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Duluth, Minn.
Topic: Duluth-Superior Harbor
Submitted by: Captain E. J. Ditzel
Number of Words:
Edited by: W. J. Sullivan
Date: April 27, 1936.

RESUME

GENERAL DESCRIPTION The Duluth-Superior Harbor (602 feet above sea-level) is the finest harbor on the Great Lakes and one of the finest natural harbors in the world, protected by a natural breakwater (called Minnesota Point) a quarter mile wide and 9 miles long, extending from the Wisconsin shore on the south to the Minnesota shore on the north.

There are two entries thru this stretch of land, one near the Duluth end and the other near the Superior end. The harbor-frontage is 49 miles, of which 6.7 are wharves. The harbor-area is 19 square miles. There are 17 miles of dredged channels. The 7 bridges in the harbor are 3 types: lift, swing, and bascule. There are 101 docks, 3 shipyards, 27 grain elevators, 21 coal docks, 7 iron-ore docks, and 3 government docks. There are 2 anchorage basins totaling 690 acres. The governing depth of the harbor is 22 feet, 24 feet on the Duluth side.

The Superior entry is a natural entry, 500 feet wide, with 3,680 feet of concrete piers. The lake approach is 30 feet deep. Converging breakwaters protect the entry.

The Duluth-Ship Canal, a dredged artificial entry, has 2 parallel concrete piers, 300 feet apart for 1,250 feet, after which they flare to 540 feet wide at the harbor end. The piers are each 1,734 feet long, and 1,100

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feet extend into the lake beyond the shore-line. The lake-approach is 30 feet deep, and the canal between the piers is 27.5 feet deep.

Both entries are provided with main lighthouses, see bit suitable ranges, fog signals, and radio beacons. A modern lift bridge spans the Duluth-Ship Canal.

A Coast Guard Station is located half a mile south of the canal, a protection to both lake and bay navigation.

The other bridges (6) are located up the St.Louis

River.

PORT ADMINISTRATION Federal waters and dredged areas of the harbor are under the jurisdiction of a harbor patrol appointed by United States Government Engineers. The Government engineers tabulate imports and exports (both domestic and foreign), record arrivals and departures, and supervise dredging, improvements, and up-keep.

Thru a Port Authority Board, consisting of 3 commissioners, appointed by the City Council under state authority, Duluth has jurisdiction over docks and approaches leading from the dredged channels. The City of Superior has a similar harbor commission; and the two work together for the general welfare of the district. They have wide powers for regulation. For future improvement, they may acquire by condemnation, purchase, or otherwise, any lands, wharves, and other waterfront locations needed for public use.

The City Planning Engineer of Duluth is Secretary.

The various bureaus of government and their functions follow: The United States Engineers are in charge of the harbor. The United States

Customs are in charge of documentation and enrollment of all vessels. The United States Immigration Department meets all vessels from Canadian and other foreign ports. The United States Weather Bureau issues weather reports. The United States Hydrographic office is maintained by the Navy Department for sending out ice bulletins and changes of aids to navigation, etc. Winter soundings for ice-thickness and inspection of all small gas and pleasure boats, etc., are under the jurisdiction of the United States Coast Guards.

EXPORTS AND IMPORTS (Foreign and Domestic) The Duluth-Superior Harbor has been for many years the second port in the United States in total net tonnage, and this too with less than an 8 months season, being second only to the port of New York.

The average yearly commerce is over 48 million net tons. The peak year was in 1929 with a total tonnage of 138,574,441 net tons, of which 50% was iron ore, 28% was coal, 12% was limestone, 7% was grain, and 3% was miscellaneous including: lumber, dairy-products, scrap-iron, fish, automobiles, and package freight. The value of 1929 shipments, both export and import, exceeded 485 million dollars.

During 1935, exports and imports were valued at \$270,865,557. Shipments were \$167,621,712, and receipts were \$103,243,845. The volumes of exports and imports totaled 29,184,768 tons. Export shipments were 21,015,164 tons, and imports were 8,169,604 tons. The average cargo received and shipped per day was 124,190 tons.

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freight, followed by bituminous coal, and automobiles. Shipments (in order of value) were led by iron-ore, with butter second, and flour third. While the tonnage of butter is far less than that of iron-ore, the ton-value of butter (at 20¢ a pound) is far greater. The ore averages \$6.50 a ton, while the butter averages \$400.00 a ton. The ratio is over 60 to 1. Butter and wool shipments are steadily increasing.

The 1935 imports included: 25,042 automobiles and trucks; 286,291 barrels of kerosene; 155,884 barrels of fuel oil; 7,786 barrels of lubricating oil; 20 tons of farm machinery; 6,856 tons of manufactured iron; 15,441 tons of wood-pulp; 103,432 tons of slag; 159,546 tons of limestone; 186,733 tons of package freight; 57,068 tons of salt; 6,646,214 tons of soft coal; 182,103 tons of hard coal; and 85,480 tons of coke.

The 1935 exports included: 17,172,155 tons of ironore; 19,880,731 bushels of wheat; 462,040 bushels of corn; 14,980,092 bushels of cats;
2,838,692 bushels of rye; 8,568,539 bushels of barley; 2,579,957 bushels of flax;
15,076 tons of package freight; 59,537 pounds of butter; 7,551 cases of eggs; 221,040
tons of scrap-iron; to Canada: 3,128,256 bushels of wheat; 53,687 bushels of oats; and
632,233 bushels of barley.

DOCKS PIERS WHARVES ELEVATORS AND TERMINALS There are 101 docks and moorings in the Duluth-Superior Harbor, located and listed as follows: 6 are street-ends, therefore city docks, 2 are owned by railroads, 6 are owned by large wholesale grocery and hardware companies, 3 are used by fishing concerns, 6 are owned by building contractors for sand and gravel, 2 are for iron (both scrap and machinery), 2 for excursions and ferry boats, 1 for ship-chandlery (supplies), 4 for cement, lime, and salt, 1 for con-

solidated wholesale grocery companies, 1 for a flour mill, 3 for dredging and shiprepairs, 27 for grain elevators, 21 for coal docks, 1 for a furnace company, 1 for an
oil company, 1 for a flaxseed mill, 4 for ship-building, 7 for iron ore, 1 for lighthouse service, 1 for Minnesota Naval Militia, 2 for United States Engineers, 3 docks for
forest products.

the largest in the world. One is a modern cement elevator with a storage capacity of 114,000 barrels and an unloading capacity of 1,000 barrels an hour. Seven iron-ore docks (nearly 3 miles long) have a storage capacity of 819,000 tons. Nine terminal warehouses with an area of 1,730,000 square feet have a capacity of 18,647,500 cubic feet. Twenty-one coal docks have a storage capacity of 13,013,000 tons. One of these coal docks has 1,000,000 tons capacity. Twenty-seven grain elevators have a total storage capacity of 62,900,000 bushels. The largest elevator has a capacity of 12,800,000 bushels! One of the large elevators unloads 20,000 bushels an hour!

SHIPS SHIPPING COMPANIES AND SAILORS There are 60 steamship companies operating 460 ships out of Duluth. This includes American and Canadian bottoms. Of these, 49 companies handle bulk freight, such as coal, grain, and iron-ore, which comprise most of the tonnage; 8, general freight, autos and passengers; 1, gasoline, kerosene and crude oil; 1, cement; 1, slag, salt, and limestone.

Taso perhicle or

Duluth. The Great Lakes Transit Corporation and the Northern Navigation Company, operating 5 passenger boats, and one excursion boat up the St. Louis River and around Minnesota Point.

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There are 364 vessels of all classes with a total tonnage of 723,193 tons enrolled in Duluth. In 1935, exactly 11,050 vessels entered and departed the Duluth Superior Harbor, 75% using the Duluth Ship Canal.

each. A bulk freighter costs between \$600,000 and \$800,000 to construct. The Standard Oil Tanks cost \$1,225,000; and one of the late bulk cement tankers cost over \$1,000,000. It is safe to say the total worth of all vessels using the Duluth-Superior Harbor is in excess of \$2,486,250,000.

The average freighters (585 feet to 638 feet) in length are called 600-footers.

It costs about \$700 a day to operate one of the 600-foot class and \$180,000 a day to operate the fleet for the season of 1936.

The Great Lakes sailors are the highest paid in the world. The wages are: \$68 to \$70 a month for deck-hands, \$80 for coal-passers, porters, and waiters, \$95 for second cook, \$125 for first cook, \$80 for deckwatches, \$105 for wheelsmen, oilers and firemen, \$130 for third mates and third engineers, \$155 for second mates and second engineers, \$290 to \$300 for chief engineers, and \$400 to \$500 for captains. The wages are scaled to the class and tonnage of the vessel. The largest ore boat in the world is the Steamer Harry Coulby of the Interlake Steamship Company of Cleveland, Ohio. The vessel is 638 feet overall, 607 feet on the keel, 65 feet beam, 33 feet moulded depth. The cost was \$1,250,000.

The headquarters for most of the steamship companies

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The average value of cargo on the lake freighter is from \$40,000 to \$45,000. A grain and butter cargo is naturally worth more.

The average freighter burns from 350 to 540 tons of coal a round trip of 11 to 12 days, and the cost of the fuel runs about \$4.50 a ton.

The various lines have smoke stack markings. One of the most famous is what is termed (among marine men) the "tin stack" of the Pitts-burgh Steamship Company. The stacks of the vessels of this company are painted aluminum to about 3 feet of the top, then black to the top. These stacks can be seen for miles on the lake.

The average crew runs about 33 to 35 men.

The average speed of these freighters is 12 miles an hour loaded, and 14 miles an hour light.

NAVIGATION The navigation season for inter-lake traffic in

1935 covered a period of 235 days. Local navigation opened April 1st and closed -67

December 16th.

The heaviest ice (or thickest) was in the winter

of 1904-5, when it was 38 inches thick. The thinnest was 18 inches in three different years: (March 3, 1919; February 18, 1921; and February 16, 1931).

Currents of various degrees of strength are prevalent at the Duluth Canal, due principally to oscillations of the lake surface setting in or out as the lake temporarily rises or falls, usually of moderate velocity and short duration. On rare occasions, more rapid currents occur, which for a few minutes

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reach a velocity in the neighborhood of 6 miles per hour, followed by reverse currents, perhaps equally strong. The duration of these currents depends upon that of the oscillation of the lake surface if the oscillation is brief, and upon the time required to fill or empty the harbor to the level of the lake.

In very heavy storms, ships sometimes enter the harbor at the Superior Entry, in preference to the Duluth Entry, on account of the heavy current.

The prevailing winds are northeast at Duluth-Superior Harbor (the only storms affecting the entrance or departure of vessels).

The heaviest fogs usually occur during the summer months of June, July, and August.

The average navigation season is 8 months, governed by local weather conditions as well as general business conditions.

SAFETY FIRST The Federal Rules and Regulations for safety first of both lives and property aboard any United States steamboat vessel enforced through the United States Inspection Service of the Department of Commerce and Labor, are as follows: printed rules are framed under glass and posted conspicuously on each vessel. Every sailor has his assigned station in case of emergency. Each week the life-boat and fire-pump drill is practiced (weather permitting) and the fact recorded in the ship's log. The crew practice (1) adjusting life-preservers, (2) educating passengers in adjusting life-belts and preservers, and (3) the unlashing and swinging out of life-boats, etc.

The general fire alarm is a continuous ringing of

the ship's bell for not less than 20 seconds and this signal is never used for any other purpose.

A licensed officer of each vessel must, at least once a week, inspect all the stearing gear, whistle equipment, and signaling appliances (between pilot bridge and engine room) and record same in the ship's log.

The licensed officer in command of any vessel reports in writing (or in person) to the board of local inspectors, nearest the port of first arrival, any accident involving loss of life (or damage to property to an approximate amount exceeding \$500). He also reports, in the same manner, any casualty or loss of life (from whatever cause) of any person on board and any stranding or grounding, whether or not any damage has been sustained by the vessel.

without the jurisdiction of inland waters, the board (to whom the report is first made) makes the investigation; but, if the accident occurs within the jurisdiction of inland waters, the report is transmitted to the board within whose jurisdiction the accident occured, which board makes the investigation (except in cases where, in the judgment of the supervising inspector general, he is authorized to direct such investigation by another board); except that, from a distance, reporting may be done in writing only, and the report sworn to before any person authorized to administer oaths.

All life-boats and life-rafts are equipped, according to law, with the necessary oars, life-preservers, matches, flares, buckets, lanterns, axes, hatchets, sea-anchors, storm-oil, drags, heaving-lines, etc.

Western end of Lake Superior, had its origin geologically when the last great glacier receded and left the lake and St. Louis River behind. This western end of Lake Superior is gradually sinking about 6 inches a century as the earth's crust settles. The water from the lake is thus slowly backing up the river, and deepening the harbor. A 9 mile strip of sand and gravel about two blocks wide has been built up by the action of the waves from the lake and the flow from the river. This strip of land, called Minnesota Point, extends from the Minnesota shore to the Wisconsin shore and forms a natural breakwater. Originally a natural entry existed about half a mile north of the present Superior entry. This first entry gradually filled in, after the first settlement in this territory, and a new natural entry, now called the Superior entry, opened at the site of an Indian burial ground.

Harbor were sea-gulls, ducks, fish, and beaver. Then for centuries the Indians paddled their birch-bark canoes about the waters, generally crossing at Little Portage, where the Duluth Steam Plant is now. In those days, there were floating islands in the bay with trees growing on them. A water opening existed from the bay marsh to the lake where the Duluth Steam Plant is now, near the base of Minnesota Point in Duluth. At times, the waves from the lake closed this opening with shore gravel.

The first white navigators may have been the Vikings. The Kensington Rune Stone rather suggests that. But be that as it may, we do know for certain the French fur-trading Voyageurs were here in the early 1700's. They first came from Madeline Island on the South Shore of Lake Superior and entered at the original natural entry. Later they came from Grand Portage on the North Shore

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and crossed Minnesota Point at Little Portage. They had canoes of 8 tons capacity.

While there may have been some lesser known voyageurs here before Sieur Jean Du Luth, he is the first white man we know about who ever visited the harbor. He did so in 1679.

The French fur-traders had a post in East End Superior and the Astor Trading Post was later up the St.Louis River at what is now called Fond du Lac. To the earliest French fur-traders, however, Fond du Lac meant the present Duluth-Superior Harbor as their maps clearly show.

Swanson) was the first dock built by the modern settlers. This dock was on the bay side just inside the original entry. The early sail boats from the Soo and the South Shore used this dock, and the goods and passengers were then taken in smaller boats to the first settlements in East End Superior. The shifting channel made navigation in the harbor a problem.

After the Superior settlement, Oneota, a little place in western Duluth, up the river, was settled. And last of all, Portland, or the present downtown Duluth was settled.

The first light-house erected at the Head of the Lakes was located near the present Superior entry, on the Wisconsin end of Minnesota Point by the federal government at a cost of \$15,000; and R. H. Barrett was appointed the first light-keeper, we used a horn which he blew with his mouth in foggy weather. The tower is an old land-mark, and still stands as a ruin near two trees which the

Many 4 a

keeper planted. The United States Surveyors' <u>location marker</u> is in the base of the tower. Another such marker is under a wooden scaffold at the street end of 23d Street on the bay front; one block north of the Park Point school.

