THE PORT OF SUPERIOR

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LOCATION

THE St. Lawrence River penetrates the continent of North America a distance of 2000 miles. Most of the river lies between parallels of the 40° to 47° N. latitude and the head of Lake Superior lies in longitude 92° west and latitude 47° north. The river is navigable for ocean steamers, drawing 14

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FIG. 1. MAP OF THE DULUTH-SUPERIOR REGION.

feet of water, to the head of Lake Superior. The rapids of the St. Lawrence, the falls of Niagara, and the Sault Ste. Marie rapids, are avoided by canals.

At the head of Lake Superior is found the city of Superior. It is situated on the land locked harbor of Superior Bay, the city limits extending up the river a distance of about twenty miles.

THE HARBOR

The harbor at the head of Lake Superior is an unusual one. In structure it is very simple, but its size and completeness make it the most remark-

Editor's Note.—*At the head of Lake Superior are two cities with one harbor. The commercial interests of Duluth and Superior are closely interwoven and both owe their growth and prosperity very largely to the commercial strategy of the position which they have in common. Only for an arbitrary state boundary they would have formed one city. Since the Journal of Geography is devoting this issue entirely to Wisconsin, the city of Superior has been treated by the writer of the following article as if it were quite unconnected with the larger city of the pair. It is recognized that much of what is here said of the advantageous position of Superior and of the cause of its growth is also true of Duluth.*

able harbor on the Great Lakes, and perhaps the most perfect fresh water harbor in the world.

FIG. 2. DIAGRAM SHOWING THE VOLUME OF BUSINESS AT THE PORTS OF SUPERIOR AND DULUTH.

During the glacial period the lake filled all of the depression, but on the retreat of the glacier and the building up of the land at the west end of the lake, the water subsided, leaving a coastal plain twelve to twenty miles in width, on the south side of the lake. The west end of this depression, now

entirely out of the water, is occupied by the St. Louis River which comes down from the Vermilion and Mesabi Iron Ranges on the north and empties into Lake Superior at the city of Superior.

The high wall of rock on the north side of Lake Superior, together with certain climatic factors gives the head of the lakes a northeast wind during the stormy months of spring and autumn. This coincidence and the fact that the lake is deeper on the north side, produces waves of great height there, causing at times a rise in the lake level of fifteen to twenty inches. It is not strange, therefore, that these conditions should produce pronounced sandbars at the mouth of St. Louis River. These sand bars are an effective break-water against the storm waves of the lake. Since the land is very slowly subsiding, (six inches a century) a number of estuaries have been formed which increase the length of the harbor of Superior to more than thirty miles.

FIG. 3. GREAT NORTHERN ELEVATOR AND MERCHANDISE DOCKS, SUPERIOR. THE ELEVATOR HOLDS $5\frac{1}{2}$ MILLION BUSHELS OF GRAIN.

While the sandbars are formed by nature, there still remains considerable work to prepare for the dockage of vessels of deep draft and large tonnage. In 1867 the United States Government began a survey of the harbor for the purpose of making much needed improvements. Since that time appropriations have been made regularly and improvements have been carried on continuously. The main channels in the harbor have been dredged to accommodate boats drawing twenty feet of water, the entry to the lake has been widened to one thousand feet and protected with concrete walls and ample break-waters.

NATURAL ADVANTAGES OF THE CITY

It is evident that Superior has all of the advantages that come with a fine harbor and a great waterway. But this alone can never make a city since many of the best harbors are situated in places where they can never benefit humanity. A harbor is a meeting place of "sail and rail" and its value depends upon the fact that it provides terminal facilities for water traffic and

greatly reduces the cost of transportation. It is estimated that the general reduction in freight rates between Superior and New York is such that the average cost by lake and canal is less than one-third of what it would be by rail.

The value of the harbor to the city of Superior depends upon the following conditions:

1. *The number of people supported.* The commerce transacted in Superior is the result of the activities of about seven millions of people living to the westward, and engaged in developing a very large territory of grain fields and ore lands; and about the same number of people living in or near the coal fields in the eastern part of the country, and engaged in mining and manufacturing.

2. *The vast deposits of coal in Ohio, West Virginia, and Pennsylvania near Lake Erie, and the absence of coal deposits in the area west and southwest of Lake Superior.* It is possible to deliver coal more cheaply to Superior than to Chicago and hence most of the coal used north of the line drawn from Superior to Omaha is delivered through this port and about seventy per cent of it is delivered from the docks in Superior. On account of the fact that navigation is closed about four months of the year, large storage docks are necessary, and it is said that this city has the largest storage capacity for coal in the world.

3. *The large deposits of high grade iron in Minnesota near Superior which is necessary in the manufacture of iron and steel in the Pittsburg district.* These deposits are the largest and richest known. There are three systems of docks in Superior for handling this ore.

