REPORT

OF THE

COMMISSIONER OF CORPORATIONS

ON

TRANSPORTATION BY WATER IN THE UNITED STATES

PART II
WATER-BORNE TRAFFIC

JULY 19, 1909

WASHINGTON
GOVERNMENT PRINTING OFFICE
1909

CONTENTS.

CHAPTER III.—NORTH ATLANTIC PORTS. RIVERS, AND CANALS.

CHAPTER IV.—SOUTH ATLANTIC PORTS AND RIVERS.

CHAPTER V.—GULF PORTS AND RIVERS.

CHAPTER VI.—GREAT LAKES—MOVEMENT OF COMMODITIES.

CHAPTER VII.—GREAT LAKES—TRAFFIC BY LAKES AND PORTS.

CHAPTER VIII.—MISSISSIPPI RIVER AND TRIBUTARIES.

I. OHIO RIVER AND TRIBUTARIES.

II. UPPER MISSISSIPPI RIVER AND TRIBUTARIES.

III. LOWER MISSISSIPPI RIVER AND TRIBUTARIES.

CHAPTER IX.—PACIFIC COAST AND RIVERS.

INDEXES.

LIST OF TABLES.

LIST OF MAPS.

58953—PT 2—09——2

LETTERS OF TRANSMITTAL.

DEPARTMENT OF COMMERCE AND LABOR,
OFFICE OF THE SECRETARY,
Washington, July 19, 1909.

SIR: I have the honor to transmit herewith Part II of the Report of the Commissioner of Corporations on Transportation by Water in the United States, the said part dealing with water-borne traffic.

Very respectfully,

CHARLES NAGEL,
Secretary.

The PRESIDENT.

DEPARTMENT OF COMMERCE AND LABOR,
BUREAU OF CORPORATIONS,
Washington, July 19, 1909.

SIR: I have the honor to transmit herewith Part II of a Report on Transportation by Water in the United States, made to the President under your direction and in accordance with the law creating the Bureau of Corporations. The said part deals with water-borne traffic.

I desire to mention as especially contributing, under my direction, to the preparation of this report the names of certain of my assistants, to wit, Mr. Burr J. Ramage and Mr. John A. Fairlie.

Very respectfully,

HERBERT KNOX SMITH,
Commissioner.

To Hon. CHARLES NAGEL,
Secretary of Commerce and Labor.

LETTER OF SUBMITTAL.

DEPARTMENT OF COMMERCE AND LABOR,
BUREAU OF CORPORATIONS,
Washington, July 19, 1909.

SIR: I have the honor to submit herewith Part II of the Report on Transportation by Water in the United States. This part discusses the freight carried by water. Part I, already published, dealt with the waterways themselves. Additional parts, dealing with terminals, rates, railway relations and control, are in course of preparation.

There are two main classes of freight—(1) bulk freight, usually raw materials and of comparatively low value; (2) merchandise freight, so called, usually in packages, of higher value and mainly the product of factories. Official statistics of water traffic are very incomplete.

Over 75 per cent of our total water-borne domestic traffic (excluding harbor and raft traffic) consists of raw materials and low-grade products, such as coal, iron ore, stone, sand, lime, phosphate, oil, cement, brick, ice, pig iron and steel rails, lumber and naval stores, agricultural products; all bulk freight.

Bulk freight is better fitted for water transportation, because neither swiftness nor especial care is usually required and its points of delivery are usually more concentrated. Conversely, water carriers often thus fail to get their corresponding share of back load from the merchandise products of the raw materials brought by them to the factories.

A comparison of different transportation methods is enlightening. We have, roughly, three great transportation systems—(1) rail; (2) deep water (coastwise and Great Lakes); (3) rivers and canals.

From 1889 to 1906 there has been (1) enormous increase in rail traffic; (2) a great increase of Great Lakes and coastwise traffic; (3) a decrease on the Mississippi River system and the inland canals, which practically represent the third class.

DEEP WATER.

Atlantic and Gulf coasts.—Here the through freight is very largely bulk; chiefly coal, lumber, phosphate, naval stores, cotton, refined oil, sugar, rice, and fruit. The greater volume moves northward.

Little coal goes south by water. There is also an important movement of general merchandise. There is some use of Gulf rivers as feeders, bringing bulk freight to central ports.

Pacific coast.—On the Pacific coast the principal bulk freight consists of lumber moving south and oil north; there is also considerable merchandise freight. There is a large trade with Alaska. The river traffic is relatively of much less importance.

The Great Lakes.—More than 80 per cent of this trade is bulk, with very advanced terminal development and very low transportation costs. This is due to an extraordinary combination of concentrated supplies of raw material at each end and a corresponding demand at the opposite end. Eighty per cent of the shipments and receipts of ore, coal, and grain are handled at a dozen ports. Three-fourths of the total Lake movement is eastward and southward—iron ore (45,000,000 net tons shipped in 1907), grain and flour (5,600,000 tons), and lumber (2,700,000 tons). The total westward and northward traffic in 1906 was 18,500,000 tons, of which almost 17,000,000 tons was coal, almost the only item of back load for the ore freighters. Not over 5 per cent of the traffic of the Lakes moves out of them by water into United States territory. Domestic shipments of lumber and grain are declining (although the Canadian grain traffic is increasing). General merchandise freight is about 10 per cent of the Lake traffic.

RIVERS AND CANALS.

This is the third branch of our transportation system. Its traffic, in general, is declining, especially on the Mississippi River system and inland canals. Up to 1855 traffic on the New York canals, including the Erie, was more than twice that of the railroads crossing New York State; in 1872 it was one-third, and now it is less than 3 per cent. The total traffic of all State and private canals has declined from 16,000,000 tons in 1880 to about 6,600,000 tons in 1906.

The Mississippi River system presents our greatest waterway problem. Its traffic has greatly declined since the building of parallel railroads. Excluding harbor and raft traffic, it was about 19,000,000 tons in 1906, mainly coal, lumber, railroad ties, sand, gravel, oil, cotton, sugar, rice, and farm products. But the cotton traffic is surprisingly small, considering the nearness of cotton plantations and cotton markets. The only prosperous exception of importance is the coal traffic downstream. This constitutes about 56 per cent of the entire vessel traffic on the Mississippi system. It is a highly developed long-distance bulk traffic, with the coal produced in enormous quantities directly on the river bank, near the Pittsburg district. It is, however, practically confined to markets immediately along the banks.

Otherwise, the river traffic is in a discouraging state. The great through business of earlier times no longer exists. The traffic history of St. Louis well illustrates this situation. River shipments there in 1890 were over 600,000 tons; in 1906, 89,000 tons. Rail shipments, on the other hand, in 1890 were about 5,000,000 tons; in 1906, 17,000,000 tons.

There are some small increases. Small gasoline boats doing a local business have increased, especially in a feeder traffic on tributary streams. In 1906 there were 550 of such boats. The old packet system has largely changed to barges moved by towboats. There has been a slight increase in traffic on the Tennessee River; and in the last six years between Memphis and Vicksburg.

The regular floating equipment of the Mississippi proper is not adapted for deep-sea use. Thus, of the great quantities of coal which travel 2,000 miles by river to New Orleans, none is sent beyond on river craft to points on the Gulf, however near New Orleans. There is a marked deterioration in terminals. The frequent extreme changes in water level make the terminal question a difficult one.

The upper Mississippi, so called, from St. Paul to St. Louis, has about 4½ feet depth at low water, and there is little through traffic—principally in logs. Even more is this true of the upper tributaries, including the Missouri.

CONCLUSIONS.

The situation in the Mississippi Valley is significant and serious. There is a vast and growing amount of freight in that valley to be moved both north and south; there has been, and doubtless will be again, extreme traffic congestion there. Even during the severest congestion the Mississippi River got a very small and a decreasing share of the traffic. This condition is highly unsatisfactory.

There are two basic causes: First, the physical conditions, variations in water level and the enormous deposit of sediment; second, the destructive competition by the parallel railroads, in general refusing to share the traffic with the river. Part IV of this report, now in course of preparation, will deal with this further. It is sufficient to say now that rail competition is a most important factor in water traffic, and that some cooperation between railways and waterways seems absolutely necessary to insure a reasonable use of our rivers. It is a public evil that our entire transportation system should be, as now, at odds with itself, wasting its strength in destructive internal warfare while the transportation needs of the public suffer.

Part I, already issued, considered the physical conditions of the waterways. Equally important are traffic conditions—what traffic is available, and how can it be secured?

Traffic is an absolute essential for the development of the waterways system. One of the most practical methods of improving waterways, and especially terminals, is to secure for them a fair amount of business, thus insuring their higher development by private interests. This is shown by the ore and coal business on the Lakes. At present our river and canal system, hampered by its natural defects, in unrestricted competition with the unified, standardized rail system, is helpless to secure for itself a reasonable share of the freight. It therefore can not afford to provide transportation facilities worthy of its great possibilities. Whatever may be the limitations of the waterways system, it is clear that certain easily made improvements in channels, port terminals, and especially in the regulation of the relations of railroads and waterways, can secure for the waterways a far greater proportion of business and lead to a great improvement in their condition.

Very respectfully,

HERBERT KNOX SMITH,
Commissioner of Corporations.

The PRESIDENT.

REPORT OF COMMISSIONER OF CORPORATIONS ON TRANSPORTATION BY WATER IN UNITED STATES.

Part II.—WATER-BORNE TRAFFIC.

SUMMARY.

Part II of the report on transportation by water in the United States deals with the following topics:

(1) The general nature of water-borne traffic, its development, and its present importance.

(2) Through traffic of the Atlantic and Gulf coasts.

(3) Traffic at North Atlantic ports and on tributary inland waterways.

(4) Traffic at South Atlantic ports and on neighboring rivers.

(5) Traffic on Gulf of Mexico and its tributaries, exclusive of the Mississippi system.

(6) Traffic on the Great Lakes and connecting waterways.

(7) Traffic on the Mississippi River and its tributaries and connecting canals, and the Red River of the North.

(8) Traffic on the Pacific coast and streams tributary to the Pacific.

There are very important differences between coastwise, Great Lakes, river and canal, and harbor traffic, although, owing to the incomplete nature of available statistics, these classes can not always be accurately separated.

Following is a brief statement of the results of this part of the investigation:

Domestic water-borne traffic is mainly in passengers and freight. Both the domestic express and mail movements are unimportant, and except in the coastwise trade and on the Great Lakes the same is true also of the movement of passengers. Of the total of more than 366,000,000 passengers by water reported to the Census in 1906, nine-tenths were carried by ferryboats. Those carried by other than ferryboats were less than one-twentieth of the number of passengers carried by rail.

IMPORTANT CLASSES OF FREIGHT.

Freight moved by water includes two general classes—first, so-called package freight, usually, but not always, in bags, boxes, barrels, or other packages, and also referred to as "general merchandise," "miscellaneous merchandise," or "steamboat freight;" and, second, bulk or coarse freight, usually shipped in cargo lots, and embracing the products of mines, fields, and forests. Freight moved by water in American vessels in 1906, including harbor traffic, but excluding logs and lumber rafted and floated, aggregated more than 265,000,000 tons, as contrasted with 130,000,000 reported by the Census in 1889. Nearly all of this is domestic traffic, foreign traffic being mainly carried in foreign vessels.

On the coasts and the Great Lakes there was a very marked increase in the traffic from 1889 to 1906, that of the Great Lakes having trebled and that on the Atlantic and Gulf coasts having nearly trebled. On the other hand, on the Mississippi River and tributaries there was an actual decline, and on other inland waters reported separately by the Census (mostly canal traffic) there was a very marked decline during this period.

Excluding harbor and raft traffic, the water-borne traffic in American vessels for 1906 amounted to 177,519,758 tons, of which 42.6 per cent moved on the Great Lakes and 36.8 per cent on the Atlantic and Gulf coasts and rivers. Of this traffic, more than one-half the tonnage consists of certain crude minerals (coal, iron ore, stone, and sand). Other bulky mineral products, such as petroleum and other oils, cement, brick, lime, ice, phosphate and fertilizer, and pig iron and steel rails constitute the third largest group. Lumber and naval stores form the second largest group, and the movement of logs and timber in rafts, which is not reported, would increase the total for forest products by a large amount. Agricultural products, including grain, flour, fruits and vegetables, cotton, and tobacco, also form an important group in volume, and more important if the value of the commodities is considered. The above commodities, most of which are shipped as bulk freight, together form over 80 per cent of the traffic in American vessels.

Package and miscellaneous freight comprises about one-fifth of the movement reported for 1906, and is of the greatest importance on the Atlantic and Gulf coasts, where it represents nearly 30 per cent of the volume of freight handled. The movement of this class of traffic is, however, of varying degrees of importance on all of the water routes of the country.

SPECIALIZATION OF TRAFFIC BY DISTRICTS.

Traffic is considerably specialized by districts. Coal forms the largest tonnage of any single commodity. In 1906 about 70,000,000 tons were shipped, or excluding harbor traffic over 49,000,000, nearly

30 per cent of the total freight in American vessels. The largest part of this movement is that on the North Atlantic coast, but immense quantities of coal are moved on the Great Lakes and also down the Monongahela, Ohio, and Mississippi rivers. Coal is also an item of large relative importance on the canals. On the Pacific coast the movement of coal is of minor importance and is declining with the increased use of petroleum for fuel purposes.

Next to coal comes iron ore, aggregating over 41,000,000 net tons in 1906. Practically the whole of this movement is on the Great Lakes, where it is more than half of the total freight tonnage carried.

Stone and sand, with other building materials, are largely carried on the Atlantic and Gulf coasts and on the rivers of the Mississippi Valley, aggregating about 15,000,000 tons in 1906. These commodities, however, are, for the most part, carried over short distances, in contrast with the long-distance movement of coal and iron ore.

Lumber still represents an important part of the movement by water in all the districts. The Census figures for 1906 are over 7,000,000,000 feet, or over 14,000,000 tons, but, lacking the movement by rafts, the statistics of these movements are incomplete. The transportation of grain and flour by water is of largest importance on the Great Lakes, where two-thirds of the 7,669,000 tons of these commodities reported for 1906 were carried. The domestic trade in grain on the Lakes shows some decline in recent years. Crude petroleum is moved by tank steamers in large quantities on the Atlantic, Gulf, and Pacific coasts.

The movement of phosphate and fertilizer, cotton, fruits, vegetables, tobacco, and naval stores is mainly on the Atlantic and Gulf coasts. Ice moves chiefly from ports on the larger rivers of Maine and from the Hudson River to New York City and southern ports. This traffic has declined, probably due to the development of ice manufactories. Crude phosphate is shipped from Florida and South Carolina, while other fertilizer materials and fertilizers are shipped from North Atlantic ports to the South. Naval stores and cotton are shipped mainly from the South Atlantic and Gulf to northern ports. Pig iron and steel rails are items of some importance on the Atlantic and Gulf coasts and on the Great Lakes.

THROUGH MOVEMENT ON THE ATLANTIC AND GULF COASTS.

The total traffic in American vessels on the Atlantic and Gulf coasts, as reported by the Bureau of the Census for 1906, amounted to 140,512,043 tons, including harbor traffic, and to 65,360,958 tons, excluding harbor movement. Most of this is domestic traffic. The Atlantic and Gulf coasts may be divided into three districts—North Atlantic, South Atlantic, and Gulf. There is a very large through movement between these districts, and also a large local traffic within

the North Atlantic district and some local traffic in the other two districts.

Four Atlantic ports, sometimes called "the Atlantic portals"—Boston, New York, Philadelphia, and Baltimore—stand out conspicuously in coastwise as also in foreign commerce. Each of these is the distributing point for an important area and also the terminal of trunk lines of railroads connecting the agricultural and manufacturing sections with the seaboard. Among other ports of importance on the Atlantic and Gulf coasts are Portland, Me., Providence, Wilmington, Del., Norfolk, Wilmington, N. C., Charleston, Savannah, Jacksonville, Mobile, New Orleans, and Galveston.

At the various ports traffic is specialized to a large extent. Some ports are identified with the movement of certain commodities, while at the larger ports special terminals are provided for different classes of traffic.

Coal is shipped from about a score of terminals at the five ports of New York, Philadelphia, Baltimore, Newport News, and Norfolk. Nearly 39,000,000 tons were shipped from these five ports in 1906, and 44,000,000 in 1907, over 60 per cent from terminals in and about the port of New York. Much of this moves only in the harbors and for short distances locally; but nearly half is delivered by barges at numerous points along the New England coast, over 1,000,000 tons going annually to New Haven, over 2,000,000 tons to Providence, and about 4,500,000 tons to Boston.

Lumber and naval stores are shipped from Jacksonville and Fernandina, Fla., Brunswick and Savannah, Ga., Charleston and Georgetown, S. C., Wilmington, N. C., and Norfolk and Newport News, Va., on the South Atlantic, mostly to points in the Middle Atlantic States. Receipts of southern pine at New York by water are over 450,000,000 feet. There is also a movement of eastern spruce from New England ports. Lumber is still carried to a large extent in sailing vessels, but steamships and steam-towed schooner barges are doing an increasing proportion of the business.

Cotton still occupies an important position in the Atlantic and Gulf coastwise trade. Recently there have been important changes in the relative rank of the different ports, and a general substitution of steam for sailing vessels in the carriage of this commodity. Galveston is the most important shipping point for cotton, both foreign and coastwise, but is closely followed in the coastwise trade by Savannah and Norfolk. New York is the principal receiving port, and Boston ranks second.

Petroleum is shipped in large quantities from Port Arthur and Sabine Pass, Tex., amounting to over 10,700,000 barrels in 1906, and 8,700,000 barrels in 1907. There is also a large movement of refined oil from refineries in New York Harbor and on the Delaware River

to New England and southern ports. Crude phosphate is shipped mostly from points in Florida and South Carolina; and fertilizers and fertilizer material are received in large quantities at southern ports from the North.

Another important movement is the interchange of general merchandise between the ports of New York, Philadelphia, and Baltimore, and New England ports, and between the principal North Atlantic and the South Atlantic and Gulf ports. Other through movements include ice, fish, and granite from New England.

Trade with Porto Rico is carried on mainly from New York and New Orleans. Shipments to the United States consist mostly of sugar, with considerable tobacco and cigars and fruits. Shipments to Porto Rico include a large variety of manufactured goods.

NORTH ATLANTIC PORTS, RIVERS, AND CANALS.

Turning to the traffic within the three principal districts, above distinguished, it appears that much the greater part of this is in the North Atlantic district. This may be further divided into several subdistricts.

THE "GULF OF MAINE"—PORTLAND AND BOSTON.

This is the great indentation between Nova Scotia and Cape Cod. It is further indented by numerous bays and harbors and tidal rivers, the most important of which are Lubec Channel, Penobscot Bay, Kennebec River, Casco Bay, Portsmouth Harbor, Massachusetts Bay (including Boston Bay), and Cape Cod Bay. There is a considerable local movement in coastwise vessels between and along these bays and rivers. Boston and Portland are its most important ports. Portland has a considerable foreign commerce in grain and flour as well as a large coastwise trade carried chiefly by sailing vessels. Its total freight tonnage (domestic and foreign) in 1906 was 2,547,000, about one-half of which was coal. Boston, the chief port of New England, is one of the most important in the country, ranking second in foreign trade to New York, and third of the Atlantic ports in domestic trade. Coal is the largest item of coastwise receipts at Boston, amounting to 4,500,000 tons annually. Lumber receipts in 1906 amounted to 165,000,000 feet, more than two-thirds from the South. Much cotton is also received, and there is an important movement of general merchandise between Boston and other Atlantic ports north and south. The total traffic in American vessels at Boston, as reported by the Census for 1906, was 7,420,574 tons, mainly coastwise.

SOUTH COAST OF NEW ENGLAND.

This coast has a series of sounds and bays furnishing protected or "inside" routes from New York to various ports in Connecticut,

Rhode Island, and southeastern Massachusetts, where connection is made by rail with many industrial communities. The projected Cape Cod Canal will extend the inside route practically to Boston. The "outside" route south of Long Island is used in the trade from the Middle and South Atlantic ports.

New Bedford, on Buzzards Bay, has a large trade in coal, cotton, and whale oil. Narragansett Bay has several ports of some importance: Newport has a considerable trade in coal, lumber, and fish, and is also used as a harbor of refuge for coal barges and other vessels. The city of Fall River, at the entrance to Taunton River, has an important coasting trade, large cargoes of coal and cotton being brought to its factories and also large quantities of steamboat freight (or general merchandise) for transshipment by rail to Boston and other points. Providence is of considerable importance in the coastwise trade, with regular lines of steamers to New York and Baltimore. Coal is the most important article received, but there is also a large volume of general merchandise and a movement of lumber, building materials, oil, and oysters. The total water-borne commerce for 1906 was over 3,000,000 tons, mostly domestic.

The commerce of Long Island Sound includes most of that to and from points in Narragansett Bay and a large part of the traffic from New York to the eastern coast of New England, besides receipts and shipments at points along the Sound. The Thames River is a tidal stream for a distance of 15 miles from its mouth to Norwich. New London, on this river, has a large trade in general merchandise and coal. On the Connecticut River there is considerable commerce, both in steamers and barges, as far as Hartford, Conn., consisting mainly of coal, lumber, building materials, and miscellaneous steamboat freight. New Haven is commercially the most important harbor on Long Island Sound, with a large trade in coal and general merchandise, and a considerable movement of lumber, oysters and shells, steel billets, and petroleum products. The water-borne commerce in 1906 amounted to 2,300,000 tons, nearly all domestic. Bridgeport, a manufacturing city, has a large carrying trade by water. Less important points include Norwalk, Stamford, and Port Chester.

PORT OF NEW YORK.

The port of New York covers an extensive area, embracing both Upper and Lower New York bays, and their connecting channels, with a total water front of about 450 miles, of which about 125 miles are available for ocean steamships. New York is by far the most important center of water-borne commerce in the United States. Its foreign commerce is many times that of any other port, and nearly one-half the total foreign commerce of the country; and the coastwise

and local harbor traffic is also many times that of any other port in the United States.

According to the Census report for 1906, the total traffic for New York Harbor and adjacent points is as shown below:

	Shipments.	Receipts.	Total.
Traffic in American vessels (mostly coastwise):[a]	*Tons.*	*Tons.*	*Tons.*
New York City	8,598,374	17,507,906	26,106,280
Adjacent ports[b]	6,758,978	960,350	7,719,328
Total	15,357,352	18,468,256	33,825,608
Foreign trade (estimated)	14,963,162	10,049,167	25,012,329
Harbor traffic			55,131,418
Grand total	30,320,514	28,517,423	113,969,355

[a] So far as foreign trade is carried in American vessels, there is a duplication in the total, but nearly all the trade in American vessels is domestic trade.
[b] Hoboken, Jersey City, Newark, Perth Amboy and South Amboy.

INLAND WATERS OF NEW YORK STATE.

The inland water routes of the State of New York embrace the New York State canals and the Hudson River, which connect the Lakes with the port of New York by three routes, and Lake Champlain, which serves also Burlington, Vt. The commerce of the Hudson consists principally of lumber, grain, ice, building materials (including brick) and coal. There is also an extensive passenger traffic. There has been a considerable falling off in river freight at Albany from 5,071,000 tons in 1899 to 3,326,000 tons in 1906. The total traffic of the Hudson River above New York City in 1906 (according to the Census) was 8,655,000 tons.

Up to 1855 the traffic on the New York canals was more than twice that of the railroads crossing New York State; until 1864 it was greater than that of the railroads, and in 1872 the canal traffic was one-third of the total traffic crossing the State. Since that time, and in spite of the abolition of canal tolls, there has been a steady decline until the past ten years. During the latter period canal traffic held its own in absolute amount, but the decline in the proportion of the total amount of traffic carried by the canals has been continuous, until at present the New York canals carry less than 3 per cent of the total traffic across New York State. The total traffic on canals in 1907 was 3,408,000 tons. Furthermore, in the last few years there has been an increase in local and way canal freight and a decline in through traffic, so that the way traffic now constitutes more than two-thirds of the total canal tonnage. Stone, lime and coal together form the largest proportion of the total tons moved; grain, lumber and wood have declined, but are still among the important articles.

The commerce of Lake Champlain consists principally of coal, pulp wood, building materials, and general merchandise.

DELAWARE BAY AND PHILADELPHIA.

The commerce of Delaware Bay and its tributaries and connecting canals is exceeded by only two or three local districts in the United States. It includes the extensive trade of Philadelphia, the important traffic of Wilmington, Del., and a considerable local movement on the Delaware River, its tributary streams, and a number of private canals.

The port of Philadelphia is on the Delaware River, about 86 miles above the Capes of the Delaware. Greenwich and Port Richmond, important shipping points for the coastwise movement of coal are within the port of Philadelphia. Marcus Hook, with great petroleum shipments, is near by. Philadelphia is well situated with reference to waterways, and connected with many inland points, as well as domestic and foreign ports. It is one of the great exporting points and also has an extensive domestic commerce. Domestic shipments on the Delaware River for 1906, as reported to the United States engineers, amounted to 12,228,000 tons, and domestic receipts by water to 8,349,000 tons, a total of 20,577,000 tons. This total involves some duplication in the case of local movements. The Census report gives the traffic in American vessels at Philadelphia for 1906 at 7,934,941 tons, excluding harbor traffic.

Wilmington, Del., has some foreign trade and a considerable domestic commerce by water, while the important shipbuilding and other manufacturing interests of the city are largely dependent upon the navigation facilities.

Connecting with the Delaware River are a number of tributaries and private canals—Cooper and Mantua creeks, Mispilion and Smyrna rivers, the Morris, Delaware and Raritan, Lehigh, and Delaware Division canals, the Schuylkill Navigation, and the Chesapeake and Delaware Canal connecting Delaware River and Chesapeake Bay. The traffic movement on these minor waterways is comparatively small, and that on the canals, except on the Chesapeake and Delaware Canal, has been slowly declining during the past ten years.

CHESAPEAKE BAY.

This is the largest bay on the Atlantic coast. It is the center of a large foreign and coastwise movement converging at Baltimore, Newport News, and Norfolk, and there is also a large local movement on the bay and its numerous tributary rivers. The rivers of the eastern shore are of less general importance than those of the western, but are much used by local steamboats and small craft engaged in oyster dredging and local trade.

Baltimore is located on the north branch of the Patapsco River about 11 miles from its entrance into the Chesapeake Bay. At this

port are the terminals of a number of steamship lines operating to many points on the Atlantic coast and on Chesapeake Bay and its tributary streams. In the foreign trade Baltimore ranks fourth among the Atlantic ports in the tonnage of vessels. In the coastwise trade the largest volume consists of coal shipped north and south, amounting to 3,400,000 tons in 1906 and 4,070,000 tons in 1907. There is also an important movement of package freight. The total traffic in American vessels, according to the Census, was 5,437,850 tons in 1906, nearly all coastwise.

Washington is the center of a considerable trade in coal, lumber, and ice, and a market for farm produce, oysters, and fish moved over the Potomac and Anacostia rivers. Traffic on the Chesapeake and Ohio Canal consists almost entirely of bituminous coal from Cumberland, Md., to Washington. There is also some traffic on the Rappahannock and York rivers.

SOUTH ATLANTIC PORTS AND RIVERS.

The water traffic within the South Atlantic division is small as compared with that of the North Atlantic division. The greater part of the domestic traffic of South Atlantic ports is with the North. There is but little local movement between these ports on the open sea, but the numerous rivers, bays, sounds, and lagoons along the South Atlantic seaboard have a considerable local traffic in the staple commodities of this section, with return shipments of plantation supplies and general merchandise. The inland manufacturing towns are generally supplied with coal by rail from local southern coal fields, and there is accordingly no large water movement of coal to southern ports for inland distribution. The foreign trade is carried very largely in tramp steamships, but the coastwise trade is sufficiently regular and large to employ regular lines of steamers to northern ports.

SOUTH ATLANTIC PORTS.

Norfolk and Newport News, at the southern end of Chesapeake Bay, near Hampton Roads, have a large and varied commerce, including important shipments of coal. The total water-borne commerce of Norfolk reported to the United States engineers for 1905 was 10,914,000 tons, and for 1906, 15,662,000 tons. The traffic in American vessels at Norfolk and Newport News, according to the Census of 1906, was 10,488,576 tons, practically all coastwise.

Wilmington, the chief port of North Carolina, is on the Cape Fear River, about 27 miles above its mouth. Its total commerce by water for 1906 was about 800,000 tons, including logs and lumber rafted; traffic in American vessels was 267,139 tons.

The two principal ports of South Carolina are Georgetown, on Winyah Bay, and Charleston, at the confluence of Cooper and Ashley rivers. The commerce of Georgetown for 1906 amounted to 393,000 tons. Charleston has some foreign and considerable coastwise trade, but has declined as a cotton port. The foreign and coastwise commerce for 1906 amounted to 835,000 tons; traffic in American vessels, 718,680 tons.

Savannah, on the Savannah River, about 15 miles above the entrance, is the principal port of Georgia, and is one of the most important South Atlantic seaports for the shipment of cotton, lumber, and naval stores, which are received from the interior by rail and to some extent by river. The traffic in American vessels in 1906 was 1,490,363 tons. Brunswick and Darien, Ga., are also important shipping points for lumber.

On the Atlantic coast of Florida are the two important ports of Fernandina and Jacksonville, with a total commerce by water in 1906, as reported to the United States engineers, of 955,000 and 2,115,000 tons, respectively. The Census gives the traffic in American vessels at Jacksonville at 993,566 tons. At the southern end of the peninsula there is a small movement centering at Miami.

RIVERS AND OTHER INLAND ROUTES.

There is considerable traffic on the James River. Through the Dismal Swamp and Albemarle and Chesapeake canals there is some movement of forest products and other traffic between Norfolk and the rivers and sounds of North Carolina. There is also considerable local traffic on the tributaries of Albemarle and Pamlico sounds and some on the Cape Fear River. In South Carolina there is a local movement of some importance on the Waccamaw, Pedee, and Santee rivers. There is also some local traffic, mostly of lumber, on the Savannah, Altamaha, and Ocmulgee rivers in Georgia, and a considerable movement on the St. Johns River in Florida. The inside coast routes have but little traffic.

GULF PORTS AND RIVERS (EXCLUSIVE OF THE MISSISSIPPI).

PRINCIPAL GULF PORTS.

The chief Gulf ports, in the order of importance, are New Orleans, Galveston, Mobile, Port Arthur, Pensacola, Tampa, and Key West. Each has considerable export and coastwise trade moved by steamship lines and sailing vessels. Of coastwise shipments, the greater part are to northern ports, the remainder representing a local movement between Gulf ports.

Several steamship lines run from Mobile to ports in Central America, Mexico, and Cuba, and a number of tramp steamers to

Europe. A steamship line operates between Mobile and New York, and several local lines run to neighboring Gulf ports and river ports, including Montgomery. Important bulk commodities handled at Mobile are lumber and timber, cotton, and coal. The total commerce reported by the United States engineers for 1906 was 1,373,000 tons, of which 302,000 tons was coastwise. Traffic in American vessels was 363,000 tons, according to the Census report.

New Orleans is on the Mississippi River about 100 miles from the Gulf. The port facilities for handling cargoes are excellent. Rail lines from all directions converge here, and there are regular lines of steamers to Tampa, Baltimore, and New York, and also to Mexico, Central America, Panama, Havana, Porto Rico, and European ports, besides many tramp vessels. In the foreign trade, New Orleans is an important point of import for the products of Central and South America and the West Indies. In exports it is also of much importance, particularly in the cotton trade. New Orleans is a natural port of export for cotton and grain. In the coastwise trade shipments are made up of cotton, rice, citrus fruits, and other agricultural products, lumber, sugar, molasses, etc., the most important traffic being with New York. The total water-borne commerce of New Orleans (foreign, coastwise, and river) for 1906 was 5,702,000 tons, three-fifths of which was foreign trade. The coastwise movement reported to the United States engineers amounted to 694,000 tons. According to the Census, the foreign and coastwise traffic in American vessels at New Orleans for 1906 was 1,924,484 tons. The river commerce of New Orleans will be considered in connection with the Mississippi River.

Galveston is the principal port of Texas, and the second Gulf port in importance. According to the United States engineers, it has the largest coastwise trade of any of the Gulf ports, amounting in 1906 to 832,000 tons. The Census reports the traffic in American vessels for 1906 at 1,695,897 tons. Several important lines of steamers run regularly to Atlantic ports, and it also has a large foreign trade in cotton, cotton-seed products, sugar, coal, and general merchandise.

TRIBUTARY RIVERS.

The maritime commerce of the Gulf ports is fed to some extent by tributary rivers. Of these, the most important are the rivers of the Alabama system, including the Mobile, Alabama, Coosa, and Tombigbee. Other Gulf tributaries with local traffic of some importance include the Withlacoochee, in Florida; the Apalachicola and its tributaries, in Florida and Georgia; the Pascagoula, Leaf, and Chickasahay, in Mississippi; the Chefuncte and Calcasieu rivers and bayous Plaquemine and Teche, in Louisiana, and the Neches, Sabine, and San Jacinto rivers, in Texas.

GREAT LAKES AND CONNECTING WATERWAYS.

The principal characteristics of Lake commerce are the preponderance of eastbound over westbound shipments and the fact that the traffic is mainly in a few commodities—iron ore, grain, coal, and lumber. There is a considerable movement of miscellaneous and package freight, both local and through, but it is small compared with the enormous bulk-freight traffic in the crude products of contiguous mines, forests, and grain fields.

Through traffic constitutes the greater part of the total freight movement. The main course of this lies between the western extremity of Lake Superior and the southern shore of Lake Erie.

The Lake traffic was not reported as a whole prior to 1889, when, according to the Census, the domestic traffic amounted to 25,266,974 net tons. The domestic traffic amounted to 45,000,000 tons in 1901, and in 1907 to more than 80,000,000 (shipments 83,507,000 and receipts 81,124,000 net tons).

MOVEMENT OF COMMODITIES.

Iron ore and coal form by far the greater part of the Lake traffic, and furnish together 98 per cent of the total increase from 1905 to 1907. The movement of lumber during these years has declined in importance; other traffic has remained about stationary, except the movement of package and miscellaneous freight, which has increased.

Since 1890, with the development of the Lake Superior mines, the United States has taken first rank among the world's iron producers. Of the total domestic production of iron ore, approximately 80 per cent was transported by way of the Great Lakes (41,000,000 net tons in 1906 and 45,500,000 net tons in 1907), constituting in some years more than half of the total domestic Lake traffic.

Next in volume to iron ore, and first in the westbound Lake traffic, is the westbound movement of coal. This was over 21,000,000 tons in 1907, representing about a fourth of the domestic Lake traffic.

In the movement of flour and grain (eastbound) there is active competition between the Lake and all-rail routes, and with the decline in export trade the domestic movement on the Lakes has declined to some extent in recent years, to about 150,000,000 bushels of grain and 1,300,000 tons of flour in 1907. There has been an increase of traffic from American ports to Canada and also between Canadian ports.

The traffic in logs and lumber is decreasing in volume and still more in relative importance. Nevertheless, it still constitutes one of the leading items.

Some of the less important forms of traffic are the movement of copper, salt, and pig iron. About 100,000 tons of copper ore are annually shipped, mainly from the copper district in the Upper

Peninsula of Michigan. Salt is shipped by Lake in considerable quantities from Manistee and Ludington, Mich., and in smaller quantities from Buffalo and other points. Pig iron moves in small lots between a considerable number of ports.

Package and miscellaneous freight has increased about 50 per cent from 1901 to 1907, and forms nearly a tenth of the total traffic.

TRAFFIC BY LAKES AND PORTS.

Lake Superior shows the largest volume of shipments of any of the Great Lakes, domestic shipments aggregating over 40,000,000 tons in 1906. About 65 per cent of the total traffic of the Lakes passes in or out of Lake Superior through St. Marys Falls canals. Lake Erie has the largest receipts (43,600,000 tons in 1906 and 47,000,000 in 1907 in the domestic traffic), is second in volume of shipments (18,450,000 tons in 1906), and has the largest proportion of the total traffic. Lake Michigan ranks third, but has the largest amount of local traffic.

Notwithstanding the large number of Lake ports, about a dozen ship and receive 80 per cent of the water-borne traffic. Duluth-Superior is the most important port for shipments and has the largest water-borne traffic of any of the Lake ports, aggregating over 29,000,000 tons in 1906, mainly ore, grain, and coal. Chicago and Milwaukee are among the leading ports, both for shipments and receipts. The Lake commerce of Chicago amounts to about 10,000,000 tons annually, and that of Milwaukee to 6,000,000 tons. Buffalo and Cleveland are also ports of first importance, both in the volume and in the variety of their commerce, and Buffalo has the largest receipts of any of the Lake ports. The Lake commerce of Buffalo for 1906 exceeded 15,500,000 tons (domestic traffic 14,345,000 tons), and, including canal traffic, the total water-borne commerce of Buffalo was over 17,320,000 tons. The Lake commerce of Cleveland for 1906 was 12,247,000 tons (domestic traffic 11,670,000 tons). Other important but more specialized ports include Two Harbors, Ashland, and Marquette, on Lake Superior, and Escanaba, on Lake Michigan, for shipments of ore; Toledo, Ashtabula, Lorain, Conneaut, and Erie, on Lake Erie, for receipts of ore and shipments of coal, and Tonawanda for receipts of lumber.

MISSISSIPPI RIVER AND TRIBUTARIES.

This is the greatest of our inland river systems, and belongs in a class by itself. It includes not only the Mississippi itself, but also the Ohio, Missouri, Illinois, Arkansas, Ouachita, Red, and Yazoo rivers, with their tributaries, together with a number of other rivers of minor importance. The state canals of Ohio and Illinois are also connected with this system.

The commerce of these various waterways has not kept pace with the general industrial progress of the Middle West. The methods of competition of railroads and the limitations imposed in the competition of boat lines with railroads by the physical characteristics of the rivers in their present condition are the prime causes that have contributed to the decline of river traffic. The boat lines have been handicapped in their competition with rail carriers by the tortuousness of the channel and by the limited and varying depths, causing at times a practical suspension of traffic. They have made little advance in methods for a long time, while the railroads have made important improvements both in physical conditions and in business methods. These improvements, adapted to the changing needs of commerce, in the absence of corresponding improvements in the rivers, have resulted disastrously to the boat lines. To-day the principal long-distance shipments by river consist of coal from the Ohio and its upper tributaries to lower Ohio and Mississippi River points, and of logs, lumber, and railroad ties on the whole system, the bulk of the traffic moving downstream.

OHIO RIVER AND TRIBUTARIES—PITTSBURG.

The Ohio with its tributaries has now the most important river traffic in the country. Coal carried in barges from the Monongahela and other tributaries forms the largest part of this movement. Lumber, sand, and gravel are other bulk commodities moved in barges. Logs and timber are rafted in considerable quantities. There is also a considerable amount of miscellaneous and manufactured articles transported in mixed cargoes on packet steamers. In the latter movement local traffic is relatively more important than formerly, owing to the disappearance of through packet lines.

Pittsburg has now the largest river commerce of any inland city in the country. Coal from the Monongahela is received in large quantities, and there is a large harbor movement of sand. Receipts and shipments by river for 1906, according to the Census, amounted to 6,854,575 tons, and including harbor traffic to 8,956,697 tons. Reports to the United States engineers show a total traffic in Pittsburg Harbor for 1906 of 12,927,975 tons.[a] At Cincinnati receipts and shipments by river for 1906 amounted to 2,363,215 tons; at Louisville to 1,203,727 tons, the total river traffic at Louisville being reported to the United States engineers at 1,436,674 tons. Other places of importance on the Ohio and its tributaries include Wheeling, Parkersburg, Marietta, and Evansville; Nashville, on the Cumberland River; Knoxville, Chattanooga, and Florence, on the Tennessee River, and Cairo, at the junction of the Ohio and Mississippi. Traffic on the Ohio State canals is unimportant.

[a] This probably includes the movement of coal from the Monongahela River to points on the Ohio below Pittsburg, which simply passes through Pittsburg Harbor.

The traffic of the Ohio River and its more important tributaries for 1906 is shown in the following table:

Rivers.	U. S. Census.[a]		U. S. engineers,[b] total traffic.
	Shipments.	Receipts.	
Monongahela	8,925,923	545,716	11,817,128
Muskingum	13,826	11,073	28,433
Little Kanawha	11,239	6,953	70,289
Kanawha	975,031	63,832	1,327,708
Big Sandy	1,776	4,887	205,452
Kentucky			184,244
Green and Barren	305,144	80,902	416,908
Wabash	42,427	30,537	
Cumberland	348,697	178,951	558,250
Tennessee	678,501	472,759	1,578,760
Ohio	3,142,097	12,296,037	11,427,784
Other[c]	782,144	345,289	
Total	15,226,805	14,036,946	

[a] Excluding logs and rafted lumber. [b] Including logs and lumber.
[c] Allegheny and Kentucky rivers.

The statistics of the United States engineers give the total traffic on each river, and a total of these figures would duplicate the traffic moving from one stream to another. Shipments and receipts on the whole Ohio system represent practically the same traffic. The total shipments should indicate the total traffic of the Ohio system, but the Census figures do not include the movement of rafted logs and lumber, and including this and harbor traffic (2,354,000 tons), the total shipments on the Ohio and tributaries were probably about 20,000,000 tons in 1906.

The Census figures show a considerable decline on practically all of these rivers except the Monongahela from 1889 to 1906, and a small decline on the Ohio system as a whole; but the principal decrease indicated is in lumber, the rafted movement of which was partly reported in 1889 and not in 1906. Including coal, the total traffic has probably increased, but shipments of miscellaneous merchandise decreased from 2,819,000 tons in 1889 to 1,314,000 tons in 1906.

UPPER MISSISSIPPI—ST. LOUIS.

The commerce of the upper Mississippi and its tributaries is relatively unimportant and declining. It consists mainly of local traffic, largely of rafted logs and lumber, and of sand. Traffic on the canals connecting the Mississippi with the Great Lakes is even less important. St. Louis is a converging point for traffic from the upper Mississippi and to a slight extent from the lower Mississippi, the Missouri, the Illinois, the Ohio, the Cumberland, and the Tennessee rivers. But river commerce at St. Louis has declined steadily during the past fifteen years. The St. Louis Merchants' Exchange reports shipments and receipts of 1,266,000 tons in 1890, of 757,000 tons in

1900, and only 417,000 tons in 1906. Shipments in 1890 were 602,000 tons, and in 1906 only 89,000 tons. The Census reports the total shipments and receipts in 1906 as 743,981 tons, including 309,000 tons of sand and stone. The harbor traffic is reported at 969,000 tons.

LOWER MISSISSIPPI—MEMPHIS AND NEW ORLEANS.

This includes the river from St. Louis to New Orleans. Here the most important through traffic is coal from the Ohio. At Memphis, Greenville, Vicksburg, Natchez, and other places there is some river traffic in coal, lumber, and plantation products and supplies. Memphis is one of the few ports on the Mississippi showing an increase in river traffic in recent years. The traffic in 1906 was 857,000 tons, and that at Vicksburg 375,000 tons. At New Orleans the receipts of bituminous coal by river from the Ohio are estimated at about 1,200,000 tons annually. Cotton, cotton seed and its products, sugar, molasses, and rice are also received at New Orleans from various points on the lower Mississippi and other streams in this territory. There is also considerable traffic in crude petroleum from Louisiana, on the lower Mississippi. The various short canals more or less directly connected with the New Orleans river trade are commercially of comparative unimportance. The total river traffic at New Orleans in 1906, according to the Census, was 1,144,113 tons, and according to reports to the United States engineers was 1,666,000 tons.

Below is given a summary of the traffic reported on the several sections of the Mississippi and some of its tributaries (other than the Ohio) for 1906:

Rivers.	U. S. Census.[a]		U. S. Engineers,[b] total.
	Shipments.	Receipts.	
	Net tons.	*Net tons.*	*Tons.*
Upper Mississippi	595,885	597,025	5,282,319
Illinois	105,826	105,002	.....
Missouri and other tributaries	1,056,390	1,051,474	573,348
Total	1,758,101	1,753,501	5,855,667
Lower Mississippi	[c] 2,329,350	3,487,137	.....
St. Louis to Cairo	.....	.....	458,016
Cairo to Memphis	.....	.....	1,719,893
Memphis to Vicksburg	.....	.....	2,355,901
Vicksburg to New Orleans	.....	.....	2,554,326
St. Francis	[d]	[e]	151,015
White	43,933	25,433	127,812
Arkansas	24,994	35,871	104,593
Yazoo	108,357	62,325	227,611
Ouachita and Black of Louisiana	25,136	18,998	171,952
Red	14,417	8,481	112,273
Other rivers	.....	[c] 102,401	.....
Total	2,546,187	3,740,646	.....

[a] Excluding logs and rafted lumber. [b] Including logs and lumber.
[c] Including the Atchafalaya, Black of Arkansas, Black Bayou, Lafourche, Macon Bayou, St. Francis, and Tensas.
[d] Included in lower Mississippi. [e] Included in other rivers.

The traffic reports to the United States engineers give each stream and the sections of the lower Mississippi separately, and a total of these would include duplications to a large extent. The Census figures, on the other hand, do not show the movement of logs and rafted lumber, while the shipments on the lower Mississippi do not include the coal movement from the Ohio. The shipments on the upper Mississippi and the receipts on the lower Mississippi indicate a total traffic on the Mississippi of 5,500,000 tons, excluding logs and rafted lumber and harbor traffic. Including rafts and harbor traffic, the total movement on the Mississippi and tributaries, exclusive of the Ohio system, is probably about 12,000,000 tons.

For the entire Mississippi system, the total shipments and receipts from one port to another, according to the Census, as shown below, amounted to 19,531,093 tons in 1906. Including rafts, the movement would be about 25,000,000 tons, and including also harbor traffic (5,190,291 tons) the total would be about 30,000,000 tons.

	Shipments.[a]	Receipts.[a]	Harbor movement.[a]
	Net tons.	*Net tons.*	*Tons.*
Ohio River system	15,226,805	14,036,946	2,354,147
Upper Mississippi system	1,758,101	1,753,501	482,090
Lower Mississippi system	2,546,187	3,740,646	2,354,054
Total	19,531,093	19,531,093	5,190,291
Car ferries (estimated)	.....	.....	6,905,597

[a] Excluding rafts.

The Census reports show a large decrease in traffic on both upper and lower Mississippi and for the whole Mississippi system from 1889 to 1906. The extent of this decrease is, however, somewhat exaggerated by the omission of rafted logs and lumber from the statistics of 1906, although these were partially included in 1889, and the largest decrease indicated is in the movement of lumber. But the movement of grain, cotton, and miscellaneous merchandise has fallen to small proportions; and while coal, petroleum, and sand have increased, the total traffic on the whole system is undoubtedly a good deal less than in 1889. The most important increase has been the coal traffic of the Monongahela; there has been an increase of miscellaneous freight on the Cumberland, the Tennessee, and the Yazoo rivers, and the total volume of traffic on the Yazoo has increased to some extent.

PACIFIC COAST AND TRIBUTARIES.

The water traffic of the Pacific Coast States is mainly in raw materials and agricultural products, such as wheat and its products, barley, live stock, fruits, hops, and the products of forests and streams.

A recently developed traffic has followed the discovery of oil fields in southern California. Generally speaking, the articles mentioned, with the wool, live stock, and minerals of the Rocky Mountain States, constitute most of the traffic in this territory, whether coastwise, by river, or by rail.

The important political events of the past few decades have increased considerably the water-borne commerce of the Pacific coast. The mining and commercial development of Alaska, as well as the demand on the part of oriental countries for the products of the West, have aided in this development, as have also the extension of railroad facilities and the introduction of new crops and industries. One serious drawback has been the scarcity of coal, which is now being partially met by the use of oil for fuel purposes.

The principal bulk coastwise shipments are products of the forests and petroleum. Lumber is moved in large and increasing quantities from Puget Sound, the Columbia River, and the coasts of Washington, Oregon, and upper California. Cargo shipments from Washington and Oregon have increased from 398,000,000 feet in 1894 to 1,443,000,000 feet in 1907; and, including upper California, the total cargo shipments for 1907 were 1,880,000,000 feet. Most of this movement is coastwise.

Petroleum is shipped, mainly in tank steamers, from Port Harford and other points between San Diego and San Francisco to coast points and Hawaii. Shipments in 1906 amounted to nearly 11,000,000 barrels, or about 1,700,000 tons. Some grain moves coastwise from Oregon and Washington to San Francisco, amounting to 3,848,000 bushels in 1907. There is a considerable movement of coal by water from Puget Sound to Coos Bay (Oregon) to other Pacific coast points, largely to San Francisco, in vessels employed also in carrying lumber and general merchandise, but there is no regular and exclusively coal carrying fleet. Shipments of coal from Seattle and Tacoma amounted to 605,000 tons in 1906 and 701,000 tons in 1907. Receipts of coal at San Francisco (including imports from British Columbia and Australia) amounted to about 800,000 tons in each of these years.

Traffic between the Pacific Coast States and Alaska and, of course, Hawaii, is carried by water. Most of the trade to Alaska is from Puget Sound ports, steamship companies operating principally from Seattle. The largest share of the Hawaiian trade is from San Francisco, but there is also a considerable amount from Puget Sound and some vessels from the Atlantic coast.

There is a considerable trade between San Francisco and Puget Sound and the Philippine Islands carried by way of Hongkong, as there is no direct line from the Pacific coast to Manila; but the larger

part of the trade with the Philippines is from New York, and a notable part of the return movement comes to Boston.

The four leading ports on the Pacific are San Francisco, Portland, Seattle, and Tacoma. Each is the center of numerous water routes and the terminus of transcontinental lines of railroad. From San Francisco the shipments in American vessels in 1906 amounted to 1,656,614 tons, from Seattle 856,988 tons, from Portland 492,573 tons (total domestic traffic by water 648,497 tons), and from Tacoma 270,256 tons. On the Pacific coast generally a larger proportion of the trade in American vessels is foreign trade than on the Atlantic coast. Grays Harbor and Humboldt Bay are important lumber shipping points; Port Harford, in San Luis Obispo Bay, is an oil port; the ports of Los Angeles receive large quantities of lumber and general merchandise, and San Diego has a considerable trade by water.

There is some local traffic on several groups or systems of rivers on the Pacific coast. On the tributaries of Puget Sound there is a large local movement of logs, aggregating 1,200,000,000 feet in 1906; and a small amount of local traffic of other kinds. On the Columbia River there is some traffic on the upper and middle river and tributaries, and a larger river commerce below Portland, including an extensive movement of logs. On the short rivers and bays along the coast of Washington, Oregon, and upper California, there are large numbers of logs moved and a small amount of general traffic. The most varied river traffic is on the rivers of central California, where there is a considerable movement of grain, flour, and general merchandise, centering at Sacramento and Stockton.

CHAPTER I.

INTRODUCTION.

Traffic moving by water consists almost entirely of passenger and freight movement. The domestic express business by water routes is negligible, and the only domestic movement of mail is on local routes of slight importance. Of the two main divisions of traffic by water, this investigation has dealt almost entirely with the carriage of freight, but a brief reference to the passenger traffic is desirable.

Section 1. Passenger traffic.

Since the advent of railroads the importance of passenger traffic on water routes has greatly declined, especially on inland streams, while on state and private canals this traffic has practically disappeared. On the Ohio and Mississippi rivers the through-passenger business, once so famous, no longer exists, and while some packet lines there are still actively engaged in the transportation of passengers this traffic is limited in the main to local movements or to the excursion business, and as a whole is of very small importance.

On other routes the situation is different. On tidal streams connected with ocean routes, or where scenic attractions offer popular routes, such as the Hudson, Potomac, St. Johns, and Columbia rivers, the passenger business still thrives to a considerable extent. In like manner finely equipped lines of passenger vessels use Long Island Sound, Chesapeake Bay, and the Great Lakes and their connecting channels.

A considerable passenger business is also done by coastwise lines. From New York and from other ports on the North Atlantic passenger steamers radiate to every port of importance on the Atlantic and Gulf coasts and also to the British maritime provinces and the West Indies, to Mexican and Central and South American ports, not to mention the trans-Atlantic movement to European ports. On the Pacific coast several passenger lines connect San Francisco with other Pacific coast ports in California, Oregon, and Washington, as well as with ports in Alaska, Hawaii, and the Canal Zone, British Columbia, and Mexican and Central American ports. Many of the coastwise passenger vessels are of excellent efficiency and equipment.

In all cases this passenger movement is carried by steam vessels; and passenger vessels, with few exceptions, are also employed in the carriage of package freight.

The total movement of passengers by water in 1906 is indicated in the following table from the United States Census Report on Transportation by Water:

TABLE 1.—PASSENGER TRAFFIC BY WATER, 1906.

[United States Census Report on Transportation by Water, p. 37.]

Division.	Ferry passengers.	All other passengers.	Total.
Atlantic and Gulf coasts	272,596,670	19,958,746	292,555,416
Pacific coast (including Alaska)	39,532,354	4,657,617	44,189,971
Great Lakes and St. Lawrence River	8,264,482	5,815,664	14,080,146
Mississippi River and tributaries	10,022,612	4,099,629	14,122,241
Other inland waters	321,521	1,556,368	1,877,889
Total	330,737,639	36,088,024	366,825,663

It will be noted that nine-tenths of the total number of passengers were carried by ferryboats, a distinctly local movement. The total of water-borne passengers by other than ferryboats is less than one-twentieth of the total number of passengers carried by railroad.

The Atlantic and Gulf coasts constitute by far the most important district in the number of passengers carried. The Great Lakes rank second, but their passenger traffic is not much in excess of the Pacific coast or the river movement. In all of the great divisions the figures for 1906 show a considerable increase of traffic over 1889. This is most notable in the Great Lakes (260.7 per cent) and the Pacific coast (237.5 per cent). On the Atlantic and Gulf coasts and the rivers the increase for this period was about 72 per cent for each of these districts.

From the reports of the United States Steamboat-Inspection Service it appears that much the largest number of passengers are carried in and out of New York—mainly, of course, ferry movement. San Francisco ranks second, Philadelphia third, and Boston fourth, the ferry movement comprising a large part of the total movement at all of these points.

Section 2. Lack of complete statistics of water-borne traffic.

The absence of reliable information respecting the total volume of freight moved annually in the United States by water and of any provision for a thorough and unified compilation of such statistics are extremely serious drawbacks to a satisfactory discussion of water-borne traffic in any of the several fields covered by the present investigation, except on the Great Lakes, either as to the increase or decrease of traffic during a given period or as to a comparison of such traffic with that moved by rail.

While the larger water lines keep detailed statistics both as to their traffic as a whole and for divisions, less important navigation interests

frequently keep no statistics of traffic whatever and can only approximate the volume of freight handled. Some lines, as in the case of those operating from Baltimore or San Francisco, reported that their records had been destroyed by fire. Individual vessel owners were not as a rule asked for information regarding their traffic. Unofficial publications, like those of local boards of trade, chambers of commerce, and river-improvement organizations, contain fragmentary statistics relative to commerce moved by water. Reports of State boards of public works, notably those of New York, also furnish valuable figures respecting traffic passing over State canals, and the fact that private canals charge tolls operates to secure some information respecting the character and volume of freight transported over such artificial waterways.

A further difficulty arises from the wide diversity prevailing in respect to weighing or measuring commodities shipped by water. Soft coal ordinarily takes the short ton of 2,000 pounds and hard the long ton of 2,240 pounds, which is also used as a measure for iron ore. It often happens, however, that the word "ton" is employed without designating whether it is net or gross. A similar obstacle is afforded by the indiscriminate use of the words "bushel" and "grain" without reference to the kind of grain, a bushel of which varies in weight according to whether it is the measure of wheat, barley, corn, or oats. So also in the case of lumber, which may include the finished product or timber, logs, shingles, telegraph poles, or wood for fuel purposes, each usually taking a different form of measurement, which requires a reduction to a tonnage basis. Finally, in the shipment of oil or petroleum care is not always taken to point out whether it is crude or refined.

Congress has often legislated on this subject. An act of February 10, 1820, imposes on collectors of customs the duty of keeping an accurate account of the national character and tonnage of all vessels in the foreign trade entering and departing from their districts and to make quarterly returns thereof to the Bureau of Statistics.[a] This statute is silent as to vessels entering and clearing in the coastwise trade. An act of May 14, 1856, provides for an annual report by the Bureau of Statistics relative to commerce and navigation and setting forth "the kinds, quantities, and value of the merchandise entered and cleared coastwise into and from the coastwise districts of the United States."[b] An act of March 3, 1875, provides for the gathering, collation, and annual publication by the Bureau of Statistics of information regarding "the actual cost of transporting freight and passengers on the railroads, and on the canals, rivers, and other navigable waters of the United States, the charges imposed for such transpor-

[a] Rev. Stat., sec. 337. [b] Rev. Stat., sec. 338.

tation of freight and passengers, and the tonnage transported."[a] An act of April 29, 1902, entitled "An act to facilitate the procurement of statistics of trade between the United States and its noncontiguous territory," provides for the issue of manifests in such trade as in the foreign trade.[b] The act of February 21, 1891, entitled "An act to facilitate the collection of commercial statistics, etc.," refers to provisions in the river and harbor acts of June 23, 1866, and March 2, 1867, requiring the Secretary of War to report on the various works connected with river and harbor improvements under his care and the amount of commerce and navigation to be benefited by such works. This act of 1891 requires owners and masters of vessels where Government improvements are conducted to furnish persons in local charge thereof a "comprehensive statement of vessels, passengers, freight, and tonnage."[c] Finally, section 7 of the act of Congress of March 6, 1902, as amended June 7, 1906, provides for a census of transportation by water, which has recently been completed by the Bureau of the Census, which also published statistics of transportation by water in 1880 and 1889.

Under the foregoing statutes three government agencies now compile statistics of water-borne traffic, namely, the Bureau of Statistics, the Chief of Engineers of the United States Army, and the Bureau of the Census. The information collected by these different agencies is, however, compiled on different bases, and it is not possible to combine the various data so as to present a complete and comprehensive statement for all the waterways in the country. On the coasts there are many points for which no statistics of total traffic are available. The most complete statement for ports in these districts is found in the Census figures showing the traffic in American vessels, which covers the domestic traffic (except that moved by rafts) and some part of the foreign commerce by water. On the Lakes the Bureau of Statistics compiles statistics of domestic shipments and receipts, omitting harbor traffic, and these are used by the Bureau of the Census, although they do not correspond exactly with the statistics for other districts of traffic in American vessels. The United States Engineers present statistics of total traffic at the Lake ports. On the rivers statistics are collected with exactness by the United States Engineers mainly at locks and dams, and on the open rivers estimates are relied on to a large extent, while it is impossible to combine their figures without duplicating the same traffic reported at different points. The Census statistics of river traffic avoid duplications, but the omission of the movement of logs and rafted lumber makes these figures also incomplete in an important part of the river traffic.

---

[a] 18 Stat. L., p. 352. [b] 32 Stat. L., pp. 172–173. [c] 26 Stat. L., p. 766.

Nevertheless the figures published by the Government bureaus are of great importance and form the basis of most of the traffic statistics published in this part of the report; but care should be taken to note whethe statistics for a given port include foreign, coastwise, or domestic traffic or traffic in American vessels, and on rivers whether the movement of rafts is or is not included. These distinctions are essential in comparing conditions at different ports or rivers.

Section 3. Classification and general summary of freight traffic.

The movement of freight over different water routes in the various fields covered by this investigation will be examined in detail in subsequent chapters. Some general observations may, however, be made here by way of introduction.

Freight may be readily divided into two main classes—package freight and bulk freight. Package freight includes all kinds of general merchandise and manufactured goods usually carried in bags, boxes, barrels, and other packages. Freight of this description moves over every natural and artificial waterway of any importance. The principal movements of package freight, however, are between New England ports and the port of New York, between the various North and South Atlantic and Gulf ports, and the movement on the Great Lakes and on the Pacific coast.

Bulk freight includes coal, iron ore, lumber, grain, oil, stone, and farm products, which are generally shipped in bulk and to a large extent in cargo lots.

More in detail freight may be classified as follows: Minerals (anthracite coal, bituminous coal, ores, stone, sand, etc.); mineral products (petroleum and other oils, ice, cement, lime, phosphate and fertilizer, pig iron and steel rails, etc.); forest products (logs, piling, cross-ties, lumber, naval stores, etc.); agricultural products (grain, hay, cotton, fruits, vegetables, and tobacco); fish, oysters, and live stock; miscellaneous (commodities not included in any of the above classes).

Owing to such difficulties as have been mentioned, it is impossible under existing conditions to present statistics showing accurately the total movement of water-borne traffic in the United States. Some indications of the movement and its general characteristics in the principal districts may, however, be learned from an analysis of the information published by the United States Census. In Table 2 will be found a general summary, compiled from the Census report, of water-borne traffic in American vessels in 1906. Nearly all of this is domestic traffic, foreign traffic being carried mainly in foreign vessels.

TABLE 2.—SUMMARY OF WATER-BORNE TRAFFIC IN AMERICAN VESSELS, 1906, BY DISTRICTS.

[Compiled from the United States Census Report on Transportation by Water.]

Articles.	Atlantic coast and Gulf of Mexico.	Great Lakes and the St. Lawrence River.[a]	Mississippi River and its tributaries.	Other inland waters.	Pacific coast (including Alaska).	Total.
Minerals:	*Net tons.*	*Net tons.*	*Net tons.*	*Net tons.*	*Net tons.*	*Net tons.*
Coal	19,149,753	17,575,467	11,033,011	899,593	451,781	49,109,605
Iron ore	18,465	41,297,209	171,779	36,612	37	41,524,102
Stone, sand, etc	7,391,354	(b)	4,004,259	924,351	2,340,008	14,659,972
Total	26,559,572	58,872,676	15,209,049	1,860,556	2,791,826	105,293,679
Mineral products:						
Petroleum and other oils	2,670,205	(b)	365,479	592	1,699,536	4,735,812
Cement, brick, and lime	4,738,177	(b)	95,443	79,754	251,677	5,165,051
Phosphate and fertilizer	1,187,883	(b)	44,413	7,775	37,144	1,277,215
Pig iron and steel rails	664,758	414,110	55,346	11,750	19,861	1,165,825
Ice	1,951,188	(b)	17,229	71,029	2,493	2,041,939
Total	11,212,211	414,110	577,910	170,900	2,010,711	14,385,842
Forest products:						
Lumber	6,050,814	[c] 3,993,165	514,950	369,576	3,504,742	14,433,247
Naval stores	373,261	(b)	770	7,729	10,267	392,027
Total	6,424,075	3,993,165	515,720	377,305	3,515,009	14,825,274
Agricultural products:						
Grain	530,843	3,689,329	380,721	499,340	691,779	5,792,012
Flour	104,362	1,334,979	81,900	4,696	350,918	1,876,855
Fruits and vegetables	796,329	(b)	55,703	15,867	232,214	1,100,113
Cotton	793,992	(b)	146,975	1,413	25,957	968,337
Tobacco	165,776	(b)	114,000	1	2,115	281,892
Total	2,391,302	5,024,308	779,299	521,317	1,302,983	10,019,209
Miscellaneous:						
Canned goods	193,602	(b)	63,697	1,110	144,372	402,781
Miscellaneous merchandise	18,580,196	7,305,390	2,385,418	785,577	3,536,392	32,592,973
Total	18,773,798	7,305,390	2,449,115	786,687	3,680,764	32,995,754
Grand total, excluding harbor traffic	65,360,958	75,609,649	19,531,093	3,716,765	13,301,293	177,519,758
Grand total, 1906[d]	140,512,043	75,609,649	27,856,641	3,944,655	17,622,816	265,545,804
Grand total, 1889[d]	52,712,124	25,256,974	29,401,409	11,221,224	11,249,927	129,851,658

[a] Domestic shipments.
[b] Included in miscellaneous merchandise.
[c] Including logs.
[d] Including harbor traffic, except on the Great Lakes.

In comparing the grand totals for the years 1889 and 1906, it is necessary to consider certain important differences in the data for the two years and for different districts. These totals include harbor traffic in all of the districts, except the Great Lakes; but on the Atlantic and Gulf coasts the statistics for 1906 include harbor traffic by ferryboats, which is not included in 1889. The totals for the Pacific coast for 1889 include the freight carried on fishing vessels—provisions, supplies, and fish—but all fishing vessels are excluded from

the census of 1906. In all of the districts the freight represented by logs and timber towed in rafts was partially reported in 1889, but omitted entirely in 1906.

Subject to these qualifications, the total movement of freight by water in 1906 was more than double that in 1889. On the Atlantic and Gulf coasts and the Great Lakes the traffic for 1906 was nearly three times that for 1889. On the Pacific coast the totals show an increase of about 55 per cent. On the rivers of the Mississippi Valley there is shown a small decline, and on other inland waters (mostly canals) there is a notable decrease.

These changes have materially altered the relative importance of the several districts. The Atlantic and Gulf coasts is the most important district, and its proportion of the total traffic has increased from 40.6 per cent in 1889 to 52.9 per cent in 1906. The Great Lakes has advanced from third to second place, and its proportion of the total traffic has risen from 19.5 per cent in 1889 to 28.5 per cent in 1906. The other districts have declined in relative importance, and together have less than one-fifth of the total traffic reported for 1906.

The Mississippi River and tributaries has fallen from second to third place, and its proportion of the total traffic has declined from 22.6 per cent in 1889 to 10.5 per cent in 1906. The Pacific coast and "Other inland waters" retain their relative positions, and both show a decline in the proportion of total traffic, the Pacific coast from 8.7 per cent in 1889 to 6.6 per cent in 1906, and other inland waters from 8.6 per cent in 1889 to only 1.5 per cent in 1906.

Excluding harbor traffic alters somewhat the relative importance of the different districts. The Great Lakes takes first place with 42.6 per cent of the total movement in 1906, and the Atlantic and Gulf coasts have but 36.8 per cent. The other districts show minor changes, but retain the same relative positions as noted above.

The principal commodities shipped by water show some marked characteristics of this form of transportation. Of the total freight shipped by water, excluding harbor traffic, more than half the volume is made up of certain crude minerals, such as coal, iron ore, stone, and sand. Excluding miscellaneous merchandise, which represents a large variety of commodities, the third largest group is composed of other bulky mineral products, such as petroleum and other oils, cement, brick and lime, ice, phosphate and fertilizer, and pig iron and steel rails. Lumber and naval stores form the second largest group, and records for the movement of logs and timber rafted would increase the total for forest products by a large amount. Agricultural products, including grain, flour, fruits and vegetables, cotton, and tobacco also form an important group in volume, and more important if the value of commodities were considered.

Taking up specific articles in more detail it will be seen that the traffic in different districts is specialized to a considerable extent.

Coal shows the largest tonnage of any single commodity, forming nearly 30 per cent of the total freight, excluding harbor traffic and bunker coal loaded for use on vessels. The largest part of this movement is that on the Atlantic and Gulf coasts from the railroad terminals in New York Harbor, Philadelphia, and Chesapeake Bay. In addition to the 19,149,753 tons shown here embracing the movement from port to port, there is about an equal volume of coal carried in what is classed as harbor traffic at New York and other ports, much of which represents a local movement over a considerable distance. The total shipments of coal from Atlantic ports in 1906 were 38,782,320 tons and in 1907, 44,016,113 tons.[a] In addition to the coastwise movement, immense quantities of coal are moved on the Great Lakes from Lake Erie ports to the West and Northwest, and other large quantities are shipped from the Monongahela and Ohio rivers down the Ohio and Mississippi rivers. Coal is also an item of large relative importance on the canals; but on the Pacific coast the movement of coal is of minor importance, and indeed seems to be declining with the increased use of petroleum for fuel purposes. Including the local movement at Atlantic ports the total water movement of coal in 1906 was about 70,000,000 tons.

Next to coal, iron ore shows the largest tonnage moved by water. Practically the whole of this movement is on the Great Lakes, where it constitutes about half the total tonnage carried and is probably greater than the movement of any single commodity in an equal field of traffic in any other part of the world. Most of the Lake ore moves from Lake Superior to ports on Lake Erie and Lake Michigan.

Stone and sand, with other building materials, such as cement, brick, and lime, are important, especially on the Atlantic and Gulf coasts and the rivers of the Mississippi Valley; but these articles are for the most part carried over short distances in contrast with the long-distance movement of coal and iron ore.

Lumber still represents an important part of the movement by water in all the districts of the United States, but owing to the exclusion of the movement by rafts from the Census figures in 1906, the statistics of this movement are far from complete. According to the Census reports a decrease in lumber transportation is shown from 1889 to 1906 in all the districts, except that of "Other inland waters," but, as will be seen in the chapter on the Pacific coast, there has been a large increase in the total movement of lumber in that district from Washington, Oregon, and northern California to the south. On the Atlantic and Gulf coasts lumber moves from the south and from ports in Maine to the large centers of North Atlantic trade; and lumber receipts at New York show a large increase since 1890.[b] There is a

[a] See Table 4, p. 33.

[b] See Table 8, p. 37.

considerable movement of lumber on the rivers of the Mississippi Valley and a large movement of rafted logs and timber on these and other rivers throughout the country.

The transportation of grain and flour by water is of largest importance on the Great Lakes, where the movement is from Duluth, Superior, Chicago, and Milwaukee eastward. From Lake Erie most of the grain is now carried by rail, but there is still some movement by the Erie Canal to eastern ports, where much of it is exported. The American grain trade on the Great Lakes shows some decline recently. Including Canadian shipments, the total movement on the Great Lakes is still increasing, as shown in the traffic of St. Marys Falls canals. There is also a considerable movement of grain on the Pacific coast. On the Atlantic coast the movement of grain by water has always been relatively unimportant, while on the rivers of the Mississippi Valley and other inland waters this trade has shown a marked decrease in recent years.

Crude petroleum is moved on the Atlantic and Gulf coasts in large quantities by tank steamers from Texas to the eastern ports for refining, and in large quantities on the Pacific coast. There is also a considerable movement of petroleum on the rivers of the Mississippi Valley, as well as large exports of both crude and refined petroleum from Atlantic and Pacific ports.

Ice, phosphate and fertilizer, cotton, fruits and vegetables, and naval stores are carried by water in large quantities, mainly on the Atlantic and Gulf coasts. The movement of ice consists chiefly in the natural product from ports on the larger rivers of Maine and from the Hudson River to New York City and southern ports. This traffic shows a decrease since 1889, probably due to the increase in the manufacture of ice. Crude phosphate rock is shipped from Florida and South Carolina, while other fertilizer materials are shipped to the South. Naval stores and cotton are shipped mainly from the South Atlantic and Gulf ports. Pig iron and steel rails are items of some importance on the Atlantic and Gulf coasts and on the Great Lakes.

Miscellaneous merchandise includes a great variety of manufactured goods and package freight, forming about one-fifth of the total volume of freight reported to the Census. This traffic is of greatest importance on the Atlantic and Gulf coasts, where it constitutes nearly 30 per cent of the total freight reported. There is also a large movement on the Great Lakes, but this forms only about one-tenth of the total tonnage. Miscellaneous freight is of considerable importance on the Pacific coast, and is also of some relative importance on the rivers of the Mississippi Valley and other inland waters.

CHAPTER II.

ATLANTIC AND GULF COASTS—GENERAL CONDITIONS.

Section 1. Present traffic conditions.

The development of railroads and the decline of canals has not prevented the continuous growth of a large movement of traffic by water along the coasts, bays, and sounds, and to some extent on the tidal streams of the Atlantic and Gulf territory. This traffic includes the movement of coal from points in New York, New Jersey, Pennsylvania, Maryland, and Virginia to various New England and southern ports; the movement of raw material, including cotton, lumber, naval stores, and oil, from South Atlantic and Gulf ports to northern ports in exchange for manufactured and imported articles, as well as for ice and coal; the interchange of merchandise between the ports of New York, Philadelphia, and Baltimore and New England ports, and between the principal North Atlantic ports and the South Atlantic and Gulf ports.

In addition to these general movements of traffic, there are others more local in character, including shipments of lumber from Maine ports to the port of New York; also the movement of fish and granite from the New England ports, the traffic of Long Island Sound and of Chesapeake Bay and its tributaries, and, finally, the general movement of commodities over the canals and tidal streams of the territory under consideration.

Of the many Atlantic ports, four, sometimes called "the Atlantic portals," stand out conspicuously, namely, Boston, New York, Philadelphia, and Baltimore. Each of these is the distributing point for an important area of the country, and also the terminal of important lines of railroad connecting the largest grain-producing sections of the United States with the seaboard, thus making each such port a way station for the grain exported from the United States to other countries and giving rise to the well-known port differential system of rail rates.

Other ports of importance are Portland, Providence, Wilmington (Del.), Norfolk, Wilmington (N. C.), Charleston, Savannah, Jacksonville, Mobile, New Orleans, and Galveston.

At these and other less prominent ports on the Atlantic and Gulf coasts a high degree of specialization has developed in the coastwise

trade. Coal is shipped mainly from a few ports in the Middle Atlantic States, lumber and naval stores from the South Atlantic ports, cotton and phosphate from certain South Atlantic and Gulf ports, and petroleum from a few ports of the Gulf and North Atlantic coasts.

TABLE 3.—TOTAL SHIPMENTS AND RECEIPTS IN AMERICAN VESSELS AT ATLANTIC AND GULF PORTS, 1906.

[Compiled from the United States Census Report on Transportation by Water, pp. 73 and 75.]

Port.	Shipments.	Receipts.	Port.	Shipments.	Receipts.
	Net tons.	*Net tons.*		*Net tons.*	*Net tons.*
Bangor, Me.	255,613	319,546	Norfolk and Newport News, Va.	7,680,230	2,808,346
Rockland, Me.	175,904	149,496	Wilmington, N. C.	121,930	145,209
Portland, Me.	303,295	1,357,316	Charleston, S. C.	303,950	414,730
Portsmouth, N. H.	25,390	362,820	Savannah, Ga.	907,397	582,966
Boston, Mass.	887,001	6,533,573	Jacksonville, Fla.	661,615	331,951
New Bedford, Mass.	163,951	581,176	Tampa and Port Tampa, Fla.	372,467	188,692
Fall River, Mass.	274,646	786,392	Pensacola, Fla.	56,130	123,632
Providence, R. I.	341,524	2,749,511	Mobile, Ala.	260,725	102,533
New London, Conn.	240,305	887,404	Gulfport, Miss.	48,061	346,096
New Haven, Conn.	161,666	2,156,814	New Orleans, La.	741,621	1,182,863
New York, N. Y.	8,598,374	17,507,906	Port Arthur, Tex.	1,052,778	39,363
Ports adjacent to New York Harbor[a]	5,052,847	929,836	Galveston, Tex.	734,915	960,982
Philadelphia, Pa.	5,213,485	2,721,456	Other ports[b]	26,957,580	18,382,541
Wilmington, Del.	95,241	250,188	Total[b]	65,360,958	65,360,958
Baltimore, Md.	3,579,407	1,858,443			
Washington, D. C.	92,910	599,177			

[a] Jersey City, Hoboken, Newark, Perth Amboy, and South Amboy.

[b] Includes traffic in American vessels at Atlantic and Gulf ports from and to ports not on the Atlantic and Gulf coasts, amounting to: Shipments, 1,587,789 tons; receipts, 2,340,843 tons.

Section 2. Movement of coal.

Coal is first in importance among the commodities moved in the Atlantic coastwise trade. From the great deposits located in and around the States of Pennsylvania and West Virginia millions of tons of coal are brought annually to the Atlantic tide water for transshipment by water. Most of this coal is now carried from the mines to tide water by rail, but there is also some movement by the Lehigh, Morris, and Chesapeake and Ohio canals. When shipped by rail coal is generally carried in hopper-bottomed gondolas of 100,000 pounds capacity, and these cars are run out on piers at the tide-water termini and dumped into the holds of vessels.

There are nearly a score of such tide-water terminals of coal-carrying railroads and canals grouped at the five important ports of New York, Philadelphia, Baltimore, Newport News, and Norfolk. Twelve are in the port of New York or on the Hudson River, as follows: Albany is a point of transfer for the Delaware and Hudson Company, coal being shipped south. Rondout, on the Hudson River, about 90 miles above New York City, has been the loading terminal of the

Delaware and Hudson canal, which is now abandoned. Newburgh, 60 miles above New York City, is the shipping point of the Pennsylvania Coal Company. Cornwall, 10 miles lower down the river, is the water terminal of the New York, Ontario and Western Railway. Piermont, 25 miles above New York City, is the loading point for vessels consigned to the Erie Railroad, although the Erie owns no docks at this place. Edgewater, N. J., above Weehawken, is another tide-water terminus of the New York, Ontario and Western Railroad. Weehawken, on the New Jersey shore of the Hudson River, opposite New York City, is a point of transfer of coal from cars to vessels for the Erie, the New York, Ontario and Western, and the Delaware and Hudson railroad companies, and is also accessible to the Pennsylvania Railroad. (The Delaware and Hudson Company has not used its property at Weehawken as a tide-water coal terminus for several years.) Hoboken, also on the New Jersey shore directly opposite New York City, is the tide-water terminal of the Delaware, Lackawanna and Western Railroad. Harsimus, at Harsimus Cove, in Jersey City, N. J., is the shipping point for the Berwind-White Coal Mining Company. St. George, Staten Island, is a shipping port for the Baltimore and Ohio Railroad, which owns docks and wharves there. Elizabethport, on Staten Island Sound about 14 miles southwest of New York, is a tide-water terminus of the Central Railroad of New Jersey, as is also Port Johnston, on the Kill Van Kull in Hudson County, N. J.

Port Reading, located on Arthur Kill on Staten Island, about 3 miles north of Perth Amboy, is one of the new terminals of the Philadelphia and Reading Railway, and one of the transfer stations whence Pennsylvania coal is distributed to New York and other coastwise markets. Perth Amboy, situated at the head of Raritan Bay on the New Jersey coast, about 25 miles from New York City, is the Lehigh Valley Railroad terminus. South Amboy, on the New Jersey coast at the mouth of Raritan Bay, is the principal loading point of the Pennsylvania Railroad for anthracite and bituminous coal.

Philadelphia is the nearest port to the anthracite and bituminous regions of Pennsylvania. At Port Richmond, on the Delaware River, in the northern part of the city, the Philadelphia and Reading Railway has extensive wharves for loading both steam and sailing vessels with coal. At Greenwich, in the southern part of the city, also on the Delaware River, is the coal terminus of the Pennsylvania Railroad.

Baltimore has several coal terminals. The Baltimore and Ohio Railroad owns docks and wharves at Locust Point and Curtis Bay, on Chesapeake Bay. Port Covington is the tide-water terminus of the Western Maryland Railroad. At Canton is the tide-water terminus of the Northern Central Railroad Company, subsidiary to the Pennsylvania Railroad.

Georgetown, in the District of Columbia, on the Potomac River, is the shipping point for bituminous coal transferred from boats on the Chesapeake and Ohio Canal.

Newport News, on Hampton Roads, is the coal terminus of the Chesapeake and Ohio Railway, which also owns a dock at Norfolk, Va.

Norfolk, Va., is the port for Lambert Point, on Hampton Roads, at the mouth of the James River, where the Norfolk and Western Railway has three piers for loading Pocahontas coal.

Anthracite coal is shipped principally from New York Harbor and Hudson River wharves. From Philadelphia shipments are primarily bituminous and secondarily anthracite. From Baltimore, Georgetown, Newport News, and Norfolk shipments are almost wholly bituminous.

The following table shows the domestic shipments of coal by water from the principal Atlantic ports for the years 1905, 1906, and 1907:

TABLE 4.—DOMESTIC SHIPMENTS OF COAL FROM ATLANTIC PORTS, 1905–1907.

[Compiled from the Monthly Summary of Commerce and Finance.]

Port.	1905.	1906.	1907.
Anthracite:	*Tons.*	*Tons.*	*Tons.*
New York	14,922,173	14,150,811	16,753,911
Philadelphia	2,046,414	1,794,773	2,411,521
Baltimore	252,568	238,162	266,062
Total	17,221,155	16,183,746	19,431,494
Bituminous:			
New York	9,076,306	10,572,464	11,691,101
Philadelphia	4,085,867	3,977,909	5,095,473
Baltimore	2,832,321	3,176,710	3,804,066
Newport News	2,696,742	2,791,404	2,396,406
Norfolk	2,370,309	2,080,087	1,597,573
Total	21,061,545	22,598,574	24,584,619
Anthracite and bituminous:			
New York	23,998,479	24,723,275	28,445,012
Philadelphia	6,132,281	5,772,682	7,506,994
Baltimore	3,084,889	3,414,872	4,070,128
Newport News	2,696,742	2,791,404	2,396,406
Norfolk	2,370,309	2,080,087	1,597,573
Grand total	38,282,700	38,782,320	44,016,113

A large part of the coastwise movement of coal is carried in vessels owned and operated by the railroad companies and by coal companies. Railroads control largely the movement of anthracite coal. This feature of the movement of coal has been made the subject of special investigation, and will be discussed at length in a subsequent part of this report, dealing with the control of transportation by water by

railroad companies and industrial corporations. There is also, however, a large amount of coal moved by companies and others engaged exclusively or primarily in the business of transportation by water.

Coal shipped by water from these ports is distributed over a wide extent of territory along the Atlantic coast. A large part of the movement from the terminals in New York Harbor and vicinity is for local delivery at New York and near-by points; and according to the estimates of the United States Census this movement equals about half of the total shipments at tide-water terminals, or about three-fourths of the total tide-water shipments from the New York Harbor terminals—approximately 19,000,000 tons in 1906. Of the longer distance movement the most important is that to New England points, notably to Allyns Point, Conn., Providence, R. I., New Bedford, Mass., and most of all to Boston and neighboring communities; but small quantities are received at points all along the New England coast. Considerable quantities are also delivered at various ports on the South Atlantic coast.

TABLE 5.—COASTWISE RECEIPTS OF DOMESTIC COAL AT NEW ENGLAND PORTS, 1905 AND 1906.

[Compiled from reports of the Chief of Engineers, U. S. Army, and Boston Chamber of Commerce.]

Port.	1905.	1906.	Port.	1905.	1906.
East of Cape Cod:			South of Cape Cod—Con.		
Maine ports—	*Tons.*	*Tons.*	Rhode Island ports—		
Portland	1,500,000	1,250,000	Pawtucket (Seekonk River)	*Tons.* [b] 254,628	*Tons.* [b] 243,733
Penobscot Bay (Bangor)	430,270	259,003	Providence River	[b] 2,383,055	[b] 2,153,452
Other Maine ports	304,813	346,453	Newport Harbor	[b] 251,000	[b] 275,000
New Hampshire ports	60,000	55,000	Other Rhode Island ports	122,787	48,958
Massachusetts ports east of Cape Cod—			Connecticut ports—		
Newburyport Harbor	165,048	168,049	New London Harbor	187,791	190,304
Gloucester	125,000	70,720	Thames River	376,542	331,925
Beverly and Salem	238,097	[a] 100,613	Connecticut River below Hartford	318,383	239,608
Lynn	253,421	276,108	New Haven Harbor	1,621,999	1,193,258
Boston	4,698,664	4,403,267	Bridgeport	527,834	541,000
Other Massachusetts ports	307,884	255,773	Other Connecticut ports	345,417	300,364
Total	8,083,197	7,184,986	Total	8,668,856	7,051,934
South of Cape Cod:					
Massachusetts ports—			Grand total	16,752,053	14,236,920
New Bedford	[b] 534,092	[b] 458,332			
Taunton River	[b] 560,000	[b] 150,000			
Fall River Harbor	[b] 871,328	[b] 874,000			
Other Massachusetts ports	[b] 314,000	[b] 52,000			

[a] Beverly alone, Project for Salem completed and reports discontinued.
[b] Coal, minerals, etc.

A large amount of coal is delivered in the bunkers of steamers for fueling purposes at all of the Atlantic ports. A summary of this for 1905 and 1906 is shown in the following statement:[a]

New York:	Tons.	All Atlantic ports:	Tons.
1905	3,410,690	1905	5,663,441
1906	3,980,256	1906	6,400,031

Section 3. Movement of lumber and naval stores.

The movement of lumber is still one of the most important factors in the coastwise trade. This consists principally of eastern spruce from New England ports and southern pine from the South Atlantic and Gulf ports. This is still carried to a large extent in sailing vessels, but steamships and steam-towed schooner barges are doing an increasing proportion of this business.

The data given in the following tables in regard to shipments and receipts in American vessels at New York and the destinations of shipments from Virginia and the Carolinas will give some indication of the extent and direction of this traffic.

It will be noted that the most important South Atlantic points of shipment are Jacksonville, Fla., Savannah and Brunswick, Ga., Georgetown and Charleston, S. C., Fernandina, Fla., and Wilmington, N. C. Other Atlantic ports of importance are Norfolk and Newport News, Va., and Port Royal, S. C., and among those not included in the table are Newbern, N. C., Wiggins and Beaufort, S. C., and Belfast, Ceylon, and Darien, Ga.

As yet but a small proportion of the receipts at New York come from the Gulf ports, although there is a considerable amount from Mobile, New Orleans, and Port Arthur, and smaller shipments from Port Tampa and Pensacola. But the great bulk of the lumber movement from the South Central States, now much more important than that from the Atlantic coast, is carried by rail to interior points, and the movement by water is but a small part of the lumber shipped from this region.

Naval stores are shipped mostly from Savannah, Brunswick, Fernandina, Jacksonville, and Pensacola, with smaller shipments from Wilmington and Georgetown. Savannah has been the most important point for this trade, but in recent years there has been a large increase in the shipments from Florida points. The traffic in American vessels on the Atlantic and Gulf coasts is reported by the Census to be 373,261 tons in 1906.

[a] Monthly Summary of Commerce and Finance, December, 1906, p. 1321.

TABLE 6.—SHIPMENTS AND RECEIPTS OF LUMBER AND NAVAL STORES IN AMERICAN VESSELS AT ATLANTIC AND GULF PORTS, 1906.

[United States Census Report on Transportation by Water, p. 74.]