The first commerce, after the fur-trade disappeared, was supplies which were shipped into Duluth-Superior Harbor for the early settlers.

They required food, clothing, dishes and household articles, tools, logging and sawmill machinery. The lumber used to build the first hotel in Superior came in by boat from Chicago. In those early days passenger travel was too difficult by land and cance routes. So the early settlers generally came here by Great Lakes vessels.

Lumber was the next commerce at the head of Lake Superior. After satisfying local demand, the sawmills shipped lumber down the Great Lakes. There was a mill at Fond du Lac in the 40's. The Merritts had a rather pretentious mill at Oneota in 1860, and even prior to that there was a mill at Rice's Point. In the record of shipping, it is shown that supplies were had from down the lakes because the vesselmen found "more profit in coming to Duluth for the product of the mills." (Wood@Pardee Vol. 2 p. 561). Frequently cargoes of more than a million feet were shipped down the lakes. (Wood-Pardee Vol. 2 p.564.) In the winter of 1856-57, a saw-mill was erected at the present site of the Duluth Ship Canal. Not being a paying enterprise, it was abandoned in a year or two. In 1855, Wheeler, Ely, and their associates had built a fair-sized steam saw-mill at Oneota, adding a planer and lath and shingle attachments in 1866-67. The mill was destroyed by fire in 1870. In 1857, another saw-mill was b built a mile above Oneota at a place called Milford. The builder, Henry C. Ford, left for the east in 1860; and the mill soon became a wreck. It was destroyed by fire in 1868. There was a large saw-mill at Superior Bay, built in 1854. Some of this machinery was later used in the first mill on Connor's Point. There was a saw-mill on Rice's Point in Duluth, built in the early 70's. Connor's Point extends from the Wisconsin

side of the St.Louis River and Rice's Point extends from the Minnesota shore where the present Interstate Bridge is located. The saw-mill on Rice's Point was known as the Da Costa Mill and had a dock fronting on the deep St. Louis River channel. From this same dock, lake steamers unloaded locomotives, rails, and equipment for Duluth's first railroad. Lake boats came into the bay via the old natural channel at Superior and thence up the Superior Bay in the deep natural channel to this dock, then the only one at the Minnesota side.

There was another saw-mill just south of where the Union depot in Duluth is now. In the early 80's, saw-mills were also operated on Minnesota Point near the present life-saving station and where the Booth dock now is. Ball's water-power, five thousand feet capacity saw-mill was built in the late 70's in what is now Lincoln Park, Duluth. It cut practically all the scattering and "left over" pine on the upper hillsides back of West Duluth.

Improvements of the harbor began in 1871 with the construction of a \$76,000 breakwater in the lake (known as the outside harbor), by the Lake Superior and Mississippi Railroad Company (now the Northern Pacific). The breakwater extended out from the shore of the mainland about 2,000 feet from the present canal. The first harbor master was Captain J. W. Miller.

The first blast furnace was built in 1873 on Rice's Point; and was under the management of John H. Shoenberger of Pittsburgh. In 1873, R. S. Munger built the first elevator on the bay front, located nearly directly down from Fifth Avenue West. He also built the first lumber mill in town and the first coal dock.

During the winter of 1875-76, the tug "Siskivit" was built by Captain Alex McDougal. She was "layed up" only six weeks that year and that because of ice. She was later chartered by the United States Government to carry mail up the North Shore.

The District United States Engineers Office was located in Duluth in September 1886. Previous to that time, a sub-office only was maintained at this point. In 1886, coastwise arrivals at Duluth totaled 665 steamers, 232 schooners; and Duluth was proud of the fact that she shipped mearly 8 million bushels of grain more than Chicago.

The second m tural entrance at Superior (where the entry now is) had been 8 to 12 feet deep. This was deepened to 12 to 16 feet by the United States Engineers of the War Department.

An artificial entry had been dug by Duluthians

(see article on Duluth Ship Canal by Delia Swanson). And in 1887, the title to the
land on both sides of the Duluth Ship Canal was given to the federal government; and
Congress was petitioned to repay the city for the cost of digging the canal and for the
money spent in building a dike across the harbor (by order of the United States

Supreme Court) which had to be later removed. This dike ran from Rice's Point to Park

Point across the bay. Railroad tracks were even laid on it to assist the construction.

Today, no sign of it exists except a few pilings under the water near the shore of Rice's

Point.

About 1888, M. H. Alworth of Duluth, as agent for William Boeling of Duluth, laid claim to the Duluth Ship Canal, alleging that Boeling

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had been the real owner of the land through which it was cut. That summer,

Alworth passed a string across the canal to be broken by the first vessel that

entered the harbor, so as to lay a foundation for a law suit; but nothing came of it.

In 1895, there were 10,816 boat arrivals and departures, and 6,411,351 tons of freight were moved, valued at \$96,000,000.

In 1896, a three million dollar appropriation was made by Congress to provide for 20-foot harbor channels, 300 to 600 feet wide; and to provide for piers at both harbor entrances.

Duluth and Superior were joined into one harbor to be known as the Duluth-Superior Harbor, by a Congressional Act, passed June 3, 1896.

Ever since then it has been known as one harbor.

HISTORICAL HIGH-LIGHTS The first steamer to make regular trips from the lower Great Lakes to Duluth was the "Keweenaw." She made the round trip in two weeks. The first tug in the Duluth-Superior Harbor was the "Agate," afterwards rebuilt and called the "Jeffery."

The first shipment of iron-ore from Duluth (in 1892) was 4,245 tons of Missabe Mountain ore. The steamer Hiram W. Sibley took 1,627 tons on the first load. The total number of tons of iron ore shipped from Duluth to date is 439,220,648 tons. The largest ore cargo to date was the steamer "Harry Coulby" with 14,617 gross tons in 1929. She will carry more when channels are deepened. The largest stone cargo (1929) was the steamer "Carl D. Bradley," 16,173 gross tons. The largest wheat cargo (1929) was the steamer "La Moyne" with 571,885 bushels. The

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set in 1896.

largest oat cargo (1915) was the steamer "W. G. Morden" with 760,066 bushels.

The ore-loading record is held by the Duluth,
Missabe & Northern Railroad at Duluth, Minnesota. July 15, 1919, the steamer
"D.G. Kerr" loaded 12,689 gross tons of iron ore in 30 minutes actual loading time,
an hourly rate of 25,378 gross tons.

The coal unloading record is held by the same company at their coal dock in 1928. The steamer "E. H. Gary" unloaded 9,366 net tons of coal in 6 hrs. and 5 minutes, at the rate of 1,539 net tons per hour.

The Rice's Point Dock-line, first established in 1873, at 600 feet from the shore, is now 1570 feet from shore. In most other portions of the harbor, the dock-lines have also been set farther out. In Superior Bay, the space between the dock-lines, at the narrowest point, is 2,000 feet.

This harbor space is gradually being dredged out as fast as needed for channels, for anchorage basin space.

Up the St. Louis Bay and River the dock-lines were

The total length of harbor lines established by the government, in the entire harbor, is 49 miles. By building of slips from the shore to the harbor lines, the harbor has a possibility of nearly 200 miles of dock frontage.

RESUME HISTORY OF DULUTH SUPERIOR HARBOR By Otto Wieland.

1793 The Northwest Company built the first dock at the Head of the Lakes for their newly established trading post, Fort St. Louis, on Connor's Point.

1853 George Stuntz built his dock on Minnesota Point a little north of the old entry.

1855 The proprietors of the townsite of Superior built Quebec pier, a "T" shaped dock extending into Superior Bay between Lowertown and Uppertown.

1861 The United States Government made the first complete survey and chart of the entire harbor. (Work in charge of Captain George/G. Meade of Gettysburg fame.)

1862 The Quebec pier and two warehouses situated on its wings were fortified to provide a refuge in case of Indian uprising.

1867 The government began improvement of the entrance: built piers 500 feet apart, filled the remainder of the opening to confine the currents between the piers, built a new lighthouse, and dredged channels in the harbor. This work was completed in 1875.

1868 The first mercantile dock on the Duluth side (de Costa dock) was built on the west side of Rice's Point by the promoters of the Lake Superior and Mississippi Railroad.

1869 The Lake Superior & Mississippi Railroad Company built the first section of the outside breakwater at Fifth Avenue East. In 1870 - 1871 with the aid of the United States Government it was extended to a length of 1000 feet. The storm of November 1872 destroyed this breakwater.

1870 The City of Duluth started digging the canal in the fall.

The canal was completed for passage of small craft in June 1871.

In June the United States Circuit Court (State of Wisconsin 1871 vs. The City of Duluth) issued an injunction restraining the city from building the canal. When the injunction was served, the canal was already in use by small craft. In July the injunction was dissolved upon the execution of a \$50,000 bond by the city of Duluth to build a dike across the bay from Rice's Point to Minnesota Point to prevent currents being turned away from the Superior entry. The dike was finished and strengthened in 1872. 1872 The State of Wisconsin and City of Superior sought to enjoin the City of Duluth and the Northern Pacific Railroad Company from building the dike. The Northern Pacific Railroad Company offered, as a compromise, to extend its line to Superior and give that city equal service with Duluth. Government engineers agreed that the Duluth Canal would not injure the Superior entry. The United States Government and the Governor of Wisconsin accepted the compromise. The City of Superior and the State of Wisconsin started a 1874 new case in the United States Supreme Court, demanding the filling in of the Duluth Canal. In October, the Supreme Court decided against the State of 1877 Wisconsin. 1878-1895 Annual small appropriations made for each side of the bay, the two cities acting independently, often in antagonism. The two cities agreed on harmonious action; organized "Duluth-Superior Harbor Commission" composed of an equal number of men from each city. Board of Army Engineers made a thorough study of the harbor's 1894 commerce and commercial prospects, and its consequent needs. On the basis of the report of this board of engineers, Congress 1896 appropriated \$3,000,000 for development of the entire harbor. New and longer piers were built at both entrances; the Duluth Ship Canal was widened; new lighthouses were built; harbor channels were deepened and widened. The work was extended over a number of years.

Later appropriations have been made to carry out the plans and recommendations of the Board of Engineers, and to provide accommodations for the largest ships that pass through the Sault locks.

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TOPIC: Duluth-Superior Harbor (F.C.) 160
SURMITTED BY: Capt. E. J. Ditzel
MUMBER OF WORDS:

GENERAL DESCRIPTION.

Situated at the Head of the Lakes, on the largest body of fresh water in the world, 602 feet above sea-level, 395 miles from Sault Ste Marie, Michigan, 2,340 miles from the mouth of the St.Lawrence River, in N Lat. 45°- 47° and W Long. 92° - 6° Midway of Central Standard Time Belt, lies the City of Duluth called the Zenith City of the Great Lakes (named Duluth after the French explorer Sier Greysolen de-Luth).

Duluth-Superior Harbor is the finest harbor on the Great Lakes and one of the finest natural harbors in the world. It is protected by a natural breakwater called Minnesota Point, a narrow strip a quarter mile wide at its widest point and 9 miles long.

The Superior Entry, the natural Entry, now widened to 500 feet, has all-concrete piers, aggregating 3,680 feet in length. The lake approach to the canal-entrance is despened to 30 feet, the canal-depth is 24 feet, and was completed in 1909. Converging breakwaters comprising 4,205 linear feet of rubble-mound, 900 linear feet of stone-filled crib and concrete super-structure pier-heads founded on piles, and 896 linear feet of shore-revetments on pile-foundation, was completed in 1912.

Enlargement of <u>East Gate Basin</u> was completed in 1920, with a present <u>total area of anchorage basin of 209.8 acres</u>, and a depth of 20 feet.

Superior Entry Stilling Basin with an area of 35 acres and a depth of 24 feet, was completed in 1915.

The <u>Superior-Harbor Basin</u> and its enlargement, including the portion of Superior Front-Channel adjoining the enlargement, an <u>area of 265 acres and a depth of 20 feet</u>, was dredged in 1919-1920.

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TOPIC: Duluth-Superior Harbor (F.C.) 160
SUBMITTED BY: Capt. E. J. Ditzel
NUMBER OF WORDS:

THE SUPERIOR ENTRY

Entering from the lake, the Superior Entry has a depth of 30 feet for the entire width of 600 feet, except for 20 feet next to the pier-heads. Within the breakwaters there is a channel 600 feet wide and 30 feet deep, extending in to the ends of the inner concrete-revetments, with 24 feet depth entering the revetted-channel. All piers and revetments are riprapped.

The south concrete pier is 1,584 feet long, and the north concrete pier is 2,096 feet long. These piers bear 50° 6° (NE 7/8 E), are 500 feet apart, and terminate nearly abreast of the lake shore-line of Wisconsin Point. The two converging breakwaters extend from the shore of Minnesota Point on the south, out to depth of 30 feet with the entrance-opening 600 feet wide in line with the axis of the innerentrance and about 1,900 feet outside of the ends of the new piers. The north-breakwater is 4,136 feet long, bearing 85° 06° (E 3/8 N), and consists of 450 linear feet of crib and concrete-pierhead, 3,190 feet of rubble-mound, and 496 feet of concrete shore-revetment. The south-breakwater is 1,865 feet long bearing 25 06° (NNE. \(\frac{1}{4} \) E.), and consists of 450 linear feet of crib and concrete pier-head 1,015 feet of rubble-mound, and 400

2 feet of concrete shore-revetment. Both pier-heads are 11 feet high and the rubble-mounds and shore-revetments are 8 feet high above lowwater datum. On both sides of the 600-foot entrance-channel there is 24-foot depth in the Stilling Basin under either break-water, the edge of deep-water being 160 feet from the center lines of the break-waters and extending into the curving shoreline. The North Basin has an area of 19% acres and the South Basin 15g acres; and these, combined with an area of 26.8 acres for the entrance-channel, give a total protection area of 61.8 acres. Between the concrete piers, which are 500 feet apart, the channel was dredged 24 feet deep for a width of 430 feet. with the edge of deep-water 35 feet from the North Concrete Revetment on the Starboard Side entering the harbor, and on the Fort Side 35 feet from the South Revetment in as far as the curve at the harbor-end: here the distance out from the south-revetment of the 24 foot curve gradually increases to 100 feet for the inner 400 feet length of the pier. Rip-rap stone was placed along the base of the piers on the canal side, the depth over it being 16 feet next to the south-revetment. The Superior Entry is unobstructed by any overhead structure. North-breakwater light, on the pierhead at the outer-entrance, shows white flash 0.3 second, eclipse 0.7 second, visible 14 miles. South-breakwater light, on the entrance pierhead, shows white

5 seconds, eclipse 5 seconds, visible 16 miles; an air fog-siren sounds blast 3 seconds, silent 27 seconds.

Inner north-pier head-light, on the outer-end of the North Concrete Revetment, shows white 1 second, eclipse 1 second. Inner south-pier head-light, on the outer-end of the South Revetment, shows red 1 second, eclipse 1 second. Superior-Harbor Basin-light No. 1, showing a white flash 0.3 second, eclipse 2.7 seconds, is located on the inner-end of the South Revetment.

- 1 - DULUTH MINN.

