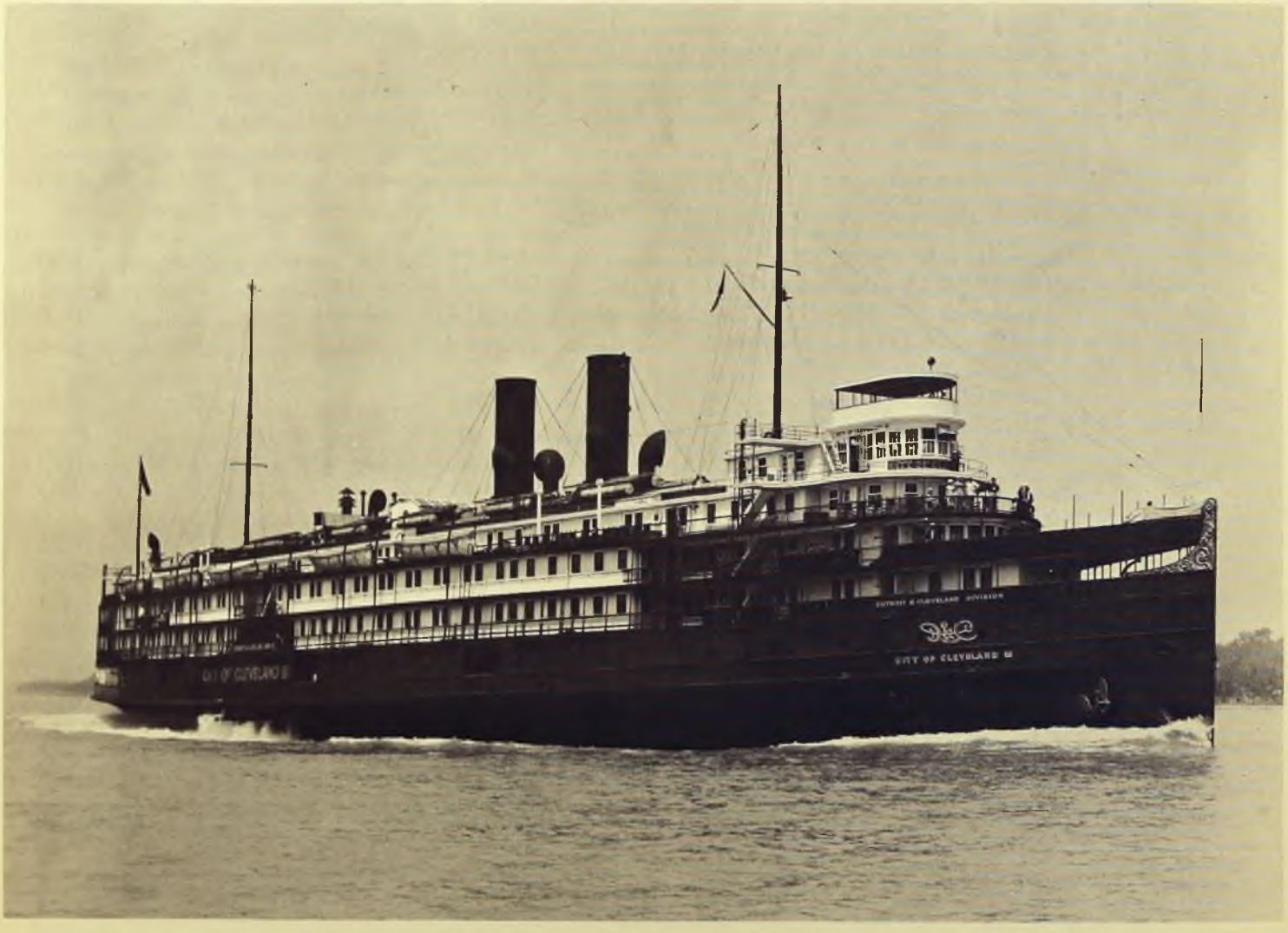
*Note: In September, 1956, American Ship Building was awarded a contract to construct two DE's.

Note:In addition, two Great Rivers Builders, Kelly Ryan(Blair,Neb.) and Missouri Valley(Leavenworth,Kan.)constructed 48 small vessels totalling 5,600 tons.

/Nearest 100 Ton.

number of small vessels, especially foreign ones, have been using the present outmoded seaway. Their number could increase to undreamed-of proportions and competitive power when the gates are opened two years hence. If automobiles can make the all-water trip from Chicago to Rotterdam at an estimated seventeen per cent saving in freight, and farm implements can realize a whopping 43 per cent saving, there is little doubt that the new seaway will be used. But, by whom? Who will build the vessels? Will the Great Lakes and Great Rivers shipbuilders raise the inland shipbuilding industry to the same commanding position that their associates in the area have done in other industries? Will the Great Lakes ship operators insist on increasingly efficient vessels so that they can set new cost records like the fifth of a cent per ton-mile for bulk cargos that has been equalled nowhere else in the world? Will our shipbuilders staff themselves adequately for the jet-propelled technological changes underway? Will they let "past practice"--that almighty law of shipbuilding--control, or will they use it meaningfully for greater achievements?