Port.	Lumber.		Naval stores.	
	Shipments.	Receipts.	Shipments.	Receipts.
	Net tons.	*Net tons.*	*Net tons.*	*Net tons.*
New Orleans, La.	55,263	148,176	24	15,475
Gulfport, Miss.	42,703	328,860	100	14,990
Mobile, Ala.	147,566	6,635	1,173	1,992
Pensacola, Fla.	19,658	82,561	1,686	27,257
Jacksonville, Fla.	499,865	3,749	46,137	1,737
Fernandina, Fla. [a]	269,000	.....	.....	.....
Brunswick, Ga. [a]	798,000	.....	.....	.....
Savannah, Ga.	448,930	5,397	105,913	5,947
Charleston, S. C.	136,941	5,266	3,398	1,308
Georgetown, S. C. [a]	330,430	.....	14,040	.....
Wilmington, N. C.	62,586	9,834	13,949	10,852
Norfolk and Newport News, Va.	446,628	122,378	4,796	767
Baltimore, Md.	10,447	503,351	354	22,758
Philadelphia, Pa.	9,402	655,017	142	29,551
New York, N. Y.	129,556	2,393,694	7,822	142,724
Boston, Mass.	19,383	299,566	162	24,461
Bangor, Me.	201,817	1,976	.....	.....
Total (including minor ports)	6,050,814	6,050,814	373,261	373,261

[a] Total shipments by water as reported by United States Engineers. Tons estimated from figures giving number of feet.

TABLE 7.—CARGOES OF EASTERN SPRUCE RECEIVED AT NEW YORK, 1890, 1900, AND 1905–1907.

[Compiled from the Monthly Summary of Commerce and Finance.]

Articles.	1890.	1900.	1905.	1906.	1907.
Piling	249	137	149	93	152
Lumber and wood	813	377	663	688	619
Laths and shingles	275	176	232	278	269
Total	1,337	690	1,044	1,059	1,040

TABLE 8.—COASTWISE RECEIPTS OF SOUTHERN PINE AT NEW YORK, 1890, 1900, AND 1905–1907.

[Compiled from the Monthly Summary of Commerce and Finance.]

Shipping port.	1890.	1900.	1905.	1906.	1907.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Jacksonville, Fla.	32,178,887	49,047,870	102,970,842	107,483,547	91,147,778
Savannah, Ga.	34,547,618	67,598,770	62,146,330	80,826,803	70,739,828
Georgetown, S. C.	5,040,000	14,211,570	65,784,930	61,444,180	63,912,879
Charleston, S. C.	29,262,018	43,902,105	40,118,516	46,731,731	48,195,769
Brunswick, Ga.	23,054,618	68,305,508	43,337,138	40,931,873	55,458,996
Fernandina, Fla.	51,480,680	34,713,668	43,721,814	27,077,866	25,606,304
Wilmington, N. C.	13,892,691	11,459,833	22,829,446	21,566,328	28,314,079
Port Royal, S. C.	.....	.....	10,243,086	10,420,165	11,239,160
Mobile, Ala.	22,430,650	10,252,941	15,560,281	18,892,998	15,541,169
Norfolk, Va.	7,665,000	9,213,675	7,197,818	7,834,934	6,636,000
New Orleans, La.	.....	.....	7,170,066	8,631,270	2,211,992
Port Arthur, Tex.	.....	.....	5,266,970	7,640,085	601,000
Total by sailing vessels [a]	198,326,488	217,355,215	265,529,610	285,137,960	224,433,208
Total by steam vessels [a]	29,482,479	120,436,648	195,138,653	209,565,617	222,796,357
Grand total [a]	227,808,967	337,791,863	460,668,263	494,703,577	447,229,565

[a] Including minor ports not given in the above table.

TABLE 9.—SHIPMENTS OF PINE LUMBER FROM VIRGINIA AND THE CAROLINAS, 1905–1907.

[Compiled from reports of the North Carolina Pine Association.]

Origin of shipments.

Origin.	1905.	1906.	1907.
Shipments by water:	*Feet*	*Feet.*	*Feet.*
Virginia	47,922,728	56,820,866	57,635,921
North Carolina	51,867,228	44,855,295	46,627,694
South Carolina	893,084	6,113,716	24,694,372
Total	100,683,040	107,789,877	128,957,987
Shipments by rail	186,980,482	312,365,270	387,784,804
Grand total	287,663,522	420,155,147	516,742,791

TABLE 9.—SHIPMENTS OF PINE LUMBER FROM VIRGINIA AND THE CAROLINAS, 1905-1907—Continued.

Destination of shipments.

Destination.	Water.	Rail.	Total.
1905.	*Feet.*	*Feet.*	*Feet.*
Maine	3,011,675	3,837,996	6,849,671
N.Hampshire	.....	1,055,041	1,055,041
Vermont	.....	182,148	182,148
Boston	1,790,199	2,905,881	4,696,080
Mass	77,444	6,253,567	6,331,011
Rhode Island	706,690	1,515,099	2,221,789
Connecticut	14,307,731	4,700,324	19,008,055
New York:			
City	38,716,784	9,425,096	48,141,880
State	3,483,026	23,156,919	26,639,945
New Jersey	1,031,943	23,002,111	24,034,054
Philadelphia	4,363,118	25,652,764	30,015,882
Pittsburg	.....	1,948,131	1,948,131
Penna	.....	39,976,023	39,976,023
Delaware	30,000	2,022,777	2,052,777
Baltimore	13,174,947	5,626,331	18,801,278
Maryland	1,064,054	6,353,758	7,417,812
Dist. of Col	2,339,975	2,167,623	4,507,598
Virginia	13,889,390	15,655,917	29,545,307
N. Carolina	2,695,964	2,925,910	5,621,974
S. Carolina	.....	912,893	912,893
W. Virginia	.....	3,778,437	3,778,437
Ohio	.....	3,925,736	3,925,736
Total	100,683,040	186,980,482	287,663,522
1906.			
Maine	1,422,912	3,590,287	5,013,199
N.Hampshire	.....	762,344	762,344
Vermont	.....	458,580	458,580
Boston	868,993	2,413,963	3,282,956
Mass	22,894	8,727,323	8,750,217
Rhode Island	816,648	1,958,843	2,775,491
Connecticut	11,230,775	10,121,073	21,351,848
New York:			
City	26,492,311	12,859,035	39,351,346
State	4,858,010	36,235,937	41,093,947
New Jersey	7,691,525	40,508,074	48,199,599
Philadelphia	18,180,509	29,111,391	47,291,900
Pittsburg	22,900	3,288,734	3,311,634
Penna	2,187,790	57,655,781	59,843,571
Delaware	477,390	4,021,181	4,498,571
Baltimore	11,317,772	9,382,557	20,700,329
Maryland	1,522,880	8,267,717	9,790,597
Dist. of Col	1,064,746	5,592,413	6,657,159
Virginia	10,366,484	39,785,100	50,151,584
N. Carolina	8,889,926	7,891,600	16,781,526
S. Carolina	60,000	13,935,447	13,995,447
W. Virginia	13,200	5,882,058	5,895,258
Ohio	.....	9,509,090	9,509,090
Illinois	.....	10,891	10,891
Wisconsin	282,212	395,851	678,063
Total	107,789,877	312,365,270	420,155,147
1907.			
Maine	1,308,225	5,158,221	6,466,446
N.Hampshire	.....	1,275,989	1,275,989
Vermont	.....	364,105	364,105
Boston	438,256	3,443,915	3,882,171
Mass	1,785,557	10,685,080	12,470,637
Rhode Island	909,204	3,664,825	4,574,029
Connecticut	9,432,509	11,711,081	21,143,590
New York:			
City	41,849,850	13,734,782	55,584,632
State	10,349,625	58,921,887	69,271,512
New Jersey	2,417,792	37,475,835	39,893,627
Philadelphia	23,353,905	35,199,991	58,553,896
Pittsburg	.....	3,588,281	3,588,281
Penna	1,573,678	56,197,172	57,770,850
Delaware	107,387	2,907,714	3,015,101
Baltimore	14,758,477	8,850,752	23,609,229
Maryland	2,220,134	10,963,972	13,184,106
Dist. of Col	1,862,669	5,174,178	7,036,847
Virginia	6,843,549	46,253,153	53,096,702
N. Carolina	3,803,236	12,582,071	16,385,307
S. Carolina	.....	17,147,023	17,147,023
Georgia	270,913	1,409,109	1,680,022
Florida	.....	7,123	7,123
Tennessee	.....	14,880	14,880
Kentucky	.....	391,129	391,129
W. Virginia	.....	9,371,885	9,371,885
Ohio	12,974	16,868,813	16,881,787
Indiana	.....	1,546,041	1,546,041
Illinois	.....	300,915	300,915
Michigan	.....	762,905	762,905
Export	5,344,170	2,951,518	8,295,688
Local	315,877	8,860,459	9,176,336
Total	128,957,937	387,784,804	516,742,791

Section 4. Movement of cotton.

Cotton has long held a leading place in the Atlantic and Gulf coastwise movement of freight from southern to eastern ports. This position is still maintained, although recent developments have brought about important changes in the relative importance of different ports and in the substitution of steam for sailing vessels for the carriage of this commodity.

Cotton is grown in 14 Southern States, but a few of these raise the bulk of the crop. Georgia is the most important of the Atlantic coast cotton States, South Carolina is second, North Carolina has a moderate crop, while small amounts come from Florida and Virginia. Of somewhat greater importance are the South Central States, especially Alabama and Mississippi, with a considerable crop from Arkansas and Oklahoma, and a smaller amount from Tennessee. The most important cotton-growing State is Texas, whose crop is generally equivalent to the aggregate of the States in either one of the groups already noted. The increase in importance of the Texas and interior crop has modified the direction of transportation movements, bringing the Gulf into greater prominence and reducing the relative importance of the Atlantic ports. Another factor in causing a decline in cotton shipments from some ports has been the development in the South of cotton factories, which consume a large amount of cotton.

Cotton is moved from interior points to the shipping ports by rail, river, and wagon, and recent changes in the inland movement by water routes will be discussed in the section dealing with the traffic on the rivers of the Mississippi Valley. Before being transferred to vessels the bales are usually reduced in size by compressing.

Table 10 gives statistics of coastwise shipments of cotton for the years ended August 31, 1897, 1906, and 1907, with the shipments to foreign ports for the latter year. The figures for coastwise shipments, however, apparently include all the shipments on bills of lading to domestic ports, some of which are afterwards exported. On the other hand, there seems to be a considerable movement of cotton coastwise for export on through bills of lading, which is included in the foreign and not in the coastwise shipments.

TABLE 10.—COASTWISE SHIPMENTS OF COTTON, YEARS ENDED AUGUST 31, 1897, 1906, AND 1907, AND FOREIGN SHIPMENTS IN 1907.

[Compiled from Latham, Alexander & Co.'s Cotton Movement and Fluctuation.]

Port.	Coastwise.[a]			Foreign.
	1897.	1906.	1907.	1907.
Gulf ports:	*Bales.*	*Bales.*	*Bales.*	*Bales.*
Galveston, Tex	272,739	576,129	665,621	3,481,653
New Orleans, La	272,191	104,485	173,269	2,072,387
Mobile, Ala	126,172	109,422	98,513	163,225
Pensacola, Fla	18,063	18,700	8,239	155,791
Total	689,165	808,736	945,642	5,873,056
Atlantic ports:				
Savannah, Ga	477,092	566,974	550,863	926,927
Brunswick, Ga		32,848	21,778	141,940
Charleston, S. C	153,630	168,579	129,937	21,393
Georgetown, S. C				
Wilmington, N. C	77,582	78,747	71,791	317,507
Washington, N. C., etc				
Norfolk, Va	540,563	644,313	598,232	9,093
Newport News, Va		19,586	34,244	3,140
Total	1,248,867	1,511,047	1,406,845	1,423,000
Grand total	1,938,032	2,319,783	2,352,487	7,296,056
Total crop	8,714,011	11,319,860	13,550,760	.....
Per cent shipped coastwise	22.24	20.49	17.36	.....

[a] Including small amounts shipped inland or consumed locally.

This table shows clearly the supremacy of Galveston as a cotton port, although in the coastwise trade it is closely rivaled by Norfolk and Savannah. New Orleans easily ranks second in the total shipments of cotton, but its shipments by water are mainly for foreign ports, and it is of relatively minor importance in the coastwise trade. Mobile and Pensacola are of less importance in both movements.

On the Atlantic coast Savannah is the principal cotton-shipping point, but in the coastwise trade it is slightly surpassed by Norfolk. The steamship companies have excluded the sailing vessels from this business because of their lower rates and quicker deliveries. Savannah is an important point for transshipment from rail to water of cotton brought there from distant interior points. During the year 1907 more cotton is said to have moved by rail from Savannah than formerly.

Wilmington is now the third cotton port on the Atlantic coast. Charleston now holds fourth place in the total movement of cotton, and this is mostly coastwise movement. The foreign shipments from Charleston have largely disappeared, and in this business Charleston is now surpassed by Brunswick.

Cotton moved coastwise is carried for the most part by the regular lines of steamers from the southern ports to the principal North

Atlantic ports. The largest proportion is delivered at New York; Boston ranks second, and smaller quantities are received at Baltimore, Providence, and other ports.

Most of the cotton shipped to these North Atlantic ports is afterwards forwarded to other points. As already noted, considerable quantities are shipped on through bills of lading for export; other amounts may be reshipped for export. Again, much of the cotton received at New York and Boston is afterwards forwarded to the manufacturing centers in New England and elsewhere.

TABLE 11.—MOVEMENT OF COTTON IN AMERICAN VESSELS, 1906, BY PORTS.

[Compiled from the United States Census Report on Transportation by Water, p. 73.]

Port.	Shipments.	Receipts.	Port.	Shipments.	Receipts.
	Net tons.	*Net tons.*		*Net tons.*	*Net tons.*
Galveston, Tex	137,628	94,278	New York, N. Y	47,289	359,185
New Orleans, La	45,459	7,885	Providence, R. I	11,785	31,064
Mobile, Ala	15,383	22,638	Fall River, Mass	700	14,900
Savannah, Ga	150,352	8,171	Boston, Mass	48	145,360
Charleston, S. C	62,882	4,056	Other ports	191,583	51,628
Norfolk and Newport News, Va	118,695	3,697	Total	793,992	793,992
Baltimore, Md	12,188	51,130			

Section 5. Other freight.

MOVEMENT OF OIL.—An important coastwise movement which has developed in recent years consists of shipments of petroleum from Port Arthur and Sabine, Tex., to Atlantic and Gulf ports, carried by the fleets of important oil companies. The total shipments for the year 1905 are reported as 10,272,916 barrels; for 1906, as 10,703,350 barrels, and for 1907 as 8,730,123 barrels. The destinations of these shipments for 1906 and 1907 are shown in the following table:

TABLE 12.—SHIPMENTS OF PETROLEUM FROM PORT ARTHUR AND SABINE, TEX., 1906 AND 1907.

[Monthly Summary of Commerce and Finance, December, 1907, p. 1209.]

Destination.	1906.	1907.	Destination.	1906.	1907.
	Barrels.	*Barrels.*		*Barrels.*	*Barrels.*
New York, N. Y	2,839,923	1,536,626	Tampa and Port Tampa, Fla	404,446	467,355
Bayonne, N. J	926,848	1,116,530	Galveston, Tex	247,051	403,259
Brooklyn, N. Y	186,791	.....	Miscellaneous ports	1,012,690	2,055,307
Constable Hook, N. J	396,279	.....			
Philadelphia, Pa	2,468,656	820,358	Total domestic	9 309 910	7,664 008
Delaware River stations	134,343	573,748	Total foreign	1 393,440	1,066,115
Baltimore, Md	226,316	236,284			
Beverly, Mass	175,576	176,873	Grand total	10,703,350	8,730,123
New Orleans, La	197,401	133,430			
Gretna, La	93,590	144,238	Bunker oil	83,501	78,127

There is also an important movement of refined oil carried by water along the Atlantic coast, both in tank vessels and to some extent by regular line steamers. A large portion of southern and eastern New England is supplied by rail with refined oil from distributing depots of the Standard Oil and other companies at coast points, which are reached by water transportation, particularly by tank vessel from tide-water refineries at Brooklyn, Edgewater, Bayonne, and Marcus Hook, on the Delaware River, near Philadelphia. Distributing points in New England are Wilsons Point (near South Norwalk), Bridgeport and New London, Conn., East Providence, R. I., East Boston and Beverly, Mass., and Portland, Me.

To the South Atlantic ports there is also an extensive movement of oil in tank vessels by the Standard Oil Company. The regular steamship lines also handle illuminating oil to a considerable extent, particularly from Baltimore and to a smaller extent from Philadelphia. From the latter point illuminating oil does not appear to be shipped in quantities by commercial steamship lines to points south of Norfolk, Va., although lubricating oils are taken to more southern ports.

MOVEMENT OF PHOSPHATE AND FERTILIZER.—Another article of importance in the bulk freight movement on the Atlantic and Gulf coasts is crude phosphate (rock and pebble). This is shipped mostly from Tampa Bay and other points on the west coast of Florida, but there are also considerable shipments from Fernandina.

Fertilizers are received in considerable amounts at the principal southern ports; and at several of these ports fertilizers are manufactured from materials received from other points, including some foreign imports. Table 13 shows, as far as data are available, the shipments of phosphate and the receipts of fertilizer and fertilizer materials at some of the more important South Atlantic and Gulf ports during 1900, 1905, and 1906.

TABLE 13.—SHIPMENTS OF PHOSPHATE AND RECEIPTS OF FERTILIZER AND FERTILIZER MATERIAL, 1900, 1905, AND 1906, BY PORTS.

[Compiled from the Monthly Summary of Commerce and Finance, and reports of Chief of Engineers, U. S. Army.]

Shipments of phosphate.

Port.	1900.	1905.	1906.	Port.	1900.	1905.	1906.
	Tons.	*Tons.*	*Tons.*		*Tons.*	*Tons.*	*Tons.*
Pensacola, Fla.	168,485	.....	.....	Key West, Fla.	[b] 21,318	80,361	.....
Withlacoochee River.	.....	237,321	158,952	Fernandina, Fla.	173,786	120,447	159,900
Tampa Bay, Fla.	.....	470,095	606,602	Savannah, Ga.	122,880	.....	.....
Punta Gorda (Charlotte Harbor), Fla.	54,506	91,155	[a] 85,833	Charleston, S. C.	189,271	31,152	11,677

[a] Phosphate, coal, etc.
[b] Fertilizers, including phosphates.

TABLE 13.—SHIPMENTS OF PHOSPHATE AND RECEIPTS OF FERTILIZER AND FERTILIZER MATERIAL, 1900, 1905, AND 1906, BY PORTS—Continued.

Receipts of fertilizer and fertilizer material.

Port.	1900.	1905.	1906.	Port.	1900.	1905.	1906.
	Tons.	*Tons.*	*Tons.*		*Tons.*	*Tons.*	*Tons.*
Norfolk, Va.[a]	.....	61,400	101,354	Charleston, S. C.	.....	226,266	212,337
Wilmington, N. C.	.....	103,084	118,519	Jacksonville, Fla.	.....	149,700	289,255

Shipments and receipts of phosphate and fertilizers in American vessels, 1906.[b]

Port.	Shipments.	Receipts.	Port.	Shipments.	Receipts.
	Net tons.	*Net tons.*		*Net tons.*	*Net tons.*
New York, N. Y.	108,585	16,500	Savannah, Ga.	7,449	44,075
Philadelphia, Pa.	66,390	49,228	Tampa and Port Tampa, Fla.	273,598	.....
Baltimore, Md.	251,641	167,285	Other ports.	446,483	729,316
Norfolk and Newport News, Va.	33,737	181,479	Total	1,187,883	1,187,883

[a] Total; receipts and shipments not separately stated.
[b] United States Census Report on Transportation by Water.

MOVEMENT OF BUILDING MATERIALS.—Large quantities of stone, sand, cement, brick, and lime are moved by water at the various Atlantic and Gulf ports. The traffic in American vessels, as reported by the Census for 1906, was 12,129,531 tons. This is, however, a local and short-distance movement and of less importance than the long-distance movement of coal and lumber. More than half of this traffic (6,675,744 tons) was received at New York.

MOVEMENT OF MISCELLANEOUS AND PACKAGE FREIGHT.—An important branch of the coastwise service is the through movement of miscellaneous freight carried by the regular lines of steamships plying along the Atlantic and Gulf coasts. All the lines operating between New York, Boston, Philadelphia, and Baltimore, and Norfolk, Va.; Wilmington, N. C.; Charleston, S. C.; Savannah and Brunswick, Ga.; Fernandina, Jacksonville, and Key West, Fla.; Mobile, Ala.; New Orleans, La.; and Galveston, Tex., do a large amount of package-freight business. The southbound movement is a general business in all kinds of manufactured commodities and general merchandise. Northbound, the larger amount of traffic consists of the freight in such staple articles as cotton, lumber, and naval stores, but there is also a movement of cotton products, fruits, and vegetables to Boston and New York, pig iron from Norfolk and Savannah, and tobacco from Norfolk. There is also an extensive movement of package freight between the Middle Atlantic ports and New England. This

traffic is indicated in the following table of miscellaneous merchandise carried by American vessels in 1906:

TABLE 14.—MOVEMENT OF MISCELLANEOUS MERCHANDISE IN AMERICAN VESSELS, ATLANTIC AND GULF PORTS, 1906.

[Compiled from the United States Census Report on Transportation by Water, p. 74.]

Port.	Shipments.	Receipts.	Port.	Shipments.	Receipts.
	Net tons.	*Net tons.*		*Net tons.*	*Net tons.*
New York, N. Y	4,736,747	4,380,165	Portland, Me	227,610	136,269
Norfolk and Newport News, Va	2,539,080	2,057,201	Savannah, Ga	134,024	255,696
Philadelphia, Pa	1,031,225	1,040,133	Charleston, S. C	66,005	188,190
Boston, Mass	742,794	718,008	Jacksonville, Fla	57,184	181,043
Baltimore, Md	731,298	695,657	New Haven, Conn	156,839	168,928
New Orleans, La	508,766	308,170	New Bedford, Mass	140,633	77,280
Galveston, Tex	430,445	462,057	Washington, D. C	31,197	117,252
Providence, R. I	307,727	281,886	Other ports	6,259,171	7,090,265
Fall River, Mass	253,002	152,769	Total	18,580,196	18,580,196
New London, Conn	226,449	269,227			

Section 6. Commerce with Porto Rico and the Panama Canal Zone.

To a great extent the traffic between Porto Rico and the United States is carried by two steamship lines operating regularly to New York, one of these lines also operating a division to New Orleans and the other calling at San Juan, P. R., in plying between New York and Venezuelan ports.

The character and value of the principal articles of domestic merchandise shipped from the United States to Porto Rico during the calendar years 1905, 1906, and 1907 are shown in the following table:

TABLE 15.—VALUE OF SHIPMENTS OF DOMESTIC MERCHANDISE FROM THE UNITED STATES TO PORTO RICO, 1905–1907, BY ARTICLES.

[Compiled from the Monthly Summary of Commerce and Finance, December, 1907, pp. 1096–1101.]

Articles.	1905.	1906.	1907.
Breadstuffs:			
Wheat flour	$1,145,021	$1,129,438	$1,288,287
All other	184,615	327,131	475,339
Rice	2,747,650	3,749,837	3,596,920
Vegetables	224,133	453,325	494,908
Meat and dairy products	1,626,512	1,997,705	2,505,163
Fish	403,399	477,580	498,579
Textile manufactures:			
Cotton	2,404,087	3,063,508	3,172,185
All other	323,402	445,388	508,361
Tobacco, unmanufactured	261,578	387,499	437,432
Wood:			
Timber and lumber	313,560	651,082	892,507
Manufactures of wood	344,838	441,661	538,772

TABLE 15.—VALUE OF SHIPMENTS OF DOMESTIC MERCHANDISE FROM THE UNITED STATES TO PORTO RICO, 1905-1907, BY ARTICLES—Continued.

Articles.	1905.	1906.	1907.
Iron and steel, and manufactures of:			
Machinery	$1,734,235	$2,034,101	$1,879,207
All other	1,166,418	1,594,099	2,051,927
Leather, and manufactures of	407,607	603,356	854,017
Cars and other vehicles	210,935	468,999	736,656
All other articles	2,925,436	3,866,212	4,922,558
Total	16,423,426	21,690,921	24,852,818

Of the shipments of domestic merchandise from the United States shown in the preceding table about three-fourths were shipped from New York and nearly one-fourth from New Orleans. Thus shipments from New York in 1907 were valued at $18,681,509, from New Orleans at $5,286,018, and from all other United States ports at $885,291.

During these years the value of foreign merchandise shipped from the United States to Porto Rican ports was $787,781 in 1905, $307,725 in 1906, and $372,366 in 1907.[a]

The shipments of domestic merchandise, with values, from ports in Porto Rico to the United States during the years 1905, 1906, and 1907 are shown in the following table:

TABLE 16.—VALUE OF SHIPMENTS OF DOMESTIC MERCHANDISE FROM PORTO RICO TO THE UNITED STATES, 1905-1907, BY ARTICLES.

[Compiled from the Monthly Summary of Commerce and Finance, December, 1907, p. 1103.]

Articles.	1905.	1906.	1907.
Fruits	$301,295	$652,769	$1,034,931
Molasses	249,486	433,454	451,458
Sugar, brown	13,193,747	14,508,552	15,229,427
Tobacco:			
Unmanufactured	537,658	855,330	1,460,508
Cigars and cigarettes	2,674,787	3,751,616	3,966,836
All other articles	519,587	470,681	657,836
Total	17,476,560	20,672,402	22,800,996

The foreign merchandise shipped from Porto Rico to the United States amounted to $97,149 in 1905, $37,341 in 1906, and $5,051 in 1907.[b]

Of the total shipments of domestic merchandise from the United States, American steam vessels carried articles to the value of $15,035,770 in 1905, $20,720,946 in 1906, and $23,058,327 in 1907. The remainder of these shipments was carried in American sailing vessels.

[a] Monthly Summary of Commerce and Finance, December, 1907, p. 1102.

[b] Ibid., p. 1104.

Of the shipments of domestic merchandise from Porto Rico, American steam vessels carried articles to the value of $16,025,807 in 1905, $20,142,342 in 1906, and $20,818,580 in 1907, the rest being carried in American sailing vessels.[a]

The commerce of United States ports with the Canal Zone consists partly of the traffic between the Pacific and Atlantic ports of the United States, moving over the Panama Railway as a part of the route between the two coasts. There is, however, a considerable commerce with the Canal Zone itself, which is included with the statistics of imports and exports of Panama, but no statement of the proportion to be credited to the Canal Zone is available, although it probably constitutes the greater part of the trade. During the calendar years 1905, 1906, and 1907 the imports from Panama to the United States were valued at $879,145, $1,448,689, and $1,680,953, and the domestic exports to Panama were valued at $7,775,544, $14,181,705, and $18,582,686, respectively. The imports from Panama consisted chiefly of bananas, and the exports to Panama of iron and steel and their manufactures, railroad cars, meat and dairy products, lumber, bituminous coal, cotton manufactures, breadstuffs, boots and shoes, explosives, and numerous other articles.

[a] Monthly Summary of Commerce and Finance, December, 1907, p. 1104.

CHAPTER III.

NORTH ATLANTIC PORTS, RIVERS, AND CANALS.

Section 1. Introduction.

Roughly speaking, the North Atlantic coast of the United States embraces the shore line of the 10 States of Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, and Maryland. The water-borne commerce of this region includes a large part of the traffic on the Atlantic and Gulf coasts, with the movement of coal, lumber, cotton, and other commodities previously discussed. There is also a large movement within the North Atlantic coast itself, both between the more important ports and a more distinctly local movement within certain well-defined districts. It is not possible, however, to distinguish sharply between the coastwise movement and the local movement on rivers, as there is a constant tendency for routes, navigation lines, and traffic to overlap one another.

In discussing the water-borne traffic of the North Atlantic coast, the various ports and waterways may be conveniently grouped in six districts as follows: (1) The east coast of New England, north of Cape Cod; (2) the south coast of New England, including Long Island Sound and its tributaries; (3) the port of New York; (4) inland waters of New York State; (5) Delaware River and Bay, with their important tributaries and connecting canals; and (6) Chesapeake Bay and its affluents, including the Chesapeake and Ohio Canal.

Section 2. The east coast of New England.

GULF OF MAINE.—The great coast indentation between the British province of Nova Scotia on the north and Cape Cod on the south has received the general designation of the "Gulf of Maine." This stretch of coast is further indented by numerous bays and harbors, in striking contrast with the corresponding portion of the Pacific coast. Among the more important of these may be noted Lubec Channel, Penobscot Bay, Kennebec River entrance, Casco Bay, Portsmouth Harbor, Massachusetts Bay (including Boston Bay), and Cape Cod Bay. Numerous streams also enter this section of the coast, but these are navigable for short distances only, and except for those whose mouths form the harbors of important seaports they are usually of relatively shallow depth.

Boston and Portland are the most important ports along this coast, but there are many smaller places, some of no little historic significance, such as Bangor, Bath, Portsmouth, Gloucester, and Salem.

PORTS AND RIVERS IN MAINE.—The St. Croix River, which forms part of the boundary between the United States and New Brunswick, is of some commercial importance. Calais, 11 miles from the mouth, has a considerable lumber trade. Eastport, on the southeastern end of Moose Island, has some business in lumber, fish, and general merchandise. The movement from these ports is indicated by the traffic through Lubec Channel.

From points along the coast of Maine, particularly from Penobscot Bay and vicinity, considerable shipments of granite are made in small coasting schooners and barges. This granite is sent largely to New York City. No statistics are available to show the extent of this traffic.

Penobscot Bay, 20 miles wide and 28 miles long, is the outlet and approach for a very considerable commerce to and from the Penobscot and Bagaduce rivers, the ports of Bangor and Rockland, and neighboring summer resorts. Lumber, granite, lime, and ice constitute the principal shipments, with coal and general merchandise received. Rockland, on the west side, is one of the most important harbors in the bay. It has a large trade in lime and also some trade in lumber, fish, and ice. Several lines of steamers touch here, and a number of small steamers ply to the islands in the bay. The Bagaduce River, which enters the bay on the eastern side, is the approach to Castine, which has steamboat communication with some of the islands and harbors in the bay.

The Penobscot River is the most important commercial stream of the territory under consideration. It rises in northwestern Maine and empties into Penobscot Bay. In its course of upward of 300 miles it is joined by numerous streams. The depth of the river in places, like that of some other streams of the territory, is gradually decreasing, owing to the large amount of refuse from the sawmills on the river above Bangor. This river is navigable for vessels of 22 feet draft to Bangor (27 miles), at the head of navigation and tide water.

Bangor has a large coastwise and some foreign trade. Other towns on the Penobscot are Winterport, the head of winter navigation, and Bucksport, at the mouth of the river. Steamers run daily in summer from Boston to Bucksport, Bangor, and other points. Small steamers ply between Bangor and the landings on the river and in Penobscot Bay.

The next important river of Maine is the Kennebec, which is navigable for a distance of 44 miles from its mouth to Augusta, the capital of the State. The city of Bath, on the west bank of the river, 12 miles above Pond Island, has long been famous for its shipbuilding industry. Other towns on the river are Richmond, Gardiner, and Hallowell, besides various small villages. Ice and lumber constitute the most important shipments from the Kennebec, and in each of these articles this river holds the leading place in the State.

The following tables show the water-borne traffic on the rivers and at the more important ports in Maine:

TABLE 17.—COMMERCE OF MINOR RIVERS AND PORTS IN MAINE, 1905 AND 1906.

[Compiled from reports of Chief of Engineers, U. S. Army.]

	1905.	1906.		1905.	1906.
	Tons.	*Tons.*		*Tons.*	*Tons.*
Lubec Channel	86,000	74,400	Camden Harbor	.....	37,848
Narraguagus River	52,750	37,760	Carvers Harbor	64,212	72,886
Sullivan Falls	42,100	29,450	Saco River	48,537	40,679
Union River	18,293	15,759	York Harbor	24,855	27,650

TABLE 18.—COMMERCE ON RIVERS IN MAINE, 1906, BY ARTICLES.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

Article.	Penobscot River, including Bucksport.	Rockland (Penobscot Bay).	Bagaduce River.	Kennebec River.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Coal	261,733	110,000	3,500	150,000
Lumber and wood	180,900	83,500	31,900	302,500
Cement, lime, bricks, and clay	66,762	280,000	20,000	[a] 1,700
Stone	71,947	[b] 9,000	100	.....
Fish	500	[c] 16,000	300	.....
Ice	55,900	10,000	.....	500,000
Grain, flour, hay, and straw	3,550	[d] 2,200	18,250	[d] 500
General merchandise	36,810	76,300	25,000	35,000
Fertilizer	4,989	.....	200	2,000
Salt	1,824	.....	.....	1,100
Other freight	3,552	4,250	6,740	4,748
Total	688,467	591,250	105,990	997,548

[a] Lime only. [b] Includes oil. [c] Includes salt. [d] Hay and straw only.

TABLE 19.—SHIPMENTS AND RECEIPTS IN AMERICAN VESSELS AT BANGOR AND ROCKLAND, ME., 1906, BY ARTICLES.

[Compiled from the United States Census Report on Transportation by Water.]

Articles.	Bangor.		Rockland.	
	Shipments.	Receipts.	Shipments.	Receipts.
	Net tons.	*Net tons.*	*Net tons.*	*Net tons.*
Lumber	201,817	1,976	3,585	11,028
Ice	43,046	.....	1,451	.....
Cement, brick, and lime	.....	9,799	124,641	7,833
Coal	40	262,981	1,903	76,270
Petroleum and other oils	34	19,200	830	169
Stone, sand, etc	106	4,655	10,936	10,737
Miscellaneous merchandise	10,570	20,935	32,558	43,459
Total	255,613	319,546	175,904	149,496

Portland, the principal maritime port in the State of Maine, is on the western side of Casco Bay. The harbor is entered by the largest vessels; steamers leave the port loaded to 30 feet draft.

A considerable foreign commerce across the Atlantic is carried to and from Portland, consisting mainly of grain and flour. There is also a large coastwise trade, long-distance traffic carried chiefly by sailing vessels and local traffic carried by numerous steamers and smaller sailing vessels. The principal article received is coal; lumber is the largest item in the coastwise shipments, and there is a considerable movement of other commodities, such as general merchandise, provisions, paper, molasses, and sugar.

The following tables show the total volume of traffic from 1898 to 1906, and commercial statistics in detail for 1905 and 1906:

TABLE 20.—COMMERCE BY WATER AT PORTLAND, ME., 1898–1906.

[Reports of Chief of Engineers, U. S. Army.]

Year.	Tons.	Year.	Tons.
1898	1,334,752	1903	2,312,457
1899	1,620,284	1904	2,233,475
1900	2,261,008	1905	2,576,403
1901	2,461,515	1906	2,546,625
1902	2,224,091		

TABLE 21.—COMMERCE BY WATER AT PORTLAND, ME., 1905 AND 1906, BY ARTICLES.

Articles.	Total water traffic.[a]		Traffic in American vessels, 1906.[b]
	1905.	1906.	
	Tons.	*Tons.*	*Net tons.*
Coal	1,500,000	1,250,000	1,127,203
Grain, flour, etc	234,335	312,328	10,107
Lumber and cooperage	85,515	90,932	59,570
Provisions	32,055	73,403	.....
Paper and rags	43,285	42,000	.....
Cotton	16,359	10,705	6,770
Oil and oil cakes	37,716	62,518	15,039
Salt	25,140	15,622	.....
Molasses and sugar	20,231	21,300	.....
Cement, brick, lime, and clay	64,230	48,849	8,998
Stone, sand, and granite	10,329	17,567	32,714
Fish	28,625	25,062	.....
Cattle on hoof	19,596	23,409	.....
Beef	32,626	.....	.....
Canned goods	14,728	15,977	10,947
Brimstone	11,809	21,019	.....
Apples	14,758	16,701	.....
Ice	100	13,781	9,772
Leather and hides	8,420	10,137	.....
Machinery, iron pipe, and steel	12,293	12,324	.....
Sulphur	4,200	.....	.....
General merchandise	357,593	416,273	379,491
Other articles	2,459	46,718	
Total	2,576,403	2,546,625	1,660,611

[a] Compiled from the reports of Chief of Engineers, U. S. Army.

[b] Compiled from the United States Census Report on Transportation by Water.

Shipments in American vessels amounted to 303,295 tons; receipts to 1,357,316 tons.

Portsmouth Harbor, N. H., is formed by the mouth of the Piscataqua River and is the approach to the cities of Portsmouth and Dover and the towns of Newcastle, Kittery, South Newmarket, and Exeter. On the north side of the harbor, opposite the city of Portsmouth, is the United States navy-yard.

The city of Portsmouth has a large trade in coal, carried principally in the larger coasting vessels and barges, which are taken alongside the wharves from the anchorage by towboats. Coal is also carried to Dover on the Cocheco River, and to South Newmarket and Exeter on the Exeter River (branches of the Piscataqua), at high water in vessels of 10 feet draft. There is also some movement of lumber, building materials, and ice in the Cocheco River, as shown in the following table of traffic for 1906:

TABLE 22.—COMMERCE OF COCHECO RIVER AND PORTSMOUTH, N. H., 1906, BY ARTICLES.

Articles.	Cocheco River.[a]	Portsmouth, traffic in American vessels.[b]	Articles.	Cocheco River.[a]	Portsmouth, traffic in American vessels.[b]
	Tons.	*Net tons.*		*Tons.*	*Net tons.*
Coal	55,000	347,391	Other freight	765	.....
Lumber and wood	47,500	231	Stone, etc	.....	20,833
Cement, lime, bricks, and clay	52,000	19,060			
Ice	20,000	200	Total	180,265	388,210
General merchandise	5,000	495			

[a] Compiled from the Report of Chief of Engineers, U. S. Army, 1907.
[b] Compiled from the United States Census Report on Transportation by Water.

THE EAST COAST OF MASSACHUSETTS.—The Merrimac River is the largest and most important river in the eastern part of Massachusetts. It is navigable at high water for vessels of 15 feet draft to Newburyport, and for vessels of 10 to 12 feet draft up to Haverhill. Newburyport receives a considerable quantity of coal coastwise, about half of which is reshipped, mostly in lighters, to up-river points. Rockport, on Cape Ann, is a shipping point for granite.

The large and deep body of water indenting the eastern shore of Massachusetts, lying westward of a line joining Cape Ann and Cape Cod, is known as Massachusetts Bay. It is about 20 miles wide (east and west) and over 50 miles long (north and south). Within the limits of Massachusetts Bay are the harbors of Salem and Gloucester, and Nahant and Boston bays. The last-named bay includes Lynn Harbor, Boston Harbor, Hingham Bay, and Cohasset Harbor. Farther south is Cape Cod Bay, embracing the harbors of Plymouth, Provincetown, and several smaller places.

Gloucester Harbor, 5 miles southwest of Cape Ann, is one of the most important fishing ports in the United States. Large quantities of fish are shipped from here, and salt and coal are received. Coal is also received in considerable quantities at Beverly, Salem, and Lynn, with a small movement of other commodities.

South of Boston are a number of small rivers and harbors with a small and unimportant water commerce. The Weymouth River, where several important industrial plants are located, is the most important, over 100,000 tons each of coal and of fertilizer being handled, and there are also shipments of granite from the Quincy quarries. At other points coal is almost the only commodity, except at Provincetown, where there is a small but more varied movement of miscellaneous goods.

The following tables indicate the commerce of these ports and rivers, and some others in eastern Massachusetts, showing the principal articles at some of the more important places and the total tonnage at minor points:

TABLE 23.—COMMERCE OF RIVERS AND PORTS IN EASTERN MASSACHUSETTS, 1906, BY ARTICLES.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	Newburyport, including Merrimac River.	Gloucester Harbor.	Beverly Harbor.	Lynn Harbor.	Weymouth Fore and Weymouth Back rivers.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Coal	236,876	70,720	100,613	276,108	122,456
Lumber and wood	.....	9,473	4,166	5,585	5,038
Cement, lime, bricks, and clay	.....	409	.....	.....	[a] 783
Stone	5,000	[b] 5,233	.....	.....	20,287
Fish	.....	107,784	.....	.....	.....
Ice	.....	325	.....	.....	.....
Grain, flour, hay, and straw	.....	.....	.....	.....	1,276
General merchandise	.....	.....	.....	51,113	.....
Fertilizer	.....	860	.....	.....	[c] 100,861
Salt	.....	51,172	.....	.....	.....
Other freight not included in preceding	1,926	29,912	34,083	10,978	10,247
Total	243,802	275,888	138,862	343,784	260,948

[a] Lime and brick only. [b] Includes sand and gravel. [c] Raw and manufactured products.

TABLE 24.—COMMERCE AT MINOR PORTS IN EASTERN MASSACHUSETTS, 1905 AND 1906.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

	1905.	1906.		1905.	1906.
	Tons.	*Tons.*		*Tons.*	*Tons.*
Manchester	8,923	4,850	Hingham Harbor	.....	15,210
Mystic River (above railroad bridge)	31,344	17,500	Scituate	8,009	8,197
Malden River	79,690	90,815	Duxbury	2,948	3,949
Town River (Weymouth)	23,050	22,126	Plymouth	57,400	33,354
			Provincetown	20,570	20,900

The Port of Boston includes Boston Harbor and also portions of a number of tributary rivers and channels within the limits of the city, which now embrace East Boston, Charlestown, South Boston, Roxbury, Dorchester, and Neponset. The principal wharves for regular lines of vessels are in the harbor along the water front of the older city, Charlestown and East Boston. There are also important terminals at South Boston and on Mystic River, which enters the harbor on the north. The Chelsea and the Charles rivers are of less importance. The latter forms the approach by water to Cambridge and Watertown, but there are no less than 7 bridges across the lower part of the river, 4 of them (at the mouth of the river) railroad bridges whose draws are closed except for a short time each day. Fort Point Channel, leading to South Bay, is also crossed by 7 bridges.

Boston is the chief port of New England and one of the most important commercial ports in the United States. It ranks second to New York in the tonnage of vessels entering and clearing in the foreign trade, and in the value of its foreign trade it is clearly surpassed only by New York, although closely rivaled by New Orleans and Galveston. Of even more importance is its coastwise trade, although it is not possible to determine precisely its relative rank in this respect.

The following tables show the number and tonnage of vessels arriving in the foreign and coastwise trade for 1906 and 1907, and the number of vessels arriving and clearing from 1901 to 1907:

TABLE 25.—SHIPPING ARRIVALS AT BOSTON, 1906 AND 1907.

[Monthly Summary of Commerce and Finance, December, 1907, p. 1189.]

	1906.		1907.	
	Number.	Tonnage.	Number.	Tonnage.
Coastwise:				
From southern ports	5,672	6,603,417	6,396	7,511,203
From eastern ports	2,971	2,671,198	3,220	2,750,271
Total	8,643	9,274,615	9,616	10,261,474
Foreign trade	1,572	3,055,759	1,499	2,956,560
Grand total	10,215	12,330,374	11,115	13,218,034

TABLE 26.—ARRIVALS AND CLEARANCES AT PORT OF BOSTON, 1901–1907.

[Annual Reports of the Boston Chamber of Commerce, 1906, p. 59, and 1907, p. 47.]

Year.	Arrivals.			Clearances.		
	Coastwise.	Foreign.[a]	Total.	Coastwise.	Foreign.	Total.
1901	10,415	1,957	12,372	2,141	1,824	3,965
1902	8,516	1,898	10,414	2,396	1,648	4,044
1903	9,316	1,740	11,056	2,310	1,449	3,759
1904	8,799	1,516	10,315	1,933	1,355	3,288
1905	9,066	1,699	10,765	1,965	1,451	3,416
1906	8,643	1,711	10,354	2,049	1,464	3,513
1907	9,616	1,624	11,240	1,810	1,397	3,207

[a] Includes vessels arriving via other United States ports where entry was officially recorded.

Provisions constitute the most important item of foreign exports, followed by leather and leather manufactures, cotton and cotton manufactures, live stock, and breadstuffs. The most important foreign imports are wool, fibers and fiber manufactures, and hides and skins. Other articles of considerable importance are cotton and sugar.

In its twenty-first annual report, for 1906, the Boston Chamber of Commerce thus refers to traffic conditions:

> While it is in a way satisfactory to be able to record an improvement in the volume of Boston's foreign commerce, in view of the unexampled prosperity of the whole country and of the phenomenal gain made by some of our rival ports, the percentage of gain of less than 5 per cent, the smallest made by any of the Atlantic and Gulf ports, is almost humiliating.
>
> Had we held our own in imports of wool and sugar, two of our most important commodities, the importation of which together fell off in the aggregate over $8,000,000, our percentage of gain would have been but 11 per cent, still the smallest in the list. New Orleans, with a gain of 12.8 per cent, wrests second place from us once more, and Galveston, with an increase of 22.8 per cent, needs only to make a further increase of 10 per cent to pass us in the race.[a]

Coal is the largest item of coastwise receipts, and there is also a considerable quantity of coal imported from Canada. A large part of the coal is received at Mystic wharves, but smaller quantities are delivered at other points in the harbor and connecting channels. Most of the coal is used for consumption locally, but over a million tons are annually reshipped to other New England points.

[a] Report Boston Chamber of Commerce, 1906, pp. 45, 46.

The following table shows the total volume of coal received at Boston from 1902 to 1907:

TABLE 27.—RECEIPTS OF COAL AT BOSTON, 1902–1907.

[Compiled from the Monthly Summary of Commerce and Finance and reports of the Boston Chamber of Commerce.]

	1902.	1903.	1904.	1905.	1906.	1907.
Domestic coal by sea:	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Anthracite	971,649	2,042,512	1,961,785	1,941,478	1,630,674	2,016,252
Bituminous	2,103,697	2,078,499	2,397,885	2,757,186	2,772,593	3,196,057
Total	3,075,346	4,121,011	4,359,670	4,698,664	4,403,267	5,212,309
Foreign coal by sea	1,043,296	1,248,566	550,383	608,471	658,072	545,652
Total by sea	4,118,642	5,369,577	4,910,053	5,307,135	5,061,339	5,757,961
By rail	161,567	294,363	158,599	77,024	116,256	126,963
Grand total	4,280,209	5,663,940	5,068,652	5,384,159	5,177,595	5,884,924
By sea from—						
New York Harbor and Hudson River	750,905	1,331,309	1,175,546	1,175,534	1,054,326	1,284,804
Philadelphia	1,016,023	1,395,447	1,268,403	1,300,195	1,184,150	1,557,486
Baltimore	598,499	468,519	463,848	799,935	760,525	1,089,309
Newport News	428,658	596,439	899,690	767,056	799,844	862,982
Norfolk	272,756	314,505	532,618	633,877	587,218	407,074
Washington	4,585	12,592	19,565	22,067	17,204	10,654
Pensacola	2,200	2,200	.....	.....	.....	.....
Total	[a] 3,075,346	4,121,011	4,359,670	4,698,664	4,403,267	5,212,309

[a] Includes 1,720 tons by lighter from Lynn, Mass.

Lumber is also received by water in considerable quantities, both from the East and South, as shown below:

TABLE 28.—RECEIPTS OF LUMBER AT BOSTON, 1905–1907.

[Reports of Boston Chamber of Commerce.]

	1905.	1906.	1907.
By sea:	*Feet.*	*Feet.*	*Feet.*
East	62,525,084	51,438,722	48,676,319
South	100,381,820	113,307,352	92,303,611
Total	162,906,904	165,346,074	140,979,930
By rail	98,680,000	115,740,000	121,910,000
Grand total	261,586,904	281,086,074	262,889,930

Cotton is also received in large quantities, the total domestic receipts being 741,318 bales in 1905, 520,893 bales in 1906, and 518,295 bales in 1907; but some part of this comes by rail. Some of the cotton received is exported, but the greater part is used in the New England cotton factories.

There is also an important movement of general merchandise between Boston and New York, Philadelphia, and Baltimore, and from Boston to South Atlantic ports. This and the cotton movement is carried largely by the regular lines of packet steamships operating from Boston, among which may be mentioned the Ocean Steamship Company, of Savannah; the Clyde Line, to Charleston and Jacksonville; the Merchants and Miners' Transportation Company, to Savannah, Norfolk, and Baltimore; the Boston and Philadelphia Line; the Metropolitan Steamship Line, to New York; and the various Sound lines.

No complete records of the commerce of Boston Harbor seem to be kept. The following table shows the commerce in some detail at three of the important subsidiary channels—Mystic River, Fort Point Channel, and Dorchester Bay; but this does not include that received and shipped from the outer harbor along the water front of the older city, nor at Charlestown, East Boston, and South Boston, where all the regular line steamers have their wharves and where much the larger part of the water traffic is conducted.

TABLE 29.—COMMERCE OF BOSTON HARBOR, 1906, BY ARTICLES.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	Mystic River.	Fort Point Channel.	Dorchester Bay.
	Tons.	*Tons.*	*Tons.*
Coal	2,682,496	928,967	240,762
Lumber	202,868	80,603	26,043
Brick	.....	31,648	9,088
Sand and stone	91,548	44,668	1,242
Lime and cement	13,311	34,864	2,307
Plaster rock	3,804	633	.....
Grain	70,456	.....	.....
Cotton	77,145	1,708	.....
Sugar	.....	165,825	.....
Iron and steel	27,582	9,013	.....
Oil	2,500	29,397	22,311
Coal tar, felt, oxide, etc	14,925	.....	21,833
Logs	41,858	.....	.....
Cinders	13,870	.....	.....
Wood	16,585	4,628	.....
Pulp wood	21,246	.....	.....
Fertilizers	47,842	.....	.....
Salt	30,490	7,420	.....
Hay	3,110	.....	.....
Miscellaneous	346,175	77,397	10,440
Total	3,707,817	1,416,671	334,026

The table below shows the total shipments and receipts at Boston in American vessels, according to the Census Report on Transportation by Water in 1906:

TABLE 30.—SHIPMENTS AND RECEIPTS IN AMERICAN VESSELS AT BOSTON, 1906, BY ARTICLES.

[Compiled from the United States Census Report on Transportation by Water, pp. 73-74.]

Articles.	Shipments.	Receipts.	Articles.	Shipments.	Receipts.
	Net tons.	*Net tons.*		*Net tons.*	*Net tons.*
Coal	3,080	4,699,655	Fruits and vegetables	43,311	69,418
Lumber	19,383	299,566	Naval stores	162	24,461
Petroleum and other oils	9,192	188,442	Pig iron and steel rails	653	32,849
Phosphate and fertilizer	42,873	12,515	Miscellaneous	762,749	744,138
Stone, sand, etc	2,853	239,462			
Cement, brick, and lime	2,697	77,707	Total	887,001	6,533,573
Cotton	48	145,360			

Section 3. The south coast of New England.

This portion of the coast line differs distinctly from the eastern coast of New England in the more protected character of the local water routes. Along the southern coast are a series of sounds and bays, including Nantucket and Vineyard sounds, Buzzards and Narragansett bays, and Long Island Sound, which furnish protected routes for deep-draft vessels. These "inside" routes are used by vessels running to various ports in Connecticut, Rhode Island, and southeastern Massachusetts, where connection is made by rail with numerous towns and cities. The projected canal across Cape Cod will extend the protected routes practically to Boston Harbor. The "outside" route south of Long Island is used in the trade from the Middle and South Atlantic ports to Boston and other points on the eastern coast of New England.

SOUTHEASTERN MASSACHUSETTS AND RHODE ISLAND.—There is an extensive movement of sailing vessels, coal barges, and frequent steamers through Nantucket and Vineyard sounds, but east of Buzzards Bay there is little local commerce by water. Nantucket and Vineyard Haven have regular steamboat connection with the mainland at Woods Hole and New Bedford, and there is a small trade at Hyannis. The extent of this traffic was as follows in 1906: Hyannis, 20,100 tons; Nantucket, 43,291 tons; Vineyard Haven, 40,167 tons; Woods Hole, 27,875 tons.

New Bedford, near the entrance to Buzzards Bay, has a considerable trade in coal, cotton, and whale oil. Other places in this bay are unimportant, but the commerce through it will probably increase on the opening of the Cape Cod Canal.

Narragansett Bay is the approach by water to Providence, Newport, Fall River, and Taunton, and a number of towns and villages, the most important of which are Bristol, Wickford, and Greenwich. The length of the bay from the entrance to its northern extremity at the mouth of the Providence River is 16 miles. Navigation in the bay and its tributaries is sometimes impeded by floating ice, and in severe winters by packed field ice.

Newport, on the eastern side of Narragansett Bay, has considerable trade in coal, lumber, and fish carried in coasting vessels, and is also used as a harbor of refuge in stress of weather, and as a port of call for orders for coal barges. Regular steamboats ply to New York and various points on Narragansett Bay. Few foreign vessels enter the port.

The city of Fall River, at the entrance to Taunton River, has an important coasting trade. The principal line of the New England Navigation Company operates from here to New York. Large cargoes of coal and cotton are brought to its factories, and there is also considerable movement of lumber and farm products. Occasional cargoes of coal are carried up to the villages of Somerset and Dighton.

Taunton, an important manufacturing city 12½ miles above Fall River, at the head of navigation of the Taunton River, has a large coasting trade in coal, carried principally in barges, and some trade in lumber.

Westerly, on the Pawcatuck River, has also some trade in coal and lumber, and there is some miscellaneous traffic to Block Island.

Table 31, below, shows the principal articles of traffic at these points.

TABLE 31.—COMMERCE OF CERTAIN PORTS IN SOUTHEASTERN MASSACHUSETTS AND IN RHODE ISLAND, 1906, BY ARTICLES.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	New Bedford, Mass.	Taunton River and Fall River, Mass.	Newport, R. I.	Westerly, R. I.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Coal, minerals, etc	458,332	1,024,000	[a] 275,000	43,458
Lumber and products	36,450	171,000	[a] 78,000	9,116
Cotton and products	44,330	305,000	.....	.....
Fish, oysters, oyster shells, etc	7,750	71,100	169,100	.....
General merchandise or steamboat freight	292,370	2,553,000	200,000	.....
Vegetables and truck	13,300	121,000	2,560	.....
Live stock and products	8,000	25,000	.....	.....
Grain and forage	.....	33,000	.....	.....
Building material	.....	.....	.....	1,933
Other freight not included in preceding	39,100	55,960	5,780	6,279
Total	899,632	4,359,060	730,380	60,786

[a] Excluding about 1,075,000 tons of coal and 115,000 tons of lumber carried to other ports, but using Newport Harbor in stress of weather.

Providence is located about 7 miles above the entrance of Providence River into the head of Narragansett Bay. By means of the river and bay there is a direct route to the ocean via the "western passage," and also an inland route to New York via Long Island Sound.

East Providence, a suburb, is on the east bank of the river, and is connected by drawbridges across the river. Pawtucket is at the head of navigation, about 4½ miles from the mouth of the Pawtucket River (Seekonk), the upper portion of the Providence River.

Providence is a commercial port of considerable importance in the coastwise trade. Regular lines of steamers ply to New York, via Long Island Sound, and to Baltimore. As shown in the table below, coal is much the most important article received, while there is a large volume of general merchandise and a considerable movement of lumber, building materials (cement, stone, sand, brick, lime, etc.), oil, and oysters.

TABLE 32.—COMMERCE BY WATER AT PROVIDENCE AND ON PAWTUCKET RIVER, 1906, BY ARTICLES.

Articles.	Providence River.[a]	Pawtucket River.[a]	In American vessels.[b]
	Tons.	*Tons.*	*Net tons.*
Coal	2,153,452	243,733	2,259,224
Lumber	34,586	10,160	58,753
Building materials	42,352	.....	51,430
Oysters and shells	44,243	.....	.....
Oil	43,209	.....	10,785
Pig iron and steel rails	.....	.....	50,988
Cotton	.....	.....	42,849
General merchandise and miscellaneous	768,161	33,846	617,006
Total	3,086,003	287,739	3,091,035

[a] Compiled from Report of Chief of Engineers, U. S. Army, 1907.
[b] Compiled from United States Census Report on Transportation by Water, 1906.

Most of the commerce through Long Island Sound, whether bound to or from Narragansett Bay or through Vineyard Sound, passes Point Judith at the mouth of Narragansett Bay. Some indication of the extent of this traffic may be gained from the following estimate of vessel tonnage passing during the year 1906, as shown by the Report of the Chief of Engineers:

	Gross tons.		Gross tons.
Steamers	9,050,000	Sloops	50,000
Yachts (steam and sail)	1,500,000	Barges	7,700,000
Schooners	32,100,000		
Ships, barks, etc	200,000	Total	50,600,000

There is some little commerce at several ports at the eastern end of Long Island, and at small islands in the neighborhood.

LONG ISLAND SOUND.—The commerce of Long Island Sound includes most of that to and from points in Narragansett Bay and a large part of the traffic from New York to the eastern coast of New England, in addition to the receipts and shipments at points in the Sound. There are a large number of rivers and harbors along the Sound, mostly on the northern or Connecticut shore, but none of them ranks as a seaport of the first order.

The Thames River is a tidal stream for a distance of 15 miles from its mouth to Norwich. New London has a large trade in general steamboat freight and a considerable trade in coal. Larger cargoes of coal are received at Allyns Point. A daily line of steamers from New York runs to Norwich, and there is some trade to other points on the river.

On the Connecticut River there is a considerable commerce, mostly in steamers and barges, as far as Hartford, Conn. This consists mainly of coal, lumber, building materials, and miscellaneous steamboat freight.

The following table shows in some detail the commerce of the Thames and Connecticut rivers for 1906:

TABLE 33.—COMMERCE ON THAMES AND CONNECTICUT RIVERS, 1906, BY ARTICLES.

Articles.	New London.[a]	New London.[b]	Thames River.[b]	Connecticut River.[b]
	Net tons.	*Tons.*	*Tons.*	*Tons.*
Coal	601,005	190,304	331,925	239,608
Lumber	15,060	5,177	46,157	28,416
Building materials	6,835	.....	2,890	68,000
Fertilizer	687	.....	.....	20,000
Paper stock and wood pulp	.....	.....	13,775	.....
Steamboat freight	504,122	486,566	30,152	80,000
Miscellaneous		15,092	2,604	4,000
Total	1,127,709	697,139	427,503	440,024

[a] Traffic in American vessels, compiled from the United States Census Report on Transportation by Water, 1906; probably includes the traffic on the Thames River above New London.

[b] Compiled from the Report of Chief of Engineers, U. S. Army, 1907.

New Haven is commercially the most important harbor on Long Island Sound. Vessels drawing 23 feet of water can go to the city, and 19 feet can be taken in at low water. Mill and Quinnipiac rivers are navigable for 1 and 3 miles. There is a very large carrying trade in coal and steamboat freight and a considerable movement of lumber, oysters and shells, steel billets, and petroleum products. On West River, between New Haven and West Haven, there is considerable traffic in coal, building materials, and oysters and shells. The total water traffic at New Haven for 1906, according to the Census, was 2,318,480 tons. The following table shows this commerce in some detail for the year 1906:

TABLE 34.—COMMERCE OF NEW HAVEN AND WEST RIVER, 1906, BY ARTICLES.

Articles.	New Haven Harbor.[a]	Quinnipiac River.[a]	Mill River.[a]	West. River.[a]	Total traffic in American vessels.[b]
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Net tons.*
Coal	898,135	73,813	221,310	44,640	1,830,953
Lumber and lath	28,446	.....	25,687	5,349	48,646
Sand and clay	29,861	13,278	1,675	10,040	28,682
Oysters	6,219	36,838	.....	34,739	.....
Oyster shells	.....	21,373	.....	27,347	.....
Iron and steel	6,981	33,500	3,521	.....	37,445
Petroleum products	.....	7,111	6,777	.....	3,798
Miscellaneous steamboat freight	419,850	4,102	9,156	6,705	368,956
Total	1,389,492	190,015	268,126	128,820	2,318,480

[a] Compiled from the reports of Chief of Engineers, U. S. Army, 1907.
[b] Compiled from the United States Census Report on Transportation by Water, pp. 73-74.

The Housatonic River is a rapid stream, but is navigable as far as Derby and Shelton, 13 miles from the mouth. Shelton has important manufactories, and coal and lumber are brought in by sailing vessels and barges. The total traffic for 1906 was 54,496 tons.

Bridgeport is an important manufacturing city, with a large carrying trade by water. There are several lines of steamers to New York, one making two trips per day, and another line to Port Jefferson, N. Y. The principal bulk cargoes are coal, brought in canal boats and coal barges. There is also considerable trade in lumber, iron, steel billets, oysters, petroleum products, ice, and steamboat freight.

Norwalk and South Norwalk, on Norwalk River, have considerable traffic by water, principally coal, oysters, and steamboat freight. From Stamford and Greenwich there is also some trade, mostly in coal, steamboat freight, and sand and crushed stone.

The commerce of Bridgeport, Norwalk, Stamford, and Greenwich for 1906 is shown in the table below:

TABLE 35.—COMMERCE OF BRIDGEPORT, NORWALK, STAMFORD, AND GREENWICH, CONN., 1906, BY ARTICLES.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	Bridgeport.	Norwalk.	Stamford.	Greenwich.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Coal	541,000	87,743	83,048	18,000
Steamboat freight	120,020	90,000	101,800	41,000
Lumber	70,791	7,880	14,165	3,348
Iron and pipe	41,616	2,652	3,230	.....
Steel and steel billets	45,061	.....	.....	.....
Crushed stone, gravel, sand, and clay	39,266	6,101	32,779	33,000
Oysters	28,332	31,921	.....	.....
Petroleum products	19,761	.....	.....	.....
Ice	12,000	.....	.....	.....
Miscellaneous	33,397	25,462	14,153	13,000
Total	951,244	251,759	249,175	108,348

At Port Chester and Echo Bay (upper New Rochelle Harbor) there is also considerable carrying trade by water in coal, lumber, building materials, and general merchandise. There is a daily line of steamers to New York.

On the northern shore of Long Island the only harbors of commercial importance are Port Jefferson, opposite Bridgeport, and Huntington Harbor, in Huntington Bay. There is some water-borne trade at these places, consisting mainly of coal, lumber, building materials, and general merchandise, with oysters and farm products from Port Jefferson. The traffic at these points for 1906 is shown below:

TABLE 36.—COMMERCE OF PORT CHESTER, ECHO BAY, PORT JEFFERSON, AND HUNTINGTON HARBOR, 1906, BY ARTICLES.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	Port Chester.	Echo Bay.	Port Jefferson.	Huntington Harbor.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Coal and other fuel	50,000	107,754	38,120	20,250
Building materials	110,000	40,392	7,070	1,675
Lumber and timber	.....	30,000	8,250	37,500
General merchandise	80,000	72,150	34,600	27,050
Iron	25,000	133	1,800	.....
Miscellaneous	.....	20,031	28,865	18,737
Total	265,000	270,460	118,705	105,212

One of the most important freight movements through Long Island Sound is that of general merchandise or package freight between New York and New England points by the various lines of steamers. The table below shows the volume of this commerce, by ports, for the years 1905 to 1907:

TABLE 37.—COASTWISE MOVEMENT OF GENERAL MERCHANDISE BETWEEN NEW YORK AND NEW ENGLAND PORTS, 1905-1907.

[Monthly Summary of Commerce and Finance, December, 1907, p. 1189.]

Port.	Shipments.			Receipts.		
	1905.	1906.	1907.	1905.	1906.	1907.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Boston, Mass.	[a] 151,619	210,413	154,844	[a] 273,052	244,144	241,142
New Bedford, Mass.	23,876	28,109	25,099	27,376	29,780	33,657
Providence, R. I.	49,516	44,916	37,069	41,892	43,813	39,157
Fall River, Mass.	40,055	28,227	20,790	42,510	36,271	36,168
Newport, R. I.	9,790	11,803	10,815	11,940	9,396	7,790
New London, Conn.	106,467	102,302	78,465	178,539	198,893	165,002
New Haven, Conn.	31,821	33,835	27,983	32,881	34,219	34,116
Bridgeport, Conn.	49,039	49,636	36,617	44,860	45,748	35,555
New York, N. Y.	[b] 653,050	643,264	592,587	[b] 462,183	510,241	391,682
Total	1,115,233	1,152,505	984,269	1,115,233	1,152,505	984,269

[a] Not reported for May, June, and July, 1905.

[b] One line not represented in 1905 figures during the months of May, June, and July.

Section 4. Port of New York.

The port of New York covers an extensive area, embracing both Upper and Lower New York Bay and their connecting channels, with a total water front of about 450 miles, of which 125 miles are available for ocean steamships. Wharves and piers extend along both Manhattan and New Jersey banks of North River, on both sides of the East and Harlem rivers, around the shores of the Upper Bay, and at various points on the eastern end of Long Island Sound and along the channels between Staten Island and the New Jersey mainland. About 54 miles of wharf front are now in commercial use within the limits of New York City, of which 10 miles are on the island of Manhattan, 24.3 miles in Brooklyn, 6 miles in Richmond, 11 miles in the Borough of Queens, and 2.5 miles in the Bronx. About 7 miles are used for regular line steamboats and steamships and 47 miles for general and miscellaneous purposes.

New York is by far the most important center of water-borne commerce in the United States. Its foreign commerce is many times that of any other port and nearly one-half of the total foreign commerce of the country, and the movement of coastwise trade and local traffic is also many times that of any other port in the United States.

About the only information available indicating the total seagoing movement is that shown in the following table of arrivals of steam and sailing vessels for the years 1905 to 1907:

TABLE 38.—VESSEL ARRIVALS AT NEW YORK, 1905-1907.

[Monthly Summary of Commerce and Finance, December, 1907, p. 1189.]

	1905.	1906.	1907.
Coastwise trade:			
From eastern ports	3,521	3,459	3,039
From southern ports	3,661	3,677	3,287
Total	7,182	7,136	6,326
Foreign trade	4,217	4,570	4,696
Grand total	11,399	11,706	11,022

This table, however, is far from indicating the total vessel movement of the port. It does not include the movement of barges nor any of the river and local traffic, and probably does not include the regular lines of steamboats operating through Long Island Sound. The absence of tonnage statistics also makes the information unsatisfactory. The larger vessels at this port make its importance greater than is indicated by the number of vessels, and it is almost certain that the decline in number of vessels shown is more than offset by the larger vessels constantly coming into use.

For the foreign trade there are official records, and a brief statement in regard to this will suggest something of the general impor-

tance of the port in the total water-borne traffic. The tonnage of vessels entered and cleared in the foreign trade at New York is about a third of the total tonnage movement in the foreign trade for the whole country, and four times that in the foreign trade of Boston, the second port in the country. The value of exports from the port of New York is one-third of the total from the United States, and the value of imports is about 60 per cent of the total imports. The total value of exports and imports is nearly seven times that at any other port in the country.

There are records of the movement of freight in certain parts of the extensive harbor where government improvements have been carried on. The sections of the harbor for which information is available includes (1) the Harlem River and some neighboring points; (2) Newtown Creek, Gowanus Bay, Red Hook, and Bay Ridge on the Brooklyn shore; and (3) northeastern New Jersey, the commerce of which is largely concentrated through the channel between Staten Island and New Jersey. The information as to these districts does not, however, distinguish between the foreign, coastwise, river, and local traffic, nor do these records include the central district on North and East rivers. It is here, on both sides of Manhattan Island, the central portion of Brooklyn, Jersey City, and Hoboken, where the most important commercial movement takes place, including practically all of the regular lines of ocean, sound, and river packet steamers.

HARLEM RIVER AND NEIGHBORING PLACES.—On the Harlem River there is a very large local traffic, aggregating 7,533,594 tons in 1895, 9,130,763 tons in 1904, 9,998,021 tons in 1905, and 11,385,649 tons in 1906. The most important part of this traffic is that lightered in freight cars by the New York, New Haven and Hartford Railroad on the lower part of the river, but there is also a large movement of coal, building materials of all sorts, and ice.

There is also considerable local traffic on Bronx River, East Chester Creek, and Flushing Bay, nearby waters connecting with Long Island Sound within the harbor of New York. This also consists mainly of coal and building materials, with some rail, bridge steel, and material for roads and streets.

Records are kept of the traffic on Newtown Creek, between the boroughs of Queens and Brooklyn, and there are estimates of the freight movement at Gowanus Bay and Bay Ridge (from Twenty-eighth to Ninety-second streets), as follows: Newtown Creek (1906), 2,803,380 tons; Gowanus Bay (1905), 3,000,000 tons; Bay Ridge (1905), 1,740,000 tons.[a]

Coal and lumber constitute the larger part of the traffic at Newtown Creek, but the movement of copper ore and products represents by far the most valuable article. There is also a considerable move-

[a] Report of Chief of Engineers, U. S. Army, 1907, pp. 1004, 1036–1037.

ment of ice, building material, general merchandise, chalk and whiting, and petroleum.

The traffic of Harlem River and neighboring places and of Newtown Creek for 1906 is shown in the following table:

TABLE 39.—COMMERCE OF HARLEM RIVER AND NEIGHBORING PLACES AND NEWTOWN CREEK, 1906, BY ARTICLES.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	Harlem River.	Bronx River.	East Chester Creek.	Flushing Bay.	Newtown Creek.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Coal and other fuel	2,978,167	130,972	133,830	114,317	1,137,835
Cement, lime, and sand	1,821,406	92,200	5,885	18,197	104,004
Brick	224,618	80,500	8,325	9,886	63,425
Building stone	77,325	5,000	7,590	.....	16,802
Lumber and timber	184,240	22,800	19,719	68,602	551,859
Grain, flour, and feed	727,674	.....	.....	.....	2,191
Hay and straw	114,534	.....	.....	.....	268
Ashes, garbage, etc	327,176	.....	250	8,647	.....
Petroleum	52,150	.....	23,561	.....	29,005
Gravel	48,000	.....	750	550	.....
Macadam and broken stone	36,013	5,500	34,399	34,483	326
Paving blocks	.....	.....	10,200	.....	6,000
Oysters, clams, and fish	6,100	.....	.....	.....	.....
Copper ore and products	.....	.....	.....	.....	396,665
Iron rails and bridge steel	.....	4,421	27,048	200	77,785
Ice	140,000	.....	.....	5,854	177,428
Chalk and whiting	.....	.....	.....	.....	70,542
General merchandise	4,615,174	145	200	12,150	134,223
Miscellaneous	33,072	.....	10,838	426	35,022
Total	11,385,649	341,538	282,655	273,312	2,803,380

NORTHEAST NEW JERSEY.—A considerable movement of commerce enters the southern part of New York Bay from a number of creeks and rivers in northeast New Jersey. Most of this traffic, except that of Shrewsbury River, passes through Raritan Bay, which has also a larger movement coming through Arthur Kill, the channel between Staten Island and New Jersey. Still larger shipments are made from the railroad terminals on Arthur Kill, most of which move northward into Newark and upper New York bays.

The following tables show the freight movement on the various New Jersey streams, with the principal articles on the more important rivers and channels:

TABLE 40.—COMMERCE ON STREAMS OF NORTHEAST NEW JERSEY, 1905 AND 1906.

[Compiled from the reports of Chief of Engineers, U. S. Army.]

Stream.	1905.	1906.	Stream.	1905.	1906.
	Tons.	*Tons.*		*Tons.*	*Tons.*
Shrewshury River	1,768,500	1,668,500	Keyport Harbor	86,821	101,196
Cheesequake Creek	45,500	83,648	South River	260,204	226,227
Shoal Harbor and Compton Creek	34,340	34,538	Raritan River	605,197	510,439
Matawan Creek	58,471	128,181	Woodbridge Creek	160,194	167,392
			Passaic River	2,567,000	2,577,188

TABLE 41.—COMMERCE ON CERTAIN RIVERS OF NORTHEAST NEW JERSEY, 1906, BY ARTICLES.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	Shrewsbury River.	South River.	Matawan Creek.	Keyport Harbor.	Raritan River.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Coal, coal dust, and coke	30,000	11,067	19,300	18,600	37,552
Lumber and products	1,000	300	.....	.....	14,903
Building materials	15,000	157,344	47,500	.....	305,573
Farm produce	200,000	.....	3,710	25,875	227
Fish, oysters, oyster shells, etc.	10,000	.....	.....	21,000	.....
Manure	.....	9,200	15,000	[a] 10,000	.....
Fertilizer	.....	5,700	14,000	.....	.....
Manufactures	.....	.....	.....	.....	41,520
Minerals and quarry products	.....	4,025	[b] 7,500	.....	61,208
Clay, sand, gravel, etc.	.....	22,551	[c] 21,171	[c] 8,321	.....
Conduits, sewer pipes, etc.	.....	16,040	.....	.....	.....
Miscellaneous	1,412,500	.....	.....	17,400	49,456
Total	1,668,500	226,227	128,181	101,196	510,439

[a] Includes some fertilizer received. [b] Shell lime. [c] Clay products.

TABLE 42.—COMMERCE ON RARITAN BAY, ARTHUR KILL, AND PASSAIC RIVER, 1906, BY ARTICLES.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	Raritan Bay.	Arthur Kill.	Passaic River.
	Tons.	*Tons.*	*Tons.*
Coal	4,632,265	6,812,045	244,966
General merchandise	.....	1,815,996	305,245
Building material	2,868	1,180,097	586,928
Ores and metals	805	483,481	153,489
Chemicals and fertilizers	.....	372,891	144,563
Machinery and manufactures	.....	226,030	.....
Oils	.....	45,736	54,150
Asphalt and pitch	40,500	7,,339	.....
Lead and copper	50,000	.....	.....
Bullion	54,000	.....	.....
Sand and stone	16,736	.....	376,969
Other articles	16,051	375,979	225,528
Total	4,813,225	11,386,594	2,091,838
Traffic of other rivers, etc.	[a] 1,619,020	[b] 5,188,246	[c] 485,350
Total movement	6,432,245	16,574,840	2,577,188

[a] Rivers flowing into Raritan Bay and Arthur Kill. [b] Raritan Bay and tributaries. [c] Hackensack River.

Most of the traffic of Arthur Kill, a large part of that on Raritan Bay, and about a fourth of that on the Passaic River passes through Kill Van Kull, where the movement for 1906 amounted to 17,097,799 tons, at an estimated value of $396,266,084. The total movement on the rivers and channels in this region, eliminating duplication, is over 20,000,000 tons.

Coal constitutes much the largest part of this traffic, but there is also a very large movement of general merchandise and building materials, a large movement of ores, metals, chemicals, and fertilizers, and a considerable amount of other articles, including oil, asphalt, stone, and sand. The commerce of the rivers entering the southern part of New York Bay is of a miscellaneous character, including farm products, building materials, and general merchandise.

TOTAL TRAFFIC OF NEW YORK BAY.—Combining roughly the statistics of traffic for Harlem River, the points on the Brooklyn shore, and the New Jersey district, the total for these portions of New York Harbor aggregates about 40,000,000 tons. While this includes a considerable portion of the bulky traffic, there are also very large shipments of coal from Weehawken and Edgewater. In addition, there is the enormous traffic of the regular steamship and steamboat lines and other commerce on North and East rivers.

The Census Report on Transportation by Water in 1906 presents for the first time statistics of the total traffic in and about New York Bay, and distinguishes between the traffic in American vessels at New York City and the adjacent cities connected with the bay, the foreign commerce, and the harbor traffic. The shipments and receipts in American vessels are shown in the following table:

TABLE 43.—SHIPMENTS AND RECEIPTS IN AMERICAN VESSELS AT NEW YORK AND ADJACENT PORTS, 1906, BY ARTICLES.

[Compiled from the United States Census Report on Transportation by Water.]

Articles.	New York City.		Adjacent ports.[a]		Total.	
	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.
	Net tons.	*Net tons.*	*Net tons.*	*Net tons.*	*Net tons.*	*Net tons.*
Coal	943,592	502,345	4,889,335	6,402	5,832,927	508,747
Lumber	129,556	2,393,694	2,111	68,584	131,667	2,462,278
Stone, sand, etc	1,609,264	3,184,477	47,310	326,211	1,656,574	3,510,688
Cement, brick, and lime	181,425	3,491,267	50,816	397,968	232,241	3,889,235
Ice	50	1,758,179	72	1,057	122	1,759,236
Petroleum and other oils	270,619	692,482	1,003	3,539	271,622	696,021
Cotton	47,289	359,185	5	.....	47,294	359,185
Phosphate and fertilizer	108,585	16,500	1,828	58,028	110,413	74,528
Pig iron and steel rails	265,663	91,584	18,876	1,000	284,539	92,584
Fruits and vegetables	105,927	319,304	.....	.....	105,927	319,304
Grain and flour	134,909	63,589	26,711	17,300	161,620	80,889
Naval stores	7,822	142,724	163	.....	7,985	142,724
Tobacco	10,331	88,707	.....	.....	10,331	88,707
Canned goods	46,191	22,880	.....	.....	46,191	22,880
Iron ore	404	824	.....	602	404	1,426
Miscellaneous	4,736,747	4,380,165	14,617	49,145	4,751,364	4,429,310
Total	8,598,374	17,507,906	5,052,847	929,836	13,651,221	18,437,742
Minor ports	.....	.....	.....	.....	1,706,131	30,514
Total New York Harbor	.....	.....	.....	.....	15,357,352	18,468,256

[a] Hoboken, Jersey City, Newark, Perth Amboy, and South Amboy.

To show the total traffic in and around New York Harbor the Census report adds to the foregoing commerce in American vessels the statistics of freight lightered in and around the harbor and an estimate for the tonnage of exports and imports, as indicated in the following table:

TABLE 44.—TOTAL TRAFFIC OF NEW YORK HARBOR, 1906.
[United States Census Report on Transportation by Water, p. 76.]

	Shipments.	Receipts.	Total.
	Net tons.	*Net tons.*	*Net tons.*
Traffic in American vessels	15,357,352	18,468,256	33,825,608
Exports and imports	14,963,162	10,049,167	25,012,329
Harbor traffic	.....	.....	55,131,418
Total	30,320,514	28,517,423	113,969,355

It should be noted in the above table that the traffic in American vessels includes some part of the foreign trade, that the tonnage of exports and imports is only approximately estimated, and that the harbor traffic does not exactly segregate the movement at New York, but probably includes some freight shipped and delivered at other ports. These considerations indicate that the total of 113,969,355 tons may be somewhat of an overestimate. On the other hand, however, the harbor traffic does not include the full amount of freight carried by ferryboats. So the total figure given may be taken to represent approximately the total movement of New York Harbor.

SOUTH SHORE OF LONG ISLAND.—There is some movement of traffic by water at several points along the western part of the south shore of Long Island, which is also tributary to New York Harbor. An extensive passenger traffic is carried to Coney Island during the summer months. There is a small freight traffic, mostly general merchandise and coal, at Canarsie Bay, an indentation in Jamaica Bay, aggregating 95,460 tons in 1905. At Great South Bay there is some traffic in lumber and general merchandise, amounting to 232,500 tons in 1906. There is also a small movement, principally of oysters, at Browns Creek, a tributary of South Bay, amounting to 29,675 tons in 1906.

Section 5. Inland waters of New York State.

In addition to the various routes already described, the inland water routes in the State of New York embrace the Hudson River, the New York State canals, which connect the Lakes with the port of New York by three routes, and Lake Champlain, which serves also Burlington, Vt.

THE HUDSON RIVER.—This stream by reason of its connection with the Erie and Champlain canals has long played an important part in the movement of traffic between the port of New York and various American and Canadian ports situated on the Great Lakes and other waterways.

Among its numerous harbors and ports are Yonkers, Tarrytown, West Point, Newburgh, Fishkill, Poughkeepsie, Kingston, Peekskill, Rondout, Saugerties, Hudson, and, finally, Troy and Albany, about 150 miles above New York City and at the head of navigation.

The commerce of the river consists principally of lumber, grain, ice, building material, including brick, and fuel, including coal. There is also an extensive passenger and excursion traffic.

An important local movement of traffic is that of ice and brick, from the many ice houses and brick kilns along the river banks. Some of the river freight starts from Albany and other river points, while a portion of it has its starting point or terminus at points along the Erie and Champlain canals. The following tables show the traffic at the more important points, including Albany, where there is a marked decrease in water shipments of ice, stone, and fuel for the past few years. The figures for 1899 show a total tonnage at Albany amounting to 5,070,800, as against 3,325,360 in 1906. This falling off of river freight is ascribable to the fact that a large percentage of freight formerly shipped by river is now sent by rail. In regard to the decline in the ice traffic as shown in the accompanying table, the secretary of the Albany Chamber of Commerce states that the ice business on the upper Hudson is uncertain and varies from year to year; that a large amount of ice is now sent to New York City from points in Maine. Fuel has also been transferred to a large extent from water to rail.

The following tables show the movement of commerce on the Hudson River at Albany for a period of years, and the movement of commerce on the Hudson River at points other than Albany, including Tarrytown, Peekskill, Rondout, Wappinger Creek, and Saugerties Harbor, for the year 1906:

TABLE 45.—COMMERCE ON THE HUDSON RIVER AT ALBANY, 1898–1906, BY ARTICLES.

[Figures furnished by the Albany Chamber of Commerce.]

Articles.	1898.	1899.	1900.	1901.	1902.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Ice	1,197,839	1,189,524	1,220,566	815,827	1,114,716
Lumber and timber	565,538	995,840	458,224	414,616	614,112
Vegetable food	737,978	482,510	39,400	42,963	446,648
General merchandise	697,554	730,809	1,037,389	776,908	297,323
Stone, cement, sand, etc	428,245	814,958	691,175	401,213	395,154
Fuel (wood and coal)	418,741	857,159	1,364,173	671,882	269,501
Brick					4,928
Manufactures					144,640
Ore					135,360
Hay					65,128
Sundries					185,587
Total	4,045,895	5,070,800	4,810,927	3,123,409	3,673,097

TABLE 45.—COMMERCE ON THE HUDSON RIVER AT ALBANY, 1898-1906, BY ARTICLES—Continued.

Articles.	1903.	1904.	1905.	1906.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Ice	706,209	713,016	851,498	783,464
Lumber and timber	489,513	614,119	378,682	547,709
Vegetable food	356,919	293,394	291,461	352,989
General merchandise	546,527	632,205	256,846	314,952
Stone, cement, sand, etc	391,885	399,529	379,290	418,570
Fuel (wood and coal)	562,268	613,332	656,511	409,823
Brick	45,090	95,072	58,100	111,565
Manufactures	128,402	55,974	175,254	113,132
Ore	117,638	45,536	76,182	69,866
Hay	87,339	41,307	43,356	49,707
Pulp wood and wood pulp	6,015	7,737	2,291	2,035
Sundries	48,614	2,324	141,157	151,548
Total	3,486,419	3,513,545	3,310,628	3,325,360

TABLE 46.—COMMERCE ON THE HUDSON RIVER AT POINTS OTHER THAN ALBANY, 1906, BY ARTICLES.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	Tarrytown Harbor.	Peekskill Harbor.	Rondout Harbor.	Wappinger Creek.	Saugerties Harbor.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Coal and other fuel	56,164	56,581	.....	27,900	5,000
Lumber and timber	1,750	300	50,000	190	1,500
Building material	2,660	3,682	200,000	45	1,200
Cement, lime, sand, gravel, etc	16,440	8,026	500,000	8,155	60,000
Clay, pottery, etc	250	1,618	.....	.....	.....
Farm products and fruits	.....	.....	5,881	40	600
Iron and emery, etc	.....	6,133	.....	345	.....
Manufactures	.....	.....	7,057	.....	10,000
Hay, grain, etc	.....	2,170	.....	269	1,000
Miscellaneous	2,450	14,040	[a]235,586	9,250	4,000
Total	79,714	92,550	998,524	46,194	83,300

[a] Includes 125,000 tons of ice.

The total traffic of the Hudson River above New York City in 1906 is reported by the Census at 8,654,880 tons, of which 2,127,976 tons were to and from the New York canals and 6,526,904 tons were to and from river ports. Shipments included 1,935,846 tons of cement, brick, and lime; 1,728,993 tons of stone, sand, etc.; 1,269,925 tons of ice; 661,980 tons of coal; 359,561 tons of lumber, and 947,320 tons of other freight, a total of 6,903,625 tons. Receipts included 417,732 tons of coal; 362,681 tons of grain; 211,876 tons of lumber; 107,488 tons of stone, sand, etc.; 103,606 tons of cement, brick, and lime, and 547,872 tons of other freight, a total of 1,751,255 tons.

NEW YORK CANALS.—In 1855, when the traffic of the New York canals was 4,022,617 tons, the freight tonnage of the New York Central and Erie railroads was only 1,512,128 tons, less than half of the canal traffic. In 1864 the traffic of the railroads crossing New York State (5,323,760 tons) for the first time surpassed the canal traffic (4,852,941 tons). By 1872 the New York railroad traffic (12,359,807 tons) was almost double the canal traffic (6,673,370 tons).[a] Since then the proportion of canal traffic has declined steadily. In 1907 the canal traffic of 3,407,914 tons was less than 3 per cent of the traffic of the railroads across New York State (125,000,000 tons).[b]

While the traffic on the New York canals has declined from the maximum figures of 1872 (for the whole system) and 1880 (for the Erie Canal), the total movement has about held its own during the past ten years, and on the Oswego Canal there has been some revival in the past few years. There have been, however, some notable changes in the general character of the traffic on these canals. The through traffic has become relatively less important, and the way traffic now constitutes more than two-thirds of the total movement. Stone, lime, and clay together form the largest proportion of the total tons moved. Grain, lumber, and wood have declined, but are still among the important articles, and there is also a considerable movement of coal, salt, and ice, and some sugar and general merchandise.

Eastbound traffic on the Erie Canal consists mostly of grain and lumber. Lake grain brought to Buffalo by railroads or affiliated concerns moves east altogether by rail and not by canal. There is, however, a considerable eastbound movement of grain over the canal from Lake steamers not members of the Association of Lake Lines and by canal boats or forwarders at Buffalo who are not engaged in westbound traffic and not affiliated with railroads. The movement of packages or general merchandise from Buffalo eastward appears to have been too small to make it profitable for any company to undertake the business. There is a considerable movement of salt from Syracuse, and also a large amount of stone, lime, and clay, mostly local shipments.