4. *The large grain fields in Minnesota, the Dakotas and the Canadian Northwest, the surplus of which must be shipped to the eastern states and to foreign countries.* Superior is the most convenient terminal for this area and hence very large elevators and mills are located here.

5. *A water power plant with a capacity of 150,000 horse power, located within 10 miles of the city limits, furnishes abundance of cheap power for the city.*

6. *The large general freight business that is transacted at this point.* Various kinds of raw material, food products and manufactured goods are shipped here from the east and distributed westward. About 39,000 miles of railroad radiate from Superior to the territory which it serves. From the west come large quantities of wool and copper, lumber from the Pacific coast, grain of all kinds, flour from Minneapolis, and many other articles, to be shipped eastward.

7. *A large area of comparatively level coastal plain, suitable for manufacturing sites and for railroad terminals.* There are six railroads entering the city, three of which have extensive terminals here. There are in the city 182 miles of railroad tracks used as terminals by the railroad lines.

8. *In the immediate vicinity of the city there is a considerable area of*

very fine farming land, suitable for general farming and dairying. This land is rapidly being put under cultivation.

INDUSTRIAL HISTORY

The white man came to Superior and found an Indian Village on Wisconsin Point. The appearance of the harbor was so attractive that people flocked to the new port from many parts of the United States. Without consideration as to the surrounding country, these people thought that the perfect harbor would soon develop a large city. The city of Superior, therefore has had three distinct periods of growth:

1. The first period resulted from the discovery of the beautiful land-locked harbor and the general belief that a great city would rise here. There were no industries in the city and no farming around it, so naturally the first attempt at building a city failed, and the population declined.

2. The period of railroad building. The St. Paul & Duluth, now the

FIG. 4. GREAT NORTHERN ORE DOCKS, CONSTRUCTED OF STEEL.

Northern Pacific Railroad, was built to the head of the lake in 1869, but was prevented from benefitting Superior by the terms of its charter which provided that its terminal should be in Minnesota.

Other roads followed, the Great Northern in 1888, the North-Western in 1882, both of which had their terminals in Superior. Both of these roads built extensive docks and elevators and prepared to take care of the immense trade that bade fair to come in from the developing of the Northwest. Industries flocked to the city, flour mills were built, a large steel plant, a wagon factory, a ship-building plant, and many other factories were located here and the city seemed to be entering on a period of permanent prosperity. This port, being a natural break in transportation, seemed the logical place for these industries and the population increased rapidly.

About this time, however, in 1893, a rate decision was handed down by the Interstate Commerce Commission and accepted by the railroads, giving

a better rate eastward to Minneapolis and St. Paul than to Superior, so that it became impossible to manufacture at this point flour, steel, or any other article that was affected by the rates. This is an illustration of how freight rates can make or kill a city. These rates were allowed presumably because Superior was not adequately represented at the meeting. A few of the manufacturing plants survived, but most of them succumbed and were absorbed by competing plants in Minneapolis and Cleveland and were locked up after the manner of trusts and monopolies.

This decision was given in 1893, and its effect on this young city was immediate and destructive. A period of depression set in. However, even during the depression, the business of the port increased. Docks were constructed or enlarged, railroad terminals were being increased, elevators were being built to care for the constantly increasing business which was being managed from other cities. This fact alone kept a considerable air of prosperity about the city, even though business initiative in the city itself was at a standstill.

3. The new era now dawning. This dates from a new rate decision by the Interstate Commerce Commission in which Superior is given the same rates to and from the east as Chicago on ordinary and package freight. The rate on bulk freight is lower already. This makes it possible for manufacturing plants to locate here and conduct their business at a profit, giving to this city the benefits of its location at the head of the Great Lakes.

In anticipation of this decision and since its announcement, manufacturing has shown a large increase. The plants located here have increased their capacity and many others are securing sites.

THE PRESENT CONDITION OF THE CITY

At the present time Superior has a population of between 40,000 and 50,000. The principal industries, i. e., those that employ most men, are those connected with the docks and railroads. Some idea of the magnitude of this work may be obtained from the following statements:

1. *Coal Docks.* There are 16 coal docks in the city. These docks receive the coal that comes up the lakes during the season of navigation and ship it out, mostly in the autumn and winter to consumers west and southwest. The storage capacity of all of these docks is more than 8,000,000 tons. The boats carry in one cargo from 8,000 to 12,000 tons and are unloaded in from one to two days. The boats are unloaded with shells or buckets that take from the boats 5 to 13 tons at one time. These coal docks give employment to over 1500 men and spend annually in the city for labor and materials over \$3,500,000.