TOPIC: Duluth-Superior Harbor (F.C.) 160 SUBMITTED BY: Capt. E. J. Ditzel NUMBER OF WORDS:

DULUTH SHIP-CANAL

The Duluth Ship-Canal, being artificial and the second entrance to the harbor, was cut thru Minnesota-Peint by the City of Duluth in 1871 - 72, then taken over by the United States in 1873, and subsequently reconstructed.

width between them at the entrance, and for a distance of about 1,250 feet from the outer-end, is 300 feet, after which they flare out at the harbor-end to a width of 540 feet. Each has a length of about 1,734 feet and extends 65° 07° N.E. x E 3/4 E, about 1,100 feet beyond the shore-line. The foundation-cribs extend 22 feet below water-datum, and the concrete superstructure rises 10 to 18 feet above that plane. The lake approach to this canal has been depended to provide fully 30 feet of water for the entire 300 feet width on prolongation of the channel between the canal-piers, and for an additional width of 30 feet to the southward of the line of the South-pier. Dredging in 1923 restored the approach channel to the full dimensions stated. In 1930, the least depth on the center-line of the channel between piers was 27.5 feet, at 1,150 feet in front the outer-end.

Duluth Canal Lights.

Duluth front range-light is fixed green,
visible 12 miles, located on the outer-end of the south-pier; a fog
diaphone sounds blast 5 seconds, silent 55 seconds. The rear-light
shows a white-flash 0.4 second, eclipse 3.6 seconds, visible 16 miles,
and is located near the inner-end of the south-pier, 1,2000 feet S.W. x
W 7/8 W. from the front-light. An auxiliary fixed red-light on the frontlight structure, visible between bearings 8° (N. 3/4 E.) and 98°
(E. 3/4 S.), serves in range with the rear-light as a guide to make
the turn from the harbor-basin into the canal, outbound.

Duluth north-pier light, showing a white-light 2 seconds, eclipse 2 seconds, visible 11 miles, is located on the outer-end of the pier.

In addition to the above, the United States has provided an equipment of incandescent electric lamps, consisting of 33 cast-iron standards on the North-pier and 32 on the South-pier, each carrying two semi-transparent globes in each of which are two 24 candle power-lamps. The City of Duluth furnishes the electric current. The purpose of the lamps is ornamentation, but they also form a conspicuous land-mark and afford additional facility to vessels entering the canal. They are placed 50 feet apart and are 21 feet above the water and should be visible 11 miles. They are lighted from surrise to sunset during the navigation season. In addition, a radio-beacon equipment, installed by the United States Light-house Department, broadcasts impulses (60 seconds of 3 long dashes, 1 short dash, then silent for 120 seconds) continuously during foggy-weather, and the first 15 minutes of every hour during clear weather.

The city of Duluth also had amplifiers installed on the outer and inner-ends of the N. pier to amplify fog-signals of the vessels approaching the Duluth Ship-Canal from both the lake and bay to the operator on the new lift-bridge spanning the Ship-Ganal and connecting the mainland with Minnesota Point.

Duluth, Minn.
Topic: Duluth-Superior Harbor (F.C.) 160
Submitted By: Capt. E. J. Ditzel
Edited By: W.J. Sullivan
Date: April 10, 1936

July

SAFETY FIRST

Safety First is taken seriously on the Great Lakes and in the Duluth-Superior Harbor. Printed rules are framed behind glass and posted conspicuously on each vessel. Every sailor has his assigned station in case of emergency. Each week the life-boat and fire-pump drill is practiced (weather permitting) and the fact recorded in the ship's log. The crew practice (1) adjusting life-preservers, (2) educating passengers, (3) and unlashing and swinging out life-boats. Inspectors may request the drill to be performed in their presence to satisfy themselves the practice is thorough.

of the ship's bell for not less than 20 seconds and this signal is never used for any other purpose. Passing ships must report the exact time of observing such drills. Officers neglecting these drills may be suspended or have their licenses revoked.

bow and stern (front and rear) deckhouses, must have, at all times the vessel is loaded and being navigated, a cable, not less than five feet from the deck, stretched between these deckhouses. This cable permits members of the crew to go from one house to the other in stormy weather or in case of a broken ship. (This rule was invoked after the Matafa disaster when sailors perished because they were unable to do this.) At all times, a traveler is attached to this cable with a line of sufficient continuous length to insure its operation, in order that communication between both ends of the vessel may be facilitated. Or a number of iron rings,

with suitable lanyards attached, may be used, equaling in number the total number of persons on the vessel. The license of the master or officer in charge may be revoked for failure to comply with this regulation.

All passenger or ferry steamers operating at night have one of the crew on watch near the pilot house, in addition to the regular pilot on watch.

A licensed officer of each vessel, under the jurisdiction of the steamboat inspection service, inspects once each week all steering gear, whistle equipment, means of communication, and signaling appliances (between bridge or pilot house and engine-room); and an official record is kept of the time and the tests made.

The licensed officer in command of any vessel reports in writing (and in person) to the board of local inspectors, nearest the port of first arrival, any accident involving loss of life or damage to property to an approximate amount exceeding \$500. He also reports, in the same manner, any casualty or loss of life from whatever cause of any person on board and any stranding or grounding, whether or not any damage has been sustained by the vessel. If the accident happens upon the high seas or without the jurisdiction of inland waters, the report is transmitted to the board within whose jurisdiction the accident occurred, which board makes the investigation, except in cases where, in the judgement of the supervising inspector general, he is authorized to direct such investigation by another board; except that, from a distance, it may be done in writing only, and the report sworn to before any person authorized to administer oaths.

Whenever a vessel commanded by an officer licensed by the Steamboat Inspection Service collides with a <u>lightship</u>, buoy, or

other aid to navigation under the jurisdiction of the Bureau of Lighthouses, or is connected with any such collision, it is the duty of the licensed officer in command of such vessel to report the accident to the nearest board of local inspectors. When any collision of this character is reported to a board of local inspectors, those officers immediately transmit such information to the Superintendent of Lighthouses of the district in which the collision occurred. Failure to promptly render the reports required are deemed sufficient cause for suspension or revocation of license. Whenever, in an investigation of an accident to a vessel, made by a board of local inspectors, it is stated by the officers of the vessel concerned, or it is developed by the investigation, or it is stated in a report of an accident, that the accident was due to a collision, with a light vessel, buoy, or other aid to navigation under the jurisdiction of the Lighthouse Service, or to any fault of any such aid, or to the lack of such aid, the local inspectors investigating the case, or to whom the report was made, promptly report to the Commissioner of Lighthouses, through the supervising inspector of the district; and the Supervising Inspector General, on the form provided for the purpose, gives the location of the accident, the aid to navigation near or at which the accident occurred, the nature of the accident, and whether it was due to some alleged fault of the aid (either in its operation or He also gives the proposed improvement in the aid (if such has been suggested), and all other information or suggestions coming to his attention which would be of value to the Lighthouse Service. If an investigation was held, the findings of the board are reported.

Local inspectors also report, in the same manner, any other information (or suggestions) coming to them concerning the need of additional aid to navigation or the modifications of any existing aids.

Boards of Local inspectors are authorized to call on the Superintendent of <u>Lighthouses</u> of the district for any information concerning aids to navigation that will be useful in an investigation of an accident. Whenever it appears to the licensed officers of steamers of over 100 gross tons (not equipped with wireless telegraphy), navigating the Great Lakes, that the vessel is in imminent danger of being lost; and that there is a possibility of the cause of the loss becoming unknown, the licensed officers in charge prepare a report stating the cause of the loss of the vessel and giving the facts connected therewith as fully as possible. These officers also give a list of the officers and crew and inclose all this in a message case (or receptacle) carried for that purpose, in order that the facts in connection with the loss of the vessel may eventually become known to the officers of the Lighthouse Service.

The life-boat equipment differs, according to the type of vessel: ferries, fireboats, tugs, motorboats, pleausre steam vessels, steam vessels carrying passengers, steam vessels not carrying passengers, and towed passenger barges.

The average steel freighter is equipped with: life-boats, life-boat equipment, life-rafts, and life-raft equipment.

length of each side, festooned in bights not longer than 3 feet, with a seine float in each bight. This line is 12-thread manilla rope and hangs to within 12 inches of the surface of the water when the boat is light. Each life-boat is numbered on each bow in figures at least 3 inches high. Odd numbered boats are carried on the starboard side of the vessel and even numbered boats on the port side, listing from bow to stern. The cubic capacity, and passenger capacity are marked on the bow of each life-boat in letters $\frac{3}{4}$ of an inch high. And at least two of the thwarts have the number of passengers allowed painted on top in letters and

figures at least 3 inches high. These markings are dark on a light background or light on a dark background. The decks (on which life-boats and life-rafts are carried) are kept clear of freight (or any other obstruction) that would interfere with the immediate launching of the life-boats of life-rafts.

The equipment of the life-boats consists of: necessary oars with two spare oars, a set and a half of pins (rowlocks) attached to the boat with separate chains, one steering-oar with rowlock (or becket), one rudder with tiller (or yoke and yoke lines), one boat-hook attached to a staff of suitable length, two life-preservers, two hatchets, one galvanized iron bucket with lanyard attached, one boiler, two plugs (secured with chains) for each drain-hole (where automatic plugs are not provided), one efficient liquid compass (with not less than a 2-inch card), one lantern (containing one gallon of illuminating oil), one box of friction matches (wrapped in a waterproof package and carried in a box secured to the under side of the stern thwart), a water-tight metal case (containing 12 self-igniting red lights capable of burning at least 2 minutes each), or a 3-cell focusing-flashlight with 3 extra standard batteries (in a portable water-tight metal case) in place of 6 red lights, or an approved signal pistol with 12 combination red lights to give forth a brilliant red flame of not less than 30,000 candle power capacity (capable of being projected vertically to a height of not less than 150 feet and capable of burning not less than 30 seconds) with a holder not less than 18 inches in length and 12 scratchers for igniting the friction-prime when using the lights as a hand signal (the whole contained in a portable water-tight metal case), a sea anchor, and a vessel containing one gallon of vegetable or animal All loose equipment is securely attached to the life-boat to which it belongs.

The carrying capacity of a life-boat is determined by the product of length x width x depth multiplied by 0.6, representing the cubic feet. This divided by 10 equals the passenger capacity. For

Duluth-Superior Harbor (F.C.) 160 Page 6.

example, the carrying capacity of a boat 22 feet long, 6 feet wide, and $2\frac{1}{2}$ feet deep is: $\frac{22x6x2\frac{1}{2}x0.6}{10} = \frac{198}{10} = 19$. Therefore, 19 passengers can be carried.

(The depth used in calculating should never exceed 45% of the width.)

Duluth, Minn.
Topic: Duluth-Superior Harbor
(F.C.) 160
Submitted By: Capt. E. J. Ditzel
Edited By: W.J. Sullivan
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SOURCES OF MATERIAL

Personal observation of Capt. E. J. Ditzel.

Official Regulations of the United States Lighthouse Service with headquarters in Detroit, Michigan and Washington, D.C.

(And)

- 1 - Duluth, Minn.

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July

SHIPS SHIPPING COMPANIES AND SAILORS

Duluth is a terminal for 60 steamship companies operating 460 ships. Of these, 49 companies handle freight, such as coal, grain, and iron ore, which comprise most of the tonnage; 8, general freight, autos and passengers; 1, handles gasoline, kerosene and crude oil; 1, cement; 1, slag, salt, and limestone.

The Great Lakes Transit Corporation operates 2 liners from Duluth down the American Shore of the Great Lakes to Chicago, Detroit, and Buffalo. The Northern Navigation Company operates 3 liners from Duluth along the Canadian shore to Port Arthur, Canadian Soo, Sarnia, Windsor, and Detroit. The steamer Montauk makes excursions up the St.Louis River to Fond du Lac and around Minnesota Point. The fishing smack Winyah carries freight and passengers along the North Shore. All combinations of connections are possible at the warehouses, docks, and stations. (Shipmasters' Directory 1935.)

VESSEL ENROLLMENT AT DULUTH

Number of vessels, kind, and tonnage.

149 Vessels (Bulk Fre	ighters) (Steel) 607,023	Tons
58 Gas Boats (Wood)	871	- 11
10 Gas Boats (Steel)	896	11
2 Sailing Ships (Wo	od) 5,426	11
15 Barges (Steel)	53,034	**
27 Barges (Wood)	7,297	11
78 Barges (Metal)	43,393	11
3 Yachts (Wood)	54	11
2 Yachts (Steel)	498	11
20 Vessels (Steam) (Wood) 4,701	- 80
364 Vessels	723,193	Tons

Ships, Shipping Companies, and Sailors (F.C.) Page 2.

used

The Minnesota tonnage tax on vessels is the lowest of any state, and there is no enrollment-fee at Duluth, which accounts for the large number of vessels registered here from outside ports. (U.S. Customs enrollment sheet, vessel list, U.S. Customs Office, Federal Bldg., Duluth, Minn.)

In 1935, twenty-two different types of vessels used the Duluth-Superior Harbor: 2 fish and freight, 2 package freight, 2 passenger limes, 1 excursion boat, 1 cement carrier, 1 standard oil tanker, 2 Canadian boats, 2 for rock and salt, 1 government lighthouse service, 1 government engineers, 1 general bulk freight, 1 foreign country, 2 pleasure craft, 1 towing tug, 1 contractors tug, 1 coast guard, and 1 naval reserve.

In 1935, sixty different companies operated vessels into Duluth-Superior Harbor. There are four tug companies: The Great Lakes Towing Company, the Whitney Brothers Contracting Company for sand and gravel, the United States Engineers for towing and ice-breaking and sight-seeing by Federal officials, and the England Towing and Wrecking Company. The two local package freight lines are: The Minnesota Atlantic Transit Company and the Western Transit Company.

In 1935, exactly 11,050 vessels entered and left the Duluth Superior Harbor, 75% using the Duluth Ship Canal and 25% using the Superior Entry.

The cost of Great Lakes vessels is interesting.

The average is \$450,000 each. A bulk freighter costs between \$600,000 and \$800,000 to construct. The Standard Oil Tanker, a beautiful red vessel with diesel engines, cost \$1,500,000! The cement boat cost over \$1,000,000. A package freighter costs from \$250,000 to \$350,000. It is safe to say the total worth of all vessels using the Duluth-Superior Harbor is in excess of \$2,486,250,000!

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Ships, Shipping Companies, and Sailors (F.C.)
Page 3.

The vessels are also interesting. They are a great attraction for tourists who stand for hours on the shore or on the canal piers to watch them pass by at about six miles an hour. Average freighters (585 feet to 638 feet in length) are called 600-footers. Lake steamers are nothing more than a squared tank 600 x 58 x 70 feet with 25 to 33 feet moulded depth, gradually tapered at each end for speed. The engine-room is at the rear and the pilot house at the front. The cargoholds have from 3 to 7 compartments and as many bulkheads to stiffen the cargoes. The package-freight boats have smaller cargo-holds and are equipped with windlasses to hoist the cargo out of the hold. This is done with pulley and shaft over the cargo-holds. All engine-rooms have two water-tight (collision) bulkheads, one forward and one aft of the boiler and engine-rooms. The vessel is controlled from the pilot-house where the officer on watch controls the navigation of the vessel as to speed and direction.