Westbound traffic consists either of through shipments of general merchandise from New York City to Buffalo and points beyond or local shipments to Buffalo and intermediate points on the Hudson River and Canal.

The most important articles in the northbound traffic on the Champlain Canal are coal, stone, lime, clay, and ice. Southbound traffic on this waterway consists mainly of wood pulp and lumber from Canada and iron ore from Lake Champlain.

---

[a] See statistics in Report of Committee on Canals of New York State, pp. 182–183.

[b] Railroad traffic figures compiled from Moody's Manual for 1908.

Traffic on the other canals of New York consists principally of farm products, lumber, coal, and general merchandise.

The volume of traffic moved over the New York canals is shown in the following tables, which give this movement for a period of years and in more detail for the year 1906:

TABLE 47.—COMMERCE ON NEW YORK CANALS IN SPECIFIED YEARS, 1837–1907.

[Compiled from the Annual Report of the Superintendent of Public Works, New York State, 1907.]

Year.	Erie.	Champlain.	Oswego.	Cayuga and Seneca.	Black River.	Total.[a]
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1837	667,151	261,659	161,353	20,274	.....	1,171,296
1842	712,310	230,844	129,498	31,716	.....	1,236,931
1847	1,661,575	313,124	441,096	58,204	.....	2,869,810
1852	2,129,334	531,001	684,191	47,275	36,597	3,863,441
1857	1,566,624	547,236	605,218	120,435	69,135	3,344,061
1862	3,204,277	647,318	1,063,413	125,659	85,442	5,598,785
1867	2,920,578	1,047,440	940,136	389,704	70,539	5,688,325
1872	3,562,560	1,449,528	832,490	386,977	94,776	6,673,370
1877	3,254,367	1,021,782	319,327	247,864	63,286	4,955,963
1882	3,694,364	1,097,343	445,295	123,488	106,933	5,467,423
1887	3,840,513	1,229,335	176,177	195,933	111,847	5,553,805
1892	2,978,832	1,021,139	90,886	75,669	115,469	4,281,995
1897	2,584,906	797,637	53,537	110,277	71,447	3,617,804
1898	2,338,020	804,076	47,662	100,342	69,963	3,360,063
1899	2,419,084	1,034,315	49,373	113,476	69,803	3,686,051
1900	2,145,876	972,867	31,742	130,126	65,330	3,345,941
1901	2,257,035	885,641	43,210	166,258	68,469	3,420,613
1902	2,105,876	766,615	143,707	155,152	103,260	3,274,610
1903	2,414,018	801,649	184,434	116,918	98,366	3,615,385
1904	1,945,708	796,468	170,342	140,656	85,373	3,138,547
1905	1,999,824	833,550	178,777	123,927	90,818	3,226,896
1906	2,385,491	740,983	172,228	164,874	77,331	3,540,907
1907	2,415,548	678,506	143,277	112,570	58,013	3,407,914

[a] The totals given for 1877 and previous years include the traffic of the Chemung, Genesee Valley, and other canals not now in operation.

TABLE 48.—TONNAGE OF EACH CLASS OF ARTICLES ON ALL THE CANALS OF THE STATE OF NEW YORK AND OF EACH CLASS OF ARTICLES WHICH CAME TO THE HUDSON RIVER FROM THE ERIE AND CHAMPLAIN CANALS IN SPECIFIED YEARS' 1837-1907.

[Annual Report of the Superintendent of Public Works of New York State, 1907.]

Articles on all the canals of the State of New York.

Year.	Forest products.	Agricultural products.	Manufactures.	Merchandise.	Other articles.	Total.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1837	618,741	208,043	81,735	94,777	168,000	1,171,296
1842	504,597	401,276	98,968	101,446	130,644	1,236,931
1847	1,087,714	1,092,946	176,448	224,890	287,812	2,869,810
1852	1,586,080	1,213,357	207,955	420,295	435,754	3,863,441
1857	1,364,002	767,370	232,803	222,954	756,932	3,344,061
1862	1,569,674	2,494,036	364,877	167,927	1,002,271	5,598,785
1867	1,744,252	1,438,517	320,844	319,880	1,864,832	5,688,325
1872	1,950,798	1,683,962	325,564	298,758	2,414,288	6,673,370
1877	1,312,526	1,522,317	184,218	83,010	1,853,892	4,955,963
1882	1,771,743	1,173,257	187,535	283,174	2,051,714	5,467,423
1887	1,529,809	1,590,509	212,216	378,734	1,842,537	5,553,805
1892	1,249,381	1,038,851	125,781	292,468	1,575,514	4,281,995
1897	896,971	789,783	152,388	250,872	1,527,790	3,617,804
1898	820,668	707,855	175,632	220,107	1,435,801	3,360,063
1899	838,449	620,908	159,413	260,063	1,807,218	3,686,051
1900	726,984	511,518	142,784	250,436	1,714,219	3,345,941
1901	839,191	558,135	129,857	230,615	1,662,815	3,420,613
1902	805,067	572,676	131,755	207,972	1,557,140	3,274,610
1903	690,161	597,047	130,406	241,564	1,956,207	3,615,385
1904	738,793	427,969	129,665	200,472	1,641,648	3,138,547
1905	851,098	436,979	132,438	172,665	1,633,716	3,226,896
1906	854,610	648,715	170,584	202,285	1,664,713	3,540,907
1907	747,736	606,159	96,916	169,258	1,787,845	3,407,914

Articles which came to the Hudson River from the Erie and Champlain canals.

1837	385,017	151,469	10,124	394	64,777	611,781
1842	321,480	293,177	16,015	185	35,769	666,626
1847	666,113	897,717	51,532	4,831	124,090	1,744,283
1852	1,064,677	989,268	47,512	10,605	122,760	2,234,822
1857	798,986	561,894	55,611	16,987	183,709	1,617,187
1862	968,062	2,152,159	45,502	5,470	231,516	3,402,709
1867	1,359,287	1,143,712	77,250	5,196	444,250	2,029,695
1872	1,467,865	1,490,248	80,936	7,672	601,223	3,647,944
1877	978,366	1,362,700	53,545	5,341	586,860	2,986,812
1882	1,397,816	1,024,318	61,876	24,154	559,988	3,068,152
1887	1,206,279	1,412,166	52,566	21,710	466,202	3,158,923
1892	997,436	865,958	71,380	53,946	377,799	2,366,519
1897	634,618	633,753	108,871	32,830	486,146	1,896,218
1898	527,830	552,054	94,465	27,239	342,985	1,544,573
1899	584,668	465,266	114,659	17,771	482,853	1,665,217
1900	444,719	369,984	112,960	15,193	397,775	1,340,631
1901	382,822	429,356	75,803	11,257	355,165	1,254,403
1902	336,242	407,281	88,804	9,701	361,056	1,203,084
1903	296,425	417,418	111,132	7,617	325,947	1,158,539
1904	253,525	292,756	119,837	4,250	268,323	938,691
1905	328,517	302,173	116,057	6,446	317,150	1,070,343
1906	320,177	374,422	109,880	6,553	261,040	1,071,072
1907	232,625	329,707	65,680	5,357	236,252	869,621

TABLE 49.—TRAFFIC ON NEW YORK CANALS, 1906, BY ARTICLES.

[Annual Report, Superintendent of Public Works, 1906.]

Articles.	Through freight.		Way freight.		Total.
	East.	West.	East.	West.	
	Net tons.	*Net tons.*	*Net tons.*	*Net tons.*	*Net tons.*
Stone, lime, and clay	.....	84,559	607,198	218,740	910,497
Lumber	257,840	4,029	352,928	29,306	644,103
Pulp wood and wood pulp	.....	195	164,239	9,287	173,721
Grain and hay	312,210	.....	260,624	21,307	594,141
Coal	.....	112,093	252,436	181,412	545,941
Salt	.....	613	153,729	238	154,580
Sugar	.....	31,192	191	12,333	43,716
Ice	12,858	.....	103,650	.....	116,508
General merchandise	340	49,175	41,751	54,971	146,237
Miscellaneous	87,180	54,130	46,149	24,004	211,463
Total	670,428	335,986	1,982,895	551,598	3,540,907

LAKE CHAMPLAIN.—This important body of water is connected at Whitehall with the Champlain Canal (5 feet in depth) running for 66 miles to Troy, N. Y., where it joins the Hudson River and the Erie Canal. The lake itself provides northern routes from Whitehall to Plattsburg, N. Y., Burlington, Vt., and other points in Vermont, and through the Richelieu River and Canadian Chambly Canal connects with the St. Lawrence River.

The northern route from Whitehall, N. Y., is known as "The Narrows." Another route is the channel between North and South Hero Islands, Vermont, a channel sometimes called the "Gut," and used by steam and sailing vessels carrying freight and considerable numbers of passengers.

The commerce of Lake Champlain consists principally of coal, pulp wood, building material, and general merchandise. The most important port on Lake Champlain is Burlington, Vt. The total traffic on the lake cannot be stated. The following table shows the commerce of the Narrows and that at Burlington for the year 1906:

TABLE 50.—COMMERCE ON LAKE CHAMPLAIN, 1906, BY ARTICLES.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	Narrows of Lake Champlain.	Burlington, Vt.	Articles.	Narrows of Lake Champlain.	Burlington, Vt.
	Tons.	*Tons.*		*Tons.*	*Tons.*
Coal	162,545	44,775	Ice	12,858	.....
Lumber and timber	179,587	180,391	Lime, cement, etc	30,459	1,304
Iron and iron ore	52,358	.....	Stone	.....	840
Wood and pulp wood	206,710	.....	Miscellaneous	13,617	8,754
Salt	613	734			
Hay	17,304	.....	Total	676,051	236,798

Section 6. Delaware Bay and tributaries.

PHILADELPHIA AND WILMINGTON.—The commerce of Delaware Bay and its tributaries and connecting canals is exceeded by only two or three local districts in the United States. This includes the extensive foreign and coastwise trade of Philadelphia, the traffic at Wilmington, Del., and a considerable local movement on the Delaware River, its tributary streams, and a number of private canals.

The Port of Philadelphia is situated on the western bank of the Delaware River, about 86 miles above the Capes of the Delaware. The wharves of the city extend along the banks of the river for a distance of about 5½ miles. Greenwich and Port Richmond, important shipping points for the coastwise movement of coal, are within the port of Philadelphia.

The city is well situated with reference to waterways, which connect the port not only with many inland points but with other domestic and foreign ports. By the Delaware River and its tributaries navigable routes are provided to numerous points, and the Lehigh, Delaware Division, Delaware and Raritan, and Chesapeake and Delaware canals furnish inland water routes from the Lehigh coal fields and to New York Harbor and Chesapeake Bay.

Through the mouth of the river and Delaware Bay lead the coastwise and foreign routes. Philadelphia has a great export and also an extensive domestic commerce. The tables below show the movement of vessels arriving and departing:

TABLE 51.—VESSEL MOVEMENT AT PHILADELPHIA, 1905 AND 1906.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

Class of vessel.	Foreign trade.		Domestic trade.	
	1905.	1906.	1905.	1906.
Arriving:				
Steam	1,316	1,386	19,859	15,900
Sailing	790	743	3,768	3,086
Canal boats and barges	2,228	2,082	28,000	37,990
Rafts			365	239
Departing:				
Steam	1,320	1,395	19,450	15,868
Sailing	761	716	35,154	33,086
Canal boats and barges	2,082	1,944	41,280	38,100
Rafts			40	50
Total	8,497	8,266	147,916	144,319

In the following tables are shown in detail the domestic and coastwise commerce of the Delaware River for 1905 and 1906, with the totals of foreign trade, as reported by the Chief of Engineers, U. S. Army, and the shipments and receipts in American vessels at Philadelphia

in 1906, according to the Census Report on Transportation by Water. Important differences will be noted between the statistics from the different sources, which may be partly explained by the fact that the Engineers' figures include a large local movement (especially of coal and sand) not included in the Census figures. Coal, petroleum, and general merchandise are the principal domestic shipments, and lumber, sugar, and petroleum are the most important domestic receipts. The foreign trade of Philadelphia consists principally of petroleum, coal, grain, and flour exported, and sugar, molasses, iron ore, and drugs and chemicals imported.

TABLE 52.—DOMESTIC AND COASTWISE COMMERCE ON DELAWARE RIVER, 1905 AND 1906, BY ARTICLES.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907, pp. 1091-1092.]

Articles.	Shipments.		Receipts.	
	1905.	1906.	1905.	1906.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Coal	7,694,946	7,730,543	611,218	617,089
Sugar	17,400	15,000	128,060	131,847
Lumber	43,718	46,879	903,068	857,713
Petroleum and products	435,653	409,658	898,802	670,129
Cotton	.....	.....	25,500	20,000
Produce and fruit	4,305	71,735	69,174	139,644
Iron:				
Manufactured	76,546	76,239	126,287	85,114
Ore	16,000	5,000	18,312	7,700
Pig	6,701	33,755	65,200	80,606
Scrap	.....	.....	554	.....
Chemicals	103,572	79,644	104,033	164,818
Asphalt	10,000	11,550	10,500	11,550
Bricks and terra cotta	25,621	5,506	21,830	14,820
Clay	.....	.....	10,819	15,000
Coal tar	25,333	3,580	10,484	21,610
Fertilizers	94,373	110,931	94,260	121,602
Grain	63,502	55,136	117,224	138,807
Hay	10,500	2,656	88,271	2,652
Ice	31,176	8,495	60,777	19,729
Manure	73,228	53,106	77,381	163,200
Oysters and fish	206,667	152,040	56,515	62,570
Railroad ties	.....	.....	89,306	155,338
Sand	896,307	826,222	1,779,712	2,052,441
Stone:				
Building	255,252	286,094	106,796	76,933
Paving	.....	.....	101,000	110,000
Wood	5,625	4,645	102,304	81,666
Miscellaneous	2,109,327	2,240,076	2,867,748	2,526,049
Total domestic and coastwise	12,205,752	12,228,490	8,545,135	8,348,627
Foreign trade	3,267,439	3,800,995	1,365,245	1,732,935
Grand total [a]	15,473,191	16,029,485	9,910,380	10,081,562

[a] Including for 1906 movement on car floats between Philadelphia and Camden, which amounted to 2,528,500 tons. No data available on this movement for 1905.

TABLE 53.—SHIPMENTS AND RECEIPTS IN AMERICAN VESSELS AT PHILADELPHIA, 1906, BY ARTICLES.

[United States Census Report on Transportation by Water, pp. 73-74.]

Articles.	Shipments.	Receipts.	Articles.	Shipments.	Receipts.
	Net tons.	*Net tons.*		*Net tons.*	*Net tons.*
Coal	3,784,825	31,911	Tobacco	517	427
Lumber	9,402	655,017	Naval stores	142	29,551
Petroleum and other oils	211,531	414,451	Flour	4,881	95
Stone, sand, etc	35,592	324,506	Canned goods	2,580	9,563
Phosphate and fertilizer	66,390	49,228	Cement, brick, and lime	6,427	3,562
Pig iron and steel rails		42,851	Iron ore	235	
Ice	1,965	36,640	Miscellaneous merchandise	1,031,225	1,040,133
Fruits and vegetables	9,528	66,469			
Grain	47,491	6,069	Total	5,213,485	2,721,456
Cotton	754	10,983			

Wilmington, Del., is situated on Christiana River, about 1½ miles from its entrance into Delaware Bay. It has some foreign trade and a large domestic commerce by water, while the important shipbuilding and other manufacturing interests of the city are dependent largely on the navigation facilities.

In Table 54 are given statistics of the domestic commerce by water for the years 1905 and 1906, as reported to the Chief of Engineers, U. S. Army. The Census Report on Transportation by Water shows shipments in American vessels at Wilmington, Del., of 95,241 tons and receipts of 250,188 tons. The discrepancy is due in part to the omission of rafted lumber from the Census statistics.

TABLE 54.—DOMESTIC COMMERCE OF WILMINGTON, DEL., 1905 AND 1906, BY ARTICLES.

[Reports of Chief of Engineers, U. S. Army.]

Shipments.

Articles.	1905.	1906.
	Tons.	*Tons.*
Coal, quarry stone, etc	140,607	147,969
Manufactured products, canned goods, flour, iron supplies, leather, etc	26,299	25,758
Agricultural products	1,000	760
General merchandise, including dry goods, groceries, etc	17,400	20,775
Miscellaneous, not included above	50,000	50,000
Total	235,306	245,262

Receipts.

Hides, railroad ties, ship timber, etc	369,852	513,126
Chemicals, oils, wood pulp, building material, etc	32,097	47,031
Agricultural products, cattle, horses, hogs, etc	26,113	14,350
General merchandise, including dry goods, groceries, etc	27,200	30,000
Miscellaneous not included above	50,000	50,000
Total	505,262	[a] 654,507
Total commerce	740,568	[a] 899,769

[a] Totals corrected to agree with sum of items.

Other ports on the Delaware River include Newcastle, Marcus Hook (important for petroleum shipments), Chester, Camden, Burlington, Bordentown (the western terminus of the Delaware and Raritan Canal), and Trenton. Easton is at the junction of the Lehigh and the Delaware Division canals, and Phillipsburg is the western terminus of the Morris Canal.

TRIBUTARIES OF DELAWARE RIVER AND BAY.—Numerous small streams flow into Delaware River, several of which are navigable for short distances. Among these are the following waterways connecting this river with various points in New Jersey: Rancocas River, Cooper Creek, Mantua Creek, Alloway Creek, Tuckerton Creek, and Raccoon Creek, the latter emptying into Delaware River at a point nearly opposite Marcus Hook, Pa. These streams are navigable for a few miles and have a relatively small commerce, consisting chiefly of coal, sand, lumber, agricultural products, etc. On Cooper Creek are located the plants of the Camden Iron Works and Browning's Chemical Works.

The following tributaries of Delaware Bay connect that body of water with various points in Delaware: Appoquinimink River, Murderkill River, Mispillion River, St. Jones River, and Smyrna River. These are short tidal streams, some of which possess considerable local importance. The St. Jones River provides a water route to Dover, the capital of Delaware. The following tables show the total shipments and receipts over these several streams for the year 1906, and the traffic in some detail on the more important streams:

TABLE 55.—COMMERCE ON TRIBUTARIES OF DELAWARE RIVER AND BAY, 1906.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

Stream.	Shipments.	Receipts.	Total.
	Tons.	*Tons.*	*Tons.*
Rancocas River[a]			
Cooper Creek	40,129	224,410	264,539
Mantua Creek	55,920	184,300	240,220
Alloway Creek	16,975	40,928	57,903
Tuckerton Creek	580	2,650	3,230
Appoquinimink River	16,350	16,020	32,370
Murderkill River	15,004	14,011	29,015
Mispillion River	177,006	81,698	258,704
St. Jones River	21,704	33,492	55,196
Smyrna River	127,122	79,899	207,021

[a] No statistics.

TABLE 56.—COMMERCE ON CERTAIN TRIBUTARIES OF THE DELAWARE RIVER, 1906, BY ARTICLES.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	Cooper Creek.	Mantua Creek.	Mispillion River.	Smyrna River.
Shipments.				
	Tons.	*Tons.*	*Tons.*	*Tons.*
Chemicals, canned goods, etc	16,000	.....	27,130	[a] 9,770
Fertilizers, fruits, vegetables, etc	1,607	55,920	.....	.....
Iron pipe	17,522	.....	.....	.....
Agricultural products, fruit, etc	.....	.....	42,626	.....
Cordwood, logs, railroad ties, etc	.....	.....	107,250	76,520
Fruit, grain, cattle, poultry, etc	.....	.....	.....	28,832
Miscellaneous (general merchandise)	5,000	.....	.....	12,000
Total	40,129	55,920	177,006	127,122
Receipts.				
Coal, raw bone, phosphate rock	74,406	160,000	[b] 25,971	7,410
Lumber, lath, brick, shingles	1,704	4,300		.....
Ores, chemicals, etc	31,906	.....	.....	.....
Corn, hay, hogs, horses, etc	1,920	.....	4,380	.....
Sand, stone, clay, etc	48,396	.....	.....	.....
Pipe and pig iron	23,267	.....	.....	.....
Fertilizers, manure	35,311	20,000	.....	.....
General merchandise, etc	.....	.....	25,000	10,000
Butter, corn, wheat, cattle, etc	.....	.....	.....	52,449
Canned goods, flour, millwork, etc	.....	.....	26,347	10,040
Miscellaneous	7,500	.....	.....	.....
Total	224,410	184,300	81,698	79,899
Total commerce	264,539	240,220	258,704	207,021

[a] Canned goods, flour, millwork, etc. [b] Coal, stone, raw bone, sand, ship timber, etc.

CANALS CONNECTING WITH DELAWARE RIVER.—Connecting with the Delaware River are a number of private canals—the Morris Canal and the Delaware and Raritan Canal, crossing the State of New Jersey; the Lehigh Canal, the Delaware Division Canal, and the Schuylkill Navigation, in Pennsylvania, and the Chesapeake and Delaware Canal, connecting Delaware River and Chesapeake Bay.

As will be seen from Table 57, the traffic movement on these canals is comparatively small, and except on the Chesapeake and Delaware Canal has been slowly declining during the past ten years. The last-named canal and the Delaware and Raritan are of the most importance. The principal article moved on all these canals is coal. There is a considerable movement of lumber from the South on the Chesapeake and Delaware Canal. There is also some movement of stone, sand, brick, and iron for building purposes and of general merchandise on the Delaware and Raritan and Chesapeake and Delaware canals.

TABLE 57.—COMMERCE ON CANALS CONNECTING WITH DELAWARE RIVER, 1880, 1889, AND 1897–1906.

Year.	Morris Canal.	Delaware and Raritan Canal.	Lehigh Canal.[a]	Schuylkill Navigation.	Chesapeake and Delaware Canal.	Total.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1880[b]	503,486	1,348,082	719,338	630,416	959,146	4,160,468
1889[b]	462,636	1,276,269	591,340	219,697	736,879	3,286,821
1897[c]	231,870	595,375	369,878	72,843	726,582	1,996,548
1898[c]	191,287	546,083	344,463	66,849	752,537	1,901,219
1899[c]	173,555	606,961	367,946	83,275	617,798	1,849,535
1900[c]	125,829	584,112	380,579	73,976	639,548	1,804,044
1901[c]	122,786	513,531	345,197	80,374	667,808	1,729,696
1902[c]	27,392	473,375	28,589	103,400	623,200	1,255,956
1903[c]	76,165	422,492	[d]	64,396	704,147	.....
1904[c]	84,380	464,518	[d]	62,162	706,226	.....
1905[c]	75,631	441,735	[e] 190,752	59,658	701,955	1,469,731
1906[c]	88,773	395,753	[b] 240,625	54,354	[b] 683,086	1,462,591

[a] Including Delaware Division Canal after 1889.
[b] United States Census Report on Transportation by Water.
[c] Reports to the Bureau of Corporations.
[d] No data secured. [e] Year ended June 30, 1905.

TABLE 58.—TRAFFIC ON CANALS CONNECTING WITH DELAWARE RIVER, 1905, BY ARTICLES.

[Reports to the Bureau of Corporations.]

Articles.	Morris Canal.	Delaware and Raritan Canal.	Lehigh Canal.[a]	Schuylkill Navigation.	Chesapeake and Delaware Canal.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Anthracite coal	73,481	169,325	171,999	50,823	111,158
Bituminous coal		30,935		.....	
Sand	.....	34,860		431	[b] 39,582
Stone	.....	73,596			
Brick	282	5,427	[c] 14,700	.....	.....
Iron	88	20,903		.....	26,119
Lumber and wood	1,780	23,074	[d] 4,053	7,038	300,237
Logwood	.....	4,140	.....	.....	.....
Clay	.....	4,302	.....	.....	.....
Ores	.....	351	.....	.....	.....
Coke	.....	2,463	.....	.....	.....
Oil	.....	3,056	.....	.....	.....
Slag	.....	.....	.....	533	.....
Slacked lime	.....	.....	.....	690	.....
Fertilizers	.....	.....	.....	.....	12,336
Railroad sills	.....	.....	.....	.....	31,270
General merchandise, etc	.....	69,303	.....	143	181,253
Total	75,631	441,735	190,752	59,658	701,955

[a] Year ended June 30, 1905.
[b] Includes shells.
[c] Includes groceries and ice.
[d] Includes hay, straw, etc.

Section 7. Chesapeake Bay and tributaries.

Chesapeake Bay, the largest bay on the Atlantic seaboard of the United States, has a large foreign and coastwise movement, centering at Baltimore, Newport News, and Norfolk; and also an important local movement on the bay and its numerous tributary rivers. The more important tributaries are the Patapsco, Potomac, Rappahannock, York, James, and Elizabeth rivers, forming with the bay important routes between Baltimore and Washington, Fredericksburg, West Point, Richmond, Norfolk, and other points. The rivers on the eastern shore are of less general importance, but are much used by local steamboats and small craft engaged in oyster dredging and local trade. Most of the rivers above the Patapsco are also of slight importance, but the Elk River, with Back Creek and the Chesapeake and Delaware Canal, forms an important route to the Delaware River and Philadelphia.

BALTIMORE.—Baltimore is located on the north bank of the Patapsco River, about 11 miles from its entrance into Chesapeake Bay and 151 miles from the mouth of the bay. The river has a channel dredged to a depth of 30 feet. At Baltimore are the terminals of a number of steamship and steamboat lines, operating to many points on the Atlantic coast and on Chesapeake Bay and its tributary streams. There are also important coal terminals at Locust Point, Port Covington, and Canton.

A large foreign and coastwise trade moves from Baltimore, as is shown by the following table, showing the vessel movement for the fiscal years ending June 30, 1906 and 1907:

TABLE 59.—VESSEL MOVEMENT AT BALTIMORE, FISCAL YEARS 1906 AND 1907.

[Report of Chief of Engineers, U. S. Army, 1907, p. 1140.]

	1906.		1907.	
	Number.	Tonnage.	Number.	Tonnage.
Entered:				
Foreign trade	848	1,548,590	772	1,419,732
Coastwise trade	1,588	2,414,582	1,667	2,576,209
Total	2,436	3,963,172	2,439	3,995,941
Cleared:				
Foreign trade	831	1,611,772	782	1,500,118
Coastwise trade	2,057	2,702,154	2,161	2,952,144
Total	2,888	4,313,926	2,943	4,452,262
Total entered and cleared	5,324	8,277,098	5,382	8,448,203

In the foreign trade Baltimore ranks fourth among the Atlantic ports in the tonnage of vessels. Grain and flour are the most important articles of export, and there are also considerable quantities of coal, iron and steel, tobacco, and provisions.

In the coastwise trade the largest volume is of coal shipped north and south. According to the Monthly Summary of Commerce and Finance, these shipments in 1906 amounted to 3,414,872 tons and in 1907 to 4,070,128 tons. Fertilizers are shipped south in considerable quantities, and there is also an important movement of package freight by the regular lines of steamships to New York, Boston, Providence, Norfolk, and Savannah. Cotton, lumber, and phosphate are received in considerable quantities from the southern ports.

In addition to the foreign and coasting trade, Baltimore is the principal market for the farm produce and oysters shipped from the many affluents of Chesapeake Bay, and there is also an important return movement of general merchandise.

The following table shows the shipments and receipts in American vessels at Baltimore for the year 1906:

TABLE 60.—SHIPMENTS AND RECEIPTS IN AMERICAN VESSELS AT BALTIMORE, 1906, BY ARTICLES.

[United States Census Report on Transportation by Water, pp. 73-74.]

Articles.	Shipments.	Receipts.	Articles.	Shipments.	Receipts.
	Net tons.	*Net tons.*		*Net tons.*	*Net tons.*
Coal	2,274,731	15,026	Fruits and vegetables	3,789	58,293
Lumber	10,447	503,351	Tobacco	1,343	48,142
Phosphate and fertilizer	251,641	167,285	Grain	45,616	52,185
Petroleum and other oils	83,921	71,154	Flour	4,546	19
Pig iron and steel rails	94,979	22,458	Canned goods	49,005	18,640
Stone, sand, etc	2,022	60,805	Iron ore	1,767	2,450
Cement, brick, and lime	11,028	21,936	Miscellaneous merchandise	731,298	695,657
Naval stores	354	22,758			
Ice	732	47,154	Total	3,579,407	1,858,443
Cotton	12,188	51,130			

UPPER AND EASTERN CHESAPEAKE BAY.—Table 61, compiled from the report of the Chief of Engineers, shows the total shipments and receipts in 1906 at various rivers and ports of the upper and eastern shores of Chesapeake Bay, most of which is tributary to Baltimore. This traffic consists mainly of lumber and wood, farm products, and oysters shipped and general merchandise received, and is carried by steamers, gasoline launches, small sailing vessels, and barges. Wheat is shipped from the upper part of the bay. In the middle section of the peninsula truck farming is more prominent, and the shipments are fresh fruits and vegetables and canned goods from canning factories.

Farther south potatoes are an important article of commerce.[a] The largest volume of business is reported from the Choptank River, Nanticoke River, and the Wicomico River. Crisfield, on one of the affluents of Tangier Sound, is said to be the largest oyster and crab depot on the eastern shore of Maryland.

TABLE 61.—COMMERCE ON UPPER AND EASTERN CHESAPEAKE BAY, 1906.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907].

Waterway.	Shipments.	Receipts.	Waterway.	Shipments.	Receipts.
	Tons.	*Tons.*		*Tons.*	*Tons.*
Elk River	4,657	10,552	Pocomoke River	35,584	30,126
Susquehanna River	22,315	51,500	La Trappe River	4,305	9,283
Queenstown Harbor	14,878	4,930	Tyaskin Creek	401	544
Claiborne Harbor	6,111	85,846	Nanticoke River	20,082	99,266
Chester River	31,990	16,209	Broad Creek River	4,655	24,435
Choptank River	66,067	142,429	Wicomico River	76,326	122,125
Cambridge Harbor	14,982	86,680	Crisfield Harbor	12,114	18,151
Warwick River	47,664	12,363			

On the western shore of Chesapeake Bay the movement of commerce is much larger than on the eastern shore, and is also concentrated on a small number of more important streams. The following statement discusses the traffic of the Potomac, Rappahannock, and York rivers and their principal tributaries. The James, Elizabeth, and other rivers at the lower end of the bay are considered in connection with Norfolk, to which the commerce is to a large degree related.

There is some fishing and oyster trade at Annapolis on the Severn River.

POTOMAC RIVER.—The Potomac River enters Chesapeake Bay about 60 miles above Old Point Comfort and forms the boundary between the States of Virginia and Maryland. It is the water approach to Alexandria, Va., and Washington, D. C., and at the latter point connects with the Chesapeake and Ohio Canal.

Washington is the center for a considerable trade in coal, lumber, and ice and a market for farm produce, oysters, and fish. This traffic moves over the Potomac and Anacostia rivers. There is some additional traffic at Alexandria and a small movement from minor tributaries on the lower river. The following table, compiled from the Report of the Chief of Engineers, shows in detail the traffic for 1906 on the Anacostia River, the Potomac River at Washington, and the Potomac River below Washington. Except in the case of some coal and stone, the movement on the Potomac below Washington seems to include practically all of the traffic shown in the other columns.

[a] Yearbook of the Department of Agriculture, 1907, pp. 291–295.

TABLE 62.—COMMERCE ON THE POTOMAC AND ANACOSTIA RIVERS, 1906, BY ARTICLES.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	Anacostia River.	Potomac River.	
		At Washington.	Below Washington.
	Tons.	*Tons.*	*Tons.*
Sand and gravel	172,496	364,398	570,894
Coal and coke	23,476	244,903	179,337
Lumber	1,440	70,546	83,361
Wood	4,500	35,500	38,398
Naval ordnance and supplies	40,752	.....	40,752
Ice	.....	38,044	52,044
Stone	25,140	20,589	22,000
Bricks and paving blocks	8,003	11,250	19,253
Brick clay	34,000	.....	34,000
Asphalt	2,061	3,800	5,861
Naphtha, oil, and gasoline	18,399	16,680	47,379
Phosphate rock	.....	.....	10,392
Fertilizer	.....	3,800	15,330
Oysters and fish	.....	13,350	18,000
General merchandise	.....	78,637	122,139
Miscellaneous	4,000	5,933	24,791
Total	334,867	907,450	1,283,931

TABLE 63.—SHIPMENTS AND RECEIPTS IN AMERICAN VESSELS AT WASHINGTON, D. C., 1906, BY ARTICLES.

[Compiled from the United States Census Report on Transportation by Water, pp. 73–74.]

Articles.	Shipments.	Receipts.	Articles.	Shipments.	Receipts.
	Net tons.	*Net tons.*		*Net tons.*	*Net tons.*
Stone, sand, etc	4,431	296,930	Ice	6,800	24,396
Lumber	1,866	41,452	Miscellaneous merchandise	32,834	122,145
Coal	46,962	88,161			
Petroleum and other oils	17	26,093	Total	92,910	599,177

CHESAPEAKE AND OHIO CANAL.—Traffic on the Chesapeake and Ohio Canal consists almost entirely of bituminous coal from Cumberland, Md., to Washington, D. C. A little coal is carried to intermediate points, and some small quantities of farm products and general merchandise. The total freight traffic in 1880 and from 1897 to 1906 was as follows:

TABLE 64.—COMMERCE ON CHESAPEAKE AND OHIO CANAL, 1880 AND 1897–1906.

[Report to the Bureau of Corporations.]

Year.	Tons.	Year.	Tons.
1880	[a] 655,423	1902	233,345
1897	311,004	1903	278,945
1898	320,145	1904	287,705
1899	296,100	1905	219,867
1900	244,108	1906	225,142
1901	284,857		

[a] United States Census Report on Transportation by Water, 1906, p. 43.

The coal movement amounted to 206,629 tons in 1904, 174,920 tons in 1905, and 197,768 tons in 1906.

RAPPAHANNOCK AND YORK RIVERS.—The Rappahannock River is of considerable commercial importance, the traffic comprising cargoes of oysters, farm produce, general merchandise, lumber, wood, and railroad ties, the latter mostly carried in barges which are towed. Steamers from Baltimore and Norfolk make regular trips to the landings on the river as far as Fredericksburg. There is also a small movement on minor tributaries.

The York River is formed by the junction of the Pamunkey and Mattaponi rivers and flows in a southeasterly direction for about 30 miles, emptying into Chesapeake Bay on the western shore, the entrance being about 15 miles north of Old Point Comfort. This river is remarkable for its straight course and depth of water in the channel. It is of some commercial importance, cotton and tobacco being shipped in coasting vessels from West Point, and grain, lumber, farm produce, and oysters in coasting and bay vessels from landings on the river and its tributaries. West Point is a terminal of a branch of the Southern Railroad and has some foreign and coastwise trade in cotton and tobacco. A regular steamship line operates to Baltimore.

The following table shows the commercial statistics of the Rappahannock and York rivers and tributaries of the latter for the year 1906:

TABLE 65.—COMMERCE ON THE RAPPAHANNOCK AND YORK RIVERS, 1906, BY ARTICLES.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	Rappahannock River.	York River.	Tributaries of York River.	
			Mattaponi River.	Pamunkey River.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Railroad ties and piles	109,650	7,850	4,700	3,150
Lumber and timber	98,345	86,945	57,135	29,810
Wood	24,903	16,672	10,800	5,872
Farm produce	31,382	5,000	5,000	.....
Grain	23,271	.....	.....	126
General merchandise	27,420	43,042	1,900	.....
Fertilizers	19,730	.....	.....	.....
Flour	6,375	.....	.....	.....
Coal	3,650	.....	.....	.....
Oysters	2,250	22,000	.....	.....
Tobacco	100	16,217	.....	.....
Miscellaneous	16,835	98	.....	600
Total	363,911	197,824	79,535	39,558

CHAPTER IV.

SOUTH ATLANTIC PORTS AND RIVERS.

Section 1. General conditions.

A somewhat arbitrary line must be drawn between the North Atlantic and South Atlantic territory with respect to water-borne traffic. For some purposes it would be convenient to include the whole of Chesapeake Bay as a distinct local district, but it has seemed best to include Baltimore and the upper part of the bay in the North Atlantic district, while Norfolk and the southern section of the bay are more properly classed with the South Atlantic.

Below Norfolk there is a long stretch of coast with no deep-sea ports, the other leading ports of the South Atlantic being in the district between Wilmington, just north of Cape Fear, and the St. Johns River, in Florida. These ports are Wilmington, N. C., Georgetown and Charleston, S. C., Savannah, Darien, and Brunswick, Ga., and Fernandina and Jacksonville, Fla.

The principal coastwise shipments from the South Atlantic are products of the fields or of the forests, including cotton, cotton seed, lumber and its products, cross-ties, naval stores, etc., and to a lesser extent phosphate rock. Return shipments to southern ports include manufactured articles, fertilizers, and supplies of all kinds for plantations, lumber camps, etc., as well as for the general retail trade. Some coal also moves from the coal ports of Chesapeake Bay and farther north to the ports of the South for local consumption and for the bunker trade. The inland manufacturing sections of the South, however, are generally supplied with coal by rail, so there is no well-defined movement of coal to southern ports for distribution inland. Cotton and lumber comprise the great staple shipments of the South. Cotton shipped by water is altogether a steamship business both in the export and in the coastwise trade, sailing vessels having been driven out because of lower rates of freight and insurance and the quicker time of delivery by steam. The shipment of lumber is also of primary importance. This moves in both steamships and sailing vessels. Sailing vessels retain a large proportion of this traffic, due no doubt in great measure to the fact that lumber generally moves in full cargo lots, and that time in its transportation is not of

so great importance as to give steamships any decided advantage in this respect. But a larger proportion of this movement than formerly is being carried in steamships and steam-towed schooner barges.

The foreign trade of the South Atlantic is carried very largely by "tramp" steamships, i. e., steamships that have no regular schedules of sailing and that are chartered from trip to trip, going wherever the most profit appears. The general coastwise trade, however, moves with such regularity and in such volume as to warrant the employment of regular lines of steamers to Boston, New York, Philadelphia, Baltimore, and other ports. These steamship lines carry a large portion of the southern traffic even compared with that moving by rail.

The relative importance of the leading South Atlantic ports is indicated by the following table, showing arrivals and departures of vessels and the vessel and freight tonnage in the foreign and coastwise trade, so far as the information is available:

TABLE 66.—SUMMARY OF OCEAN COMMERCE AT SOUTH ATLANTIC PORTS, 1906.

[Compiled from Report of Chief of Engineers. U. S. Army, 1907.]

Port.	Coastwise.				Foreign.				Freight tonnage.
	Vessels.		Vessel tonnage.		Vessels.		Vessel tonnage.		
	Arrivals.	Departures.	Arrivals.	Departures.	Arrivals.	Departures.	Arrivals.	Departures.	
Norfolk									15,662,080
Wilmington, N. C.[a]	258		263,679		63		98,818		484,366
Georgetown	781	710	1,026,586	936,400	2	5	522	1,435	392,770
Charleston	739	86	1,380,950	133,557	110	39	132,400	21,058	835,380
Savannah	674	573	1,451,413	1,233,825	104	206	203,087	425,796	3,801,049
Darien	42	20	37,863	8,950	21	42	25,753	53,425	130,991
Brunswick	487	461	584,753	535,850	74	98	73,388	104,181	1,423,985
Fernandina	208	184	219,660	143,754	85	117	136,410	215,234	955,478
Jacksonville	629	597	882,289	862,007	43	55	20,690	21,472	[b]2,115,123

[a] Ocean vessels navigating Cape Fear River at and below Wilmington.

[b] See Table 87, p. 112.

The numerous rivers, bays, sounds, and lagoons throughout the South have more or less local traffic by water. From the various points on these waterways commodities are shipped and carried to the more important centers of traffic, largely for reshipment to foreign ports or to the ports of the North. The craft engaged in the local traffic return with cargoes of general merchandise and miscellaneous supplies for distribution along their routes.

A notable feature of the whole southern coast line is the presence of long, narrow stretches of low, sandy beaches, behind which lie tidal inlets, lagoons, sounds, and bays navigable for vessels of light draft.

Albemarle and Pamlico sounds are the largest of these protected bodies of water, but inside passages exist along the coast south of these points; and so general is this configuration that it is said to be possible at present to float a light-draft vessel through existing waterways, from Georgetown, S. C., all the way to Key West inland, with the exception of the 40-mile section now being cut by a company from St. Augustine to Jacksonville.[a] Several stretches of this inside route are referred to in the following discussion.

Owing to this inside route, by which most of the small local movement along the coast takes place, there is a sharper line of distinction in the South Atlantic district than in the North Atlantic between the local river and coast traffic and the longer distance coastwise movement on the open sea. The latter is very largely a movement between the South Atlantic and North Atlantic districts.

There are, however, no large natural indentations on the South Atlantic coast forming such important subdistricts as those considered on the North Atlantic coast. Both coastwise and inland traffic may, however, be considered with reference to a large number of sections of less importance, in each of which both coastwise and inland traffic centers around one of the coast ports.

Section 2. Norfolk and tributary commerce.

LOWER CHESAPEAKE BAY.—This is an important center of waterborne traffic. On the bay and its tributary waters are such important commercial centers as Norfolk and Newport News, from which lines of coastwise steamships and bay steamers operate to northern ports, while the traffic of the James and Elizabeth rivers is also of considerable importance. Hampton Roads, at the confluence of the James, Nansemond, and Elizabeth rivers, affords one of the best anchorages of the Atlantic coast.

The James River empties into the western part of Hampton Roads at Newport News, and is the approach by water to the cities of Richmond and Petersburg, with which Norfolk is connected by regular steamboat lines. Richmond has a considerable trade by water. The principal articles received are coal, oil, logs, and fertilizers and fertilizer material. Shipments by water are comparatively small. From other points on the James River there are considerable shipments of lumber and cordwood, and a return movement of general merchandise. The following table shows the movement on the James River in some detail:

[a] Atlantic Deeper Waterways Association, President's Bulletin No. 1.

TABLE 67.—COMMERCE ON JAMES RIVER, 1906, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army, 1907, p. 1195.

Articles.	Richmond, Va.			Points on James River other than Richmond, Va.			Grand total.
	Shipments.	Receipts.	Total.	Shipments.	Receipts.	Total.	
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Coal	88	48,022	48,110	101	2,369	2,470	50,580
Oil	.....	31,547	31,547	.....	696	696	32,243
Logs	.....	19,831	19,831	.....	.....	.....	19,831
Lumber	1,520	5,945	7,465	113,694	711	114,405	121,870
Fertilizer and fertilizer material	1,452	17,646	19,098	60	4,643	4,703	23,801
Asphalt blocks, bricks, etc	.....	8,074	8,074	15,036	6,255	21,291	29,365
Cattle	.....	.....	.....	39	57	96	96
Cement, lime, etc	.....	3,970	3,970	2	1,572	1,574	5,544
Cordwood	1,930	715	2,645	36,240	1,000	37,240	39,885
Fish and oysters	.....	3,953	3,953	137	217	354	4,307
Flour	25	.....	25	20	619	639	664
Grain	561	958	1,519	397	2,053	2,450	3,969
Groceries	.....	.....	.....	17,105	43,662	60,767	60,767
Hardware	13	640	653	194	1,349	1,543	2,196
Hay, straw, etc	.....	125	125	1,880	1,447	3,327	3,452
Hogs	.....	.....	.....	25	71	96	96
Horses	.....	.....	.....	57	114	171	171
Ice	.....	.....	.....	5	502	507	507
Peanuts	.....	.....	.....	208	82	290	290
Railroad ties	5,479	.....	5,479	5,818	50	5,868	11,347
Salt	.....	1,500	1,500	.....	.....	.....	1,500
Sand	.....	2,003	2,003	.....	.....	.....	2,003
Unclassified freight	36,749	48,571	85,320	5,907	22,107	28,014	113,334
Total	47,817	193,500	241,317	196,925	89,576	286,501	527,818

Petersburg is the head of navigation on the Appomattox River, a tributary of the James. There is some trade on this river, fertilizer and lumber constituting the principal articles. The total traffic in 1906 was 30,438 tons.

The Nansemond River flows into the southwestern part of Hampton Roads and is navigable to Suffolk, 18½ miles above the mouth. Steamers make daily trips between Norfolk and Suffolk, stopping at landings on the river, and there is a considerable movement of clay, brick, and some lumber and merchandise. The traffic for 1906 amounted to 91,063 tons.

Newport News, situated at the point where the James River enters Hampton Roads, is an important shipping point. It has large grain elevators, coal bins, and cotton sheds, and is the terminus of the Chesapeake and Ohio Railway.

Fortress Monroe, also known as Old Point Comfort, is a military post and village on the north side of the entrance to Hampton Roads. The steamers of several lines plying Chesapeake Bay and tributaries

make a landing here. The town of Hampton, on the west bank of Hampton Creek, is about 2 miles northwest from Fort Monroe and has some trade, coal, lumber, ice, and farm produce being carried in vessels of 10 feet or less draft; small steamers from Norfolk and Newport News also make regular trips to Hampton.

Norfolk, on the eastern branch of the Elizabeth River, near Hampton Roads, is the center of a large and varied commerce. From Norfolk lines of railroad radiate to points north, west, and south. It is one of the most important ports of the United States for the shipment of coal, cotton, and merchandise, having a large foreign trade and a coasting and bay trade employing several lines of steamers and many sailing vessels. On the Atlantic it has regular steamship service to Boston, Providence, New York, Philadelphia, and Savannah; on Chesapeake Bay and its tributaries with Baltimore, Washington, Alexandria, West Point, Richmond, Petersburg, and other places; and through the Dismal Swamp and the Albemarle and Chesapeake canals to points on the bays, sounds, and rivers of the coast of North Carolina. It has also ferry communication with Portsmouth and Berkley, Va., and frequent daily communication by water with Newport News, Old Point Comfort, and Hampton. The lines between Norfolk and Baltimore handle railroad freight to and from the West and South, as well as coastwise freight from the steamship lines plying on the Atlantic coast that call at Norfolk. A railroad ferry line also operates between Norfolk and Cape Charles City.

The following tables show the water-borne commerce of Norfolk and Newport News as reported by the Chief of Engineers for several years and in some detail for 1906, and the traffic in American vessels for 1906, according to the Census Report on Transportation by Water. The discrepancies are probably due in part to the inclusion in the Engineers' statistics of harbor traffic and rafts, which are not included in the Census figures.

TABLE 68.—COMMERCE OF NORFOLK AND NEWPORT NEWS IN SPECIFIED YEARS, 1888–1906.

[Report of Chief of Engineers, U. S. Army, 1907, pp. 1204 and 1206.]

Year.	Norfolk.	Newport News.	Year.	Norfolk.	Newport News.
	Tons.	*Tons.*		*Tons.*	*Tons.*
1888	1,914,506	(a)	1902	7,853,108	2,663,669
1890	2,384,841	(a)	1903	9,478,900	2,826,558
1895	5,013,185	(a)	1904	10,780,972	4,208,781
1900	5,538,051	(a)	1905	10,914,378	4,717,852
1901	7,761,356	3,736,443	1906	b15,662,080	5,544,086

a No data.

b The marked increase is partly on account of the unusual activity incident to the Jamestown Tercentennial Exposition.

TABLE 69.—COMMERCE OF NORFOLK AND NEWPORT NEWS, 1906, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army, 1907, pp.1203 and 1206.]

Articles.	Norfolk.	Newport News.	Articles.	Norfolk.	Newport News.
	Tons.	*Tons.*		*Tons.*	*Tons.*
Coal	4,557,097	3,796,897	Pig iron	26,140	.....
Coke	299,890	.....	Copper ore	16,384	.....
Logs	383,829	.....	Grain	13,530	274,606
Lumber	428,053	.....	Ice	12,000	.....
Fertilizer	101,354	.....	Jute bagging	1,411	.....
Chemicals	76,386	.....	Miscellaneous	9,666,036	1,472,583
Cement, brick, and lime	42,670	.....	Total	15,662,080	5,544,086
Clay	37,300	.....			

TABLE 70.—SHIPMENTS AND RECEIPTS IN AMERICAN VESSELS AT NORFOLK AND NEWPORT NEWS, 1906, BY ARTICLES.

[United States Census Report on Transportation by Water, pp. 73-74.]

Articles.	Shipments.	Receipts.	Articles.	Shipments.	Receipts.
	Net tons.	*Net tons.*		*Net tons.*	*Net tons.*
Coal	4,081,999	102,521	Canned goods	2,973	29,158
Lumber	446,628	122,378	Grain	4,449	8,977
Pig iron and steel rails	224,485	12,377	Flour	4,973	2,907
Tobacco	99,860	5,532	Ice	372	12,330
Cotton	118,695	3,697	Naval stores	4,796	767
Fruits and vegetables	105,675	71,433	Iron ore	3,018	636
Phosphate and fertilizer	33,737	181,479	Miscellaneous merchandise	2,539,080	2,057,201
Stone, sand, etc	1,075	153,210	Total	7,680,230	2,808,346
Cement, brick, and lime	4,265	29,528			
Petroleum and other oils	4,150	14,215			

CANAL ROUTES TO THE SOUTH.—The Elizabeth River, on which Norfolk is situated, has three tributaries or branches, known as the Western Branch, the Eastern Branch, and the Southern Branch.

The Southern Branch is of considerable importance. On this branch are situated the city of Portsmouth and the United States navy-yard, together with several large lumber mills where vessels are loaded. From it lead the Albemarle and Chesapeake Canal and the Dismal Swamp Canal, which connect Norfolk with the rivers and bays of North Carolina. Both canals connect with the waters of Albemarle Sound, the Dismal Swamp Canal leading into the Pasquotank River and the Albemarle and Chesapeake Canal into Currituck Sound. Traffic on both these canals is substantially the same in character. The resources of the country through which these canals pass would not justify their maintenance without the existence of through business, since it is said that the lumber has largely been cut and the railroads that have been built are used to a considerable extent as a means of transporting lumber cut in this section. The

greatest tonnage through the canals consists of forest products, which are towed in barges or as rafts from the forests of North Carolina to Norfolk. Logs are used largely at Norfolk and Richmond and lumber goes to Baltimore and Philadelphia. The barges generally return empty. In addition to the barges and rafts there are packet steamers and small sailing vessels operating through the canals between Norfolk and points on the Albemarle and Pamlico sounds and the rivers of North Carolina.

The traffic of the Dismal Swamp Canal in 1906, as reported by the Chief of Engineers, amounted to 388,488 tons, of which 245,628 tons were of lumber and the rest of miscellaneous merchandise. The vessel movement consisted of 1,733 steamers, 730 sailing vessels, 1,452 barges, and 278 rafts. Through the Albemarle and Chesapeake Canal the traffic reported for 1906 was about 100,000 tons of lumber, logs, shingles, and merchandise. The vessel movement consisted of 2,999 steamers, 414 sailing vessels, 403 barges, and 266 rafts. According to the report of the canal companies to the Census, the traffic on the Dismal Swamp Canal in 1889 was 78,211 tons, and in 1906 was 340,135 tons; and on the Albemarle and Chesapeake Canal was 316,793 tons in 1889 and 95,269 tons in 1906, a total for the two canals of 395,004 tons in 1889 and 435,404 tons in 1906.

The following table shows the traffic reported on these canals in some detail for the year 1905:

TABLE 71.—COMMERCE ON THE DISMAL SWAMP AND THE ALBEMARLE AND CHESAPEAKE CANALS, 1905, BY ARTICLES.

Articles.	Dismal Swamp Canal.[a]	Albemarle and Chesapeake Canal.[b]	Articles.	Dismal Swamp Canal.[a]	Albemarle and Chesapeake Canal.[b]
		North.			*North.*
Logs and piles.....feet..	8,473,489	13,533,202	Peanuts.....bags..	3,135	.....
Lumber.....M feet..	134,197	15,547	Peas.....pounds..	1,200	.....
Wood.....cords..	9,854	228			*South.*
Telegraph poles.number..	359	.....	Corn.....bushels..	75,550	29,500
Ties, rails, and posts, number.....	21,485	.....	Fertilizer and potash, tons.....	28,631	29,500
Shingles.....M..	12,261	3,337	Guano.....tons..	.....	1,424
Laths.....M..	648	.....	Coal.....do....	9,164	4,035
Staves .....M..	59	4,248	Stone, sand, cement, lime, and plaster.....tons..	6,593½	.....
Cotton.....bales..	188	698	Oyster shells....bushels..	5,529	2,000
Iron and rails.....tons..	4,165	26	Salt.....tons..	2,278½	.....
Oysters.....bushels..	109,777	11,135	Iron.....do....	.....	101½
Canned.....cases..	7,052	.....	Truck baskets..number..	62,500	.....
Fish.....barrels..	2,981	28	Empty barrels.....do....	294	.....
Potatoes.....do....	2,437	27,518	Miscellaneous.....tons..	56,285	4,175
Potatoes.....bushels..	8,896	.....	Miscellaneous ...barrels..	246	.....
Corn.....do....	.....	40,275			
Melons.....number .	82,600	39,700			

[a] Compiled from the Report of Chief of Engineers, U. S. Army, 1906, p. 1135.
[b] Figures furnished to the Bureau of Corporations, year ended September 30.

Section 3. Albemarle and Pamlico sounds and tributaries.

The principal inland waters of the State of North Carolina include Albemarle and Pamlico sounds and their numerous tributaries. The commerce of these waters is largely with Norfolk, Va., sound and river steamboats serving as feeders to the rail lines operating to Norfolk from various points on the shores of the waterways. At these points several steamers, barges, and a number of small sailing vessels are engaged in the carrying trade.

On the tributaries of Albemarle Sound the more important towns include Elizabeth City, on the Pasquotank River; Hertford, on the Perquimans River; Edenton, on Edenton Bay; Winton, on the Chowan River; Franklin, Va., on the Blackwater River; Plymouth and Roanoke, on the Roanoke River; and Columbia, on the Scuppernong River. The Meherrin and Cashie rivers are also tributary to the sound. There are also numerous landings to which light-draft steamers ply. The shipment of forest products and the receipt of general merchandise of a miscellaneous nature constitute the principal traffic at these towns and landings. From the south the Alligator River enters Albemarle Sound. Through this river and the Fairfield Canal the products of Hyde County, N. C., find an outlet to market.

The traffic movement in 1906 on the principal tributaries of Albemarle Sound is shown in the table below. No statistics are available to indicate the extent of commerce on the Pasquotank, Chowan, Cashie, and Alligator rivers, Edenton Bay, or Albemarle Sound itself

TABLE 72.—COMMERCE ON STREAMS TRIBUTARY TO ALBEMARLE SOUND, 1906, BY ARTICLES.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	Perquimans River.	Blackwater River.	Roanoke River.	Meherrin River.	Scuppernong River.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Logs	24,000				
Lumber and shingles	81,250		50,000	900	[a] 31,397
General and miscellaneous merchandise	3,320	5,200	38,508	8,000	7,867
Farm and plantation products					3,297
Fertilizers					2,348
Total	108,570	5,200	88,508	8,900	44,909

[a] Lumber, cooper logs, and timber.

To the south of Albemarle Sound lies Pamlico Sound, the largest body of water in North Carolina, separated from the Atlantic by a narrow beach. On this sound are extensive areas devoted to oyster culture, and many small vessels are employed in this industry. Occasional steamers from Baltimore and Norfolk, that pass through the

Albemarle and Chesapeake or Dismal Swamp canals and Albemarle Sound, also pass through Pamlico Sound bound to and from the towns on the Pamlico and Neuse rivers.

The Pamlico River empties into the northwestern part of Pamlico Sound, the upper river, above Washington, N. C., being known as the Tar River. The river is navigable for sailing vessels as far as Washington, from which point lumber is shipped in barges and small schooners, and supplies are carried to villages and settlements on the shores of Pamlico Sound. Light-draft steamers go up the Tar River as far as Tarboro, 41 miles above Washington, when the river is high enough to permit. Below Washington a number of navigable rivers and creeks empty into the Pamlico River, including the Pungo River, which has also navigable tributaries. At Belhaven there is a terminus of the Norfolk and Southern Railroad, from which point lumber and oysters are shipped by rail, and lumber in barges. Lumber is shipped by barges from a number of mills along the Pamlico River.

The Neuse River is navigable by small, flat-bottomed, shallow-draft steamers as far as Kinston, 71 miles above its entrance into Pamlico Sound, and in time of freshet navigation is sometimes extended to Waynesboro, 136 miles from the mouth. The Neuse has several navigable feeders, the most important being the Trent, which empties into the Neuse at Newbern, 34 miles from the mouth of the Neuse. Lumber is shipped by barge from several points where there are mills.

The commercial statistics of the Pamlico and Tar, Neuse, and Trent rivers and other tributaries of Pamlico Sound are shown in the following table:

TABLE 73.—COMMERCE ON STREAMS TRIBUTARY TO PAMLICO SOUND, 1906, BY ARTICLES.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	Pamlico and Tar rivers.	Neuse River.	Trent River.	Fishing Creek.	Contentnia Creek.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Timber, lumber, etc	306,050	321,400	205,045	1,250	9,750
Cotton	14,344	10,289	8,400	442	475
Cotton seed and its products	16,455	5,715	2,665	240	700
General and miscellaneous merchandise	87,548	74,800	74,503	.....	1,110
Farm and plantation products	23,351	28,442	29,512	.....	355
Fertilizers	19,558	41,500	10,450	319	9,616
Fish, oysters, clams, and shells	15,559	9,250	6,665	.....	.....
Coal	5,641	6,375	3,619	.....	100
Brick and stone	1,750	1,200	510	.....	.....
Naval stores	875	2,234	2,023	.....	.....
Live stock	253	110	115	.....	.....
Total	491,384	501,315	343,507	2,251	22,106

A waterway about 40 miles long connects Newbern, on the Neuse River, with Beaufort and Morehead City, on Bogue Sound. The Newbern and Beaufort Canal forms a link 3.2 miles long in this waterway, connecting the head of Clubfoot Creek with the head of Harlowe Creek. It is stated that the corporation owning the canal makes no expenditures in the way of maintenance, and therefore no effort is made to keep the rest of the waterway in better condition than the canal itself. Notwithstanding this disadvantage, some business continues to be done over this waterway in the transportation of cotton, cotton seed, cotton-seed meal and oil, hay, fish, grain, oysters, clams, lumber, timber, and general merchandise. Its traffic in 1906 amounted to 81,770 tons. Its improvement would, it is said, give a considerable impetus to the trade of this section of North Carolina. A manufacturer of Newbern, N. C., in speaking of this waterway, says:

> We ship via the Beaufort Canal to southern points, and if we could get an outlet to Wilmington we would use the canal more. If it were deeper and wider, it would be a big help in getting goods from Charleston. We are as much interested in opening up the southern route via the canal as we are in the northern route.[a]

The southeastern part of Pamlico Sound forms the northern entrance to Core Sound and affords an inside passage to Beaufort, N. C., for vessels of about 5 feet draft. The commerce of Core Sound is confined principally to "sharpies" and power launches, carrying fish, oysters, clams, produce, etc., between Beaufort and Ocracoke and intermediate points.

Section 4. The coast and rivers from Beaufort, N. C., to Wilmington, N. C.

The town of Beaufort, N. C., is of some commercial importance. Through Core Sound and connecting waters masted vessels of shallow draft can pass from Beaufort to the Delaware River. There is some traffic in small schooners and sloops. The articles of traffic and their amounts in 1905 and 1906 at Beaufort Harbor are shown in the following table:

TABLE 74.—COMMERCE OF BEAUFORT HARBOR, N. C., 1905 AND 1906, BY ARTICLES.

[Compiled from the reports of Chief of Engineers, U. S. Army.]

Articles.	1905.	1906.	Articles.	1905.	1906.
	Tons.	*Tons.*		*Tons.*	*Tons.*
Timber, lumber, etc.	19,298	14,291	Farm and plantation products.	892	840
Fish, oysters, clams, shells, etc.	21,407	19,652	Fertilizers	3,235	1,815
General and miscellaneous merchandise	19,398	19,613	Live stock	3	20
Cotton	161	248	Coal	325	120
Cotton seed and its products	195	1,140	Brick and stone	272	275
Naval stores	1,470	875	Total	66,656	58,889

[a] That is, via the Albamarle and Chesapeake and the Dismal Swamp canals.

Stretching along the coast from Beaufort to Swansboro is Bogue Sound, an inland waterway separated from the ocean by a narrow strip of land called Bogue Banks. This sound is very narrow and shallow, and of little commercial importance at present. Its commerce during the calendar year 1906 amounted to 29,602 tons, consisting chiefly of lumber, shingles, etc., fish, oysters and clams, rosin and turpentine, miscellaneous farm products, fertilizer, and general merchandise.

From Swansboro to the mouth of New River is a series of tidal channels through the marine marsh, 22 miles long. Improvement of this waterway to form an inland passage is projected by the United States Government. The commerce in 1906 consisted of cotton, fish, oysters, clams, and fertilizers, amounting to 6,686 tons. It is said, however, that these figures can not be taken as an indication of the amount of commerce that will utilize the waterway after the proposed improvement is made, for the commerce moving at present seeks other routes owing to the difficulty and delay now attending this route. It is said that the improvement will afford means of transportation for large quantities of timber, lumber, and miscellaneous products that now have no outlet except by wagon or by boats of the lightest draft.

Cape Fear River, the most important in North Carolina, has been improved by the United States, and is navigable to Wilmington for ocean-going vessels of a considerable draft. Above Wilmington the river is navigable for light-draft steamers for 115 miles to Fayetteville, N. C. The commerce of this river in 1906 is estimated at 135,991 tons. The northeast branch of the Cape Fear River is navigable at high water for light-draft boats to Kornegay's Bridge, about 103 miles above its mouth. The commerce for 1906 amounted to 106,151 tons, consisting principally of timber, naval stores, fertilizers, general merchandise, cotton, and miscellaneous farm products. This traffic was handled by a few boats that made some attempt at regular trips, and by a large number of rafts, flats, etc.

On the Black River there is no steamboat navigation above Clear River, although Lisbon is the head of navigation. The commerce in 1906 is estimated at about 57,051 tons, consisting principally of lumber, general merchandise, naval stores, fertilizers, and cotton and other farm products.

The packet steamers operating on these rivers take groceries and general merchandise from Wilmington and bring in cotton, naval stores, and general produce. Besides the boats on the rivers above Wilmington, two lines operate to Southport, a town just inside the mouth of Cape Fear River, and another runs to points on Little River, which enters the Atlantic at the North Carolina-South Carolina line.

The statistics of the traffic movement in 1906 on the principal rivers in North Carolina adjacent to Wilmington are shown in the following table:

TABLE 75.—COMMERCE ON RIVERS IN NORTH CAROLINA, 1906, BY ARTICLES.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	Cape Fear River.	Northeast River (branch of Cape Fear River).	Black River.	New River.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Timber, lumber, etc.	80,987	82,619	45,779	7,350
Cotton	2,250	406	250	101
Cotton seed and its products	825	340	425	1,300
Naval stores	5,360	2,063	5,108	213
General and miscellaneous merchandise	12,300	2,000	4,252	2,385
Farm and plantation products	460	273	372	431
Fertilizers	28,340	12,091	740	800
Live stock	209	46	107	5
Fish, oysters, and clams	10	.....	3	1,075
Brick and stone	5,250	6,313	15	.....
Total	135,991	106,151	57,051	13,660

WILMINGTON, N. C.—The commerce of these rivers centers at the port of Wilmington, N. C., on the Cape Fear River, about 27 miles from the mouth. Considerable cotton enters the export trade, being carried in foreign tramp steamships, some of which bring in foreign cargoes of material for fertilizer. Some of these steamships also take cargoes of lumber. Two or three steamships are loaded each year with mixed cargoes of gum blocks (used for veneering) and rosin for Glasgow, Scotland.

A regular line of coastwise steamships operating between New York and Georgetown, and another running between Baltimore and Charleston, call at Wilmington. These lines take most of the lumber shipped coastwise by steamer. Lumber is also shipped from Wilmington by rail and by sailing vessel. The coastwise shipments by steamer are not so great in volume as the shipments by schooners, and the relative amounts by these two classes of carriers have not changed much during the last few years. No lumber is shipped by barge from Wilmington, although some comes into Wilmington by that class of carriers.

Shipments of naval stores by water from Wilmington are not of much importance, except by the regular steamship line to New York. The shipment of cross-ties is, however, extensively carried on, and is done mostly by sailing vessels to northern ports. Fertilizer comes into Wilmington by sailing vessels from Norfolk and Bal-

timore, some from the latter city being received by the Baltimore steamer.

Coastwise shipments of cotton from this port were never very great, and only about 1,000 bales were shipped coastwise during 1906. The cotton grown on plantations in the territory back of Wilmington, which was formerly sent to Wilmington, is now sent, when designed for domestic consumption, principally by rail to Norfolk. Some cotton is received at Wilmington by the steamship line from Georgetown. This latter is cotton for export.

It was stated that during the calendar year 1906, 6,450 tons of anthracite coal came by water from New York and 1,034 tons from Philadelphia, a total of 7,484 tons. Of bituminous coal 6,750 tons came by water from Norfolk and 465 tons[a] from New York, the shipment from New York, however, being exceptional. These shipments represent all the coal coming to Wilmington by water. Most of the soft coal used there comes by rail from mines in West Virginia on the lines of the Chesapeake and Ohio and Norfolk and Western railways. The bunker trade at Wilmington is small. Most of the rail receipts of soft coal were used as railroad fuel, the local consumption for steam and domestic purposes amounting very closely to 50,000 tons annually. Wilmington is not a distributing point for coal.

The commerce of the port of Wilmington during the year 1906 amounted to 814,291 tons, valued at $42,684,315.75, a loss as compared with 1905 of 56,815 tons and in value of $6,538,991.25. The decrease was due principally to a falling off in the exporting of cotton and lumber and in receipts of coal. The commercial statistics are shown in detail in the following tables:

TABLE 76.—VESSELS NAVIGATING CAPE FEAR RIVER AT AND BELOW WILMINGTON, N. C., 1906.

[Report of Chief of Engineers, U. S. Army, 1907, p. 1251.]

Class of vessel.	American.		Foreign.		Total.	
	Number.	Tonnage.	Number.	Tonnage.	Number.	Tonnage.
Steamships	134	200,319	50	93,841	184	294,160
Barks	3	1,461	5	3,073	8	4,534
Schooners	107	43,400	8	1,904	115	45,304
Brigs	3	1,089	.....	.....	3	1,089
Barges	11	17,410	.....	.....	11	17,410
Total	258	263,679	63	98,818	321	362,497

[a] The total of these coal receipts is somewhat in excess of the receipts shown in the table following.

TABLE 77.—COMMERCE OF WILMINGTON, N. C., 1906, BY ARTICLES.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907, pp. 1248-1250.]

Articles.	Foreign and coastwise.		Internal.	
	Shipments.	Receipts.	Shipments.	Receipts.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Timber, lumber, etc	94,261	4,046	.....	217,528
Cotton	77,850	1,466	.....	2,934
Cotton seed and products	640	189	640	975
Naval stores	23,913	5,985	.....	14,527
General and miscellaneous merchandise	48,811	45,102	26,434	5,888
Farm and plantation products	2,092	1,650	1,078	939
Fertilizers	1,952	118,519	41,222	1,125
Live stock	20	175	29	345
Fish, oysters, and clams	.....	1,095	.....	26
Coal	4,236	10,759	50	.....
Brick and stone	.....	1,536	4,035	11,578
Cement	.....	15,133	572	.....
Kerosene oil	.....	24,936	.....	.....
Total	253,775	230,591	74,060	255,865

TABLE 78.—SHIPMENTS AND RECEIPTS IN AMERICAN VESSELS AT WILMINGTON, N. C., 1906, BY ARTICLES.

[United States Census Report on Transportation by Water, pp. 73-74.]

Articles.	Shipments.	Receipts.	Articles.	Shipments.	Receipts.
	Net tons.	*Net tons.*		*Net tons.*	*Net tons.*
Lumber	62,586	9,834	Fruits and vegetables	70	1,042
Naval stores	13,949	10,852	Cotton	159	3,649
Phosphate and fertilizers	12,330	21,276	Canned goods	1,918	207
Petroleum and other oils	378	25,282	Ice	276	10
Cement, brick, and lime	1,719	16,115	Tobacco	42	.....
Coal	242	8,292	Miscellaneous merchandise	19,746	44,951
Stone, sand, etc	.....	1,434	Total	121,930	145,209
Grain	4,992	1,919			
Flour	3,523	346			

Section 5. Georgetown, S. C., and neighboring rivers.

At the head of Winyah Bay is situated the harbor of Georgetown, S. C. This harbor receives the waters of the Waccamaw, Pedee, Little Pedee, and Sampit rivers, and through the Estherville-Minim Creek Canal the commerce of the Santee River and its tributaries, including the Wateree and Congaree rivers. The trade of these rivers, centering at Georgetown, is of considerable importance, especially that of the Waccamaw, Pedee, and Santee rivers. From these rivers lumber, naval stores, and cotton are received for reshipment, shipments of plantation and camp supplies and general merchandise affording return cargoes.

RIVERS.—The principal towns on the Waccamaw River are Bucksville and Conway, S. C. Steamboats ply the river regularly to these points from Georgetown, touching also at way landings, and seagoing schooners of from 300 to 500 tons are towed to sawmills along the river to load lumber for northern ports. The sawmills at Georgetown maintain towboats on the river, bringing down rafts of logs. There are also numerous small tugs and quite a number of gasoline boats, owned by planters and mill men, who do their own work with these boats.

The Little Pedee River, which empties into the Pedee at a point about 30 miles above Winyah Bay, is navigable for a distance of about 47 miles from its mouth. This river and its tributary, the Lumber River, are being improved to Lumberton, N. C. One packet steamer makes an occasional trip up the Little Pedee. There is some log towing done on the river, as well as some traffic by barges and pole boats.

The Pedee River is navigable to Cheraw, S. C., about 170 miles from the mouth of the river. Several boats operate to Georgetown, the downstream freights consisting of lumber, timber, cotton, naval stores, rice, and general plantation products. The return freight consists of fertilizers and miscellaneous merchandise and supplies. Ocean-going sailing vessels load lumber on the lower river. Log rafts, too, are towed to sawmills at points along the river or at Georgetown.

The situation of Georgetown, just north of the mouth of the Santee River, makes it an important port in the trade of that river. There is considerable traffic between Georgetown and points on the river, carried by steamboats which use the Estherville-Minim Creek Canal between Winyah Bay and the Santee. At a point about 120 miles up, the Wateree and Congaree rivers unite to form the Santee. Columbia, on the Congaree, and Camden, on the Wateree, are the most important cities on these tributaries. On the Wateree the only traffic is floating logs downstream, which amounted to 16,200 tons in 1906. On the Congaree a steamboat line is in operation from Columbia to Georgetown, where connection is made with steamers for New York, Baltimore, and Charleston. There is other relatively unimportant traffic on the river. On the Santee River there are no towns of commercial importance.

There is a small volume of commerce tributary to Georgetown on Black River and Mingo Creek, no statistics of which movement are at present available. This commerce moves largely in two small steamers owned at Rhems, S. C.

The movement of traffic on the rivers of South Carolina adjacent to Georgetown during 1906 and for a series of years is shown in the following tables:

TABLE 79.—COMMERCE ON SOUTH CAROLINA RIVERS, 1899–1906.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907.]

Year.	Waccamaw River.	Little Pedee River.	Pedee River.	Santee River.[a]	Congaree River.	Wateree River.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1899	376,822	16,685	134,072	154,327	88,696	109,170
1900	467,887	23,780	154,727	179,090	121,363	93,024
1901	302,655	51,460	188,912	204,375	14,583	10,417
1902	141,686	57,050	152,008	215,600	58,075	42,575
1903	143,813	77,750	153,014	220,900	114,310	41,050
1904	190,435	83,100	162,566	242,800	43,035	15,600
1905	207,630	87,985	148,869	329,350	34,350	22,000
1906	244,920	18,880	175,250	427,300	35,522	16,200

[a] Including Estherville-Minim Creek Canal.

TABLE 80.—COMMERCE ON SOUTH CAROLINA RIVERS, 1906, BY ARTICLES.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	Waccamaw River.	Little Pedee River.	Pedee River.	Santee River.	Congaree River.	Wateree River.
Outward freights:	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Timber, lumber, etc	200,000	12,000	150,600	402,000	31,200	16,200
Naval stores	6,000	280	500	10,000	.....	.....
Cotton	2,750	450	1,550	300	50	.....
Rice and rice flour	1,870	.....	100	2,000	.....	.....
Fish, game, vegetables, etc	750	.....	.....	2,000	.....	.....
Miscellaneous and general merchandise	2,550	.....	1,500	4,000	172	.....
Inward freights:						
Fertilizers, railroad supplies, etc	31,000	6,150	21,000	[a] 7,000	4,100	.....
Total	244,920	18,880	175,250	427,300	35,522	16,200

[a] Of this 4,100 tons was through freight for the Congaree River.

GEORGETOWN, S. C.—The traffic movement by water at Georgetown, S. C., includes not only the shipments and receipts to and from these rivers, but also the shipments and receipts of steamship lines operating between Georgetown and New York, Baltimore, and Charleston, as well as shipments of lumber and cross-ties, large in amount, sent by sailing vessels and barges and in tramp steamers. There is very little export business done at Georgetown.

The commercial statistics of Georgetown (Winyah Bay) for the years 1899 to 1906 are shown in the following table:

TABLE 81.—COMMERCE OF WINYAH BAY (GEORGETOWN, S. C.), 1899–1906.

[Report of Chief of Engineers, U. S. Army, 1907, p. 296.]

Year.	Tons.	Year.	Tons.
1899	120,587	1903	368,502
1900	129,639	1904	369,774
1901	247,989	1905	363,916
1902	387,471	1906	392,770

By articles and amounts this traffic in 1906 was made up as follows:

TABLE 82.—COMMERCE OF WINYAH BAY (GEORGETOWN, S. C.), 1906, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army, 1907, p. 1260.]

Articles.	Tons.
Outward freights:	
Lumber, timber, cross-ties, and shingles	330,430
Naval stores	14,040
Cotton	2,435
Rice	670
Miscellaneous	1,355
Total	348,930
Inward freights: Miscellaneous	43,840
Grand total	392,770

The commerce of the port during 1906 is said to have fallen off somewhat on account of a severe storm in the autumn of that year, which destroyed the rice crop and much of the cotton and standing timber. The cotton crop is reported to have been reduced to less than 50 per cent of its normal size.

One large sawmill at Georgetown ships an average of about 10 million feet b. m. of lumber each month, of which 60 per cent goes to New York, Baltimore, and Philadelphia, each taking about 1½ to 2 million feet per month, and the most of the balance goes to Norfolk, although some shipments are made to Boston and ports on Long Island Sound. The Norfolk shipments are made in barges; to the other ports the lumber is sent by steamships. Other lumber companies at Georgetown ship by the regular steamship line operating to New York and in chartered schooners. Some of these chartered vessels bring return cargoes of coal to southern ports.

Section 6. Charleston and adjoining waterways.

The city of Charleston, S. C., is situated at the head of the harbor, at the confluence of the Cooper and the Ashley rivers. On these two rivers there are no regular packet lines. There are, however, a few gasoline boats and sloops that go 50 or 60 miles up each river, handling general merchandise and supplies from Charleston and return cargoes of garden truck, wood for fuel, naval stores, and a very little cotton, the latter being handled chiefly by rail. On these rivers there are no towns or villages of importance, the principal landings being at lumber mills and phosphate works. Vessels load phosphate for the most part from lighters while lying in Charleston Harbor.

As an ocean port Charleston has a considerable foreign and coastwise trade, the principal articles shipped being lumber, cotton and

cotton goods, phosphate rock, clay, naval stores, and rice. As a port for the shipment of cotton Charleston has declined in importance. For some thirty years before and after the civil war these shipments to northern ports, which were made by sailing vessels, were large. These sailing vessels continued to be a considerable factor in the trade until some twelve or fifteen years ago, when the competition of the regular steamship lines to the ports of the North forced them out. The steamship lines, with larger boats, quoted lower rates of freight and insurance and made quicker deliveries, the time to New York by steamer being two or three days as against two or three weeks by sailing vessel. In addition to this advantage the steamship could profitably take shipments of almost any size, while the sailing vessels required full cargoes. The schooners had some advantages, for they could load directly at the shipping dock and discharge at the wharf of the consignee, while the shipments by steamships frequently entailed an expense for drayage at both ends of the route. The net results of these conditions, however, combined to drive the sailing vessels from the coastwise cotton trade entirely.

It is also claimed that the attitude of the railroads has operated to minimize the cotton trade of Charleston. The South Carolina Railroad formerly brought a good deal of cotton into Charleston, but the road passed into the hands of the Southern Railway, which was interested in securing the longer rail haul to Pinners Point and Norfolk, Va. So, too, the organization of the Central of Georgia Railway merged into a single system several roads that had Charleston connections. The new system turned to Savannah as a port, taking away much of the Charleston business, since the Central of Georgia Railway does not run into Charleston.

Another cause has been the development of the cotton-manufacture industry in South Carolina and adjacent territory. These southern mills began operations some twenty years ago, and since that time their consumption of cotton has substantially increased. In this connection it is said that the cotton mills of South Carolina now use more cotton than is grown in the State. It is said, however, that these mills draw their supply from the Piedmont region of the State and from the adjacent territory in Georgia and North Carolina, very little of the cotton grown south and east of Columbia being consumed by the South Carolina mills.

Another of such causes is the improvement of banking facilities of the interior towns. Planters now do their business with these banks, where in former years they were compelled to get advances on their crops before maturity from cotton factors at Charleston, and as a natural result the crop after making was shipped through Charleston. Some of the cotton that now comes through Charleston comes for this reason.

As a net result the cotton shipments from Charleston, formerly some 500,000 bales or more annually, now amount to not more than 150,000 to 200,000 bales.

The shipment of lumber, cross-ties, etc., from Charleston by water is an important traffic. As in the case of cotton shipments this was also a schooner trade, but the steamship lines in building larger boats enlarged the port holes to facilitate loading lumber from the water, and this, together with the advantages which the steamships possessed (enumerated above), had important reciprocal influences in lowering both the cotton and the lumber rates and in attracting the lumber to the steamships, although shipments of lumber to a considerable extent are still made by sailing vessels.

As shown in Table 83, the receipts of materials for the manufacture of fertilizers at Charleston constitute an important traffic. Considerable tropical fruit (oranges, bananas, etc.) from Jamaica is also landed at Charleston. Coastwise bituminous coal comes into Charleston by sailing vessels, principally from Newport News, Va.

The regular coastwise steamship lines at Charleston include service to Boston, Mass., New York, N. Y., Baltimore, Md., Wilmington, N. C., Georgetown, S. C., Brunswick, Ga., and Jacksonville, Fla. Besides these lines there are a number of local boats operating among the sea islands below Charleston to plantation landings, etc., as far as Beaufort, S. C., to St. Helena Sound and the mouth of the Edisto River. These boats do a considerable business in the transportation of passengers and freight. This section marks the garden-truck section of South Carolina tributary to Charleston. Reshipments of these commodities received from steamers are made over the Atlantic Coast Line Railway at Young Island, S. C., and Charleston, and over the Southern Railway from Charleston. The steamboats among the sea islands also carry cotton and other plantation products and supplies. Many planters among the islands own their own sloops, gasoline boats, etc., in which they bring their products to market.

The commerce of Charleston Harbor for the year 1906 is shown in the following table:

TABLE 83.—COMMERCE OF CHARLESTON HARBOR, S. C., 1906, BY ARTICLES.

Articles.	Foreign and coastwise.[a]		In American vessels.[b]	
	Shipments.	Receipts.	Shipments.	Receipts.
	Tons.	*Tons.*	*Net tons.*	*Net tons.*
Lumber	179,448	.....	136,941	5,266
Cotton	37,328	.....	62,882	4,056
Cotton goods	48,683	.....	.....	.....
Phosphate rock	11,677	.....	29,210	30,653
Fertilizer and material	7,724	212,337		
Coal	.....	84,955	1,059	85,371

TABLE 83.—COMMERCE OF CHARLESTON HARBOR, 1906, BY ARTICLES—Continued.

Articles.	Foreign and coastwise.[a]		In American vessels.[b]	
	Shipments.	Receipts.	Shipments.	Receipts.
	Tons.	*Tons.*	*Net tons.*	*Net tons.*
Cement, brick, and lime	.....	[c]26,009	196	42,553
Petroleum and oils	.....	8,597	961	11,338
Naval stores	3,008	.....	3,398	1,308
Fruit and vegetables	.....	8,030	220	12,246
Grain	.....	.....	1,897	5,911
Flour	.....	.....	310	648
Canned goods	.....	.....	610	581
Stone, sand, etc	20,377	.....	199	28,609
Miscellaneous	10,635	176,572	66,067	188,190
Total	318,880	516,500	303,950	414,730

[a] Report of Chief of Engineers, U. S. Army, 1907, p. 1269.
[b] United States Census Report on Transportation by Water in 1906.
[c] Cement only.

INSIDE ROUTES.—There is an inside passage for shallow-draft vessels between Georgetown and Charleston, through Bulls Bay, but it is little used. It consists of a series of creeks, sounds, rivers, and bays extending from a point opposite McClellanville, S. C., to Charleston Harbor, affording a tidal route sheltered for the most part from the sea by numerous islands, which form the outer coast line. It is obstructed at several points, however, and the passage across Bulls Bay is much exposed. The present commerce is comparatively small, as only very small vessels can get through without excessive delays.

The traffic in 1903 was 33,344 tons; in 1904, 39,064 tons; in 1905, 58,421 tons; and in 1906, 49,440 tons. Oysters, lumber, and wood were the principal articles, with some naval stores and farm products. The largest movement is toward Charleston.

Below Charleston the inside route is continued to Savannah by means of tidal channels and numerous rivers which enter the ocean along this stretch of the coast.

A short distance below Charleston the North and South Edisto rivers enter the Atlantic. Neither is of much commercial importance. At St. Helena Sound a number of navigable rivers enter the ocean, the most important of which are the Coosaw, Ashepoo, Bull, Combahee, Morgan, and Harbor rivers. Phosphate rock, lumber, etc., are shipped from this region.

At Port Royal Sound, one of the largest and best harbors on the coast of South Carolina, several rivers enter. The principal of these tributaries are the Beaufort, Broad, and Chechessee rivers; of these the Beaufort River is the only one of commercial importance. At the city of Beaufort, 11 miles above the mouth, there is a little trade. Port Royal, on Battery Creek, a tributary of the Beaufort, is the terminus of a railroad, but the town had no trade in 1906. A large

phosphate plant on the river, between Beaufort and Port Royal, ships some phosphate by rail and in foreign vessels. From Port Royal Sound several creeks and small rivers lead to Tybee Roads and the Savannah River, forming part of the Charleston-Savannah inland passage.

Section 7. Savannah and the Savannah River.

Savannah, on the south bank of the Savannah River, about 15 miles above the entrance, is the chief port of the State of Georgia and one of the important ocean ports of the South for the shipment of cotton, lumber, and naval stores. These commodities are received by rail and to some extent from points on the Savannah River above Savannah.

The river traffic consists chiefly of the transportation of cotton and cotton seed, naval stores, cross-ties, lumber, and plantation products to Savannah and Augusta, with cargoes of general merchandise and plantation supplies from those points. About one-half the cotton movement is to Augusta, where it is consumed by local mills, which make a better market for Savannah River cotton at Augusta than at Savannah. There are four packet steamers on the river, which during 1906 carried 53,500 tons of freight. Besides this movement 1,300 tons of rice were shipped into Savannah from points on the river. During the same year 16,911,500 feet b. m. of timber were rafted down the river.

Steamboats doing a local business also operate on the Savannah River below Savannah and among the sea islands of the coast. One line operates to Beaufort, S. C. These boats bring vegetables, fruit, oysters, cotton, etc., into Savannah and return with miscellaneous merchandise and supplies. Fifteen or twenty years ago a good deal of cotton was received by packet from Florida, but there have been no such receipts in recent years.

There are regular coastwise steamship lines between Savannah and Boston, New York, Philadelphia, and Baltimore. All coastwise shipments of cotton for domestic consumption in the Northern States and some for export via northern ports go by coastwise steamship lines. In addition to these foreign exports of cotton via the northern ports, there is an export movement of great volume by tramp steamships direct from Savannah. Early in the season the export cotton leaves Savannah for coastwise ports instead of being shipped direct. This is because there are not many foreign vessels available for charter until well into October. The relative amounts going by each of these routes are shown in the statistics below. The shipment of cotton by sailing vessels from Savannah was formerly a trade of considerable magnitude, but because of lower rates and quicker deliveries the steamers now handle all the business. The

volume of coastwise and foreign shipments of cotton from Savannah for the years ended August 31, 1904, 1905, and 1906 is shown in the following table:

TABLE 84.—COASTWISE AND FOREIGN SHIPMENTS OF COTTON FROM SAVANNAH, YEARS ENDED AUGUST 31, 1904–1906.

[Report of Savannah Cotton Exchange, 1906, p. 18.]

Destination.	1904.		1905.		1906.	
	Upland.	Sea island.	Upland.	Sea island.	Upland.	Sea island.
	Bales.	*Bales.*	*Bales.*	*Bales.*	*Bales.*	*Bales.*
Charleston	523	.....	253	.....	9	40
Baltimore	30,321	1	32,063	74	36,965	.....
New York	133,139	19,855	213,116	30,972	231,399	31,531
Boston	89,350	7,668	220,443	8,940	217,803	9,290
Philadelphia	26,978	501	57,728	1,990	31,150	2,554
Brunswick	.....	50	213	3	68	.....
Total	280,311	28,075	523,816	41,979	517,394	43,415
Foreign	807,919	20,020	1,276,409	14,702	947,556	19,199
Grand total[a]	1,108,526	49,585	1,805,692	59,094	1,468,861	64,868

[a] Includes also amount reshipped to interior and amount consumed locally.