2. *The Ore Docks.* There are three systems of ore docks in the city. The largest one, the Great Northern, handles ore from the Mesabi Iron Range while the other two, recently built, handle ore from the Cuyuna Range. The Great Northern system of docks consists of four docks which have a storage capacity of 428,000 tons of iron ore. During the past season

there was shipped from this dock 16,500,000 tons of iron ore. This system is said to be the largest ore dock system in existence; during the shipping season it employs 575 men and pays out for labor and materials in the city, over \$297,000 annually.

3. *The Elevators.* There are 16 grain elevators in the city. The largest of these, shown in the cut, has a storage capacity of five and one-half millions of bushels. From this elevator during the last season was shipped forty-one million bushels of grain, about twenty-five millions of which was wheat. During the last shipping season all of the elevators in the city shipped eighty-six million bushels of grain, two-thirds of which was wheat.

4. *The Flour Mills.* These are two in number under one management. When running at full capacity, which they have been doing for the past year, they have an output of 75,000 barrels of flour per month.

5. *Other Important Factories.* A linseed oil mill makes about 10,000 gallons of linseed oil daily, using about 4,000 bushels of flax seed.

There are a number of other important factories in the city, the largest of which are the Webster Chair Factory, employing 350 men and producing an output of 1200 chairs daily, and the Duplex Works employing 120 men with a large output of engines and windmills.

6. *Important Property of the City.* In addition to an adequate and commodious municipal building the city has more than 1000 acres of land for parks, including one mile of dock property, a large proportion of which is unimproved. It has also very valuable land, about a hundred acres, on Superior Bay front to be used for city docks. This is a larger harbor frontage than is owned by any other city on the Great Lakes.

VOLUME OF BUSINESS

By reference to the diagram, Fig. 2, it is seen that the volume of business has increased enormously, though with some variation, since the opening of the port. This has taken place in spite of the fact that freight rates, in a way, have discriminated against the city. It is evident, furthermore that the great volume of business will in time reduce the rates still more. Below is given in tabular form the comparative tonnage and value of several of the world's greatest ports.

City	Entered and Cleared in 1911: tons.
Liverpool	14,767,990
London	20,978,221
Hamburg	23,776,188
Antwerp	26,556,000
New York	27,854,255
Superior (in 1912)	23,990,860

The reader will quickly realize that the *value* of the freight handled at the other ports compared with Superior is vastly greater, inasmuch as they are in densely populated districts and the freight is largely manufactured

goods or raw material that has great intrinsic value; nevertheless the comparison is significant in pointing to the future of this port when the surrounding region is more fully developed.

THE FUTURE OF SUPERIOR

It is not beyond the purpose of this article to give a few points about the future of this port. The volume of business has grown up without reference to the demands of the city itself, but since the city is now entering a manufacturing stage it is clear that the growth of business and wealth as well as population will increase faster than in the past. The factors that will figure most largely in the future of Superior aside from the ones mentioned heretofore are the following:

1. The Welland Canal. This canal around Niagara Falls is being enlarged and deepened so that it will accommodate ocean steamers and will permit vessels of large size to clear from Superior to any port in the world. This will make this an ocean port.

2. The Erie Barge Canal. This canal from Buffalo to New York City is being enlarged so that it will easily transport 75,000,000 tons per annum as compared with 3,000,000 tons, its present tonnage. This waterway of the Great Lakes-Erie Canal will then be able successfully to compete with the Panama Canal from the west coast to New York and intermediate points.

3. The Manufacture of Steel. Across the St. Louis river, on the Minnesota side, the U. S. Steel Corporation is erecting a mammoth steel plant, which promises to be, when completed, equal to the one at Gary, Indiana. Considerable land is owned by this corporation in the city of Superior and it is expected that much of the plant will be in this city. Furthermore, if this city becomes a primary steel market, which is now expected, other steel plants will be erected here to meet the demands for steel in the West and Southwest. It is also expected that the tariff adjustment will be such that much iron and steel will be made for the Canadian trade.

BIBLIOGRAPHY OF GOVERNMENT, STATE, AND OTHER PUBLICATIONS TREATING OF WISCONSIN GEOGRAPHY OR GEOLOGY

By E. F. Bean, University of Wisconsin, Madison

Alden, W. C., The Delavan Lobe of the Lake Michigan Glacier of the Wisconsin Stage of Glaciation. Professional Paper 34, U. S. Geological Survey, 1905.

Alden, W. C., The Drumlins of Southeastern Wisconsin, Bulletin U. S. Geological Survey, No. 273, 1905.

Alden, W. C., Milwaukee Folio No. 140, U. S. Geological Survey. 25 cents.

Case, E. C., Wisconsin, Its Geology and Physiography, Milwaukee, 1906. \$1.00. (Address Prof. E. C. Case, University of Michigan, Ann Arbor).