The challenge of the seaway is going to tax the resourcefulness of Great Lakes shipbuilders. They enter an era of broader and stiffer competition. Judging from past performance, however, we have good reason to believe that the success story of naval construction on the Great Lakes will be continued.



CITY OF CLEVELAND III. Designed by Frank E.Kirby. Built by Detroit Dry Dock Co., 1908. Gross tons 4568. Keel length 390 feet.Over all,401 Ft. Engines,Inclined, 1,000 H.P. Cylenders, 54,82,82,by 96" stroke. Speed, 25 M.P.H. Laid up after colision in 1950. Scrapped, 1954.

SAMUEL WARD STANTON DRAWINGS OF GREAT LAKES VESSELS

—CONTINUED—

CITY OF CHICAGO.

Built 1890 at West Bay City. Hull, of steel, constructed by F. W. Wheeler & Co. Length 226 feet, breadth of beam 34 feet; depth of hold 13 feet. Lengthened 1891, 12 feet, making total length 238 feet. Engine, vertical beam compound. Built by the W. & A. Fletcher Co. N.Y. Diameter of cylinders 26 and 54 inches by 6 feet 8 inches and 10 feet stroke.
Boilers, two of steel. Wheels, feathering, 22½ feet in diameter; 10 buckets each wheel. Tonnage 1164 Gross. 735 Net.

A beautifully finished and luxuriously furnished steamboat, belonging to the Graham & Morton Transportation Company and plying between Chicago and Benton Harbor on Lake Michigan. Sleeping accommodations for 300 people; all modern improvements and excellent speed go to make the CITY OF CHICAGO a model inland steamboat. Cost $285,000.

INDIANA. (Propeller)

Built 1890 at Manitowoc, Wis. Hull, of wood, constructed by Burger and Burger. Length 201 feet. Breadth 35 feet (Over guards 40 feet); depth of hold 14 feet and to second deck 23 feet.
Engine, one fore and aft compound, 28 and 50 inches diameter of cylinders, by 36 inches stroke; built by Charles F. Elmes, Chicago.
Two steel boilers, by John Mohr & Sons, Chicago--each 11 feet in length and 108 inches in diameter, allowed 125 pounds of steam. Gross tonnage 1777. Net 962.

No stauncher or more elaborately furnished steamer was ever built in this country than the INDIANA. She was constructed for the Goodrich Transportation Co., to ply between Chicago and the ports north of there on the west shore of Lake Michigan in conjunction with numerous other steamers of the line.

MARYLAND.

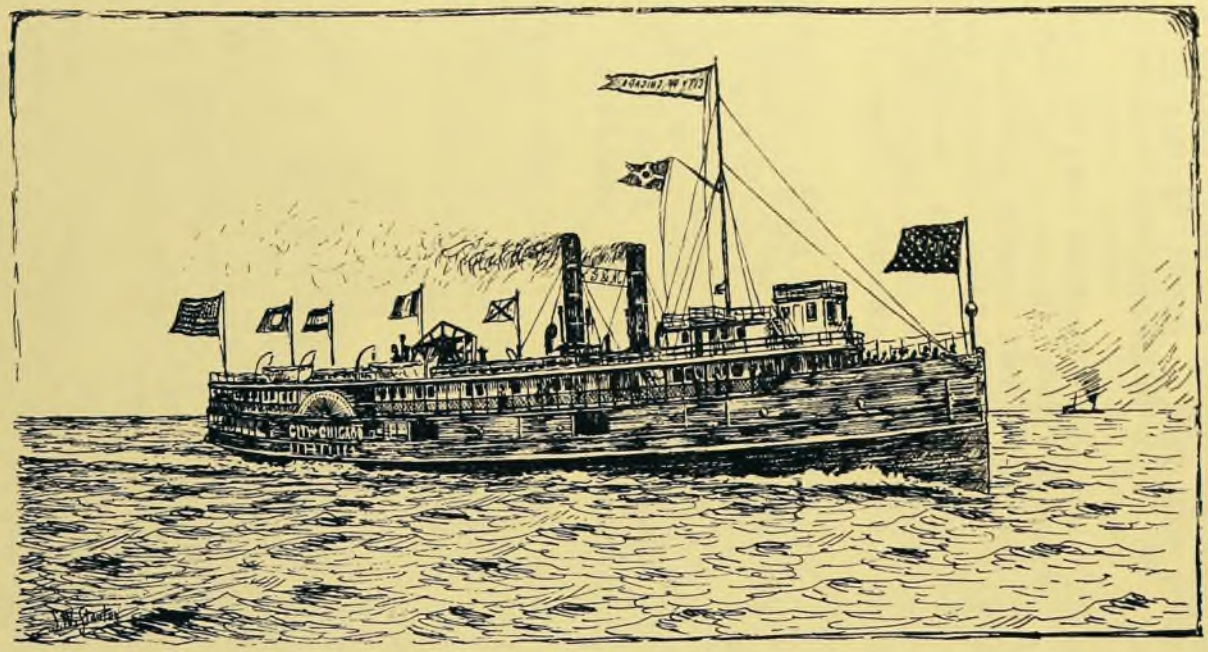
Built 1890 at Wyandotte, Michigan by the Detroit Dry Dock Company. Hull, of steel; length of keel 316 feet; length overall 334 feet; width of hull 42 feet; depth of hold 20 feet 4 inches.
Engine tri-compound; diameter of cylinders 22, 35, and 56 inches, by 44 inches stroke of piston. Indicated horsepower 1,400.
Boilers, two, of steel, "Scotch" type, each 14 feet 2 inches in diameter by 11 feet 6 inches in length. Grate surface 152 square feet; steam pressure 160 pounds.
Wheel, sectional screw, 13 feet 2 inches in diameter. Pitch 16 feet.