Lumber and naval stores are shipped from Savannah in large amounts, principally to New York, but also to Philadelphia, Baltimore, and Boston. Lumber is carried both by steamers and sailing vessels and to some extent by rail. Naval stores coastwise go mostly by the regular steamships. The following table shows the foreign and domestic shipments of lumber and naval stores:

TABLE 85.—SHIPMENTS OF LUMBER AND NAVAL STORES FROM SAVANNAH, 1905 AND 1906.

[Reports of Savannah Board of Trade.]

Lumber.

	1905.	1906.
	Feet.	*Feet.*
Domestic	193,980,143	225,564,105
Foreign	14,121,118	20,304,304
Total	208,101,261	245,868,409

TABLE 85.—SHIPMENTS OF LUMBER AND NAVAL STORES FROM SAVANNAH, 1905 AND 1906—Continued.

Naval stores.

	Season 1905–6.		Season 1906–7.	
	Spirits.	Rosin.	Spirits.	Rosin.
	Casks.	*Barrels.*	*Casks.*	*Barrels.*
Foreign	[a] 105,423	[a] 300,163	85,726	333,316
Coastwise:				
Baltimore	8,540	79,594	12,413	66,666
Boston	8,730	14,473	9,262	13,861
Philadelphia	11,153	92,004	13,506	106,775
New York	40,360	161,931	26,177	114,377
Interior	33,586	36,507	42,801	31,014
Packing	2,235	.....	.....	.....
Total	210,027	684,672	189,885	666,003

[a] Corrected figures.

The greater bulk of coal received at Savannah comes coastwise by sailing vessels, mostly from Hampton Roads, Philadelphia, and Baltimore, and is used for all purposes, as domestic, steam, etc. Anthracite coal comes altogether from Philadelphia. Coastwise coal receipts are said to amount to about 200,000 tons annually. The amount of coal consumed in the local bunker trade is small. Some rail coal comes into Savannah, of which no tonnage record is available. It becomes a commercial factor only when the supply of coastwise coal runs short. The source of this rail coal is the mines of West Virginia, although there is also some Alabama coal. Receipts of coal for railroad use are chiefly from mines in Tennessee.

The following table shows the total shipments and receipts in American vessels at Savannah for the year 1906:

TABLE 86.—SHIPMENTS AND RECEIPTS IN AMERICAN VESSELS AT SAVANNAH, 1906, BY ARTICLES.

[United States Census Report on Transportation by Water, pp. 73–74.]

Articles.	Shipments.	Receipts.	Articles.	Shipments.	Receipts.
	Net tons.	*Net tons.*		*Net tons.*	*Net tons.*
Lumber	448,930	5,397	Cement, brick, and lime	15	24,714
Naval stores	105,913	5,947	Coal	2,701	130,149
Cotton	150,352	8,171	Tobacco	1,736	638
Pig iron and steel rails	29,303	1,326	Canned goods	1,057	16,487
Fruits and vegetables	23,144	7,995	Flour	520	.....
Grain	2,103	69,066	Miscellaneous merchandise	134,034	255,751
Phosphate and fertilizers	7,449	44,075			
Petroleum and other oils	140	13,250	Total	907,397	582,966

Section 8. Brunswick and the Georgia coast and rivers.

Between Savannah and Darien, Ga., are several sounds and tributary rivers, the navigation of which is confined chiefly to small local vessels and those using the inside passage between Savannah and Fernandina, of which the several waterways form parts. There are no towns or villages of any commercial importance on the sounds or their tributaries. One of these rivers, the Ogeechee, which enters Ossabaw Sound, is one of the largest rivers in Georgia, but it is very shallow for the greater part of its length, and although navigable for small vessels for a distance of some 20 miles from its mouth is of little commercial importance. There is a little commerce in lumber from Belfast on the Midway River. Vessels of too deep a draft for Doboy or Altamaha sounds enter Sapelo Sound to load lumber, which is brought to them in rafts.

The Altamaha River, which enters Altamaha Sound, is the largest river in the State of Georgia. It is formed by the confluence of the Oconee and Ocmulgee rivers, 112 miles above the town of Darien. The Altamaha is shallow and crooked, but is navigable for light-draft steamboats throughout its entire length. The principal items of commerce are timber, naval stores, and general merchandise. During the calendar year 1906, 83,800,000 feet b. m. of timber were rafted down the river, most of which came from the Oconee and Ocmulgee rivers, and was sent to mills at Darien and vicinity. About 36,000,000 feet of the timber originated on the Altamaha. There was also a movement on the river of about 14,000 tons of other freight.

On the Oconee River during the year 1906 steamers between the Forks and the bridge of the Central of Georgia Railway, 25 miles above Dublin, handled 49,000 tons of freight. The commerce above Milledgeville between the railway bridge and the northern boundary of Greene County during the same period amounted to 1,246 tons. This commerce was carried on in detached sections of the river tributary to the railroads crossing the river. In addition to this traffic, 42,455,437 feet b. m. of timber were rafted down the river.[a]

The Ocmulgee River at high stages is navigable as far as Macon. Other places on the river are Lumber City, Abbeville, and Hawkinsville. For several years there has been no navigation at all between Macon and Hawkinsville, except one small steamer making occasional trips. A company has been formed, however, to operate from Macon to Brunswick, Ga. During the calendar year 1906 steamers plying on the river handled 18,000 tons of freight. Timber to the amount of 35,500,000 feet b. m. were also rafted down the river.[b]

Although the Altamaha River enters Altamaha Sound, yet its commercial mouth is Doboy Sound. Through this sound, from the

[a] Report of Chief of Engineers, U. S. Army, 1907, part 2, p. 1288. [b] Ibid, p. 1290.

port of Darien, on the Darien River, shipments of yellow-pine timber and lumber are made. The commerce of Darien consists almost entirely of timber and lumber. A daily steamer runs between Darien and Brunswick. In 1906 the commerce of Darien Harbor amounted to 130,991 tons, an increase of 48,783 tons over the previous year. Besides this traffic, 29,683,000 feet of timber were rafted through Darien Harbor to Brunswick and Savannah. Shipments of timber to foreign ports from Darien during the calendar year 1906 amounted to 54,459,467 superficial feet, coastwise shipments to 5,870,921 superficial feet, making a total of 60,330,388 superficial feet.

Through Jekyl Sound, St. Andrews Sound, the Cumberland River, and Cumberland Sound, an inside passage is afforded between Brunswick and Fernandina. On this inside route the traffic is largely by small schooners. Several small steamboats make regular trips between Brunswick, Darien, Fernandina, St. Simons, and Cumberland islands and the Satilla River, as well as a number of tugs which tow lighters carrying naval stores, lumber, and cross-ties. During 1906, 151,835 tons of freight were carried over this route, in addition to 97,010,000 feet b. m. of timber in rafts.[a]

The most important rivers tributary to these waters are the Satilla River, entering St. Andrews Sound, and the St. Marys River, tributary to Cumberland Sound. The Satilla River is navigable for light-draft steamers for a distance of 50 miles to Baileys Mills, and vessels loading lumber go up as far as Satilla Bluff, about 24 miles from the mouth of the river, and finish their loading in Jekyl Sound. St. Marys River is navigable for vessels of 14 feet draft to the village of Colerain and for light-draft steamers to Traders Hill. The town of St. Marys, Ga., 4 miles above the mouth, is the principal town on the river.

BRUNSWICK, the second port in commercial importance in the State of Georgia, is situated on the northern branch of the Brunswick River, just above its entrance into St. Simon Sound. There is regular steamboat communication with Darien, Fernandina, and intermediate points, and a large coastwise and foreign commerce carried in sailing vessels and steamers. Steamships of the Clyde Line plying between Boston, Charleston, and Jacksonville call at Brunswick. A line of steamers operated in connection with the Atlanta, Birmingham and Atlantic Railway was inaugurated in November, 1906, to ply between Brunswick and New York and between Brunswick and Habana, Cuba. During the year 1906 the coastwise steamships to Boston and New York carried 207,225 tons of freight.

On the local waters between Brunswick and adjacent ports there are a number of small steamers, besides numerous small sailboats,

[a] Report of Chief of Engineers, U. S. Army, 1907, part 2, pp. 1295–1296.

tugs, and gasoline launches, the latter craft towing barges carrying naval stores, lumber, cross-ties, etc. It is estimated that the local movement in 1906 amounted to 120,000 tons.

The export trade at Brunswick in tramp steamships is of some importance. The chief articles of export are cotton, lumber, cross-ties, and naval stores. In 1906 these shipments included 158,245 bales of cotton, 399,308,000 feet of lumber and cross-ties, 40,692 barrels of turpentine, and 198,224 barrels of rosin.

The total amount of freight received and shipped at Brunswick in 1906 was 1,423,985 tons.[a]

At St. Simons Mills, near Brunswick, are several lumber mills to which vessels go for cargoes.

Section 9. Eastern Florida.

On the Atlantic coast of Florida are two coast ports of considerable importance, Fernandina and Jacksonville, and there is also some local trade on the St. Johns River. At the southern end of the peninsula there is a small movement centering at Miami.

FERNANDINA is situated on the east bank of the Amelia River, about 2 miles above its entrance into Cumberland Sound. Fernandina has railroad communication with Jacksonville and western Florida and steamboat connection with St. Marys and points on the St. Marys River and with Brunswick, at which point connection is made with the steamship and steamboat lines operating from that point. Considerable quantities of lumber, phosphate, and naval stores are shipped from the port in coastwise and foreign vessels. It is said that 90 per cent of the naval stores export trade of northern Florida east of River Junction, Fla., is done by way of Fernandina. Neglecting the commerce of St. Marys, Ga., the total commerce of the harbor of Fernandina during 1906 amounted to 955,478 tons. Shipments were made as follows: 134,619,000 superficial feet of lumber, 159,900 tons of phosphate rock, 487,380 barrels of rosin, and 5,787,421 gallons of turpentine.[b]

JACKSONVILLE, on the St. Johns River, 27½ miles from the mouth, is the most important port of Florida, and one of the principal ports of the South Atlantic coast. It has direct communication by coastwise steamships with Boston, Providence, New York, Philadelphia, Charleston, S. C., and Brunswick, Ga. There is also a considerable movement of sailing vessels.

Lumber and cross-ties constitute the most important shipments from Jacksonville, which has a larger share of this trade than any other southern port. Naval stores are also shipped in increasing amounts, but a large proportion of those intended for export is sent

[a] Report of Chief of Engineers, U. S. Army, 1907, part 2, pp. 1292–1294.
[b] Ibid, p. 1301.

to Fernandina on account of lack of sufficient water in the St. Johns River for large foreign vessels. Fruits and vegetables are important articles of shipment, fertilizer materials are received in large quantities, and there is also a considerable amount of coal brought in coastwise and a large amount of miscellaneous and general merchandise.

The ocean traffic of the St. Johns River has increased from 494,474 tons in 1898 to over 2,000,000 tons in 1906.

The coastwise commerce of the St. Johns River for 1906, as reported by the Jacksonville Board of Trade, was as follows:

TABLE 87.—COMMERCE ON ST. JOHNS RIVER, 1906, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	Tons.	Articles.	Tons.
Lumber:		Oil	13,094
Pine	472,701	Cement	10,770
Cypress	22,552	Bacon	9,998
Cross-ties	[a] 405,011	Sugar	9,529
Naval stores	87,638	Flour	6,320
Oranges	114,000	Salt	5,615
Fruits and vegetables	41,601	Wines and liquors	5,000
Coal	132,207	Canned goods	1,138
Fertilizers	289,255	Grain	1,757
Kaolin	26,131	Iron pipe	1,279
Ammonia	1,175	Live stock	1,875
Steel rails	31,620	Potatoes	1,476
Hay	24,535	Shoes	1,154
Shingles	6,172	Wire	887
Cotton	1,431	Gravel	350
Cotton-seed oil	472	Cocoanuts	290
Fish and oysters	1,800	General merchandise	384,044
Hides	1,530		
Tobacco	470	Total	2,115,123
Doors, sash, and blinds	246		

[a] Corrected figures received from secretary of board of trade.

Shipments and receipts in American vessels at Jacksonville, according to the Census Report on Transportation by Water, are shown in the table below:

TABLE 88.—SHIPMENTS AND RECEIPTS IN AMERICAN VESSELS AT JACKSONVILLE, FLA. 1906, BY ARTICLES.

[United States Census Report on Transportation by Water, pp. 73–74.]

Articles.	Shipments.	Receipts.	Articles.	Shipments.	Receipts.
	Net tons.	*Net tons.*		*Net tons.*	*Net tons.*
Lumber	499,865	3,749	Grain	500	5,074
Naval stores	46,137	1,737	Flour	150	1,850
Fruits and vegetables	51,299	95	Canned goods	30	457
Coal	350	97,356	Pig iron and steel rails		2,212
Cement, brick, and lime	10	18,154	Miscellaneous	57,817	181,043
Petroleum and other oils	3,097	15,424			
Phosphate and fertilizers	420	4,800	Total	661,615	331,951
Cotton	1,940				

St. Johns River, the largest and most important river of eastern Florida, flows northward nearly parallel to the coast. It is navigable from its mouth to Lake Washington, a distance of about 276 miles. On the east side important river points are reached by the Florida East Coast Railway and on the west by the Atlantic Coast Line Railway. Jacksonville is situated on this river at a point about 27½ miles above the bar at the mouth. At Mayport, a small town just inside the mouth of the river, connected with Jacksonville by rail and also by steamboat, considerable coal is discharged for distribution for use by the locomotives of the Florida East Coast Railway and for consumption at points along that line. Other towns on the river are Green Cove Springs, Palatka, Welaka, Sanford, and Enterprise. The lumber mills, about 10 miles above Palatka, is about as far as sailing vessels usually go.

Regular steamboat packet lines operate on the St. Johns River as far up as Sanford, touching at intermediate points, connecting at Palatka with small boats on the Oklawaha River. Sawmills and other companies at Jacksonville and other points maintain towboats on the river towing logs, lumber, cross-ties, etc., timber and lumber products constituting a large part of the river trade.

Naval stores move by river steamboat into Jacksonville from points along the St. Johns River as far up as 40 miles above Sanford and from the Oklawaha River (which merges into the St. Johns at Welaka) as far as Silver Springs. The farms along these rivers at which naval stores are produced range back for some 10 or 12 miles (hauling distance). Some naval stores are also produced in retorts at sawmills on the river; not in very great quantities at present, but the amount is increasing.

The table below shows the local commerce on the St. Johns River at Orange Mills Flats, above Jacksonville, and at Volusia Bar, between Palatka and Sanford, and on the Oklawaha River, for the year 1906:

Table 89.—LOCAL COMMERCE ON ST. JOHNS AND OKLAWAHA RIVERS, 1906, BY ARTICLES.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	St. Johns River.		Oklawaha River.
	Orange Mills Flats.	Volusia Bar.	
	Tons.	*Tons.*	*Tons.*
Lumber	377,317	68,500	.....
Merchandise, general	49,289	220,147	4,125
Naval stores	23,938	33,042	5,147
Cross-ties	11,430	4,200	.....
Roots, herbs, etc.	30,000	.....	.....
Sash, doors, and blinds	9,292	124	.....
Shingles	14,508	512	.....
Brick	13,500	.....	.....
Coal	3,300	28,017	.....

TABLE 89.—LOCAL COMMERCE ON ST. JOHNS AND OKLAWAHA RIVERS, 1906, BY ARTICLES—Continued.

Articles.	St. Johns River.		Oklawaha River.
	Orange Mills Flats.	Volusia Bar.	
	Tons.	*Tons.*	*Tons.*
Grain	13,773	7,720	.....
Hay	2,655	2,990	.....
Fertilizers	280	8,575	.....
Fish and oysters	345	1,640	.....
Kaolin	3,000	.....	.....
Oil and gasoline	272	1,046	.....
Oranges and other fruit	5,121	11,093	26
Railroad supplies	516	11,345	.....
Vegetables	1,302	13,750	.....
Total	559,838	412,701	9,298

Along the east coast of Florida from the mouth of the St. Johns River to the city of Miami the coast is low and sandy. From the mouth of the St. Johns to Cape Canaveral the coast is broken by three inlets—St. Augustine, Matanzas, and Mosquito—none of which is of commercial importance. The stretch of coast southward from Cape Canaveral is formed almost entirely by a low, narrow strip of sand which lies at a distance of 1 to 2 miles from the mainland, from which it is separated by shallow stretches of water, broken at a few intervals by inlets from the ocean. This long chain of interior waters which skirts the east coast of Florida forms in part the proposed and much talked of inside passage from the St. Johns River to Biscayne Bay. The Indian River, a long, shallow lagoon, constitutes an important section of this inside passage. There are a number of towns and villages on this river, the principal ones being Titusville, Cocoa, Eau Gallie, Melbourne, Fort Pierce, and Eden. The Indian River is navigated only by launches, small sail boats, and light-draft steamers. Its commerce is small, and no statistics of its value are available. The Florida East Coast Railway parallels the west bank of the Indian River. An extension of this road over the Florida keys is now in operation as far as Knights Key, 122 miles beyond Miami, and its construction is projected into Key West.

Miami, on Biscayne Bay, has been until recently the southern terminal of the Florida East Coast Railway. The commerce of the port is in cattle, fertilizers, lumber, fruits, vegetables, grain, and general merchandise. It is estimated that 35 per cent of the total trade of this section is carried by water. Regular steamship lines ply to Nassau, Bahama Islands; Habana, Cuba; and Key West; and a line of schooners has been established between Miami and New York.

The arrivals and departures of vessels during 1906 are shown in the table following:

TABLE 90.—VESSEL ARRIVALS AND DEPARTURES AT BISCAYNE BAY, 1906.

[Report of Chief of Engineers, U. S. Army, 1907, p. 1315.]

Class of vessel.	Arrivals.		Departures.	
	Number.	Tonnage.	Number.	Tonnage.
Steamers	267	390,000	267	460,000
Sailing vessels	270	22,560	163	12,860
Yachts	65	.....	65	.....
Fishing vessels	[a] 193	1,920	.....	.....

[a] In service.

The commercial statistics of Biscayne Bay during 1906, as furnished by the Board of Trade at Miami, are shown in the following table:

TABLE 91.—COMMERCE OF BISCAYNE BAY, 1906, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army, 1907, p. 1315.]

Articles.	Tons.	Articles.	Tons.
Merchandise, general	16,000	Lumber	6,000
Railroad supplies	21,000	Oranges	120
Fertilizers	4,300	Pineapples	2,300
Fish and oysters	1,920	Tobacco	260
Fruits	130	Sash, doors, and blinds	50
Grain	740	Vegetables	150
Hay	3,000	Total	56,405
Hides	205		
Live stock	230		

CHAPTER V.

GULF PORTS AND RIVERS.

Section 1. General conditions.

Water-borne traffic in that part of the United States bordering the Gulf of Mexico consists, for the most part, of the shipment of lumber and timber products, naval stores, cotton, cotton seed and its products, grain, petroleum, and phosphate rock, as well as receipts of anthracite coal and miscellaneous merchandise. The principal ports of the Gulf are Key West, Port Tampa, Pensacola, Mobile, New Orleans, Port Arthur, and Galveston. From these ports there is very considerable export trade, as shown under each port in the following paragraphs. Besides this export movement there is some coastwise traffic, moving by coastwise steamship lines and a number of sailing vessels. A part of this commerce is with the ports of the North Atlantic and the remainder is a local movement between the Gulf ports. This latter traffic is not extensive, however, since most of the commodities moved are produced in all parts of the territory bordering the Gulf, rendering local exchange of such products of relatively small importance. The maritime commerce of the Gulf ports is fed to some extent by tributary rivers.

The foreign and coastwise commerce of the principal Gulf ports is shown in the following table. At some of the ports it has been impracticable to show separately the amount of the coastwise commerce.

TABLE 92.—SUMMARY OF COMMERCE AT PRINCIPAL GULF PORTS, 1906.

[Compiled from reports of Chief of Engineers, U. S. Army.]

Port.	Vessels.		Vessel tonnage.		Freight tonnage.
	Arrivals.	Departures.	Arrivals.	Departures.	
Key West:[a]					
Foreign and coastwise	685	838	698,586	779,572	232,774
Port Tampa (Tampa Bay):					
Foreign and coastwise	412	412	.....	.....	838,378
Pensacola:					
Foreign	259	300	441,466	523,890	.....
Coastwise	114	74	221,651	123,894	.....

[a] Statistics of Key West Harbor for 1905. No statistics available for 1906.

TABLE 92.—SUMMARY OF COMMERCE AT PRINCIPAL GULF PORTS, 1906—Continued.

Port.	Vessels.		Vessel tonnage.		Freight tonnage.
	Arrivals.	Departures.	Arrivals.	Departures.	
Mobile:					
Foreign	815	783	[a] 648,902	[a] 666,966	[b] 1,071,340
Coastwise	160	180	[a] 232,143	[a] 214,190	[b] 301,725
New Orleans:					
Foreign	1,143	1,170	1,995,300	2,167,354	[c] 3,342,486
Coastwise	464	454	807,866	692,799	[c] 694,108
Port Arthur (harbor at Sabine Pass):					
Foreign and coastwise	182		1,194,100		1,904,389
Galveston:					
Foreign	401	547			1,770,737
Coastwise	485	355			831,728

[a] Net tons.

[b] In addition to this tonnage, bunker coal was furnished to outward bound steamships to the amount of 317,693 tons, and the river commerce centering at Mobile amounted to 902,805 tons.

[c] This tonnage is in addition to the commerce on the Mississippi River and tributaries handled at New Orleans. (See pp. 319–324.)

Section 2. South and west Florida.

KEY WEST.—Key West, situated among the Florida Keys, affords an excellent harbor at the eastern outlet of the Gulf. It is of considerable commercial importance, having steamship communication with New York, Philadelphia, Miami, Habana, Tampa, Mobile, New Orleans, and Galveston. A large number of steamers and small sailing vessels enter and clear from this port, over half of which are from or for foreign ports. The traffic is chiefly in phosphate, coal, cattle, tobacco, sponges, and general merchandise. Commercial statistics of Key West Harbor are shown in the following tables:

TABLE 93.—COMMERCE OF KEY WEST, 1905, BY ARTICLES.

[Compiled from Report of Chief of Engineers, U. S. Army, 1906, p. 1223.]

Articles.	Tons.	Articles.	Tons.
General and miscellaneous merchandise	101,802	Fertilizers	940
Phosphate	80,361	Fish and oysters	600
Coal	25,000	Naval stores	100
Lumber and shingles	11,000	Cement	100
Live stock	10,000	Total	232,774
Fruits	1,550		
Farm and plantation products	1,321		

TABLE 94.—TOTAL COMMERCE OF KEY WEST, 1898–1905.

[Report of Chief of Engineers, U. S. Army, 1907, p. 335.]

Year.	Tons.	Year.	Tons.
1898	72,968	1902	14,146
1899	130,713	1903	134,043
1900	30,594	1904	174,305
1901	18,863	1905	232,774

On the shores of Florida Bay, the large shallow body of water lying between the south coast of the mainland of Florida and Florida Keys, there are no towns or villages. This bay is frequented only by spongers, fishermen, and inhabitants of the Keys. Between Cape Romano and Cape Sable, the southeastern part of Florida, the shore is broken by innumerable low islands and keys, between which a network of rivers and bayous leads to the interior.

CHARLOTTE HARBOR AND CALOOSAHATCHEE BAY.—Charlotte Harbor is of some commercial importance. Large vessels enter the harbor for cargoes of phosphate, which are loaded from lighters that are towed from the tributary rivers. Punta Gorda, on the south bank of the Peace River, is the most important town reached by vessels through Charlotte Harbor.

Commercial statistics of the commerce of Charlotte Harbor for the years 1905 and 1906 are given in the following table:

TABLE 95.—COMMERCE OF CHARLOTTE HARBOR, 1905 AND 1906, BY ARTICLES.

[Compiled from reports of Chief of Engineers, U. S. Army.]

Articles.	1905.	1906.	Articles.	1905.	1906.
	Tons.	*Tons.*		*Tons.*	*Tons.*
Phosphate, coal, etc	104,399	85,833	Naval stores		1,423
Lumber, piles, etc		5,000	General and miscellaneous merchandise	2,240	1,907
Fish and oysters	5,557	4,788			
Live stock	4,718	3,583			
Fruit (oranges and pineapples)	5,273	1,755	Total	122,187	104,289

A steamer formerly ran regularly between Punta Gorda and Myers, on the Caloosahatchee River, landing at Puntarasa and other ports. This service is said to have been abandoned in May, 1904, on the extension of the Atlantic Coast Line from Myers to Punta Gorda. It has occasionally been resumed since that time. Through this river and canal at its head light-draft steamers can pass into Lake Okechobee, though the head of navigation is generally taken as Fort Thompson, about 60 miles from the mouth. A transportation line was established between Fort Myers and Lake Okeechobee in the summer of 1905, but was abandoned in the spring of 1906.[a]

[a] Reports of Chief of Engineers, U. S. Army, 1906, p. 1226; 1907, pp. 337, 1320.

In the section drained by the Caloosahatchee there has been a constant influx of settlers and a rapid increase in the cultivated area. The commercial statistics of this river for the year 1906 amounted to 22,265 tons, consisting mainly of fruits and farm and plantation products. From Puntarasa, near the mouth of the river, cattle are shipped to Key West and Cuba.

Kissimmee River.—In connection with the waterway formed by the Caloosahatchee River and Lake Okechobee the Kissimmee River affords a navigable waterway of river with connecting canals and lakes for several hundred miles into central Florida through a territory having no railroad facilities. The town of Kissimmee is at the head of navigation. The commerce of the Kissimmee River is in lumber, cattle, fish, naval stores, fruits, vegetables, and general merchandise.[a] Most of the traffic appears to be between Kissimmee and Fort Bassinger, and amounts to about 10,000 tons a year.

TAMPA BAY AND TRIBUTARIES.—Tampa Bay affords one of the best harbors on the Gulf coast of Florida. It has several tributary bays, including Hillsboro, Old Tampa, Terracia, and Boga Ceiga bays, the Manatee River, and Sarasota Pass and Bay. Tampa, Port Tampa, St. Petersburg, Manatee, Palmetto, and Braidentown are among the more important of the places situated on these waters.

At Port Tampa are long railroad docks for the accommodation of several lines of steamers, much phosphate rock being shipped in foreign steamers. Besides the trade in phosphate there is traffic in lumber, coal, crude petroleum, tobacco, grain, and general merchandise. Steamship lines operate to New Orleans, Mobile, Key West, and Habana. During the year ended June 30, 1906, a line was established to Philadelphia; and recently the Mallory Line between Mobile and New York has made Tampa a port of call.

A number of small steamboats operate locally in Tampa Bay and tributaries, the principal commodities transported being fruit, produce, and fish brought to Tampa, on Hillsboro Bay, for shipment by rail and for local consumption.

The commerce of Sarasota Bay is in fruits, vegetables, fish, naval stores, lumber, and general merchandise. In the year 1906 this traffic amounted to 12,011 tons, mostly farm products.

The Manatee River is navigable to Rye, Fla. Fruits, vegetables, fuller's earth, lumber, naval stores, and general merchandise are carried by boats on this river. It is estimated that 60 per cent of the trade of this neighborhood is carried by water. There are 4 steamers and 10 sailing vessels engaged in the trade.

---

[a] Report of Chief of Engineers, U. S. Army, 1907, pt. 1, p. 335.

The following table shows the traffic for 1906 on Tampa and Hillsboro bays and the Manatee River:

TABLE 96.—COMMERCE ON TAMPA AND HILLSBORO BAYS AND MANATEE RIVER, 1906, BY ARTICLES.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	Tampa Bay.	Hillsboro Bay.	Manatee River.	Articles.	Tampa Bay.	Hillsboro Bay.	Manatee River.
	Tons.	*Tons.*	*Tons.*		*Tons.*	*Tons.*	*Tons.*
Phosphate	606,602	26,730	.....	Tobacco	2,163	601	5
Oil and gasoline	78,113	6,303	450	Live stock	2,360	.....	1,200
Lumber, etc	30,113	109,709	23,825	Flour	19,348	5,170	830
Naval stores	28,259	2,875	750	General and miscellaneous merchandise	38,534	22,213	3,606
Coal	27,030	23,700	.....	Fish and oysters	.....	9,421	50
Brick, stone, and sand	.....	27,338	.....	Fuller's earth	.....	15,750	12,000
Cement	1,300	11,400	[a] 2,675	Ice	.....	6,800	.....
Fertilizers	800	35,100	1,500	Total	838,378	449,856	88,153
Fruits	1,936	20,146	6,552				
Farm and plantation products	1,820	126,600	34,710				

[a] Including 675 tons of lime.

Shipments and receipts in American vessels at Tampa and Port Tampa in 1906 were as follows:

TABLE 97.—SHIPMENTS AND RECEIPTS IN AMERICAN VESSELS AT TAMPA AND PORT TAMPA, 1906, BY ARTICLES.

[United States Census Report on Transportation by Water, pp. 73-74.]

Articles.	Shipments.	Receipts.	Articles.	Shipments.	Receipts.
	Net tons.	*Net tons.*		*Net tons.*	*Net tons.*
Phosphate and fertilizers	273,598	.....	Tobacco	2	2,916
Lumber	36,607	1,069	Flour	844	2,419
Naval stores	3,812	4,108	Canned goods	83	1,155
Petroleum and other oils	420	83,369	Ice	54	1,716
Coal	.....	35,560	Pig iron and steel rails	.....	784
Stone, sand, etc	1,800	4,770	Miscellaneous merchandise	50,386	38,682
Cement, brick, and lime	285	2,082	Total	372,467	188,692
Fruit and vegetables	1,632	4,204			
Grain	2,944	5,858			

That part of the Gulf coast from and including Anclote Keys to Apalachicola Bay is low and broken by a number of creeks and rivers of little or no commercial importance. During the spring and summer spongers and fishermen resort here. A number of small vessels also carry cedar from the rivers and creeks. There is a small movement of sponges, lumber, naval stores, and general merchandise on the Anclote River up to Tarpon Springs. At Sponge Harbor, on the river, spongers prepare their cargoes for shipment. At Hudson small

schooners lying off the town sometimes load with naval stores. Port Inglis, at the mouth of the Withlacoochee River, is a subport of entry, from the anchorage basin of which vessels ply to European ports with phosphate cargoes. At Cedar Keys a branch of the Seaboard Air Line Railway terminates, and from this town there is a little trade in red cedar, sponges, and fish. From the Suwanee River, navigable as far up as Branford, a distance of about 69 miles, there is some trade in lumber. St. Marks has railroad communication with Tallahassee.[a]

The commercial statistics of the Crystal and Withlacoochee rivers in 1906 is shown in the following table:

TABLE 98.—COMMERCE ON CRYSTAL AND WITHLACOOCHEE RIVERS, 1906, BY ARTICLES.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907, pp. 1329, 1332.]

Articles.	Crystal River.	Withlacoochee River.	Articles.	Crystal River.	Withlacoochee River.
	Tons.	*Tons.*		*Tons.*	*Tons.*
Phosphate	.....	158,952	Coal	.....	3,899
Iron pyrites	.....	10,154	Fertilizers	.....	2,344
Lumber	7,741	3,847	Farm products	.....	544
General and miscellaneous merchandise	300	1,442	Total	8,291	181,226
Fish and oysters	250	44			

No statistics are available to show the commerce of the Anclote and Suwanee rivers in 1906.

APALACHICOLA RIVER AND TRIBUTARIES.—The Apalachicola River is formed by the confluence of the Chattahoochee and Flint rivers, about 137 miles above the town of Apalachicola. This section of the river is navigable for its entire length. About 55 miles from the mouth of the river steamboats may leave the main river, and by passing through the "Cut-off," lower Chipola River, and Lee Slough reenter the Apalachicola about 17 miles farther down, making landings of considerably greater importance than upon the corresponding part of the main river. The country bordering on the Apalachicola River is almost entirely dependent upon the river for the transportation of its supplies. There is a large passenger traffic by water. The commerce of the river consists chiefly of cotton, naval stores, and general merchandise, and saw logs and timber for export. The movement of these commodities is so combined with the traffic of the Chattahoochee, Flint, and upper Chipola rivers that a separation is impracticable.

The Chipola River, a tributary of the Apalachicola, flows through a country heavily timbered with longleaf yellow pine and cypress,

[a] United States Coast Pilot, Part VIII, pp. 58–62.

which is rafted down the river in large quantities, estimated at about 10,000,000 feet b. m. annually. Naval stores and miscellaneous freight are also carried on the river.

The Chattahoochee River is navigable to Columbus, Ga., 223 miles above its confluence with the Flint. The commerce of the Chattahoochee consists of cotton, cotton seed, fertilizer, grain, naval stores, hardware, and general merchandise, but it is so combined with the commerce of the Flint and Apalachicola rivers that it can not be segregated.

The Flint River, at periods of ordinary low water, is navigable as far as Albany, Ga. The commerce of the Flint consists principally of cotton, naval stores, provisions, and general merchandise, and saw logs and timber for export. There are great quantities of fine timber along the banks of the river, mainly pine, cypress, and hard wood. Several large sawmills are located at Bainbridge, Ga. Above Bainbridge a few small boats ply on the river. Below Bainbridge the river is navigated by steamboats plying also on the Chattahoochee, Chipola, and Apalachicola rivers, operating to the mouth of the Apalachicola River, at Apalachicola.[a]

For the commerce of this system of rivers reference is made to the following table:

TABLE 99.—COMMERCE ON APALACHICOLA RIVER AND TRIBUTARIES, 1906, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army, 1907, p. 1345.]

Articles.	Quantity.	Equivalent in tons.	Articles.	Quantity.	Equivalent in tons.
Cotton.....bales..	12,412	3,353	Hides and skins...packages..	1,399	71
Cotton seed.....sacks..	40,820	2,041	Livestock.....head..	596	223
Cotton-seed meal.....do....	20,700	1,035	Lumber.....feet b. m..	878,000	1,756
Fertilizers.....do....	49,830	4,483	Provisions (case goods),		
Corn and oats.....do....	53,105	4,129	packages.....	290,835	27,714
Rosin.....barrels..	51,410	12,863	Gravel.....yards..	1,400	2,240
Turpentine.....do....	20,835	4,216	Shingles.....number..	5,258,000	1,510
Molasses.....do....	4,589	918	Brick.....do....	830,000	1,975
General and miscellaneous, packages.....	327,092	52,393	Total.....	.....	[a] 120,920

[a] Total corrected to agree with sum of items.

Estimated value of above freights (in round numbers), $13,510,750.

In addition to the above, large quantities of timber are carried down these streams in rafts to sawmills at Apalachicola and Carrabelle, Fla., of which no record of the amount is available.

[a] Report of Chief of Engineers, U. S. Army, 1906, pp. 336–337, 1249–1250; 1907, pp. 353–357.

The town of Apalachicola, on the west bank of the Apalachicola River, at the point where the river enters Apalachicola Bay, has a larger water-borne trade than any other town between Pensacola and Tampa. It ships considerable lumber in foreign and coastwise vessels, and fish and oysters by the steamers running on the Apalachicola River and its tributaries. A steamboat runs from Apalachicola to Mobile, touching at intermediate points. Another boat runs to the shipping at East Pass and to Carrabelle, Fla., at which point connection is made with the Georgia, Florida and Alabama Railway. An extension of this road to Apalachicola has been undertaken.

The town of Carrabelle, Fla., is situated at the mouth of the Carrabelle River, which empties into St. George Sound, as the eastern part of Apalachicola Bay is called. The commerce of Carrabelle consists for the most part of timber, naval stores, dressed and kiln-dried lumber, shingles, fish, oysters, and general merchandise. No detailed statistics of the traffic at the port of Apalachicola, including that of Carrabelle, are available.

The following table shows the vessel movement at Apalachicola reported for the year ended June 30, 1907. Freight consisted of 23,061,000 feet of lumber.

TABLE 100.—VESSEL MOVEMENT AT APALACHICOLA, 1906.

[Report of Chief of Engineers, U. S. Army, 1907, p. 1338.]

	Vessels.	Tonnage.
Entered from foreign ports	51	24,861
Entered from coastwise ports (estimated)	75	24,017
Total	126	48,878
Cleared for foreign ports	38	17,182
Cleared for coastwise ports (estimated)	81	26,799
Total	119	43,981
Engaged in traffic of the port:		
Steam	32	1,925
Sail	25	265
Total	57	2,190

This statement, from the records of the custom-house at Apalachicola, includes vessels loaded from both Apalachicola and Carrabelle, all of which use the entrance at East Pass, Carrabelle Harbor. Of the total commerce, it is said, probably 40 per cent should be credited to Carrabelle. In addition there was a large traffic in fish, oysters, coal, naval stores, and miscellaneous merchandise carried in vessels not required to report at the custom-house and of which

no accurate record is kept. It is said that this amounts to about 40,000 tons annually.[a]

St. Andrews Bay affords an excellent harbor, but is seldom visited except by local vessels and fishermen and a steamer operating between Mobile and Apalachicola, which touches at points on the bay. It has some commerce with Pensacola, including shipments of lumber in barges.[b]

PENSACOLA.—Pensacola is an important commercial city of the Gulf coast. It is situated on Pensacola Bay, which is connected with Escambia and East bays, and through Santa Rosa Sound with Choctawatchee Bay. Over these connecting waters and their tributaries large quantities of lumber and timber are brought to Pensacola for shipment.

The Escambia River flows from Alabama (where it is known as the Conecuh River) into Escambia Bay, and is navigable for small craft of light draft. Out of this river rafts of logs and timber are brought to Escambia on the bay and then towed to Pensacola. Blackwater River, a tributary of East Bay, is navigable for a short distance above Milton, Fla., from which point boats ply to Pensacola towing lighters of lumber.

The Choctawhatchee River and its tributary, the Holmes River, flow into Choctawhatchee Bay. From these rivers there is ome commerce by boats plying between points in the bay and Pensacola. These boats tow logs and barges of lumber and carry naval stores and general produce, and take back shipments of general merchandise from Pensacola.[c]

A coastwise line operating between Apalachicola and Mobile touches at points on St. Andrews Bay and Pensacola. No regular steamship line operates from Pensacola to domestic Atlantic ports. There is a considerable bunker trade at Pensacola in bituminous coal from mines on the Louisville and Nashville Railroad, and formerly there was some coastwise trade in coal to Galveston in sailing vessels and steamers. Several lines of transatlantic freight steamships run from Pensacola, loading lumber, naval stores, phosphate rock, cotton, grain, tobacco, and packing-house products. Some of these commodities come to Pensacola by the local water routes noted above, but the larger part originate on the line of the Louisville and Nashville Railroad.

The total water-borne commerce of Pensacola is of considerable importance. In 1906 the custom-house records show that 373 ves-

[a] Report of Chief of Engineers, U. S. Army, 1907, pt. 2, p. 1339.
[b] United States Coast Pilot, Part VIII, pp. 68–69.
[c] Ibid., pp. 71, 72.

sels arrived, with a total tonnage of 663,090 tons, but two-thirds of these and a larger proportion of the clearances were in the foreign trade. Foreign exports for the year ended June 30, 1903, amounted to $13,741,540, and this had increased to $20,229,414 in 1907, mostly exports of commodities noted above. No imports were reported in 1903, but in 1907 they amounted in value to $618,363. Shipments in American vessels in 1906 were 56,130 tons, mostly grain and lumber; receipts in American vessels were 123,632 tons, mostly lumber and naval stores. In the local traffic there were reported for 1906, 94 steam and 33 sail vessels, with a total tonnage of 5,956.

Section 3. Mobile Bay and tributaries.

Mobile Bay is of considerable commercial importance. It is the approach by water to the city of Mobile and the entrance to the Mobile River, through which the commerce of the Alabama and Tombigbee rivers and their tributaries seeks an outlet to the Gulf.

MOBILE, ALA.—Mobile, at the head of Mobile Bay, on the western shore of the mouth of the Mobile River, is one of the important commercial cities on the Gulf. Several steamship lines ply regularly to ports in Central America, Mexico, and Cuba, and a number of tramp steamers run to Europe. A steamship line operates between Mobile and New York; and there is also regular steamer service between Mobile, Pensacola, St. Andrews, Millville (reaching all points on St. Andrews Bay), and Apalachicola, Carrabelle, and Tampa, Fla. Besides these several steamboats run to points on Mobile Bay and a number of lines, handling package freight, to points on the Alabama and Tombigbee rivers.

The more important commodities handled at Mobile include lumber and timber, cotton, and coal. No records are available to show the lumber and timber receipts at Mobile. The coastwise shipments of lumber from Mobile are small compared with those sent to foreign ports. The reason for this is apparently the shorter distance from South Atlantic lumber-shipping ports to the eastern markets, and because the other ports on the Gulf saw their own lumber. The Mallory Line to New York, however, takes considerable lumber to that port. Schooner shipments of lumber for car sills are made to Camden, N. J., and Philadelphia, Pa., and were formerly made to Baltimore, Md., and Wilmington, Del. Several schooners owned at Mobile carry lumber to ports in the West Indies and South America.

Cotton is handled in considerable quantities at Mobile. A statement of the cotton receipts at Mobile by river and by rail for the

cotton years ended August 31, 1898 to 1907, is shown in the following table:

TABLE 101.—RECEIPTS OF COTTON AT MOBILE, ALA., YEARS ENDED AUGUST 31, 1898–1907.

[Compiled from annual statements of Mobile Cotton Exchange.]

From—	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.
	Bales.	*Bales.*	*Bales.*	*Bales.*	*Bales.*	*Bales.*	*Bales.*	*Bales.*	*Bales.*	*Bales.*
Alabama River	35,865	38,158	39,305	27,054	28,182	39,664	35,161	40,189	38,508	42,009
Tombigbee River	50,850	38,058	28,566	19,153	28,459	29,153	23,874	34,664	27,624	30,382
Warrior River	4,281	7,648	6,122	1,501	1,858	1,088	452	2,174	1,271	1,509
Mobile and Ohio R. R.	84,277	64,382	51,861	15,023	29,974	65,828	59,814	105,041	60,900	64,565
Louisville and Nashville R. R.	112,345	39,633	48,507	44,499	43,593	51,416	34,524	75,520	44,204	45,194
Southern Ry.	72,838	73,384	34,732	22,835	22,731	26,159	44,964	56,143	45,290	42,989
Mobile, Jackson and Kansas City R. R.	.....	.....	.....	.....	2	402	153	11,946	29,804	28,290
Corrections	4,310	2,606	745	1,270	1,820	2,847	2,734	3,879	2,749	5,362
Total	364,766	263,869	209,838	131,335	156,619	216,557	201,676	329,556	250,350	260,300

It is claimed that before the building of railroads into the cotton-growing territories tributary, respectively, to Mobile and New Orleans, and before the great expansion of New Orleans as a cotton center, Mobile was the largest cotton-shipping port in the world, practically all the shipments being made by sailing vessels. The shipments of cotton from Mobile for the cotton years 1898 to 1907 are shown in the following table:

TABLE 102.—SHIPMENTS OF COTTON FROM MOBILE, ALA., YEARS ENDED AUGUST 31, 1898–1907.

[Compiled from annual statements of Mobile Cotton Exchange.]

By—	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.
	Bales.	*Bales.*	*Bales.*	*Bales.*	*Bales.*	*Bales.*	*Bales.*	*Bales.*	*Bales.*	*Bales.*
Ocean vessels, foreign	227,975	167,394	133,004	53,262	92,320	104,618	119,898	183,988	139,954	163,225
Vessels, coastwise	.....	1,108	19,233	532	67	54,589	48,681	82,344	74,309	61,911
Mobile and Ohio R. R.	6,794	14,691	7,473	3,781	937	467	1,256	56	397	1,715
Louisville and Nashville R. R.	124,648	74,086	52,534	59,294	59,960	53,654	26,267	53,138	28,771	24,755
Southern Ry.	889	4,035	100	10,896	2,194	409	450	3,399	671	5,533
Total	360,306	261,314	212,344	127,765	155,478	213,737	196,552	322,925	244,102	257,139

All coastwise shipments of cotton are now made by steamship line to New York. The development of coastwise shipments since 1898, especially since 1902, has been due to the establishment of the regular Mobile-New York steamship service.

Some thirty to thirty-five years ago, before there was rail connection between Mobile and New Orleans, bituminous coal that had been brought to New Orleans by river was brought to Mobile from New Orleans by schooner. The development of coal mining in Alabama and the building of railroads, however, brought the coal from the Alabama mines in competition with the river coal from New Orleans. At present it is said that this rail coal not only dominates the Mobile market, but it is cutting into the trade of the Pittsburg (river) coal at New Orleans. Most of the bituminous coal at Mobile is used in the bunker trade—i. e., coaling steamers—including some coal shipped for consumption to ports in Mexico and Central America. The receipts of anthracite coal at Mobile brought by schooners from Philadelphia amount to about 5,000 tons annually. Some of this anthracite is forwarded from Mobile by rail to New Orleans to supply dealers at the latter city.

Sand and gravel for the Mobile market are dredged from the beds of the Alabama, Tombigbee, and Warrior rivers and from Mobile Bay and River. A number of steamboats and barges are engaged in this trade. Other boats and barges handle coal, lumber, etc., around the harbor. Several small towboats, with headquarters at Mobile, are engaged on the bay and river in towing logs and lumber, and some of the boats do a towing business on Mississippi Sound and elsewhere on the Gulf.

As shown in the table below, foreign exports form much the larger part of the shipments by water at Mobile, but coastwise receipts are more important than the imports.

TABLE 103.—COASTWISE AND FOREIGN COMMERCE AT MOBILE, 1906, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army, 1907, pp. 1368-1369.]

Shipments.

Articles.	Tons.	Articles.	Tons.
Cotton	19,413	Cross-ties	1,224
Lumber and timber	88,093	Miscellaneous	20,268
Coal	650	Total coastwise	162,406
Gravel	16,000	Exports	956,948
Cedar strips	2,025	Total	1,119,354
Naval stores	2,463		
Hay and grain	12,270		

Receipts.

Phosphate	3,092	Naval stores	6,514
Anthracite coal	5,556	Logs	400
Fish and oysters	6,470	Miscellaneous	40,140
Cement	5,579	Total coastwise	139,319
Gravel	8,000	Imports	114,392
Cord wood	4,300	Total	253,711
Cross-ties	169		
Lumber and timber	59,099		

In addition to the above, 317,693 tons of bunker coal were furnished to outward-bound steamships. Water shipments to and from points on the Tombigbee and Alabama rivers, consisting of cotton, cotton seed, logs, provisions, feed, machinery, farm supplies, and manufactured goods, amounted in 1906 to 902,805 tons.

TABLE 104.—SHIPMENTS AND RECEIPTS IN AMERICAN VESSELS AT MOBILE, 1906, BY ARTICLES.

[United States Census Report on Transportation by Water, pp. 73–74.]

Articles.	Shipments.	Receipts.	Articles.	Shipments.	Receipts.
	Net tons.	*Net tons.*		*Net tons.*	*Net tons.*
Lumber	147,566	6,635	Naval stores	1,173	1,992
Cotton	15,383	22,638	Flour	2,536	2
Grain	18,937	501	Canned goods	736	3,038
Phosphate and fertilizer	15,612	21,200	Fruits and vegetables	410	890
Stone, sand, etc	6,286	.....	Miscellaneous	50,014	35,960
Cement, brick, and lime	591	4,814			
Coal	1,481	4,863	Total	260,725	102,533

RIVERS OF ALABAMA.—On the Alabama River steamers run regularly from Mobile to Montgomery, Ala., an estimated distance of 360 miles, making numerous landings for passengers and freight at intermediate points. There is also an extensive rafting business on the river. Selma is an important city on this river. Steamboats also go up the Tombigbee and its tributary, the Warrior River. Demopolis and Pickensville, Ala., and Columbus, Miss., are important points on the Tombigbee. Tuscaloosa, on the Warrior River, is of considerable commercial importance. Improvements are being made on the Warrior, which when completed will afford an outlet by river for coal and iron mined in the region drained by the Black Warrior River, as the upper course of the Warrior above Tuscaloosa is called. The cotton traffic on the Alabama, Tombigbee, and Warrior rivers has been mentioned.[a]

It is estimated that 40 per cent of the receipts at Mobile from the Alabama, Tombigbee, and Mobile rivers comes from the Alabama River. Large quantities of timber, saw logs, cord wood, etc., consisting of yellow pine, sycamore, cottonwood, poplar, and ash, are barged and rafted down the river to Mobile. No detailed statistics of its traffic by commodities are available, although the total during the year ended June 30, 1907, is estimated at 417,041 tons, consisting principally of cotton, cotton seed, fertilizer, grain, lumber,

[a] See p. 126.

shingles, naval stores, staves, and a large quantity of miscellaneous freight.[a]

On the Coosa River, a tributary to the Alabama, there is considerable traffic between Rome, Ga., and Lock No. 4, about 26 miles below Greenport, Ala. The commerce of this portion of the Coosa consists chiefly of cotton, cotton seed, fertilizer, timber, lumber, staves, grain, and miscellaneous articles, which amounted to 124,078 tons during the fiscal year ended June 30, 1907. From Lock No. 4 to Wetumpka the Coosa River has never been navigable, on account of numerous rapids, but there is a small commerce in the rafting of logs and square timber, of which no reliable estimate is available. For the Oostenaula and Coosawattee rivers, Georgia, tributaries of the Coosa, no commercial statistics are at hand, although it is said that light-draft boats make occasional trips from Rome, Ga., to Carters Landing, at the head of navigation on the Coosawattee River, when the stage of the water permits their passage under the numerous low bridges over these streams.

The original project for the improvement of the Coosa River contemplated the opening of a continuous water route from the Mississippi River to the Atlantic Ocean by way of the Ohio, Tennessee, Coosa, Etawah, Ocmulgee, and Altamaha rivers, with canals to the Coosa from the Tennessee, and to the Ocmulgee from the Etawah, a tributary of the Coosa. This was known as the "southern route." The project was never carried to completion.[b]

The Tombigbee River is navigable for steamboats as far up as Columbus, Miss., and for rafts to Walkers Bridge, Miss. Its commerce consists principally of cotton, cotton seed, logs, timber, breadstuffs, fertilizer, farm supplies, provisions, machinery, and general merchandise. During 1906, 414,932 tons of these commodities were handled on the river between Demopolis and the mouth of the river; 9,775 tons between Columbus, Miss., and Demopolis; and 1,000 tons above Columbus, the latter consisting of heading bolts and general merchandise.[c]

At Demopolis the Warrior River enters the Tombigbee. That river, as previously stated, is known as the Black Warrior above Tuscaloosa, and is an important commercial stream leading from the coal fields of northern Alabama. When improvements in the river are completed through shipment of coal to Mobile, impracticable at present, is likely to assume considerable proportions. The commercial statistics of traffic passing certain completed locks and dams of the

---

[a] Report of Chief of Engineers, U. S. Army, 1907, pp. 366, 1359.
[b] Ibid., pp. 367, 1361–1363.
[c] Ibid., pp. 1377–1379.

river during the fiscal year ended June 30, 1907, are shown in the following table:

TABLE 105.—COMMERCE THROUGH LOCKS ON THE WARRIOR RIVER, YEAR ENDED JUNE 30, 1907, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army, 1907, pp. 1381–1382.]

Articles.	Lock No. 7.	Lock No. 8.	Lock No. 9.	Lock No. 10.	Lock No. 11.	Lock No. 12.	Lock No. 13.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Coal	2,587	2,607	2,607	2,772	2,728	2,852	.....
Corn	115	115	.....	.....	.....	.....	.....
Flour	34	34	.....	.....	.....	.....	.....
Cotton	206	206	.....	.....	.....	.....	.....
Hay	2	7	.....	.....	.....	.....	.....
Cotton seed	202	202	.....	.....	.....	.....	.....
Stone	14,784	15,491	15,491	16,355	16,107	14,825	.....
Logs	400	6,200	1,989	129	369	189	149
Lumber	2,654	2,492	2,508	833	506	506	152
Fertilizer	480	480	.....	.....	.....	.....	.....
Oats	14	17	.....	.....	.....	.....	.....
General and miscellaneous merchandise	68	97	76	39	20	50	1
Total	21,546	27,948	22,671	20,128	19,730	18,422	302

The total freight tonnage passing through each of these locks during the fiscal years ended June 30, 1905, 1906, and 1907, is shown in the following table:

TABLE 106.—COMMERCE THROUGH LOCKS ON THE WARRIOR RIVER, FISCAL YEARS ENDED JUNE 30, 1905–1907.

[Report of Chief of Engineers, U. S. Army, 1907, pp. 1383–1384.]

Year ended June 30—	Lock No. 7.	Lock No. 8.	Lock No. 9.	Lock No. 10.	Lock No. 11.	Lock No. 12.	Lock No. 13.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1905	12,953	18,613	21,242	20,801	23,380	22,893	.....
1906	14,322	15,405	12,531	10,948	10,132	10,132	3,180
1907	21,546	27,948	22,671	20,128	19,730	18,422	302

In addition to the commerce passing through the locks there is some coal traffic in the pool between Locks Nos. 12 and 13 and a considerable movement of logs in the pool between Locks Nos. 7 and 8, no accurate record of which is available.

Section 4. The Gulf coast and rivers of Mississippi.

The part of the Gulf lying south of the State of Mississippi between the mouth of Mobile Bay and Lake Borgne is known as the Mississippi Sound. On the shore of the sound or its tributaries are Moss Point, Scranton, Biloxi, and Gulfport, and other towns, from which consid-

erable lumber and some naval stores are shipped. At Pass Christian there is a little trade in fish, oysters, coal, and building material. The shore line is paralleled from Mobile Bay by the tracks of the Louisville and Nashville Railroad.

Pascagoula Harbor is one of the principal lumber shipping points on the Gulf coast. Many vessels, mostly foreign, clear from here, and most of the lumber that is loaded from Ship Island Harbor is towed there from the Pascagoula River. This river is formed by the junction of the Chickasahay and Leaf rivers. Above the town of Moss Point the Pascagoula River is important only as a waterway for logs and timber, which are rafted to sawmills near the mouth of the river. The town of Pascagoula itself has little commercial importance. At Scranton, however, there is some trade with Mobile, New Orleans, and towns along the sound, and lumber is shipped. An important point on Mississippi Sound for the shipment of lumber is Moss Point, which has rail communication with Scranton, where connection is made for New Orleans, Mobile, and other points.

The Pascagoula River is navigable for boats of 5 feet draft at low water as far up as Cedar Creek, a distance of about 55 miles. The principal movement on the upper river and on its tributaries, the Leaf and the Chickasahay rivers, is of logs and timber, which are sawed at mills on the lower Pascagoula and the lumber loaded at the mills or towed in lighters to vessels lying at anchor in Pascagoula and Ship Island harbors for shipment to foreign and domestic ports. These lumber shipments are made in considerable volume. In the first three columns of Table 107 is shown the traffic originating on each stream; in the fourth column are shown the shipments from the lower Pascagoula, of which the greater part are shipments of lumber, referred to above. At Horn Island Pass, near the mouth of the Pascagoula River, 352 vessels are reported as passing out in 1906, carrying about 185,044 tons of lumber.

TABLE 107.—COMMERCE OF CERTAIN RIVERS OF MISSISSIPPI, 1906, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army, 1907, pp. 1387-1389.]

Articles.	Leaf River.	Chickasahay River.	Upper Pascagoula River.	Shipments from lower Pascagoula River.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Logs, timber, and lumber	177,750	168,125	238,500	438,271
General merchandise	50	200	5,000	.....
Turpentine	.....	.....	1,600	1,680
Rosin	.....	.....	5,000	6,625
Charcoal	.....	.....	10,000	18,000
Total	177,800	168,325	260,100	464,576

Biloxi Bay has some trade in lumber, wood, charcoal, and oysters. Biloxi is a port of some importance. At Gulfport is the terminus of the Gulf and Ship Island Railroad, operating to Jackson, Miss., and there are large shipments of lumber and timber, mostly for export.

The number and class of vessels passing in and out of the dredged channel between Gulfport and Ship Island Harbor during 1905 and 1906 are shown in the following table:

TABLE 108.—VESSEL MOVEMENT AT GULFPORT CHANNEL, 1905 AND 1906.

[Report of Chief of Engineers, U. S. Army, 1907, p. 1394.]

Class of vessel.	1905.		1906.	
	Arrivals.	Departures.	Arrivals.	Departures.
Steamships	96	84	117	103
Square-rigged vessels	77	76	64	77
Schooners	75	89	55	74
Total	248	249	236	254

The following shows the total exports and imports at Biloxi and the Gulfport Channel for 1906:

TABLE 109.—FOREIGN COMMERCE AT BILOXI AND GULFPORT CHANNEL, 1906.

[Report of Chief of Engineers, U. S. Army, 1907, pp. 1392–1393.]

	Exports.	Imports.
	Tons.	*Tons.*
Biloxi Harbor	24,668	52,746
Gulfport Channel	680,062	63,930

According to the census receipts at Gulfport in American vessels for 1906 were 346,096 tons, of which 328,860 tons were lumber and 14,990 tons naval stores. Shipments in American vessels were 48,061 tons, of which 42,703 tons were lumber. The total shipments of lumber for the fiscal year 1906-7 were 306,374,000 feet.[a]

The Wolf and the Jordan rivers enter the Gulf through Bay St. Louis. In 1906 the traffic on these rivers included 41,062 tons of lumber, 9,050 tons of naval stores, and 3,753 tons of general merchandise, a total of 53,865 tons.[b]

The Pearl River, which empties into the Rigolets, the passage connecting Lake Pontchartrain and Lake Borgne, is navigable for light-draft steamers to Monticello, Miss., and when the river is high to Edinburg. From a few towns at short distances above the mouth of the river lumber and naval stores are shipped, principally to New

[a] Moody's Manual 1908, p. 366.

[b] Report of Chief of Engineers, U. S. Army, 1907, p. 1394.

Orleans. The traffic movement on the river below Rockport, Miss., for the year 1906, included 52,512 tons of lumber, 8,686 tons of naval stores, and 2,222 tons of general merchandise. On the river between Jackson and Edinburg about 425 tons of miscellaneous articles were moved.[a]

Section 5. New Orleans as a Gulf port.

Situated on the Mississippi River, about 100 miles from the Gulf of Mexico, New Orleans possesses commanding advantages as a Gulf port. The port facilities for the handling of cargoes are excellent. Rail lines from the West, Southwest, North, and East converge here, and from New Orleans there are regular lines of steamers to Mexico, Central America, Panama, Tampa, Havana, Porto Rico, Baltimore, New York, and European ports, besides many tramp vessels, thus affording transportation facilities for all kinds of exports and imports. In the foreign trade New Orleans is an important port of import for the products of Central and South America and the West Indies, including such commodities as coffee, bananas, cocoanuts, pineapples, and other tropical fruits, which are shipped through New Orleans to all parts of the United States.

As a port of export New Orleans is also of large importance, particularly in the export of cotton. The excellent river and rail facilities from many parts of the South make New Orleans the port of export for the cotton grown in a considerable portion of the southern territory. In the export of grain New Orleans also enjoys an extensive trade. Large elevators have been erected by railroads along the river front, from which shipments are made to European, West Indian, and Central and South American ports.

Of the coastwise steamship traffic at New Orleans the most important is that to and from New York, including Pacific coast traffic over Southern Pacific lines. From New Orleans to New York the cargoes are made up of cotton, rice, citrus fruits and other agricultural products, lumber, sugar, molasses, wines, liquors, salt, and rubber. From New York the shipments consist of general merchandise, machinery, iron and steel products, wire, building materials, cordage, bagging, etc. A line between New Orleans and Baltimore began operations in the summer of 1907 as an experiment. The ships of this line carry freight exclusively, consisting of canned goods, southbound; and rice, sugar, lumber and merchandise, northbound. A steamship line also runs between New Orleans and Tampa, Fla., touching at Mobile, Ala., and Carrabelle, Fla. The westbound cargoes of the line consist of phosphate rock; the eastbound cargoes are of a miscellaneous nature, including flour, grits, canned goods, wine, salt, lard, rice, sugar, and other commodities of a similar character.

[a] Report of Chief of Engineers, U. S. Army, 1907, pp. 1396–1397.

The following table shows the total receipts and shipments by water at New Orleans during the years 1905 and 1906. This table shows not only the foreign and coastwise freight movement, but also the traffic on the Mississippi and the local waterways, i. e., bayous, canals, etc.

TABLE 110.—TOTAL WATER-BORNE COMMERCE AT NEW ORLEANS, 1905 AND 1906, BY ARTICLES.

[Compiled from reports of Chief of Engineers, U. S. Army.]

Articles.	1905.	1906.	Articles.	1905.	1906.
	Tons.	*Tons.*		*Tons.*	*Tons.*
Grain and its products	733,866	854,951	Stone, sand, and gravel	6,756	150,000
Cotton	583,990	553,378	Oil	262,793	439,527
Cottonseed and its products	399,147	305,164	Miscellaneous and unclassified	539,720	628,995
Live stock	7,522	7,772	Total	5,104,798	5,702,496
Coal and coke	1,053,204	864,453	Passengers carried	21,967	24,132
Lumber	345,160	502,186			
Logs	298,858	366,872			
Iron, steel, and metals	78,836	43,677			
Groceries and provisions	794,946	895,521			

Of the total water-borne commerce at New Orleans the larger part, as shown below, is in the foreign trade; river commerce is second in importance;[a] and the coastwise trade is the least of the three divisions of water-borne traffic.

The following table shows the coastwise commerce for 1906 in detail:

TABLE 111.—COASTWISE AND FOREIGN COMMERCE AT NEW ORLEANS, 1906, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army. 1907, p. 1417.]

Shipments.

Articles.	Tons.	Articles.	Tons.
Coastwise:		Coastwise—Continued.	
Mineral products	122,250	Salt	8,840
Lumber	57,157	Wine	3,060
Rice	55,406	General and miscellaneous	54,465
Sugar	39,164	Total coastwise	391,337
Cotton	27,696	Exports	2,572,300
Cotton seed	389	Total	2,963,637
Oil, crude	12,960		
Flour	9,950		

Receipts.

Coastwise:		Coastwise—Continued.	
Oil	65,758	Phosphate	1,160
Coal	18,846	General and miscellaneous	199,604
Iron and steel	7,443	Total coastwise	302,771
Gasoline	6,256	Imports	770,186
Mineral products	2,004	Total	1,072,957
Sugar	1,700		

[a] See p. 324.

The following table shows the coastwise shipments and receipts in American vessels at New Orleans for 1906, according to the census. This shows a much larger movement than shown in the previous table, especially in shipments of miscellaneous merchandise and receipts of lumber and stone and sand. On the other hand, the census statistics of river traffic at New Orleans are less than those from other sources. (See p. 324.)

TABLE 112.—COASTWISE SHIPMENTS AND RECEIPTS IN AMERICAN VESSELS AT NEW ORLEANS, 1906, BY ARTICLES.

[United States Census Report on Transportation by Water, pp. 73-74.]

Articles.	Shipments.	Receipts.	Articles.	Shipments.	Receipts.
	Net tons.	*Net tons.*		*Net tons.*	*Net tons.*
Lumber	55,263	148,176	Flour	16,605	.....
Petroleum and other oils	25,983	73,398	Naval stores	24	15,475
Stone, sand, etc	.....	551,827	Phosphate and fertilizer	2,827	5,308
Cement, brick, and lime	490	21,355	Ice	1,970	.....
Pig iron and steel rails	1,431	15,403	Canned goods	823	1,056
Coal	3,419	12,631	Tobacco	560	50
Cotton	45,459	7,885	Miscellaneous merchandise	508,766	308,170
Grain	62,294	50			
Fruits and vegetables	15,707	22,079	Total	741,621	1,182,863

LOUISIANA CANALS.—The numerous short canals of southern Louisiana contribute to some extent to the water-borne commerce of New Orleans. The Bayou Teche section of southern Louisiana is connected with the Mississippi River at New Orleans by the Barataria and Lafourche ("Company") Canal and Harveys Canal. Through the former of these canals, Bayou Barataria, and various other lakes and bayous, Houma, on Bayou Terrebonne, is reached by small boats, and an extension is contemplated to Morgan City, on Grand Lake. Small steamers, gasoline boats, luggers, and skiffs carry through the canal lumber, sugar, moss, molasses, produce, fish, oysters, and game. No records are kept of the annual tonnage movement on these waterways.

About 10 miles below New Orleans the Lake Borgne Canal connects Lake Borgne with the Mississippi River. This canal is one of the largest artificial waterways in Louisiana, shortening the water distance between Mobile and New Orleans by 60 miles. It was originally built to bring the coal, lumber, brick, and building material from Alabama and Gulf ports to New Orleans. Owing to financial difficulties the career of the canal has been a checkered one, and its operation has been of comparatively little commercial importance. No information of the traffic passing through the canal is available, but it is expected that on the completion of the improvements now being made by the United States Government in the Warrior and

Black Warrior rivers in Alabama an all-water route via the Lake Borgne Canal will be available to New Orleans from the coal fields of Alabama. At the mouth of Lake Borgne, on the Mississippi River, a large coaling plant has been erected for coaling ocean steamships, but owing to the failure of an effort to enlarge the port limits of New Orleans in order to make the use of this coaling plant practicable the operation has been unprofitable.

At New Orleans two canals run into the heart of the city from Lake Pontchartrain. These are the Old and New Basin canals. These canals are unimportant factors in transportation at present. Only light-draft vessels can navigate their waters, and, as they do not connect with the Mississippi River, their traffic is limited to a local trade in such products as logs and lumber, charcoal, bricks, shells, and oysters that are brought to New Orleans from the shore of Lake Pontchartrain and the neighboring country. The traffic on the Louisiana canals near New Orleans is reported by the Census at 683,900 tons in 1906, of which 500,000 tons are reported for the New Basin Canal, which is probably too high.

Section 6. Louisiana rivers and bayous.

LAKE PONTCHARTRAIN AND TRIBUTARIES.—Lake Pontchartrain has considerable commerce in lumber, brick, tiles, etc., carried by small schooners and steamers between New Orleans and various landings on the lake and its tributaries. The most important tributary of the lake is the Chefuncte River. The waters from Lake Maurepas and its tributaries, the Tickfaw and the Amite rivers, also empty into Lake Pontchartrain. From these two rivers there is considerable trade in lumber, cotton, and naval stores to New Orleans by schooners and steamers, by way of the Old and New Basin canals. The receipts and shipments of these rivers and of the Chefuncte River in 1906 are shown in the following table:

TABLE 113.—COMMERCE ON TRIBUTARIES TO LAKE PONTCHARTRAIN, 1906, BY ARTICLES.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907, pp. 1434-1436.]

Articles.	Chefuncte River and Bogue Falia.	Tickfaw River and tributaries.	Amite River and Bayou Manchac.
	Tons.	*Tons.*	*Tons.*
Lumber, logs, etc.	33,953	32,245	42,534
Sand, brick, and clay	189,692	.....	1,824
Naval stores	1,354	.....	.....
Live stock	462	35	22
Cotton	222	42	[a]2,147
General and miscellaneous	10,044	2,368	4,142
Total	235,727	34,690	50,669

[a] Including cotton seed.

The statement of vessels entering and leaving these rivers in 1906 is shown in the following table:

TABLE 114.—VESSEL MOVEMENT ON TRIBUTARIES TO LAKE PONTCHARTRAIN, 1906.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907, pp. 1434-1436.]

Class of vessel.	Chefuncte River and Bogue Falia.			Tickfaw River and tributaries.			Amite River and Bayou Manchac.		
	Number.	Trips.	Net tonnage.	Number.	Trips.	Net tonnage.	Number.	Trips.	Net tonnage.
Steamers	12	1,788	345	3	537	126	8	315	296
Sailing vessels	33	1,099	643	12	234	287	26	484	578
Barges	31	1,246	2,599	1	2	100	2	11	158
Total	76	4,133	3,587	16	773	513	36	810	1,032

WEST OF NEW ORLEANS.—The coast between the Southwest Pass, one of the mouths of the Mississippi River, and the entrance to Atchafalaya Bay is low and broken by numerous passes which lead from the Gulf to the network of bays and bayous traversing the country west of the Mississippi River. These inland waters are navigable only for small, light-draft vessels. There are no towns along the coast and no harbors that can be used by vessels of over 8 feet draft, even under favorable conditions.[a]

Barataria Bay, 35 miles southwest of South Pass, another of the entrances to the Mississippi River, is frequented only by fishermen and oystermen. This trade is to New Orleans in steamers and luggers of 3 to 4 feet draft through the bayous and canals connecting the bay with the Mississippi.

Bayou Lafourche was an outlet of the Mississippi River, with which it formed a junction at Donaldsonville, La., 70 miles above New Orleans. Navigation is obstructed at present by a dam placed across the head of the bayou at its junction with the Mississippi by the levee boards of the State of Louisiana, under authority of Congress. The bayou is now navigable for its entire length by flatboats and log rafts. Most of the freight is transported on flatboats towed by mules.

Bayou Terrebonne is navigable from its mouth to Houma, La., a distance of about 23 miles. The connection of Houma with the Mississippi by canal is mentioned above. No statistics of the commerce on Bayou Terrebonne are available.

The Atchafalaya River and the town of Morgan City, La., are approached through Atchafalaya Bay and the Atchafalaya River, which empties into the head of the bay. The river is the outlet for numerous bayous and several lakes, which form a passage to the Mississippi River and New Orleans suited to steamers of 3 feet draft all the year. During high water 8 feet can be taken through.

[a] United States Coast Pilot, Part VIII, p. 98.

Grand Lake, Pigeon Bayou, Grand River, and Bayou Plaquemine form parts of a system of waterways. Prior to 1867 the largest steamboats could pass from the Mississippi River through Bayou Plaquemine to Grand Lake, but at that time the bayou was closed by a dam shutting out the waters of the Mississippi. The opening of Bayou Plaquemine, for which a project is under construction, is expected to assure more completely the connection of the Atchafalaya River with the Mississippi, thus giving greater transportation facilities.

At Morgan City there is some trade in oysters and lumber. Steamers of from 3 to 6 feet draft run irregularly up the river to landings on the bayous and to the Mississippi River and down the river to Cote Blanche and Vermilion bays.[a] No statistics of this commerce are available.

Bayou Teche is an important commercial stream of southern Louisiana, finding its outlet into the Gulf of Mexico through the Atchafalaya River. It is navigable to St. Martinsville, La., 75 miles from its mouth. The maximum draft that can be carried is about 4 feet.

The statistics of commerce in 1906 on Bayou Lafourche, Bayou Plaquemine, Grand River, and Pigeon Bayou, and Bayou Teche are shown in the following table:

TABLE 115.—COMMERCE ON SPECIFIED LOUISIANA BAYOUS, 1906, BY ARTICLES.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907.]

Shipments.

Articles.	Bayou Lafourche.	Bayou Plaquemine, Grand River, and Pigeon Bayou.	Bayou Teche.	Articles.	Bayou Lafourche.	Bayou Plaquemine, Grand River, and Pigeon Bayou.	Bayou Teche.
	Tons.	*Tons.*	*Tons.*		*Tons.*	*Tons*	*Tons.*
Cane		20,900	130,000	Cotton			443
Sugar	9,106		50,621	Cotton-seed products			552
Molasses			8,043				
Lumber, logs, etc		151,000	8,752	Rice			91
Fuel oil			17,996	Miscellaneous	4,142	75,100	43,080
Coal			2,000				
Brick			55,383	Total	13,248	247,000	316,961

Receipts.

Fuel oil	33,792	325,000	114,716	Miscellaneous	4,781		14,173
Coal	219		2,725				
Lumber, logs, etc			219,451	Total	38,844	325,000	389,130
Cane			35,000				
Fertilizers	52		3,065	Total commerce	52,092	572,000	706,091

[a] United States Coast Pilot, Part VIII, p. 99.

A boat of 5 feet draft can go from the Atchafalaya River through East and West Cote Blanche bays into Vermilion Bay. In West Cote Blanche Bay there is a landing at Cote Blanche at which an occasional steamboat from Morgan City lands to deliver freight or passengers.

Vermilion Bay is an indentation of the Gulf coast, its principal tributary being the Vermilion River. A draft of from 3 to 5 feet can be taken up the river to Abbeville. Petite Anse Bayou empties into the bay from the northward and is the approach to the salt mines at Averys Island, from which, however, the salt is now shipped by rail. The town of Grand Cote is situated near the north end of the bay and can be reached by vessels of 4 feet draft.

A few miles west of Vermilion Bay the Mermentau River enters the Gulf. This river and its principal tributary, Nezpique Bayou, are navigable for small steamers of 4 feet draft. Only small schooners and barges which are engaged in the local coasting trade enter the river from the Gulf, their greatest draft being $5\frac{3}{4}$ feet. The Mermentau River is navigable throughout its whole length to about 2 miles above Mermentau, a distance of about 70 miles; Bayou Nezpique, the principal tributary, is navigable to Viterboville, La., a distance of about 25 miles above the head of the Mermentau River; Bayou Plaquemine Brule and Bayou des Cannes are each navigable for about 10 miles.

About 78 miles east of Galveston entrance, Calcasieu River and Lake empty into the Gulf of Mexico through Calcasieu Pass. The most important town on Calcasieu River is Lake Charles, La., about 50 miles above the entrance to the pass. From Lake Charles considerable lumber is shipped both by rail and by river. Above the town, river navigation is confined to light-draft steamers and towboats, the latter being engaged in towing logs to the sawmills at Lake Charles. At Lake Charles are several railroads.

A project for an inland waterway from Franklin, La., to Mermentau, La., was adopted by Congress in 1907. The proposed channel is to connect with the bayou Teche near Franklin, thence to Cote Blanche and Vermilion bays by a dredged canal and existing drainage canals or bayous, thence up Schooner Bayou, thence by a dredged canal to Grand Lake, and across this lake to Lake Misere, west of the Mermentau River.

The commerce of Bayou Vermilion, the Mermentau River and tributaries, and the Calcasieu River in 1906 is shown in the following table:

TABLE 116.—COMMERCE ON SPECIFIED LOUISIANA RIVERS, 1906, BY ARTICLES.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907, pp. 1438–1442.]

Articles.	Bayou Vermilion.	Mermentau River and tributaries.	Calcasieu River.
	Tons.	*Tons.*	*Tons.*
Shipments:			
Rice	1,800	10,498	3,000
Cane	15,000	.....	.....
Sugar and molasses	2,000	.....	.....
Cotton and cotton seed	7,500	1,240	890
Lumber, wood, etc.	750	3,700	15,657
Cattle	300	608	.....
Miscellaneous	.....	517	4,446
Total	27,350	16,563	23,993
Receipts:			
Logs, etc.	375	24,000	286,000
Fuel oil	1,000	16,068	[a] 2,100
Merchandise	750	1,110	1,500
Miscellaneous	2,550	3,893	642
Total	4,675	45,071	290,242
Total commerce	32,025	61,634	314,235

[a] Includes coal.

Section 7. Texas ports and rivers.

PORT ARTHUR AND SABINE, TEX.—Fifty-two miles eastward from the entrance to Galveston Bay is situated Sabine Pass, the Gulf outlet of Sabine Lake and its two tributaries, the Sabine and Neches rivers. From Sabine and Port Arthur, Tex., on the lake, large shipments of petroleum, both crude and refined, are made. This petroleum comes to these ports through pipe lines from the oil fields of eastern Texas and from Kansas and Indian Territory, and is shipped by tank vessels in large quantities to New York and Philadelphia, and also to numerous other Atlantic and foreign ports.[a]

Shipments of lumber, cotton, and cotton-seed products are also made to foreign and domestic ports. The commercial statistics of the harbor at Sabine Pass for 1905 and 1906 are shown as follows:

TABLE 117.—VESSEL MOVEMENT AT PORT ARTHUR AND SABINE, TEX., 1905 AND 1906.

[Reports of Chief of Engineers, U. S. Army.]

Class of vessel.	1905.			1906.		
	Number.	Trips.	Net tonnage.	Number.	Trips.	Net tonnage.
Steamers	68	561	953,964	111	452	827,733
Sailing vessels	32			50	71	76,192
Barges	24			21	184	290,176

[a] For destination of petroleum shipments, see page 41.

TABLE 118.—WATER-BORNE COMMERCE AT PORT ARTHUR AND SABINE, TEX., 1905 AND 1906, BY ARTICLES.

[Reports of Chief of Engineers, U. S. Army.]

Shipments.

Articles.	1905.	1906.
	Tons.	*Tons.*
Crude petroleum	1,088,758	931,010
Refined petroleum	439,589	569,475
Lumber, logs, etc	173,444	246,732
Corn, wheat, and rice	18,568	72,541
Cotton and cotton-seed meal	32,443	31,308
Asphalt, pitch, etc	8,832	29,318
Staves, shingles, etc	9,400	2,208
Riprap stone	.....	12,279
Sulphur	.....	360
Flour	187	28
Miscellaneous	526	254
Total	1,771,747	1,895,513

Receipts.

Creosote oil	5,158	5,476
Coal	1,125	2,100
Machinery, iron, barrels, etc	1,431	1,200
Miscellaneous	493	100
Total	8,207	8,876

Shipments of petroleum.

[Monthly Summary of Commerce and Finance, December, 1907, p. 1209.]

Trade.	1906.	1907.
	Barrels.	*Barrels.*
Domestic	9,309,910	7,664,008
Foreign	1,393,440	1,066,115
Bunker oil	83,501	78,127
Total	10,786,851	8,808,250

Both Sabine and Port Arthur have rail connections with Beaumont, Tex. At Port Arthur is the head of the Port Arthur Ship Canal, 7 miles in length and 25 feet in depth, leading along the western shore of Sabine Lake, being separated from the latter by a narrow strip of land. This canal was acquired by the United States December 13, 1906.

The Neches River empties into the northwestern end of Sabine Lake and is navigable for steamers of 3 feet draft for about three months in the year to Bevilport, a distance of about 135 miles. Beaumont, the largest city on the river, is situated about 27 miles

above the mouth of the river. Beaumont is an important center of the petroleum industry. It has several lines of railroad.

The Sabine River enters the northeastern end of Sabine Lake, forming the boundary line between Texas and Louisiana for a considerable distance. The river is navigable during three months of the year for a considerable distance above its mouth.

Statistics of the traffic of the Neches and Sabine rivers for the calendar year 1906 are shown in the following table:

TABLE 119.—COMMERCE ON NECHES AND SABINE RIVERS, 1906, BY ARTICLES.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907, p. 1445.]

Articles.	Neches River.	Sabine River.	Articles.	Neches River.	Sabine River.
Shipments:	*Tons.*	*Tons.*	Receipts:	*Tons.*	*Tons.*
Lumber	19,800	62,500	Logs	60,000	336,000
Sand, shells, and gravel	86,000	10,000	Merchandise	150	150
Fuel oil	10,530	.....	Miscellaneous	706	50
Rice	.....	842			
Miscellaneous	1,470	328	Total	60,856	336,200
Total	117,800	73,670	Total commerce	178,656	409,870

GALVESTON BAY AND TRIBUTARIES.—Galveston is the principal port of the State of Texas and one of the most important on the Gulf coast. The bar at the harbor entrance has been improved by jetties and dredging. The harbor may properly be divided into an outer and inner harbor, the former including the deep water between the inner parts of the jetties and between Bolivar and Fort points, the latter being a deep, narrow slough, about 200 yards wide, which leads from the outer harbor (Galveston entrance) along the north shore of Galveston Island and northern front of the city of Galveston for a distance of about $3\frac{1}{2}$ miles. Both harbors afford good anchorage and during the winter months furnish refuge for coasting vessels.

The city of Galveston, situated near the eastern end of Galveston Island, has a large foreign trade in cotton, cotton-seed products, and grain, and an important coastwise trade in cotton, sugar, coal, and general merchandise. Several lines of coasting steamers make regular trips to ports on the Atlantic coast, and its coastwise trade is larger than at any other United States port on the Gulf of Mexico. Galveston is also a terminus for several railroad lines running through the interior of the State and does a large wholesale business in supplies for the adjacent country.

For several years after the civil war Galveston was the only port of entrance and exit to central, middle, and a large part of eastern Texas. Some small business was done at Corpus Christi

and Brownsville, but Galveston was then, as now, the chief port in Texas, and at that time practically all the cotton produced in the State, except that shipped down the Red River to New Orleans, was handled at Galveston, but it took only one small steamer each week and a few schooners plying between Galveston, New York, and Boston to carry the whole crop from Galveston. Wagons brought the cotton to Houston, whence it was shipped to Galveston through Buffalo Bayou. The modern barge was then unknown. Steamboats plied between Houston and Galveston, their decks piled high with the products of the State coming to Galveston or with merchandised goods from Galveston. In those days there were no railroads or telegraphs. The great bulk of Texas-grown cotton was purchased outright by Galveston merchants or sent to Galveston for sale. The wholesale merchants sold direct to the New York, Boston, or Philadelphia merchant or to the New England spinners.

Early in the seventies, however, the Houston and Texas Central Railway was completed to Denison, thus forming a through line to St. Louis, and thence to all points in the United States. The Texas and New Orleans road, connecting Houston and New Orleans, was completed shortly after, as was also the International and Great Northern. The completion of these rail lines revolutionized cotton transportation in Texas. Shippers were no longer dependent upon water transportation alone, but had the choice of several routes. The receipts at the smaller ports of the State dropped off, while Galveston alone remained as a cotton port.

The completion of the Houston and Texas Central Railway to Denison and its junction there with the Missouri, Kansas and Texas Railway opened the way to the grain fields of the West, and a spasmodic effort was made to export grain through Galveston. A small grain elevator was erected in 1875 and some shipments were made. Some of these shipments did not arrive in good condition, and shipments were abandoned, leading to the establishment of flour mills from which large shipments of flour are now made. Later the people of the West and Southwest joined with Galveston, and by their combined efforts large appropriations were made for the improvement of Galveston Harbor. New lines of railroad have been built in the territory north and west of Galveston, through Oklahoma, Kansas, Nebraska, etc., and the facilities for handling grain have been greatly improved. The result has been to attract to Galveston much grain for ocean shipment.

The water-borne commerce at Galveston for the calendar year 1906 is shown in the following tables. Most of this is carried by steamers, comparatively few sailing vessels entering and clearing at Galveston.

TABLE 120.—VESSEL MOVEMENT AT GALVESTON, 1906.

[Report of Chief of Engineers, U. S. Army, 1907, p. 1457.]

Class of vessel.	Foreign bound.			Coastwise.		
	Entered.	Cleared.	Total.	Entered.	Cleared.	Total.
Steamers	395	539	934	445	326	771
Sailing vessels	6	8	14	40	29	69

TABLE 121.—COASTWISE AND FOREIGN COMMERCE AT GALVESTON, 1906, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army, 1907, p. 1458.]

Shipments.

Articles.	Tons.	Articles.	Tons.
Coastwise:		Coastwise—Continued.	
Cotton	147,520	Manufactures of iron and steel	221
Ore	30,898	Flour	173
Wool	18,081	Cotton products	4,794
Sugar	104,789	Total coastwise	403,757
General merchandise	84,950	Exports	1,710,844
Grain	100		
Lumber and manufactures of wood	12,231	Total	2,114,601

Receipts.

Coastwise:		Coastwise—Continued.	
Coal	43,415	Sugar	30
General merchandise	298,777	Lumber and manufactures of wood	80
Manufactures of iron and steel	79,506	Total coastwise	426,971
Cement	5,092	Imports	59,893
Petroleum	40		
Wool	31	Total	486,864

TABLE 122.—SHIPMENTS AND RECEIPTS IN AMERICAN VESSELS AT GALVESTON, 1906, BY ARTICLES.

[United States Census Report on Transportation by Water, pp. 73-74.]

Articles.	Shipments.	Receipts.	Articles.	Shipments.	Receipts.
	Net tons.	*Net tons.*		*Net tons.*	*Net tons.*
Cotton	137,628	94,278	Canned goods	86	14,312
Grain	20,279	3,782	Cement, brick, and lime	134	13,865
Fruits and vegetables	64,262	26,262	Phosphate and fertilizer	61	1,647
Stone, sand, etc	52,003	71,586	Flour	856	.....
Lumber	19,265	21,779	Tobacco	402	.....
Pig iron and steel rails	257	161,462	Miscellaneous merchandise	430,470	462,057
Coal	1,795	50,390	Total	734,915	960,982
Petroleum and other oils	7,417	39,562			

It will be noticed that the above shipments and receipts in American vessels are much in excess of the coastwise traffic reported by

the United States Engineers. The Census figures include local commerce, and apparently there is considerable foreign trade at this port carried in American vessels.

A channel has been dredged between Galveston Harbor and Texas City, Tex. At Texas City the Texas City Terminal Company operates 4½ miles of track to Texas City Junction, where connection is made with the International and Great Northern; Missouri, Kansas and Texas; Southern Pacific; Galveston, Houston and Henderson; and Gulf, Colorado and Santa Fe railways. There is a line of steamships from Texas City to ports in Mexico and Yucatan.

Exports and imports for 1906 amounted to 58,258 tons, and the Texas City Terminal Company gives the commerce of the port for the same period at 84,315 tons.[a]

The San Jacinto River empties into the northwestern end of Galveston Bay. Boats from the bay enter the river through what is known as the Morgan Cut and Canal, consisting of a dredged cut about 4½ miles long and a canal about one-half mile long. Through this cut and canal the ship channel in Galveston Bay, the San Jacinto River, and the Buffalo Bayou (a narrow tidal stream which enters the San Jacinto at Lynchburg) large shipments of cotton are made from Houston to Galveston. These shipments are made mostly in barges of 5 feet draft. Partial commercial statistics for the calendar year 1906 show that the principal carriers in Buffalo Bayou carried 132,108 tons. This movement was made up of the commodities shown in the following table:

TABLE 123.—COMMERCE ON BUFFALO BAYOU, TEX., 1906, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army, 1907, p. 1464.]