The living quarters on the average freighter are much better than a few decades ago. They are larger, very much cleaner, equipped with shower baths, hot and cold water, and steam heat. The food differs on the various vessels; naturally, the larger companies, servicing the line by wholesale, serve better. The food is wholesome and ample, surpassing some of the better hotels.

world. The wages are: \$68 to \$70 a month for deckhands, \$80 for coal passers and porters, \$80 for waiters, \$95 for second cooks, \$125 for first cooks, \$80 for deck watches, \$105 for wheelsmen and oilers, \$130 for third mates and third engineers, \$155 for second mates and second engineers, \$290 to \$300 for chief engineers, and \$400 to \$500 for captains. This of course includes meals and lodging cabins, but not laundry. The wages are scaled to the class and tonnage of the vessel. A first class vessel is from 580 to 600 feet in length, second class from 400 to 500 feet, and third class from 292 to 380.

Ships, Shipping Companies, and Sailors (F.C.) Page 4.

various ship owners and operators and acts as the employment agent. The association's officers are in all the leading ports. These offices keep a record of every employee on the lakes. This record is filed; and, from this file, the office can determine where any man shipped, when and why he left, and how long he was in service, etc.

The Shipmasters' Association is a lodge and insurance association for the licensed masters (captains). There is a lodge in each leading port.

Coulby, which has a record of 14,617 gross (or, 16,371 net) tons of iron ore carried (1929) on one trip. With deeper channels, this vessel can carry more. The steamer Harry Coulby was built in Lorraine, Ohio, in 1927 and is owned by the Interlake Steamship Company of Cleveland, Ohio. This steamer is registered at Wilmington, Delaware because of the low fee. The vessel is 638 over all, 607 feet on the keel, with a 65 foot beam, with a 33 foot molded depth, steel-arched. The cost was \$1,250,000. (Shipmasters' Directory, 1935.)

Steel vessels are made at shippards in Duluth-Superior, Manitowoc, Racine, Milwaukee, Chicago, Bay City, Detroit, Toledo, Lorraine, Cleveland, Ashtabula, Erie, and Buffalo. The cost of building the lake vessels of course is governed by the price of steel, wages, inflation of currency, etc., but the average 600-footer costs about \$800,0001

The headquarters for most of the steamship companies is in Cleveland. Most of these companies are owned by the mining companies and by the railroads.

The average value of a cargo on an average vessel is from \$40,000 to \$45,000. A grain or butter cargo is naturally worth more.

The average lake freighter burns from 350 to 450

Ships, Shipping Companies, and Sailors (F.C.) Page 5.

tons of coal a round trip. Coal costs about \$4.50 a ton. The cost for a round trip is about \$1,000. This takes about 11 or 12 days. It depends on the weather and loading conditions. A vessel averages 26 to 28 round trips in a season of approximately eight months.

Tourists are always interested to know why lake f freighters have the engine-room and the smoke stack at the stern while ocean vessels have them in the center of the vessel. The lake freighters have the engine-room in the stern for greater carrying capacity and ease of loading and unloading. But the gain is at a loss in seaworthiness. A lake freighter rolls more than an ocean freighter in a heavy sea.

The various shipping companies are indicated by the smoke-stack markings. One of the Most famous is what is termed (among marine men and sailors) the "tin stack." This is the Pittsburgh Steamship Company line. Their stacks are painted alluminum to about 3 feet of the top with the top black. It is really remarkable how far these stacks can be seen out on the lake.

The sailors work on shifts known as watches. There are two watch systems on the lakes, known as the forward and after watches. The foreward watch is from 6 p.m. to midnight and the after watch from midnight to 6 a.m., when the foreward watch again begins. (Either before or after midnight or noon.)

A complete crew consists of: 1 master, 3 mates, 1 boatswain, 2 wheelsmen, 2 watchmen, 2 deckwatches, 4 deckhands, 1 chief engineer, 3 assistant engineers, 3 oilers, 3 to 6 firemen, 3 coal passers, 1 cook, 1 second cook, 1 water, 2 porters, and on most boats 1 wireless operator. This makes a crew of about 35 for each boat.

The average speed of a lake freighter loaded is 12 miles an hour, unloaded 14 miles an hour, and in canals and restricted channels, less.

Ships, Shipping Companies, and Sailors (F.C.) Page 6.

To visit one of these vessels, a tourist may go to any coal or iron ore dock, or grain elevator, climb aboard, ask for the mate, and tell him what is desired. The tourist will find the mate human. Every courtesy will be shown visitors at the Duluth, Missabe Northern Ore Docks, where the office will issue passes to board any of the steamers.

Duluth, Minn.
Topic: Duluth-Superior Harbor (F.C.)
Submitted By: Capt. E.J. Ditzel

Source of Material

- Personal Observation (Capt. E.J. Ditzel is an authority on Great Lakes Navigation and on the Duluth-Superior Harbor.)
- Shipmasters' Directory, 1935, 50 pp., headquarters, Detroit, Mich. (Capt. E.J. Ditzel's personal library) --- Book.
- U.S. Customs enrollment sheet, vessel list, U.S. Customs Office Federal Bldg. Duluth, Minn.

Duluth, Minn.
Topic: Duluth-Superior Harbor (F.C.)
Submitted By: Capt. E. J. Ditzel

SOURCE OF MATERIAL

- (1) U.S. Engineers Office, Duluth, Minn.
- (2) Shipmasters' Directory for 1935, Detroit, Michigan, published by Rotary Printing Company, Capt. M.S. Peterson, Grand Secretary of the Shipmasters' Association, 40 West Northup Place, Buffalo, New York State. (This is an excellent reliable source of information on all current phases of shipping.) 150 pages----Book.
- (3) U. S. Engineers Report to the War Department for 1935 on Duluth-Superior Harbor, Government Printing Office, Washington, D. C. 200 pages----Book.
- (4) Article in the Duluth Sunday News Tribune of February 16, 1936, by Major A. B. Jones, in charge of the Duluth District of the U. S. A. Engineers, in his annual report. Newspaper.
- (5) Personal Observation. (Capt. E.J. Ditzel is an authority on Great Lakes Navigation and the Duluth-Superior Harbor.)

- 1 - Duluth, Minn.
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Edited By: W. J. Sullivan Date: March 23, 1936.

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DOCKS PIERS WHARVES ELEVATORS AND TERMINALS

Of the 101 docks and moorings in

the Duluth-Superior Harbor, 6 are street-ends and are city docks, 21 are owned by railroads, 6 are owned by large wholesale grocery and hardware companies, 3 are used by concerns engaged in the fish industry, 6 are owned by building contractors for sand, gravel, tile, etc., 2 are for iron, both scrap and machinery 2 for excursion and ferry boats, 1 for ship-chandlery (supplies), 4 for cement, lime, and salt, 1 for consolidated wholesale grocery companies, 1 for a flour mill, 3 for dredging and ship-repairs, 27 for grain elevators, 21 for coal, 1 for a furnace company, 1 for an oil company, 1 for a flaxseed mill, 4 or 5 for ship-building, 7 for iron ore, 1 for the lighthouse service, 1 for the Minnesota Naval Militia, and 2 for the United States Engineers. Three docks handle forest products.

The tremendous size of many of these docks is indicated by the following facts. One modern elevator for cement has a storage capacity of 114,000 barrels with an unloading capacity of 1,000 barrels an hour. The 7 ore docks total 15,324 feet (nearly 3 miles) and have a total storage capacity of 819,000 tons, not including the hundreds of railroad cars spotted on the platform above the pockets on the docks. Nine terminal wholesale warehouses have a total area of 1,730,000 square feet with a capacity of 18,647,500 cubic feet. The 21 coal docks have a storage capacity of 13,013,000

Docks, Piers, Wharves, Elevators and Terminals Page 2.

tons. The largest coal dock alone has a capacity of 1,000,000 tons. The 27 grain elevators have a total storage capacity of 62,900,000 bushels! The largest grain elevator alone has a capacity of 12,800,000 bushels! One large elevator actually unloads 20,000 bushels an hour.

at the foot of 11th Ave. W., Duluth, operates a floating dry dock 60 feet long overall, with a 60-foot width at the entrance. This dry dock has a lifting capacity of 1,500 tons and can handle vessels drawing 12 feet of water. The Superior Ship-building Company, at 3rd Street and Clough Avenue, Superior has 2 graving dry docks. Dock No.1 is 609 feet long overall, 570 feet long on the keel blocks; and has a width of 66 feet at the entrance, and a depth over the sill of 14 feet at low water datum. Vessels up to 570 feet in length can be accommodated at the dock. Dock No. 2 is 620 feet long overall, 580 feet long on the keel blocks, with a width of 66 feet 6 inches of entrance at the top, and a depth over the sill of 17.5 feet at low water datum, and can accommodate vessels up to 580 feet in length.

Duluth, Minn.
Topic: Duluth-Superior Harbor
Submitted by: Capt. E. J. Ditzel

SOURCE OF MATERIAL

- (1) U.S. Engineers Office, Duluth, Minn.
- (2) Shipmasters' Directory for 1935, Detroit, Michigan, published by Rotary Printing Company, Capt. M. S. Peterson, Grand Secretary of the Shipmasters' Association, 40 West Northrup Place, Buffalo, New York State. (This is an excellent reliable source of information on all current phases of shipping.) 150 pages - Book.
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- (5) Personal Observation. (Capt. E. J. Ditzel is an authority on Great Lakes Navigation and the Duluth-Superior Harbor.)

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- 1 - DULUTH MINN.

TOPIC: Duluth-Superior Harbor (F.C.)

SUBMITTED BY: Capt. E.J. Ditzel

NUMBER OF WORDS: 350

July .

DOCKS - ELEVATORS - TERMINALS (INTRODUCTION)

The Duluth-Superior Harbor has 49 miles of dock frontage, 17 miles of dredged channels, and 2 anchorage basins totaling 690 acres. These are all west of Minnesota Point, a natural breakwater 8 miles long. The governing depth throughout the harbor is 22 feet and the Duluth Harbor basin 24 feet.

There are 101 docks and moorings: 3 docks handle forest products; 2, rails and structural steel; 2, salt for distribution; 2, lime-stone and cement; 1, refined oil; 6, sand and gravel; 7, iron ore; 2, are scrap-iron; 2, vessel outfitting and repairing; 19 are miscellaneous docks.

Eight railroads, and belt-line railroads, connect with water terminals, 3 wharves are owned and operated by the United States

Government, 9 wharves for handling package-freight 7 of which are railroad terminals, and 2 ewned by separate and private companies with cold-storage facilities for perishable goods in transit. The Great-Lakes Transit Co. and the Northern Navigation Co. use the Northern Pacific railroad dock #4 as a terminal for passengers.

A modern elevator for cement in Duluth has a storage capacity of 114,000 barrels with an unloading capacity of 1,000 barrels an hour.

Duluth-Superior Harbor (F.C.) 160 Page 2.

The Duluth-Superior Harbor has extensive facilities for handling iron-ore. The length of all 7 iron-ore docks totals 15,324 ft.

and total storage capacity of the "pockets" is 819,000 tons, not including the ore in the hundreds of railroad cars spotted on the platform above the pockets on the dock. The docks range from 2,394 feet in length to 1,988 feet, and from 66 feet 6 in. high to 34 feet high from the water to the dock above the bins.

Seven terminal warehouses and 2 private terminal warehouses have a total area of 1,730,000 square ft. with a capacity of 18,647,500 cubic ft.

Many wholesale houses located on the waterfront have shipping facilities.

DULUTH MINN
TOPIC: Duluth-Superior Harbor (F.C.)
Submitted by: Capt. E.J. Ditzel

Source of Material

U.S. Army Engineers Report to Secretary of War.

STANDARD ELLES

- 1 - Duluth, Minn.

Topic: Duluth-Superior Harbor (F. C.)

Submitted By: Capt. E. J. Ditzel

Number of words: 125

ELEVATORS

There are 27 grain elevators at the Head of the Lakes as follows: with the following copacities

(a telescopie	× 965,4001
Peavy	6,000,000 bu.
Occident " (Annex) " (1) Unloading Leg	4,500,000 bu. 2,000,000 bu. 12,000 bu. per hour.
Consolidated Elevators (B) & (C) " (D) & (G) " (E) & (F) " (H) & (I) " (2) Unloading Legs	1,800,000 bu. 3,600,000 bu. 2,600,000 bu. 2,500,000 bu. 20,000 bu. per hour.
Capital No. 4 & 5	4,000,000 bu. 2,700,000 bu.
Itaska Elevator	2,400,000 bu.
Globe Elevators No. 1-2-3 " (1) Unloading Leg	4,000,000 bu. 6,000 bu. per hour.
Great Northern (S) & Annex	12,800,000 bu.
Terminal (K) & (L) " (M) & (N)	2,000,000 bu. 2,000,000 bu.
TOTAL.	62 900 000 by

62,900,0001 bu.

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Duluth-Superior Harbor (R. C.)
Page 2

SOURCE OF MATERIAL .

Shipmasters Directory - 1933 - Cleveland, Ohio

Duluth, Minn.
Topic: Duluth-Superior Harbor (F.C.)
Submitted By: Capt. E.J. Ditzel

SOURCE OF MATERIAL

(1) U. S. Engineers Office, Duluth, Minn.

(2) Shipmasters' Directory for 1935, Detroit, Michigan,

- (2) Shipmasters' Directory for 1935, Detroit, Michigan, published by Rotary Printing Company, Capt. M. S. Peterson, Grand Secretary of the Shipmasters' Association, 40 West Northrup Place, Buffalo, New York State. (This is an excellent reliable source of information on all current phases of shipping.) 150 pages----Book.
- (3) U.S. Engineers Report to the War Department for 1935 on Duluth-Superior Harbor, Government Printing Office, Washington, D. C. 200 pages----Book.
- (4) Article in the Duluth Sunday News Tribune of February 16, 1936, by Major A. B. Jones, in charge of the Duluth District of the U. S. A. Engineers, in his annual report. Newspapers.
- (5) Personal Observation. (Capt. E. J. Ditzel is an authority on Great Lakes Navigation and the Duluth-Superior Harbor.)

- 1 - Duluth, Minn.

Topic: Duluth-Superior Harbor (F. C.)