One of the large modern cargo carrying steamers of the Great Lakes. Built for the Inter-ocean Transportation Company. During the 127 days she was in commission in 1890 she carried 29 cargoes of iron ore between Escanaba and South Chicago, aggregating 92749 tons or an average of 3,190 tons per cargo. Her largest load that year was 3.720 tons, including fuel. When loaded the MARYLAND'S speed is 13½ miles per hour.

LADY OF THE LAKE? **Built at Conneaut, Ohio 1834.**

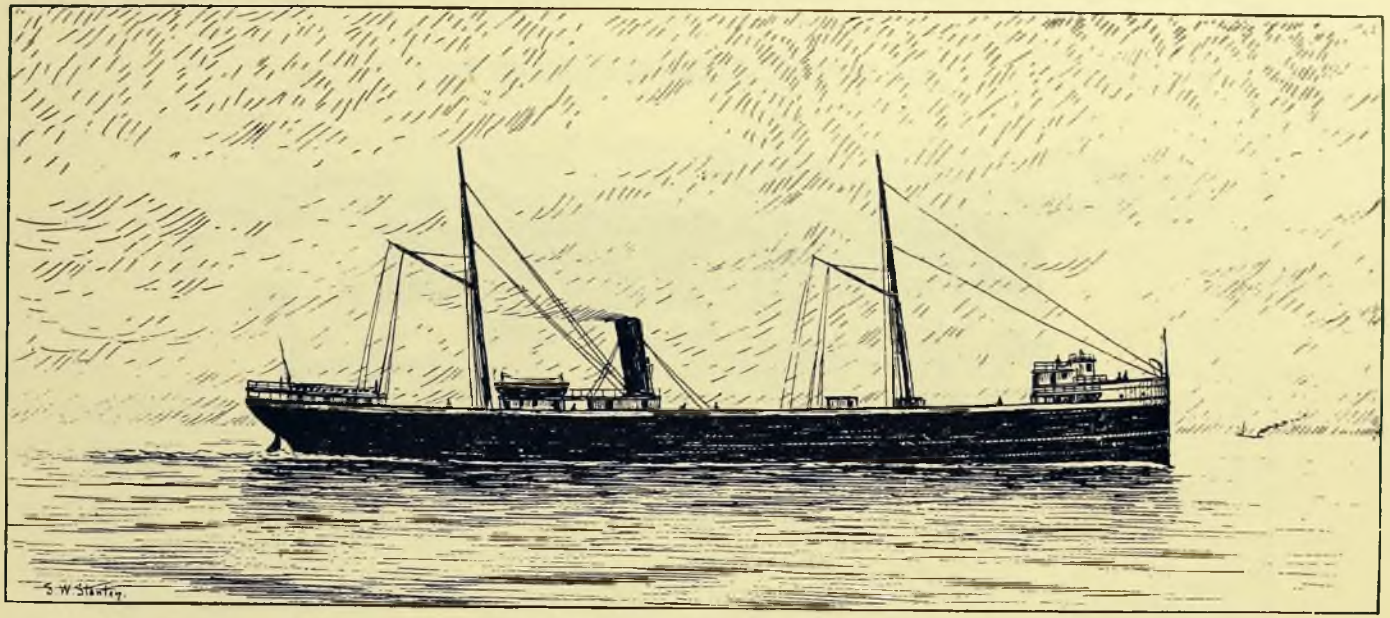
Mr.Richard J.Wright, 2566 Thurmont Road, Akron 13, Ohio, has requested information on this steamboat.

Please send information direct to Mr.Wright if not taken from Beers History of the Great Lakes. He has that.



LAKE MICHIGAN STEAMBOAT CITY OF CHICAGO, 1890.

LAKE MICHIGAN PROPELLER INDIANA, 1890.



GREAT LAKES STEAMSHIP MARYLAND, 1890.