Articles.	Tons.	Articles.	Tons.
Cotton	104,317	Gravel	148
Lumber	430	Bolts and nuts	15
Shells	2,016	Steel rails	257
Building material	4,000	Soap	96
Wood	1,000	Spikes	196
Rice	2,727	Chloride	17
Petroleum	3,100	Bank sand	10,535
Brick	250	Linseed oil	42
Burlap bags	15	Roofing slate	120
Coal	1,594	Rope	711
Stearine	18	Cotton bagging	32
Packing	37		
Roofing paper	404	Total	132,108
Ale	31		

The Trinity River, one of the largest rivers in the State of Texas, emptying into the northeastern end of Galveston Bay, is navigable at

[a] Report of Chief of Engineers, U. S. Army, 1907, p. 1460.

certain seasons of the year for a distance of about 120 miles by light-draft steamers. The trade from towns along this river is in cotton, cattle, and wood carried in vessels of 5 feet draft or less. Improvement of the river is projected to Dallas, 511 miles above the mouth.

During the calendar year 1906 the following commodities were taken out through the channel at the mouth of the Trinity River:

TABLE 124.—COMMERCE ON TRINITY RIVER, 1906, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army, 1907, pp. 1466–1467.]

Articles.	Quantity.	Articles.	Quantity.
Rice.....sacks..	29,000	Cotton and cotton seed.....tons..	9
Lumber.....tons..	50	Charcoal.....do....	200
General merchandise.....do....	5,000	Hides.....number..	50
Logs.....do....	10,000	Saw logs.....M feet..	6,000

In addition to this freight 500 cords of wood, valued at $2,000; general merchandise, valued at $25,000; eggs, chickens, and vegetables, $6,425; 300 head of hogs, $1,500, and moss, cedar, etc., $2,000, were taken out of Old River and the mouth of Trinity River, in addition to 10,000 barrels of fuel oil sent up the river.

BRAZOS RIVER TO THE RIO GRANDE.—The Brazos River, which enters the Gulf just south of Galveston Bay, is one of the largest rivers in the State of Texas, and during high stages of water has been ascended by light-draft steamboats to the town of Washington, a distance of about 218 miles. At ordinary stages of the river it is navigable for steamers of 3 feet draft to Bolivar Landing, 42 miles above the mouth. Cotton and cotton-seed products are shipped from the Brazos River, vessels loading to a draft of 12 or 13 feet. Although obstructed by a bar the mouth has been improved by jetties, between which there is a channel depth of 13 feet at mean low water.

Velasco, a town on the north bank of the Brazos River, 5 miles above its mouth, has good facilities for loading and discharging vessels. At Velasco is the Houston and Brazos Valley Railway, connecting at Anchor, Tex., with the International and Great Northern Railroad. Another town on the river is Brazoria, some 20 miles above Velasco. From Columbia and Bolivar Landing, on the river, shipments of cotton, cotton-seed products, and lumber are made by light-draft steamers to Velasco and Galveston.[a]

Steamers of 3 feet draft can pass between Galveston and points on the Brazos River through the Galveston and Brazos Canal, which enters the river about three-fourths of a mile from its mouth. It is reported that during the calendar year 1906, 352 vessels engaged in

[a] United States Coast Pilot, Part VIII, pp. 111–112.

carrying freight passed up and down through the canal, transporting 30 sacks of oats, 387 barrels oysters, 108 tons merchandise, 365 piles, 205,000 feet lumber, 18 carloads of furniture, 10 barrels honey, 205 cords brush, 500 pounds fish, 14 cords wood, 128 tons cotton, 7 tons cotton seed, and 50,000 shingles.

A long chain of bays and lagoons stretch along and just inside the coast of Texas from near the Brazos River southward to the Rio Grande.

A number of shallow bays are tributary to Matagorda Bay, a body of water some 45 miles long, lying south of the point where the Brazos River enters the Gulf and north of San Antonio Bay, with which it is connected by Espirito Santo Bay. With the exception of Lavaca Bay, which is the approach to the town of Port Lavaca, these bays are of no commercial importance, and are entered only by local fishermen and oystermen. Port Lavaca has some trade in lumber and general merchandise, which is carried in small schooners of about 5 feet draft. It has rail connection with the interior by the Galveston, Harrisburg and San Antonio Railway. Near the town of Matagorda, on the northern shore of Matagorda Bay, the Colorado River enters the bay, but, there being only 1 foot of water over the bar, passage between the bay and river for boats is impracticable.[a]

San Antonio Bay, to the south of Matagorda Bay, and adjoining waters, are used by small, flat-bottomed schooners and sloops, which carry lumber, cord wood, and cotton, the latter for shipment by rail at Port Lavaca or Rockport.

Aransas Bay connects with Corpus Christi Bay through a narrow channel known as Morris and Cummings Cut at its southern end, where it has been improved by dredging, and Corpus Christi Bayou at its northern end. The cut and bayou have a combined length of about 5 miles and a depth of about 6½ feet. The principal entrance from the Gulf to Aransas and Corpus Christi Bay, however, is by Aransas Pass. At Rockport, a small town on the west shore of Aransas Bay, is a branch of the San Antonio and Aransas Pass Railway.

The city of Corpus Christi is situated on the west shore of Corpus Christi Bay. From Corpus Christi the San Antonio and Aransas Pass Railway runs to San Antonio, Waco, Houston, and other points in the interior; a branch of the St. Louis, Brownsville and Mexico Railway runs to Robstown, where connection is made with the main line, and the Texas-Mexican Railway, a part of the National Lines system of Mexico, extends to Laredo, Tex., where it crosses the Rio Grande and connects for points in Mexico. There is said, however, to be but little commerce at Corpus Christi.[b]

---

[a] United States Coast Pilot, Part VIII, p. 113. [b] Ibid., p. 115.

A project was approved by Congress in 1907 for an inland waterway along the coast of Texas, embracing the improvement of the Galveston and Brazos River Canal; a channel from Aransas Pass to Pass Cavallo, including the Guadalupe River to Victoria, and the channel of Turtle Cove from Aransas Pass to Corpus Christi. The object of this improvement is to secure and maintain a navigable channel to the depth of 5 feet along the coast of Texas, utilizing the lagoons lying between the islands and the mainland, affording navigation for light-draft steamers and barges to the coast country of Texas.[a]

A narrow, shallow lagoon, known as Laguna Madre, leads from Corpus Christi Bay to Point Isabel. This lagoon has only a few inches of water in some places, and, so far as known, is not navigable through its whole length, even for small boats, except during high stages of water.

A short distance north of the Rio Grande is the town of Brazos Santiago. At this point there is a shifting bar which is usually impassable for all vessels from August to December, and during the remainder of the year only when there is no sea or swell can vessels of 6 feet draft enter. The steamers making trips to Brazos Santiago usually lighter their freight outside the bar to a shallow-draft, stern-wheel steamer which lands at Isabel. At Point Isabel the Rio Grande Railroad runs to Brownsville, at which point connection is made with the St. Louis, Brownsville and Mexico Railway, which practically parallels the coast from Brownsville to Galveston and Houston.

The Rio Grande has a least navigable depth of about 4 feet to the city of Brownsville, a distance of about 50 miles, but the channel is narrow and tortuous and the mouth of the river is obstructed by a shifting bar. An occasional pleasure boat is the only craft entering the river from the Gulf, but a steamer runs regularly between Brownsville and Rio Grande City, farther up the river.[b]

---

[a] Report of Chief of Engineers, U. S. Army, 1907, p. 443.

[b] United States Coast Pilot, Part VIII, p. 116.

CHAPTER VI.

GREAT LAKES—MOVEMENT OF COMMODITIES.

Section 1. General characteristics and total traffic.

The principal characteristics of Lake commerce are the preponderance of eastbound over westbound shipments, strikingly shown by an examination of the statistics of commerce passing through the St. Marys Falls Canals, and the fact that it is largely bulk traffic, composed in the main of a few commodities, namely, iron ore, grain, coal, and lumber. There is considerable movement of package freight, both local and through, but this is comparatively small as contrasted with the enormous bulk-freight traffic represented by the crude products of contiguous mines, forests, and grain fields. In addition to iron ore, grain, coal, and lumber, there is also some movement of copper east, and of manufactured iron and salt west.

A third characteristic is that, notwithstanding the large number of Lake ports, about a dozen receive and ship the greater portion of water-borne freight. The most important of these are Duluth-Superior, Two Harbors, Ashland, and Marquette, on Lake Superior; Chicago, Milwaukee, Escanaba, and Gladstone, on Lake Michigan; Detroit, on the Detroit River; and Toledo, Cleveland, Ashtabula, Erie, Buffalo, and Tonawanda, on Lake Erie.

The fourth general characteristic is that through traffic constitutes the greater part of the total traffic. The main course of this lies between the western extremity of Lake Superior and the southern shore of Lake Erie. From a group of ports, of which Duluth-Superior and Two Harbors are the most important, the paths of Lake Superior traffic converge into the main trunk route of the Lakes. Its course passes out of Lake Superior through St. Marys River into and along the entire length of Lake Huron, thence via the St. Clair Flats Canal and St. Clair and Detroit rivers into Lake Erie. There it terminates by ramification to a number of ports stretched along the southern shore of Lake Erie from Detroit to Buffalo.

Over this main trunk line passes by far the heaviest traffic of the Lakes. During 1906 domestic shipments from Lake Superior amounted to 41,584,905 net tons, more than one-half of the total domestic Lake

traffic. Of this amount 35,503,324 net tons, or more than 85 per cent, was through east-bound traffic for delivery at Lake Erie ports. Of a total reverse movement to Lake Superior of 10,166,175 tons, 9,497,293 tons, or more than 90 per cent, constituted through west-bound traffic from Lake Erie. About 65 per cent of the aggregate domestic Lake shipments for 1906 passed over this route.

A second main trunk route is formed by through traffic between Lake Michigan and Lake Erie. This traffic originates principally between Chicago, Milwaukee, and Escanaba. It passes out of Lake Michigan through the Straits of Mackinac, joining the main trunk line on its course through Lake Huron.

Over the above-described routes passes the principal portion of the ore, grain, and coal traffic on the Lakes. Many other routes are formed by both interlake and intralake traffic. Some of these cross, while others parallel or join the trunk lines for distances of varying length, reaching both the American and Canadian shores. Among the important Canadian branches from the main trunk routes and also local Canadian routes may be mentioned those running to Parry Sound, Owen Sound, and Collingwood, on Georgian Bay, and to Montreal via the St. Lawrence River.

The movement of intralake traffic is heavier on Lake Michigan than on any other of the Great Lakes. This is probably due to its location wholly within the borders of the United States.

Two water routes connect the Great Lakes with the Atlantic Ocean. One passes through the Welland Canal on the Canadian side into Lake Ontario, thence through the St. Lawrence River. The other passes from Lake Erie through the Erie Canal and Hudson River. In point of tonnage moved the American route is by far the more important.

The total Lake traffic has not been obtained prior to 1889. The total amount of shipments, according to the census of that year, was 25,266,974 net tons. The Bureau of Statistics has reported the total domestic Lake traffic at United States ports for a number of years. The net tons of shipment reported for the year 1901 were 45,138,000, and receipts 45,007,000. Compared with 1907, there has been a remarkable increase in the total movement. Domestic shipments have risen to 83,507,000 and domestic receipts to 81,124,000 net tons during the period.

As shown in the following table, summarizing the domestic Lake traffic from 1905 to 1907, iron ore constitutes the largest proportion of the traffic, from 54.4 to 56.5 per cent, and also represents the greater part of the increase. Of the total difference between Lake shipments in 1905 and 1907, namely, 16,161,000 tons, iron ore constituted 8,994,000 tons, or 56 per cent. Coal is the second item in volume, furnishing from 19.8 to 25.8 per cent of the total, and

6,859,000 tons, or 42 per cent, of the increase in shipments from 1905 to 1907. These two items together constitute about 80 per cent of the domestic traffic and 98 per cent of the entire increase of domestic shipments from United States ports.

Flour, wheat, and other grain have constituted from 6.1 to 7 per cent of the domestic Lake traffic. Lumber and logs furnish from 3.7 to 6.6 per cent of the domestic freight tonnage, but this movement is decreasing in volume. The traffic in other commodities shown separately has remained about stationary, while miscellaneous freight has formed about 8 per cent of the total.

TABLE 125.—TOTAL DOMESTIC SHIPMENTS AND RECEIPTS ON THE GREAT LAKES, 1905–1907, BY ARTICLES.

[Compiled from Monthly Summary of Commerce and Finance.]

Articles.	1905.		1906.		1907.	
	1,000 net tons.	Per cent of total.	1,000 net tons.	Per cent of total.	1,000 net tons.	Per cent of totsl.
Shipments:						
Coal	14,666	21.8	17,575	23.2	21,525	25.8
Flour	1,257	1.9	1,335	1.8	1,315	1.6
Wheat [a]	1,020	1.5	1,432	1.9	1,900	2.3
Grain other than wheat [b]	2,409	3.6	2,258	3.0	1,960	2.4
Manufactured snd pig iron [c]	775	1.1	1,035	1.4	787	.9
Sslt	565	.8	568	.7	558	.7
Copper [c]	135	.2	131	.2	119	.1
Iron ore [c]	36,621	54.4	41,297	54.6	45,615	54.6
Lumber and logs	4,269	6.3	3,993	5.3	[d] 2,761	3.3
Miscellaneous freight [e]	5,629	8.4	5,986	7.9	[f] 6,967	8.3
Total	67,346	.....	75,610	.....	83,507	.....
Receipts:						
Coal	12,914	19.8	15,533	21.2	19,468	24.0
Flour	1,247	1.9	1,338	1.8	1,314	1.6
Wheat [a]	1,028	1.6	1,459	2.0	1,874	2.3
Grain other than wheat [b]	2,158	3.3	2,004	2.7	1,776	2.2
Manufactured and pig iron [c]	729	1.1	1,044	1.4	778	1.0
Salt	548	.8	555	.8	560	.7
Copper [c]	133	.2	140	.2	118	.1
Iron ore [c]	36,609	56.0	41,319	56.5	45,572	56.2
Lumber and logs	4,317	6.6	3,852	5.3	3,013	3.7
Miscellaneous freight [e]	5,712	8.7	5,934	8.1	6,651	8.2
Total	65,395	.....	73,178	.....	81,124	.....

[a] Converted from bushels on basis 1 bushel equals 60 pounds.

[b] Converted from bushels on basis 1 bushel barley equals 48 pounds; 1 bushel oats equals 32 pounds; 1 bushel corn equals 56 pounds; 1 bushel rye equals 56 pounds.

[c] Converted from gross to net tons.

[d] Logs included in miscellaneous freight.

[e] Includes flaxseed converted from bushels on basis 1 bushel equals 56 pounds.

[f] Includes flaxseed and logs.

The absence of complete statistics prior to 1901 precludes the discussion of the total traffic earlier than that date; but the movement of the most important commodity, that of iron ore, can be shown from its inauguration, and the main features of the movement of grain and flour and of lumber and coal can be shown by shipments and receipts at certain ports of first importance and by the movement through the St. Marys Falls canals.

Section 2. Movement of iron ore.

The United States has, since 1890, taken the first place among the world's iron producers. This was made possible by the development of the wonderful iron-ore deposits of Michigan, Wisconsin, and Minnesota, near Lake Superior, and by Great Lakes waterways connecting these deposits with the Pittsburg mills and the neighboring coal measures. Of the total domestic production of iron ore, aggregating more than 47,000,000 tons in 1906, approximately 80 per cent was transported by way of the Great Lakes, forming the principal traffic movement thereon.[a]

This source of ore supply—the Lake Superior region—is the most important iron district in the world. Nearly the entire production of this region is derived from five areas or ranges located near the borders of Lake Superior—the Marquette, in Michigan; the Menominee and Gogebic, in Michigan and Wisconsin; and the Vermilion and Mesabi, in Minnesota. Other less important ranges situated on either side of the American-Canadian boundary line are located within its limits.

From the mines ore is hauled by rail to five Lake ports—Duluth-Superior, Two Harbors, Ashland, Marquette, and Escanaba—the rail distance varying from 12 to 90 miles. The nearest of these shipping ports is about 550 miles by lake from Cleveland, one of the principal centers of distribution to the furnaces, and the most distant of them 300 miles farther away.

By reason of improved canal facilities, deepened channels, and perfected mechanical devices for loading and unloading cargo, transportation cost has been reduced on these great waterways to a point probably below that reached for a similar service in any other part of the world. So completely has machinery replaced manual labor that ore from some mines is practically never touched by the ordinary hand shovel until it reaches its destination. The ore is dug and loaded into gondola cars by means of steam scoops, automatically dumped into hopper-like containers, run into the holds of vessels, and transported to the southern shores of lakes Erie and Michigan. There the ore is unloaded from vessels by mechanical devices, for

[a] Mussey, Combination in the Mining Industry, p. 81; Mineral Resources, 1906.

use at Lake ports or for distribution by rail to inland furnaces. This highly organized system of handling and transporting ore has been an exceedingly important factor in influencing the growth of Lake shipments. Its present state of efficiency seems the more remarkable when compared with transportation methods of less than sixty years ago. It is made possible by the enormous localized supply, deep and open water routes, and a largely concentrated demand.

In 1854 the only method of transportation between the mines and the Lakes was by sleigh. During the summer season the wagon roads, such as existed, were next to impassable. From the dock ore was loaded on the decks of vessels by means of wheelbarrows. At St. Marys Falls it was unloaded, carried around the rapids on a strap railroad equipped with cars drawn by horses, and again wheeled aboard vessels and taken to the lower Lake ports. This strap road, completed in 1851, was the first railroad of any kind built in the Upper Peninsula of Michigan.[a]

On June 18, 1855, the primitive strap road around the rapids was rendered useless by the opening of the Sault Ste. Marie Canal. Meantime a similar road was built between the mines and Marquette. Longitudinal sleepers with strap rails were laid and horse cars were run, carrying ore at a nominal rate of $1 a ton. Its capacity was very much limited, however, as each team made but one round trip a day.

In 1857 the railroad, incorporated as the Iron Mountain Railroad, ultimately becoming a part of the Marquette, Houghton and Ontonagon, was finished from Marquette to the mines, a distance of about 16 miles. At the terminus of this road was built, in 1858, the first pocket system of ore loading in the world. It consisted of a series of 8 or 10 pockets with chute attachments. The pockets held only a few tons each and were small in comparison with the immense structures of to-day, whereby 10,000 to 13,000 tons may be deposited in the hold of a vessel in a few hours.

Eleven years elapsed before the second ore-carrying road was built in the Superior region. This road connected the mines with Lake Michigan. In December, 1864, the Chicago and Northwestern opened its Peninsula line from Negaunee to Escanaba, a distance of 62 miles, at the same time building an ore dock with pockets having a capacity of 20,000 tons and unloading directly into vessels without shoveling.

By this time transportation facilities had been greatly improved, the canal had been built around St. Marys Falls, and the railroad to Marquette gave an outlet by way of the same, while the railroad to Escanaba gave an outlet by way of the Straits of Mackinac.

---

[a] The Hon. Peter White, p. 76.

SHIPMENTS BY RANGES.—The remarkable development of the great Superior region has been accomplished within a comparatively short time. Fifty odd years ago the production of two crudely worked mines afforded the entire supply of iron-ore shipments. In 1907 the ore from five great ranges which passed down the Lake amounted to more than 41 million tons. In showing the growth of ore shipments and the influence of this region upon Lake traffic the principal ranges or areas from the reserves of which it is drawn are treated in the order of their development.

The Lake Superior iron ranges are so called because the ores are, without exception, found along the low ranges of hills which run in general a little north of east, roughly paralleling the Lake shore. Of the five ranges above mentioned the Marquette is distinguished as the pioneer district, the Mesabi as the most recently developed and the most highly productive, the Menominee as covering the largest area of any range except the Mesabi, the Vermilion as the smallest of the five, and the Gogebic as the producer of the richest ores.

Marquette range.—The mines of the Marquette, the oldest and most thoroughly explored range, extend from Palmer, Negaunee, and Ishpeming about 25 miles west of Michigamme Lake, with a tongue running south 10 miles from Champion to Republic. The easternmost mines are some dozen miles from Marquette, and the most distant have a haul of 36 miles. This iron belt is from 3 to 10 miles wide. The Duluth, South Shore and Atlantic, a branch of the Canadian Pacific, and the Lake Superior and Ishpeming railroads carry their ores to Marquette, while the Peninsula branch of the Chicago, Milwaukee and St. Paul Railway takes some ore all rail to Milwaukee.[a]

According to Mineral Statistics of Michigan for 1880, the first shipment of ore was made in 1850. A period of more or less retarded development lasted until 1863. From that year, however, to 1873 the Lake Superior mines evidenced a wonderful growth. In 1863 but 3 mines shipped ore; in 1873 the number had risen to 40.

Immediately following the close of the civil war a great impetus was given to the iron industry by increased activity in railroad and other building. The annual shipments of iron by a more or less unsteady ascent passed the 100,000 mark for the first time in 1860. By 1864 they had increased to 250,000, and to a little more than 1,000,000 tons in 1873. The mines had not yet, however, really been brought into relation with the iron market. The Lehigh Valley, and not Pittsburg, was still the iron center of the United States.

Menominee range.—The Menominee range extends from Waucedah, about 40 miles west of Escanaba, on both sides of the Menominee

[a] Combination in Mining Industry, p. 39

River, west and north to Iron River and Stambaugh, a distance of some 50 miles. Its ore goes out over the Chicago and Northwestern Railway to Escanaba, a haul of from 43 to 72 miles. The Chicago, Milwaukee and St. Paul Railway also taps this district. Although iron was known to exist on this range as early as 1846, it was not opened until 1872 and not materially developed until 1877. During the following year 94,245 tons had been shipped, and in 1879 shipments rose to almost 270,000 tons, and have continued to the present day to be an increasingly valuable source of material wealth.

The panic of the year 1873 caused a temporary suspension of development in the ore region and a decline in shipments, but after 1875 shipments steadily increased. In 1879 for the first time they slightly exceeded those for 1873, and by 1882 the total shipments had risen to nearly 3,000,000 tons.

Gogebic and Vermilion ranges.—The Gogebic range extends from Gogebic Lake, east of Bessemer, Mich., for about 30 miles west. The iron-bearing formations are, over a large part of its length, very narrow. In the autumn of 1885 the Milwaukee, Lake Shore and Western was finished from the mines to Ashland, and the Gogebic started with shipments of over 100,000 tons. By 1887 the output was more than 1,700,000 tons, and by 1892, 3,000,000 tons. Shipments are made chiefly over the Chicago and Northwestern and the Wisconsin Central railroads to Ashland, the length of the haul varying from 39 to 59 miles. A small quantity of ore is shipped by way of Escanaba, a haul of about 90 miles.

The Vermilion range extends about 25 miles from Tower to Ely, 80 miles directly north of Duluth. This range contains great deposits of rich iron, largely Bessemer ore, with 3 or 4 per cent more iron, and also somewhat more phosphorus than the famous Gogebic hematite.

In 1882 the Minnesota Iron Company began building the Duluth and Iron Range Railroad, 68 miles, between Two Harbors and Tower. A great ore dock was built at Two Harbors and shipments were commenced in 1884, a year before the Gogebic. But the output increased slowly and did not reach the million mark until 1892. The ore of this range was so hard that it had to be blasted with dynamite and nitroglycerin and run through a crusher. Owing to the nature of this ore, it soon proved profitable to employ the underground method of operating.

The contribution from these two new ranges, the improved methods of mining, manufacturing, and carrying, and the improvement of waterways connecting Lakes Superior and Huron combined to increase shipments of ore from a little less than 3,000,000 in 1882 to 9,500,000 tons in 1892. Of this last amount the Gogebic contributed approximately 3,000,000 tons, the Marquette 2,800,000, the Menominee about

2,400,000, and the Vermilion over 1,000,000, while the newly discovered Mesabi contributed about 29,000 tons.

Mesabi range.—The Mesabi is the greatest iron-ore range in the world. It lies between Grand Rapids, on the Mesabi River, and Birch Lake, a distance of about 100 miles. Its width varies from 2 to 10 miles. In 1892 the first shipment left the mines via the Duluth, Mesabi and Northern Railroad, just completed at that time. Shipments from this range pass over the Great Northern, the Duluth, Mesabi and Northern, and the Duluth and Iron Range railroads to the ports of Duluth-Superior and Two Harbors. By 1895 the shipments were larger than from any of the older ranges, and they are now larger than those of the other ranges combined.

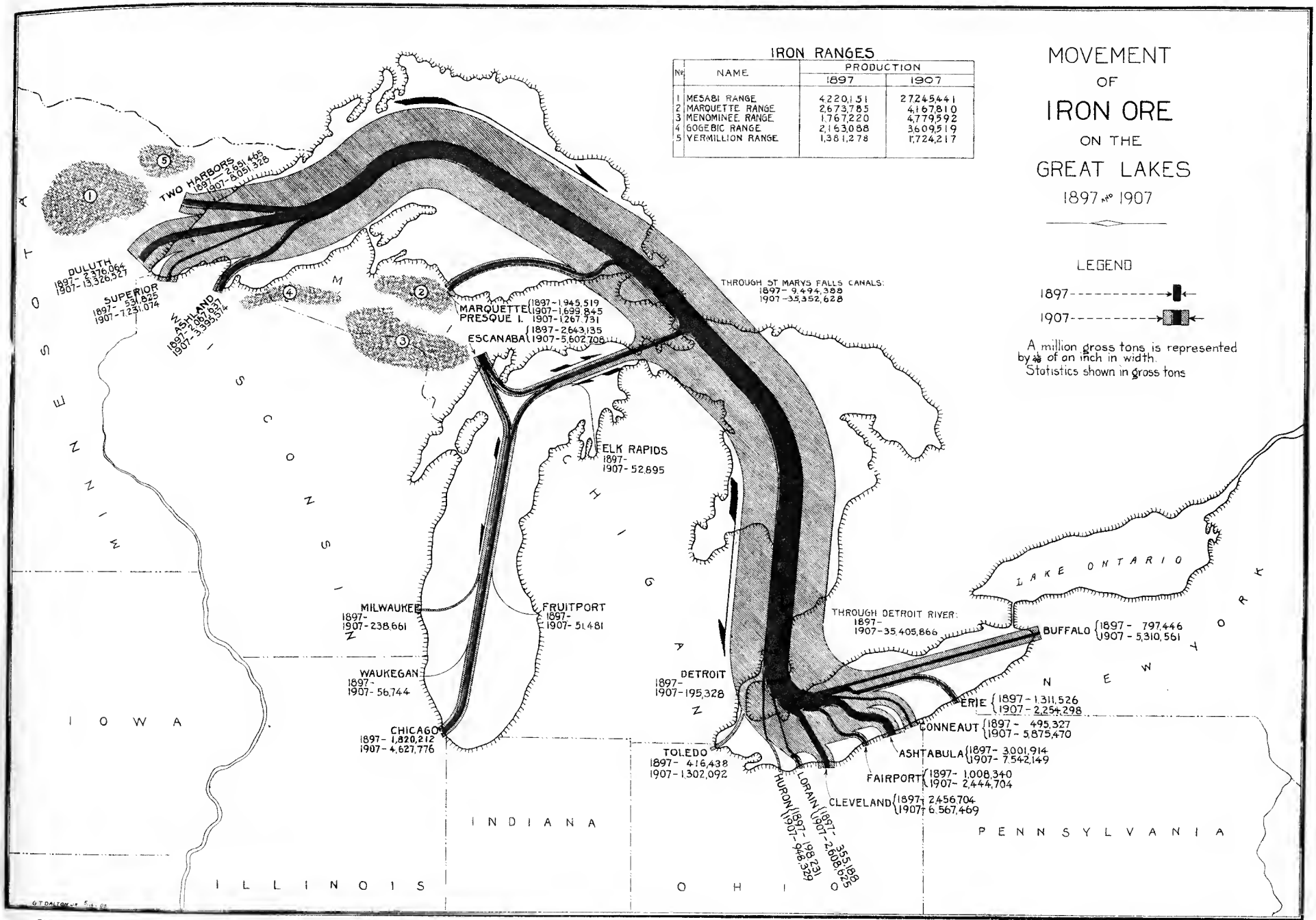
The reserves of the Mesabi range are supposed to be twice as great as those of the old ranges combined, and the method of mining is much less expensive. Continuous railway-track connections in some instances extend from the interior of the mine to the ore docks at the lake. Under such conditions standard-gauge tracks are laid to the mines, which consist of open cuts worked in terraces. By a single operation of a steam shovel 4 to 6 tons of ore are removed from the cut and dumped into the same car which carries it to the lake.

During the panic year of 1893 the total shipments of ore from these ranges dropped to about 6,500,000 tons, but in 1896 they had risen to approximately 10,500,000 tons. By this time the connecting waterways of Lakes Superior and Huron had again been improved, to the extent of providing a through depth of 20 feet below mean water level.

The effect of these improvements, the low cost of production on the Mesabi range, and the control of mines, furnaces, and transportation agencies by combinations of leading interests is plainly read in the gigantic growth of Lake transportation of iron ore during the ten years following.

In 1897 shipments of iron ore increased from 10,500,000 to approximately 12,000,000 tons. Each succeeding year shipments continued to increase until 1902, when they reached a little less than 27,000,000 tons. Due to overproduction of ore and a slackened demand for the manufactured product, shipments fell to a little more than 20,000,000 in 1904, only to rise again to approximately 33,500,000 in 1905; 37,500,000 in 1906; and 41,500,000 in 1907.

The map facing this page is intended to supplement the figures of shipments and receipts for this period. Some idea of the remarkably increased growth in the Lake movement in iron ore during these ten years can be gained by comparing the narrow shading, which represents the movement for 1897, with the wider shading, which represents the increased movement for 1907.



FIGURES FOR ESCANABA INCLUDE SHIPMENTS FROM GLADSTONE.

TABLE 126.—PRODUCTION OF IRON ORE IN SPECIFIED YEARS, 1855–1907, BY RANGES.

[Years 1855 to 1884 from H. K. Mussey, Combination in the Mining Industry (shipments); years 1889 to 1907 from Mineral Resources of the United States.]

Year.	Marquette range.	Menominee range.	Gogebic range.	Vermilion range.	Mesabi range.	Total.
	Gross tons.	*Gross tons.*	*Gross tons.*	*Gross tons.*	*Gross tons.*	*Gross tons.*
1855	1,449	.....	.....	.....	.....	1,449
1860	114,401	.....	.....	.....	.....	114,401
1865	236,208	.....	.....	.....	.....	236,208
1870	830,940	.....	.....	.....	.....	830,940
1875	891,257	.....	.....	.....	.....	891,257
1877	1,004,682	10,405	.....	.....	.....	1,015,087
1880	1,316,552	592,193	.....	.....	.....	1,908,745
1884	1,558,032	895,634	1,022	62,124	.....	2,516,813
1889	2,631,026	1,876,157	2,147,923	864,508	.....	7,519,614
1890	2,863,848	2,274,192	2,914,081	891,910	.....	8,944,031
1891	2,778,482	1,856,124	2,041,754	945,105	.....	7,621.465
1892	2,848,552	2,402,195	3,058,176	1,226,220	29,245	9,564,388
1893	2,064,827	1,563,049	1,466,815	815,735	684,194	6,594,620
1894	1,935,379	1,255 255	1 523,451	1,055,229	1,913,234	7,682,548
1895	1,982,080	1,794,970	2,625,475	1,027,103	2.839.350	10,268,978
1896	2,418,846	1,763,235	2,100,398	1,200,907	3,082,973	10,566,359
1897	2,673,785	1,767,220	2,163,088	1,381,278	4,220,151	12,205,522
1898	2,987,930	2,275,664	2,552,205	1,125,538	4,837,971	13 779 308
1899	3,634,596	3,281,422	2,725,648	1,643,984	6,517,305	17,802 955
1900	3,945,068	3,680,738	3,104,033	1,675,949	8,158,450	20,564,238
1901	3,597,089	3,697,408	3,041,869	1,805,996	9,303,541	21,445,903
1902	3,734,712	4,421,250	3,683,792	2,057,532	13,080,118	26,977,404
1903	3,686,214	4,093,320	3,422,341	1,918,584	13,452,812	26,573,271
1904	2,465,448	2,871,130	2,132,898	1,056,430	11,672,405	20,198,311
1905	3,772,645	4,472,630	3,344,551	1,578,626	20,156,566	33,325,018
1906	4,070,914	4,962,357	3,484,023	1,794,186	23,564,891	37,876,371
1907	4,167,810	4,779,592	3,609,519	1,724,217	27,245,441	41,526,579

SHIPPING AND RECEIVING PORTS.—Following is the development and relative rank of shipping and receiving ports through which this traffic is handled:

Marquette was an ore-shipping port before 1855, and until 1864 was the single outlet through which passed the entire production of Superior ore. Its importance has diminished, however, with the recent development of other ore ranges. By 1897 shipments from Marquette had not quite reached 2 million tons, placing this port next to the smallest in the region, a position which it afterwards occupied in 1907, the annual shipments in that year from Marquette and Presque Isle together not having reached 3 million tons.

Ore was first shipped from Escanaba in 1864. The position of this port was third in rank, with approximately 2⅓ million tons in 1897. In 1907 it shipped 5,594,708 tons, but had dropped to fourth place. The beginning of ore shipments from Two Harbors and Ashland was during 1885. Two Harbors occupied first and Ashland fourth position with respect to volume of shipments in 1897. Those

from the former port exceed 2½ million tons and those from the latter port slightly more than 2 million tons. During the ten years following Two Harbors gained an increase of approximately 5½ million tons, and annual shipments therefrom were only exceeded by those from Duluth. Ashland dropped to fifth place during the same period, after having made a comparatively slight gain of something more than 1¼ million tons.

The most remarkable increase was made by Duluth and Superior. Superior started in 1892, a year earlier than Duluth, and was the smallest of the important ore-shipping ports in 1897, having sent out in that year only a little over a half million tons, but by 1907 was the third greatest ore port of that region, with shipments exceeding 7 million tons.

Shipments from Duluth were large from the first, those of the second year practically equaling the amount sent out by the older ports. In 1897 they reached more than 2¼ million tons, being slightly exceeded by Two Harbors. But the effect of the enlargement of the St. Marys Falls Canal, and the wonderful development of the Mesabi range, which in 1907 had increased the annual shipments from Duluth to more than 13 million tons, gave this port the lead of all others in the Lake Superior region, and created what is probably the greatest ore-shipping port in the world.

The great bulk of the ore mined in the Lake Superior region goes to Lake Erie, although the Lake Michigan ports are important factors, particularly in supplying furnaces at Chicago and vicinity and Milwaukee. Shipments are received at Detroit, Mich., and on Lake Erie at Toledo, Sandusky, Huron, Lorain, Cleveland, Fairport, Ashtabula, and Conneaut, Ohio, Erie, Pa., and Buffalo and Tonawanda, N. Y. At Detroit, Toledo, Lorain, Cleveland, Buffalo, and Tonawanda there are furnace plants, but the greater portion of the iron ore received at the various ports is carried south and southeast to such iron centers as Ironton, Ohio, Wheeling, W. Va., Youngstown, Ohio, Sharon, Pa., and adjacent territory (Pittsburg, Johnstown, and Punxsutawney), and also to some eastern Pennsylvania and New Jersey furnaces, particularly those of the Susquehanna, Lehigh, and Schuylkill valleys. In fact, Lake Superior iron ore has been and is still shipped to tide water in competition with foreign ores.

As has been shown, the shipping ports are small in number and confined within a comparatively small area, while the receiving ports are more numerous and stretched over considerable territory on Lake Michigan and Lake Erie. In comparing the relative importance of receiving ports it may be stated that many and varying conditions tend to influence the volume of ore shipment. Prime factors among these are the policies of and interests controlling railroads serving these ports, natural and artificial harbor advantages, and the location of new and the improvement of old plants.

As an example of the first-mentioned factor, Conneaut, during the period covered by Table 127, made a greater increase than any other port. The Bessemer and Lake Erie Railroad is owned by the United States Steel Corporation, the largest shipper of iron ore on the Lakes, and, owing to its position as Lake terminus of this road and to the control of the road by this corporation, Conneaut has risen within ten years from a comparatively insignificant position to the third leading receiving port of the Lakes. In 1897 its receipts were less than a half million tons, and by 1907 they had reached almost 6 million tons. It may be noted here that Erie, which is also a terminus of this road, made the smallest increase of any Lake port; its receipts equaled a little more than 1¼ millions in 1897, and increased less than a million tons in 1907, thereby dropping from the fourth to the eighth rank.

The advantage of harbor facilities has placed Ashtabula, a purely ore-distributing center, in the lead of all other Lake receiving ports, over 7½ million tons being delivered there in 1907. Cleveland, the oldest and at one time the most important receiving port, is served by more railroads than Ashtabula, but it is at a disadvantage by reason of its poorer harbor facilities, boats being required to dock in the river. Improvements are now under way, however, to overcome this disadvantage. Nevertheless, Cleveland, being both an ore distributing and consuming center, has maintained her position as the second most important receiving port on the Lakes. Receipts increased from a little less than 2½ million tons in 1897 to more than 6½ million tons in 1907.

The influence of location with respect to plants inaugurated within the period covered by the table is clearly illustrated in the changed relative rank of Buffalo and Lorain. At Buffalo from 1901 to 1907 two new plants were established, while the capacity of an old plant was increased, namely, the Lackawanna Company built seven stacks with a capacity of over a million tons, the Buffalo and Susquehanna Company built two stacks within the same period having a capacity of about 225,000 tons, and the Buffalo Union Furnace Company increased their plant capacity by building one stack in 1899, and another in 1901, the two having a capacity in 1907 of 135,000 tons. Thus, by reason of increased consumption of ore, Buffalo rose from sixth place in 1897, with receipts at about three-quarters of a million tons, to fourth place in 1907, having received during that year more than 5¼ million tons. The rise of Lorain from ninth to sixth rank, with an increase of approximately 2¼ million tons, and of Toledo and Detroit from practically nothing in 1897 to 1,300,000 in the case of the former and to approximately 200,000 in the case of the latter, is due to the building of new and the improvement of old furnace plants.

The only important ore-receiving ports on Lake Michigan are Chicago, from which the ore is distributed principally to plants in the

immediate vicinity, and Milwaukee, at which port are located furnaces. Receipts at the former port increased from approximately 2 millions in 1897 to more than 4½ millions in 1907. Data with respect to receipts at Milwaukee are not obtainable for 1897; in 1907 they amounted to approximately 240,000 tons.

TABLE 127.—DOMESTIC SHIPMENTS AND RECEIPTS OF IRON ORE AT THE PRINCIPAL PORTS ON THE GREAT LAKES, RELATIVE RANK OF EACH PORT, AND PERCENTAGE OF SHIPMENTS OR RECEIPTS OF EACH PORT TO TOTAL SHIPMENTS OR RECEIPTS, 1897, 1901, AND 1905–1907.

[Statistics for 1897 compiled from various sources; 1901 and 1905–1907 from Monthly Summary of Commerce and Finance.]

Port.	1897.			1901.		
	1,000 gross tons.	Rank of port.	Per cent of total.	1,000 gross tons.	Rank of port.	Per cent of total.
Shipments:						
Duluth	2,376	2	20.0	3,339	3	17.1
Superior	532	6	4.5	2,260	5	11.6
Two Harbors	2,651	1	22.3	4,824	1	24.7
Ashland	2,068	4	17.4	2,769	4	14.2
Marquette	1,946	5	16.4	1,078	7	5.5
Presque Isle	.....	.....	.....	1,216	6	6.2
Escanaba	2,302	3	19.4	3,921	2	20.1
Total[a]	11,875	.....	.....	19,551	.....	.....
Receipts:						
Chicago	1,820	3	15.3	2,713	4	14.0
Toledo	416	8	3.5	792	8	4.1
Huron	198	10	1.7	425	10	2.2
Lorain	355	9	3.0	701	9	3.6
Cleveland	2,457	2	20.7	3,528	2	18.2
Fairport	1,008	5	8.5	1,147	6	5.9
Ashtabula	3,002	1	25.3	3,878	1	20.0
Conneaut	495	7	4.2	3,121	3	16.1
Erie	1,312	4	11.1	1,382	5	7.1
Buffalo	797	6	6.7	1,144	7	5.9
Total[a]	11,860	.....	.....	19,430	.....	.....

Port.	1905.			1906.			1907.		
	1,000 gross tons.	Rank of port.	Per cent of total.	1,000 gross tons.	Rank of port.	Per cent of total.	1,000 gross tons.	Rank of port.	Per cent of total.
Shipments:									
Duluth	8,731	1	26.7	11,154	1	30.2	13,327	1	32.7
Superior	5,008	4	15.3	5,983	3	16.2	7,231	3	17.8
Two Harbors	7,480	2	22.9	7,913	2	21.5	8,051	2	19.8
Ashland	3,297	5	10.1	3,239	5	8.8	3,396	5	8.3
Marquette	1,556	6	4.8	1,355	7	3.7	1,700	6	4.2
Presque Isle	1,383	7	4.2	1,417	6	3.8	1,268	7	3.1
Escanaba	6,187	3	15.9	5,657	4	15.3	5,595	4	13.7
Total[a]	32,698	.....	.....	36,873	.....	.....	40,728	.....	.....

[a] Including minor ports except for 1897.

TABLE 127.—DOMESTIC SHIPMENTS AND RECEIPTS OF IRON ORE AT THE PRINCIPAL PORTS ON THE GREAT LAKES, RELATIVE RANK OF EACH PORT, AND PERCENTAGE OF SHIPMENTS OR RECEIPTS OF EACH PORT TO TOTAL SHIPMENTS OR RECEIPTS, 1897, 1901, AND 1905–1907—Continued.

Port.	1905.			1906.			1907.		
	1,000 gross tons.	Rank of port.	Per cent of total.	1,000 gross tons.	Rank of port.	Per cent of total.	1,000 gross tons.	Rank of port.	Per cent of total.
Receipts:									
Chicago	3,312	5	10.1	4,252	5	11.5	4,628	5	11.4
Toledo	1,010	9	3.1	1,438	9	3.9	1,302	9	3.2
Huron	811	10	2.5	778	10	2.1	948	10	2.3
Lorain	1,793	8	5.5	2,158	6	5.8	2,609	6	6.4
Cleveland	5,702	2	17.4	6,662	2	18.1	6,567	2	16.1
Fairport	2,109	7	6.5	1,833	8	5.0	2,445	7	6.0
Ashtabula	6,285	1	19.2	6,727	1	18.2	7,542	1	18.5
Conneaut	5,337	3	16.3	5,412	3	14.7	5,875	3	14.4
Erie	2,181	6	6.7	2,097	7	5.7	2,254	8	5.5
Buffalo	3,396	4	10.4	4,631	4	12.6	5,311	4	13.1
Total[a]	32,687			36,892			40,689		

[a] Including minor ports except for 1897.

COMPARISON OF ALL-RAIL AND LAKE MOVEMENT.—A small amount of ore moves by all rail from the mines to blast furnaces in Wisconsin, and at times to Chicago and St. Louis. Under certain conditions, especially when Lake navigation is closed, some all-rail shipments are made to other ports. Although continuous rail connection between the Superior region and Chicago existed as early as 1873, the all-rail shipments have never equaled more than a small fraction of the Lake shipments, as shown by the following table:

TABLE 128.—COMPARISON OF ALL-RAIL AND LAKE SHIPMENTS OF IRON ORE FROM THE SUPERIOR REGION, 1897–1907.

[Mineral Resources of the United States and Monthly Summary of Commerce and Finance.]

Year.	All-rail shipments.	Lake shipments.	Year.	All-rail shipments.	Lake shipments.
	Gross tons.	*Gross tons.*		*Gross tons.*	*Gross tons.*
1897	253,993	12,215,645	1903	640,328	23,649,550
1898	369,241	13,655,432	1904	596,175	21,226,664
1899	350,446	17,901,358	1905	876,552	33,476,904
1900	489,078	18,570,315	1906	1,008,650	37,513,595
1901	431,715	20,157,522	1907	956,315	41,288,755
1902	531,952	27,039,169			

Section 3. Movement of grain and flour.

Grain and flour have formed a large and important part of the commerce on the Great Lakes, and although this movement is of less relative importance than formerly it is of special significance in view of

the contrast with the coast and river routes, where comparatively little grain is now carried by water, and in view of the active competition between Lake and rail routes for this traffic.

The movement of grain and flour and the routes of transportation have changed from time to time with the development of the country. During the eighteenth century a small surplus of grain was exported from the Atlantic coast, but there was no long-distance domestic movement. In the early years of the nineteenth century, with the increase of settlement west of the Alleghenies, the Mississippi River became an important highway for the transportation of grain and flour. But the opening of the Erie Canal in 1825, and the consequent development of the Lake States, soon gave the preeminence in the movement of grain to the route via the Lakes and the canal to New York, although the Mississippi River also continued to be an important route for this traffic, and up to 1840 more barrels of flour arrived at New Orleans than at Buffalo.

Beginning about 1860 the railroads began to compete for the traffic in grain and flour from the West to the seaboard, and by 1872 had gained nearly all the eastbound traffic in flour, the larger part of the movement of oats and a considerable share of the corn and wheat. Since then the railroads have on the whole increased their control of this traffic, but with considerable variations, while, as already noted, the Lakes still retain an important share of the movement. No satisfactory records exist of the total Lake movement before 1899, but the development of the Lake traffic and the competition with the railroads will be examined with reference to the principal shipping and receiving ports.

RELATIONS BETWEEN AREAS OF PRODUCTION AND ROUTES OF TRANSPORTATION.—No study of the movement of grain can, however, be understood without reference to changes in the areas of production, their relations with the markets, and the reciprocal influences of areas of production and routes of transportation. The opening of the Lake and canal route carried a rapid extension westward of the grain area, and by 1860 the center of production had been clearly shifted from the Middle Atlantic to the North Central States.

In the contest between the Lake route and the railroad, geographical conditions were also an important factor. In the eighth decade corn and oats came principally from Illinois and Indiana, which, with the development of through railroad lines and arrangements in rates, lay within the sphere of railroad influence.

> When the grain to be shipped was raised in Ohio and Indiana and in the southern portions of Michigan and Illinois it was almost sure to go by rail, for in nearly all cases shipment by water would involve a short rail haul to the Lakes, with its high local rates, and in some cases after the grain reached the Lake

it would be only slightly advanced in its eastward journey by Lake shipment.

* * * * * * *

From these points the railroads possess a decided advantage over the Lake carriers in point of distance, for the latter must round the lower peninsula of Michigan, while the former run directly across country to their destination. From Chicago to Buffalo by Lake is 889 miles, while the distance from Chicago to New York City by the shortest rail route is but 912 miles.

From Buffalo to New York City by the shortest rail route is 410 miles. It thus appears that every mile covered in the passage to Buffalo by Lake results in an effective eastward movement of 0.564 mile.[a]

On the other hand, by the eighth decade, wheat was raised largely in Wisconsin and Iowa, and since then the wheat-raising area has moved farther westward and northward to Nebraska, Minnesota, and the Dakotas.

By the westward and northward movement of the surplus wheat-producing regions the situation has been wholly changed. The districts which formerly produced the surplus that was almost certain to go by rail now grow but little if any more wheat than will satisfy their own necessities, but the location of the new wheat-growing areas is the important factor. These districts are located directly west of Lake Superior.

As a result of this northward and westward movement of the wheat fields the railroads have lost the advantage in point of distance which they formerly possessed. By the shifting of the wheat-growing districts the Lake carriers have been placed upon terms of substantial equality with the railroads. In shipping by Lake from Chicago it was found that every mile traversed in the passage to Buffalo resulted in effective eastward movement of but 0.564 mile. Shipment by water from the head of Lake Superior is not accompanied by this wasteful expenditure of energy. Every mile the grain is moved results in its being practically 1 mile nearer one of our great exporting ports.

* * * * * * *

The shifting of the surplus wheat-producing districts has been accompanied by a corresponding movement of the great milling centers. From 1878 Minneapolis has, with but few interruptions, steadily increased her output of flour, reaching the enormous total of 12,874,890 barrels in 1896. At the head of Lake Superior, in the cities of Duluth and West Superior, there has recently sprung up another important milling center.

As the milling industry has in a large measure followed the wheat-growing region westward and northward, it follows that the Lakes are now in a more favorable position for competing for the flour traffic than formerly. * * *

We find in the case of flour, as in the case of wheat, that the shifting of the places of production has put the water carriers in a more favorable position to meet the competition of the rail-

[a] G. G. Tunell, Statistics of Lake Commerce, p. 41.

roads. The Lake carriers are no longer handicapped by an excessively circuitous route.[a]

GENERAL FEATURES IN THE PRODUCTION AND DISTRIBUTION OF GRAIN.—Some facts in regard to the production and main features in the distribution of grain in the United States are also of interest to this discussion.

The five leading cereals in the order of their productiveness are corn, oats, wheat, barley, and rye. Together, the total crop for 1906 aggregated more than 4½ billion bushels, or about 35 per cent of the world's production. It has been estimated that about one-third of the grain production of the United States remains on the farm; the other two-thirds are turned into the channels of commerce for internal and foreign distribution. Of the three principal cereals, namely, corn, oats, and wheat, more than 1⅓ billion bushels were moved during 1906 beyond the county where grown. Eighty-three per cent of these shipments moved from the surplus cereal area comprising the States of Ohio, Indiana, Illinois, Wisconsin, Michigan, Minnesota, Iowa, Missouri, Kansas, Nebraska, North Dakota, and South Dakota.

From the farms grain is first collected by local grain dealers at country elevators. The supply for general distribution is next concentrated almost wholly by rail at certain primary markets. The most important of these primary markets are Chicago, Minneapolis, St. Louis, Duluth, Kansas City, Milwaukee, Omaha, Peoria, Louisville, and Toledo.

The map facing this page (taken from Vol. VI of the Report of the Industrial Commission) indicates the relation between different areas of production and primary markets which compete through the railroads reaching these areas. It reveals the fact that a given area may to-day be commercially tributary to Chicago, to-morrow to St. Louis, and the next day to Kansas City. In other words, while as a general rule grain comes to a particular market, there is no considerable territory that does not have the choice of two or more primary markets. A cent or two difference will turn the tide from hundreds of shipping points to other markets.

The geographical location of these cities is of much significance in the distribution of these crops. The above-mentioned markets lie on the western heads of the lakes or on the great interior waterways.[b]

At the primary markets are the large terminal elevators, where the visible supply of grain is held for distribution to the internal centers of consumption and for the foreign trade. At many of these points there is also a large consumption of grain, especially in connection with the milling interests. The flour mills at Minneapolis alone require from 60 to 70 million bushels of wheat annually.

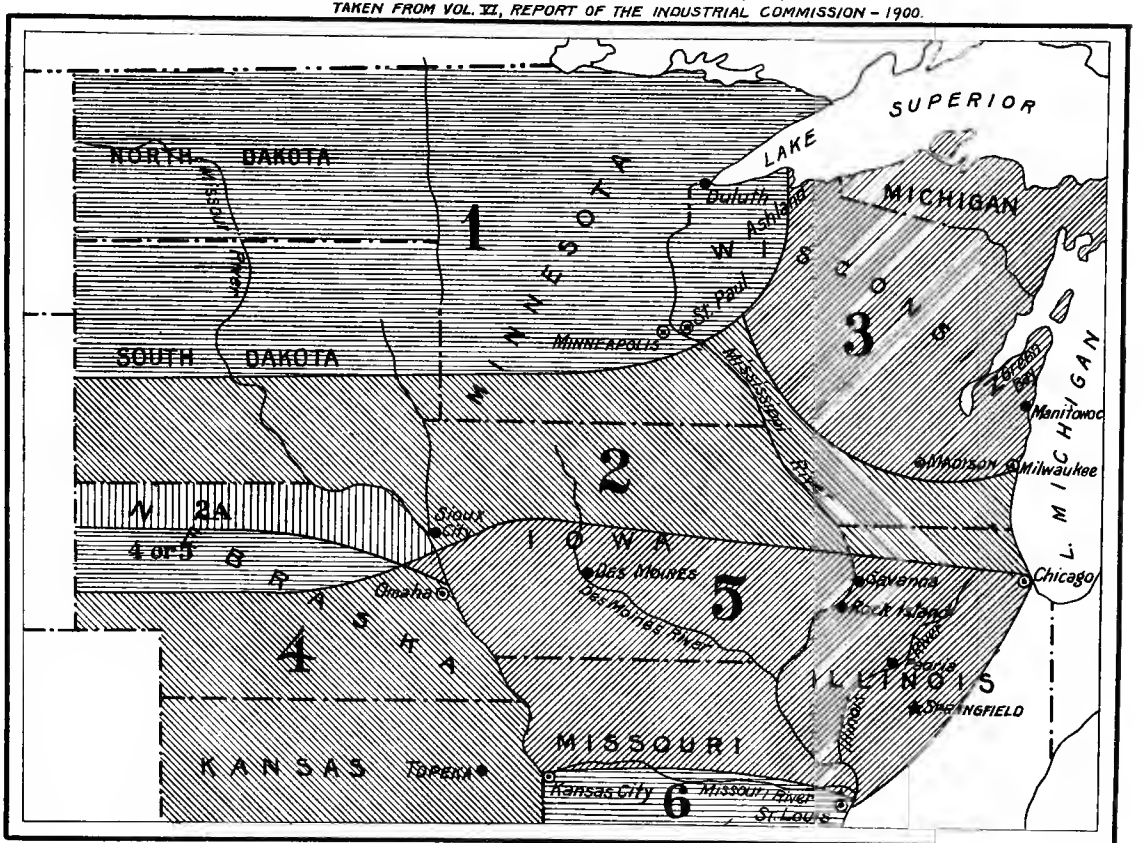
---

[a] G. G. Tunell, Statistics of Lake Commerce, pp. 41–45.

[b] Industrial Commission, Vol. VI, p. 45.

MAP SHOWING TERRITORIAL COMPETITION AMONG PRIMARY MARKETS FOR GRAIN

TAKEN FROM VOL. XI, REPORT OF THE INDUSTRIAL COMMISSION - 1900.



From the primary markets grain moves to the seaboard, either east to the Atlantic or south to the Gulf of Mexico. Eastward the railroads and Great Lakes complement and compete with each other; to the south railroads now control the traffic, but potential competition may be said to exist via the Mississippi River.

From the seaboard centers grain is further distributed for domestic consumption, and also exported in large quantities to the markets of the world.

LAKE AND ALL-RAIL COMPETITION FROM CHICAGO.—The first shipments of grain from Chicago were made in 1838, consisting of 36 bags of wheat. From this small beginning Chicago soon became the greatest grain center of the world. By 1845 the shipments of flour and wheat amounted to over 1 million bushels; by 1854 the shipments of flour and grain were more than 13 million bushels, and by 1862 more than 56 million bushels.

Until about 1856 almost the entire eastbound movement from Chicago was by Lake. Rail competition then began, and, as already shown, on account of the circuitous Lake route compared with the more direct railroad routes, Chicago is the least favorably situated of the Lake ports to meet this competition. In Table 129 (pp. 166–167) will be found a comparison of the eastbound lake-and-rail shipments from Chicago of flour, wheat, corn, and oats from 1860 to 1907. Before 1900 average annual shipments for periods of five years are given, and from 1900 to 1907 the shipments are shown for each year. Generally speaking, the railroads have been successful in competing for the carriage of flour and oats, but have been less successful with corn and wheat.

With respect to flour, Lake shipments exceeded those by rail as late as 1865, but in 1866 the balance turned in favor of rail shipments and since then the railroads have carried much the larger share of the flour traffic. But the Lake traffic has also increased largely in amount, and the relative proportions of Lake and rail shipments have varied considerably from year to year. From 1872 to 1885 the railroads had their most pronounced ascendency, in some years carrying more than ten times the Lake shipments. During the next ten years Lake shipments increased largely in amount and in proportion to the total, about 45 per cent of the eastbound shipments going by Lake in 1892 and 1894. The succeeding decade showed a relative decline in Lake shipments, falling to a minimum of 10 per cent in 1904. From 1905 to 1907 the Lake shipments have again increased, for 1907 being about three times those of a decade before and about one-third of the total eastbound shipments from Chicago to the Atlantic seaboard.

In the contest for the wheat traffic the railroads have been less successful. The rail shipments of wheat from Chicago first exceeded

1 million bushels in 1866; and although the amount shipped by rail continued to increase this averaged only about a fourth of the eastbound shipments down to 1878. During the eighties and early nineties the railroads carried on the average less than a third of the eastbound wheat from Chicago, and in 1894 reached a minimum proportion of less than one-sixteenth. Since the latter date, however, the railroads have gained relatively, while the total eastbound shipments from Chicago have decreased notably since 1901. In 1904 and 1905 railroad shipments of wheat were larger than those by Lake, but in 1906 and 1907 Lake shipments were again in first place by a considerable margin.

In the shipment of corn from Chicago the Lake vessels have been even more successful than in the case of wheat. The rail shipments of corn first exceeded 1 million bushels in 1867, and while increasing in amount these did not become an important part of the eastbound traffic until 1876, when more than a third of the eastbound movement was carried by rail. From this time until 1894 about two-thirds of the corn shipments were carried by Lake, and from 1895 to 1899, when the total Lake and all-rail shipments of corn reached the maximum, the annual average coming close to 96½ million bushels, Lake vessels carried about 76 per cent of the whole. In 1901 the railroads captured a large portion of the corn traffic, reducing the Lake proportion to 56 per cent. During the next two years Lake vessels carried from 74 to 78 per cent, but decreased again to less than 60 per cent from 1904 to 1906, and to but little more than 50 per cent in 1907. The total annual eastbound shipments of corn from Chicago from 1902 to 1907 have ranged from 43 to 92⅓ million bushels, reaching in 1907 the highest mark since 1900.

On the other hand, in the movement of oats from Chicago the railroads have maintained a supremacy since the early part of the eighth decade of the nineteenth century, and have absorbed even a larger proportion of this traffic than that of flour. By 1863 the railroads carried more than 2 million bushels of oats annually, and since 1873 the railroads have carried by far the greater portion of the eastbound shipments. From 1875 to 1900 Lake shipments of oats averaged only from one-fourth to one-third of the eastbound shipments, increasing in 1897, the maximum year of total movement (103 million bushels), to nearly 50 per cent. During the past decade Lake shipments have fallen off still further. In 1901 they formed 20 per cent of the total and in 1903, 28 per cent, but in 1906 they were only 10 per cent and in 1907 but 6 per cent of the eastbound shipments.

Of the total grain and flour movement from Chicago, Lake shipments during the period from 1860 to 1864 were approximately ten times greater than the all-rail movement. From this time to the 1880–1884 period the average annual Lake shipments increased

from a little more than 41 to slightly more than 63 million bushels. During the same series of years the average annual all-rail movement increased from about 4 to 64½ millions, and for the first time exceeded the movement by Lake. From 1885 to 1899 total shipments of grain and flour increased largely and Lake shipments gained on the railroads, carrying 52 per cent during the period from 1885 to 1889, 55 per cent from 1890 to 1894, and 60 per cent from 1895 to 1899. Shipments by Lake reached a maximum of 135 million bushels of grain and flour in 1900, but from 1901 to 1907 all-rail shipments have exceeded those by Lake except in 1903, when Lake vessels carried about 55 per cent of the total. During the remaining years since 1901 Lake shipments were never greater than those for 1902, which equaled 45 per cent of the total, and in one year (1904) Lake shipments were as low as 36 per cent.

TABLE 129.—EASTBOUND SHIPMENTS OF FLOUR, WHEAT, CORN, AND OATS FROM CHICAGO, 1860–1907.

[Compiled from Commercial Monographs and reports of Chicago Board of Trade.]

Flour.

Period.	Lake.	Rail.	Total.	Year.	Lake.	Rail.	Total.
	Bushels.	*Bushels.*	*Bushels.*		*Bushels.*	*Bushels.*	*Bushels.*
1860–1864 [a] [b]	3,180,166	2,647,706	5,827,872	1900	5,047,866	24,351,597	29,399,463
1865–1869 [a]	3,228,807	4,907,832	8,136,639	1901	4,134,434	30,560,328	34,694,762
1870–1874 [a]	2,043,026	5,536,716	7,579,742	1902	4,890,762	20,342,111	25,232,873
1875–1879 [a]	1,229,003	10,313,305	11,542,308	1903	5,694,674	19,230,350	24,925,024
1880–1884 [a]	2,731,058	14,747,309	17,478,367	1904	3,165,125	27,603,261	30,768,386
1885–1889 [a]	6,399,577	15,248,006	21,647,583	1905	10,797,759	19,979,145	30,776,904
1890–1894 [a]	8,059,405	10,764,077	18,823,482	1906	11,740,707	22,180,626	33,921,333
1895–1899 [a]	3,936,460	11,520,792	15,457,252	1907	14,717,930	23,937,579	38,655,509

Wheat.

1860–1864 [a] [b]	12,733,897	330,903	13,064,800	1900	26,577,243	8,408,032	34,985,275
1865–1869 [a]	7,940,564	1,610,716	9,551,280	1901	31,523,724	12,163,630	43,687,354
1870–1874 [a]	13,376,999	4,687,323	18,064,322	1902	22,028,580	6,719,688	28,748,268
1875–1879 [a]	12,865,937	7,308,771	20,174,708	1903	16,443,522	5,201,368	21,644,890
1880–1884 [a]	11,580,783	4,881,911	16,462,694	1904	5,627,386	9,257,986	14,885,372
1885–1889 [a]	9,897,798	4,733,388	14,631,186	1905	5,069,982	5,538,215	10,608,197
1890–1894 [a]	21,260,970	3,754,994	25,015,964	1906	9,138,655	5,664,424	14,803,079
1895–1899 [a]	15,324,114	7,111,216	22,435,330	1907	14,368,973	8,867,120	23,236,093

Corn.

1860–1864 [a] [b]	22,762,090	293,878	23,055,968	1900	78,968,109	29,134,224	108,102,333
1865–1869 [a]	21,897,835	1,544,572	23,442,407	1901	33,833,732	26,606,605	60,440,337
1870–1874 [a]	30,823,657	3,280,259	34,103,916	1902	30,610,064	12,371,368	42,981,432
1875–1879 [a]	35,298,503	12,498,875	47,797,378	1903	68,093,622	19,244,477	87,338,099
1880–1884 [a]	44,611,728	22,997,033	67,608,761	1904	41,798,051	28,603,681	70,401,732
1885–1889 [a]	44,002,017	18,770,265	62,772,282	1905	49,772,146	37,984,327	87,756,473
1890–1894 [a]	48,272,499	21,648,850	69,921,349	1906	43,637,502	32,154,544	75,792,046
1895–1899 [a]	73,410,837	23,039,327	96,450,164	1907	46,604,412	45,696,166	92,300,578

[a] Figures indicate annual average shipments. [b] Average for four years; figures for 1863 not given.

TABLE 129.—EASTBOUND SHIPMENTS OF FLOUR, WHEAT, CORN, AND OATS FROM CHICAGO, 1860–1907—Continued.

Oats.

Period.	Lake.	Rail.	Total.	Year.	Lake.	Rail.	Total.
	Bushels.	*Bushels.*	*Bushels.*		*Bushels.*	*Bushels.*	*Bushels.*
1860–1864[a b]	2,548,906	720,705	3,269,611	1900.....	24,382,635	48,329,294	72,711,929
1865–1869[a] ..	10,142,829	1,753,029	11,895,858	1901.....	15,178,727	57,910,976	73,089,703
1870–1874[a] ..	6,446,929	5,292,769	11,739,698	1902.....	10,200,846	44,969,967	55,170,813
1875–1879[a] ..	4,086,961	8,626,772	12,713,733	1903.....	17,071,172	44,619,711	61,690,883
1880–1884[a] ..	4,192,825	21,873,298	26,066,123	1904.....	7,641,077	37,131,798	44,772,875
1885–1889[a] ..	10,743,844	26,573,909	37,317,753	1905.....	11,938,925	50,946,740	62,885,665
1890–1894[a] ..	18,392,086	43,567,047	61,959,133	1906.....	6,986,823	62,090,125	69,076,948
1895–1899[a] ..	27,313,830	54,665,458	81,979,288	1907.....	4,505,204	61,649,914	66,155,118

Total.

1860–1864[a b]	41,225,059	3,993,192	45,218,251	1900.....	134,975,853	110,223,147	245,199,000
1865–1869[a] ..	43,210,035	9,816,149	53,026,184	1901.....	84,670,617	127,241,539	211,912,156
1870–1874[a] ..	52,690,611	18,797,067	71,487,678	1902.....	67,730,252	84,403,134	152,133,386
1875–1879[a] ..	53,480,404	38,747,723	92,228,127	1903.....	107,302,990	88,295,906	195,598,896
1880–1884[a] ..	63,116,394	64,499,551	127,615,945	1904.....	58,231,639	102,596,726	160,828,365
1885–1889[a] ..	71,043,236	65,325,568	136,368,804	1905.....	77,578,812	114,448,427	192,027,239
1890–1894[a] ..	95,984,960	79,734,968	175,719,928	1906.....	71,503,687	122,089,719	193,593,406
1895–1899[a] ..	119,985,241	96,336,793	216,322,034	1907.....	80,196,519	149,150,779	220,347,298

[a] Figures indicate annual average shipments. [b] Average for four years; figures for 1863 not given.

SHIPMENTS FROM MILWAUKEE.—Milwaukee, situated about 85 miles north of Chicago, on the west shore of Lake Michigan, is farther removed by rail from the seaboard, although nearer by Lake to the eastern markets. The all-rail traffic moves around the corner of the Lake via Chicago, or since about 1890 by car ferries across the Lake. In addition to the long distance lake traffic to Lake Erie, there is a large traffic by transit lines across Lake Michigan.

From Milwaukee flour shipments are sent all-rail to a much smaller extent than from Chicago. All-rail shipments reached their maximum proportion of the total traffic from Milwaukee in the years 1872 to 1876, exceeding the Lake shipments in 1875 and 1876, but from the latter date to 1899 all-rail shipments from Milwaukee have averaged only from 10 to 12 per cent of the total shipments from this point. Since 1900 the railroads have gained a larger part of the traffic, reaching a maximum in 1904, when they carried the equivalent of 3,219,863 bushels of flour, or 24 per cent of the total shipments. Shipments by transit lines increased steadily from an annual average of 705,000 bushels for the period 1860 to 1864 to 6,170,000 bushels for the period 1895 to 1899, but have remained well behind the other Lake shipments from the beginning. From 1900 to 1906 about 16 per cent of the flour was shipped by rail, 27 per cent by transit lines, and 57 per cent by Lake.

With reference to the shipment of wheat the all-rail route shows to greater advantage than in that of flour, but it must not be left out of consideration that Milwaukee has practically ceased to be a great wheat-shipping center. In the years before and after 1870 Milwaukee shipped, year for year, a greater quantity of wheat than Chicago or any other primary shipping center in the country, and in the single year 1873 the shipments amounted to 24,991,266 bushels of wheat. Since 1879 the shipments of wheat from Milwaukee have never again reached 10 million bushels.[a]

All-rail shipments have decreased in amount since the period 1875–1879, but have increased in proportion to the rapidly diminishing volume of the total wheat traffic from Milwaukee. During the period last mentioned only 11 per cent of the wheat carried went by rail, 8 per cent by transit lines, and 81 per cent by Lake. During the period 1895–1899, on the other hand, 58 per cent went by rail, 8 per cent by transit, and only 34 per cent by Lake, while during the years from 1900 to 1906 the division was still more unfavorable to the water route. For these seven years only 27 per cent of the wheat from Milwaukee was shipped by Lake, 19 per cent by transit, and 54 per cent by all-rail routes.

Shipments of corn from Milwaukee are too inconsiderable to deserve detailed treatment. Up to 1896 such shipments exceeded a million bushels in only four years—1872, 1880, 1882, and 1883. In 1898 they reached a maximum of 8 million bushels and in 1900 were nearly 5 million bushels, but decreased to less than 2 million bushels during the next four years, increasing again to 4½ million bushels in 1906. Up to 1902 the larger proportion of these corn shipments went by Lake; but for the past few years the all-rail and transit lines have carried the larger share.

Shipments of oats have always been very considerable, although it is chiefly since 1890 that this traffic has grown rapidly. From an annual average of less than 4 million bushels during 1890 to 1895, which exceeded all previous periods, the average annual shipments rose to 10¾ million bushels for the next succeeding five years. From 1900 to 1906 there was a decline from a little less than 8 millions to slightly more than 6½ million bushels of oats shipped from Milwaukee. Up to 1885 Lake vessels carried a larger share of the shipments of oats from this port; from then until 1891 the all-rail lines predominated; from 1892 to 1903 the Lake and transit lines together carried most of the traffic, the transit lines carrying more than the Lake lines in 1903. Since the latter date Lake shipments have notably decreased and all-rail shipments have increased, but the transit lines have held first place, carrying more than half of the total movement of oats.

[a] Commercial Monographs, 1900, p. 1966. Published by the Bureau of Statistics; originally in the Monthly Summary.

Of the total amount of grain and flour shipped from Milwaukee both transit lines and all-rail routes remained well behind Lake shipments until 1903, when the transit and rail lines together carried about one-half of the total shipments. The transit lines considerably exceeded the all-rail routes in the quantity carried. In the next year the Lake vessels lost heavily, their traffic declining from 14¾ million bushels to something over 6½ million bushels, or 29 per cent of the total, 46 per cent being carried by transit lines and 25 per cent by all-rail routes. In 1905 and 1906, however, the proportion carried by Lake vessels increased again to 38 and 42 per cent, and all-rail shipments to 27 per cent, while the transit lines declined to 35 and 31 per cent.

TABLE 130.—EASTBOUND SHIPMENTS OF FLOUR, WHEAT, CORN, AND OATS FROM MILWAUKEE, 1860–1906.

[Compiled from Commercial Monographs and reports of Milwaukee Chamber of Commerce.]

Flour.

Period or year.	Lake.	Rail.	Transit lines.	Total.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*
1860–1864 [a]	1,774,319	96,039	705,245	2,575,603
1865–1869 [a]	2,316,249	1,202,945	483,341	4,002,535
1870–1874 [a]	3,449,520	2,051,753	1,423,301	6,924,574
1875–1879 [a]	3,077,307	2,596,554	2,685,092	8,358,953
1880–1884 [a]	5,562,909	1,156,563	4,508,685	11,228,157
1885–1889 [a]	8,132,346	1,525,518	5,371,088	15,028,952
1890–1894 [a]	8,416,031	1,643,364	5,704,416	15,763,811
1895–1899 [a]	9,182,975	2,117,300	6,170,054	17,470,329
1900	10,590,957	2,451,713	3,455,267	16,497,937
1901	10,074,501	2,908,125	4,392,225	17,374,851
1902	11,336,711	2,451,375	5,486,535	19,274,621
1903	10,994,621	2,321,933	4,648,433	17,964,987
1904	5,279,756	3,219,863	4,995,977	13,495,596
1905	8,697,389	3,079,395	3,595,802	15,372,586
1906	8,330,450	2,410,088	4,066,956	14,807,494

Wheat.

1860–1864 [a]	11,491,928	23,863	[b] 17,963	11,533,754
1865–1869 [a]	10,728,494	419,294	24,988	11,172,776
1870–1874 [a]	16,031,622	1,248,902	390,981	17,671,505
1875–1879 [a]	13,758,577	1,886,640	1,318,412	16,963,629
1880–1884 [a]	3,361,587	711,985	190,812	4,264,384
1885–1889 [a]	2,876,171	855,714	54,173	3,786,058
1890–1894 [a]	1,334,887	838,184	160,714	2,333,785
1895–1899 [a]	1,037,418	1,744,596	236,648	3,018,662
1900	406,900	1,086,650	548,231	2,041,781
1901	525,300	2,899,850	535,272	3,960,422
1902	392,580	1,465,200	330,789	2,188,569
1903	298,500	997,300	300,116	1,595,916
1904	517,346	808,720	667,786	1,993,852
1905	404,557	774,420	482,376	1,661,353
1906	1,712,070	675,320	116,612	2,504,002

[a] Figures indicate annual average shipments.

[b] Average for two years only; figures for other three years of period not given.

TABLE 130.—EASTBOUND SHIPMENTS OF FLOUR, WHEAT, CORN, AND OATS FROM MILWAUKEE, 1860-1906.—Continued.

Corn.

Period or year.	Lake.	Rail.	Transit lines.	Total.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*
1860-1864 [a]	[b] 85,625	[c] 5,487	[c] 17,052	108,164
1865-1869 [a]	203,180	[d] 1,145	46,781	251,106
1870-1874 [a]	540,313	7,054	19,588	566,955
1875-1879 [a]	315,245	17,767	7,960	340,972
1880-1884 [a]	668,209	68,297	37,293	773,799
1885-1889 [a]	40,208	59,004	[d] 41,457	140,669
1890-1894 [a]	63,788	128,420	[d] 66,987	259,195
1895-1899 [a]	3,013,908	92,038	[d] 209,059	3,315,005
1900	4,093,863	324,900	396,277	4,815,040
1901	2,267,625	158,650	140,706	2,566,981
1902	651,412	749,400	174,022	1,574,834
1903	415,200	132,050	706,170	1,253,420
1904	174,050	481,650	935,101	1,590,801
1905	121,550	805,250	848,025	1,774,825
1906	1,229,598	1,681,200	1,637,380	4,548,178
Oats.				
1860-1864 [a]	[d] 418,034	20,063	[c] 7,881	445,978
1865-1869 [a]	655,353	[d] 8,229	32,853	696,435
1870-1874 [a]	673,205	87,209	44,178	804,592
1875-1879 [a]	730,538	368,232	27,458	1,126,228
1880-1884 [a]	610,324	344,484	71,838	1,026,646
1885-1889 [a]	140,874	330,282	[d] 73,705	544,861
1890-1894 [a]	2,378,130	792,887	776,494	3,947,511
1895-1899 [a]	7,135,531	826,747	2,816,576	10,778,854
1900	3,935,509	914,400	3,084,696	7,934,605
1901	3,580,205	1,333,400	2,250,190	7,163,795
1902	1,588,200	1,363,600	1,400,192	4,351,992
1903	3,033,500	938,600	3,734,502	7,706,602
1904	644,900	1,043,900	3,889,506	5,578,306
1905	531,256	2,211,500	3,971,642	6,714,398
1906	714,975	2,841,800	3,040,676	6,597,451
Total.				
1860-1864 [a]	13,769,906	145,452	748,141	14,663,499
1865-1869 [a]	13,903,276	1,631,613	587,963	16,122,852
1870-1874 [a]	20,694,660	3,394,918	1,878,048	25,967,626
1875-1879 [a]	17,881,667	4,869,193	4,038,922	26,789,782
1880-1884 [a]	10,203,029	2,281,329	4,808,628	17,292,986
1885-1889 [a]	11,189,599	2,770,518	5,540,423	19,500,540
1890-1894 [a]	12,192,836	3,402,855	6,708,611	22,304,302
1895-1899 [a]	20,369,832	4,780,681	9,432,337	34,582,850
1900	19,027,229	4,777,663	7,484,471	31,289,363
1901	16,447,631	7,300,025	7,318,393	31,066,049
1902	13,968,903	6,029,575	7,391,538	27,390,016
1903	14,741,821	4,389,883	9,389,221	28,520,925
1904	6,616,052	5,554,133	10,488,370	22,658,555
1905	9,754,752	6,870,565	8,897,845	25,523,162
1906	11,987,093	7,608,408	8,861,624	28,457,125

[a] Figures indicate annual average shipments.
[b] Average for three years only; figures for other two years of period not given.
[c] Average for two years only; figures for other three years of period not given.
[d] Average for four years only; figures for other year of period not given.

DEVELOPMENT OF LAKE SUPERIOR PORTS.—The most notable feature in the movement of grain and flour during the past twenty years has been the diversion of this traffic from Chicago and Milwaukee, the earlier shipping points of first importance, to other places, notably to Duluth and Superior, and more recently to other points on Lake Superior in Canada. This diversion to Lake Superior points has been due mainly to the northward and westward trend of the area of wheat production, which in turn has been promoted by the improvement of the water route from Lake Superior to the lower Lakes. As the sixth decade of the nineteenth century was marked by the supersession of the Pennsylvania and New York wheat fields by those of Illinois, so since 1880 the wheat acreage of Illinois has dwindled in proportion to that of the new Northwest, including not only the States of Minnesota, Nebraska, and the Dakotas, but also the Canadian provinces to the north.

This northwestwardly movement of the wheat fields has been intimately associated with the development of Lake Superior shipping ports and the renewed dominance of the Lake over all-rail routes in the transportation of wheat and also to a considerable extent of flour. So long as the wheat fields of the country were tributary to Chicago the railroads enjoyed a considerable advantage over the Lake carriers. From Duluth the distance by Lake to Buffalo is no greater than from Chicago, while its proximity to the new wheat fields gave the Lake Superior port a great advantage.

The diversion of trade from Chicago to the Northwest first became marked in the flour trade. The opening of the Minneapolis, St. Paul and Sault Ste. Marie Railroad in 1888 gave the millers and shippers of St. Paul and Minneapolis a new route to the East, shorter by the whole length of Lake Michigan than the route via Chicago. About the same time shipments from the head of the Lakes rapidly increased, this increase being due in part to the development of the milling industry at this point.

The results of these changes in the direction of the flour movement are set forth in the following table, showing the rapid increase of shipments from the head of the Lakes and by the "Soo" route and the corresponding decline in shipments from Chicago. During the past ten years, however, the production and shipments of flour from Duluth have declined, while shipments from Chicago have increased.

TABLE 131.—MOVEMENT OF FLOUR FROM CHICAGO, MINNEAPOLIS, AND DULUTH-SUPERIOR, 1887–1907.

[Compiled from tables in Commercial Monographs, 1900, and from reports of Duluth, Minneapolis, and Chicago boards of trade.]

Year.	Duluth-Superior.		Minneapolis, shipments by the "Soo" route.	Chicago, shipments by lake and rail.	Year.	Duluth-Superior.		Minneapolis, shipments by the "Soo" route.	Chicago, shipments by lake and rail.
	Output.	Shipments.				Output.	Shipments.		
	Barrels.	*Barrels.*	*Barrels.*	*Barrels.*		*Barrels.*	*Barrels.*	*Barrels.*	*Barrels.*
1887	.....	1,322,715	.....	6,226,742	1898	2,460,045	6,259,795	.....	5,032,236
1888	.....	1,747,176	931,502	5,325,292	1899	1,748,825	6,314,755	2,745,045	5,421,548
1889	84,446	1,953,053	1,367,792	3,762,741	1900	345,460	4,860,250	2,486,398	7,396,697
1890	430,978	2,589,384	1,156,516	3,930,506	1901	860,605	5,640,235	2,632,396	7,939,149
1891	684,000	3,142,501	1 206,642	3,885,018	1902	.....	8,703,330	2,226,036	5,839,441
1892	1,094,493	4,763,481	1,684,005	5,578,559	1903	1,178.695	5,912,950	3,130,351	5,834,871
1893	2,108,120	7,033,759	1,720,166	3,964,266	1904	835,720	3,725,630	2,011,379	7,267,896
1894	2,946,290	7,844,473	1,458,146	3,556,630	1905	793,145	5,143,810	2,615.073	7,361,867
1895	2,978,000	7,144.153	2,111,455	2,389,115	1906	908,175	5,654,035	2,314,406	8,199,628
1896	3,120,945	7,499,230	2,419.914	2,673,690	1907	715,280	4,567,865	.....	9,231,693
1897	2,532,830	7,630,170	2,857,942	2,618,076					

Shipments of wheat from Duluth amounted to 3,291,000 bushels in 1881, increased rapidly to 14,065,775 bushels in 1885, and fluctuated up and down slowly for the next few years. After 1890 there was another rapid increase to the maximum of 54,688,866 bushels in 1898, since when the shipments have been less, fluctuating from year to year.

Other grain has played a less important part in the movement from Duluth-Superior. Shipments of corn first exceeded a million bushels in 1889, of oats in 1890, of barley in 1894, and of rye in 1896, and the shipments of these grains have shown large relative variations from year to year. In the past few years oats and rye have formed a considerable part of the grain shipments from Duluth-Superior.

A distinctive feature of the commerce of Duluth-Superior has been the trade in flaxseed, which may be considered in connection with the grain movement. Beginning in a small way in 1886, shipments of flaxseed increased at first slowly and suddenly in 1895 to 2,435,132 bushels, and since then has increased, in the main steadily, to a maximum of 21,932,310 bushels in 1906.

Practically all of the shipments of grain and flaxseed from Duluth-Superior go by Lake. In 1897 out of a total of 57,674,480 bushels only 900,598 bushels were shipped by rail. In 1907 about 3,000,000 bushels were shipped by rail. A considerable proportion of the Lake shipments go to Canadian ports. In 1901 these shipments to Canadian points amounted to 10,491,709 bushels and in 1907 to about 7,200,000 bushels.

TABLE 132.—SHIPMENTS OF GRAIN AND FLAXSEED FROM DULUTH-SUPERIOR, 1881–1907.

[Compiled from Duluth Board of Trade reports.]

Year.	Wheat.	Corn.	Oats.	Rye.	Barley.	Flaxseed.	Total grain and flaxseed.
Total shipments.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1881	3,291,000	.....	.....	.....	.....	.....	3,291,000
1885	14,065,775	93,287	91,269	.....	38,681	.....	14,289,012
1886	17,658,251	284,236	33,176	.....	23,471	20,302	18,019,436
1890	14,090,826	1,453,089	1,616,635	.....	130,931	51,440	17,342,921
1895	38,356,025	4,515	1,148,547	313,722	2,356,519	2,435,132	44,614,460
1896	50,652,517	408,433	4,864,954	1,273,020	6,795,775	6,382,148	70,376,847
1897	38,137,236	401,819	6,296,354	1,311,593	5,067,251	6,460,227	57,674,480
1898	54,688,866	3,609,758	5,037,397	3,157,390	3,245,954	6,414,706	76,154,071
1899	43,819,138	8,410,582	2,989,704	917,472	3,647,021	9,397,567	69,181,484
1900	30,858,667	3,547,674	851,440	610,912	2,685,137	6,067,035	44,620,865
1901	35,111,593	5,301,527	1,898,044	853,399	2,785,905	12,677,299	58,627,767
1902	39,639,649	423,943	1,183,397	1,179,803	5,454,477	14,377,750	62,259,019
1903	26,560,467	974	4,473,711	860,441	6,519,584	16,341,247	54,756,424
1904	21,399,335	13,049	6,905,922	974,871	8,378,476	13,332,221	51,003,874
1905	28,126,623	241,625	8,861,808	584,955	9,598,048	15,807,363	63,220,422
1906	33,109,354	164,480	11,541,934	608,401	10,206,776	21,932,310	83,563,255
1907	49,207,734	149,365	3,771,013	671,152	9,689,122	18,037,133	81,525,519
Lake shipments.							
Total:							
1903	25,806,532	.....	4,118,342	860,441	5,867,802	15,383,717	52,036,834
1904	20,002,087	.....	5,584,945	877,295	7,601,783	12,694,008	46,760,118
1905	27,030,084	237,411	7,578,669	492,047	8,996,565	15,341,532	59,676,308
1906	38,256,431	161,566	11,367,505	496,367	9,571,795	21,803,262	81,656,926
1907	48,761,859	103,887	2,900,752	563,615	8,689,731	17,483,285	78,503,129
Domestic:							
1905	25,871,378	196,626	7,366,669	430,947	7,470,089	14,776,090	56,111,799
1906	36,993,746	130,384	10,714,506	471,167	9,102,730	17,959,387	75,371,920
1907	43,724,152	50,721	2,573,900	482,676	8,689,731	15,747,122	71,268,302

The development of Lake Superior traffic in grain and flour is best set forth as a whole by the statistics of the movement through the St. Marys Falls canals. All of the traffic to and from Lake Superior must pass through these canals, and there is practically no local grain traffic on this lake.

As will be seen in Table 133, the flour traffic was the first to develop. Small and fluctuating before 1871, the movement of flour increased irregularly from then until 1883. After the latter year the advance was rapid until 1894, which showed a maximum of 8,965,773 barrels. From 1894 to 1902 were years of minor fluctuations, while during the past five years the movement of flour through the canals has declined to some degree, indicating that a larger proportion of flour shipments now goes by rail.

Wheat traffic on Lake Superior did not exist before 1870. It increased slowly from then until 1882, and since the latter date the

advance has been at an astonishing rate, though with some fluctuations from year to year, to the maximum of 98,135,775 bushels in 1907. The traffic in other grain developed more slowly, as these were grown in regions too remote from Lake Superior ports, but since 1895 there has been a rapid increase in this movement, which reached a maximum of 54,343,155 bushels in 1906, falling off somewhat to 43,463,338 bushels in 1907. It must be noted, however, that one of the most important factors in the wheat movement of recent years has been the shipments from Canadian ports, most of which are delivered at Canadian points, very largely in Georgian Bay.

TABLE 133.—FLOUR AND WHEAT TRAFFIC OF THE ST. MARYS FALLS CANALS, 1855–1907.

[Compiled from Commercial Monographs and Monthly Summary of Commerce and Finance.]