Submitted by: Capt. E. J. Ditzel

Number of words: 252

COAL DOCKS IN THE DULUTH-SUPERIOR HARBOR

There are 21 Coal Docks at the Head of the

Lakes with the following storage space:

Berwind Fuel & Dock Co. #2

Carnegie Dock & Fuel Co. #2

Clarkson Dock & Fuel Co. #2

Clarkson Dock & Fuel Co. #2

Buluth Missabe Northern Rr. 625,000 Tons Soft

Fanna Fuel Co. (Nee Ford Co.) 500,000 Tons Soft

In-fand Coal & Fuel Co. 750,000 Tons Soft

Northwestern Fuel Co. #4

Pittsburgh Fuel Co. #7

Pittsburgh Fuel Co. #7

Senith Furnace Co. Berwind Fuel Co. -(Sup.) 700,000 Tons Soft

Carnegie Fuel & Dock Co. #1

Great Lakes Coal & Fuel Co. 700,000 Tons Soft

M. A. Hanna Coal & Dock Co. 1500,000 Tons Soft

M. A. Hanna Coal & Dock Co. 1500,000 Tons Soft

M. A. Hanna Coal & Dock Co. 1500,000 Tons Soft

M. A. Hanna Coal & Dock Co. 1500,000 Tons Soft

M. A. Hanna Coal & Dock Co. 1500,000 Tons Soft

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M. A. Hanna Coal & Dock Co. 1500,000 Tons Soft

M. A. Hanna Coal & Dock Co. 1500,000 Tons Soft

M. A. Hanna Coal & Dock Co. 1500,000 Tons Soft

M. A. Hanna Coal & Dock Co. 1500,000 Tons Soft Le High - Valley Coal & Dock Co. 8,000 Tons Hard Northern Coal & Dock Co. 500,000 Tons Soft 100,000 Tons Hard Northwestern Fuel Co. #1
" #2
Philadelphia & D. #2 1,000,000 Tons Soft 550,000 Tons Soft 400,000 Tons Soft Philadelphia & Reading Coal Co. Pittsburgh Coal Co. #5 650,000 Tons Soft 200,000 Tons Hard C. Reiss Coal Co. 800,000 Tons Soft 11 11 11 60,000 Tons Hard

11,785,000 Tons Soft

1,228,000 Tons Hard

TOTAL 13,013,000

Duluth-Superior Harbor (F. C.) Page 2

Source of Material.

Shipmasters Directory - 1933 - Clevehand, Ohio

1/5.

Duluth, Minn.

Topic: Duluth-Superior Harbor (F.C.) 160

Submitted By: Capt. Ditzel

Number of Words: 163



DRY-DOCKS IN DULUTH-SUPERIOR HARBOR

The Marine Iron & Shipbuilding Co.,

located at the foot of 11th Ave. W., Duluth, operates a floating dry dock 60 feet long overall, with a 60-foot width at the entrance, a lifting capacity of 1,500 tons and can handle vessels drawing 12 feet.

The Superior Ship-Building Co.,

3rd St. and Clough Ave., Superior, has 2 graving dry docks.

Dock No. 1 is 609 feet long overall,

570 feet long on the keel blocks, has a width of 66 feet at the entrance, and a depth over the sill of 14 feet at low water datum. Vessels up to 570 feet in length can be accommodated at the dock.

Dock No. 2 is 620 feet long overall,

580 feet long on the keel blocks, with a width of 66 feet 6 inches of entrance at the top, and a depth over the sill of 17.5 feet at low water datum, and can accommodate vessels up to 580 feet in length.

Duluth-Superior Harbor

-SOURCE OF MATERIAL-

All data supplied by the U.S. Army Engineers at Duluth.

Personal observation.

Duluth, Minn.

Topic: Duluth Superior Harbor (F. C.)

Submitted by; Capt. E. J. Ditzel

Number of words: 680

LIST OF PIERS, WHARVES, AND DOCKS AT DULUTH & SUPEROIR.

1. Cowan-Lenning-Brown Dock. (Whoessale groceries).

2. Booth Fisheries Co. Dock. (Now Christianson -- Fish).

3. City Dock. (Morse street).

4. Sam Johnson & Sons Dock. (Fish).

5. Christianson Dock. (Fish dock).

6. City Dock. (Street end).

7. Whitney Dock. (Gravel & sand).

8. Marshell-Wells Dock. (Hardware Wholesale).

9. Standard Salt & Cement Co. Dock. (Bldg. Supplies).

10. Rust-Parker Dock. (W holesale groceries).

11. Northern Pacific Ry. Dock. (Warehouses nos. 5 & 6).

12. Duluth Iron & Metal Co. Dock. (Scrap-iron).

13. Clow & Nicholson Dock. (Excursion boat dock).

14. City Warf-Fifth Ave. West. (Boat landings).

15. Duluth Marine Supply Dock. (Boat supplies).

16. Kelly*How-Thompson Dock. (Wholesale hardware).

17. Stone-Ordean-Wells Dock. (Wholesale groceries).

18. Barnett & Record Co. Dock. (Sand & gravel).

19. Morthern Pacific Ry. Dock. (Warehouses nes. 3 & 4).

20. Chigago, St. Paul, Minneapolis & Omaha Ry. Dock.

- Duluth Superior Harbor (* . C.) Page 2.
- 21. Huron Portland Cement Dock. (Cement elevator).
- 22. Cutler-Magner Dock (Lime-stone dock).
- 23. McDougall Terminal Warehouse Co. Dock.
- 24. Soo Dock. Soo Line R.R. Co.
- 25. Cutler-Magner Dock. (Salt dock & sheeds).
- 26. Marine Iron Works Dock. (Ship yards).
- 27. Duluth Universal Dock. (Flour mill).
- 28. Zenith Dredge Co. Dock. (Repair plant).
- 29. Northern Pacific Ry. Dock. (Warehouses nos. 1 & 2).
- 30. Consolidated Elevators Dock. (Elevators B, C, D, & G).
- 31. Pittsburgh Co al Dock. Number 1.
- 32. Pittsburgh Coal Dock. Number 7.
- 33. Consolidated Elevators Dock. (Elevators E, F, H, & I).
- 34. Clarkson Coal Dick Co. (Dock).
- 35. Capitol Elevator Co. Dock. (Elevators 4, 5, 6, & %).
- 36. Northwestern Fuel Co. Dock no. 4.
- 37. Occident Elevator Dock & Annex.
- 38. Peavey Elevator Dock.
- 39. Northern Pacific Lumber Dock.
- 40. Whitney Dock. (Sand & gravel).
- 41. Gity Dock. (Foot of twenty-first avenue west).
- 42. St. Louis Bay Dock Co. Dock.
- 43. Duluth, Missabe & Northern Ry. Dock.
- 44. " Lime-stone dock.
- 45. " " Number 6.

Duluth Superior Harbor (F. C.) Page:3.

- 46. Duluth, Missabe & Northern Ryl Dock No. 3.
- 47. Ford Motor Go. Dock. (Now Hanna Fuel Co's dock).
- 48. Duluth-Superior Dredging Co's Dock.
- 49. Duluth, Winnipeg & Pacific Lumber Sock.
- 50. Berwind Fuel Co. Dock No. 2.
- 51. Inland Coal & Dock Co. Dock.
- 52. Carnegie Dock No. 2.
- 53. Zenith Furnace Co. Dock.
- 54. Minneapolis, St. Paul & Saulte St. Marie Ry. Ore Dock.
- 55. The C. Reiss Coal Co. Dock.
- 56. Berwind Coal Dock No. 1.
- 57. Standard Oil Co. Dock.
- 58. Great Takes Coal & Dock Co. Dock No. 1.
- 59. Carnegie Dock & Fuel Co. Dock No. 1.
- 60. Northwestern Fuel Co. Coal Dock No. 2.
- 61. Great Northern Ry. Merchandise Dock.
- 62. Great Northern Elevators Dock.
- 63. Globe Elevator Co. No. 1 Bock.
- 64. Lehigh Valley Coal Co. Dock.
- 65. City Wharf. (Street end).
- 66. Speades Co. Dock.
- 67. Duluth-Superior Ferry Dock.
- 68. Whitney Dock. (Sand & Gravel & Shipyard).
- 69. City Whark. (Street end).
- 70. Morton Salt Co. Dock.

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Duluth Superior Harbor (F. C.)
 Page 4.
 71. Speneer Kellog Dock. (Flaxseed mill)
72.Dolon Horton Dock. (Wholesale groceries).
73.01d Globe Shipyard.
74. Whitney Dock. (Sand & Gravel).
75. Superior Shipbuilding Co. Dock.
76.
77. " " " " "
78. Barnett & Record Co. Dock. (Main plant).
79. Minneapolis, St. Paul & Saulte St. Marie Ry. Dock.
80. Reeves Coal Dock.
81. Philadelphia & Reaking Goal Co. Dock.
82. Northern Coal & DockCo. Dock.
83. M. A. Hanna Coal & Dock Co. Dock.
84. Northwestern Coal Dock No. 1.
85. Cargill Elevators. (K & L).
86. " (M& N).
87. Listman Elevator.
88. Lake Superior Exevator.
89. Great Lakes Coal & DockCo. Dock No. 2.
90. Northern Pacific Ry. Ore Dock.
91. Great Northern Ry. Ore Dock No. 1.
92. " "
93. " " " " " 3.
94. " " " " " 4.
95. Pittsburgh Coal Dock No. 5.
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Duluth Superior Harbor (F. C.)
Page 5.

- 96. Itaska Elevator.
- 97. Chicago, St. Paul, Minneapolis & Omaha Ry. Dock.
- 98. United States Lighthouse Wharf. (Changed to Mar. Wells Slip).
- 99. Minnesota "aval Militia Wharf.
- 100. United States Vessel Yard, South Pier.
- 101. " " North Pier.

Duluth Superior Harbor (F. C.)
Page 6.

Source of Material

Data from USA Engineers Report to War Dept.

Pages 155-156 -- (1933).

[Incomplete - Syx 11/1975]

No.

-1- Duluth, Minn.
Topic: Duluth-Superior Harbor (F.C.)
Submitted By: Otto Wieland
Number of Words: 1,776
Edited By: W. J. Sullivan
Date: May 5, 1936

HISTORY OF DULUTH-SUPERIOR HARBOR

The wonderful and spacious harbor which nature has provided at the western extremity of Lake Superior, now the Duluth-Superior Harbor, has been a place of importance as long as man has lived upon its shore. It was known to the pre-historic races that worked the copper mines of Isle Royale; it was a strategic point in the wars of the Indian tribes that successively occupied the Lake Superior country; and, in the romantic days of the voyageur and the fur trade, it became an important market for the exchange of goods between the whites and the aborigines.

Permanent white settlement, which began about the middle of the nineteenth century, was soon followed by serious attempts to exploit the vast timber and mineral resources of the region, and also the agricultural resources of the prairies beyond.

The transporting of the settlers and their stock, implements and machinery, and the shipping back of the steadily increasing products of their labor, required more and larger ships; and the consequent need of deeper and wider channels made it necessary for the United States government to assume control of the shipping lanes and harbors.

The first government improvement in the Duluth-Superior Harbor was the building of the old lighthouse at the Superior entry in 1857. R. H. Barrett, a clerk in Geo. R. Stuntz's trading post - which had been

History of Duluth-Superior Harbor (F.C.) Page 2.

established near the tip of Minnesota Point in 1852 - became the first lighthouse keeper.

A few years later, however, the entry moved away from the lighthouse, the old outlet closing up and a new one forming nearly a half mile farther south. The new entry was nearly a third of a mile wide, and very shallow; there was a channel through it with a depth of eight to nine feet, but this channel was so crooked that boats had to change their course several times in passing through it. In addition, the channel was subject to sudden changes caused by flood waters from heavy rains or melting snows, by tides, winds, and changes of atmospheric pressure.

To remedy this condition, the government, in 1867, began to improve the entry by building piers or jetties across the bar and closing up the remainder of the channel, so as to confine the currents between the piers. The work was completed in 1875. The narrowing of the outlet gave the current greater scouring effect, and the channel was gradually deepened; but government engineers, and especially the people of Superior, were convinced that the deepening would have been far more pronounced, if the Duluth canal had not been dug in the meantime.

The digging of the Duluth Canal, which was begun in the fall of 1870 and was completed in June of 1871, resulted in bitter and protracted litigation between Duluth and the State of Wisconsin which lasted until October, 1877.

Both cities realized that, in order to derive full benefit from and many defended to the interior; and there developed an intense rivalry between them to get the first railroad to the Head-of-the-Lakes. Superior sought to promote the "Lake Superior & St. Croix Railroad", which was surveyed in the fifties. Duluth people, in 1857, secured a charter for the "Nebraska & Lake Superior Railroad", and also one for the "Minnesota Point Ship Canal Company", The Panic of 1857 and the following Civil War prevented the early realization of any of these plans.

In 1861, the charter of the "Nebraska & Lake Superior Railroad" was amended, making the southern terminus "some point on the Mississippi River" and the

History of Duluth-Superior Harbor (F.C.) Page 3.

northern terminus "some point on Lake Superior within the State." This change brought the project within the range of practicability; and, by 1868, the plans for the road were completed, and construction was started from the Duluth end.

Rails and other supplies were brought here by boat and unloaded at the De Costa dock on the west side of Rice's Point. The vessels came through the Superior entry, where they frequently had to be lightered, and they often ran aground in the channels of the bay. The urgent need of reaching the unloading dock with less delay caused the Lake Superior & Mississippi Railroad Company to build the first section of the outside breakwater at Fifth Avenue East, in the fall of 1869.

Duluth people realized, however, that such a breakwater could not long withstand the northeasters of Lake Superior. They needed an inside harbor of their own, and they were determined to have it at once.

In the charter incorporating Duluth as a city, in 1870, they had inserted a clause granting the city power to construct a canal connecting Lake Superior with Superior Bay. The common council immediately decided upon a canal 150 feet wide, 16 feet deep, with piers extending to 18 feet of water in the lake.

A dredging company was put on the job in the fall of 1870; the work was pushed with all possible speed; and, when winter stopped operations, they were two thirds through the Point. In the spring, work was promptly and energetically resumed.

Now Superior people were greatly alarmed. They were firmly convinced that such a canal would cause serious injury to their natural entrance, and government engineers strongly supported their contention. Therefore, the United States Circuit Court issued an injunction restraining the dredging company and the City of Duluth from building the canal.

On a Saturday afternoon in June, 1871, Mr. Sidney Luce received information that the injunction had been issued, and would be served the following Monday morning.

History of Duluth-Superior Harbor (F.C.) Page 4.

Early Sunday morning, about fifty sturdy and determined men went to work with pick and shovel and wheelbarrow, to cut through the narrow neck of land remaining. By noon, the water began to trickle through, only a tiny stream at first; but, as the water in the bay was six inches higher than in the lake, the strong current rapidly widened the channel. By mid-afternoon, a rowboat was able to pass through the opening; and, the following morning, Captain Sherwood was able to run the steam yacht "Ferro" through from the bay to the lake, the strong current rapidly widened the

When the injunction was served, on Monday forencon, the opening was thirty feet wide and steadily growing wider; small craft were passing through it. The canal was a fait accompli.

Ten days later, the injunction was dissolved upon the execution, by the city of Duluth, of a \$50,000 bond, conditional upon the building, by the city, of a dike across the bay, from Rice's Point to Minnesota Point, before December first of that year.

Before the end of the season, Major Houston, government engineer in charge of the harbor, decided that the dike was not necessary, and advised postponement of its construction until the effect of the new canal could be more definitely determined. But the Department held that, since the injunction had been dissolved on the condition of the bond, the dike must be built. And it was built, from the end of Spruce Street on Rice's Point to Chambers Street on Minnesota Point.

But, in the meantime, the Lake Superior & Mississippi Railroad had been completed, regular train service from and to St. Paul having started August 1, 1870. Besides, the Northern Pacific Railroad, also to terminate at Duluth, was now under construction; and its early completion seemed definitely assured. Duluth was on the crest of its first real boom, its population was increasing by leaps and bounds, every industry here was enjoying the full tide of prosperity.

The dike, if completed, would cut Superior off from access to the only railroad now at the Head-of-the-Lakes. No wonder her people protested. With the

Duluth, Minn. Topic: Duluth-Superior Harbor Submitted by: Otto E. Wieland. Source of Information

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Bedur 1

-1- Duluth, Minn.
Topic: Duluth-Superior Harbor
Submitted By: Capt. E. J. Ditzel
Number of Words: 500
Edited By: W. J. Sullivan
Date: April 27, 1936

HISTORY OF DULUTH-SUPERIOR HARBOR

In 1871, a breakwater was constructed in the lake about 2,000 feet north of the present Duluth Ship Canal by the Lake Superior and Mississippi Railroad (now the Northern Pacific). In 1871-72, the City of Duluth started to dig the Duluth Ship Canal; and, in 1896, Congress appropriated 3 million dollars (1) to provide 20-foot channels in the harbor, each 300 to 600 feet wide, and (2) to provide concrete piers at both entrances to the harbor.

In 1895, 10,816 vessels arrived or departed; and 6,411,351 tons of freight moved (valued at \$96,000,000). In 1929, there were 10,335 arrivals and departures, 60,385,767 tons of freight moved, and the value was \$485,631,945. This clearly shows the increase in the size of the lake freighters. The average freight handled during a season for the last 10 years is 48,640,000 tons.

The maximum commerce for a single year (1929) was 60,385,767 tons. From 1900 to 1929, the average number of vessels entering and departing was 10,000.

The average season of interlake navigation is from April 25th to December 9th (63 years).

The first lighthouse erected at the Head of the Lakes was located near the Superior Entry on Minnesota Point by the Federal

History of Duluth-Superior Harbor Page 2.

Government at a cost of \$15,000. This ruin still stands as a land mark. In its base is the United States Survey's triangle marker.

The first steamer to make regular trips from the lower lakes to Duluth was the "Keweenaw". She made the round trip in two weeks.

The first tug in the Duluth-Superior Harbor was the "Agate", afterwards rebuilt and called the "Jeffery".

The first shipment of iron-ore from Duluth was (in 1892), 4,245 tons of Missabe Mountain ore. The Steamer Hiram W. Sibley took 1,627 tons on the first load.

The total number of tons of iron ore shipped from Duluth to date is 439,220,648 tons.

The largest ore cargo to date was the steamer "Harry Coulby" with 14,617 gross tons in 1929. She will carry more when channels are deepened.

The largest stone cargo (1929) was the steamer "Carl D. Bradley", 16,173 gross tons.

The largest wheat cargo (1929) was the steamer "La Moyne" with 571,885 bushels.

The largest oat cargo (1915) was the steamer "W. G. Morden" with 760,066 bushels.

The ore loading record is held by the Duluth, Missabe & Northern Railroad at Duluth, Minnesota. July 15, 1919, the steamer "D. G. Kerr" loaded 12,689 gross tons of iron-ore in 30 minutes actual loading time, an hourly rate of 25,378 gross tons.

The coal unloading record is held by the same company at their coal dock in 1928. The steamer "E. H. Gary" unloaded 9,366 net tons of coal in 6 hrs.

History of Duluth-Superior Harbor Page 3.

and 5 minutes, at the rate of 1,539 net tons per hour.

The Rice's Point Dock-line, first established in 1873, at 600 feet from the shore, is now 1,570 feet from shore. In most other portions of the harbor, the dock-lines have also been set farther out. In Superior Bay, the space between the dock-lines at the narrowest point, is 2,000 feet.

This harbor space is gradually being dredged out as fast as needed for channels, for anchorage basin space.

Up the St. Louis Bay and River the dock-lines were set in 1896.

The total length of harbor lines established by the government, in the entire harbor, is 49 miles. By building of slips from the shore to the harbor lines, the harbor has a possibility of nearly 200 miles of dock frontage.

TOPIC: Iron Ore Loading Docks (637). SUBMITTED BY: Walter R. Hodge. NUMBER OF WORDS:

indent: I

A small amount of the iron ore mined in Minnesota is shipped directly by rail from the mine to the furnaces where it is convorted into iron or steel but by far the greater tonnage of Minnesota iron ore leaves the mine in steel ore cars of 50-ton or 75-ton capacity and is hauled by rail to some ore loading dock at Two Harbors or Duluth in Minnesota, or Superior, Wisconsin for shipment by boat to lower lake ports. Ore from the Vermillion range and from the western end of the Missabe range travels over the tracks of the Duluth & Iron Range R.R. to docks at Two Harbors, Minn. Docks at Duluth, Minn., receive iron ore from mines of the entire Missabe range over the Great Northern Ry. and Duluth, Missabe & Northern Ry. The D. M. & N. Ry., for operating reasons, has leased and now operates the D. & I. R. Ry. Both railways are subsidiaries of the United States Steel Corporation.

A modern iron ore leading dock is built of steel and concrete, or of reinforced concrete, extending in most instances from 1,500 ft. to 2,400 ft. out into the harbor from the shore line. The D. M. & N. docks at Duluth are three in number. The most modern of the three is 2,304 ft. long and of steel and concrete construction. Its upper dock is about 84 ft. above the water. It carries 384 loading pockets, each of which will hold 400 tons of iron ore, giving the dock a total storage capacity of 153,600 gross tons.

Bach loading pocket is lined with replaceable concrete slabs to avoid wear on the pocket itself. The bottom of the pocket slopes outward at an angle of over 45°. Steel spouts are hinged to the front of each pocket, which, when raised, close the pocket and when lowered guide the ore into the hold of the cargo boat moored slongeide the structure. Over the top of these pockets run rail-road tracks.

orders arrive from the furnaces for a cargo og a certain grade of iron ore and this is placed in the pockets before the boat which is to carry the cargo arrives at the dock. Once the freighter is in position spouts are lowered and loading proceeds with remarkeable speed. A few examples of rapid loading follow.

One trip in 1921 the freighter D.G. Kerr of the Pittsburgh Steamship Co. (U.S. Steel Corp.) loaded 12,382 gross (tens of 2,240 lbs. each) in the space of 162 minutes or at the rate of 1,000 tens every 1.2516 minutes. On September 4, 1926 the D.M.& N. dock at Duluth loaded 26 vescels in a 24 hour period. The amount loaded in this time was 225, 253 gross tons of iron ore. In addition to loading this amount of iron ore, which actually was loaded in eighteen hours, the dock crew dumped 2,547 ore cars into the pockets. From the S.J. Morgan, Jr. on Oct. 29,1932 at the limestone docks of the same railroad was unloaded 9,271 gross tons of limestone and

loaded 9449 tens of iron ore in two hours and 40 minutes.

Bulk freighters coming to Duluth frequently carry cargoes of coal from lower lake ports for the handling of which there are well equipped docks at Duluth-Superior harbor. Up-bound boats also carry limestone from lower Michigan quarries and dock cargoes of automobiles from Michigan factories.

Iron ore freighters in the early days were wooden vessels loading from wooden docks or by wheelbarrow and driven by sail. Today, however, steel steam driven boats of the more recent type each in its held carries over 12,000 gross tons of iron ere on a trip.

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Personal observation.

98

-1- Duluth, Minn.
Topic: Freight Terminals (F.C.) 415
Submitted By: W. J. Sullivan
Number of Words: 522
Edited By: W. J. Sullivan
Date: April 1, 1936

(ADD)

TERMINALS

There are no <u>municipal-owned</u> terminals in either Duluth or Superior. The city of Duluth owns no harbor frontage except street-ends.

The rates for storing general cargo at the two principal private terminals, the Duluth Terminal and the Northern Cold Storage, are $7\frac{1}{2}$ cents per square foot per month based on a floor load of 250 pounds per square foot. Cooler storage charges are 3 1/3 cents per cubic foot per month, and freezer charges are $4\frac{1}{2}$ cents per cubic foot per month.

storage capacity for short or long term storage. There are several open docks where open-air storage could be secured (the Duluth Superior Dredging Company dock in Duluth and the old Globe Shipyard dock in Superior). There are no fixed charges for such storage.

Appliances for handling freight at the sheds and warehouses are modern. At the Northern Cold Storage and Warehouse Company's dock, there are two electrically operated portable conveyors with a capacity of 60 tons per hour each, used in handling general merchandise and

Freight Terminals (F.C.) 415 Page 2.

perishable goods. The McDougall Terminal and Warehouse Company has 2 electric traveling cranes with a capacity of 60 tons per hour each, 1 portable conveyor with 80 tons capacity per hour, and 1 stationary conveyor with 120 tons per hour capacity, used in handling general freight merchandise. The Northern Pacific Railway warehouses Nos. 1 and 2 have 3 portable hoists for handling shingles with a capacity of 35 tons per hour each, and 1 portable hoist for loading flour and feed. Warehouse No. 3 of the Northern Pacific Railway has 1 portable hoist of 50 tons per hour capacity used in handling general merchandise. Whitney Brothers Company at their dock on Howard's Bay have a stationary A-frame derrick with a reach of 80 feet and a lifting capacity of 125 tons used to unload especially heavy loads, such as machinery and boilers. Hand trucks supplement these mechanical devices and are generally used at all other sheds and warehouses for loading and unloading cargo.

The stevedore contractors are T. W. Moran, rooms 18-19, Columbia Building, Superior, Wisc.; and Northern Pacific warehouse No. 3, Duluth, Minn. The rates are 70 cents per hour from 7 a.m. to 7 p.m.; 85 cents per hour from 7 p.m. to 10 p.m.; and 85 cents per hour on holidays and Sundays.

Grain trimming is handled through the Superior Grain Trimmers Association. Mr. James Duffy is manager of the Association. This work is all done by contract, and the rate is based on the number of bushels loaded and varies with different vessels.

The labor charges of the two private terminals are included in their shipping and handling charges. The labor supply is adequate for all needs.

Duluth, Minn.
Topic: Freight Terminals (F.C.) 415
Submitted By: W. J. Sullivan

SOURCE OF MATERIAL

"The Port of Duluth-Superior" (Lake Series No. 6) Corps of Engineers, U. S. Army, Bureau of Operations, U. S. Shipping Board, 1932, U. S. Gov't. Printing Office, Washington D. C., Maps, Pictures, 156 pp. (Very complete and reliable)-----Book.

Duluth, Minn.
Topic: Freight Terminals (F.C.) 415
Submitted By: Capt. E.J. Ditzel
Number of Words: 57/



FREIGHT TERMINALS

Duluth has 34 waterfront freight terminals.

Fifteen are grain elevators, total storage capacity 29,700,000 bushels; 9, coal docks, 6,155,000 tons; 5, freight terminals, 1,217,916 square feet; 2, iron ore docks, 268,800 tons; 3, cold storage freight terminals, 3,525,000 cubic feet.

They are:

Northern Cold Storage & Warehouse Co. Located at foot of 7th Ave. W. and Railroad St.

McDougall Terminal located at foot of 9th Ave. W. and Railroad St.

Northern Pacific Railroad Dock's 3 and 4 located at foot of 6th ave. and 7th Ave. W. and Railroad St., respectfully.

Pittsburgh Coal & Dock Co's. Dock #7 (992,000 Square feet Storage)
Pittsburgh Coal & Dock Co's. Dock #1 Both Docks (1,015,000 Storage)
located on E side at Rice's Point, NW from Birch Ave. on the W side at Duluth Harbor
Basin.

Clarkson Coal & Dock Co. (795,000 Square feet, 555,000 Tons) located E side of Rice's Point NW of Birch Ave., west side Duluth-Harbor Basin.

Capitol Elevator Co., 4,5,6, and 7 (Capacity 6,700,000 Bu) located E. side of Rife's Point, S of Birch Ave., W side of Duluth-Harbor Basin.

Northwestern Fuel Co., Dock No. 4, Ground storage capacity: Anthracite, 90,000 tons; Bituminous, 400,000 tons; Total 490,000 tons; Coal Storage Area 550,000 Square feet.

Occident Elevator Dock & Annex (6,500,000 Bu capacity located E side Rice's Point, Arthur & Elm Aves., W side Duluth Harbor Basin.

Peavy Elevator Dock (6,000,000 Bu Capacity)
located E side of Rice's Point between Elm & Lynn Aves. W side Duluth Harbor Basin.

Freight Terminals (F.C.) 415 Page 2.

St. Louis Bay Dock Co., (Now Duluth, Missabe Northern Ry.), Ground storage capacity: Bituminous, 600,000 tons; Coal storage area 884,000 Square feet. located Minnesota side St. Louis Bay, along harbor west of 29th Ave. West.

Duluth Missabe Northern Ry. Dock No. 6 (153,600 tons capacity) located N-Channel, St. Louis West Duluth, Minn.

Bay,

Duluth Missabe Northern Ry. Dock No. 5 (115,200 tons capacity) located N-Channel, St. Louis Bay, West Duluth, Minn. or a bout 33rd Ave. W. and Bay Front-Both docks.

Hanna Coal Dock (nee Ford Motor Co. Dock) Ground storage capacity: Bituminous, 625,000 tons; coal storage area, 635,000 square feet.

located N-Channel St. Louis Bay at 37th Ave. West.

Berwind Fuel Co. Dock No. 2, Ground storage capacity: bituminous, 556,000 tons; coal storage area 740,000 Square feet.
located Minnesota side upper St. Louis Bay and North of Northern Pacific Ry. crossing, Grassy Point bridge.

Inland Coal & Dock Co. Dock, Ground storage capacity: bituminous, 840,000 tons; coal storage area, 1,005,400 Square feet.

located at foot of 50th Ave. W. and along southern side of LeSure St. on Grassy Point.

Carnegie Dock Nol 2, Ground storage capacity: Bituminous, 556,000 tons; coal storage area, 740,000 square feet.
located W of 50th Ave. W.

Zenith Furnace Co. Dock, ground storage capacity: Bituminous, 650,000 tons; limestone, 50,000 tons; coal storage area, 772,225 Square feet. located at the foot of 59th Ave. W.

Consolidated Elevators (B&C)
Consolidated Elevators (D&G) 5,400,000 Bu capacity
located E. side of Rice's Point and S of Bay Front Slip, W side of Duluth Harbor
Basin.

Consolidated Elevators (E&F)
Consolidated Elevators (H&I) 5,100,000 Bu capacity
located E side of Rice's Point about 900 feet NW from Birch Ave.

388.

-1- Duluth, Minn.
Topic: Duluth-Superior Harbor (F.C.)
Submitted By: Capt. E. J. Ditzel
Number of Words: 492 600-630
Edited By: W. J. Sullivan
Date: March 23, 1936

DOCKS, PIERS, WHARVES, ELEVATORS AND TERMINALS

Of the 101 docks and moorings in the Duluth-Superior Harbor, 6 are street-ends and are city docks, 21 are owned by railroads, 6 are owned by large wholesale grocery and hardware companies, 3 are used by concerns engaged in the fish industry, 6 are owned by building contractors for sand, gravel, tile, etc., 2 are for iron, both scrap and machinery 2 for excursion and ferry boats, 1 for ship-chandlery (supplies), 4 for cement, lime, and salt, 1 for consolidated wholesale grocery companies, 1 for a flour mill, 3 for dredging and ship-repairs, 27 for grain elevators, 21 for coal, 1 for a furnace company, 1 for an oil company, 1 for a flaxseed mill, 4 or 5 for shipbuilding, 7 for iron ore, 1 for the lighthouse service, 1 for the Minnesota Naval Militia, and 2 for the United States Engineers. Three docks handle forest products.