Year.	Flour.	Wheat.[a]	Grain other than wheat.	Year.	Flour.	Wheat.	Grain other than wheat.
	Barrels.	*Bushels.*	*Bushels.*		*Barrels.*	*Bushels.*	*Bushels.*
1855	10,289	.....	.....	1882	344,044	3,728,856	473,129
1856	17,686	.....	33,908	1883	687,031	5,900,473	776,552
1857	16,560	.....	22,300	1884	1,248,243	11,985,791	517,103
1858	13,782	.....	10,500	1885	1,440,093	15,274,213	422,981
1859	39,459	.....	71,738	1886	1,759,365	18,991,485	715,373
1860	50,250	.....	133,437	1887	1,572,735	23,096,520	775,166
1861	22,743	.....	76,830	1888	2,190,725	18,596,351	2,022,308
1862	17,291	.....	59,062	1889	2,228,707	16,231,854	2,133,245
1863	31,975	.....	78,480	1890	3,239,104	16,217,370	2,044,384
1864	33,937	.....	143,560	1891	3,780,143	38,816,570	1,032,104
1865	34,985	.....	.....	1892	5,418,135	40,994,780	1,666,690
1866	33,603	.....	229,926	1893	7,420,674	43,481,652	2,405,344
1867	28,345	.....	249,031	1894	8,965,773	34,869,483	1,545,008
1868	27,372	.....	285,123	1895	8,902,302	46,218,250	8,328,694
1869	32,007	.....	323,501	1896	8,882,858	63,256,463	27,448,071
1870	33,548	49,700	304,077	1897	8,921,143	55,924,302	24,889,688
1871	26,060	1,376,705	308,823	1898	7,778,043	62,339,996	26,078,384
1872	136,411	567,134	445,774	1899	7,114,147	58,397,335	30,000,935
1873	172,692	2,119,997	309,645	1900	6,760,688	40,489,302	16,174,659
1874	179,855	1,120,015	149,999	1901	7,634,350	52,812,636	24,760,547
1875	309,991	1,213,788	250,080	1902	8,910,240	76,730,965	27,740,822
1876	315,224	1,971,549	407,772	1903	7,093,380	61,384,552	32,095,646
1877	355,117	1,349,738	343,542	1904	4,710,538	49,928,869	33,030,992
1878	344,599	1,872,940	264,674	1905	5,772,719	68,321,288	39,229,553
1879	451,000	2,603,666	951,496	1906	6,495,350	84,271,358	54,343,155
1880	523,860	2,105,920	2,547,106	1907	6,524,770	98,135,775	43,463,338
1881	605,453	3,456,965	367,838				

[a] None shipped on Lake Superior prior to 1870.

The importance of the shipping ports thus discussed is shown by the following table summarizing the domestic Lake shipments of flour and grain from the principal shipping ports in comparison with the total domestic Lake shipments. It will be seen that 90 per cent of the Lake shipments of corn are shipped from Chicago, and that practically all the flour and wheat by Lake are shipped from the ports of Duluth, Superior, Milwaukee, and Chicago. These

ports also ship much the greater part of the oats, barley, and rye; but several other shipping points are of some importance for these grains, for example, Green Bay and Manitowoc and, in lesser degree, Gladstone and Washburn.

TABLE 134.—DOMESTIC LAKE SHIPMENTS OF FLOUR AND GRAIN, 1906 AND 1907, BY PORTS.

[Compiled from Monthly Summary of Commerce and Finance, December, 1907, p. 1169.]

Port.	Flour.		Wheat.		Corn.	
	1906.	1907.	1906.	1907.	1906.	1907.
	Net tons.	*Net tons.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
Duluth	224,288	154,467	17,857,752	23,653,109	6,860	.....
Superior	359,403	360,640	17,939,902	20,829,952	1,213,630	49,376
Green Bay	10	26	.....	28,200	.....	21,750
Manitowoc	38,484	36,877	20,100	46,600	53,144	508,454
Milwaukee	313,424	314,995	1,808,180	2,883,116	3,008,050	3,156,723
Chicago	297,687	344,108	8,701,930	14,448,231	38,661,377	40,161,705
Total	1,233,296	1,211,113	46,327,864	61,889,208	42,943,061	43,898,008
Total domestic Lake shipments	1,334,979	1,314,987	47,726,778	63,349,585	43,531,540	44,355,990

Port.	Oats.		Barley.		Rye.	
	1906.	1907.	1906.	1907.	1906.	1907.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
Duluth	4,264,448	962,699	29,606	100,000	292,000	263,575
Superior	6,744,656	1,695,913	8,931,323	8,405,705	143,540	253,142
Green Bay	2,580,530	1,950,300	1,003,433	923,800	182,000	23,800
Manitowoc	4,809,338	5,179,607	1,973,573	726,135	303,999	158,950
Milwaukee	3,664,468	4,956,107	4,178,990	2,929,876	317,985	432,084
Chicago	6,316,307	4,551,649	726,795	.....	476,786	729,411
Total	28,379,747	19,296,275	16,843,720	13,085,516	1,716,310	1,860,962
Total domestic Lake shipments	33,638,055	20,680,188	18,252,250	13,564,074	2,227,813	2,186,444

RECEIPTS AT BUFFALO AND ERIE.—The movement of grain and flour is not only an eastward movement (even more markedly so than of iron ore), but, in contrast with iron ore, which is distributed to a number of receiving ports, the domestic Lake movement of grain and flour is concentrated for delivery in very large part at the single port of Buffalo.

> The importance of Buffalo as a receiving port for grain shipped from the upper Lakes is seen from the fact that 87 per cent of the domestic wheat, 64 per cent of the corn, 52 per cent of the oats, and 83 per cent of the barley received by Lake at United States ports is credited to that port.[a]

Domestic flour shipments are also directed mainly to Buffalo.

[a] Monthly Summary of Commerce and Finance, December, 1907, p. 1141.

Next in importance to Buffalo as a receiving port for grain and flour is Erie, and an examination of the receipts at these two ports will indicate roughly the Lake movement to United States ports. Other United States grain-receiving ports of some importance are Ogdensburg and Ludington, the latter for the movement across Lake Michigan in car ferries.

Statistics of Lake receipts of grain and flour at Buffalo are available from 1836. In that year 139,178 barrels of flour and a total of 1,239,531 bushels of grain and flour were received by Lake. The receipts increased slowly for ten years to a total of 5,581,790 bushels in 1845. The next year (1846) the receipts more than doubled—to 1,374,529 barrels of flour and a total of 13,366,167 bushels of grain and flour. For the next thirteen years there was a moderate rate of growth, but during the civil-war period there was a rapid increase to a maximum of 72,872,454 bushels in 1862. After this the Lake traffic declined to some extent; then came a gradual increase until 1888, when 5,244,930 barrels of flour and a total of 99,448,150 bushels of grain and flour were received by Lake. In the next decade the Lake traffic again developed rapidly, reaching a maximum of 12,440,617 barrels of flour in 1897 and 267,395,434 bushels of grain and flour in 1898. During the last decade flour receipts by Lake have declined to 9,759,676 barrels in 1907. Grain receipts have also declined. Including flour reduced to bushels, the total Lake receipts for 1907 were 167,784,418 bushels of grain and flour—about 62 per cent of the maximum figures of 1898.

The general situation at Erie has been similar to that at Buffalo, but on a smaller scale and with comparatively greater fluctuations from year to year. Receipts of flour have declined to some extent and corn to a more marked degree. Receipts of wheat were also small from 1901 to 1905, but have increased again in 1906 and 1907.

The tables below show the Lake receipts of grain and flour at Buffalo and Erie, the figures showing annual average receipts for specified periods 1868 to 1899, and yearly receipts from 1900 to 1907.

TABLE 135.—LAKE RECEIPTS OF FLOUR AND GRAIN AT BUFFALO AND ERIE, 1868–1907.

Receipts at Buffalo.

[Figures for 1868–1894, inclusive, compiled from Statistics of Lake Commerce, by George G. Tunell; for 1895–1907, inclusive, from reports of the Buffalo Chamber of Commerce, 1905–1907.]

Period or year.	Flour.	Wheat.	Corn.	Oats.	Barley and rye.	Total.
	Barrels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1868–1869 [a]	1,550,000	15,891,500	14,176,500	8,475,500	.....	.....
1870–1874 [a]	1,292,400	23,572,400	24,737,400	6,654,000	.....	.....
1875–1879 [a]	1,023,600	29,756,400	29,003,400	4,279,200	.....	.....
1880–1884 [a]	1,650,600	28,325,800	34,365,000	2,652,800	.....	.....

[a] Figures indicate annual average receipts.

TABLE 135.—LAKE RECEIPTS OF FLOUR AND GRAIN AT BUFFALO AND ERIE, 1868-1907—Continued.

Receipts at Buffalo—Continued.

Period or year.	Flour.	Wheat.	Corn.	Oats.	Barley and rye.	Total.[a]
	Barrels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1885–1889 [b]	4,442,000	34,054,000	32,786,200	5,728,600	.....	.....
1890–1894 [b]	9,026,800	59,698,600	35,149,200	15,814,800	.....	[c] 174,090,399
1895–1899 [b]	10,458,117	58,058,990	52,718,674	39,655,018	17,969,211	219,783,591
1900	11,463,079	47,826,458	63,192,660	28,422,256	11,182,939	207,939,708
1901	11,053,439	61,294,248	30,539,848	21,438,545	8,943,523	177,483,359
1902	12,026,616	62,452,696	22,487,454	15,891,387	12,686,493	173,651,110
1903	11,243,027	40,455,328	43,364,979	30,976,088	13,898,638	184,910,168
1904	6,160,965	26,270,000	27,898,000	19,124,000	17,401,600	121,498,425
1905	10,201,100	40,436,616	32,745,046	25,733,094	15,306,947	165,252,203
1906	10,279,384	55,544,832	25,976,478	23,951,155	14,924,698	171,794,083
1907	9,759,676	66,658,138	28,477,767	11,272,858	12,577,275	167,784,418

Receipts at Erie.

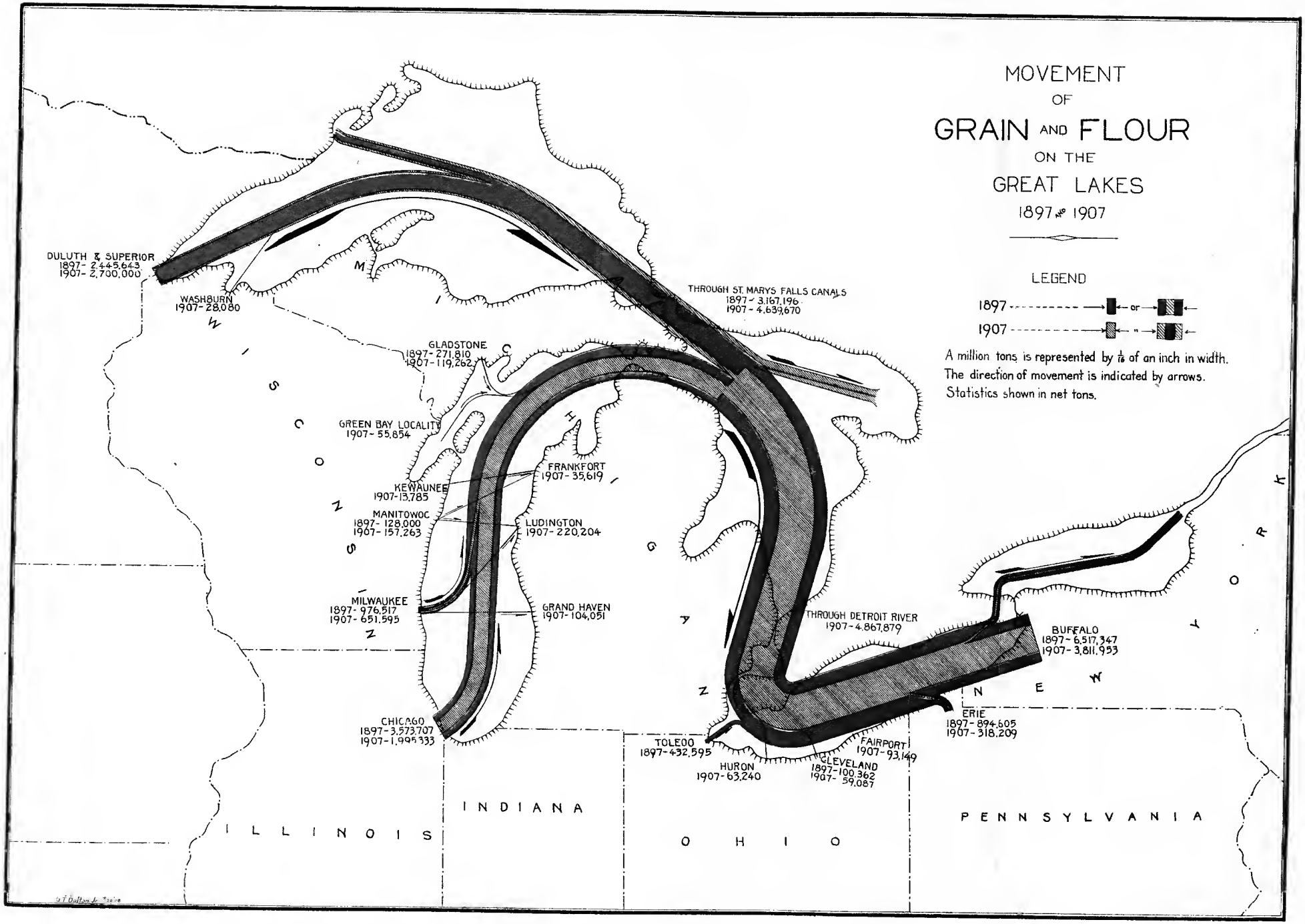
[Figures for 1870–1896, inclusive, compiled from Statistics of Lake Commerce, by George G. Tunell; for 1901–1907 from reports of New York Produce Exchange.]

1870–1874 [b]	217,000	1,709,400	864,000	491,000	.....	.....
1875–1879 [b]	253,400	2,832,600	2,427,200	188,000	.....	.....
1880–1884 [b]	664,600	2,093,000	3,743,600	271,400	.....	.....
1885–1889 [b]	900,200	920,000	1,727,600	[d] 208,000	.....	.....
1890–1894 [b]	1,708,400	4,075,400	5,142,200	[e] 138,500	.....	.....
1895–1896 [b]	1,912,500	3,710,000	4,801,000	217,000	.....	.....
1901	1,187,763	1,071,547	29,996	.....	21,773	6,468,250
1902	1,809,815	1,472,081	30,052	.....	94,886	9,741,186
1903	1,666,313	1,117,928	3,423,196	.....	651,418	12,690,950
1904	847,897	995,276	389,904	.....	523,046	5,723,762
1905	1,398,123	1,383,826	703,251	.....	58,660	8,437,291
1906	1,643,630	3,791,133	1,495,094	.....	11,674	12,694,236
1907	1,587,916	4,603,550	927,912	.....	.....	12,677,084

[a] Including flour reduced to bushels.
[b] Figures indicate annual average receipts
[c] For period 1891–1894, inclusive.
[d] Three years, 1885, 1888, and 1889.
[e] Four years, 1890, 1891, 1893, and 1894.

The decline in Lake receipts of grain and flour during the past ten years is an indication of several distinct factors. In regard to flour and wheat the statistics of traffic through the St. Marys Falls canals show that there has been no such decline in the total movement by Lake; and the smaller receipts at American ports indicate rather the growing importance of exports via Canada and of Canadian shipments of wheat which are also delivered at Canadian ports. The domestic Lake receipts of wheat at United States ports in 1907 were less than three-fourths of the movement of wheat through the St. Marys Falls canals.

In regard to other grain the decline of receipts at United States Lake ports indicates the increased importance of rail movement over that by Lake. But this is only in part the result of the competition



of the trunk lines to the eastern seaboard; it is in larger part due to the decrease in the grain movement to eastern ports, to the notable decrease in the exports of breadstuffs, and to the increasing importance of domestic consumption.[a] These features of recent development in the grain trade are indicated in the following tables, showing the receipts of grain at certain primary markets and Atlantic ports and the exports of certain grain from the United States:

TABLE 136.—RECEIPTS OF GRAIN AT PRIMARY MARKETS, CALENDAR YEARS 1901 AND 1907.

[Statistical Abstract of the United States, 1907, p. 541.]

Market.	1901.	1907.	Market.	1901.	1907.
	Bushels.	*Bushels.*		*Bushels.*	*Bushels.*
Chicago	245,207,653	264,787,241	Omaha		42,597,600
Duluth	51,218,000	69,429,062	St. Louis	60,049,798	85,459,390
Minneapolis	115,626,800	133,911,720	Little Rock		5,518,000
Kansas City	46,768,600	58,919,650			

TABLE 137.—RECEIPTS OF GRAIN AT ATLANTIC PORTS, CALENDAR YEARS 1897 AND 1907.

[Statistical Abstract of the United States, 1907, p. 541.]

Port.	1897.	1907.	Port.	1897.	1907.
	Bushels.	*Bushels.*		*Bushels.*	*Bushels.*
New York	188,528,260	122,210,924	Baltimore	89,986,464	51,274,138
Portland, Me	19,212,523	25,061,918			
Boston	44,797,888	37,776,856	Total	399,100,180	290,242,750
Philadelphia	56,575,045	53,918,914	Montreal	36,960,630	42,954,386

TABLE 138.—DOMESTIC EXPORTS OF GRAIN AND FLOUR, YEARS ENDED JUNE 30, 1898 AND 1907.

[Statistical Abstract of the United States, 1907, p. 452.]

Commodity.	1898.	1907.	Commodity.	1898.	1907.
Flour.....barrels..	15,349,943	15,584,667	Corn.....bushels..	208,744,939	83,300,708
Wheat.....bushels..	148,231,261	76,569,423	Oats.....do....	69,130,288	4,014,042

Facing page 178 is a map showing movement of grain and flour on the Great Lakes in 1897 and 1907, illustrating the foregoing discussion.

[a] The grain movement to Galveston has developed largely during this decade, but the movement to New Orleans has fallen from 45,029,731 bushels in 1897 to 22,444,681 bushels in 1907, and the Galveston business (exports in 1897–98 about 20,000,000 bushels) is not large enough to alter the above statement of general conditions.

Section 4. Movement of lumber.

In recent years the movement of lumber on the Great Lakes has declined in volume and even more in relative importance. Nevertheless lumber still constitutes one of the leading items of traffic on the Lakes, and an account of the earlier traffic and the causes of its decline, as well as the more recent movement, should be noted.

LUMBER PRODUCTION IN THE LAKE STATES.—The Lake movement of lumber is closely associated with the lumber industry in the Lake States, which for many years was the most important lumber district in the United States. The northern portion of the Lake States was originally covered with a fairly dense stand of white pine, merging near the lower borders into hard-wood forests. The region thus covered comprised the upper half of the lower peninsula of Michigan, the entire area of the upper peninsula, and, in general terms, the northern halves of the States of Wisconsin and Minnesota.

The exploitation of the white-pine forests of the Lake States commenced about 1850, and by 1860 had attained a scale of marked importance. During the next decade occurred the greatest relative growth in the operations in this region. Between 1860 and 1880 the product multiplied six times, and between 1850 and 1880 more than twenty times. At the census of 1880 the lumber production of the Lake States occupied first place, with a third of the total output of the United States. The greatest actual increase, however, came in the following decade, but after 1890 the lumber production of this district declined both in absolute amount and relatively to other districts, and in 1905 the Lake States were surpassed in output by the Southern States. It is estimated that from 1873 to 1905 the enormous amount of 200,000 million feet b. m. of white pine has been cut in these States.

Lumbering operations in the Lake States have progressed from the east toward the west. The Saginaw Valley and the Lake Huron shore of Michigan were at first the most important districts, and as late as 1880 the output of Michigan was more than double that of Wisconsin and Minnesota combined. But the Saginaw Valley reached its maximum in 1882, while the districts on Lake Michigan continued to increase their output until 1890, and the lumber production of Minnesota increased until 1900. In the latter year Wisconsin had taken first place among these three States.

The lower peninsula of Michigan has now been largely depleted of its timber and the upper peninsula has been cut to a large extent. In Wisconsin and Minnesota there are large tracts of standing timber, although the output from all of these States is now decreasing. The development of the lumber production in these States is indicated in the following tables, showing the cut of white pine for each year from 1873 and the value of lumber products in census years

since 1850 in these three States, and the lumber cut by districts for certain years:

TABLE 139.—CUT OF WHITE PINE IN MICHIGAN, WISCONSIN, AND MINNESOTA, 1873–1905.

[United States Census of Manufactures, 1905, Part III, p. 642.]

Year.	Total cut.	Year.	Total cut.	Year.	Total cut.
	M feet b. m.		*M feet b. m.*		*M feet b. m.*
1873	3,993,780	1885	7,053,095	1897	6,233,454
1874	3,751,306	1886	7,425,368	1898	6,155,300
1875	3,968,553	1887	7,757,917	1899	6,056,508
1876	3,879,046	1888	8,254,291	1900	5,419,333
1877	3,595,333	1889	8,183,048	1901	5,336,448
1878	3,629,473	1890	8,597,623	1902	5,294,395
1879	4,806,943	1891	7,879,948	1903	4,791,852
1880	5,651,295	1892	8,594,223	1904	4,220,917
1881	6,768,857	1893	7,326,264	1905	3,663,963
1882	7,552,150	1894	6,821,516		
1883	7,624,790	1895	7,050,669	Total	200,998,454
1884	7,935,033	1896	5,725,763		

TABLE 140.—VALUE OF LUMBER PRODUCTS IN MICHIGAN, WISCONSIN, AND MINNESOTA IN CENSUS YEARS, 1850–1905.

[United States Census of Manufactures, 1905, Part III, p. 617.]

Year.	Michigan.	Wisconsin.	Minnesota.	Total.
1850	$2,464,329	$1,249,953	$57,800	$3,772,082
1860	7,303,404	4,616,430	1,257,603	13,177,437
1870	31,946,396	15,130,719	4,299,162	51,376,277
1880	52,449,928	17,952,347	7,366,038	77,768,313
1890	83,121,969	60,966,444	25,075,132	169,163,545
1900	53,915,647	57,882,001	42,689,932	154,487,580
1905	40,569,335	44,395,766	33,183,309	118,148,410

TABLE 141.—LUMBER CUT OF LAKE REGION, 1889, 1894, AND 1899, BY DISTRICTS.

[Compiled from Commercial Monographs, 1900.]

District.	1889.	1894.	1899.	District.	1889.	1894.	1899.
	M feet.	*M feet.*	*M feet*		*M feet.*	*M feet.*	*M feet.*
Lake Erie points.	68,500	48,845	26,313	Lake Michigan—Con.			
Lake Huron:				Green Bay Shore	918,920	696,830	602,231
Saginaw Valley	836,184	482,558	193,251	Miscellaneous[a]	481,752	472,044	312,681
Lake Shore	601,594	210,614	61,773				
Cheboygan	105,568	87,800	42,575	Total	2,375,789	1,666,251	1,108,146
Total	1,543,346	780,972	297,599	Lake Superior:			
Lake Michigan:				Duluth	204,254	342,806	731,600
Manistee	284,126	261,536	117,855	Ashland	152,000	264,540	507,055
Ludington	136,406	93,765	33,280	Total	356,254	607,346	1,238,655
White Lake	24,875	14,066					
Muskegon	490,912	127,510	42,099	Grand total	4,343,889	3,103,414	2,670,713
Grand Haven	38,798	500		Lake States	8,183,050	6,821,516	6,153,940

[a] Chicago and Lake Superior district.

TABLE 142.—LUMBER PRODUCTION OF SAGINAW VALLEY, IN SPECIFIED YEARS, 1865–1899.

[Report of New York Committee on Canals, 1899, p. 210, and Commercial Monographs, 1900.]

Year.	Lumber.	Shingles.	Laths.	Year.	Lumber.	Shingles.	Laths.
	M feet.	*M.*	*M.*		*M feet.*	*M.*	*M.*
1865	250,639	.....	.....	1885	717,790	222,453	80,931
1870	576,726	178,570	61,287	1890	833,054	221,839	129,731
1875	581,558	124,030	73,209	1895	388,266	49,843	.....
1880	873,047	241,075	65,663	1899	193,251	62,285	.....
1882	1,011,274	295,046	94,703				

TABLE 143.—LUMBER CUT OF DULUTH DISTRICT, IN SPECIFIED YEARS AND PERIODS, 1881–1903.

[Commercial Monographs, 1900.]

Year or period.	Lumber.	Shingles.	Laths.	Year or period.	Lumber.	Shingles.	Laths.
	M feet.	*M.*	*M.*		*M feet.*	*M.*	*M.*
1881	94,000	38,000	13,000	1895	494,500	83,210	87,440
1885	192,000	45,000	28,000	1899	731,600	127,933	149,782
1890	191,000	80,000	32,000	1891–1899	3,862,364	755,477	690,721
1881–1899	1,802,000	636,000	301,000	1903	[a]1,067,133	.....	.....

[a] Report of the Duluth Board of Trade, 1903, p. 19.

LAKE TRAFFIC.—There are no records showing the total movement of lumber on the Great Lakes prior to 1901, but, in addition to the statistics of production in the Lake districts given above, the general situation can be shown by statements of shipments from Saginaw Valley, the movement through St. Marys Falls canals, and the receipts by Lake at the great lumber marts at Buffalo, Tonawanda, Cleveland, Toledo, Detroit, Milwaukee, and Chicago. From 1901 the reports of the Bureau of Statistics show the domestic shipments and receipts at all Lake ports.

TABLE 144.—LAKE AND ALL-RAIL SHIPMENTS OF LUMBER FROM SAGINAW RIVER POINTS, 1885–1897.

[Tunell's Statistics of Lake Commerce, p. 96.]

Year.	Rail.	Lake.	Year.	Rail.	Lake.
	Feet.	*Feet.*		*Feet.*	*Feet.*
1885	149,672,900	659,565,000	1892	427,490,000	347,866,091
1886	176,500,000	591,013,100	1893	369,000,000	173,154,000
1887	261,900,000	486,285,000	1894	381,450,000	182,600,017
1888	304,362,500	451,391,000	1895	393,527,000	136,120,632
1889	352,500,000	432,130,000	1896	280,572,500	68,743,000
1890	401,847,000	409,972,000	1897	379,000,000	89,137,511
1891	408,258,000	404,577,000			

It will be noted that from the Saginaw Valley the shipments of lumber have not only declined in proportion to the decrease in lumber production in that district, but that the shipments by Lake decreased even more rapidly, and that after 1890 the larger proportion of shipments from this district went by rail.

The statistics of traffic through the St. Marys Falls canals (p. 211) show that Lake shipments of lumber from Lake Superior points began to be of considerable importance in 1884, when the lumber traffic through the canals first exceeded 100,000,000 feet. From this year the movement increased rapidly until 1899, when the canal traffic amounted to 1,038,057,000 feet. Then for a few years the movement was comparatively stationary, after which, however, the lumber traffic from Lake Superior began to decline.

Lake receipts reached their maximum at Tonawanda, N. Y., in 1890 and at Buffalo in 1892, the maximum receipts for these two ports combined being 1,004,984,000 feet of lumber in 1890. At Cleveland the maximum Lake receipts of lumber (714,476,000 feet) were also reached in 1892, and the maximum at Toledo in 1888. At Chicago the maximum receipts of lumber by Lake were 1,872,976,000 feet in 1882, but the decline in Lake receipts did not become noticeable until after 1890. At Milwaukee the maximum Lake receipts were 192,448,000 feet in 1892.

At all of these points, by 1890, lumber was arriving by rail in important quantities; and at Buffalo the rail receipts were already more than twice the Lake receipts by 1892. At other ports Lake receipts continued for some time to form the larger portion of lumber received, but the amount and proportion of lumber by rail rapidly increased. By 1907 only one-sixth of the lumber received at Chicago came by Lake, the remaining five-sixths coming by rail from all parts of the United States, including the States on the Pacific coast.

The reasons assigned for the decline of this important traffic are given in Mr. G. G. Tunell's report on Lake commerce as follows:

> With the depletion of the forests of white and Norway pine contiguous to the Lakes and near the rivers flowing into the Lakes, the transportation situation has been radically altered. As the lumbermen have been forced to go farther and farther into the interior, the railroads have found it correspondingly easier to compete with the Lake carriers. This has followed because in a great many cases it has not paid to haul the logs to the logging streams flowing into the Lakes or to transport them directly to the mill at the Lake side. The former plan has also been growing in disfavor for other reasons. Logs in some districts now have considerable value, and a good many are lost in floating them to the mills. Then, too, there may be delays in driving the logs because of ice or a lack of water. Now, as the cost involved in moving the logs from the remote

districts to the Lake shore is often sufficient to prevent such movement, the logs are sawed at mills located at interior points. From these interior mills the lumber generally goes to market by rail, for the cost of shipping by the combined rail-and-water route with its charges for transshipment is greater than that by the all-rail lines.

There are also other factors that make it advantageous to ship by the all-rail lines from the interior mills. The railroads have better terminals in the large ports. This factor is often of sufficient importance to determine whether lumber is to go by the all-rail or lake-and-rail lines. With the rapid increase of the population of many of the Lake cities, the local trade has grown wonderfully, and in some instances now exceeds the out-of-town or wholesale business. The growth of the retail business is of significance, because it necessitates the delivery of lumber to localities remote from the docks. To avoid the large expense involved in the cartage, lumber yards are established in the outlying districts and suburbs. These yards find it advantageous to receive their stocks directly by rail, particularly where there is no extra charge for switching. In cities covering a vast extent of territory the cost of delivering bulky articles, such as coal and lumber, by team from a central point often forms a large proportion of the price paid for the commodities. It is therefore highly desirable to carry such commodities as near the point of consumption as possible by cheaper means of transportation. The railroads furnish this economical form of carriage. * * *

Altered methods of doing business at the mills also in part explain the greater rail movement. It is becoming the custom to sort lumber where it is sawed, and it is therefore possible to fill orders of consumers and country dealers directly from the mills. These consignments generally go by rail. Formerly the sorting was done by the wholesalers at the great distributing centers about the Lakes, who bought supplies by the cargo and often made a large portion of their profits by a nice manipulation of the mixed stocks received. * * *

The change from pine to hard wood is of great significance, for hard-wood logs are so heavy that they do not float, and they are therefore generally sawed at interior mills. * * *

The necessity of transfer has always been a handicap upon the Lake carriers, and where the cost of transshipment has not fallen as freight rates have fallen this burden has been an increasing one. It may be said, almost without qualification, that no improvements have been made in handling lumber on the docks. Everything is now done, as it was a half century ago, by main strength. Practically all the work is accomplished by manual labor. Machinery is used to a very limited extent in hoisting posts and ties from the ship's hold, but lumber is still handled in the primitive way. * * *

Map facing page 186 shows the movement of lumber on the Great Lakes in 1897 and 1907, illustrating the decline in traffic during the decade.

TABLE 145.—RECEIPTS OF LUMBER AND SHINGLES AT CHICAGO AND MILWAUKEE IN SPECIFIED YEARS, 1860–1907.

[Compiled from Tunell's Statistics of Lake Commerce and reports of the Chicago and Milwaukee boards of trade.]

Year.	Chicago.				Milwaukee.			
	Lumber.		Shingles.		Lumber.		Shingles.	
	By lake.	By rail.	By lake.	By rail.	By lake.	By rail.	By lake.	By rail.
	M feet.	*M feet.*	*M.*	*M.*	*M feet.*	*M feet.*	*M.*	*M.*
1860	254,499	7,995	127,803	91	30,124	.....	12,871	.....
1865[a]	614,020	33,125	193.230	117,667	33,372	8,684	2,589	.....
1870	979 759	39,239	350.561	301,530	.....	.....	.....	.....
1875	1,080 599	66,594	420,298	215,410	106,067	26,309	11,030	193,348
1880	1,419,974	141,805	583,340	66,206	132,614	57,824	31,447	101,249
1885	1,504,186	240,706	744.191	51,057	149,156	89,101	42,128	48,090
1890	1,359,921	581,471	389 195	126,380	140,273	236,957	.....	.....
1895	1,073,847	564,283	147 206	205,107	145,809	51,773	5,827	1,455
1900	590,270	1,006,476	70,465	268,023	139,594	54,635	5,476	3,644
1901	730,691	1,256,889	57,723	266,544	.....	.....	.....	.....
1902	644,076	1,425,309	95,096	378,780	.....	.....	.....	.....
1903	459,848	1,251,500	22,743	443,659	.....	.....	.....	.....
1904	395,646	1,274,626	19,070	431,454	.....	.....	.....	.....
1905	448,163	1,745,377	13,530	569,804	84,215	120,657	4,375	41,630
1906	428,835	1,934,021	14,125	570,539	72,786	212,335	20,469	42,100
1907	411,947	2,067,511	26,515	491,597	74,927	212,070	5,481	37,600

[a] Figures for Chicago are for board of trade year, which ended three months after the calendar year.

TABLE 146.—LAKE RECEIPTS OF LUMBER, SHINGLES, LATHS, AND TIES AT CLEVELAND, TOLEDO, BUFFALO, AND TONAWANDA IN SPECIFIED YEARS, 1870–1907.

[Figures for 1870–1897, inclusive, compiled from Statistics of Lake Commerce, by Geo. G. Tunell; for 1900–1907 from Monthly Summary of Commerce and Finance and from reports of Buffalo Chamber of Commerce.]

Year.	Cleveland.			Toledo.		Buffalo.			Tonawanda.		
	Lumber.	Shingles.	Laths.	Lumber.	Shingles.	Lumber.	Shingles.	Ties.	Lumber.	Laths.	Shingles.
	M feet.	*M.*	*M.*	*M feet.*	*M.*	*M feet.*	*M.*	*Number.*	*M feet.*	*M.*	*M.*
1870	158,866	108,002	63,173	.....	.....	.....	.....	.....	.....	.....	.....
1875	140,980	78,945	3,510	.....	.....	.....	.....	.....	.....	.....	.....
1876	102,609	73,565	34,318	.....	.....	119,146	.....	.....	.....	.....	.....
1880	231,263	96,797	19,461	197,011	15,505	214,169	.....	.....	.....	.....	.....
1882	317,810	112,369	34,457	218,000	3,838	248,196	44,908	840,200	.....	.....	.....
1885	.....	.....	.....	230,000	10,100	240,637	52,716	87,500	.....	.....	.....
1887	.....	.....	.....	182,000	6,100	264,612	36,705	93,080	501,536	10,096	63,435
1890	495,984	60,998	18,537	192,000	4,929	287,334	73,500	197,110	717,650	13,039	52,232
1892	714,476	152,733	35,795	173,000	400	298,980	42,165	312,500	498,000	6,243	42,809
1895	351,883	45,599	12,199	159,000	2,200	231,257	92,588	133,928	421,372	8,547	41,310
1897	229,971	44,158	16,413	122,000	2,300	221,302	110,401	328,052	584,837	7,529	49,501
1900	[a]441,133	.....	.....	[a]95,526	.....	[a]162,243	.....	.....	388,783	1,646	55,516
1903	[a]241,235	.....	.....	[a]61,169	.....	179,453	158,162	66,444	476,846	3,946	5,997
1904	[a]194,545	.....	.....	[a]41,310	.....	202,950	181,083	129,000	420,640	3,534	2,340
1905	[a]221,081	.....	.....	[a]33,818	.....	172,537	295,950	60,200	459,571	3,415	.....
1906	[a]175,100	.....	.....	[a]37,799	.....	194,165	227,436	96,837	441,609	4,686	2.790
1907	[a]109,169	.....	.....	[a]23,410	.....	141,683	223,444	30,877	331,332	7,291	2,250

[a] Domestic receipts only, from Monthly Summary of Commerce and Finance.

According to the figures of the Bureau of Statistics (Table 147), showing domestic shipments and receipts of lumber at Lake ports since 1900, the aggregate movement by water has continued to decline in recent years. In comparison with the great increase in the total traffic, this marks a still greater decline in the relative importance of the lumber traffic on the Lakes.

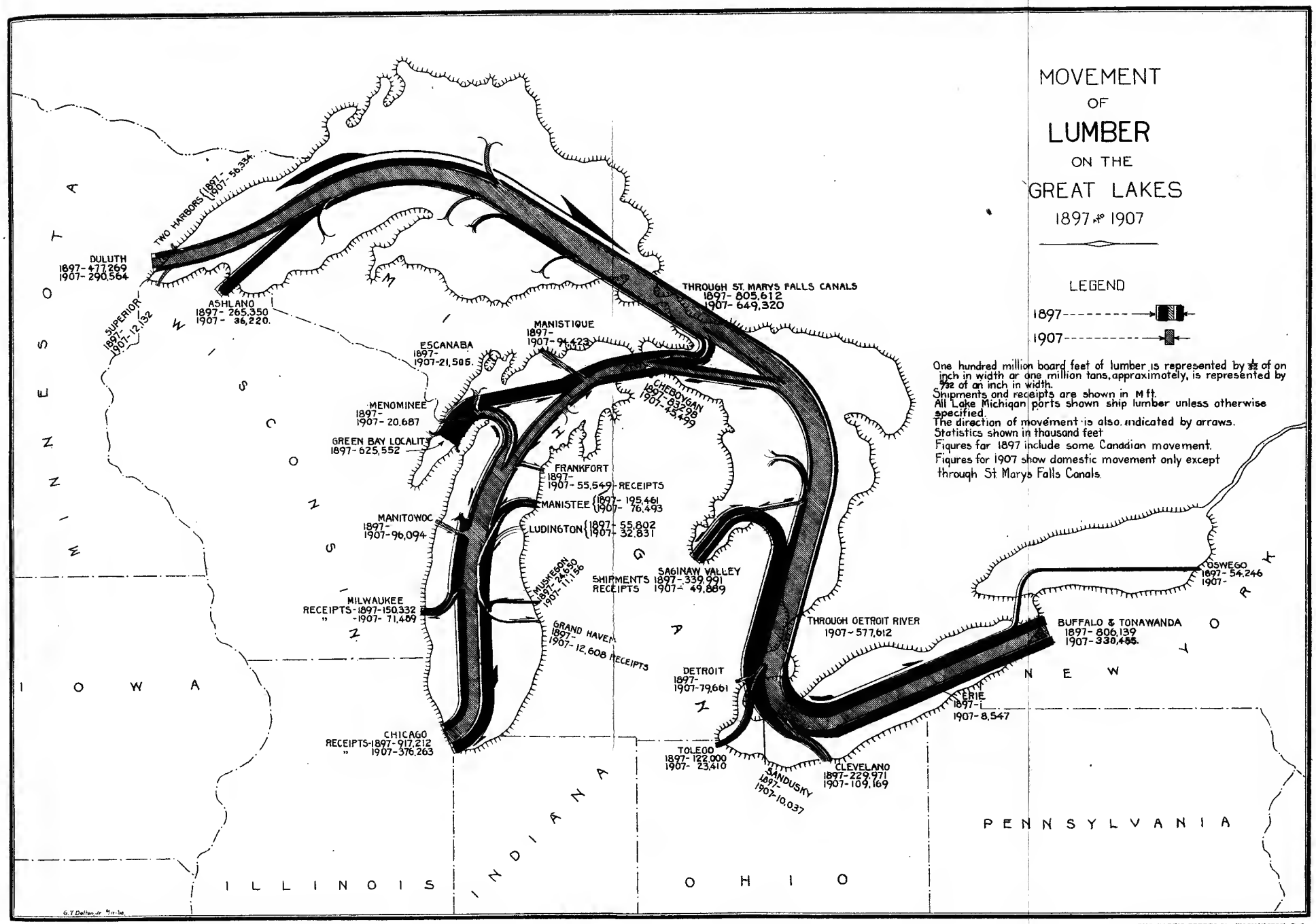
This general reduction is indicated also at most of the important ports, and is especially marked in lumber shipments from Superior, Menominee, Marinette, and Manistee, and in receipts at Tonawanda, Buffalo, Cleveland, Chicago, and Milwaukee. A notable feature of these latter years has been the shifting of trade within the Lakes, and some ports show an increasing business. Thus, such shipping points as Two Harbors, Minn., and Washburn and Manitowoc, Wis., have risen in importance; there has been some increase in lumber shipments from Manistique, Mich.; and Milwaukee has become a point of shipment by Lake. So, too, lumber receipts by Lake have increased at Detroit, Frankfort, and Ludington, Mich., while Saginaw and Bay City, formerly leading shipping points, now receive lumber by Lake and also import logs from the Canadian shore.

TABLE 147.—DOMESTIC SHIPMENTS AND RECEIPTS OF LUMBER AT LAKE PORTS, 1900 AND 1905–1907.

[Compiled from Monthly Summary of Commerce and Finance.]

Lake shipments.

Port.	1900.	1905.	1906.	1907.
	M feet.	*M feet.*	*M feet.*	*M feet.*
Duluth	369,220	357,814	461,477	290,564
Superior	107,975	55,144	45,405	12,132
Two Harbors	21,453	37,730	57,540	56,334
Ashland	168,346	95,924	56,889	15,997
Washburn	.....	71,692	38,517	20,223
Marquette	13,563	9,735	2,021	2,895
Sault Ste. Marie	.....	26,911	10,166	16,212
Manistique	74,725	117,272	91,413	94,423
Escanaba	6,050	5,172	10,412	12,799
Gladstone	.....	16,477	5,264	8,706
Menominee	107,632	33,437	25,281	20,687
Marinette	127,870	72,840	46,805	35,484
Green Bay	.....	11,261	9,556	20
Manitowoc	53,964	120,599	115,612	96,094
Milwaukee	19,758	61,352	57,030	42,322
Ludington	31,447	32,214	33,009	32,831
Muskegon	.....	17,327	14,106	11,156
Manistee	140,335	90,805	99,568	76,493
Frankfort	12,108	14,426	14,397	9,979
Charlevoix	31,712	15,816	9,514	8,155
Cheboygan	.....	48,938	50,717	45,499
Total (including minor ports)	.....	1,854,875	1,807,570	1,380,284



FIGURES FOR ASHLAND, 1907, INCLUDE SHIPMENTS FROM WASHBURN. FIGURES FOR ESCANABA INCLUDE SHIPMENTS FROM GLADSTONE.

TABLE 147.—DOMESTIC SHIPMENTS AND RECEIPTS OF LUMBER AT LAKE PORTS, 1900 AND 1905-1907—Continued.

Lake receipts.

Port.	1900.	1905.	1906.	1907.
	M feet.	*M feet.*	*M feet.*	*M feet.*
Ogdensburg	.....	5,530	13,367	5,826
Tonawanda and North Tonawanda	309,893	414,340	356,459	232,397
Buffalo	162,243	143,132	137,710	98,058
Erie	11,938	10,183	9,440	8,547
Cleveland	441,133	221,081	175,100	109,169
Sandusky	25,445	30,190	27,454	10,037
Toledo	95,526	39,818	37,799	23,410
Detroit	64,580	68,615	91,093	79,661
Saginaw	.....	12,096	27,886	24,986
Bay City	.....	38,759	32,042	24,903
Frankfort	22,410	76,738	58,912	55,549
Ludington	52,867	168,956	140,770	105,137
Muskegon	.....	6,014	11,683	12,360
Grand Haven	.....	11,377	14,958	12,608
Michigan City	.....	41,926	33,069	21,667
Chicago	562,161	423,993	405,422	376,263
South Chicago	116,627			
Racine	15,104	3,637	4,509	3,644
Milwaukee	122,118	85,197	71,956	71,489
Sheboygan	56,030	7,985	8,523	8,051
Manitowoc	10,151	13,099	9,749	7,726
Duluth-Superior	23,298	890	4,225	5,104
Total (including minor ports)	.....	1,871,269	1,748,555	1,377,807

Section 5. Movement of coal.

Next in volume to iron ore, and most important in the westbound freight traffic on the Great Lakes, is the movement of coal. To the Lake carriers this movement is of special importance in furnishing their principal "back load," or westward cargo. If it were not for coal most of the vessels carrying iron ore, grain, and lumber to lower Lake ports would be obliged to return empty. To the great territory west and north of Lakes Michigan and Superior, which has no coal resources of its own, this movement means cheap coal, both for domestic and manufacturing purposes. Coal is carried from Buffalo to Duluth at from 25 to 35 cents a ton, a fact of great significance to the Northwest.

Both anthracite and bituminous coal are shipped by Lake in large quantities. Most of the anthracite is shipped from Buffalo, but there are also considerable quantities from Erie, Charlotte, Oswego, and Ogdensburg. Bituminous coal is shipped to a slight extent from Buffalo, but principally from Lake Erie points farther west. Cleveland has been the largest shipping point for this kind of coal, but it is now closely pressed by Ashtabula and Toledo, while large shipments are also made from Erie, Conneaut, Fairport, Lorain, Huron, and Sandusky.

Tables 148 and 152 show the shipments of coal from Lake Ontario and Lake Erie ports for certain years from 1889 to 1907. Lake Ontario shipments are comparatively small and stationary. A considerable proportion of the total shipments from these ports is for export to Canadian points. Shipments from Buffalo amounted to half a million tons by 1873, exceeded a million tons in 1883, and have continued to increase rapidly. The total shipments from Lake Erie were about 5,500,000 tons in 1889, and by 1895 over 7,500,000 tons. The total domestic shipments of coal from all Lake ports in 1901 amounted to 9,480,000 tons, in 1906 to 17,576,000 tons, and in 1907 to 21,525,000 tons.

A considerable item in the Lake coal trade is the bunker coal shipped for fuel in outgoing vessels. This amounted to slightly more than 2,000,000 tons in 1906 and about the same in 1907. This bunker coal is included in the total shipments, but, naturally, does not reappear in the receipts.

TABLE 148.—LAKE SHIPMENTS OF COAL IN SPECIFIED YEARS, 1889–1906, BY LAKES AND PORTS.

Lake and port.	1889.[a]	1895.[a]	1900.[b]	1905.[b]	1906.[b]
Lake Ontario:	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Ogdensburg	67,666	75,815	192,923	[c] 177,540	[c] 176,848
Oswego	282,098	544,882	425,641	600,702	482,553
Fair Haven	119,317	62,285	52,200	105,026	102,110
Sodus Point	12,935	42,669	82,260	42,697	53,740
Charlotte	350,000	361,578	397,032	586,807	416,834
Down Welland Canal	27,500	8,412	[d] 2,352	[d] 41,088	[d] 111,243
Total	859,516	1,095,641	1,152,408	1,553,860	1,343,328
Lake Erie:					
Up Welland Canal	238,388	150,452	[d] 45,032	[d] 81,554	[d] 36,284
Buffalo	2,168,343	2,617,268	1,826,091	2,785,362	2,681,808
Erie	410,403	727,184	1,130,842	813,766	1,128,591
Conneaut	.....	171,363	351,015	[c] 1,156,386	[c] 885,633
Ashtabula	489,585	979,199	1,593,223	[c] 2,051,152	[c] 2,512,867
Fairport	59,438	224,080	253,593	[c] 143,121	[c] 321,671
Cleveland	825,030	1,278,627	2,193,526	[c] 2,570,030	[c] 3,073,500
Lorain	273,674	295,057	402,662	[c] 1,180,516	[c] 1,807,098
Huron	56,000	208,000	295,635	[c] 786,690	[c] 786,603
Sandusky	275,385	223,134	755,004	[c] 885,341	[c] 785,804
Toledo	650,000	716,099	1,547,968	[c] 2,145,573	[c] 2,325,259
Total	5,446,246	7,590,463	10,394,591	14,599,491	16,345,118
Lake Michigan:					
Frankfort	.....	.....	.....	25,661	44,306
Grand Haven	.....	.....	150	24,388	14,976
Ludington	.....	.....	91,501	331,897	454,463
Total	.....	.....	91,651	381,946	513,745
Grand total	6,305,762	8,686,104	11,638,650	16,535,297	18,202,191

[a] Compiled from Report of New York Committee on Canals.
[b] Compiled from Report of Chief of Engineers, U. S. Army.
[c] Includes coke.
[d] From Canadian government Report on Railways and Canals.

RECEIVING PORTS.—In the coal traffic the ports of destination are more numerous than the ports of shipment. All the ports on the upper Lakes, both large and small, receive coal not only for their own use, but to a greater or less extent for the surrounding country. Nevertheless, Chicago and Milwaukee, at the head of Lake Michigan and Duluth-Superior, at the head of Lake Superior, are the chief receiving ports for coal, and the distributing points for the northwestern region. The territory supplied from these ports expands and contracts with variations in rates; but, according to Mr. George G. Tunell, writing in 1898, the district supplied with hard coal from the head of Lake Superior can be roughly described as the area north and west of "a line drawn from Eau Claire, Wis., to La Crosse, and through southeastern Minnesota, across northwestern Iowa to the Missouri River, and down this river to Kansas City and then west." Mr. Tunell also says:

> It would be difficult to indicate the line separating the territory supplied with soft coal by Duluth and Superior from that supplied by Chicago and Milwaukee. It may, however, be said that the line would be pushed somewhat back to the north and west.

Lake and rail competition at Chicago.—In the westward movement of coal from the mines to Chicago there has been continued competition between the railroads and the Lake carriers. In the earlier days coal receipts at Chicago were almost entirely by Lake. In 1860 the Lake receipts were 90 per cent of the total, receipts by the Illinois and Michigan Canal 5 per cent, and by rail 5 per cent. A year later rail receipts were only 1 per cent of the total. From this time, however, while Lake receipts increased in volume, they decreased in proportion to the total traffic. Canal receipts soon ceased to play any considerable part, and railroad receipts increased rapidly. By 1878 Lake receipts had risen to 730,000 tons, but this was only 40 per cent of the total, while rail receipts had risen to 1,092,000 tons, almost 60 per cent of the total receipts. Lake receipts continued to increase in actual amount for another decade, since when they have remained approximately stationary. Rail receipts have continued to increase both in amount and in relation to the total. By 1888, 75 per cent of the receipts of coal at Chicago came by rail, by 1898 rail receipts were 79 per cent of the total,[a] and in 1906 they were over 93 per cent of the total.

In connection with this increase in the amount and proportion of rail receipts, it is important to note that the contest has been determined in large part by the kind of coal and to the difference in the geographical location of the mines. Much the greater part of the coal now received at Chicago by Lake is anthracite or hard coal, and most of this class of coal is brought by vessels, while nearly all soft coal arrives by railroad.

Hard coal is carried by rail from the anthracite mines in eastern Pennsylvania to Buffalo and Erie. From here to Chicago, even for

[a] Commercial Monographs, 1900

this coal, the Lake carriers are at a disadvantage in regard to distance. As already noted with reference to the grain movement eastward, the distance between Buffalo and Chicago by Lake is 889 miles, while it is but 523 miles by rail. Nevertheless, the advantage of the water route is sufficient to overcome this greater distance as well as the cost of transshipment at Buffalo.

In regard to bituminous coal, however, the location of the mines places the Lake route at a much greater disadvantage. This is true even of the older bituminous districts in western Pennsylvania, West Virginia, and southern Ohio, which formerly were the chief sources of supply of this coal to Chicago. The additional distance by rail from those districts to Chicago over the haul to Lake Erie ports is only from 200 to 300 miles, as against the Lake distance of 800 miles. Moreover, in transshipment soft coal breaks very much more than hard coal, involving considerable loss, which also operates against the use of the Lake route. But much the larger part of the bituminous coal arriving at Chicago comes now from the coal mines of Illinois and Indiana, from where the all-rail distance to Chicago is as short or shorter than to the coal-shipping ports on Lake Erie. In 1895 four-fifths of the bituminous coal received at Chicago came from Indiana and Illinois. For this coal the geographical situation makes Lake transportation out of the question.

TABLE 149.—RECEIPTS OF COAL AT CHICAGO IN SPECIFIED YEARS, 1872-1907.

[Compiled from Tunell's Report on Lake Commerce, p. 90; Chicago Board of Trade, 1907, p. 104; Monthly Summary of Commerce and Finance; and Mineral Resources of the United States, 1906, p. 638.]

Year.	By Lake.			Total Lake and rail.	Year.	By Lake.			Total Lake and rail.
	Anthracite.	Bituminous.	Total.			Anthracite.	Bituminous.	Total.	
	Tons.	*Tons.*	*Tons.*	*Tons.*		*Tons.*	*Tons.*	*Tons.*	*Tons.*
1872.....	495,765	90,820	586,585	1,398,024	1901...	1,012,160	59,495	1,071,655	9,439,952
1875.....	474,812	273,894	748,706	1,641,488	1902...	[a] 249,963	64,480	314,443	9,834,957
1880.....	457,317	288,987	746,304	2,706,088	1903...	1,157,270	104,841	1,262,111	11,359,022
1885.....	741,866	206,817	948,683	3,978,675	1904...	971,921	71,985	1,043,906	10,758,264
1890.....	1,236,021	40,766	1,276,787	4,737,384	1905...	884,057	83,204	967,261	10,817,681
1895.....	1,269,512	.....	1,269,512	6,091,284	1906...	810,988	127,163	938,151	12,246,529
1900.....	998,580	77,230	1,075,810	8,839,657	1907...	1,015,776	438,492	1,454,268	.....

[a] Anthracite coal strike.

Milwaukee.—Milwaukee is 85 miles north of Chicago, and this reduction in the Lake distance and increase in the rail haul seems enough to change entirely the position of the rail and Lake lines in the coal traffic. Only about 10 per cent of the coal received at Milwaukee comes by rail, and some of this is moved across Lake Michigan by car ferries. What coal comes all rail is from Illinois.

Lake receipts at Milwaukee come from all of the Lake Erie shipping ports, but mostly from Buffalo, Erie, Cleveland, and Toledo. As shown in Table 150, there were some coal receipts as early as 1861;

by 1880 these had increased to 300,245 tons, by 1890 to 903,659 tons, and by 1900 to 1,651,442 tons. Since the latter date coal receipts by lake have continued to increase at an even more rapid rate, and in 1907, 4,039,512 tons arrived by water.

TABLE 150.—RECEIPTS OF COAL AT MILWAUKEE IN SPECIFIED YEARS, 1861–1907.

[Compiled from Tunell's Report on Lake Commerce and reports of Milwaukee Chamber of Commerce.]

Year.	By Lake.	By rail.	Total.	Year.	By Lake.	By rail.	Total.
	Net tons.	*Net tons.*	*Net tons.*		*Net tons.*	*Net tons.*	*Net tons.*
1861	31,608	.....	.....	1901	1,765,021	[a] 188,468	1,953,489
1865	36,369	.....	.....	1902	1,373,971	[a] 267,124	1,641,095
1875	228,674	15,962	244,636	1903	2,649,351	[a] 372,292	3,021,643
1880	300,245	68,323	368,568	1904	2,696,334	[a] 248,105	2,944,439
1885	710,736	65,014	775,750	1905	2,835,132	[a] 322,332	3,157,464
1890	903,659	92,999	996,658	1906	3,354,072	[a] 461,203	3,815,275
1895	1,336,603	109,820	1,446,423	1907	4,039,512	[a] 309,995	4,349,507
1900	1,651,442	157,151	1,808,593				

[a] Including car ferries.

Other coal-receiving ports of some importance on Lake Michigan are Racine, Sheboygan, Manitowoc, Green Bay, Marinette, Gladstone, Escanaba, and Manistique, but several of these points receive most of their coal by railroad-car ferries across the Lake.

Lake Superior.—To points on Lake Superior the railroads not only have no advantage in distance as compared with the Lake route from the eastern coal districts but they are in fact at a distinct disadvantage in this respect. Under these conditions the whole movement of coal to Duluth-Superior and other ports on Lake Superior is by lake. The development of this trade is shown in Table 151, giving the movement through St. Marys Falls canals for certain years since 1855 and the receipts at Duluth-Superior. Some coal moved through the canal from the beginning, but the amount did not reach 100,000 tons until 1875, and the rapid development of this traffic dates from the opening of the enlarged canal in 1881. Since then the movement has increased at an astonishing rate, surpassed only by the eastward movement of iron ore. By 1886 the coal traffic through the canal was over a million tons; in 1896 it was over 3,000,000 tons, while in the next decade this figure had been practically trebled, and in 1907 the total coal movement through the canals was 11,400,095 tons.

Duluth-Superior receives more than half of the coal passing through the St. Marys Falls canals, and the receipts have grown in proportion to the canal traffic. In 1907 over 7,000,000 tons of coal were received at these ports. The larger part of this coal is delivered at Superior, which receives nearly all of the anthracite.

Large quantities of coal are also delivered at other points on Lake Superior, including Marquette, Hancock-Houghton and other points on the Portage-Lake waterway, Ashland, and Two Harbors.

TABLE 151.—COAL TRAFFIC OF LAKE SUPERIOR IN SPECIFIED YEARS, 1855–1907.

[Compiled from Monthly Summary of Commerce and Finance and G. G. Tunell's Statistics of Lake Commerce.]

Year.	Through St. Marys Falls canals.	Receipts at Duluth-Superior.	Year.	Through St. Marys Falls canals.	Receipts at Duluth-Superior.
	Net tons.	*Net tons.*		*Net tons.*	*Net tons.*
1855	1,414	.....	1895	2,574,362	1,654,882
1870	15,952	.....	1900	4,486,977	2,350,111
1875	101,260	.....	1905	6,509,056	3,668,556
1880	170,501	60,000	1906	8,739,630	5,330,119
1885	894,991	592,000	1907	11,400,095	7,024,684
1890	2,176,925	1,780,000			

TABLE 152.—DOMESTIC SHIPMENTS AND RECEIPTS OF COAL FROM THE PRINCIPAL PORTS ON THE GREAT LAKES, RELATIVE RANK OF EACH PORT, AND PERCENTAGE OF SHIPMENTS OR RECEIPTS OF EACH PORT TO TOTAL SHIPMENTS OR RECEIPTS, 1897, 1901, AND 1905–1907.

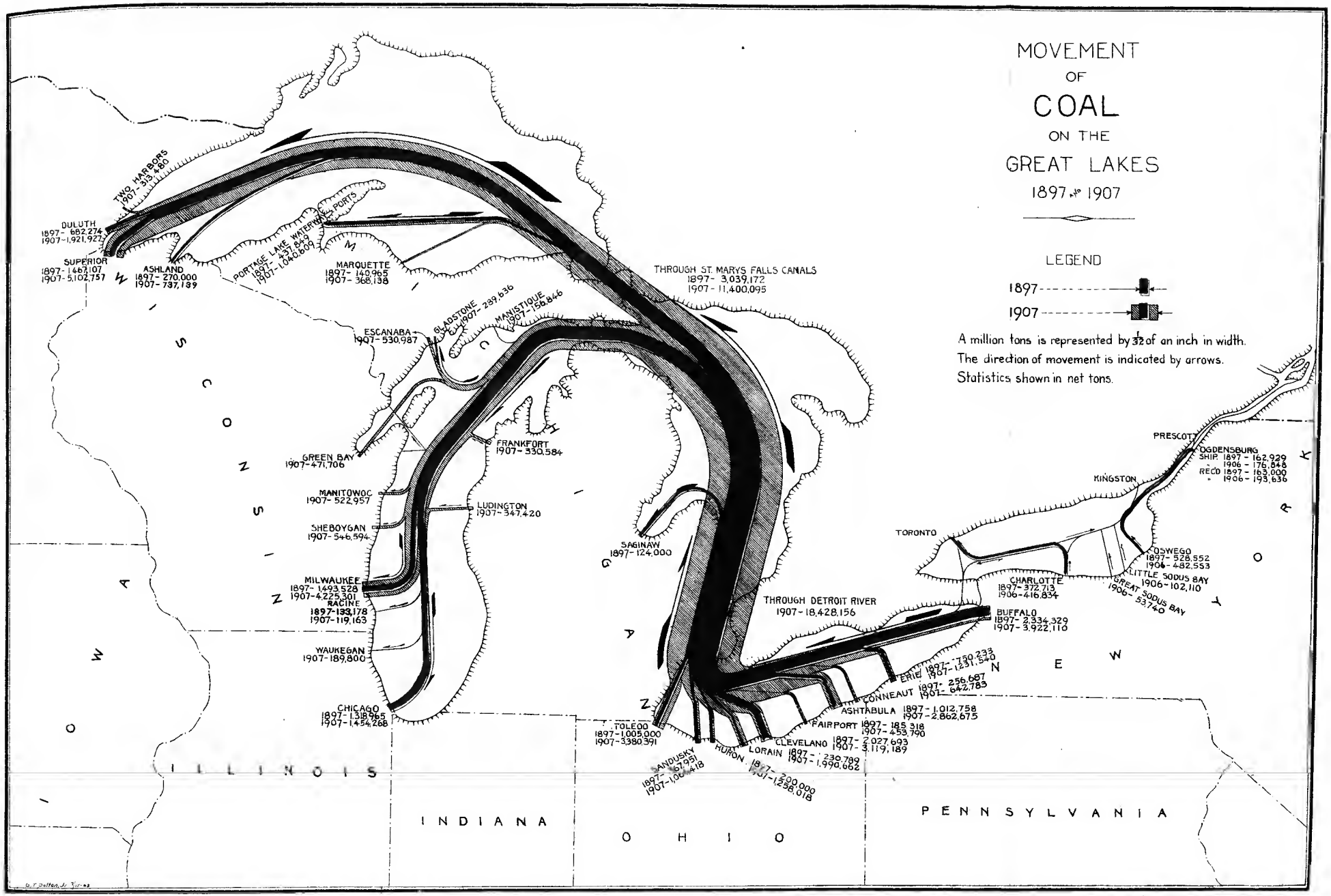
[Statistics for 1897 compiled from various sources; 1901–1907 compiled from Monthly Summary of Commerce and Finance.]

Shipments.

Port	1897,[a] 1,000 net tons.	1901.			1905.			1906.			1907.		
		1,000 net tons.	Rank of port.	Per cent of total.	1,000 net tons.	Rank of port.	Per cent of total.	1,000 net tons.	Rank of port.	Per cent of total.	1,000 net tons.	Rank of port.	Per cent of total.
Hard coal.													
Buffalo	2,234	2,594	1	78.4	2,972	1	87.4	2,700	1	87.4	3,431	1	84.1
Erie	516	512	2	15.5	267	2	7.9	257	2	8.3	419	2	10.3
Oswego	529	57	3	1.7	72	3	2.1	36	3	1.1	128	3	3.1
Total[b]	.....	3,310	.....	.....	3,399	.....	.....	3,087	.....	.....	4,079	.....	.....
Soft coal.													
Charlotte	373	150	9	2.4	217	11	1.9	179	13	1.2	255	13	1.5
Buffalo	100	231	7	3.7	375	10	3.3	413	10	2.9	492	9	2.8
Erie	234	312	6	5.1	429	8	3.8	669	8	4.6	812	7	4.7
Conneaut	257	159	8	2.6	602	6	5.3	829	5	5.7	642	8	3.7
Ashtabula	1,013	1,192	2	19.3	2,128	1	19.0	2,478	2	17.1	2,851	3	16.3
Fairport	185	115	12	1.9	118	14	1.0	276	11	1.9	454	10	2.6
Cleveland	2,028	1,027	3	16.6	1,876	3	16.6	2,889	1	19.9	3,103	2	17.8
Lorain	231	417	5	6.8	1,101	4	9.8	1,697	4	11.7	1,978	4	11.3
Huron	200	146	10	2.4	461	7	4.1	771	6	5.3	1,247	5	7.1
Sandusky	368	635	4	10.3	781	5	6.9	745	7	5.1	1,058	6	6.1
Toledo	1,005	1,357	1	22.0	2,095	2	18.6	2,314	3	16.0	3,364	1	19.3
Frankfort	.....	108	13	1.8	198	12	1.8	226	12	1.6	330	12	1.9
Ludington	35	130	11	2.1	426	9	3.8	488	9	3.4	333	11	1.9
Chicago	8	45	14	.7	121	13	1.1	121	14	.8	110	14	.6
Detour	.....	10	15	.2	83	15	.7	116	15	.8	101	15	.6
Total[b]	.....	6,170	.....	.....	11,267	.....	.....	14,489	.....	.....	17,446	.....	.....
Grand total[b]	.....	9,480	.....	.....	14,666	.....	.....	17,576	.....	.....	21,525	.....	.....

[a] Total shipments, including exports, which formed a considerable part of the shipments from Oswego and Charlotte.

[b] Includes minor ports.



FIGURES FOR ASHLAND, 1907, INCLUDE RECEIPTS AT WASHBURN.

TABLE 152.—DOMESTIC SHIPMENTS AND RECEIPTS OF COAL FROM THE PRINCIPAL PORTS ON THE GREAT LAKES, RELATIVE RANK OF EACH PORT, AND PERCENTAGE OF SHIPMENTS OR RECEIPTS OF EACH PORT TO TOTAL SHIPMENTS OR RECEIPTS, 1897, 1901, AND 1905–1907—Continued.

Receipts.

Port.	1897, 1,000 net tons.	1901.			1905.			1906.			1907.		
		1,000 net tons.	Rank of port.	Per cent of total.	1,000 net tons.	Rank of port.	Per cent of total.	1,000 net tons.	Rank of port.	Per cent of total.	1,000 net tons.	Rank of port.	Per cent of total.
Hard coal.													
Chicago	[a]1,319	1,012	1	30.0	884	1	26.5	811	1	27.2	1,016	2	25.0
Waukegan	.....	83	6	2.5	92	7	2.8	79	7	2.7	108	7	2.7
Milwaukee	645	830	2	24.6	814	2	24.4	722	2	24.2	895	3	22.0
Sheboygan	.....	145	5	4.3	161	5	4.8	134	5	4.5	198	4	4.9
Green Bay	.....	51	7	1.5	105	6	3.1	89	6	3.0	128	6	3.2
Superior	674	501	3	14.9	592	3	17.8	672	3	22.5	1,060	1	26.1
Duluth		277	4	8.2	213	4	6.4	149	4	5.0	159	5	3.9
Total[b]	.....	3,371	.....	.....	3,334	.....	.....	2,981	.....	.....	4,062	.....	.....
Soft coal.													
Ogdensburg	163	151	10	2.6	220	13	2.3	182	14	1.4	260	15	1.7
Chicago	.....	59	19	1.0	83	18	.9	127	19	1.0	438	7	2.8
Milwaukee	849	997	2	17.1	2,283	1	23.8	2,937	2	23.4	3,330	2	21.6
Sheboygan	[c]290	111	14	1.9	200	14	2.1	307	9	2.4	349	10	2.3
Manitowoc	[c]250	253	4	4.3	332	7	3.5	418	6	3.3	463	6	3.0
Green Bay	.....	101	16	1.7	257	9	2.7	292	10	2.3	344	11	2.2
Escanaba	.....	247	5	4.2	442	4	4.6	487	5	3.9	504	5	3.3
Gladstone	.....	208	8	3.6	226	11	2.4	218	13	1.7	285	14	1.8
Detour	.....	66	18	1.1	117	17	1.2	147	16	1.2	98	19	.6
Sault Ste. Marie	.....	69	17	1.2	121	16	1.3	143	17	1.1	128	17	.8
Marquette	141	119	12	2.0	235	10	2.5	256	12	2.0	330	12	2.1
Lake Linden	.....	176	9	3.0	258	8	2.7	343	8	2.7	423	8	2.7
Dollar Bay	.....	115	13	2.0	79	19	.8	130	18	1.0	120	18	.8
Hancock-Houghton	.....	234	6	4.0	337	6	3.5	354	7	2.8	404	9	2.6
Ashland	270	215	7	3.7	387	5	4.0	492	4	3.9	517	4	3.4
Washburn	.....	105	15	1.8	148	15	1.5	162	15	1.3	171	16	1.1
Superior	1,475	1,394	1	23.9	1,664	2	17.4	3,078	1	24.5	4,043	1	26.2
Duluth		698	3	12.0	1,199	3	12.5	1,431	3	11.4	1,763	3	11.4
Two Harbors	.....	130	11	2.2	220	12	2.3	289	11	2.3	313	13	2.0
Total[b]	.....	5,835	.....	.....	9,581	.....	.....	12,578	.....	.....	15,406	.....	.....
Grand total[b]	.....	9,206	.....	.....	12,915	.....	.....	15,559	.....	.....	19,468	.....	.....

[a] Hard and soft coal. [b] Includes minor ports. [c] Includes coke and hard coal.

The map opposite page 192 shows the movement of coal on the Great Lakes in 1897 and 1907.

Section 6. Other Lake traffic.

In addition to the four leading commodities already noted there are some other features of Lake traffic which deserve mention. These include the movement of copper, salt, pig iron and iron manufactures, and package and miscellaneous freight.

COPPER.—While copper constitutes only a very small proportion in volume of the freight moved on the Lakes, its high value makes its importance much beyond that indicated by its weight. About 100,000 tons of copper are shipped annually on the Lakes from the copper district in the upper peninsula of Michigan, mostly coming out through the Portage Lake canals. Some shipments of copper are also made from Superior, Manitowoc, and Milwaukee. Copper moves eastward, most of the shipments being delivered at Buffalo.

TABLE 153.—DOMESTIC LAKE SHIPMENTS AND RECEIPTS OF COPPER, 1906 AND 1907, BY PORTS.

[Compiled from Monthly Summary of Commerce and Finance.]

Shipments.

Port.	1906.	1907.	Port.	1906.	1907.
	Gr. tons.	*Gr. tons.*		*Gr. tons.*	*Gr. tons.*
Lake Linden	40,133	38,679	Manitowoc	6,051	4,603
Portage	39,357	27,758	Milwaukee	2,379	7,366
Hancock-Houghton	10,750	18,237			
Superior	17,191	8,104	Total [a]	116,564	106,695

Receipts.

Buffalo	76,975	73,532	Grand Haven	103	2,397
Erie	8,522	7,872	Chicago	4,108	2,978
Fairport	4,789	275	Duluth	8,402	75
Detroit	6,519	4,408			
Frankfort	5,996	1,825	Total [a]	125,435	105,163
Ludington	2,422	7,618			

[a] Including minor points.

SALT.—Salt is shipped by Lake in considerable quantities from Manistee and Ludington, Mich., and in smaller quantities from Buffalo, Wyandotte, Marine City, and Port Huron, as shown in the table below. Most of these shipments seem to cross Lake Michigan to Chicago and Milwaukee. This movement has fallen off to some extent since 1901.

TABLE 154.—DOMESTIC LAKE SHIPMENTS AND RECEIPTS OF SALT, 1906 AND 1907, BY PORTS.

[Compiled from Monthly Summary of Commerce and Finance.]

Shipments.

Port.	1906.	1907.	Port.	1906.	1907.
	Net tons.	*Net tons.*		*Net tons.*	*Net tons.*
Buffalo	53,818	52,289	Bay City	13,448	14,616
Wyandotte	31,140	54,776	Ludington	127,220	165,312
St. Clair	18,235	16,015	Manistee	244,319	183,670
Marine City	30,751	22,469			
Port Huron	36,749	34,923	Total [a]	567,986	558,288

Receipts.

Chicago	204,939	222,447	Duluth	43,922	45,008
Milwaukee	139,076	143,099	Superior	20,560	19,771
Sheboygan	25,326	14,250	Toledo	28,423	28,357
Manitowoc	8,955	14,486			
Michigan City	11,530	12,568	Total [a]	554,811	560,268

[a] Including minor ports.

PIG IRON AND IRON MANUFACTURES.—A few hundred thousand tons of pig iron and a larger amount of iron manufactures are shipped annually by lake. The movement of pig iron is in small lots between a considerable number of ports, the largest shipments being from Manistique, Mich., and the largest receipts at Frankfort, Mich., indicating a car-ferry movement between these ports. Iron manufactures are shipped principally from Cleveland and Buffalo, and the most important receiving ports for these articles are Detroit, Chicago, and Duluth-Superior.

TABLE 155.—DOMESTIC LAKE SHIPMENTS AND RECEIPTS OF PIG IRON, 1905–1907, BY PORTS.

[Compiled from Monthly Summary of Commerce and Finance.]

Shipments.

Port.	1905.	1906.	1907.	Port.	1905.	1906.	1907.
	Gr. tons.	*Gr. tons.*	*Gr. tons.*		*Gr. tons.*	*Gr. tons.*	*Gr. tons.*
Duluth	48,846	53,333	16,863	Escanaba	11,344	38,064	3,203
Superior	35,291	58,695	21,759	Gladstone	1,625	17,750	8,418
Two Harbors	33,589	32,564	5,570	Ludington	4,914	14,755	20,424
Ashland	38,813	19,433	10,745	Frankfort	5,156	28,267	5,519
Marquette	3,725	8,606	13,378				
Manistique	40,383	56,537	72,806	Total [a]	279,319	369,741	206,939

[a] Including minor ports.

TABLE 155.—DOMESTIC LAKE SHIPMENTS AND RECEIPTS OF PIG IRON, 1905-1907, BY PORTS—Continued.

Receipts.

Port.	1905.	1906.	1907.	Port.	1905.	1906.	1907.
	Gr. tons.	*Gr. tons.*	*Gr. tons.*		*Gr. tons.*	*Gr. tons.*	*Gr. tons.*
Buffalo	54,264	72,460	37,829	Frankfort	23,092	31,356	42,922
Erie	9,337	31,106	18,075	Manistique	4,556	23,347	2,907
Conneaut	5,575	5,958	.....	Chicago	36,362	30,556	10,488
Ashtabula	28,399	77,414	.....	Milwaukee	7,614	14,688	18,218
Fairport	11,328	22,250	5,570	Total[a]	275,853	387,659	205,039
Cleveland	29,410	10,981	18,988				
Lorain	5,080	26,935	.....				

[a] Including minor ports.

TABLE 156.—DOMESTIC LAKE SHIPMENTS AND RECEIPTS OF IRON MANUFACTURES, 1905-1907, BY PORTS.

[Compiled from Monthly Summary of Commerce and Finance.]

Shipments.

Port.	1905.	1906.	1907.	Port.	1905.	1906.	1907.
	Gr. tons.	*Gr. tons.*	*Gr. tons.*		*Gr. tons.*	*Gr. tons.*	*Gr. tons.*
Buffalo	60,848	156,420	177,549	Chicago	24,111	6,952	13,671
Cleveland	203,670	277,575	237,735	Total[a]	412,952	554,074	495,740
Frankfort	13,673	20,457	3,679				
Ludington	33,393	23,817	17,934				

Receipts.

Buffalo	22,176	13,103	1,670	Manistique	14,904	19,397	3,987
Detroit	67,618	72,191	52,493	Duluth	54,012	135,326	107,154
Chicago	26,157	19,759	43,566	Superior	44,832	118,471	92,289
Milwaukee	33,107	26,354	27,569	Total[a]	375,064	544,726	489,739
Manitowoc	11,856	13,739	8,132				
Gladstone	27,796	29,941	36,398				

[a] Including minor ports.

PACKAGE AND MISCELLANEOUS FREIGHT.—Miscellaneous freight not included in the commodities specially noted embraces a large variety of articles. Much of it is what is generally known as package freight, but the records of Lake commerce include in the miscellaneous list considerable bulk freight, such as flaxseed. The volume of this package and miscellaneous freight constitutes a considerable part of the Lake movement, aggregating about 4,500,000 tons in 1901 and about 7,000,000 tons in 1907, an increase of over 50 per cent, and about 5 per cent of the total increase of Lake traffic between these years. A part of this movement is through westbound package freight, but much the larger portion seems to consist of local movement in all directions on the Lakes.

There is a considerable movement of barreled oil from lower Lake ports and from Chicago by vessel, going especially to Lake Superior points. This business is handled both by regular freight lines and by tramp steamers.

All of the Lake ports have more or less miscellaneous traffic, but the larger part of both shipments and receipts are concentrated at Buffalo, Cleveland, Detroit, Milwaukee, Chicago, and Duluth-Superior. Buffalo has the largest shipments of miscellaneous goods, while at the other ports named receipts predominate. At Detroit this miscellaneous traffic forms a larger proportion of its total Lake commerce than at any of the other leading ports, owing to the fact that Detroit is neither an important shipping nor receiving port for any of the bulk movement of Lake commerce. The volume of this movement at these and other Lake ports is shown in the following table:

TABLE 157.—DOMESTIC LAKE SHIPMENTS AND RECEIPTS OF PACKAGE AND MISCELLANEOUS FREIGHT, 1900 AND 1905–1907, BY PORTS.

[Compiled from Monthly Summary of Commerce and Finance.]

Port.	Shipments.				Receipts.			
	1900.	1905.	1906.	1907.	1900.	1905.	1906.	1907.
	Net tons.	*Net tons.*	*Net tons.*	*Net tons.*	*Net tons.*	*Net tons.*	*Net tons.*	*Net tons.*
Buffalo	689,452	777,753	832,988	846,766	668,831	802,000	837,312	753,922
Erie	48,562	123,020	133,875	139,373	61,564	163,047	125,606	151,465
Cleveland	113,968	213,776	205,716	216,259	275,673	488,817	367,891	525,835
Sandusky	18,101	215,621	75,679	291,480	8,947	17,819	15,177	18,398
Detroit	73,620	106,828	130,699	125,486	234,482	291,765	440,864	510,399
Port Huron	6,492	14,291	166,781	114,016	11,628	17,967	22,077	30,752
Frankfort	106,057	142,231	128,222	107,638	144,366	105,404	133,983	158,605
Ludington	117,095	228,113	204,864	299,343	109,875	234,271	199,898	262,682
Grand Haven	.....	83,578	108,135	143,883	.....	120,687	131,334	154,244
Chicago	452,179	640,042	604,693	644,604	969,328	1,134,594	1,035,317	1,089,074
Milwaukee	293,891	459,336	468,170	556,874	325,124	656,785	694,780	989,046
Manitowoc	171,243	160,576	157,437	201,039	158,446	164,602	161,509	230,966
Sault Ste. Marie	.....	67,436	186,149	121,458	.....	11,692	15,136	8,319
Green Bay	.....	11,064	10,675	10,896	.....	126,452	228,912	136,033
Duluth	36,147	325,174	305,541	320,573	114,156	211,091	256,385	313,258
Superior	26,107	203,335	308,812	215,677	103,698	214,098	226,832	238,001
Total [a]	.....	5,628,679	6,364,315	6,966,508	.....	5,712,011	5,933,380	6,650,824

[a] Including minor ports. Totals for 1906 and 1907 include flaxseed; total shipments for same years include logs, which are not included in total receipts.

CHAPTER VII.

GREAT LAKES—TRAFFIC BY LAKES AND PORTS.

Section 1. Introduction.

The following table summarizes the traffic of the Great Lakes by lakes and ports, showing the domestic traffic at the principal ports for 1889 and 1906, the total traffic as reported by the Chief of Engineers, U. S. Army, for 1906, and the domestic shipments and receipts for 1906:

TABLE 158.—SUMMARY OF COMMERCE AT PRINCIPAL LAKE PORTS, 1889 AND 1906.

Port.	Domestic freight.[a]		Domestic shipments, 1906.[a]	Domestic receipts, 1906.[a]	Total freight, 1906.[b]
	1889.	1906.			
Lake Superior:	*Net tons.*	*Net tons.*	*Net tons.*	*Net tons.*	*Tons.*
Duluth	1,114,048	16,786,937	14,632,066	2,154,871	16,518,200
Superior-West Superior	1,180,297	12,582,263	8,447,890	4,134,373	12,653,021
Two Harbors	936,541	9,316,743	9,018,987	297,756	9,566,874
Ashland	2,247,242	4,407,031	3,774,931	632,100	4,910,031
Washburn	188,393	373,119	170,072	203,047	
Hancock-Houghton	286,191	526,554	66,572	459,982	.....
Marquette	1,710,885	1,810,685	1,531,965	278,720	3,055 014
Sault Ste. Marie	76,125	438,954	243,565	195,389	.....
Lake Michigan:					
Manistique	144,011	499,350	332,562	166,788	92,907
Escanaba	3,626,390	6,937,210	6,412,483	524,727	.....
Gladstone	287,590	546,531	224,825	321,706	527,193
Menominee	272,529	200,924	97,099	103,825	120,158
Green Bay	156,810	726,958	107,008	619,950	957,479
Kewaunee	32,627	143,466	60,758	82,708	139,297
Manitowoc	113,377	1,237,790	577,064	660,726	1,202,170
Sheboygan	124 337	525,018	15,089	509,929	542,337
Milwaukee	1,935.808	6,236,146	1,233,293	5,002,853	6,204,024
Racine	160,537	176,988	17,147	159,841	162,247
Waukegan	.....	179,534	1,795	177,739	202,199
Chicago-South Chicago	7,984 038	10,357,038	2,510,632	7,846,406	10,302,112
Michigan City	.....	101,192	4,979	96,213	89,170
St. Joseph	.....	47,658	39,886	7,772	115,839
Holland	.....	56.296	31,075	25,221	159,986
Grand Haven	169,546	420,541	145,249	275,292	414,728
Muskegon	1,002,743	119,877	61,517	58,360	136,340
Ludington	627,627	1,663,718	956,593	707,125	1,497,424
Manistee	629,910	521,841	488,239	33,602	443,931
Frankfort	.....	831,161	441,823	389,338	719 259

[a] Compiled from United States Census Report on Transportation by Water, p. 134, and Monthly Summary of Commerce and Finance. Domestic shipments include 2,003,453 net tons of bunker coal.
[b] Compiled from Reports of Chief of Engineers, U. S. Army.

TABLE 158.—SUMMARY OF COMMERCE AT PRINCIPAL LAKE PORTS, 1889 AND 1906—Continued.

Port.	Domestic freight.		Domestic shipments, 1906.	Domestic receipts, 1906.	Total freight, 1906.
	1889.	1906.			
Lakes Huron and St. Clair and connecting rivers:	*Net tons.*	*Net tons.*	*Net tons.*	*Net tons.*	*Tons.*
Cheboygan	218,940	172,403	148,530	23,873	459,528
Alpena	.....	254,261	198,890	55,371	249,426
Saginaw River	.....	178,147	21,815	156,332	293,105
Port Huron	170,073	358,077	211,232	146,845	.....
Marine City	61,001	81,054	35,362	45,692	.....
Detroit	764,553	1,184,862	203,223	981,639	.....
Lake Erie:					
Toledo	1,436,991	4,167,813	2,350,837	1,816,976	4,522 280
Sandusky	602,403	954,290	824,813	129,477	1,366,663
Huron	70,180	1,659,690	783,273	876,417	1,675,096
Lorain	620,773	4,211,733	1,698,823	2,512,910	4,325,691
Cleveland	3,621,570	11,670,328	3,434,962	8,235,366	12,247,626
Fairport	998,459	2,506,903	295,439	2,211,464	2,575,018
Ashtabula	2,695,180	10,157,785	2,481,670	7,676,115	10,314,129
Conneaut	.....	6,972,996	888,854	6,084,142	7,063,069
Erie	1,271,988	3,906,739	1,070,415	2,836,324	4,287,230
Buffalo	6,730,137	14,345,007	4,201,316	10,143,691	15,568,338
Tonawanda and North Tonawanda	1,046,895	1,079,146	23,968	1,055,178	1,064,030
Lake Ontario and St. Lawrence River:					
Charlotte	.....	186,703	180,634	6,069	432 709
Great Sodus Bay	.....	.....	.....	.....	58,905
Little Sodus Bay	.....	4,145	4,075	70	103,991
Oswego	691,118	54,777	37,436	17,341	615,840
Cape Vincent	.....	2,849	708	2,141	112,501
Ogdensburg	662,904	465,337	56,082	409,255	1,056,100
Recapitulation:[a]					
Lake Superior	7,925,930	49,374,964	40,332,392	9,042,572	.....
Lake Michigan	18,571,258	33,433,459	15,073,679	18,359,780	.....
Lake Huron, etc	3,373,807	3,159,308	1,460,276	1,699,032	.....
Lake Erie	19,343,875	62,088,947	18,455,131	43,633,816	.....
Lake Ontario, etc	1,988,236	731,184	288,171	443,013	.....
Grand total	.....	.....	75,609,649	73,178,213	.....

[a] Includes minor ports not listed above. See United States Census Report on Transportation by Water, 1906, p. 138.

Section 2. Ports and harbors of Lake Superior.

Lake Superior was the last of the Great Lakes to become an important area of transportation by water, but recent developments have made it the most important of the Lakes in shipments of iron ore, flour, and grain, and in receipts of coal, while it also carries a large share of the traffic in lumber. More than half the domestic shipments on the Lakes are from ports on Lake Superior. The local movement between different ports on Lake Superior is, however,

very small, and the character of the traffic on this lake can best be shown by the movement through the St. Marys Falls canals.

The most important United States port on Lake Superior is Duluth-Superior. Other harbors of importance are Two Harbors, Ashland, Marquette, and those on the Portage Lake waterway. There are numerous minor points from which small shipments of lumber are made. There is also a large and growing traffic from the Canadian shore, where the most important ports are Fort William and Port Arthur, on Thunder Bay.

DULUTH-SUPERIOR.—This harbor consists of the Superior Entry, Superior Bay, Allouez Bay, St. Louis Bay, and St. Louis River to the limits of the cities of Duluth and Superior, and has 49 miles of frontage. The Duluth Canal, cut through Minnesota Point, forms one entrance to the harbor, and dredging operations by the Government have secured 17 miles of 20-foot channel. This is the most important port on the Great Lakes, and the freight tonnage is believed to be exceeded only by that of two other ports in the United States—New York and Philadelphia.

The principal shipments are iron ore, grain, and flour, and the most important article received is coal. In all of these Duluth-Superior ranks first among the Lake ports. There are also large shipments of lumber and a considerable traffic in machinery, general merchandise, and other articles. The total shipments and receipts by Lake for the year 1906 amounted to 29,171,221 tons, of which 16,518,200 tons were handled at Duluth and 12,653,021 tons at Superior. The following tables show the shipments and receipts in detail for the years 1906 and 1907:

TABLE 159.—LAKE COMMERCE OF DULUTH-SUPERIOR, 1906, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army, 1907, p. 1841.]

Shipments.

Articles.	Duluth.	Superior.	Total.
	Net tons.	*Net tons.*	*Net tons.*
Iron ore	12,498,033	6,870,153	19,368,186
Lumber	604,161	66,264	670,425
Flour	205,096	333,633	538,729
Wheat	576,171	608,168	1,184,339
Other grain	124,369	362,255	486,624
Flaxseed	339,774	289,064	628,838
Shingles and lath	28,475	31,925	60,400
Copper, coal, and iron	1,073	17,340	18,413
Wool	4,714	4,463	9,177
Miscellaneous	42,235	16,141	58,376
Total	14,424,101	8,599,406	23,023,507

TABLE 159.—LAKE COMMERCE OF DULUTH-SUPERIOR, 1906, BY ARTICLES—Continued.

Receipts.

Articles.	Duluth.	Superior.	Total.
	Net tons.	*Net tons.*	*Net tons.*
Coal, hard and soft	1,601,166	3,723,374	5,324,540
General merchandise and fish	154,030	80,775	234,805
Manufactured iron	141,081	112,135	253,216
Cement and limestone	90,183	43,407	133,590
Sand, gravel, and stone	50,418	22,493	72,911
Oil and salt	46,994	42,038	89,032
Piles, poles, ties, and posts	6,418	21,631	28,049
Miscellaneous	3,809	7,762	11,571
Total [a]	2,094,099	4,053,615	6,147,714

[a] Not including logs—Duluth, 26,535,000 feet; Superior, 365,000 feet.