The tremendous size of many of these docks is indicated by the following facts. One modern elevator for cement has a storage capacity of 114,000 barrels with an unloading capacity of 1,000 barrels an hour. The 7 ore docks total 15,324 feet (nearly 3 miles) and have a total storage capacity of 819,000 tons, not including the hundreds of railroad cars spotted on the platform above the pockets on the docks. Nine terminal wholesale warehouses have a total area of 1,730,000 square feet with a capacity of 18,647,500 cubic feet. The 21 coal docks have a storage capacity of 13,013,000

Docks, Piers, Wharves, Elevators and Terminals Page 2.

tons. The largest coal dock alone has a capacity of 1,000,000 tons. The 27 grain elevators have a total storage capacity of 62,900,000 bushels! The largest grain elevator alone has a capacity of 12,800,000 bushels! One large elevator actually unloads 20,000 bushels an hour!

The Marine Iron & Shipbuilding Co., located at the foot of 11th Ave. W., Duluth, operates a floating dry dock 60 feet long overall, with a 60-foot width at the entrance. This dry dock has a lifting capacity of 1,500 tons and can handle vessels drawing 12 feet of water. The Superior Ship-building Company, at 3rd Street and Clough Avenue, Superior has 2 graving dry docks. Dock No. 1 is 609 feet long overall, 570 feet long on the keel blocks; and has a width of 66 feet at the entrance, and a depth over the sill of 14 feet at low water datum. Vessels up to 570 feet in length can be accommodated at the dock. Dock No. 2 is 620 feet long overall, 580 feet long on the keel blocks, with a width of 66 feet 6 inches of entrance at the top, and a depth over the sill of 17.5 feet at low water datum, and can accommodate vessels up to 580 feet in length.

Duluth, Minn.
Topic: Duluth-Superior Harbor (F.C.)
Submitted by: Capt. E.J. Ditzel

SOURCE OF MATERIAL

- (1) U.S. Engineers Office, Duluth, Minn.
- (2) Shipmasters' Directory for 1935, Detroit, Michigan, published by Rotary Printing Company, Capt. M.S. Peterson, Grand Secretary of the Shipmasters' Association, 40 West Northrup Place, Buffalo, New York State. (This is an excellent reliable source of information on all current phases of shipping.) 150 pages - Book.
- (3) U. S. Engineers Report to the War Department for 1935 on Duluth-Superior Harbor, Government Printing Office, Washington, D.C. 200 pages - Book.
- (4) Article in the Duluth Sunday News Tribune of February 16, 1936, by Major A. B. Jones, in charge of the Duluth District of the U.S.A. Engineers, in his annual report. Newspaper.
- (5) Personal Observation. (Capt. E.J. Ditzel is an authority on Great Lakes Navigation and the Duluth-Superior Harbor.)

No.

Julo

Duluth, Minn.
Topic: Terminals (F.C.) 415
Submitted By: W. J. Sullivan
Number of Words: 898
Edited By: W. J. Sullivan
Date: March 31, 1936

TERMINALS

Duluth, because of its location, is a traffic center. It is a terminal for Great Lakes vessels because it is equipped with a great harbor at the most western point on the lakes. It is a terminal for railroads because it is the eastern end of 10 railroads converging from the south, west, and north. It is a terminal for bus lines because such companies find it profitable to radiate from Duluth in all directions for both long and short hauls, and for both through and pick-up shipments. Excellent concrete roads radiate from Duluth in all directions. Fruit, film, press, and fish fast-express bus lines give special service.

Nine terminal wholesale warehouses here have a total floor area of 1,730,000 square feet with a capacity storage of 18,647,500 cubic feet. The Marshall-Wells and the Kelley-How-Thompson are the two largest wholesale hardware houses in the Northwest with branch houses as far away as Canada and the Pacific Coast. The Stone-Ordean-Wells, the Rust-Parker Company, and the Finnish Consumers' Cooperative are three large grocery terminals with investments of many millions of dollars. The Duluth Terminal (formerly the Mc Dougall Terminal) and the Northern Cold Storage are very large buildings in the very heart of the city adjacent to the waterfront, the railroad yards, and the main streets and highways. The Bridgeman-Russell Creamery Company (with a capitalization of many millions of dollars) is the largest creamery in the Northwest. The main plant has its front door on the main street where through street cars run in the heart of the city. The back door has a spur-line railroad track, and the two sides of the building

have huge outdoor auto truck platforms (with hanging roofs) for a fleet of trucks numbering over a hundred. The company ships from many points in the Dakotas and Montana and Wisconsin to as far east as New York City. A branch office is located in Detroit, Mich.

The 7 ore docks total 3 miles long! One of these, the D.M.&N., loaded 12,639 gross tons in only 30 minutes! The average rate of loading iron ore is 23 minutes per 1,000 tons. The loading facilities are such that a boat may load and depart with 12,000 tons of iron ore in 4 hours. By having special preparations made, a boat was loaded with 12,890 tons of iron ore and departed, all in one hour and fifteen minutes.

The 21 coal docks store 13,046,000 tons of 2,000 pounds. The electrical structural steel unloading equipments are huge. The St. Louis Bay Dock Company unload 9,366 tons of coal in 6 hours and 5 minutes.

The Northwestern Fuel Company's dock has a coal handling bridge of longest span in the United States. The length is 719 feet and the height 132 feet. The clam (shovel) picks up 12 tons of coal at each lift: There are three types of unloading for coal used in Duluth: man-trolley type of bridge, rope type, and old cable car system (3 still in service).

The 27 grain elevators have a combined storage capacity of 53,213,000 bushels. The Great Northern elevator (250 feet high) is of fireproof steel construction, the largest working house in the world, with an unloading capacity of 400 railroad cars a day. It has connection with all railroads. Over 350 railroad cars have been unloaded and 1,400,000 bushels of grain loaded into boats in one day of 10 hours!

One cement elevator unloads 1,000 barrels an hour and stores 114,000 barrels. There are 2 modern terminal plants for package and perishable freight. Forty-six wharves handle freight other than iron ore, coal, and grain. Those are equipped with up to date electrical machinery for handling of lake carrier's freight. One large scrap-iron dock holds well over a million dollars worth of scrap iron. Here one may see iron cut by huge shears, iron bailed like paper, railroad wheels piled high as a house for a block in length, and huge piles of steel shavings. One large sand and gravel dock has a belt-lift which raises the sand to great bins from which it drops in shoots by gravity to auto trucks below, or to railroad cars.

The Zenith Mill Supply, buys, sorts, bails, stores, and ships direct to paper mills all kinds of paper, cloth, and etc. The bailing machine is two stories high and operates by hydraulic pressure. The spur line railroad is at the back door.

The N.P. Dock #4 unloads autos and trucks from lake freighters, and loads package freighters with butter, eggs, cheese, frozen products, and package freight. This is the stevadore headquarters due to the transient type of hand-labor required. (See article on Docks by Capt. Ditzel and article on Railroads and Bus Lines by Clayton Videen.)

Duluth, Minn.
Topic: Terminals (F.C.) 415
Submitted By: W. J; Sullivan
Number of Words: 898
Date: March 31, 1936

SOURCES OF MATERIAL

General Information, U.S. Engineers Office, Duluth, published Sept. 20, 1934, 12 pages---pamphlet. (Map of Duluth-Superior Harbor)

Statistical Report, 1934, A.K.B. Lyman, Lieut. Col., Corps of Engineers, U.S. Engineers Office, Duluth, Minn, 12 pages -- pamphlet.

Capt. E. J. Ditzel, 13 West Superior Street, interviewed by W. J. Sullivan, March 30, 1936 on Terminals.

Personal observation.

Duluth, Minn.
Topic: Duluth-Superior Harbor (F.C.) 160
Submitted By: Capt. E. J. Ditzel
Number of Words: 936
Edited By: W.J. Sullivan
Date: April 6, 1936

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NAVIGATION

traffic in 1935 covered a period of 235 days. Local navigation opened April 1st and closed December 16th. During the rest of the year, ice prevented navigation. The heaviest ice (or thickest) was in the winter of 1904-5, when it was 38 inches thick. The thinnest was 18 inches in 3 different years: (March 3, 1919; February 18, 1921; and February 16, 1931). (This data was obtained from the U.S. Coast Guard through the U.S. Weather Bureau at Duluth, December 28, 1935.)

Currents of various degrees of strength are prevalent at the Duluth Canal, due principally to oscillations of the lake surface setting in or out as the lake temporarily rises or falls, usually of moderate velocity and short duration. On rare occasions, more rapid currents occur, which for a few minutes reach a velocity in the neighborhood of 6 miles per hour, followed by reverse currents, perhaps equally strong. The duration of these currents depends upon that of the oscillation of the lake surface if the oscillation is brief, and upon the time required to fill or empty the harbor to the level of the lake. In very heavy storms, ships sometimes enter the harbor at the Superior Entry, in preference to the Duluth Entry, on account of the heavy current. (Personal experience of Capt. E. J. Ditzel.)

Duluth and Superior Harbor. (The only storms affecting the entrance or departure of vessels.) (Personal experience of Capt. E. J. Ditzel.)

Duluth-Superior Harbor (F.C.) 160
Page 2.

The heaviest fogs usually occur during the summer months of June, July and August. (Personal experience of Capt. E. J. Ditzel.)

Pilot Rules consider a steam vessel to be any vessel propelled by machinery. A vessel is "under way" when it is not (1) at anchor, (2) made fast to shore, or (3) aground.

Boat whistles are used as follows: One blast means, "I am directing my course to starboard." Two blasts mean, "I am directing my course to port." Starboard is righthand, while port is lefthand. Five or more short blasts mean danger, or "I do not understand your signal." One long blast means, "I am approaching a blind curve in the channel (impossible to see around bend), or "I am backing out from the dock." One blast will then be used by any vessel approaching from the other side of the channel or dock, unless a danger signal is given. One short blast means, "I am overtaking and passing you on the starboard side." Two short blasts mean, "I am overtaking and passing you on the port side." Three blasts repeated at one minute intervals is the fog signal. Three blasts are also used to signal the aerial lift bridge over the Duluth Ship Canal. All signals are answered in kind (or a danger signal is given and then signaling begins over again.)

No vessel overtakes and passes another in a channel (or canal) of less than 500 feet width without permission of the vessel ahead. To avoid collision, a steam vessel must avoid a sailing vessel.

Lights are carried by all vessels at night (sunset to sunrise) according to the following rules: A bright white light, not over 40 feet high, visible (on a dark night with a clear atmosphere) from the bow (front) for five miles; a green light on the starboard bow, not visible from

the port side, and not visible from the stern, but visible 2 miles otherwise; a red light on the port side with similar regulations; a white light (vessels over 150 feet), when under way, visible all around the horizon for 3 miles, on a line with the keel, not over 75 feet abaft (behind) the other white light (seen from the bow). Small sail boats or rowboats show one white light when stationary and show colored lights when needed.

When a vessel is in distress and requires assistance from other vessels, or from the shore, a continuous sounding of the fog signal, or the firing of a gun, is used. At night a burning tar barrel, or oil barrel, is used.

The code signals from the pilot house to the engine room are: I whistle (or bell) means, "Go ahead." I whistle (or bell) means, "Stop." 2 whistles (or bells) mean, "Back up." 3 whistles (or bells) mean, "Check speed." 4 whistles (or bells) mean, "Strong, full steam." And 4 whistles (or bells) mean, "All right." Two whistles (or bells) always mean, "Back up," regardless of other signals previously given.

Radio equipment is used to ascertain location on lake trips, to receive sailing orders from company offices, to receive weather reports, to receive hydographic reports, to intercept any S.O.S. (distress) calls, and to enjoy musical and other entertainment programs.

Contact is made with local offices and docks by means of whistles. A vessel signals its fleet, its class, and its name by a certain code; and the dock (or office) answers by whistle to direct the captain to certain docks and to which side of the dock.

. Duluth-Superior Harbor (F.C.) 160 / Page 4.

In like manner, a tug may be called to assist in docking the vessel. Four long blasts is the signal for calling a tug. The tug answers in one long and one short blast. Also bridges are signaled to open. Thus three long blasts warns the aerial lift bridge over the Duluth-Ship-Canal to go up. The bridge answers with the same signal. The vessel may then give one long and one short blast to indicate the pilot knows the bridge has answered.

In courtesy signal consists of three long blasts, followed by two short ones. This signal is generally given (1) to the first vessel in or out of the harbor in the spring, (2) to a friend on shore or another vessel, (3) to a foreign or unusual visiting craft, (4) to the last vessel in or out of the harbor in the fall, or (5) to the first or last trip of a certain line or vessel. Of course the greeted vessel answers, sometimes many times.

The ship's bell tolls the time.

Starting at midnight, one bell is rung (cumulatively) for each half hour; that is two bells for each hour, up to eight bells for the fourth hour. Then the system starts over again. Thus 12:30 is 1 bell, 1 o'clock is 2 bells; 1:30 is 3 bells; 2 o'clock is 4 bells; 2:30 is 5 bells; 3 o'clock is 6 bells; 3:30 is 7 bells; and 4 o'clock is 8 bells; but then, starting over again, 4:30 is 1 bell; 5 o'clock is 2 bells; 6 o'clock is 4 bells; 7 o'clock is 6 bells; and 8 o'clock is 8 bells; while, starting again, 8:30 is 1 bell; 9 o'clock is 2 bells; 9:30 is 3 bells; 10 o'clock is 4 bells; and 12 o'clock is 8 bells. Thus 8 bells occurs every 4 hours, at 12, 4, and 8 o'clock. And nothing over 8 bells is ever rung. The bells are rung (as far as possible) in groups of two; thus 3:30 o'clock is rung (as 7 bells) in this way; ding-dong, din

Duluth-Superior Harbor (F.C.) 160 Page 5.

would say 6 bells. The U.S. Steel Corporation vessels, and the Pickands Mather Company vessels, use this system. Other vessels may use the regular clock system.

Duluth, Minn.
Topic: Duluth-Superior Harbor (F.C.)
160
Submitted By: Capt. E. J. Ditzel
Number of Words: 936
Edited By: W.J. Sullivan
Date: April 6, 1936

SOURCES OF MATERIAL

U.S. Weather Bureau, Duluth, Minn.

U.S. Coast Guard, Duluth, Minn.

Personal Observation (Capt. E. J. Ditzel is an authority on Great Lakes navigation and on the Duluth-Superior Harbor.)

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Duluth, Minn.

Topic: Duluth-Superior Harbor (F.C.) 416

Submitted By: Capt. E.J. Ditzel

Number of Words: 92

VESSEL ENROLLMENT AT DULUTH

Number of vessels, kind, and tonnage:

	sels (Bulk Freighters)	(Steel)	607,023	Tons
	Boats (Wood)		871	Tons
10 Gas	Boats (Steel)		896	Tons
2 Sai	ling Ships (Wood)		5,426	Tons
15 Bar	ges (Steel)		53,034	Tons
27 Bar	ges (Wood)		7,297	Tons
78 Bar	ges (Metal)		43,393	Tons
3 Yac	hts (Wood)		54	Tons
2 Yac	hts (Steel)		498	Tons
20 Ves	sels (Steam) (Wood)		4,701	Tons
		TOTAL	723,193	Tons

The Minnesota tonnage tax on vessels

is the lowest of any state, and there is no enrollment-fee at Duluth, which accounts for the large number of vessels registered here from outside ports.

Duluth, Minnl
Topic: Duluth-Superior Harbor
(F.C.) 416
Submitted By: Capt. E.J. Ditzel
Number of Words:
Date:

SOURCES OF MATERIAL

U.S. Customs enrollment sheet, vessel list, U.S. Customs Office, Federal Bldg., Duluth, Minn.

Duluth, Minn.

Topic: Freight Terminals (F.C.) 416 Submitted By: Capt. E. J. Ditzel

Number of Words: 514

STEAM-BOATS, CONNECTIONS, EXCURSIONS, ETC.

Duluth is a terminal for 60 steamship companies operating 460 ships. Of these, 49 companies handle bulk freight, such as coal, grain, and iron ore, which comprise most of the tonnage; 8, general freight, autos and passengers; 1, handles gasoline, kerosene and crude oil; 1, cement; 1, slag, salt and limestone.

The Great Lakes Transit Corporation operates 2 liners from Duluth down the American Shore of the Great Lakes to Chicago, Detroit, The Northern Navigation Co. operates 3 from Duluth along the Canadian and Buffalo. shore to Port Arthur, Canadian Soo, Sarnia, Windsor, and Detroit. Montauk makes excursions up the St. Louis River to Fond du Lac and around Minnesota Point.

The fishing smack Winyah carries freight and passengers along the North Shore.

All combinations of connections are possible at the warehouses, docks, and stations.

The steamboat lines operating into Duluth

are:

No. of Vessels

Pittsburgh S.S. Co., Cleveland, Ohio Pittsburgh S.S. Co., Cleveland, Ohio

Picands Mather Co., Cleveland, Ohio

(Interlake S.S. Co.)

71 Steamers 14 Barges (Steel)

46 Steamers

4 Canadian S.S. Lines with

(Hutchinson S.S. Co.) The Pioneer S.S. Co., Cleveland, Ohio 19 Steamers Cleveland Cliff's Iron Co., Cleveland, Ohio 21 Steamers Tomlinson S.S. Co., Cleveland, Ohio 17 Steamers A.T. Kinney S.S. Co., Cleveland, Ohio 5 Steamers Great Lakes Trans. Co., Buffalo, N.Y. 22 Steamers (pkg. frt) Wilson Trans. Co., Cleveland, Ohio 11 Steamers Minnesota and Atlantic S.S. Co., Detroit, Mich. 6 Steamers (pkg. frt) Great Lakes S.S. Co., Cleveland, Ohio 19 Steamers Producers S.S. Co., Cleveland, Ohio 5 Steamers Bethlehem Trans. Co., Cleveland, Ohio 6 Steamers Morrow S.S. Co., Cleveland, Ohio 1 Steamer Paisley S.S. Co., Cleveland, Ohio 1 Steamer Becker S.S. Co., Cleveland, Ohio 4 Steamers Franklin S.S. Co., Cleveland, Ohio 3 Steamers Johnstown S.S. Co., Cleveland, Ohio 2 Steamers Columbia S.S. Co., Cleveland, Ohio 10 Steamers Kinsman S.S. Co., Cleveland, Ohio 4 Steamers Virginia S.S. Co., Cleveland, Ohio 5 Steamers Valley Camp S.S. Co., Cleveland, Ohio 10 Steamers Jenkins S.S. Co., Cleveland, Ohio 5 Steamers Gramer S.S. Co., Cleveland, Ohio 1 Steamer Mahoning S.S. Co., Cleveland, Ohio 2 Steamers H. Steinbrenner H. Steinbrenner Cleveland, Ohio General Trans. Co., Cleveland, Ohio 1 Steamer 2 Steamers Cambria S.S. Co., Cleveland, Ohio 2 Steamers Buckeye S.S. Co., Cleveland, Ohio 1 Steamer Shenango Furnace Co., Cleveland, Ohio 3 Steamer Beaver S.S. Co., Cleveland, Ohio 1 Steamer Butler S.S. Co., Cleveland, Ohio 1 Steamer Lakewood S.S. Co., Cleveland, Ohio 1 Steamer Welland S.S. Co., Cleveland, Ohio 1 Steamer Lake Arline S.S. Co., Duluth, Minn. 1 Steamer Massaba S.S. Co., Duluth, Minn. 1 Steamer Boland & Cornelius, Buffalo, N.Y. 8 Steamers Interstate S.S. Co., Cleveland, Ohio 2 Steamers Reiss S.S. Co., Sheboygan, Wis. 11 Steamers Nicholson Universal Trans. Co., Detroit, Mich. 3 Steamers Spokane S.S. Co., Port Huron, Mich. 1 Steamer James Davidson, Bay City, Mich. 3 Steamers Ford Motor Co., Detroit, Mich. 4 Steamers Brown S.S. Co., Buffalo, N.Y. 3 Steamers Inland Steel Co., Indiana Harbor, Ind. 3 Steamers William Clifford, Duluth, Minn. 1 Steamer Wisconsin Steel Co., Chicago, Ill. 1 Steamer W.L. Emery, Detroit, Mich. 1 Steamer Huron Trans. Co., Detroit, Mich. 3 Steamers D. Sullivan & Co., Chicago, Ill. 9mSteamers Total Bulk Carriers American Bottoms 377 Steamers Eastern S.S. Co., Buffalo & Toronto 20 Steamers Patterson, S.S. Co., Ft. William, Ont. 11 Steamers Mathews S.S. Co., Toronto, Ont. 8 Steamers Canadian S.S. Co., Montreal, Que. 46 Steamers Total Bulk Carriers 85 Steamers " Canadian Bottoms 377 Steamers Bulk Freighters making Duluth-Superior Harbor 465 Steamers 49 American S.S. Lines with 377 Steamers

85 Steamers

Duluth, Minn.
Topic: Freight Terminals (F.C.) 416
Submitted By: Capt. E.J. Ditzel
Number of Words: / O

7eb.17,1936

SOURCES OF MATERIAL

Shipmasters Directory, 1935, printed by Shipmasters Assoc., Norwalk, Ohio; 1933.

Freight Terminals (F.C.) 416

Duluth, Minn.
Topic: Bibliography -900
Submitted By: Capt. E.J. Ditzel

Shipmasters Directory, 1935, printed by Shipmasters Assoc., Norwalk, Ohio; 1933 (Official data of the Shipmasters Assoc.)

Appendix Material

Elevators and Warehouses

Duluth's seven terminal and two private warehouses have a total capacity of 18,647,500 cu.ft. --- an area of 1,730,000 sq.ft.

Duluth has 27 grain elevators with a total capacity of 62,900,000 bu.

One grain elevator alone has a capacity of 12,800,000 bu.

One elevator can store 114,000 barrels of cement which it can unload at the rate of 1,000 barrels per hr.

HARBOAPPENDIXAMABERIALLS Great Lakes Vessels Duluth is the terminal for 60 sheamship companies operating 460 ships. The vessel enrollment at Duluth includes: 149 vessels (bulk freight, steel) -----607,023 Tons 58 gas boats (wood)----- 871 10 gas boats (steel) ----- 896 " 2 sailing ships (wood)-----5,426 15 barges (steel) -----53.034 27 barges (wood) ----- 7,297 78 barges (metal) -----43,393 " 3 yachts (wood) ----- 54 " 2 gachts (steel) ----- 498 The Average Great Lakes Boat; Costs \$450,000 Has a crew of 35. Travels 12 mi. per hr. with load, Travels 14 mi. per hr. unloaded. Carries a cargoe worth \$43,000. Makes a round trip in 11 or 12 days during which it Makes a round trip at a costs of \$1.000. Makes 27 round trips in the season of 8 mo. A bulk freighter costs approx. \$700,000; A Standard Oil tanker with Diesel engines, \$1,500,000; A package freighter, \$300,000. A first class vessel is between 580 and 600 Ft. in length. A second class vessel is between 400 and 500 ft. in length. A third class vessel is between 292 and 380 ft. in length. Signals The winds of ? 1 blast (whistle) ---- I am directing my course to starboard (right). 2 blasts -----I am directing my course to port(left) 1 long blast ---- I am approaching blind cureve, or, I'm backing from dock. 1 long blast-will ansemer this signal from other side of channel or d 1 short blast -- I am overtaking you, passing on the starbaoard side. 2 short blasts -- I am overtaking you passing on the port side. 3 blasts repeated at 1 min.intervals ----- fog signal.

5 or more short blast -- Danger, or, I do not understand your signal. 3 blasts (within reach of but not less than of mi. of aerial bridge. aerial bridge.

is a signal for the bridge to raise and permit passage.

All signals are answered in kind around it

No vessel overtakes another in channel less than 500 ft. wide without permission of second vessel.

A Steam vessel must avoid a sailing vessel.

Lights White light not over 40 ft. high, visible 5 mi., on clear night from bow. Green light not visible from port visible 2 mi. on starboard bow. Red light visible 2 mi. Not visible to starbaord, on port bow.

white light visible 3 mi. on line with keel and not more than 75 ft. Boots of the different line is interfect by their brooks the color of the surprestance is entired by the brooks the paint with a group of the place to be the black top is the characteristic of the pittleburgh steamship con abaft bow light.

- 1 - DULUTH MINN.

TOPIC: DULUTH-SUPERIOR HARBOR (F.C.) 160
SUBMITTED BY: Capt. E.J. Ditzel
NUMBER OF WORDS:

We are submitting two blue-prints of the Duluth-Superior Harbor with an explanatory key attached. This map shows the exact location of all elevators, coal and ore docks, freight terminals,

We intend one copy for your files in St.Paul and one for your submission to Washington.

and lumber and stone docks.

If the Washington office wishes to print this map in the sectional volumn of the "American Guide", the Duluth Office has a <u>negative</u>

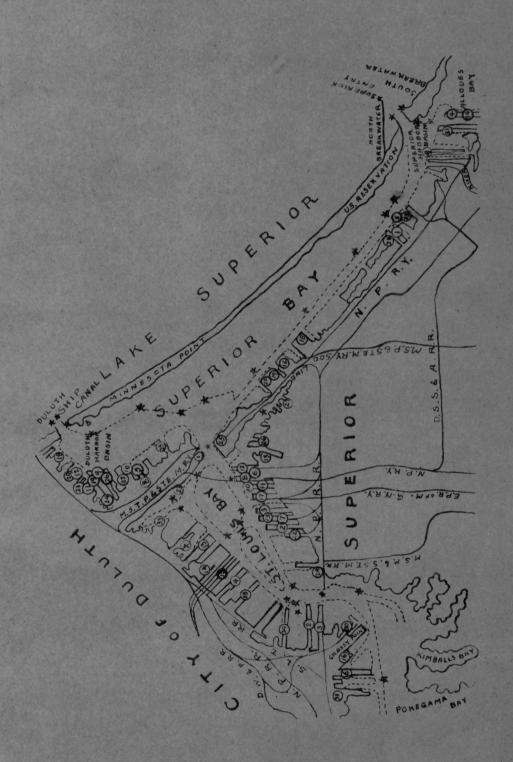
<u>Van Dyke</u> for blue-print reproduction, which we will gladly send them upon request.

Our original idea was to have it done with a white positive Van Dyke with the key printed on the film so that the map and key could be printed on the same page. But it would entail additional expense. With our Van Dyke you can print the key on the page facing the map; or, if the page is large, above or below the map.

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DULUTH MINN.

TOPIC: DULUTH SUPERIOR HARBOR (F.C.) 160
SUBMITTED BY: Capt. E.J. Ditzel



KEY TO MAP OF DULUTH-SUPERIOR HARBOR.

SUPERIOR, WISC.

- 1. Belt Line Elevator
- 2. Berwind Fuel Co.
- 3. Carnegie Dock & Fuel Co. Dock No.1
- 4. C.M. st. P. & O. Freight Sheds
- 5. Daisy Flour Mills
- 6. Globe Elevator
- 7. Great Lakes Coal & Dock Co.
- 8. Great Northern "Elevator"
- 9. Great Northern "Ore Docks"
- 10. Great Northern "Rail Docks"
- 11. Great Northern "Warehouse"
- 12. Hanna Dock Co. M.A.
- 13. Island Creek Coal Dock Co. No. 2
- 14. Itasca Elevator
- 15. Lehigh Valley Coal Dock
- 16. Northwestern Fuel Co., Dock No. 1
- 17. Northwestern Fuel Co., Dock No. 2
- 18.
- 19. Northern Coal & Dock Co. (Osborn)
- 20. Philadelphia & Reading Coal Dock
- 21. Pittsburg Coal Co. Dock No. 5
- 22. Pittsburgh & Ashland Coal & Dock Co.
- 23. Reiss Coal Co. C., Dock No. 3
- 24. Soo Line Ore Docks
- 25. Reeves Coal & Dock Co.
- 26. Superior Manufacturing Co.
- 27. Superior Shipbuilding Co.
- 28. Terminal Elevators K & L.
- 29. Morton Salt Co.

DULUTH, MINN.

- 1. Alger-Smith & Co. Lumber Dock
- 2. Alger-Smith & Co. Lumber Dock
- 3. Berwind Fuel Co.
- 4. Superior Coal & Dock Company
 - 5. Capital Elevator
 - 6. Carnegie Coal Dock No. 2
 - 7. Clark & Jackson, Lumber dock
 - 8. Clarkson Coal & Dock Co.
 - 9. Consolidated Elevators, "B.C.D. & G."
- 10. Consolidated Elevators, "H.E.& F."
- 11. Cutler & Co. D. G.
- 12. C.M. St. P. & O. Freight Sheds
- 13. Duluth, Missabe & Northern "Coal Dock"
- 14. Duluth, Missabe & Northern "Stone Dock"
- 15. Duluth, Missabe & Northern "Ore Docks"
- 16. Inland Coal & Dock Co.
- 17. Marshall-Wells Hdwe. Co.
- 18.
- 19. Northern Pacific "Freight Shed No. 2"
- 20. Northern Pacific"Freight Shed No. 4"
- 21. Northern Pacific "Freight Shed No. 5"
- 22. Northern Pacific "Freight Shed No. 6"
- 23. Northern Pacific "Lumber Dock"
- 24. Northern Pacific "Rail Dock"
- 25. Peavey Elevator
- 26. Pittsburgh Coal Dock No. 1
- 27. Pittsburgh Coal Dock No. 7
- 28. Red Cliff Lumber Co. Lumber Dock.
- 29. Soo Line"Freight Sheds"
- 30. Virginia & Rainey Lake Lumber Co.
- 31. Zenith Furnace Co.
- 32. Kelly Island Lime Co.
- 33. Mullery & McDonald Forwarding Co.
- 34. Canadian Northern Lumber Dock