TABLE 160.—DOMESTIC LAKE COMMERCE OF DULUTH-SUPERIOR, 1906 AND 1907, BY ARTICLES.

[Compiled from Monthly Summary of Commerce and Finance.]

Shipments.

Articles.	Duluth.		Superior.		Total.	
	1906.	1907.	1906.	1907.	1906.	1907.
Iron ore.....gross tons..	11,154,263	13,326,527	5,982,804	7,231,074	17,137,067	20,557,601
Lumber.....M feet..	461,477	290,564	45,405	12,132	506,882	302,696
Flour.....net tons..	224,288	154,467	359,403	360,640	583,691	515,107
Wheat.....bushels..	17,857,752	23,653,109	17,939,902	20,829,952	35,797,654	44,483,061
Other grain.....do....	4,592,914	1,326,274	17,033,149	10,404,136	21,626,063	11,730,410
Pig iron and manufactures, gross tons.....	53,841	17,904	58,695	21,779	112,536	39,683
Bunker coal.....net tons..	12,897	8,691	4,668	1,238	17,565	9,929
Other freight [a].....do....	305,808	321,503	328,066	224,753	633,874	646,256

Receipts.

Coal:						
Soft.....net tons..	1,431,413	1,762,781	3,078,183	4,042,800	4,509,596	5,805,581
Hard.....do....	148,969	159,146	671,554	1,059,957	820,523	1,219,103
Pig iron and manufactures, gross tons.....	136,266	107,204	118,471	92,289	254,737	199,493
Salt.....net tons..	43,922	45,008	20,560	19,771	64,482	64,779
Logs and lumber.....M feet..	24,097	1,226	1,242	3,950	25,339	5,176
Other freight.....net tons..	267,283	313,342	228,034	238,001	495,317	551,343

[a] Including flaxseed.

Two Harbors, located on Agate Bay, 27 miles northeast of Duluth, is one of the chief shipping ports for iron ore. There is also considerable lumber shipped and coal received. The commerce of this port has increased from 263,437 tons in 1885 to 9,566,874 tons in 1906.

Other ports on the north shore of Lake Superior are Corundum, 46 miles from Duluth, where labradorite is quarried and loaded in

scows; Crystal Bay, 58 miles from Duluth, where corundum mining has developed; and Grand Marais, 107 miles from Duluth, the only safe harbor on the north shore between Agate Bay and the international boundary.

Ashland Harbor is located at the head of Chequamegon Bay. A government breakwater furnishes a protected area of 1,600 acres, and affords safe anchorage and dockage for a distance of 3 miles along the city front. The commerce of this port consists principally of iron ore and lumber shipped, and coal, mineral oil, and general merchandise received.

Washburn, on the west side of Chequamegon Bay, 4½ miles north of Ashland, is an important shipping point for lumber and grain. Lumber is also shipped from Bayfield, on the same bay, and from Ontonagon, farther east.

The traffic of Chequamegon Bay has increased from 1,400,000 tons in 1887 to 4,910,031 tons in 1906.

PORTAGE LAKE WATERWAY.—This waterway, about 25 miles in length, crosses Keweenaw Point from Lake Superior to Keweenaw Bay, including 2¼ miles of canal from Lake Superior to Portage Lake, 17 miles in Portage Lake, and 5½ miles in Portage River and its four cuts. It is much used as a harbor of refuge by vessels bound up or down Lake Superior, particularly during the stormy season in the fall of the year. The waterway passes through the center of the rich copper-mining district of Michigan, and there is an important movement of freight shipped from Houghton, Hancock, Dollar Bay, Lake Linden, Hubbell, and Chassell, consisting mainly of copper and lumber, while coal, other supplies, and general merchandise are received. During the navigation season of 1906 the commerce through this waterway amounted to 2,632,355 short tons of freight. The local business between points on the waterway amounted to about 100,000 tons of freight. Domestic receipts and shipments at Hancock-Houghton in 1906 amounted to 526,554 tons. Several small ports are located on Keweenaw Peninsula and Keweenaw Bay.

TABLE 161.—TRAFFIC THROUGH THE PORTAGE LAKE SHIP CANALS, 1904–1907, BY ARTICLES.

[Compiled from Monthly Summary of Commerce and Finance.]

Articles.	1904.	1905.	1906.	1907.
Coal:				
Hard.....tons..	98,194	162,872	106,123	160,904
Soft.....do....	1,105,994	1,025,994	1,146,200	1,187,321
Flour.....barrels..	399,317	719,329	1,280,089	1,170,565
Wheat.....bushels..	737,394	1,557,049	1,998,502	1,668,355
Flaxseed.....do....	155,410	783,522	311,000	884,000
Grain.....do....	957,991	751,584	1,292,205	274,630
Lumber and timber.....M feet..	269,529	243,768	249,416	163,703

TABLE 161.—TRAFFIC THROUGH THE PORTAGE LAKE SHIP CANALS, 1904–1907, BY ARTICLES—Continued.

Articles.	1904.	1905.	1906.	1907.
Ties.....number..	43,050	51,549	50,390	225,796
Logs.....M feet..	10,064	9,893	5,603	9,659
Laths and shingles.....M..	66,298	63,948	46,590	58,162
Iron ore.....tons..	104,581	198,281	197,697	127,095
Iron manufactures and machinery.....do....	34,084	56,835	99,289	82,640
Pig iron.....do....	7,520	10,984	9,128	10,427
Copper.....do....	84,785	95,533	96,267	85,279
Building stone.....do....	14,984	8,651	15,495	15,586
Limestone.....do....	50,651	34,851	24,036	42,130
Sand.....do....	31,730	13,698	17,412	8,709
Salt.....barrels..	126,331	146,356	175,855	210,447
Cement.....do....	11,000	63,650	50,700	62,755
Kerosene oil.....do....	15,775	34,045	34,890	45,965
General merchandise.....tons..	126,257	183,666	225,124	184,459
Total traffic.....net tons..	2,397,553	2,462,910	2,660,370	2,496,336

Marquette, the oldest ore-shipping point on Lake Superior, has a harbor formed by a government breakwater. The commerce consists mainly of iron ore shipped and coal and general merchandise received.

Presque Isle Harbor, a small bay within the city limits of Marquette, is also an important ore-shipping point. In 1906 the total traffic of this port amounted to 1,935,619 short tons. In 1906 the total amount of freight at Marquette and Presque Isle was 3,055,014 short tons.

On the south shore east of Marquette the only ports of any commercial importance are Munising and Grand Marais, Mich. The latter is the only harbor between Grand Island and Whitefish Bay and is largely used as a harbor of refuge. It is also a shipping point for lumber and has some other traffic. The total freight movement in 1906 amounted to 103,575 tons.

The following tables show the commerce at some of the more important Lake Superior points other than Duluth-Superior for 1906 and 1907:

TABLE 162.—COMMERCE OF SPECIFIED LAKE SUPERIOR PORTS, 1906, BY ARTICLES.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907.]

Shipments.

Articles.	Two Harbors.	Ashland, etc. [a]	Portage Lake ship canals.	Marquette and Presque Isle.
	Net tons.	*Net tons.*	*Net tons.*	*Net tons.*
Iron ore	9,189,592	3,738,684	192,097	2,764,033
Lumber and ties	88,078	193,570	395,239	9,101
Flour	.....	.....	128,009	.....
Grain and flaxseed	.....	151,497	100,968	.....

[a] Including also Washburn and Bayfield.

TABLE 162.—COMMERCE OF SPECIFIED LAKE SUPERIOR PORTS, 1906, BY ARTICLES—Continued.

Shipments—Continued.

Articles.	Two Harbors.	Ashland, etc.	Portage Lake ship canals.	Marquette and Presque Isle.
	Net tons.	*Net tons.*	*Net tons.*	*Net tons.*
Stone and sand	.....	28,067	12,949	.....
Pig iron and iron manufactures	.....	16,046	11,607	4,788
Fish	.....	2,906	.....	.....
Lath and shingles	.....	1,153	4,632	.....
Coal	.....	.....	35,524	.....
Copper	.....	.....	85,124	.....
Miscellaneous	.....	68	21,184	.....
Total	9,277,670	4,131,991	987,333	2,777,922
Receipts.				
Coal	279,888	764,158	1,216,799	256,442
Iron manufactures	.....	.....	96,810	2,539
Stone and sand	.....	.....	43,994	.....
Cement	.....	.....	10,140	.....
Copper	.....	.....	11,143	.....
Salt	.....	5,917	25,122	471
Iron ore	.....	1,399	5,600	.....
Lumber and ties	.....	.....	24,294	.....
Miscellaneous	9,316	6,566	211,120	17,640
Total	289,204	778,040	1,645,022	277,092

TABLE 163.—DOMESTIC COMMERCE OF LAKE SUPERIOR PORTS, 1906 AND 1907, BY ARTICLES.

[Compiled from Monthly Summary of Commerce and Finance.]

Shipments.

Articles.	Two Harbors.		Ashland, etc. [a]		Portage Lake ship canals. [b]		Marquette and Presque Isle.	
	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.
Iron ore.....gross tons..	7,912,525	8,051,328	3,238,922	3,395,574	.....	.....	2,772,053	2,967,576
Lumber.....M feet..	57,540	56,334	119,438	65,119	8,766	4,020	3,235	3,375
Wheat.....bushels..	.....	.....	238,983	441,051	.....	.....	.....	.....
Other grain.....do....	.....	.....	3,393,066	788,265	.....	.....	.....	.....
Copper.....gross tons..	.....	.....	.....	.....	50,883	58,516	.....	.....
Pig iron and manufactures.....gross tons..	32,564	5,570	19,438	10,745	.....	2	15,206	16,535
Coal.....net tons..	1,859	1,029	3,630	3,761	386	255	235	138
Other freight [c].....do....	3,548	1,849	37,233	31,344	2,925	2,398	66	6,650

[a] Including also Washburn and Bayfield.

[b] Hancock, Houghton, Lake Linden, Dollar Bay, Hubbell, and Chassell.

[c] Including logs.

TABLE 163.—DOMESTIC COMMERCE OF LAKE SUPERIOR PORTS, 1906 AND 1907, BY ARTICLES—Continued.

Receipts.

Articles.	Two Harbors.		Ashland, etc.		Portage Lake ship canals.		Marquette and Presque Isle.	
	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.
Coal:								
Hard.....net tons..	.....	.....	33,810	48,321	51,188	95,835	17,287	38,158
Soft.....do....	288,935	313,480	654,198	689,065	827,268	946,474	256,156	329,980
Lumber and logs..M feet..	5	3,205	40,540	42,468	3,349	3,406	.....	.....
Iron manufactures, gross tons.....	7,857	1,469	30	.....	2,078	1,160	2,968	966
Other freight....net tons..	11	484	43,674	54,628	39,984	31,498	4,505	4,602

ST. MARYS FALLS CANALS.—Lake Superior empties into Lake Huron through the St. Marys River. Navigation around the rapids at Sault Ste. Marie is provided for by two canals, one on the United States side and one on the Canadian side. Through these canals passes practically the whole traffic of Lake Superior, constituting now about two-thirds of the whole volume of lake traffic. The importance of this canal traffic and the fact that records of traffic are available for a considerable period will warrant special attention to the Lake commerce at this point.

In 1855 the State of Michigan completed the construction of locks and a canal around the rapids, which provided a navigable waterway for vessels of 11.5 feet draft. This opened the way to through navigation between Lake Superior and the other lakes, and the movement of commerce gradually increased. In 1870 the total traffic was about 540,000 tons, and in 1881 about 1,568,000 tons.

In 1870 the United States Government undertook the enlargement of this canal, and in 1881 the new Weitzel lock was opened for traffic. This permitted the passage of much larger boats, up to 16 feet draft, and marks the beginning of the rapid development of the canal traffic and Lake Superior commerce. By 1887 the freight movement through the canal was 5,494,649 tons; by 1892 it had risen to 11,214,333 tons, and by 1896 to 16,239,061 tons.

In 1886 another project was inaugurated for the construction of a still larger lock, and in 1896 this Poe lock was opened to navigation, permitting the passage of vessels of 20 feet draft, while the lock chamber is of dimensions sufficient to permit the passage of two or more smaller boats.

The canal is about 1.6 miles long; its width varies from 500 feet at the upper entrance to 108 feet at the movable dam, 270 feet at the locks, and 1,000 feet in the lower entrance. The chamber of the Poe lock is 800 feet long and 100 feet wide. The Weitzel lock, which

is still in use for smaller vessels, has a chamber 515 feet long and 80 feet wide, narrowing to 60 feet at the gates, with an available depth of 14.5 feet. The gates and culvert valves of both locks are operated by hydraulic power.[a]

The Canadian government has also constructed a canal on the Canadian side of the river, opened in September, 1895. This is about 1.4 miles long, with a masonry lock 900 feet long by 60 feet wide.

Important and rapid as had been the development of commerce up to 1896, this was soon outclassed by the expansion following the opening of the 20-foot channel. This permitted the use of larger boats and lowered the cost of transportation at a time when industrial conditions called for a constantly increasing volume of iron ore from the Lake Superior mines, and with this came an increase in other forms of traffic. In six years the freight movement through the canals more than doubled, to 35,961,146 tons, and in 1907 this had increased to 58,217,214 tons.

The following table shows the number and class of vessels, together with passenger statistics, passing through the canals. Beginning with the year 1895 the figures include traffic passing through the Canadian canal. There has been a general increase in the total passages for the entire period, with the exception of the years 1903, 1904, and 1907. The registered tonnage has increased relatively more; that of 1907 over 1887 being 800 per cent; over 1897, 150 per cent, and over 1902, 38 per cent. It is of interest to note that although the total passages in 1907 decreased by 1,718 over the year 1906 the registered tonnage in turn increased by 2,989,650 net tons. This is due to the increase in the size of vessels, some of the largest ore boats having been put into service during the last year.

TABLE 164.—VESSEL MOVEMENT THROUGH ST. MARYS FALLS CANALS, 1881–1907.

[Monthly Summary of Commerce and Finance, December, 1907, p. 1176.]

Year.	Date of opening canal.	Date of closing canal.	Tonnage and class of vessels.					Passengers.
			Sailing vessels.	Steamers.	Unregistered craft.	Total passages.	Registered tonnage.	
			Number.	*Number.*	*Number.*	*Number.*	*Net tons.*	*Number.*
1881	May 7	Dec. 5	1,706	2,117	181	4,004	2,092,757	24,671
1882	Apr. 21	Dec. 3	1,663	2,739	372	4,774	2,468,088	29,256
1883	May 2	Dec. 11	1,458	2,620	237	4,315	2,042,259	39,130
1884	Apr. 23	Dec. 10	1,709	3,609	371	5,689	2,997,837	54,214
1885	May 6	Dec. 2	1,689	3,354	337	5,380	3,035,937	36,147
1886	Apr. 25	Dec. 4	2,534	4,584	306	7,424	4,219,397	27,088
1887	May 1	Dec. 2	2,562	5,968	825	9,355	4,897,598	32,668
1888	May 7	Dec. 4	2,009	5,305	489	7,803	5,130,659	25,558
1889	Apr. 15	...do....	2,635	6,501	443	9,579	7,221,935	25,712
1890	Apr. 20	Dec. 3	2,872	7,268	417	10,557	8,454,435	24,856

[a] Lake Survey Bulletin 18, p. 85.

TABLE 164.—VESSEL MOVEMENT THROUGH ST. MARYS FALLS CANALS, 1881-1907—Con.

Year.	Date of opening canal.	Date of closing canal.	Tonnage and class of vessels.					Passengers.
			Sailing vessels.	Steamers.	Unregistered craft.	Total passages.	Registered tonnage.	
			Number.	*Number.*	*Number.*	*Number.*	*Net tons.*	*Number.*
1891	Apr. 27	Dec. 7	2,405	7,339	447	10,191	8,400,685	26,190
1892	Apr. 18	Dec. 6	3,324	8,737	519	12,580	10,647,203	25,896
1893	May 1	Dec. 5	2,955	8,379	674	12,008	8,949,754	18,869
1894	Apr. 17	Dec. 6	3,676	10,208	607	14,491	13,110,366	27,226
1895[a]	Apr. 25	Dec. 11	4,790	12,495	671	17,956	16,806,781	31,656
1896	Apr. 21	Dec. 8	4,391	13,404	820	18,615	17,249,418	37,066
1897	...do....	Dec. 14	4,438	12,029	704	17,171	17,619,933	40,213
1898	Apr. 11	...do....	4,449	12,461	851	17,761	18,622,754	43,426
1899	Apr. 26	Dec. 20	4,776	14,378	1,101	20,255	21,958,347	49,082
1900	Apr. 19	Dec. 16	4,004	14,426	1,022	19,452	22,315,834	58,555
1901	Apr. 20	Dec. 21	4,482	14,372	1,187	20,041	24,626,976	59,663
1902	Apr. 1	Dec. 20	4,368	17,069	1,222	22,659	31,955,582	59,377
1903	Apr. 2	Dec. 15	3,569	14,027	1,000	18,596	27,736,444	55,175
1904[b]	May 5	Dec. 13	2,994	12,188	938	16,120	24,364,138	37,695
1905[b]	Apr. 14	Dec. 16	3,263	17,197	1,219	21,679	36,617,699	54,204
1906[b]	Apr. 13	Dec. 17	2,817	18,138	1,200	22,155	41,098,324	63,033
1907[b]	...do....	Dec. 11	2,303	17,245	889	20,437	44,087,974	62,758

[a] From 1895, figures include traffic through Canadian canal, opened to commerce September 9, 1895.
[b] In 1904, 1905, 1906, and 1907 the dates of opening and closing are for American locks.

Table 165 shows the freight traffic through the canals from 1881 to 1907 by commodities, and the percentages of the principal commodities. The principal articles are the same as on the Lakes as a whole, but with some differences in the relative proportions of the different articles.

Iron ore has always been the largest item of traffic and has not only grown enormously in total volume, but its relative proportion has increased in the past ten years from 55 to 68 per cent. Coal is second in volume and has increased largely, but its relative proportion varies somewhat from year to year and is less now than in the eighties.

Flour, grain, and wheat, while less in volume than either iron ore or coal, has until 1897 represented the greatest value of the commodities moved through the canals. The proportion of these articles has declined somewhat with the enormous increase of the iron-ore movement; but the actual tonnage, in spite of variations from year to year, shows a marked increase, except in the case of flour during the past ten years.

Lumber shows an increase in volume, and approximately the same relative proportion until 1902, since when there has been some decline in the actual movement, and a marked reduction in its relative proportion, from 6.3 per cent in 1901 to 1.9 per cent in 1907.

TABLE 165.—QUANTITY, ESTIMATED VALUE, AND PERCENTAGE OF TRAFFIC IN EACH COMMODITY TO TOTAL TRAFFIC PASSING THROUGH ST. MARYS FALLS CANALS, 1881–1907, BY COMMODITIES. [a]

[Compiled from Monthly Summary of Commerce and Finance.]

Year.	Coal.			Flour, wheat, and other grain.			
				Flour.			
	Net tons.	Per cent of total.	Estimated value.	Barrels.	Net tons. [b]	Per cent of total.	Estimated value.
1881	259,647	18.8	.....	605,453	60,545	3.9	.....
1882	430,184	21.2	.....	344,044	34,404	1.7	.....
1883	714,444	31.5	.....	687,031	68,703	3.0	.....
1884	706,379	24.6	.....	1,248,243	124,824	4.3	.....
1885	894,991	27.5	.....	1,440,093	144,009	4.4	.....
1886	1,009,999	22.3	.....	1,759,365	175,937	3.9	.....
1887	1,352,987	24.6	$4,735,454	1,572,735	157,274	2.9	$7,863,675
1888	2,105,041	32.8	7,367,644	2,190,725	219,073	3.4	10,953,625
1889	1,629,197	21.7	5,702,190	2,228,707	222,871	3.0	11,143,535
1890	2,176,925	24.1	7,619,238	3,239,104	323,910	3.6	16,195,520
1891	2,507,532	28.2	8,776,362	3,780,143	378,014	4.2	18,900,715
1892	2,904,266	25.9	10,164,931	5,418,135	541,814	4.8	21,672,540
1893	3,008,120	27.9	10,528,420	7,420,674	742.067	6.9	29,682,696
1894	2,797,184	21.2	8,191,917	8,965,773	896,577	6.8	33,621,649
1895[a]	2,574,362	17.1	6,993,351	8,902,302	890,230	5.9	33,383,632
1896	3,023,340	18.6	8,452,073	8,882,858	888,286	5.5	34,199,003
1897	3,039,172	16.0	9,456,824	8,921,143	892,114	4.7	40,145,144
1898	3,776,450	17.8	10,334,461	7,778,043	777,804	3.7	33,056,683
1899	3,940,887	15.6	12,854,278	7,114,147	711,415	2.8	25,610,929
1900	4,486,977	17.5	14,620,840	6,760,688	676,069	2.6	27,042,752
1901	4,593,136	16.2	15,492,226	7,634,350	763,435	2.7	24,811,637
1902	4,812,478	13.4	16,570,398	8,910,240	891,024	2.5	31,185,840
1903	6,937,633	20.0	24,898,407	7,093,380	709,338	2.0	31,920,210
1904	6,454,869	20.5	19,657,221	4,710,538	471,054	1.5	25,907,959
1905	6,509,056	14.7	20,706,302	5,772,719	577,272	1.3	30,018,139
1906	8,739,630	16.9	25,136,044	6,495,350	649,535	1.3	27,280,470
1907	11,400,095	19.6	.....	6,524,770	652,477	1.1	.....

[a] From 1895 figures include traffic through Canadian Canal, opened to commerce September 9, 1895.
[b] Converted from barrels on basis 200 pounds equals 1 barrel.

TABLE 165.—QUANTITY, ESTIMATED VALUE, AND PERCENTAGE OF TRAFFIC IN EACH COMMODITY TO TOTAL TRAFFIC PASSING THROUGH ST. MARYS FALLS CANALS, 1881-1907, BY COMMODITIES—Continued.

Year.	Flour, wheat, and other grain—Continued.							
	Wheat.				Grain, other than wheat.			
	Bushels.	Net tons.[a]	Per cent of total.	Estimated value.	Bushels.	Net tons.[b]	Per cent of total.	Estimated value.
1881	3,456,965	103,709	6.6	.....	367,838	8,828	0.6	.....
1882	3,728,856	111,866	5.5	.....	473,129	11,355	.6	.....
1883	5,900,473	177,014	7.8	.....	776,552	18,637	.8	.....
1884	11,985,791	359,574	12.5	.....	517,103	12,410	.4	.....
1885	15,274,213	458,226	14.1	.....	422,981	10,152	.3	.....
1886	18,991,485	569,745	12.6	.....	715,373	17,169	.4	.....
1887	23,096,520	692,896	12.6	$22,634,590	775,166	18,604	.3	$759 653
1888	18,596,351	557,891	8.7	18,224,424	2,022,308	48,535	.8	1,981,862
1889	16,231,854	486,956	6.5	15,907,217	2,133,245	51,198	.7	2,090,580
1890	16,217,370	486,521	5.4	15,893,022	2,044,384	49,065	.5	2,003,496
1891	38,816,570	1,164,497	13.1	38,040,239	1,032,104	24,770	.3	1,011,462
1892	40,994,780	1,229,843	11.0	30,746,085	1,666,690	40,001	.4	933,346
1893	43,481,652	1,304,450	12.1	32,611,239	2,405,344	57,728	.5	1,346,993
1894	34,869,483	1,046,084	7.9	22,316,469	1,545,008	37,080	.3	772,504
1895	46,218,250	1,386,548	9.2	30,041,863	8,328,694	199,889	1.3	4,164,347
1896	63,256,463	1,897,694	11.7	47,442,347	27,448,071	658,754	4.1	10,704,748
1897	55,924,302	1,677,729	8.8	48,654,143	24,889,688	597,353	3.2	11,449,256
1898	62,339,996	1,870,200	8.8	49,871,997	26,078,384	625,881	2.9	13,039,192
1899	58,397,335	1,751,920	6.9	43,798,001	30,000,935	720,022	2.9	17,700,552
1900	40,489,302	1,214,679	4.8	28,342,511	16,174,659	388,192	1.5	14,071,953
1901	52,812,636	1,584,379	5.6	36,440,719	24,760,547	594,253	2.1	22,779,703
1902	76,730,965	2,301,929	6.4	55,246,295	27,740,822	665,780	1.8	25,521,556
1903	61,384,552	1,841,537	5.3	49,107,642	32,095,646	770,296	2.2	22,787,909
1904	49,928,869	1,497,866	4.7	52,425,313	33,030,992	792,744	2.5	23,121,694
1905	68,321,288	2,049,639	4.6	61,489,159	39,229,553	941,509	2.1	25,891,505
1906	84,271,358	2,528,141	4.9	67,417,086	54,343,155	1,304,236	2.5	38,583,640
1907	98,135,775	2,944,073	5.1	.....	43,463,338	1,043,120	1.8	.....

[a] Converted from bushels on basis 60 pounds equals 1 bushel.
[b] Converted from bushels on basis 48 pounds equals 1 bushel.

TABLE 165.—QUANTITY, ESTIMATED VALUE, AND PERCENTAGE OF TRAFFIC IN EACH COMMODITY TO TOTAL TRAFFIC PASSING THROUGH ST. MARYS FALLS CANALS, 1881–1907, BY COMMODITIES—Continued.

Year.	Flour, grain, and wheat (per cent of total).	Wheat and other grain (per cent of total).	Manufactured and pig iron.				Salt.			
			Net tons.	Per cent of total.	Estimated value.		Barrels.	Net tons.[a]	Per cent of total.	Estimated value.
					Manufactured iron.	Pig iron.				
1881	11.1	7.2	87,830	5.6	.....	.....	65,897	9,226	0.6	.....
1882	7.8	6.1	92,870	4.6	.....	.....	176,612	24,726	1.2	.....
1883	11.6	8.6	109,910	4.9	.....	.....	70,898	9,926	.4	.....
1884	17.2	12.9	72,428	2.5	.....	.....	144,804	20,273	.7	.....
1885	18.8	14.4	60,842	1.9	.....	.....	136,355	19,090	.6	.....
1886	16.9	13.0	115,208	2.5	.....	.....	158,677	22,215	.5	.....
1887	15.8	12.9	74,919	1.4	$3,035,750	$241,468	204,908	28,687	.5	$204,908
1888	12.9	9.5	63,703	1.0	2,442,950	252,348	210,433	29,461	.5	210,433
1889	10.2	7.2	57,561	.8	1,577,250	442,272	168,250	23,555	.3	168,250
1890	9.5	5.9	116,327	1.3	4,680,750	386,104	179,431	25,120	.3	179,431
1891	17.6	13.4	69,741	.8	2,128,000	462,077	234,528	32,834	.4	234,528
1892	16.2	11.4	101,520	.9	2,988,600	709,716	275,740	38,604	.3	275,740
1893	19.5	12.6	89,452	.8	2,852,300	550,902	228,730	32,022	.3	228,730
1894	15.0	8.2	60,659	.5	1,805,350	331,452	237,461	33,245	.2	237,461
1895	16.4	10.5	100,337	.7	3,683,150	346,788	269,919	37,789	.2	202,439
1896	21.3	15.8	121,872	.7	4,696,200	377,298	237,515	33,252	.2	178,136
1897	16.7	12.0	135,164	.7	6,092,400	176,437	285,449	39,963	.2	214,086
1898	15.4	11.7	250,170	1.2	10,709,350	476,775	301,560	42,218	.2	226,170
1899	12.6	9.8	214,585	.8	19,111,000	457,762	316,336	44,287	.2	237,252
1900	8.9	6.3	135,585	.5	11,551,000	351,313	328,895	46,045	.2	328,895
1901	10.4	7.7	206,443	.7	17,609,800	485,520	443,774	62,128	.2	332,830
1892	10.7	8.2	198,152	.6	20,323,380	277,925	443,306	62,063	.2	288,149
1903	9.5	7.5	193,267	.6	18,385,950	522,440	454,882	63,683	.2	318,417
1904	8.7	7.2	229,985	.7	18,512,600	672,885	365,459	51,164	.2	255,821
1905	8.0	6.7	237,696	.6	18,195,100	872,409	423,122	59,237	.1	296,185
1906	8.7	7.4	391,105	.8	29,614,880	387,002	468,162	65,543	.1	351,121
1907	8.0	6.9	307,941	.5	.....	.....	460,802	64,512	.1	.....

[a] Converted from barrels on basis 280 pounds equals 1 barrel.

TABLE 165.—QUANTITY, ESTIMATED VALUE, AND PERCENTAGE OF TRAFFIC IN EACH COMMODITY TO TOTAL TRAFFIC PASSING THROUGH ST. MARYS FALLS CANALS, 1881–1907, BY COMMODITIES—Continued.

Year.	Copper.			Iron ore.			Lumber.			
	Net tons.	Per cent of total.	Estimated value.	Net tons.	Per cent of total.	Estimated value.	M feet b. m.	Net tons.[a]	Per cent of total.	Estimated value.
1881...	29,488	1.9	.....	748,131	47.7	.....	58,877	93,906	6.0	.....
1882...	25,409	1.2	.....	987,060	48.6	.....	82,783	134,030	6.6	.....
1883...	31,024	1.4	.....	791,732	34.9	.....	87,131	150,925	6.7	.....
1884...	36,062	1.3	.....	1,136,071	39.5	.....	122,389	183,585	6.4	.....
1885...	31,927	1.0	.....	1,235,122	37.9	.....	127,984	205,448	6.3	.....
1886...	38,627	.9	.....	2,087,809	46.1	.....	138,688	248,866	5.5	.....
1887...	34,886	.6	$6,977,200	2,497,713	45.5	$8,741,995	165,226	278,346	5.1	$2,974,068
1888...	28,960	.5	5,792,000	2,570,517	40.1	8,996,808	240,372	405,462	6.3	4,326,696
1889...	33,456	.4	6,691,200	4,095,855	54.5	14,335,492	315,554	563,478	7.5	5,679,972
1890...	43,729	.5	8,745,800	4,774,768	52.8	16,711,688	361,929	622,149	6.9	6,514,722
1891...	69,190	.8	13,838,000	3,560,213	40.0	12,460,744	366,305	619,064	7.0	6,593,490
1892...	64,993	.6	12,998,600	4,901,132	43.7	17,153,962	512,844	891,386	7.9	9,231,192
1893...	87,530	.8	17,506,000	4,010,556	37.2	14,050,946	588,545	1,027,571	9.5	10,593,810
1894...	99,573	.8	19,914,600	6,548,876	49.6	17,027,078	722,788	1,203,568	9.1	11,564,608
1895...	107,452	.7	21,490,400	8,062,209	53.5	22,332,319	740,700	1,216,480	8.1	8,838,400
1896...	116,872	.7	23,374,400	7,909,250	48.7	25,705,063	684,986	1,050,919	6.5	8,562,325
1897...	122,324	.7	24,464,800	10,633,715	56.0	31,901,145	805,612	1,259,919	6.6	10,875,762
1898...	124,226	.6	29,814,240	11,706,960	55.1	35,120,880	895,485	1,432,939	6.8	12,984,533
1899...	120,090	.5	38,428,800	15,328,240	60.7	52,116,016	1,038,057	1,797,330	7.1	17,646,969
1900...	131,066	.5	39,319,800	16,443,568	64.1	61,663,380	909,651	1,530,483	6.0	15,009,241
1901...	98,601	.3	26,227,866	18,090,618	63.7	58,794,509	1,072,124	1,805,447	6.3	16,617,922
1902...	120,612	.3	22,916,280	24,277,555	67.5	75,260,420	1,091,471	1,852,533	5.1	17,736,404
1903...	112,877	.3	25,961,710	21,654,898	62.5	74,709,398	1,003,192	1,709,769	4.9	18,057,456
1904...	109,605	.4	26,305,200	19,635,797	62.3	52,034,862	923,280	1,542,564	4.9	16,388,220
1905...	106,520	.2	30,358,200	31,332,637	70.8	93,997,911	966,806	1,609,591	3.7	17,885,911
1906...	107,633	.2	36,595,220	35,357,042	68.3	121,981,795	900,631	1,467,142	2.8	19,813,882
1907...	89,959	.1	.....	39,594,944	68.0	.....	649,320	1,096,541	1.9	.....

[a] Tonnage obtained by subtracting the total of all other commodities from total freight.

TABLE 165.—QUANTITY, ESTIMATED VALUE, AND PERCENTAGE OF TRAFFIC IN EACH COMMODITY TO TOTAL TRAFFIC PASSING THROUGH ST. MARYS FALLS CANALS, 1881-1907, BY COMMODITIES—Continued.

Year.	Silver ore and bullion.			Building stone.		
	Net tons.	Per cent of total.	Estimated value.	Net tons.	Per cent of total.	Estimated value.
1881	.....	.....	.....	1,400	0.1	.....
1882	22	.....	.....	5,428	.3	.....
1883	814	.....	.....	2,405	.1	.....
1884	9,731	0.4	.....	6,047	.2	.....
1885	3,669	.1	.....	8,189	.2	.....
1886	2,009	.....	.....	9,449	.2	.....
1887	350	.....	$53,826	13,401	.2	$134,010
1888	3,385	.....	520,579	33,541	.5	335,410
1889	5,947	.1	914,589	33,538	.4	335,380
1890	3,432	.....	527,807	47,973	.5	479,730
1891	1,731	.....	266,211	44,080	.5	440,800
1892	1,930	.....	296,815	39,698	.4	396,980
1893	2,470	.....	379,861	19,426	.2	194,260
1894	412	.....	46,144	21,417	.2	214,170
1895	100	.....	11,200	23,876	.2	238,760
1896	240	.....	26,880	17,731	.1	177,310
1897	5	.....	560	6,249	.....	62,490
1898	.....	.....	.....	4,670	.....	46,700
1899	487	.....	60,875	39,063	.2	468,756
1900	110	.....	13,750	48,902	.2	586,824
1901	.....	.....	.....	46,584	.2	559,008
1902	1	.....	125	38,919	.1	467,028
1903	.....	.....	.....	21,300	.1	255,600
1904	1,356	.....	74,580	27,093	.....	325,116
1905	41	.....	2,255	10,899	.....	130,788
1906	.....	.....	.....	6,222	.....	74,664
1907	.....	.....	.....	898	.....	.....

TABLE 165.—QUANTITY, ESTIMATED VALUE, AND PERCENTAGE OF TRAFFIC IN EACH COMMODITY TO TOTAL TRAFFIC PASSING THROUGH ST. MARYS FALLS CANALS, 1881-1907, BY COMMODITIES—Continued.

Year.	Unclassified freight.			Total of all freight except lumber, net tons.	Total freight.	
	Net tons.	Per cent of total.	Estimated value.		Net tons.	Estimated value.
1881	129,031	8.2	.....	1,473,835	1,567,741	.....
1882	172,167	8.5	.....	1,895,491	2,029,521	.....
1883	191,571	8.5	.....	2,116,180	2,267,105	.....
1884	207,173	7.2	.....	2,690,972	2,874,557	.....
1885	184,963	5.7	.....	3,051,180	3,256,628	.....
1886	230,726	5.1	.....	4,278,893	4,527,759	.....
1887	344,586	6.3	$20,675,160	5,216,303	5,494,649	$79,031,757
1888	345,854	5.4	20,751,240	6,005,961	6,411,423	82,156,019
1889	312,410	4.1	18,744,600	6,952,544	7,516,022	83,732,527
1890	371,294	4.1	22,277,640	8,419,064	9,041,213	102,214,948
1891	417,093	4.7	25,025,580	8,269,695	8,888,759	128,178,208
1892	459,146	4.1	27,548,760	10,322,947	11,214,333	135,117,267
1893	415,180	3.8	24,910,800	9,769,001	10,796,572	145,436,957
1894	451,185	3.4	27,071,100	11,992,292	13,195,860	143,114,502
1895	463,308	3.1	27,798,480	13,846,100	15,062,580	159,575,129
1896	520,851	3.2	31,251,060	15,188,142	16,239,061	195,146,843
1897	579,048	3.1	34,742,880	17,722,836	18,982,755	218,235,927
1898	623,146	2.9	37,388,760	19,801,725	21,234,664	233,069,741
1899	587,484	2.3	52,873,560	23,458,480	25,255,810	281,364,750
1900	541,397	2.1	54,139,700	24,112,590	25,643,073	267,041,959
1901	558,041	2.0	69,755,125	26,597,618	28,403,065	289,906,865
1902	740,100	2.1	92,512,500	34,108,613	35,961,146	358,306,300
1903	659,839	1.9	82,479,875	32,964,668	34,674,437	349,405,014
1904	732,009	2.3	98,821,215	30,003,542	31,546,106	334,502,686
1905	836,583	1.9	117,121,620	42,661,089	44,270,680	416,965,484
1906	1,134,851	2.2	170,227,650	50,283,938	51,751,080	537,463,454
1907	1,022,654	1.8	.....	57,120,673	58,217,214	.....

An analysis of traffic statistics of the St. Marys Falls canals is shown in Table 166. One important fact shown is the amount paid for transportation per ton-mile from year to year. There has been a steady decline throughout the entire period with the exception of a few years, when slight increases over the preceding years occurred. The lowest rate, of 0.79 mill, existed in 1898; the highest, of 1.5 mills, in 1888 and 1889. The ton-mile rate in 1907 was 0.38 mill less than in 1900.

The table also shows a steady increase in American and Canadian craft, the percentage of increase being about the same in both cases. The proportion of freight carried by Canadian vessels was greatest in 1888, 1903, and 1904; the lowest appears in the year 1898, since which date there has been a noticeable increase, and in the year 1907 5 per cent of the freight carried is credited to Canadian vessels.

TABLE 166.—TRAFFIC STATISTICS OF ST. MARYS FALLS CANALS: TON-MILES, FREIGHT CHARGES, VALUE OF FREIGHT AND CRAFT, ETC., 1888–1907.

[Compiled from Monthly Summary of Commerce and Finance, December, 1907.]

Seasons.	Total freight carried.	Average distance freight was carried.	Total ton-miles.	Amount paid for transporting freight.		Valuation of freight.	Value of American craft.	Value of Canadian craft.	Proportion freight carried by Canadian vessels.
				Total.	Per ton-mile.				
	Net tons.	*Miles.*			*Mills.*				*Per ct.*
1888..	6,411,423	806.4	5,173,132,972	$7,883,077	1.5	$82,156,019	$20,381,100	$1,514,300	6.0
1889..	7,516,022	790.4	5,940,646,352	8,634,247	1.5	83,732,527	25,328,600	1,597,600	4.0
1890..	9,041,213	797.2	7,207,299,415	9,472,215	1.3	102,214,948	27,857,700	1,777,800	3.5
1891..	8,888,759	820.4	7,292,462,269	9,849,023	1.35	128,178,208	31,947,300	2,119,500	4.0
1892..	11,214,333	822.4	9,222,773,938	12,072,851	1.31	135,117,267	36,220,100	2,108,700	3.8
1893..	10,796,572	831.9	8,980,310,240	9,957,483	1.1	145,436,957	39,017,400	2,115,700	4.1
1894..	13,195,860	821.1	10,927,871,324	10,798,310	.99	143,114,502	41,124,200	1,959,800	3.5
1895..	15,062,580	830.0	12,502,548,892	14,238,758	1.14	159,575,129	40,858,800	2,037,000	3.75
1896..	16,239,061	836.4	13,582,641,886	13,511,615	.99	195,146,842	43,006,200	2,135,300	4.0
1897..	18,982,755	841.3	15,969,393,576	13,220,099	.83	218,235,927	42,375,700	2,001,400	3.0
1898..	21,234,665	842.6	17,891,597,030	14,125,896	.79	233,069,740	45,199,800	2,491,900	2.2
1899..	25,255,810	827.2	20,891,944,628	21,959,707	1.05	281,364,750	65,000,520	3,369,600	3.1
1900..	25,643,073	825.9	21,179,229,014	24,953,314	1.18	267,041,959	66,116,583	3,618,576	3.0
1901..	28,403,065	823.3	23,383,861,987	23,217,974	.99	289,906,865	57,244,200	3,311,900	4.0
1902..	35,961,146	827.4	29,755,916,637	26,566,189	.89	358,306,300	67,205,000	3,792,400	4.0
1903..	34,674,437	835.6	28,974,660,408	26,727,735	.92	349,405,014	68,252,800	6,384,500	6.0
1904..	31,546,106	843.5	26,608,815,636	21,552,894	.81	334,502,686	63,789,300	5,377,100	6.0
1905..	44,270,680	833.3	36,892,797,973	31,420,585	.85	416,965,484	73,211,300	5,429,000	5.0
1906..	51,751,080	842.4	43,596,953,680	36,666,889	.84	537,463,454	88,392,000	6,140,500	5.0
1907..	58,217,214	828.3	48,221,465,547	38,457,345	.80	569,830,188	102,525,500	7,918,000	5.0

The importance of the traffic through these canals, which, as already stated, practically measures the total traffic of Lake Superior, is indicated by the following table, comparing the total domestic shipments on the Lakes with the movement through the canals for the years 1905 to 1907. As will be seen, 86 per cent of the iron-ore shipments on the Lakes pass through St. Marys Falls canals; also 49 per cent of the coal, 48 per cent of the flour, about 50 per cent of the grain other than wheat, 38 per cent of the logs and lumber, and 78 per cent of the copper. The total Lake Superior traffic has been from 65 to 69 per cent of the total domestic lake shipments.

In regard to wheat the traffic through the canal is larger than the total domestic Lake shipments. This is due in large part to the important and growing movement of wheat from Canadian ports, which are not included in the domestic Lake shipments, but are included in the canal traffic. Practically the whole movement of wheat on the Great Lakes in recent years is that from Lake Superior ports passing through the St. Marys Falls canals.

TABLE 167.—COMPARISON OF DOMESTIC SHIPMENTS ON GREAT LAKES AND TRAFFIC THROUGH ST. MARYS FALLS CANALS, 1905–1907.

[Compiled from Monthly Summary of Commerce and Finance.]

Articles.	Total domestic lake shipments (1,000 net tons).			Through St. Marys Falls canals (1,000 net tons).[a]			Per cent of total through St. Marys Falls canals.		
	1905.	1906.	1907.	1905.	1906.	1907.	1905.	1906.	1907.
Iron ore	36,621	41,297	45,615	31,333	35,357	39,595	85.6	85.6	86.8
Coal	14,666	17,575	21,525	6,509	8,740	11,400	44.4	49.7	53.0
Flour	1,257	1,335	1,315	577	649	652	45.9	48.6	49.6
Wheat	1,020	1,432	1,900	2,050	2,528	2,944	.....	.....	.....
Grain, other than wheat	2,409	2,258	1,960	941	1,304	1,043	39.1	57.8	53.2
Manufactured and pig iron	775	1,035	787	238	391	308	30.7	37.8	39.1
Salt	565	568	558	59	66	65	10.4	11.6	11.6
Copper	135	131	119	106	108	90	78.5	82.4	75.6
Lumber and logs	4,269	3,993	2,761	1,610	1,467	1,097	37.7	36.7	39.7
Unclassified freight	5,629	5,986	6,967	848	1,141	1,023	15.1	19.1	14.7
Total	67,346	75,610	83,507	44,271	51,751	58,217	65.7	68.4	69.7

[a] Including traffic through Canadian Canal.

Section 3. Ports and harbors of Lake Michigan.

Lake Michigan has the largest number of important harbors of any of the Great Lakes, and the commerce is much more diversified than on the other Lakes. Shipments include all of the important articles of Lake traffic (grain, flour, iron ore, coal, and lumber), but shipments of grain and lumber have declined, and the total shipments on this lake are now less in volume than the receipts. Coal receipts on this lake are larger than on any other of the Lakes. The local movement from port to port within Lake Michigan is much larger than on any of the other Lakes, this including the movement of iron ore from Escanaba to South Chicago, the movement of lumber by various routes, the movement of fruits from the southeastern shore of the lake, and an extensive passenger, summer-resort, and excursion business during the summer months. A large number of lines of vessels operate not only on the through routes, but also on numerous local routes along and across the lake. Many lines of car ferries are operated by railroad companies between points in Wisconsin and the Upper Peninsula of Michigan and points in the Lower Peninsula of Michigan, these ferry lines forming important links in through routes from the Northwest to the East.

Another feature of Lake Michigan traffic is the increasing amount of winter navigation. A dozen regular lines of car ferries and passenger and freight steamers are in operation on this lake between the more important ports during the winter months.

The leading ports on Lake Michigan are Chicago, Milwaukee, and Escanaba, but there are many others of considerable importance,

such as Gladstone, Manitowoc, Green Bay, Sheboygan, Grand Haven, Ludington, Manistee, Frankfort, and Charlevoix, and a large number of other places of minor importance.

Domestic shipments and receipts on Lake Michigan in 1906 aggregated over 33,000,000 tons. Shipments were 15,000,000 tons (20 per cent of the total domestic shipments on the Lakes) and receipts were over 18,000,000 tons (25 per cent of the total domestic Lake receipts).

Through the Straits of Mackinac, at the entrance of Lake Michigan, passes the immense volume of through business between that lake and the other Lakes. This is not as extensive as the aggregate movement at the other important connecting channels—the St. Marys River and the Detroit River—but it is an important factor in the total Lake movement. There is a considerable movement of car ferries across the straits between St. Ignace, on the Upper Peninsula of Michigan, and Mackinaw, on the Lower Peninsula, but this is mainly passenger business. Mackinac Island is a famous summer resort where many large steamers stop.

Manistique, on the south shore of the Upper Peninsula of Michigan, has some commerce in lumber, coal, iron ore, and general merchandise. Car ferries call at this harbor during the entire year. The shipments and receipts for 1906 amounted to 92,907 tons.

GREEN BAY.—Green Bay is 118 miles in length, from the head of Big Bay de Noc to the mouth of Fox River, and 23 miles across at its widest point. It is partly separated from Lake Michigan on the east by a peninsula approximately 75 miles long, with an average width of 10 or 12 miles. The outlet of Green Bay is 28 miles wide. Within this bay are a number of ports of considerable importance—Escanaba, Gladstone, Menominee, Marinette, and Green Bay Harbor, which connects with Fox River. Much of the commerce from the ports in the southern part of this bay goes to and from Lake Michigan by way of the Sturgeon Bay Canal.

Escanaba and Gladstone.—Escanaba, on the west shore of Little Bay de Noc, at the northerly end of Green Bay, has a good natural harbor. It is a very important ore-shipping point, and extensive wharves and slips have been constructed by railway and other corporations. Large quantities of coal are received, but other traffic is of slight importance. Shipments and receipts in 1906 aggregated 6,937,210 tons, and in 1907, 6,847,375 tons, making it the second port in volume of traffic on Lake Michigan.

Gladstone, also located on the western shore of Little Bay de Noc, 7½ miles north of Escanaba, has a natural harbor used by the largest vessels. There is a large and important movement of commerce at this point in grain, flour, and coal, almost entirely with Lake Erie

ports. The freight traffic by water aggregated 527,193 net tons in 1906.

Menominee, on the Menominee River, has a considerable commerce in coal, grain, and lumber, both locally and for transshipment. The traffic for 1906 amounted to 120,158 net tons.

The following table shows in some detail the commerce for 1906 and 1907 at Manistique, Escanaba, Gladstone, and Menominee, Mich.:

TABLE 168.—DOMESTIC COMMERCE OF UPPER MICHIGAN PENINSULA PORTS ON LAKE MICHIGAN, 1906 AND 1907, BY ARTICLES.

[Compiled from Monthly Summary of Commerce and Finance.]

Shipments.

Articles.	Manistique.		Escanaba.		Gladstone.		Menominee.	
	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.
Iron ore.....gross tons..	3,862	.....	5,656,859	5,594,708	12,198	8,000	22,493	25,441
Lumber.....M feet..	91,413	94,423	10,412	12,799	5,264	8,706	25,281	20,687
Coal.....net tons..	5,314	4,152	8,649	9,145	60	67	30	111
Pig iron and iron manufactures, gross tons.....	57,821	73,571	39,031	3,223	17,867	8,418	298	810
Flour.....net tons..	5,160	4,669	2	.....	90,770	95,365	.....	.....
Wheat.....bushels..	24,098	15,776	.....	.....	583,271	55,000	.....	.....
Other grain.....do....	129,660	66,079	.....	.....	3,141,458	1,118,670	.....	.....
Other freight.[a].....net tons..	66,926	58,390	3,611	2,653	13,180	20,336	20,981	27,371

Receipts.

Coal:								
Soft.....net tons..	65,577	154,760	487,260	504,051	217,643	284,751	40,330	57,338
Hard.....do....	1,913	2,086	25,412	26,936	7,130	4,885	2,621	2,021
Pig iron and iron manufactures, gross tons.....	42,744	6,894	464	468	29,941	36,455	1,577	1,235
Salt.....net tons..	451	1,306	476	445	5,243	4,267	4,713	1,795
Lumber and logs.....M feet..	761	1,224	530	.....	.....	.....	1,241	849
Grain.....bushels..	1,000	400	.....	.....	.....	.....	76	.....
Other freight.....net tons..	49,427	35,569	10,000	8,342	58,156	49,046	51,911	93,474

[a] Including logs.

Green Bay Harbor, at the southern end of Green Bay, has a large commerce in coal, grain, lumber, and general merchandise. The traffic for 1906 amounted to 957,479 net tons.

Fox River has a considerable local movement by water. Between Green Bay and Princeton on various routes, mostly centering around Oshkosh, some half dozen stern-wheel steamboats are employed in a general freight and passenger or excursion business. Some barges and tugs bring coal and pulp wood up the river from Green Bay. In 1906 there were 20,958 lockages through the 27 locks on this river; the highest number at any lock was 1,433, at Eureka. Only 101 lockages were made at Portage. The total freight transported on

this river in 1906 was 316,040 tons, the principal items being logs, coal, sand and gravel, pulp wood, and general merchandise.[a]

STURGEON BAY AND LAKE MICHIGAN CANAL.—This canal has been cut from Lake Michigan to Sturgeon Bay, an arm of Green Bay. It was originally constructed by a private company, between 1872 and 1881, was taken over by the United States in 1893, and since then the canal has been enlarged and a harbor constructed. The neck of land through which the canal is cut is about 1⅜ miles wide; the channel from the lake to Green Bay is about 5¼ miles long. This canal shortens the route from Green Bay points and is used by a large number of vessels. In 1906 there passed through 2,366 vessels, with a tonnage of 1,478,282, and carrying 691,414 tons of freight.

The principal articles carried from Green Bay are grain, lumber and timber, iron ore, and stone; the leading articles inbound are coal, general merchandise, and salt.

TABLE 169.—TRAFFIC THROUGH STURGEON BAY AND LAKE MICHIGAN CANAL, 1905–1907, BY ARTICLES.

[Compiled from Monthly Summary of Commerce and Finance.]

Articles.		1905.	1906.	1907.
Coal and coke	tons	86,029	109,653	125,512
Flour	barrels	12,800	55,330	18,361
Wheat	bushels	410,400	203,600	570,000
Grain	do	479,499	320,600	140,000
Peas	do	304,400	207,850	151,400
Lumber and logs	M feet	151,293	134,380	139,104
Ties	number	212,771	172,603	252,525
Iron ore	tons	25,143	89,531	119,086
Iron manufactures	do	19,213	19,509	16,823
Pig iron	do	2,655	2,273	4,108
Stone	do	47,480	72,461	109,083
Salt	barrels	34,829	158,295	288,546
Piles, poles, and posts	number	342,351	293,895	315,249
Wood	cords	10,815	8,324	10,443
Oil	barrels	.....	2,355	18,044
Cement	tons	3,350	8,046	21,233
Paper	do	2,357	1,337	2,102
Hay	do	.....	6,652	1,394
Miscellaneous	do	75,925	71,061	65,373
Total traffic	do	639,246	[a] 704,105	[a] 775,496

[a] Includes a small amount of freight not listed above.

On the Wisconsin shore of Lake Michigan, north of Milwaukee, are several ports of considerable local importance—Kewaunee, Manitowoc, and Sheboygan. Car ferries run to Kewaunee and Manitowoc; the principal shipments are grain, and coal is the largest item of receipts.

[a] Report of Chief of Engineers, U. S. Army, 1907, p. 1909.

The following table shows in some detail the domestic Lake commerce for 1906 and 1907 of some of the more important Lake Michigan ports in Wisconsin:

TABLE 170.—DOMESTIC COMMERCE OF WISCONSIN PORTS ON LAKE MICHIGAN, 1906 AND 1907, BY ARTICLES.

[Compiled from Monthly Summary of Commerce and Finance.]

Shipments.

Articles.	Green Bay Harbor.		Kewaunee.		Manitowoc.		Sheboygan.	
	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.
Wheat.....bushels..	.....	28,200	1,675	.....	20,100	46,600	.....	.....
Other grain.....do....	3,765,963	2,919,650	958,273	486,170	7,140,054	6,573,146	9,500	.....
Lumber.....M feet..	9,556	20	2,843	1,463	115,612	96,094	440	50
Coal.....net tons..	3,705	4,125	1,048	70	5,894	4,207	538	710
Copper.....gross tons..	.....	.....	25	.....	6,051	4,609	.....	.....
Flour.....net tons..	10	26	1,993	1,276	38,484	36,877	.....	.....
Pig iron and iron manufactures.....gross tons..	1	22	.....	20	1,196	1,852	.....	1,250
Salt.....net tons..	183	357	.....	.....	.....	4	.....	2,000
Other freight.....do....	13,531	10,896	29,017	28,639	158,428	201,263	13,451	11,356

Receipts.

Coal:								
Hard.....net tons..	88,568	127,925	2,532	2,877	26,244	59,550	133,569	198,018
Soft.....do....	292,189	343,781	52,817	57,903	417,946	463,407	306,647	348,576
Salt.....do....	8,343	6,115	361	1,680	8,955	14,486	25,326	14,250
Lumber and logs....M feet..	318	1,943	346	246	9,749	7,726	8,610	8,721
Pig iron and iron manufactures.....gross tons..	918	1,247	5,109	3,886	23,048	14,187	21	.....
Flour.....net tons..	9	10	.....	.....	60	40	.....	.....
Wheat.....bushels..	1,050	50	.....	.....	.....	.....	.....	.....
Other grain.....do....	8,350	5,358	9,000	.....	26,600	7,583	.....	.....
Other freight.....net tons..	228,912	136,033	20,368	25,054	161,509	230,966	26,882	30,083

MILWAUKEE.—Milwaukee, at the mouth of Milwaukee River, stands among the leading Lake ports in the extent and value of its water-borne commerce. It ranks second in importance to Chicago of the ports on Lake Michigan,[a] and, except for the combined traffic of Duluth and Superior, it is the leading port for the distribution of coal from Ohio ports to the West and Northwest. By means of car ferries and transit lines, which ply both winter and summer, Milwaukee is connected with several railway systems terminating on the eastern shore of Lake Michigan. By reason of its excellent harbor the manufacturers and distributers of this city enjoy superior shipping facilities and low freight rates, especially to and from eastern points. Many bulky articles, such as coal, salt, and sugar are transshipped from water to rail at Milwaukee. Large quantities of flour, wheat, other grain,

[a] Escanaba, however, has a larger volume of traffic.

and miscellaneous merchandise are shipped, and in addition to coal there are large receipts of iron ore, salt, sugar, and miscellaneous merchandise. The development of the traffic in grain, flour, and wheat has been discussed in some detail in the chapter on the movement of commodities, showing also the contest for traffic between all-rail, Lake, and transit lines. The total freight movement of the harbor aggregated 6,204,024 tons in 1906.

TABLE 171.—DOMESTIC LAKE COMMERCE OF MILWAUKEE, 1906 AND 1907, BY ARTICLES.

[Compiled from Monthly Summary of Commerce and Finance.]

Shipments.

Articles.	1906.	1907.	Articles.	1906.	1907.
Wheat.....bushels..	1,808,180	2,883,116	Flour.....net tons..	313,424	314,995
Other grain.....do....	11,169,493	11,474,790	Pig iron and iron manufactures.....gross tons..	3,902	15,146
Lumber.....M feet..	57,030	42,322	Salt.....net tons..	33	.....
Coal.....net tons..	13,986	9,741	Other freight.....do....	478,455	556,874
Copper.....gross tons..	2,379	7,366			

Receipts.

Coal:			Pig iron and iron manufactures.....gross tons..	41,042	45,787
Hard.....net tons..	722,156	895,199			
Soft.....do....	2,937,335	3,330,102	Flour.....net tons..	429	271
Salt.....do....	139,076	143,099	Wheat.....bushels..	167,000	2,093
Lumber and logs....M feet..	73,041	71,609	Other grain.....do....	108,311	24,049
Iron ore.....gross tons..	272,717	238,661	Other freight.....net tons..	695,088	989,239

Between Milwaukee and Chicago are several ports of minor importance—Racine and Kenosha, Wis., and Waukegan, Ill. Coal is the principal article received at these ports, and there is also some local traffic.

CHICAGO AND SOUTH CHICAGO.—The original harbor of Chicago was limited to the lower end of Chicago River, but this has been greatly extended by dredging and widening the river and by the building of breakwaters to form an outer harbor. This outer harbor is mainly a protection to Chicago River. It is used mostly by yachts and other small craft and has practically no commerce except that going in and out of the river. In the river the channel depths and widths are still limited and variable, and are no longer adequate for present traffic conditions. As a result the traffic is diminishing, a good deal of the local commerce having gone since 1897 to the Calumet River. The total commerce of the Chicago River for 1906 is reported as 5,011,786 tons, compared with 7,391,454 tons in 1898.

Grain, flour, and mill stuffs are the principal shipments; lumber, coal, salt, and iron ore are the largest receipts. The development of the traffic in the leading commodities, and the contest between the Lake and rail routes have been discussed in Chapter VI.

Calumet River and Harbor (South Chicago) could be used originally by only the smallest craft, but has been greatly improved by dredging and the constructing of breakwaters. Its commerce is now of equal importance with Chicago River in the Lake trade of Chicago. The annual traffic is reported at 5,290,000 tons, the principal items being iron ore received and grain shipped. It is steadily increasing, and new manufacturing plants are steadily occupying the river banks as fast as the 20-foot channel depths are secured by the government improvements under way.

The following tables show the total freight traffic for Chicago and South Chicago from 1897 to 1906, and the shipments and receipts in detail for 1906 and 1907:

TABLE 172.—LAKE COMMERCE OF CHICAGO AND SOUTH CHICAGO, 1897-1906.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907, pp. 1920 and 1926.]

Year.	Chicago.	South Chicago.	Total.	Year.	Chicago.	South Chicago.	Total.
	Tons.	*Tons.*	*Tons.*		*Tons.*	*Tons.*	*Tons.*
1897	7,149,759	3,493,218	10,642,977	1902	5,184,792	4,454,428	9,639,220
1898	7,391,454	4,117,526	11,508,980	1903	6,105,553	4,742,225	10,847,778
1899	6,189,365	3,229,874	9,419,239	1904	4,446,071	3,728,260	8,174,331
1900	5,873,070	3,783,674	9,656,744	1905	5,388,986	4,530,394	9,919,380
1901	6,184,242	3,995,277	10,179,519	1906	5,011,786	5,290,326	10,302,112

TABLE 173.—LAKE COMMERCE OF CHICAGO AND SOUTH CHICAGO, 1906, BY ARTICLES.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907, pp. 1920 and 1926.]

Articles.	Chicago.		South Chicago.		Total.	
	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Flour	220,760	.....	44,369	.....	265,129	.....
Wheat	148,560	10,092	124,147	12,150	272,707	22,242
Corn	831,522	.....	371,580	.....	1,203,102	.....
Oats	88,729	.....	22,814	.....	111,543	.....
Rye	6,999	560	7,516	.....	14,515	560
Barley	4,203	.....	11,541	.....	15,744	.....
Flaxseed	10,317	10,500	.....	.....	10,317	10,500
Grass seed	3,236	.....	262	.....	3,498	.....
Mill stuffs	107,934	.....	14,964	.....	122,898	.....
Malt	9,786	.....	156	.....	9,942	.....
Oil cake	49,902	.....	7,745	.....	57,647	.....
Broom corn	621	.....	.....	.....	621	.....
Lard and tallow	4,495	.....	334	.....	4,829	.....
Pork and beef	719	.....	56	.....	775	.....
Hides and leather	161	.....	52	.....	213	.....
Oil	2,487	.....	227	.....	2,714	.....
Sugar	3,125	197,428	500	.....	3,625	197,428
Wool and hair	53,664	.....	75,188	.....	128,852	.....
Coal	.....	627,175	.....	287,386	.....	914,561
Salt	.....	194,169	.....	28,251	.....	222,420

TABLE 173.—LAKE COMMERCE OF CHICAGO AND SOUTH CHICAGO, 1906, BY ARTICLES—Continued.

Articles.	Chicago.		South Chicago.		Total.	
	Shipments.	Receipts.	Shipments.	Receipts.	Shipments.	Receipts.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Iron ore	.....	199,396	.....	4,084,936	.....	4,284,332
Lumber	.....	803,450	.....	70,002	.....	873,452
Posts, ties, poles, and wood	.....	149,380	.....	54,886	.....	204,266
Laths and shingles	.....	4,132	.....	1,509	.....	5,641
Cement	.....	67,444	.....	210	.....	67,654
Copper	.....	3,858	.....	185	.....	4,043
Green fruits	.....	146,225	.....	49	.....	146,274
Miscellaneous	353,762	696,995	63,217	6,094	416,979	703,089
Total	1,900,982	3,110,804	744,668	4,545,658	2,645,650	7,656,462

TABLE 174.—DOMESTIC LAKE COMMERCE OF CHICAGO AND SOUTH CHICAGO, 1906 AND 1907, BY ARTICLES.

[Compiled from Monthly Summary of Commerce and Finance, December, 1907, pp. 1166–1169.]

Shipments.

Articles.	1906.	1907.	Articles.	1906.	1907.
Wheat.....bushels..	8,701,930	14,448,231	Pig iron and iron manufactures.....gross tons..	7,107	15,052
Other grain.....do....	46,181,265	45,442,765	Lumber.....M feet..	813	998
Flour.....net tons..	297,687	344,108	Salt.....net tons..	2,629	707
Coal, bunker.....do....	89,048	82,241	Other freight[a].....do....	604,721	644,604
Coal.....do....	31,530	29,350			

Receipts.

Iron ore.....gross tons..	4,251,920	4,627,776	Pig iron and iron manufactures.....gross tons..	50,315	54,054
Coal:			Copper.....do....	4,108	2,978
Hard.....net tons..	810,988	1,015,776	Flour.....net tons..	419	2,470
Soft.....do....	127,163	438,492	Other grain.....bushels..	20,000	.....
Lumber and logs...M feet..	407,822	377,583	Other freight[a]....net tons..	1,035,317	1,089,074
Salt.....net tons..	204,939	222,447			
Wheat.....bushels..	702,415	564,000			

[a] Including flaxseed.

At the southern end of Lake Michigan, in Indiana, there are as yet no important ports. Wolf River and Indiana Harbor are small harbors developed by private enterprise. Gary Harbor, just constructed primarily for the Indiana Steel Company, a branch of the United States Steel Corporation, has facilities for the largest Lake vessels. Michigan City, Ind., at the southern end of Lake Michigan, receives some freight by water, mainly lumber, railroad ties, and salt. The shipments are insignificant. The total freight traffic for 1906 amounted to 89,170 tons.

THE EASTERN SHORE.—On the eastern or Michigan shore of Lake Michigan are a large number of ports, mostly of secondary and local importance.

On St. Joseph River two boats do a small freight and some passenger business. St. Joseph, Benton Harbor, South Haven, and Holland (Black Lake) have considerable freight traffic in fruit and a large passenger excursion and resort travel from Chicago.

Grand Haven is a harbor of considerable importance. A line of steamers runs to Milwaukee in connection with the Grand Trunk Railroad, and there are two other steamboat lines with regular and frequent scheduled trips to Chicago. There is a large passenger business, especially during the season of fair weather, and a very considerable movement of general and miscellaneous freight. The latter amounted to 382,373 tons in 1905 and 414,728 tons in 1906.

On the Grand River there is some traffic between Grand Haven and Grand Rapids (39 miles), amounting to 77,217 tons in 1905 and 110,395 tons in 1906.[a]

Muskegon, 12 miles north of Grand Haven, on Muskegon Lake, the outlet of Muskegon River, has a considerable commerce by water, mostly lumber and stone. The freight traffic amounted to 238,721 tons in 1905 and 136,340 tons in 1906.

Muskegon River has a length of about 33 miles to Newaygo, which may be called the head of navigation.

Ludington, Mich., is the principal western terminus of the Pere Marquette Railroad, which operates lines of car ferries from this point to Manitowoc and Milwaukee, Wis., and also a line of passenger and package-freight steamers to Milwaukee. The business done by the car-ferry lines is of large and constantly increasing importance. The total freight traffic of Ludington amounted to 1,421,558 tons in 1905 and 1,497,424 tons in 1906. Coal, salt, and lumber are the principal articles shipped, and lumber and grain and flour are the chief ones received, with a large amount of miscellaneous freight both ways.

Manistee, 24 miles northeast of Ludington, on Manistee Lake and River, has a considerable commerce by water, derived principally from the salt and lumber industries. It is a regular port of call for one line of steamers plying from Chicago to various points on the eastern shore of Lake Michigan, and a single steamer makes stated trips between Manistee and Milwaukee. The freight movement for 1905 amounted to 469,870 tons and for 1906 to 443,931 tons.

Frankfort, Mich., has a very considerable commerce, practically all of which is carried by the car-ferry lines of the Ann Arbor Railroad, which run to Manitowoc, Kewaunee, and Marinette, Wis., and Manistique, Mich., and form an important link in the through commerce between the Northwest and the Atlantic seaboard. The freight movement for 1905 amounted to 838,205 tons and for 1906 to 719,259 tons.

---

[a] Report of Chief of Engineers, U. S. Army, 1907, pp. 649–652.

Traverse City, the principal harbor on Grand Traverse Bay, and Petoskey, on the south shore of Little Traverse Bay, are summer resorts with some local traffic.

Charlevoix, Mich., on Round Lake, at the mouth of Pine River, has a large traffic by water, furnished chiefly by the lumber industry, which has recently been growing greatly at this point. It is also an important summer resort, and during the season two steamboat lines make regular and frequent calls. The freight reported for 1905 amounted to 66,670 tons and for 1906 to 36,413 tons, but many of the lumber vessels do not clear, and the total traffic is said to be considerably over 1,000,000 tons.[a]

The following tables show the Lake commerce at some of the more important ports on the eastern shore of Lake Michigan in some detail for 1906 and 1907:

TABLE 175.—COMMERCE OF LOWER MICHIGAN PENINSULA PORTS ON LAKE MICHIGAN, 1906, BY ARTICLES.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907.]

Shipments.

Articles.	Grand Haven.	Ludington.	Manistee.	Frankfort.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Coal	14,976	454,463	.....	44,306
Cement	2,446	16,431	.....	333
Stone	1,149	517	.....	30
Brick	193	1,036	.....	75
Other building material	6,819	1,421	.....	.....
Lumber	954	57,123	161,575	16,744
Wood	9,867	13,401	2,511	5,881
Bark	135	1,717	9,485	153
Iron and machinery	1,584	38,660	.....	5,650
Salt	4,011	102,547	223,967	335
Sugar	1,829	2,500	.....	.....
Fruits and vegetables	2,721	4,187	.....	94
Hides	3,602	.....	.....	.....
Loaded freight cars	.....	.....	.....	316,995
Empty freight cars	.....	.....	.....	735
Miscellaneous	62,175	141,261	10,049	28,676
Total	112,461	835,264	407,587	420,007

Receipts.

Lumber and wood	22,586	244,137	.....	42,525
Grain	64,255	170,264	.....	55,375
Flour	54,379	38,206	.....	3,727
Feed, bran, and middlings	32,914	7,633	.....	175
Iron and machinery	983	5,309	.....	2,380
Copper	.....	2,246	.....	6,975
Cement	1,526	105	.....	.....

[a] Report of Chief of Engineers, U. S. Army, 1907, pp. 665-666.

TABLE 175.—COMMERCE OF LOWER MICHIGAN PENINSULA PORTS ON LAKE MICHIGAN, 1906, BY ARTICLES—Continued.

Receipts—Continued.

Articles.	Grand Haven.	Ludington.	Manistee.	Frankfort.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Malt	28,960	32,771	.....	3,979
Stone	7,000	2,381	19,195	259
Meats	5,438	.....	.....	.....
Leather	4,481	.....	.....	.....
Iron ore	40,200	.....	.....	.....
Loaded freight cars	.....	.....	.....	118,090
Empty freight cars	.....	.....	.....	1,695
Miscellaneous	39,545	159,108	17,149	64,072
Total	302,267	662,160	36,344	299,252

TABLE 176.—DOMESTIC COMMERCE OF LOWER MICHIGAN PENINSULA PORTS ON LAKE MICHIGAN, 1906 AND 1907, BY ARTICLES.

[Compiled from Monthly Summary of Commerce and Finance, December, 1907, pp. 1166–1169.]

Shipments.

Articles.	Grand Haven.		Ludington.		Manistee.		Frankfort.	
	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.
Pig iron, and manufactures.....gross tons..	161	204	38,572	38,358	.....	.....	48,724	9,198
Coal:								
Hard.....net tons..	3,797	2,256	26,153	14,004	.....	.....	2,535	280
Soft.....do....	11,233	9,670	445,677	303,096	.....	.....	206,543	308,221
Bunker.....do....	16,040	18,972	42,118	30,320	16,326	14,947	19,735	22,083
Salt.....do....	3,961	3,940	127,220	165,312	244,319	183,670	1,423	2,210
Lumber.....M feet..	721	1,525	33,009	32,831	99,568	76,493	14,397	9,979
Flour.....net tons..	377	193	119	.....	.....	.....	.....	.....
Wheat.....bushels..	.....	458	2,205	1,635	.....	.....	.....	.....
Other grain.....do....	.....	17,764	23,285	8,850	.....	.....	.....	.....
Other freight....net tons..	108,219	143,969	205,417	299,427	28,458	29,487	128,222	107,638

Receipts.

Iron ore.....gross tons..	.....	.....	1,447	.....	.....	.....	26,101	25,641
Pig iron, and manufactures.....gross tons..	362	678	6,560	15,805	.....	.....	32,162	43,802
Copper.....do....	103	2,397	2,422	7,618	.....	.....	5,996	1,825
Lumber and logs..M feet..	14,990	12,608	141,208	105,192	430	1,104	59,091	55,857
Flour.....net tons..	54,529	50,000	54,841	43,805	912	364	5,172	4,618
Wheat.....bushels..	21,704	91,372	79,340	276,792	.....	.....	20,100	2,000
Other grain.....do....	2,787,114	2,426,082	6,633,449	8,497,925	108,155	71,925	2,825,510	1,571,100
Coal:								
Hard.....net tons..	.....	.....	1,550	3,833	1,000	1,951	.....	.....
Soft.....do....	.....	58	19,343	19,311	.....	170	125	800
Other freight.....do....	131,352	154,244	199,928	262,682	28,881	17,718	133,987	158,655

Section 4. Lake Huron and the Detroit River.

Lake Huron is a connecting link in the chain of Great Lakes through which passes all the through traffic between Lakes Superior and Michigan on the one side and Lake Erie on the other. There are, however, no harbors along the west coast of Lake Huron with sufficient navigable depth of water to accommodate the larger lake vessels, and the local traffic along the Michigan shore consists of small and medium sized vessels, lumber barges, schooners, lake tugs, and passenger steamers, which land at all shore points having sufficient depth of water to accommodate them. The more important United States ports on Lake Huron are Cheboygan, Alpena, and Saginaw, none of which compare with the leading ports on the other lakes.

Of greater importance in the traffic of Lake Huron in recent years are the Canadian ports on Georgian Bay, among which may be mentioned Depot Harbor, Owen Sound, Collingwood, and Midland.

Cheboygan, on the lower reach of the Cheboygan River and its outlet into the Straits of Mackinac, has a considerable commerce. This consists mainly of logs, timber, ties, poles, and pulp wood, and amounted to 459,528 tons in 1906. A number of lake passenger steamers also stop at this port.

Alpena, at the mouth of Thunder Bay River, on Thunder Bay (next to Saginaw Bay the most prominent indentation on the American shore of Lake Huron), has a considerable commerce, consisting of lumber, cement, coal, cedar posts and ties, hay and feed, and general merchandise. The total shipments and receipts for 1906 were 249,426 tons.

East Tawas, on the north shore of Tawas Bay, and Au Sable, north of Saginaw Bay, are now places of small importance.

Saginaw River, formed by the Tittabawassee and Shiawassee rivers, flows in a northerly direction 22 miles and discharges into the south end of Saginaw Bay. A channel of 12 feet has been secured at and below Bay City and 10 feet above that point. The two tributaries named are navigable for small boats, the Tittabawassee for a distance of 24 miles and the Shiawassee for 13 miles, from their junction at Green Point. The Cass and Flint rivers, also tributaries of the Saginaw, are obstructed by logs and are navigable only for rowboats.

The commerce of the Saginaw River has been rapidly decreasing, falling from 1,945,033 tons in 1901 to 293,105 tons in 1906. This decrease has been due to the decline of the lumber trade in the Saginaw Valley.[a] The present traffic consists mainly of logs, lumber, coal, and salt.

Harbor Beach, 60 miles north of the St. Clair River, has an artificial harbor of refuge, the only safe refuge on the west shore from

[a] See p. 182.

the foot of the lake to Tawas Bay, a distance of 115 miles. During 1906 this harbor was used by 954 vessels, with a total tonnage of 771,875 tons.

ST. CLAIR RIVER AND LAKE ST. CLAIR.—The St. Clair River connects Lake Huron with Lake St. Clair. The most important ports on this river are Port Huron, on the American side, and Sarnia, on the Canadian side near the outlet from Lake Huron. Other ports of minor importance are Marine City and St. Clair, Mich., and Point Edward, Ontario.

Port Huron is a port of entry with a considerable export and some import trade. There is also a considerable domestic Lake movement here. The total shipments and receipts reported to the Bureau of Statistics aggregate about 350,000 tons in 1906 and 375,000 tons in 1907. Salt is the largest item shipped, and coal and grain are the principal articles received.

Black River flows through the city of Port Huron, in a southeasterly direction. There was received on this river during 1906, 135,695 tons of freight, mostly gravel and pulp wood.[a]

ST. CLAIR FLATS CANAL.—The St. Clair Flats Canal is simply a dredged channel cut through the flats at the mouth of St. Clair River, the dredged material having been deposited so as to form dikes on each side of the cut. The dikes are 7,221 feet long. The commerce through this canal includes the through movement from the upper to the lower Lakes, and some local traffic between points on St. Clair and Detroit rivers. This is estimated in the aggregate by the United States Engineers at 60,589,441 net tons of freight for the season of 1906.

Lake St. Clair is a small lake, nearly circular, 26 miles in length and 24 in breadth. The steamer channel from St. Clair Flats Canal to the entrance of Detroit River is 17 miles long. In addition to the St. Clair River, a few small streams enter this lake, and there are several villages on its shores, but none of these are of any commercial importance.

DETROIT AND THE DETROIT RIVER.—The Detroit River connects Lake St. Clair and Lake Erie, and its total length is 28¼ miles. The city of Detroit has a large and important commerce by water. All the passenger steamers passing through the Lakes stop here; there are a number of local lines of steamboats, and four railroad companies have car ferries crossing the river between Detroit and Windsor.

Domestic shipments and receipts by water at Detroit, as reported to the Bureau of Statistics, aggregated 1,185,000 tons in 1906 and 1,210,000 tons in 1907. General merchandise, some grain, and bunker coal were the principal shipments. Receipts are of much greater

[a] Report of Chief of Engineers, U. S. Army, 1907, p. 681.

relative importance, including a large amount of general merchandise, considerable grain, and some coal, lumber, salt, and copper.

A few small streams enter the Detroit River, and there are a number of small cities and villages on both banks. Most of these are of very slight commercial importance.

Rouge River discharges into the Detroit River at the southerly limits of the city of Detroit. Large industrial plants are located on both sides of the mouth of the river. Receipts and shipments during 1906 amounted to 234,861 tons, mostly iron ore, lumber, and pulp wood.

Wyandotte, a suburb of Detroit, has a number of important industries, located on the river, including shipbuilding yards, chemical works, and soda-ash works, but no records of the shipments and receipts are available.

The traffic through the Detroit River represents the largest amount of Lake traffic concentrated at one point. The great bulk of this is the through traffic between the upper and lower Lakes, but in addition to that passing the St. Clair Flats Canal there is a considerable movement between Detroit and other points on the river and Lake Erie ports. The aggregate traffic through the Detroit River in 1906 is estimated by the United States engineers at 63,808,571 net tons of freight. The difference of 3,219,130 tons between this and the freight movement estimated at the St. Clair Flats Canal indicates the shipments and receipts on the Detroit River. According to the reports of the Bureau of Statistics, the total domestic freight movement through the Detroit River for the year 1906 was 60,578,155 tons, and for 1907 was 67,292,504 tons.

The following tables show shipments and receipts from Port Huron and Detroit, and the movement through the Detroit River:

TABLE 177.—DOMESTIC LAKE SHIPMENTS AND RECEIPTS AT PORT HURON AND DETROIT, 1906 AND 1907, BY ARTICLES.

[Compiled from Monthly Summary of Commerce and Finance, December, 1907, pp. 1166-1169.]

Shipments.

Articles.	Port Huron.		Detroit.	
	1906.	1907.	1906.	1907.
Coal [a] ..... net tons..	5,102	8,213	62,776	54,662
Salt ..... do....	36,749	34,923	1,250	71
Grain ..... bushels..	.....	.....	.....	144,587
Iron ore ..... gross tons..	1,000	.....	1,400	.....
Pig iron and iron manufactures ..... do....	250	.....	5,049	7,064
Lumber ..... M feet..	600	.....	635	398
Other freight ..... net tons..	166,781	114,016	130,704	125,486

[a] Mostly bunker coal.

TABLE 177.—DOMESTIC LAKE SHIPMENTS AND RECEIPTS AT PORT HURON AND DETROIT, 1906 AND 1907, BY ARTICLES—Continued.

Receipts.

Articles.	Port Huron.		Detroit.	
	1906.	1907.	1906.	1907.
Iron ore.....gross tons..	.....	.....	158,036	195,328
Coal.....net tons..	82,861	125,850	26,905	24,913
Lumber.....M feet..	2,627	1,460	91,093	79,661
Flour.....net tons..	8,120	16,542	2,070	766
Wheat.....bushels..	.....	135,000	1,013,168	739,343
Other grain.....do....	1,041,760	1,639,576	787,548	632,700
Pig iron and iron manufactures.....gross tons..	81	156	75,556	52,633
Salt.....net tons..	515	50	9,678	8,857
Copper.....gross tons..	.....	.....	6,519	4,408
Other freight.....net tons..	22,077	30,752	440,864	510,399

TABLE 178.—DOMESTIC LAKE TRAFFIC THROUGH THE DETROIT RIVER, 1906 AND 1907, BY ARTICLES.

[Monthly Summary of Commerce and Finance, December, 1907, p. 1177.]

Articles.	Southbound.		Northbound.		Total.	
	1906.	1907.	1906.	1907.	1906.	1907.
Iron ore.....gross tons..	32,208,009	35,405,866	12,506	.....	32,220,515	35,405,866
Coal, bard.....net tons..	.....	.....	2,960,920	4,014,177	2,960,920	4,014,177
Coal, soft.....do....	.....	1,035	11,561,111	14,412,944	11,561,111	14,413,979
Flour.....do....	1,237,652	1,161,836	872	20	1,238,524	1,161,856
Wheat.....bushels..	46,968,671	60,382,559	.....	.....	46,968,671	60,382,559
Corn.....do....	32,086,383	34,439,311	.....	.....	32,086,383	34,439,311
Oats.....do....	24,311,170	12,004,242	.....	.....	24,311,170	12,004,242
Barley.....do....	14,786,080	11,556,346	.....	.....	14,786,080	11,556,346
Rye.....do....	1,328,517	1,339,028	.....	.....	1,328,517	1,339,028
Flaxseed.....do....	17,758,376	15,119,469	.....	.....	17,758,376	15,119,469
Pig iron.....gross tons..	337,086	90,110	5,895	1,264	342,981	91,374
Iron manufactures.....do....	1,437	8,894	453,809	436,461	455,246	445,355
Copper.....do....	89,534	86,780	.....	25	89,534	86,805
Salt.....net tons..	41,463	24,530	74,401	100,669	115,864	125,199
Lumber and logs.....M feet..	870,511	575,435	9,796	4,227	880,307	579,662
Miscellaneous.....net tons..	966,738	1,053,090	1,303,042	1,299,766	2,269,780	2,352,856
Total traffic.....do....	44,129,343	46,966,193	16,448,812	20,326,311	60,578,155	67,292,504

Section 5. Ports and harbors of Lake Erie.

In its natural condition Lake Erie afforded no safe and commodious harbors suitable for the vessels of the size and draft now used in the Lake commerce. In their unimproved condition the harbors were shallow and of variable depth at their entrances, necessitating the employment of small, light-draft boats. By the combination of government, municipal, and private work the harbors have been

improved to accommodate the large lake vessels now used. At ports of large commercial importance additional works in the form of breakwaters have been constructed to furnish a sheltered area outside and beyond the river mouths.

Nearly all the commerce of Lake Erie centers at the mouth of Detroit River, from which it spreads out to all the harbors from Port Colborne, Buffalo, and the Niagara River on the east to Toledo at the western end of the lake. The greater portion of the traffic passes through the island region in the western end, and the passage between Point Pelee and Pelee Island is the most important channel of the lake. There is also, however, some local commerce between Lake Erie ports, and also a considerable movement between Lake Erie and Detroit, in addition to the longer distance through movement.

Lake Erie stands first among the Lakes both in the volume and value of its total traffic. At its ports are received practically all the grain and flour shipped to American ports and nearly 80 per cent of the iron-ore movement, and from Lake Erie ports are sent the great bulk of the coal shipments. In contrast with Lake Superior, where shipments greatly predominate, Lake Erie is primarily a lake of receiving ports, but the coal shipments and miscellaneous package freight bring the volume of shipments on Lake Erie above those from Lake Michigan, and the lake as a whole stands second to Lake Superior in Lake shipments.

Buffalo and Cleveland are distinctly the most important ports on Lake Erie, both in volume and diversity of traffic. Other important points are Toledo, Lorain, Ashtabula, Conneaut, and Erie, while Sandusky, Huron, and Fairport have each a traffic of more than a million tons. There are no Canadian ports of large importance on this lake. Rondeau Harbor and Port Stanley, on the north shore, are harbors of refuge and receiving ports for coal to the Pere Marquette Railroad. Port Colborne, about 18 miles west of Buffalo, is the Lake Erie entrance to the Welland Canal.

West of Cleveland.—Toledo Harbor includes Maumee Bay and Maumee River. The wharf frontage extends over a distance of 3 miles along the river, the lower end being about 4 miles above the mouth of the river at the head of Maumee Bay. The commerce of Toledo is large and important, aggregating 4,522,280 tons in 1906, an increase of 25 per cent over the previous year. Coal and coke are the principal shipments, and iron ore the largest item of receipts. The Miami and Erie Canal extends from Toledo to Cincinnati.[a]

Sandusky Harbor is in the lower part of Sandusky Bay. While not ranking as one of the most important Lake ports, there is a large commerce, amounting to 1,366,663 tons in 1906. Coal and coke

[a] See page 265.

constitute the largest volume of shipments; lumber, grain, and produce and iron ore are the most important receipts. There is a considerable movement of stone, lime, and sand.

Sandusky River enters Sandusky Bay at its upper end, 14 miles above Sandusky, and is navigable for small vessels as far as Fremont, Ohio, about 18 miles from the mouth.

Huron Harbor, Ohio, is at the mouth of Huron River, about 10 miles southeast of Sandusky Harbor. The commerce of Huron for the year 1906 amounted to 1,675,096 tons, mostly coal and coke shipped and iron ore received.

Lorain Harbor is within the mouth of Black River, 25 miles west of Cleveland. The commerce of this harbor for the year 1906 amounted to 4,325,691 tons, an increase of nearly 33 per cent over that for the previous year. Shipments of coal and coke and receipts of iron ore constitute the great bulk of this traffic.

TABLE 179.—COMMERCE OF LAKE ERIE PORTS WEST OF CLEVELAND, 1906, BY ARTICLES.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907.]

Shipments.

Articles.	Toledo.	Sandusky.	Lorain.	Huron.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Coal and coke	2,325,259	785,804	1,807,098	786,603
Lumber, logs, etc	6,331	.....	.....	.....
Grain and produce	6,160	.....	.....	.....
Stone, lime, and sand	4,500	160,000	.....	.....
Iron ore	4,000	.....	.....	11,819
Pig iron, and manufactures	314	.....	34	.....
Salt	.....	50	.....	.....
Miscellaneous	16,625	34,207	1,419	7
Total	2,363,189	980,061	1,808,551	798,429

Receipts.

Iron ore	1,781,131	36,779	2,417,109	871,697
Stone, lime, and sand	150,000	199,097	52,268	.....
Lumber, logs, etc	108,736	57,619	16,927	1,710
Grain and produce	40,448	40,769	.....	.....
Salt	28,670	6,428	.....	.....
Coal and coke	25,422	.....	.....	.....
Pig iron, and manufactures	1,531	2,055	30,167	67
Fish	800	3,150	500	250
Miscellaneous	22,353	40,705	169	2,943
Total	2,159,091	386,602	2,517,140	876,667
Total commerce	4,522,280	1,366,663	4,325,691	1,675,096

TABLE 180.—DOMESTIC COMMERCE OF LAKE ERIE PORTS WEST OF CLEVELAND, 1906 AND 1907, BY ARTICLES.

[Compiled from Monthly Summary of Commerce and Finance.]

Shipments.

Articles.	Toledo.		Sandusky.		Lorain.		Huron.	
	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.
Coal:								
Hard.....net tons..	11,012	16,095	4,000	5,955	.....	13,000	.....	10,519
Soft.....do....	2,210,604	3,229,702	669,294	1,011,363	1,605,832	1,865,166	739,288	1,196,919
Bunker.....do....	103,643	134,594	75,790	47,100	91,538	112,496	32,087	50,580
Wheat.....bushels..	361,632	793,074	.....	.....	.....	.....	.....	.....
Iron ore, and manufactures.....gross tons..	280	114	.....	.....	30	.....	10,617	52
Lumber.....M feet..	187	275	.....	52	.....	150	.....	.....
Salt.....net tons..	.....	275	50	.....	.....	.....	.....	.....
Miscellaneous.....do....	14,041	9,335	75,679	291,480	1,419	323	7	1

Receipts.

Iron ore.....gross tons..	1,438,396	1,302,092	32,019	73,690	2,158,133	2,608,625	778,301	948,329
Coal.....net tons..	23,957	8,714	.....	.....	.....	.....	.....	.....
Salt.....do....	28,423	28,357	3,896	1,240	.....	.....	.....	.....
Lumber.....M feet..	37,799	23,410	27,454	10,037	6,301	5,661	855	818
Grain.....bushels..	290,450	236,277	654,496	200,500	.....	.....	.....	.....
Pig iron, and manufactures.....gross tons..	1,367	6,675	1,835	.....	26,935	.....	60	.....
Miscellaneous..net tons..	[a] 67,749	[a] 54,970	15,177	18,398	53,032	63,473	2,943	873

[a] Including flaxseed.

CLEVELAND.—Cleveland, next to Buffalo in importance of Lake Erie ports and one of the leading Lake ports, is located at the mouth of the Cuyahoga River. The original harbor consisted of the lower reach of the river and its original bed, which are under the control of the city of Cleveland. A total dock frontage of 14½ miles has been provided, practically the whole of which has been improved by the construction of wharves and docks, many of which are equipped with the most modern appliances for the rapid loading and unloading of vessels. An outer harbor has been erected by the United States Government by the construction of two breakwaters inclosing a protected area of about 375 acres.

From Cleveland, the Ohio and Erie Canal extends to the Ohio River at Portsmouth.[a]

As at the other Lake Erie ports, shipments of coal and coke and receipts of iron ore constitute the great bulk of the Lake traffic. But there are also considerable shipments of petroleum, iron manufactures, and miscellaneous merchandise, and large receipts of lumber, grain, stone, lime, and sand. The total freight movement by lake

[a] See page 264.

and by rail from 1894 and 1895 to 1906 and domestic shipments and receipts by Lake in 1906 and 1907 are shown in the following tables:

TABLE 181.—LAKE AND RAIL COMMERCE AT CLEVELAND, 1894–1906,[a] BY ARTICLES.

[Statistics furnished by the Cleveland Chamber of Commerce.]

Received by lake.

Articles.	1895.	1896.	1897.	1898.	1899.	1900.
Anthracite coal.....tons..	.....	.....	6,150	.....	941	700
Bituminous coal.....do....	.....	3,400	.....	.....	300	2,300
Iron ore.....do....	2,766,328	2,707,169	2,770,265	2,986,701	3,662,137	3,823,314
Stone, sand, and lime.....do....	111,651	95,175	241,703	267,626	219,772	192,496
Petroleum .....barrels..	1,047	4,207	7,492	960	7,190	2,130
Pig, bloom, and railroad iron..tons..	20,905	59,533	26,834	8,555	9,361	12,039
Other iron and castings.....do....	5,481	1,298	5,686	1.940	8,465	1,571
Lumber and other forest products, cars	29,466	23,767	18,362	31,344	35,691	30,071
Manufactures.....tons..	.....	.....	3,332	24,737	21,259	11,775
Live stock.....head..	117	160	111	257	79	175
Wheat.....bushels..	1,511,600	1,760,766	2,276,633	678,000	1,352,667	892,490
Corn.....do....	16,000	180,000	.....	40,000	247,500	453,000
Oats.....do....	.....	314,000	600	167,437	342,563	696,375
Barley.....do....	.....	.....	.....	38,333	69,084	.....
Rye and other cereals.....do....	150,000	272,393	653,285	470,000	296,000	.....
Agricultural products except grain, tons.....	1,465	1,587	2,090	1,043	360	415
Milling products and flour.....tons..	5,986	9,122	16,062	1,457	4,268	.....
Provisions.....do....	5,235	14,591	33,077	27,792	39,080	37,050
Salt.....do....	819	7,308	3,960	6,371	4,030	2,829
Cement.....do....	.....	.....	.....	.....	.....	.....
Merchandise and other articles..do....	65,464	53,315	76,680	78,439	60,216	113,671
Total tons.....	3,593,044	3,475,281	3,623,001	4,038,684	4,769,720	4,820,597

Articles.	1901.	1902.	1903.	1904.	1905.	1906.
Bituminous coal.....tons..	.....	1,200	500	2,750	10,350	29,250
Iron ore.....do....	4,290,787	4,993,038	4,388,593	3,558,109	5,869,222	6,642,431
Stone, sand, and lime.....do....	280,010	227,183	334,168	462,423	371,970	236,451
Petroleum.....barrels..	1,305	3,070	1,900	240	248	100
Pig, bloom, and railroad iron..tons..	7,899	1,853	6,941	3,245	1,300	75
Other iron and castings.....do..	81	55	1,233	171	.....	.....
Lumber and other forest products, cars.....	37,433	21,959	23,146	15,905	18,520	16,449
Manufactures.....tons..	10,193	2,666	1,806	2,410	903	.....
Live stock.....head..	16	28	30	.....	.....	14
Wheat.....bushels..	357,000	447,500	927,943	254,500	621,147	816,575
Corn.....do....	105,000	167,900	.....	329,000	.....	165,000
Oats.....do....	120,000	100,000	353,555	430,000	190,000	685,000
Barley.....do....	.....	.....	.....	55,000	95,000	158,200
Rye and other cereals.....do....	.....	271,487	661,500	638,400	725,000	1,129,500
Agricultural products except grain, tons.....	32	140	298	130	145	118
Milling products and flour....tons..	15	.....	60	330	.....	50
Provisions.....do....	24,210	31,849	20,194	16,501	5,329	7,515
Salt.....do....	3,705	480	1,692	1,585	1,015	225
Cement.....do....	.....	.....	.....	.....	1,101	3,759
Merchandise and other articles..do....	66,219	74,024	88,161	84,353	90,742	89,181
Total tons.....	5,410,277	5,799,420	5,340,828	4,477,172	6,749,262	7,575.473

[a] Statistics of Lake trade not available for 1894.

TABLE 181.—LAKE AND RAIL COMMERCE AT CLEVELAND, 1894-1906, BY ARTICLES—Continued.

Forwarded by lake.

Articles.	1895.	1896.	1897.	1898.	1899.	1900.
Anthracite coal.....tons..	.....	.....	.....	2,925	4,899	1,025
Bituminous coal.....do....	1,278,627	1,804,003	2,027,693	2,108,310	2,171,417	2,201,828
Coke.....do....	.....	402	550	252	.....	104
Iron ore.....do....	.....	.....	.....	1,394	9,912	.....
Stone, sand, and lime.....do....	8,112	5,225	8,453	1,108	943	2,548
Petroleum.....barrels..	87,580	124,473	100,933	20,090	36,025	34,575
Pig, bloom, and railroad iron..tons..	15,050	8,568	22,580	1,200	10,833	10,711
Other iron and castings.....do....	179,392	82,663	105,034	65,273	55,434	20,307
Lumber and other forest products, cars.....	273	94	231	48	171	81
Manufactures.....tons..	.....	.....	5,623	35,113	98,756	41,945
Live stock.....head..	23	31	14	145	6	119
Wheat.....bushels..	22,500	40,000	339,009	242,000	1,024,833	218,800
Corn.....do....	.....	34,893	775,285	1,681,893	1,835,893	1,862,775
Oats.....do....	.....	256,500	872,000	549,562	929,375	2,301,253
Barley.....do....	.....	.....	.....	.....	.....	73,100
Rye and other cereals.....do....	178	.....	.....	51,036	.....	110,000
Agricultural products except grain, tons.....	5	1,087	381	104	198	75
Milling products and flour....tons..	2,884	12,334	973	1,061	8,430	17,279
Provisions.....do....	7,734	6,559	5,392	13,879	9,366	1,367
Salt.....do....	3,117	572	739	171	776	16
Merchandise and other articles..do....	94,374	99,121	134,809	161,488	142,743	142,749
Total tons.....	1,608,313	2,047,285	2,378,347	2,461,834	2,621,201	2,548,826

Articles.	1901.	1902.	1903.	1904.	1905.	1906.
Anthracite coal.....tons..	9	.....	.....	.....	.....	.....
Bituminous coal.....do....	1,787,028	2,234,029	2,752,549	3,052,819	2,567,916	2,926,279
Coke.....do....	218	.....	.....	545	2,114	450
Iron ore.....do....	3,024	.....	2,352	2,547	2,400	34,670
Stone, sand, and lime.....do....	4,390	5,258	608	1,731	2,305	4,043
Petroleum.....barrels...	24,005	63,001	125,889	479,078	821,172	208,189
Pig, bloom, and railroad iron..tons..	2,461	2,160	120	5,012	18,212	34,395
Other iron and castings.....do....	3,006	12,339	5,446	2,672	7,372	735
Lumber and other forest products, cars.....	1,041	23	224	6	17	12
Manufactures.....tons..	39,249	41,452	70,314	79,608	102,643	139,860
Live stock.....head..	6	14	35	35	60	.....
Wheat.....bushels..	616,233	360,000	398,000	.....	.....	160,000
Corn.....do....	764,285	.....	2,200	.....	.....	.....
Oats.....do....	592,813	3,250	.....	500	500	2,000
Agricultural products except grain, tons.....	.....	.....	.....	80	30	110
Milling products and flour....tons..	2,528	17,397	7,110	3,585	10,324	1,954
Provisions.....do....	245	250	387	495	349	1,425
Salt.....do....	5,148	399	.....	.....	.....	222
Cement.....do....	.....	.....	.....	.....	325	821
Merchandise and other articles..do....	168,563	722,405	638,451	596,694	615,974	615,769
Total tons.....	2,089,817	3,059,603	3,518,985	3,841,738	3,494,866	3,807,111

TABLE 181.—LAKE AND RAIL COMMERCE AT CLEVELAND, 1894–1906, BY ARTICLES—Continued.

Received by rail.

Articles.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Anthracite coal.....tons..	208,738	202,874	142,838	201,756	179,891	201,841	137,914
Bituminous coal.....do....	2,736,730	2,819,080	2,994,802	3,779,305	4,520,543	4,845,269	4,124,049
Coke.....do....	295,108	438.697	338,678	503,935	482,539	384,738	394,934
Iron ore.....do....	171,382	190,749	147,356	204,409	.....	.....	.....
Stone, sand, and lime....do....	312,692	436,344	354,564	408,563	551,886	619,065	626,298
Petrolcum.....barrels..	458,780	662,579	720,305	392,780	337,531	343,645	585,857
Pig, bloom, and railroad iron, tons.....	240,505	344,588	235,515	345,368	341,885	577,036	452,429
Other iron and castings..tons..	124,457	207,934	183,329	254,837	220,502	278,299	275,335
Lumber and other forest products.....cars..	8,703	10,250	12,485	11,615	12,379	16,965	14,164
Manufactures.....tons..	144,016	209,060	143,156	218,343	294,593	451,122	526,809
Cattle.....head..	74,807	73,538	62,665	109,047	97,865	118,347	123,552
Hogs.....do....	626,432	601,179	688,011	999,219	1,123,848	1,096,429	1,180,605
Sheep.....do....	171,756	130,709	146,588	183,717	149,769	130,480	186,819
Live stock (other).....do....	29,623	6,378	18,195	11,766	9,673	6,395	15,770
Wheat.....bushels..	1,887,085	1,701,996	981,404	1,146,736	2,382,848	2,535,811	2,471,340
Corn.....do....	794,048	885,349	636,774	3,737,660	9,171,520	7,834,013	11,799,878
Oats.....do....	1,979,639	1,700,766	1,330,175	4,323,059	6,733,212	6,692,774	11,686,264
Barley.....do....	470,567	276,776	372,007	484,285	579,885	311,453	216,257
Rye and other cereals.....do....	133,287	207,534	420,029	197,774	317,556	20,332	8,169
Agricultural products except grain.....tons..	62,351	89,109	78,073	113,789	111,882	165,304	252,971
Milling products and flour.do....	45,234	56,152	54,420	61,179	86,574	94,793	118,272
Provisions.....do....	53,944	72,939	94,604	78,681	54,111	49,514	77,533
Salt.....do....	60	123	6,631	6,050	12,051	13,151	9,607
Merchandise and other articles, tons.....	364,950	495,980	526,537	524,572	622,703	654,417	575,772
Total tons.....	.....	6,100,143	5,861,435	7,401,051	8,427,008	9,441,607	8,867,904

Articles.	1901.	1902.	1903.	1904.	1905.	1906.
Anthracite coal.....tons..	326,741	158,405	254,193	199,907	295,423	145,822
Bituminous coal.....do....	3,982,932	4,949,027	5,561,948	5,339,733	4,833,305	5,992,708
Coke.....do....	601,213	737,603	763,430	594,101	583,053	659,307
Iron ore.....do....	.....	.....	.....	.....	.....	34,776
Stone, sand, and lime.....do....	812,139	886,451	914,562	857,546	1,085,194	1,107,876
Petroleum.....barrels..	399,039	462,370	474,038	391,737	467,578	316,854
Pig, bloom, and railroad iron...tons..	552,695	697,161	660,104	691,194	758,492	785 593
Other iron and castings.....do....	369,675	444,156	504,137	527,422	598,280	584,874
Lumber and other forest products, cars.....	16,235	16,775	25,937	21,076	18,775	22,876
Manufactures.....tons..	592,379	655,358	680,248	738,825	653,937	580,270
Cattle.....head..	68,851	61,858	90,748	94,235	105,703	100,215
Hogs.....do....	995,113	960,067	1,215,798	1,345,376	1,251,229	964,139
Sheep.....do....	197,456	195,537	224,489	237,161	190,080	242,712
Live stock (other).....do....	18,085	16,188	20,228	19,781	27,592	44,530
Wheat.....bushels..	2,499,631	2,792,943	1,302,148	802,526	1,063,721	2,016,941
Corn .....do....	9,466,224	5,236,253	7,848,150	9,203,215	9,462,204	8,591,635
Oats.....do....	8,926,671	7,926.569	6,723,288	8,385,461	10,233,115	8,365,994
Barley.....do....	216,811	94,096	173,832	197,457	108,722	229,806

TABLE 181.—LAKE AND RAIL COMMERCE AT CLEVELAND, 1894–1906, BY ARTICLES—Continued.

Received by rail—Continued.

Articles.	1901.	1902.	1903.	1904.	1905.	1906.
Rye and other cereals.....bushels..	20,934	60,513	17,318	30,464	8,400	10,743
Agricultural products except grain, tons.....	148,830	165,986	174,409	148,733	138,276	118,549
Milling products and flour.....tons..	106,020	164,636	172,585	125,867	106,090	92,287
Provisions.....do....	69,618	129,452	76,659	98,379	119,780	116,413
Salt.....do....	14,514	14,600	13,746	15,053	18,306	17,822
Cement.....do....	.....	.....	.....	.....	61,072	88,249
Merchandise and other articles, tons.....	586,587	619,157	616,270	706,602	800,615	950,140
Total tons.....	9,215,949	10,442,611	11,569,390	11,177,736	11,255,011	12,411,797

Forwarded by rail.

Articles.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Anthracite coal.....tons..	29,633	16,363	20,299	33,750	24,850	41,072	15,457
Bituminous coal.....do....	16,002	48,760	25,872	31,770	38,218	46,622	31,779
Coke.....do....	42,048	49,536	85,256	117,390	93,628	129,146	51,448
Iron ore.....do....	1,395,704	2,395,704	1,818,884	2,169,621	2,757,102	2,928,272	2,986,856
Stone, sand, and lime.....do....	59,892	72,988	67,155	53,662	121,353	158,236	123,709
Petroleum.....barrels..	1,163,109	1,251,314	936,120	902,309	712,992	647,408	613,980
Pig, bloom, and railroad iron, tons.....	116,029	257,685	162,363	295,955	314,892	228,482	195,849
Other iron and castings...tons..	212,937	312,284	266,163	312,062	397,664	567,620	500,100
Lumber and other forest products.....cars..	7,079	8,984	9,757	8,787	11,829	14,333	10,955
Manufactures.....tons..	250,562	253,485	227,666	265,009	298,506	365,417	483,172
Cattle.....head..	927	1,042	1,514	8,854	7,712	25,367	33,572
Hogs.....do....	17,580	52,828	101,390	155,819	211,999	433,910	322,384
Sheep.....do....	9,773	8,421	6,672	19,490	8,370	27,932	18,645
Live stock (other).....do....	16,893	1,191	1,119	1,663	2,703	2,270	1,614
Wheat.....bushels..	360,474	920,649	1,074,577	1,167,987	2,122,785	1,497,953	1,647,170
Corn.....do....	28,877	17,060	18,185	1,407,928	5,977,028	4,304,594	8,576,192
Oats.....do....	150,945	36,007	175,950	1,641,997	3,820,803	3,445,823	7,437,853
Barley.....do....	10,021	4,476	824	6,174	12,148	123,440	37,149
Rye and other cereals.....do....	87,114	160,200	248,949	90,201	298,911	73,051	229,173
Agricultural products except grain.....tons..	17,394	20,134	30,445	38,529	22,906	78,897	43,951
Milling products and flour.do....	43,008	40,057	30,354	36,260	27,723	55,120	42,642
Provisions.....do....	51,088	66,356	72,120	76,190	54,686	45,099	47,930
Salt.....do....	29,313	14,198	19,489	70,067	111,219	128,021	82,509
Merchandise and other articles, tons.....	259,730	312,362	365,468	380,322	378,691	460,154	404,039
Total tons.....	.....	4,270,152	3,581,176	4,358,525	5,321,321	5,928,691	5,839,071

TABLE 181.—LAKE AND RAIL COMMERCE AT CLEVELAND, 1894–1906, BY ARTICLES—Continued.

Forwarded by rail—Continued.

Articles.	1901.	1902.	1903.	1904.	1905.	1906.
Anthracite coal.....tons..	18,731	6,214	6,590	27	74	10,138
Bituminous coal.....do....	39,240	116,184	62,082	61,047	50,575	45,687
Coke.....do....	20,678	24,191	18,170	21,655	45,527	117,718
Iron ore.....do....	3,366,764	4,176,810	3,793,197	3,217,583	4,966,660	5,673,347
Stone, sand, and lime.....do....	139,245	203,322	236,293	249,905	252,824	308,587
Petroleum.....barrels..	741,259	864,919	880,716	712,361	658,794	545,773
Pig, bloom, and railroad iron...tons..	269,908	485,892	568,468	628,008	359,603	352,932
Other iron and castings.....do....	585,040	792,400	838,808	841,296	966,593	1,226,129
Lumber and other forest products, cars.....	13,350	14,081	15,448	13,888	13,131	14,517
Manufactures.....tons..	598,057	551,939	663,568	704,622	705,002	489,635
Cattle.....head..	11,226	4,087	4,922	6 791	4,222	11,924
Hogs.....do....	573,224	170,301	178,388	163,811	149,319	106,998
Sheep.....do....	25,740	15,418	23,012	54,261	20,287	43,184
Live stock (other).....do....	5,793	2,405	2,517	5,308	6,993	4,935
Wheat.....bushels..	1,493,088	617,506	659,903	297,383	444,203	1,177,918
Corn.....do....	6,980,069	2,847,758	4,017,988	4,763,262	6,160,404	3,837,502
Oats.....do....	5,481,674	3,418,828	2,213,740	3,002,447	4,410,817	2,349,161
Barley.....do....	46,613	7,053	4,424	6,982	33,744	46,236
Rye and other cereals.....do....	273,090	18,000	1,930	13,948	10,299	11,599
Agricultural products except grain, tons.....	23,720	31,568	47,833	44,134	37,091	29,705
Milling products and flour.....tons..	32,489	32,143	50,566	52,813	49,795	46,359
Provisions.....do....	54,437	59,179	62,273	74,558	77,562	75,594
Salt.....do....	76,141	90,000	56,558	30,770	53,916	66,760
Cement.....do....	.....	.....	.....	.....	12,587	23,329
Merchandise and other articles, tons.....	475,801	479,673	492,434	619,369	720,697	815,799
Total tons.....	6,525,202	7,768,919	7,561,167	7,171,463	8,974,067	9,871,729

TABLE 182.—DOMESTIC LAKE COMMERCE AT CLEVELAND, 1906 AND 1907, BY ARTICLES.

[Compiled from Monthly Summary of Commerce and Finance, December, 1907, pp. 1166–1169.]

Shipments.

Articles.	1906.	1907.	Articles.	1906.	1907.
Coal.....net tons..	2,905,506	3,119,189	Flour.....net tons..	1,009	.....
Pig iron, and manufactures, gross tons.....	280,580	238,232	Lumber.....M feet..	1,513	630
Iron ore.....gross tons..	330	4,547	Salt.....net tons..	223	413
Grain.....bushels..	163,000	110,000	Miscellaneous.....do....	205,716	216,259

Receipts.

Iron ore.....gross tons..	6,662,049	6,567,469	Coal.....net tons..	4,629	5,322
Lumber.....M feet..	[a]175,232	109,169	Flour.....do....	1,413	1,292
Grain.....bushels..	1,379,005	2,480,300	Copper.....gross tons..	565	880
Pig iron, and manufactures, gross tons.....	11,769	19,315	Salt.....net tons..	548	234
			Miscellaneous[b].....do....	367,891	525,835

[a] Includes 132 M feet of logs.

[b] Including flaxseed.

EAST OF CLEVELAND.—Fairport, Ohio, is situated at the mouth of Grand River, about 29½ miles eastward from Cleveland. The east bank of the river for nearly a mile above the lake is completely occupied by private docks, accessible to the largest lake vessels. The river is also navigable for boats of 8 feet draft for a farther distance of 1¼ miles. The commerce of Fairport for the year 1906 amounted to 2,575,018 tons, mostly receipts of iron ore and shipments of coal and coke.

Ashtabula is situated at the mouth of the Ashtabula River, 56¼ miles east of Cleveland. The harbor comprises about a mile of the river, four connecting slips, and an outer area protected by breakwaters with three large slips. The commerce of Ashtabula for 1906 amounted to 10,314,129 tons, almost entirely receipts of iron ore and shipments of coal and coke.

Conneaut Harbor is at the mouth of Conneaut Creek, about 69¼ miles east of Cleveland. The commerce for the year 1906 amounted to 7,063,069 tons, mainly receipts of iron ore and shipments of coal and coke.

Erie Harbor, Pa., is formed by Presque Isle Peninsula, and in its original condition was nearly landlocked. The commerce for 1906 amounted to 4,287,230 tons. Receipts of iron ore and shipments of coal constitute the greater bulk of this traffic, but there are also considerable receipts of flour and grain and shipments of general merchandise.

TABLE 183.—COMMERCE OF LAKE ERIE PORTS EAST OF CLEVELAND, 1906, BY ARTICLES.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	Fairport.	Ashtabula.	Conneaut.	Erie.
Shipments.				
	Tons.	*Tons.*	*Tons.*	*Tons.*
Coal and coke	321,671	2,512,867	885,633	1,128,591
Pig iron, and manufactures	8,796	871	69,727	.....
Iron ore	.....	3,192	.....	.....
Miscellaneous	10,315	438	3,394	142,246
Total	340,782	2,517,368	958,754	1,270,837
Receipts.				
Iron ore	2,052,538	7,651,069	6,084,254	2,486,518
Flour and provisions	64,309	.....	111	164,363
Grain and produce	25,246	.....	1,879	158,297
Pig iron	24,920	86,704	2,770	.....
Stone, lime, and sand	23,572	57,100	12,861	3,610
Copper	5,364	.....	.....	8,290
Coal and coke	3,400	.....	.....	.....
Logs, lumber, etc	662	948	341	47,818
Fish	100	300	.....	2,100
Miscellaneous	34,125	640	2,099	145,397
Total	2,234,236	7,796,761	6,104,315	3,016,393
Total commerce	2,575,018	10,314,129	7,063,069	4,287,230

TABLE 184.—DOMESTIC COMMERCE OF LAKE ERIE PORTS EAST OF CLEVELAND, 1906 AND 1907, BY ARTICLES.

[Compiled from Monthly Summary of Commerce and Finance, December, 1907, pp. 1166-1169.]

Shipments.

Articles.	Fairport.		Ashtabula.		Conneaut.		Erie.	
	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.
Coal:								
Hard..net tons..	.....	.....	.....	11,381	17,600	500	257,340	419,271
Soft.....do....	226,112	389,681	2,256,813	2,632,027	666,475	489,877	564,788	696,199
Bunker....do....	50,216	64,109	221,072	219,267	162,873	152,406	103,971	116,070
Pig iron, and manufactures, gross tons.	7,854	139	.....	.....	36,560	9,048	8,961	6,642
Iron ore.....do....	.....	.....	2,850	5,000	.....	.....	56	.....
Salt.....net tons..	.....	.....	.....	.....	.....	.....	.....	30
Copper..gross tons..	.....	.....	.....	.....	.....	.....	150	126
Flour.....net tons..	.....	.....	.....	.....	.....	.....	173	929
Miscellaneous..do....	10,315	8,824	593	2,519	959	331	133,875	139,373

Receipts.

Iron ore..gross tons..	1,832,623	2,444,704	6,726,882	7,542,149	5,412,156	5,875,470	2,097,308	2,254,298
Pig iron, and manufactures, gross tons.	22,250	5,570	77,414	.....	5,977	12	31,106	18,288
Flour.....net tons..	64,309	77,411	.....	.....	17	40	190,097	185,660
Grain.....bushels..	901,639	536,000	.....	.....	10,515	6,329	3,706,762	4,480,072
Copper...gross tons..	4,789	275	.....	.....	.....	.....	8,522	7,872
Lumber.....M feet..	331	.....	708	500	93	83	9,440	8,547
Miscellaneous, net tons.....	37,525	23,247	53,212	70,200	15,435	212	[a] 125,606	[a] 151,465

[a] Including flaxseed.

BUFFALO.—Buffalo, at the eastern end of Lake Erie, is the most important port on this lake, has the largest volume of lake receipts of any of the lake ports, and ranks next to Duluth-Superior in the total volume of lake traffic. The inner harbor comprises Buffalo Creek or River, the City Ship Canal, several slips and basins (including Erie Basin, originally constructed as a receiving basin for the Erie Canal), and Black Rock Harbor, a narrow waterway $3\frac{1}{8}$ miles in length, along the Niagara River front of Buffalo. An outer harbor, formed by a breakwater constructed by the Government, protects the lake front from Stony Point to the head of Niagara River, a distance of $4\frac{1}{2}$ miles. Two short private canals extend from the southern part of this outer harbor into railroad and steel-plant properties.

During 1906 the arrivals and departures of vessels by lake and river aggregated 8,294, with a tonnage of 13,876,759. The total shipments and receipts by lake for 1906 aggregated 15,568,338 tons. Receipts were 10,680,196 and shipments 4,888,142 tons.

Iron ore constitutes the largest volume of receipts, but the receipts of flour, wheat, corn, and other grain which are concentrated at this

port constitute much the most important part of the Buffalo lake traffic. As at other Lake Erie ports, coal is the largest item of shipments, but there are also very large shipments of sugar, railroad iron, salt, and other general merchandise, which in the aggregate approaches to the volume of the coal traffic and very greatly exceeds it in value.

In addition to its Lake traffic, there is also an important movement of water-borne traffic at Buffalo via the Erie Canal. Although decreasing in recent years, there were in 1906, 2,333 departures of canal boats. Shipments by canal from Buffalo in 1906 amounted to 1,014,597 tons, and receipts by canal at Buffalo to 741,160 tons, a total of 1,755,757 tons of freight. Canal shipments consisted mostly of grain, stone, lime and clay, and lumber. Canal receipts consisted mainly of stone, lime and clay, and lumber, with a considerable variety of other merchandise.

Combining the Lake and canal traffic, the total water-borne commerce at Buffalo amounted to 13,210,147 tons of freight in 1905 and 17,324,095 tons in 1906.

The following tables show the Lake and canal commerce of Buffalo for 1906 and the Lake commerce for 1907 from several sources. Some important differences will be noted in the statistics of Lake commerce for 1906 between the reports of the United States engineers and the figures for domestic traffic given in the Summary of Commerce and Finance.

TABLE 185.—LAKE COMMERCE AT BUFFALO, 1906, BY ARTICLES.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907, pp. 2107-2108.]

Shipments.

Articles.	Net tons.	Articles.	Net tons.
Coal	2,681,808	Salt	53,608
Cement	766,005	Miscellaneous	832,988
Sugar	434,225		
Railroad iron	119,508	Total	4,888,142

Receipts.

Iron ore	5,223,356	Pig iron	51,418
Flour	1,027,531	Glucose	52,572
Wheat	1,656,834	Shingles and laths	43,519
Corn	716,666	Oil cake	22,057
Flaxseed	434,911	Ties and posts	10,121
Oats	379,603	Lard and tallow	3,085
Barley	328,628	Seeds	8,704
Rye	34,268	Wool	8,669
Lumber	323,500	Miscellaneous	19,558
Feed	144,937		
Merchandise	111,384	Total	10,680,196
Copper	78,875	Total Lake commerce	15,568,338

TABLE 186.—DOMESTIC LAKE COMMERCE AT BUFFALO, 1906 AND 1907, BY ARTICLES.

[Monthly Summary of Commerce and Finance, December, 1907, pp. 1166-1169.]

Shipments.

Articles.	1906.	1907.	Articles.	1906.	1907.
Coal:			Pig iron, and manufactures.....gross tons..	159,654	178,316
Hard.....net tons..	2,699,666	3,430,558	Salt.....net tons..	53,818	52,289
Soft.....do....	43,260	98,319	Lumber.....M feet..	2,242	1,789
Bunker.....do....	369,651	393,233	Miscellaneous...net tons..	832,988	846,850
Iron ore.....gross tons..	16,640	12,971			

Receipts.

Iron ore.....gross tons..	4,631,021	5,310,561	Lumber.....M feet..	137,710	99,158
Flour.....net tons..	936,260	906,146	Pig iron, and manufactures.....gross tons..	85,563	39,499
Wheat.....bushels..	42,269,484	54,811,707	Coal.....net tons..	1,112	.....
Corn.....do....	24,954,822	27,973,846	Copper.....gross tons..	76,975	73,532
Oats.....do....	24,105,071	10,647,267	Miscellaneous[a]..net tons..	837,944	753,922
Barley.....do....	14,131,440	11,264,108			
Rye.....do....	1,161,201	1,339,028			

[a] Including flaxseed.

TABLE 187.—CANAL COMMERCE AT BUFFALO, 1906 AND 1907, BY ARTICLES.

[From report of New York superintendent of public works.]

Shipments.

Articles.	1906.	1907.	Articles.	1906.	1907.
	Net tons.	*Net tons.*		*Net tons.*	*Net tons.*
Boards and scantling.....	146,756	157,316	Stone, lime, and clay.....	313,760	414,469
Corn.....	125,172	75,243	Pig iron.....	7,501	318
Wheat.....	189,038	248,409	Rye.....	3,992	2,155
Oats.....	104,337	63,970	Miscellaneous.....	7,471	15,832
Flaxseed.....	40,499	58,236	Total.....	1,014,597	1,091,461
Barley.....	76,071	55,513			

Receipts.

Boards and scantling.....	136,263	157,821	Coffee.....	6,768	3,886
Corn.....	59,657	55,804	Miscellaneous.....	83,818	74,567
Other grain.....	38,256	56,422	Total.....	741,160	850,994
Sugar.....	32,075	11,326	Total canal commerce.....	1,755,757	1,942,455
Stone, lime, and clay.....	384,323	491,168			

Niagara River is the outlet for Lake Erie, and above Niagara Falls is used for commercial purposes as far as Grand Island.

Tonawanda is the only port of importance on this river. It has a large commerce, almost exclusively in timber products and iron ore. The harbor frontage on Niagara River and Tonawanda Creek is all occupied by lumber docks, except the frontage of an iron and steel company. The total receipts by water for 1906 were 1,064,030

tons. Shipments by the Erie Canal amounted in the same year to 277,952 tons, mostly lumber.[a]

Section 6. Lake Ontario and the St. Lawrence River.

Lake Ontario is the smallest of the Great Lakes, and its commerce is small in comparison with that of the other lakes. Navigation is chiefly confined to vessels which can pass the Welland Canal and the other Canadian canals on the St. Lawrence River. The dimensions of the locks on these canals, which limit the size of vessels, are: Length, 270 feet; width, 45 feet, and depth, 14 feet at mean lake level. Harbor improvements on this lake have been planned with these limitations in mind, the improvements of the United States Government being designed to give harbor facilities for vessels drawing not more than 14 feet of water.

In connection with the St. Lawrence River, Lake Ontario provides water routes between various points in the State of New York and points in Canada. At Oswego the lake is connected with the Oswego Canal, running to the Erie Canal at Syracuse, thus bringing Lake Ontario into communication by water with the extensive system of inland canals in the State of New York and with the port of New York.

The United States commerce on Lake Ontario consists for the most part of coal shipped from Charlotte, Great and Little Sodus bays, and Oswego to Canadian ports on the lake and to United States and Canadian ports on the St. Lawrence River, grain and other products shipped from upper Lake ports through the Welland Canal to St. Lawrence River points, lumber from Canadian ports, and pleasure traffic.

On the Canadian side the more important ports are Port Dalhousie, at the terminus of the Welland Canal; Hamilton, Toronto, and Kingston. There are also a number of Canadian waterways connecting with Lake Ontario. Murray Canal unites the Bay of Quinte, at the eastern end of the lake, with Presque Isle Bay. The Trent Canal is a series of waterways, constructed and in progress, which will connect Lake Huron with Lake Ontario at the Bay of Quinte. The Rideau Canal connects the Ottawa River with the eastern end of Lake Ontario. The Canadian canals along the St. Lawrence River include the Williamsburg group (comprising the Galops, Rapides Plat, and Farrans Point canals), and the Cornwall, Soulanges, and Lachine canals, which, with the river, furnish a route to deep water at Montreal.

---

[a] Report of Chief of Engineers, U. S. Army, 1907, p. 2114.

The lower Niagara River is navigable for vessels of from 14 to 16 feet draft from the foot of the lower rapids to the mouth. Lewiston, at the head of the navigable portion, is the only American port of any importance. On the Canadian side are Queenston, opposite Lewiston, and Niagara-on-the-Lake, at the mouth of the river, but none of these places have any considerable freight traffic.

Charlotte Harbor, the port of Rochester, N. Y., is in the mouth of the Genesee River, about 7 miles below the city of Rochester, The river is navigable for lake vessels for about 2½ miles above the mouth. The principal lake commerce here consists of shipments of coal, which amounted to 416,834 tons, out of a total of 432,709 tons of freight shipped and received, in 1906.

Great Sodus Bay, 27 miles west of Oswego, has some lake commerce, mostly coal, amounting to 58,905 tons in 1906. Little Sodus Bay, 13 miles west of Oswego, is a somewhat more important point, shipping 102,110 tons of coal in 1906 and receiving 1,872 tons of other freight.

Oswego has a considerable amount of commerce by lake and canal. The harbor consists of the lower part of Oswego River, a cove at the mouth forming an inner harbor, and an outer harbor formed by an outer breakwater. Shipments by lake, which consist almost entirely of coal, amounted to 482,565 tons in 1906; receipts by lake amounted to 133,275 tons, mostly lumber, posts, and pulp wood, with some grain and a small amount of other articles.

Henderson, Dexter, and Sacketts Harbor, at the eastern end of Lake Ontario, are small places with a small amount of lake commerce.

Cape Vincent, on the St. Lawrence River, 3 miles from the lake, receives considerable lumber by water and a small amount of miscellaneous freight, receipts and shipments aggregating 112,501 tons in 1906. Alexandria Bay, 26 miles farther down the river, is a famous summer resort.

Ogdensburg, at the mouth of the Oswegatchie River, 62 miles from Lake Ontario, is the most important United States port on the St. Lawrence River. Considerable quantities of coal, grain, lumber, and nickel and copper, and some miscellaneous freight, are received by water, and coal and coke and general merchandise are shipped. The total traffic by water in 1906 amounted to 1,056,100 tons.

The following table shows the movement of commerce for 1906 at the more important United States ports on Lake Ontario and the St. Lawrence River.

TABLE 188.—COMMERCE OF UNITED STATES PORTS ON LAKE ONTARIO AND THE ST. LAWRENCE RIVER, 1906, BY ARTICLES.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907.]

Shipments.

Articles.	Charlotte.	Great and Little Sodus bays.	Oswego.	Cape Vincent.	Ogdensburg.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Coal	416,834	155,850	482,553	.....	[a] 176,848
Grain	.....	.....	.....	.....	13,399
Machinery	.....	.....	.....	.....	46,256
Merchandise	.....	.....	12	153	26,290
Fish and miscellaneous	113	20	.....	.....	97,068
Total	416,947	155,870	482,565	153	359,861

Receipts.

Logs, poles, posts, ties, and pulp wood	3,123	279	57,384	103,610	.....
Lumber, lath, and shingles	783	23	64,605	6,716	227,142
Wood pulp	.....	.....	.....	.....	2,791
Hay	.....	170	604	1,322	473
Grain	.....	.....	10,668	.....	175,896
Flour	.....	.....	.....	.....	15,967
Coal	.....	.....	.....	.....	193,636
Feldspar	11,847	5,154	.....	.....	.....
Nickel and copper	.....	.....	.....	.....	22,143
Raw silk	.....	.....	.....	.....	2,423
Merchandise	9	.....	.....	.....	33,409
Fish and miscellaneous	.....	1,400	14	700	22,359
Total	15,762	7,026	133,275	112,348	696,239

[a] Coal and coke.

TABLE 189.—DOMESTIC COMMERCE OF UNITED STATES PORTS ON LAKE ONTARIO AND THE ST. LAWRENCE RIVER, 1906 AND 1907, BY ARTICLES.

[Compiled from Monthly Summary of Commerce and Finance.]

Shipments.

Articles.	Charlotte.		Sodus Point and Fair Haven.		Oswego.		Cape Vincent.		Ogdensburg.	
	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.	1906.	1907.
Coal.....net tons	180,634	255,240	2,635	8,856	37,265	130,566	.....	.....	1,752	285
Lumber.....M feet	.....	.....	.....	46	50	.....	10	35	158	.....
Miscellaneous.net tons	.....	15,836	1,447	9,573	71	3,558	688	999	54,014	68,489

Receipts.

Lumber.....M feet	445	172	.....	813	2,685	597	.....	.....	13,367	5,826
Coal.....net tons	.....	.....	.....	.....	681	.....	.....	559	192,569	277,515
Flour.....do	.....	.....	.....	.....	.....	.....	.....	.....	14,665	20,284
Wheat.....bushels	.....	.....	.....	.....	46,000	194,443	.....	.....	476,741	596,095
Corn.....do	.....	.....	.....	.....	.....	133,000	.....	.....	4,697,950	4,295,034
Other grain.....do	.....	.....	.....	.....	388,150	117,150	.....	.....	815,502	294,000
Miscellaneous.net tons	5,179	5,874	70	98	594	4,705	2,141	3,209	16,394	25,168

CHAPTER VIII.

MISSISSIPPI RIVER AND TRIBUTARIES.

Section 1. General conditions.

The Mississippi River and its tributaries afford at present a total navigable mileage of 13,912 miles, draining an area of about 1,300,000 square miles in 30 States, extending from western New York to western Montana and from Minnesota to Louisiana. This system of rivers includes not only the Mississippi itself but also the Ohio, Missouri, Illinois, Arkansas, Ouachita, Red, and Yazoo rivers, including their tributaries, as well as a number of other rivers of minor importance.

As late as the seventh decade of the last century the rivers of the Mississippi Valley afforded the chief means for the transportation of the freight of that region. The physical nature of these rivers, with their shallow depth, frequently obstructed by snags, sand bars, and shoals, evolved the peculiar type of craft that has become famous in history as the Mississippi River steamboat. Prior to the introduction of steam as a motive power cargoes were carried on flatboats floating with the current or propelled by poles, or, in some instances, by sails. When the early steamboats were built, the hull of the flatboats, with certain necessary modifications, proved to be best adapted for river navigation, and the type is general to-day—a hull of shallow draft on which freight is piled above the water line rather than stowed below the deck. The stern-wheel is also a development of the western rivers, that method of applying motive power having been found best suited to the currents of the streams. At the present time, besides the movement of logs, timber, railroad ties, etc., in rafts or floated as loose sticks, freight is moved on the rivers by two distinct types of boats—(1) the packet steamboat and (2) the barge or flatboat pushed by towboat. The packet steamboat carries such freight as moves with some regularity in relatively small quantities, and generally also carries passengers, its service corresponding to the service performed by local freight and passenger trains. When commodities move in considerable quantities or boat-load lots, they are more profitably carried on barges towed, or rather pushed, by river towboats. In point of time required for the movement of freight by river, when the rivers are at a good stage, a comparison with the time required by rail is not unfavorable to the boat lines. Under auspi-

cious conditions the packet steamboat can average about 120 miles per day, including landings made for the handling of freight. A fleet of loaded coal barges can be towed from Pittsburg to Cincinnati (468 miles) in four or five days, to Louisville (598 miles) in five or six days, and to New Orleans (2,020 miles) in sixteen to eighteen days, and the return trip with empty craft can be made in about the same time.[a] From Louisville the trip to New Orleans averages from twenty to twenty-five days, although it is sometimes done in eleven days. No statement can be made regarding the length of time it takes the cargo craft to discharge and make the return trip, because these boats frequently are moored in a "coal harbor" for a considerable period. The returning tows of empty craft make about the same rate of speed upstream as the loaded fleets do downstream. This speed varies of course with the size and power of the towing steamers and the size of the tows or fleets. The statement is made that coal boats in the Pittsburg-New Orleans trade average 1.8 trips per annum. Owing to the current of the rivers, however, the time required to return is longer when loaded barges are towed back, entailing additional expense, which hampers the development of upstream traffic, and to an extent also that of the downstream freight movement. To this fact is due one of the disadvantages of river carriers as compared with carriers on the Lakes.

The commerce of the rivers has not kept pace with the general industrial development of the Central West. The reason for this is not far to seek. The building and competition of railroads and the limitations imposed by the physical characteristics of the rivers have been the chief causes that have contributed to the decline of river traffic. When the railroads began operations, the transportation of passengers, mail, and the higher grades of freight demanding expeditious handling were taken over from the boat lines, until to-day practically the only traffic left to the river is that of package freight and farm products between local river points and the long-distance movement of coal and other crude products of relatively cheap cost. The boat lines were, and are, handicapped to a great extent in their competition with rail carriers by the unreliability in the depth of water in the rivers, causing at times a practical suspension of traffic. This irregularity in the stages of the rivers frequently entails heavy expense, due to the cost of holding cargoes on river craft to await navigable stages. Then, too, during the winter season the northern rivers are closed by ice for several months. Changes in level, often exceeding 20 or 30 feet on the Mississippi, also make the question of terminals very difficult. This unreliability of the rivers has led many of the larger shippers along the river to provide for rail shipments only. Railroads have been more readily adapted

[a] H. Doc. No. 492, 60th Cong., 1st sess., p. 18.

to the increasing demands of commerce. Heavier rails have been laid, rolling stock of larger capacity has been added, locomotives of greater power have been put in service, and the constructive and administrative sides of railroading have been brought to a high state of excellence. These improvements, adapted to the changing needs of commerce, have resulted disastrously to the boat lines.

Contrasted with these changes, the improvement in facilities offered by the river carriers have been slight. The river steamboat of to-day is practically the steamboat of half a century ago. This is true also of their terminals and the systems of loading and unloading. The tendency of commerce has been toward a movement by carriers of greater and greater capacity, and in this respect the river-boat lines could not adequately meet requirements, because increased carrying capacity meant increased draft of the boats and barges, and improvement in this direction proved impracticable, since the draft of the river craft early reached the greatest depth practicable for navigation on the rivers, on which, generally, no systematic efforts were undertaken to secure and maintain greater depths of water. The river boats have been restricted also to the movement of freight between river points only; thus they could not hold their own on competitive business with railroads, which could recoup losses on competitive business by increased charges at noncompetitive points. Moreover, all river business is naturally competitive among the boat lines themselves, while a very great proportion of the railroad traffic is not subject to competition. In fine, the remarkable feature of river transportation, not only on the system of rivers in the Mississippi Valley but also on practically all the rivers of the country, is not the small amount of freight now moving over the rivers, but the fact that the river lines carry the volume of traffic they do under the existing conditions.

The disappearance of through packet service and of many of the fleets of long-distance bulk carriers is significant. Under the present condition of the rivers the operation of such lines proved unprofitable in competition with railroads. Under the description of the river traffic at a number of the separate ports, mention is made elsewhere of the withdrawal of a number of through packet lines, notably the Anchor Line, on the Mississippi between St. Louis, Memphis, Vicksburg, and New Orleans. Between 1864 and 1891 a fleet of several steamers and numerous barges of 500 to 1,000 tons were in successful operation, carrying iron ore from Missouri points (principally Sulphur Springs) to Pittsburg, returning to St. Louis with cargoes of coal and manufactures of iron and steel. This line was operated as long as the ore fields in Missouri could be profitably worked.[a] Grain from the Ohio and upper Mississippi River to

[a] Report of a board of engineers, U. S. Army, on an examination of the Ohio River, H. Doc. No. 492, 60th Cong., 1st sess., pp. 22–23.

southern points also constituted bulk shipments of importance, which have disappeared. To-day the principal long-distance shipments by river are of coal from the Ohio to lower Mississippi River points, and of logs, railroad ties, timber, etc., on practically all the rivers of this system. In several sections the latter are of diminishing importance due to the depletion of the forest supply. These traffic movements are treated more in detail elsewhere.

That the river commerce is not, however, an altogether negligible quantity is shown by the statistics of the total commerce of the Mississippi River and its tributaries in 1906, amounting to 27,856,641 tons, as shown by the United States Census Bureau in its Report on Transportation by Water in 1906. The total, however, is based in part on careful estimates and includes the movement by ferries and local harbor traffic, and does not include the movement in boats under 5 tons, nor of logs, lumber, railroad ties, etc., in rafts or floated as loose sticks.

The commerce of the upper Mississippi and its tributaries is less important than that of the lower river and its tributaries. The traffic of the upper river consists very largely of logs, lumber, railroad ties, etc., mostly floated and rafted. On the lower river there is a smaller but considerable movement of these articles; but in addition there is the important traffic in coal from the Ohio River. South of Cairo, too, the Mississippi and its tributaries have a larger traffic in package freight than the upper river; and below Memphis there is a movement of cotton, petroleum, sugar, molasses, and rice—traffic which does not exist in the upper river.

RED RIVER OF THE NORTH.—Belonging to a class by itself, the Red River of the North, the only stream of commercial importance flowing into Canada, may, for purposes of convenience, be mentioned in connection with the Mississippi and its tributaries. Navigation on the Red River of the North is confined at present to comparatively short stretches north and south of Grand Forks, N. Dak., the head of navigation being Belmont, N. Dak., about 35 miles south of Grand Forks. The commerce consists principally in the movement of grain to Grand Forks by 2 steamboats and 12 barges. This amounted in 1906 to 13,965 tons, as compared with an annual average of about 20,000 tons for the five preceding years. The Red Lake River and Red Lake (both forming part of a projected improvement in connection with the Red River of the North from Breckenridge to the boundary line, a distance of nearly 400 miles) are navigable, the log movement in 1906 amounting to 55,000,000 feet board measure.[a]

[a] Report of Chief of Engineers, U. S. Army, 1907, p. 507.

I. OHIO RIVER AND TRIBUTARIES.

Section 2. The Ohio River System.

A thorough understanding of the nature and extent of traffic on the Ohio River and its tributaries and the possibilities of its development involves some consideration of the physical conditions of the system as a whole, and the relation of this group of waterways to the Great Lakes on one hand and to the Mississippi River and the Gulf of Mexico on the other. The Ohio River and its tributaries have a navigable length of nearly 5,000 miles, flowing through or bordering the States of Pennsylvania, West Virginia, Ohio, Kentucky, Indiana, Illinois, Tennessee, and Alabama, draining an area of approximately 210,000 square miles. The waterways of this system, besides the Ohio, include the Allegheny, Monongahela, Muskingum, Kanawha, Little Kanawha, Big Sandy, Kentucky, Green, Wabash, White, Tennessee, and Cumberland rivers, and less important streams, as well as the Ohio and Erie and the Miami and Erie canals. On the banks of the waterways are located such industrial centers as Pittsburg Pa.; Wheeling and Parkersburg, W. Va.; Marietta and Cincinnati, Ohio; Louisville, Ky.; Evansville, Ind.; Knoxville, Nashville, and Chattanooga, Tenn.; Florence and Decatur, Ala.; and Cairo, Ill., not to mention numerous smaller towns and cities scattered along the various streams from Pennsylvania to Alabama. Columbus, Cleveland, Toledo, and other cities and towns in Ohio and on the Great Lakes are connected with this system by the state canals of Ohio. These canals, however, are at present of local importance only, and even that is slight, though preliminary steps have been taken to connect the Ohio River at Beaver, Pa., with Lake Erie by a ship canal. By act of June 30, 1906,[a] Congress authorized the incorporation of a company to survey, construct, and operate such a canal to have a navigable channel of at least 12 feet in depth.

In its course of 967 miles, between Pittsburg, Pa., and Cairo, Ill., the Ohio River receives most of its tributaries from the south, affording transportation facilities from the rich fields of bituminous coal and the forest tracts of the Appalachian region, as well as the fertile agricultural sections of the South and the Middle West. Coal and products of the forest and the farm, with a considerable movement of miscellaneous and manufactured articles, furnish the chief articles of traffic. These products are shipped largely from the smaller towns and farm landings and carried to the more populous centers for consumption or for reshipment. As already mentioned, one of the most striking features of river traffic, however, is the absence of through lines that

[a] 34 Stat. L., pt. 1, p. 809.

were formerly in operation. River commerce at present, with the exception of the traffic in coal and to a lesser degree that in lumber, is confined principally to local movements over comparatively short routes. Coal, lumber, sand, and gravel are the chief commodities moving in bargeload lots. Most of the other articles transported are carried in mixed cargoes on packet steamboats. Logs and timber are largely rafted.

Along the Ohio River from Pittsburg to Cairo there are 40 railroad crossings or terminals,[a] from which points freight moving between interior points and points on the river system could be handled under a coordinated rail and water service. At present, however, as shown on succeeding pages, the commerce of the rivers, aside from the through movement of bituminous coal fleets on the Ohio, consists chiefly of the interchange of products between local river points and goes but few miles back from the river bank.

Section 3. River commerce at and above Pittsburg.

The Ohio River is formed at Pittsburg by the confluence of the Allegheny and Monongahela rivers, and a consideration of this system of the rivers properly begins with the traffic on these streams.

ALLEGHENY RIVER.—The traffic movement on the Allegheny River is a movement of bulk freight, with little or no movement of package freight. In former years passenger boats plied the Allegheny, but these have long since disappeared, and there are now no regular lines of packets on the river. Railroads parallel the river for its entire length, and these roads are said to be adequate to handle the general trade supplying the wants of the people living near the river.

The commerce of the river, except on the lower 25 miles of its course, consists principally in the downstream transportation of lumber and timber rafts and the towage of gravel, sand, and stone. On this upper section of the river the movement in 1907 was 1,029,024 tons, consisting principally of gravel and sand.[b] The most important traffic of this river is on the lower 25 miles, which is at present undergoing improvement by the Government by the construction of locks and dams. The greater part of the traffic is that on the portion of the river forming part of Pittsburg Harbor. In this section the traffic is principally of coal, gravel, sand, and timber.

Years ago much petroleum, pine, oak, and hemlock timber and bark came down the Allegheny. To-day there is no movement of oil and bark, and the timber supply of the region adjacent to the river is prac-

[a] Report of a Board of Engineers on Examination of the Ohio River, H. Doc. No. 492, 60th Cong., 1st sess., p. 24.

[b] Report of Chief of Engineers, U. S. Army, 1907, p. 1698.

tically exhausted. A comparatively small amount is rafted down, chiefly from Tionesta Creek, and is used principally in the construction of river cargo craft.

Coal is a commodity that moves in considerable quantity on the Allegheny, but this is an upstream movement, consisting of cargoes from the Monongahela, used on the Allegheny chiefly to supply the iron and steel mills of Pittsburg, for about 6 miles up from the mouth of the river. No coal comes down the Allegheny, because navigation is too uncertain, although there is said to be as much coal in that territory as in the Monongahela Valley, though of a shallower vein, so that it can not (probably) compete with that from the Monongahela.

In the lower Allegheny there is also a considerable movement of gray or glacial drift sand dredged from the bed of the river. This sand and gravel is used in Pittsburg and vicinity in all kinds of concrete work, which is largely superseding stone in all kinds of building. Much of this sand is used by the iron and steel mills around Pittsburg, and also by a plate glass company at its factory at Tarentum, Pa. Several companies are engaged in the sand business at Pittsburg. An official of one of these companies in speaking of this trade said:

> The largest proportion of this sand and gravel (some being dredged also from the beds of the Ohio and the Monongahela) is delivered at Pittsburg and its immediate vicinity, but the market extends for a radius of 80 miles from Pittsburg. The company ships anywhere it gets an order and uses its own boats to make deliveries wherever it is practicable to do so, shipping also by railroad from Pittsburg.

No satisfactory statement can be made of the whole traffic of the Allegheny River. Statistics are kept of the movement through the government locks, but the sum of these involve some duplication and at the same time take no account of the traffic not passing through such improvements, as, for example, much of the coal from the Monongahela River, which is delivered in Pittsburg Harbor on the Allegheny below Lock 1, and also the local traffic on the river above Dam 3. For the fiscal year ended June 30, 1906, the United States Engineers presented a table of statistics showing a traffic of 2,464,445 tons, compiled from "such information as it was practicable to obtain," and this was "believed to be less than the actual tonnage."

The following table shows the traffic reported for the year ended June 30, 1907, through each lock and on the section of the river above Dam No. 3:

TABLE 190.—COMMERCE OF THE ALLEGHENY RIVER, FISCAL YEAR ENDED JUNE 30, 1907, BY ARTICLES.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907, pp. 1698, 1706.]

Articles.	Dam 1.	Dam 2.	Dam 3.	River above Dam 3.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Sand	113,280	210,580	1,670	212,513
Gravel	142,687	375	.....	700,196
Coal	284,850	117,028	464	27,208
Timber	21,703	580,569	21,330	21,522
Lumber	4,004	931,531	6,116	6,116
Posts	6,160	71,450	47,695	47,695
Railroad ties	1,630	.....	.....	5,131
Stone	.....	.....	122	2,982
Barges (new)	5,820	.....	1,500	1,500
Boat bottoms (new)	3,564	.....	3,168	3,168
Braces	1,280	3,512	368	368
Other freight	431	391	479	625
Total	585,409	1,915,436	82,912	1,029,024

MONONGAHELA RIVER.—The Monogahela River is one of the most important commercial streams in the United States, having been improved by locks and dams for its entire length from Pittsburg, Pa., to Fairmont, W. Va., a distance of 131 miles. Many of the large steel mills of the Pittsburg district are located on the banks of this river, and the tonnage of coal moving from mines on the Monongahela to these mills forms a large part of the commerce of the river, as does also the tonnage shipped from these mines to the principal cities and towns on the Ohio and Mississippi rivers, from which points it is distributed to inland points to some extent. Most of this river-borne coal from the mines on the Monongahela River is shipped from the first six pools, the greater bulk of all shipments being made from below Brownsville, Pa. The shipments to points on the Ohio and Mississippi are treated elsewhere. Practically all the river coal is transported in craft belonging to the several companies by which the coal is mined. The coal is loaded from "tipples," a type of loading apparatus which will be described in a subsequent part of this report relating to terminal facilities. Small tows of three or four barges (about 600 tons capacity each), two barges and a boat (a boat carrying about 1,000 tons of coal), or four or six flats (from 200 to 250 tons coal capacity) are brought to Pittsburg Harbor, the smaller craft being used for steamboat fuel or unloaded for local consumption at

Pittsburg. The coal boats are generally moored in the harbor, to be later made up into larger tows for shipment to points below Pittsburg.

Package-freight traffic on the Monongahela River is of little importance, there being only one company of any importance taking this class of freight. This company operates boats from Pittsburg to Morgantown, and to Fairmont, W. Va. The operations of a former company plying between Monongahela River points and Pittsburg were attended with misfortune, and the property of the company is now owned by the company now operating. One of the large coal-carrying companies at one time did a packet business on the Monongahela, but it was discontinued, owing, it is said, to dissatisfaction of patrons arising from delays incident to the landing of the company's heavy machinery and supplies at its own mines. The Monongahela is paralleled practically for its entire length by rail lines, to which most of the package-freight traffic has been diverted. These roads have acquired a considerable proportion of the river banks most available for boat-landing purposes at towns on the river, and this has tended to restrict the carrying trade of the water carriers. In the fiscal year ended June 30, 1907, the maximum movement of general merchandise reported at any lock on the river was at Dam 1, whence 7,612 tons moved up river and 19,592 tons down, the greater part of the latter originating on the river above Dam 1 and below Dam 2.[a]

Sand and gravel are important articles of traffic on the Monongahela River. The movement of these commodities is in both directions, the up-river movement, which is heavier in volume, consisting largely of sand dredged from the Allegheny River. The sand from the Monongahela River is different in character, being a yellow sand, and little if any gravel is taken from the Monongahela.

Little or no coke is shipped by river. Coke is produced in the region around Connellsville, Pa., where river transportation facilities are not available. This commodity is therefore shipped by rail.

The movement of timber on the Monongahela does not appear to be of much importance, the larger movement being up river, 14,790 tons passing Dam 1, near the mouth of the river, during the fiscal year ended June 30, 1907. This was practically all consumed below Dam 5. There was a small movement of lumber above Dam 5. The maximum amount of down-river movement amounted to about 8,000 tons, which appears to have been consumed or received in the pool between Dams 2 and 3, much of it probably being used in the construction of river craft. Practically all of this movement originated below Dam 15.[a]

[a] Report of the Chief of Engineers, U. S. Army, 1907, p. 1695.

Of lumber, there is a small movement up river, 7,405 tons passing Dam 1 in the fiscal year 1907, the greater part of which was destined for the pool between Dams 2 and 3. The down-river movement of lumber is insignificant.

Of steel rails, 18,447 tons, originating on the pool above Dam 1, passed Lock 1 in the fiscal year 1906 and only 3 tons in 1907. Other iron products to the amount of 40,393 tons passed downstream through Lock 1 in 1906, and 24,635 tons in 1907, about two-thirds of which appears to have originated on the pool above Dam 1. There was also a small movement of these other products of iron upstream in 1906, and in 1907, 18,061 tons passed upstream through Dam 1, three-fourths of which stopped in the pool below Dam 2.

Besides the commodities mentioned, there was some movement of pit posts (for coal mines), stone, brick, laths and shingles, mine braces, railroad ties, farm, dairy, and orchard products, and live stock.

The largest number of passengers passed Lock 1, 39,626 individuals traveling upstream and 37,508 down[a] in the year ended June 30, 1906. The corresponding figures for the fiscal year 1907 were 22,044 and 20,794, respectively.

The commerce of the river for the fiscal years 1880, 1889, and 1902 to 1907, inclusive, was as follows:

TABLE 191.—COMMERCE ON MONONGAHELA RIVER, 1880, 1889, AND 1902–1907.[a]

[Report of Chief of Engineers, U. S. Army, 1907, p. 1696.]

Year ended June 30—	Freight.	Passengers.	Year ended June 30—	Freight.	Passengers.
	Net tons.			*Net tons.*	
1880 (calendar year)	[b]3,450,400	.....	1904	9,268,736	116,174
1889 (calendar year)	[b]3,294,932	.....	1905	9,211,752	78,458
1902	9,100,887	181,527	1906	11,447,444	77,134
1903	11,369,814	101,457	1907	11,817,128	47,216

[a] The commerce on the Monongahela River is estimated by taking the aggregate of the greatest amounts of the different kinds of freight passing up and down at any single lock, plus the coal mined and shipped in pools 1 and 2, which amount is less than the total movement.

[b] United States Census Report on Transportation by Water, p. 43.

The increase in the tonnage movement on the river has been enormous in recent years. This increase is attributed chiefly to the improvement that has been made, affording a navigable channel at all seasons. During the calendar year 1892 the commerce amounted to 4,163,304 net tons; in 1896, 5,989,159 net tons. During the year 1906 it had increased to 10,731,801 net tons, and in 1907 to 11,930,316 net tons.

[a] These statistics taken from Report of Chief of Engineers for 1906, part 2, pp. 1583–1585, and for 1907, part 2, pp. 1694–1696.

The upstream and downstream traffic on the Monongahela River at locks of maximum tonnage between Pittsburg Pa., and Fairmont, W. Va., during the calendar years 1902 to 1907 is shown in the following table:

TABLE 192.—TRAFFIC AT LOCKS OF MAXIMUM TONNAGE ON THE MONONGAHELA RIVER, 1902-1907, BY ARTICLES.

[Compiled from the Monthly Summary of Commerce and Finance.]

Article.	1902.	1903.	1904.	1905.	1906.	1907.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Bituminous coal	.....	.....	6,320,660	8,489,340	8,962,792	10,043,460
Sand	.....	.....	531,997	664,128	707,001	724,215
Gravel	.....	.....	522,283	737,688	981,412	1,039,415
Other articles	.....	.....	123,791	138,789	80,596	123,226
Total	9,586,686	10,607,738	7,498,731	10,029,945	10,731,801	11,930,316

The United States Census Report on Transportation by Water shows total shipments on the Monongahela River in 1906 of 8,925,923 tons and receipts of 545,716 tons.

RIVER COMMERCE AT PITTSBURG.—Pittsburg is the most important inland river port in the United States. The traffic on the Allegheny and Monongahela rivers, which has just been described, centers at Pittsburg. From Pittsburg shipments are made down the Ohio for Ohio and Mississippi River points, and a considerable amount of freight tonnage, though of smaller quantity, is received from those points. Of the 4,662,960 tons of coal passing down through Lock 1 on the Monongahela River during the year ended June 30, 1907, 3,024,210 tons, consigned to points below Pittsburg, passed Davis Island Dam, 4.7 miles below Pittsburg. This coal passing Davis Island Dam constituted 91 per cent of the entire amount of traffic at that point.

The coal that is brought down the Monongahela destined for down-river shipment is moored in barges in Pittsburg Harbor adjacent to the south bank of the Monongahela River. As the coal craft are assembled and as the stage of water on the river serves, tows or fleets of about 25 boats, barges, and flats are made up for towing down the upper Ohio River. Fleets of this size contain 350,000 to 500,000 bushels of coal and are towed as far as Louisville, where the larger fleets for the lower Mississippi are made up. Frequently in summer and autumn months, when the water is shallow in the upper Ohio, these tows can not leave Pittsburg and are detained there, entailing considerable losses.

In connection with the consideration of the river coal trade at Pittsburg the comparative statistics of the coal movement to and through Pittsburg by rail and river for a series of years is interesting. These statistics are shown in the following table. From this

table it will be seen that the shipments both by rail and by river have increased since 1900, except in 1904. It appears that 57 per cent of the coal for the Pittsburg district in 1906 was carried by water, while to the territory west of Pittsburg the river lines carried only 11 per cent.

TABLE 193.—SHIPMENTS OF COAL TO AND THROUGH PITTSBURG, BY RAIL AND RIVER, 1900–1906, BY TRANSPORTATION ROUTES.[a]

[Compiled from Mineral Resources of the United States.]

Transportation route.	1900.	1901.	1902.	1903.	1904.	1905.	1906.
Pennsylvania R. R.:	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*	*Short tons.*
To Pittsburg and vicinity	1,792,448	2,051,361	2,062,422	1,851,348	1,968,596	[b] 2,126,670	
To west of Pittsburg	1,477,277	1,407,643	1,701,431	2,211,347	2,386,163	[b] 2,728,232	
Baltimore and Ohio R. R.:							
To Pittsburg district	481,587	464,204	580,241	442,866	545,720	597,280	
To west of Pittsburg	990,082	1,157,966	1,231,314	1,305,565	1,190,568	1,387,215	
Pittsburg, Cincinnati, Chicago and St. Louis R.R.	3,298,470	3,933,601	4,965,541	5,068,885	5,689,611	6,098,553	
Allegheny Valley Ry.: [c]							
To Pittsburg district	150,000	163,809	163,303	96,377	91,101	[d]	[e] 5,107,413
To west of Pittsburg	6,500	19,755	15,602	47,895	53,584	[d]	[f] 22,419,496
Pittsburg and Lake Erie R. R.:							
Local and Pittsburg	2,234,770	1,789,327	8,873,150	9,775,667	8,929,868	9,467,360	
To west of Pittsburg	4,469,540	5,367,980					
Pittsburg, Chartiers and Youghiogheny Ry.[g]	.....	410,764	360,763	325,767	245,651	372,222	
Wheeling and Lake Erie R. R.	.....	.....	.....	.....	.....	[h] 1,055,848	
Total by rail	14,900,674	16,766,410	19,953,767	21,125,717	21,100,862	23,833,380	27,526,909
Monongahela River locks:							
To Pittsburg district [i]	3,260,393	4,662,127	5,686,022	6,303,365	4,173,992	5,558,541	6,840,816
To west of Pittsburg	2,557,470	3,283,353	3,619,905	3,069,299	2,811,584	3,926,319	2,883,965
Total by water	5,817,863	7,945,480	9,305,927	9,372,664	6,985,576	9,484,860	9,724,781
Total shipments	20,718,537	24,711,890	29,259,694	30,498,381	28,086,438	33,318,240	37,251,690
Per cent hauled by rail	72	68	68	69	75	72	74
Per cent hauled by water	28	32	32	31	25	28	26

[a] The excess of coal traffic on the Monongahela, shown in this table, over the amount shown in the table on page 254, is probably due principally to the fact that Table 192 takes no cognizance of the coal mined and consumed within the pools between the locks and dams.

[b] Includes shipments over the Allegheny Valley Ry., now practically a part of the Pennsylvania system.

[c] Coal originating on this road only. Does not include coal received from the Pennsylvania R. R. and forwarded over the Allegheny Valley Ry.

[d] Included in Pennsylvania R. R. shipments.

[e] By rail to Pittsburg district.

[f] By rail to west of Pittsburg.

[g] Exclusive of tonnage delivered to Pittsburg and Lake Erie R. R., which is included in shipments reported by that company.

[h] West Side Belt and Wabash Pittsburg Terminal railways.

[i] Including coal mined in pools Nos. 1 and 2 and consumed by works along the Monongahela River.

Sand and gravel are dredged from the bed of the Ohio below Pittsburg, as well as from the beds of the Allegheny and Monongahela. The items of sand and gravel shown in statistics of the commerce of Pittsburg Harbor, presented below, include the figures of these materials from each of these three rivers.

The United States Census Report on Transportation by Water shows shipments from Pittsburg in 1906 of 493,702 tons, receipts 6,360,873 tons, and harbor traffic 2,102,122 tons of sand, a total of 8,956,697 tons.

The total traffic of Pittsburg Harbor for the year 1906, including both up and down stream and local movement, is shown in the following table. This probably includes the movement through the harbor, as well as shipments and receipts at Pittsburg.

TABLE 194.—COMMERCE OF PITTSBURG HARBOR, 1906, BY ARTICLES.[a]

[Report of Chief of Engineers, U. S. Army, 1907, p. 1733.]

Articles.	Short tons.	Articles.	Short tons.
Coal	9,729,861	Lumber	15,954
Gravel	1,680,721	Live stock	824
Sand	1,218,808	Miscellaneous	91,847
Barges (new)	6,900	Steel and iron products, miscellaneous	88,180
Bottoms, coal boat (new)	3,712	Stone	2,816
Braces, poles, posts, etc	15,536	Ties, railroad	2,160
Brick	36	Timber	38,682
Coke	3,200	Total	12,927,975
Farm products	1,792		
General merchandise	26,946	Passengers.....number..	271,450

[a] This table gives only actual amounts of articles handled, care being taken not to duplicate any items. It should be stated that a very large part of this commerce is stored in the harbor from a week to several months and then rehandled and shipped out and the empties returned. Neither the rehandling nor the return of empties is considered in the table.

As will be noted in the table, coal constituted about 75 per cent of the total commerce. Over 90 per cent of the remaining traffic consisted of sand and gravel, a trade that finds its market at Pittsburg. Miscellaneous merchandise, including all package freight, constituted only a small part of the total commerce. Doubtless a cause of this comparatively small amount of water-borne package freight in a thickly settled district is due to the fact of railroad development in this section, the Ohio being paralleled by railroads for practically its entire length from Pittsburg to Cairo.

The shipment of through freight by water from Pittsburg, particularly of hardware, steel rails, and iron and steel products, was formerly of considerable importance, and packet lines operating on the Ohio up to about 1900 had prorating arrangements with practically all the railroads tapping the Ohio and Mississippi rivers, reaching to the South and West. At about the time mentioned,

however, these arrangements, with one rather unimportant exception, were terminated by these railroads on the ground that the railroads entering Pittsburg desired it. Some shipments of iron and steel products are still made by river, but these are for the most part of barge lots. Some molasses and sugar is also brought to Pittsburg by barges from the lower Mississippi.

Package-freight carriers operate from Pittsburg down the Ohio to Wheeling and Cincinnati; to Charleston, W. Va., on the Kanawha River, and to Zanesville, up the Muskingum River, touching at intermediate landings.

Section 4. Upper Ohio and tributaries—Pittsburg to Cincinnati.

DAVIS ISLAND DAM.—The upper Ohio River is being improved by the United States Government, so as to provide slack-water navigation continuously at all seasons of the year except when prevented by ice. Lock and Dam 1 at Davis Island, 4.7 miles below the "point" at Pittsburg, is a part of this project that has been completed. This dam, which is movable, was designed to raise the level of the water to give a depth of 6 feet in Pittsburg Harbor. The traffic movement at this dam affords an excellent record of the commerce between Pittsburg and other points on the Ohio River and its tributaries below. The freight movement at Davis Island Dam for the fiscal year ended June 30, 1907, is shown in the following table:

TABLE 195.—COMMERCE AT DAVIS ISLAND DAM, YEAR ENDED JUNE 30, 1907.

[Report of Chief of Engineers, U. S. Army, 1907, p. 1731.]

Class of vessel.	Number.	Articles.	Short tons.
Packets	669	Coal	3,024,210
Towboats	2,597	Iron and steel products	39,150
Model barges	72	Sand	115,460
Coal boats	2,656	Gravel	46,685
Barges	5,596	Lumber	19,736
Flats	5,175	Miscellaneous	74,390
Miscellaneous	1,135	Total	3,319,631
Total	17,900		

The commerce by way of the Davis Island Dam for the calendar years 1903 to 1907, both inclusive, is shown in the following table:

TABLE 196.—COMMERCE OF DAVIS ISLAND DAM (BOTH WAYS), 1903–1907, BY ARTICLES.

[Compiled from the Monthly Summary of Commerce and Finance.]

Articles.	1903.	1904.	1905.	1906.	1907.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Coal	3,069,199	2,811,584	3,926,319	2,883,965	3,206,727
Iron and steel manufactures	72,050	41,330	130,284	106,180	33,955
Lumber	2,708	16,163	15,472	12,130	21,621
Sand	55,900	3,300	110,020	24,415	682,730
Miscellaneous	94,596	62,674	96,287	82,507	76,773
Total	3,294,453	2,935,051	4,278,382	3,109,197	4,021,806

Much brick, tile, and sewer pipe are made at points on the "Brickyard Bend" of the Ohio River, near New Cumberland, W. Va. At East Liverpool, Ohio, a great deal of crockery ware and pottery products are manufactured. From New Cumberland, W. Va., there was formerly quite an extensive river trade in carrying paving blocks and bricks to the various cities and towns on the Ohio and Mississippi rivers as far as New Orleans. These commodities are of such a nature that unless there is a considerable difference in the freight rate by rail it is not profitable to ship by water, due to the difficulty in loading and discharging by river. To the high rates of freight on these commodities that have prevailed in recent years on shipments by river and to the installation and growth of plants at other points nearer the points of consumption is attributed the decline in the river trade, which has been effectually killed. The facilities for shipment by river in bargeload lots have, therefore, been allowed to go to decay, and practically all the shipments are now made by rail.

At Wheeling, W. Va., shipments by river amounted to 42,360 tons in 1906 and receipts by river to 119,190 tons, a total of 161,550 tons, mostly general merchandise.

MUSKINGUM RIVER.—At Marietta, Ohio, the Muskingum River enters the Ohio. This river has been improved by locks and dams to a point a few miles above Zanesville, Ohio, and the improvement of the river is to be continued above Dresden, there to connect with the canal, thus affording an outlet to the Great Lakes at Cleveland. As already mentioned, a packet line owning one boat is in operation between Pittsburg and Zanesville, carrying oil in small quantities from Marietta to points on the Muskingum; flour from mills at New Martinsville, W. Va., to landings at small towns on the Ohio River; live stock to Wheeling, W. Va., and farm products, which are picked up at small towns and landings, to Pittsburg. Shipments of dry

goods, groceries, etc., are made from Pittsburg. Shipments to and from Zanesville are small. Two other small steamboats operate on the Muskingum, carrying passengers, general merchandise, and farm products, such as wheat, live stock, etc. One of these towboats makes daily trips between Zanesville and McConnellsville, Ohio, and the other between Marietta and Beverly, Ohio. Gasoline boats towing barges carrying freight are numerous at Marietta both on the Ohio River and on the Muskingum. These boats are also found in considerable numbers at many other points on the Ohio, as will be mentioned in succeeding pages.

The commerce of the Muskingum River is indicated in the following table showing the movement of vessels and traffic at each lock for the calendar year 1906.

TABLE 197.—MOVEMENT OF VESSELS, FREIGHT, AND PASSENGERS AT EACH LOCK ON THE MUSKINGUM RIVER, 1906.

[Report of Chief of Engineers, U. S. Army, 1907, p. 1769.]

Lock.	Vessels.			Freight.	Passengers.
	Steamboats.	Barges.	Total.[a]		
				Tons.	
1	574	172	1,167	28,433	28,849
2	633	35	925	27,951	24,331
3	633	32	792	21,513	19,111
4	632	63	836	20,611	12,129
5	129	40	250	13,780	3,309
6	119	41	225	11,201	2,782
7	128	43	246	11,237	4,428
8	649	43	780	18,740	12,328
9	697	186	913	22,539	21,633
10	656	42	731	21,910	36,014

[a] Including miscellaneous and rafts.

The traffic at each lock is largely duplicated at other locks, so that the sum of these would be much in excess of the total movement. On the other hand the total movement is greater than that at any one lock.

The United States Census Report on Transportation by Water in 1906 shows shipments on the Muskingum River of 13,826 tons and receipts of 11,073 tons, excluding logs and rafts.

LITTLE KANAWHA RIVER.—At Parkersburg, W. Va., the Little Kanawha enters the Ohio. Several Ohio River packets touch at Parkersburg, including boats operating to Wheeling, Pittsburg, Charleston, Cincinnati, and intermediate landings. There is also quite a large fleet of gasoline boats on the Little Kanawha at Parkersburg, but this class of craft is not numerous on this section of the Ohio.

On the Little Kanawha a steamboat was in service until 1906 and did considerable passenger business, but the boat was operated with difficulty while repairs to the locks of the river improvements were being made and the service was discontinued. The Little Kanawha River is paralleled from Parkersburg as far as Palestine, W. Va., a distance of about 31 miles, by the Little Kanawha Railroad, which operates gasoline boats to Creston, some 17 miles above Palestine, in connection with the rail service. The railroad has been acquired by interests looking to its potential value in event of the exploitation of the valuable fields of coal in the territory adjacent to the upper part of the river. The upper-river region buys much of its agricultural products at Parkersburg, since a great part of this region is not cleared. Shipments from Parkersburg are principally groceries, agricultural implements and machinery, flour, feed, oil-well supplies, and all kinds of general merchandise. Downstream traffic is composed chiefly of railroad ties and logs, which are floated downstream or towed in rafts. Some ties come down in flatboats towed by gasoline boats. Many railroad ties are shipped by river from Parkersburg, one steamer being engaged in towing them up the Ohio River to Pittsburg, a tow consisting of three flats containing 6,000 to 7,500 ties. The ties and logs brought down the Little Kanawha come from all along the course of the river, some being hauled to the stream by teams from points several miles back from the river.

The traffic of the Little Kanawha passing through the various locks during the calendar year 1906 was as follows:

TABLE 198.—COMMERCE ON THE LITTLE KANAWHA RIVER, 1906, BY ARTICLES.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907, p. 1747.]

Articles.	Lock 1.	Lock 2.	Lock 3.	Lock 4.	Lock 5.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Saw logs	57,276	54,059	52,883	46,416	38,950
Railroad ties	11,385	19,201	15,786	12,691	21,408
Lumber	1,309	1,764	3,500	581	146
Groceries and paints	1,516	1,385	1,612	1,093	1,067
Oil-well supplies	962	1,325	1,311	1,199	1,892
Miscellaneous	5,916	5,534	4,509	4,106	6,826
Total	78,364	83,268	79,601	66,086	70,289
Passengers.....number	7,213	6,142	4,092	2,892	9,228

The Census Report on Transportation by Water in 1906 shows shipments on the Little Kanawha River of 11,239 tons and receipts of 6,953 tons, excluding logs and rafts.

TABLE 199.—COMMERCE ON THE LITTLE KANAWHA RIVER PASSING LOCK 5, 1897–1906.

[Report of Chief of Engineers, U. S. Army, 1907, p. 1747.]

Year.	Tons.	Year.	Tons.
1897	127,943	1902	69,706
1898	122,405	1903	73,464
1899	138,664	1904	66,415
1900	119,439	1905	106,510
1901	122,190	1906	70,289

From the bend in the Ohio River near Pomeroy, Ohio, several companies ship coal from mines lying along the river. Much of this coal is shipped by rail, although some is sold to river steamboats for fuel and a small amount is sent by river to Cincinnati for the retail trade. Salt, produced by several different companies, is also shipped by river from Pomeroy, Ohio, and Hartford City, W. Va., to Louisville, Ky. One steamer is engaged towing barges in this salt trade.

KANAWHA RIVER.—At Point Pleasant, W. Va., the Kanawha River enters the Ohio. Coal is an important article of shipment, constituting in 1906 nearly 90 per cent of the commerce of this river. This comes from mines along the river extending from a point some 28 miles above the mouth of the river to above Handley, Kanawha County, W. Va. Some shipments are made from points above Handley and from points on Paint Creek, but the greater part of the river coal comes from mines below Handley.

The ordinary cargo craft on the Kanawha River is the so-called "Pittsburg barge" of about 550 net tons coal capacity. Flats of various sizes are also used to furnish fuel for the coal-towing steamers and for delivery to small dealers at intermediate points along the river. The barges are brought out of the upper Kanawha in tows of one or more barges at a time (six barges generally) and assembled in the harbor at Point Pleasant. These craft are moored or harbored until a fleet is assembled of sufficient size to be towed down the Ohio. Such a fleet generally consists of about 24 mixed craft, including fuel flats, carrying altogether about 12,000 tons. These coal shipments go almost wholly to Cincinnati, where several of the more important companies maintain offices. Log rafts of poplar and oak are also towed down the Kanawha, and there are some gasoline boats engaged in this trade. There are, however, no gasoline freighters on the Kanawha at Point Pleasant.

Packet lines on the Kanawha River include two companies, each operating one boat, running between Charleston and Pittsburg, stopping at intermediate points. Boats also run between Charleston, Pomeroy, Cincinnati, and way landings. One boat runs to points between Charleston and Gallipolis, Ohio. Two steamboats operate as packets on the river above Charleston. Another local steamer runs from Charleston to Winfield and one from Winfield to Gallipolis. As shown in Table 200, 73,297 tons of general merchandise and produce were handled by steamboats on the Kanawha in 1906.

The commerce of the Kanawha River for the calendar year 1906 was as follows:

TABLE 200.—COMMERCE ON THE KANAWHA RIVER, 1906, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army, 1907, p. 1753.]

Articles.	Quantity.	Equivalent in tons.
Coal.....bushels..	29,407,500	1,176,300
Coke.....tons..	.....	500
Timber.....feet b. m..	19,430,000	34,002
Staves, oak.....number..	183,000	1,372
Bark and wood for tanning.....cords..	631	1,230
Hoop poles.....number..	531,000	1,327
Laths.....do....	1,942,000	388
Railroad ties, oak.....do....	345,400	36,842
Shingles.....do....	485,000	73
Bricks.....do....	636,000	1,590
Salt.....barrels..	5,590	782
Merchandise and produce in steamboats.....tons..	.....	73,297
Total.....do....	.....	1,327,703

The Census Report on Transportation by Water in 1906 shows shipments on the Kanawha River of 975,031 tons, and receipts of 63,832 tons, excluding logs and rafts.

The total traffic of the Kanawha for the calendar years 1889 and 1897 to 1906 was as follows:

TABLE 201.—COMMERCE ON THE KANAWHA RIVER, 1889 AND 1897–1906.

[Report of Chief of Engineers, U. S. Army, 1907, p. 1753.]

Year.	Tons.	Year.	Tons.
1889	[a] 1,145,202	1902	1,090,797
1897	832,002	1903	1,506,043
1898	1,244,334	1904	1,233,153
1899	1,124,364	1905	1,613,889
1900	1,475,930	1906	1,327,703
1901	1,547,610		

[a] Shipments. United States Census Report on Transportation by Water, 1906, p. 179.

The Kanawha River is paralleled by the Kanawha and Michigan Railway, and in part by the Chesapeake and Ohio Railway.

From Huntington, W. Va., coal known on the river as "Island Creek" coal is shipped by river to an elevator at Sekidan (North Bend), Ohio, a few miles below Cincinnati. This coal comes from the mines of the United States Coal and Oil Company, of Holden, W. Va., being hauled by rail from the mines to Huntington.

BIG SANDY RIVER.—At Catlettsburg, Ky., the Big Sandy River enters the Ohio. The commercial statistics of the river for several calendar years prior to December 31, 1906, are as follows:

TABLE 202.—COMMERCE ON THE BIG SANDY RIVER, 1901–1906, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army, 1907, p. 1780.]

Articles.	1901.	1902.	1903.	1904.	1905.	1906.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Timber	260,000	250,000	134,035	98,459	123,456	168,830
Hides	34	15	22	297	15	14
Leather	1	1	3	1	.....	.....
Lumber	13,000	93	379	862	225	144
Produce	9,000	6,000	52	30	9	169
Live stock	235	726	494	139	44	102
Spokes	10	55	1,763	1,108	148	.....
Staves	3,480	1,720	1,604	.....	.....	4
Tan bark	550	35	.....	.....	.....	.....
Ties	44,000	44,067	123,260	33,352	18,731	22,463
Grain	154	195	1,674	867	33	811
Wool	2	2	2	1	1	.....
Miscellaneous	19,000	47,614	26,017	16,718	5,868	12,915
Total	349,466	350,523	289,305	151,834	148,530	205,452
Passengers.....number.	396	412	1,096	243	93	449

From the mouth of the Big Sandy River, at Catlettsburg, Ky., as far as Cincinnati, the Chesapeake and Ohio Railway parallels the Ohio, and from its tracks on the Kentucky side of the river maintains ferryboats at several points. The operation of the railroad caused serious competition to the river steamboats operating along this stretch of the Ohio, and much of the business that went to the boats before the railroad was built has been diverted to the railroad.

OHIO AND ERIE CANAL.—From Portsmouth, Ohio, on the Ohio River, the Ohio and Erie Canal, owned by the State of Ohio, extends across the State to Cleveland, on Lake Erie. A feeder extends from the main canal at Lockbourne to Columbus, and the Walhonding branch, 6 miles long, extends from the main canal to Roscoe, Ohio. The canal, although of considerable importance in former days, has lost its commercial importance, owing to neglect and failure and

inability to meet modern conditions. Its depth of only 4 feet makes it impracticable as a highway of present-day commerce. There is some local trade between Cleveland and Dresden, that portion of the canal being said to be in fairly good condition. On this section boats of 80 tons are engaged in carrying coal from the Trenton fields, 100 miles, into Cleveland, and boats of 60 tons ply as far south as New Comerstown. The physical condition of the southern division is bad. Traffic on this canal is now very insignificant. The State canal office reported 8,818 tons for 1906. In 1880 the traffic amounted to 429,626 tons and in 1889 to 129,398 tons.

MIAMI AND ERIE CANAL.—The Miami and Erie Canal extends from Cincinnati, on the Ohio River, to Toledo, on Lake Erie. Passage between the canal and the Ohio River is impossible, however, three-quarters of a mile at the outlet having been given to the city of Cincinnati in 1863 for street and sewerage purposes. This land is now, however, occupied by the Pittsburg, Cincinnati, Chicago and St. Louis Railway for terminal and depot purposes.[a] The prism of the canal is so small, with only 4 feet depth of water, that it is of commercial value only for local traffic. During the summer of 1907 the only commerce on the canal south of Dayton was carried on by a fleet of 7 boats propelled by gasoline, carrying paper from Lockland to Cincinnati, returning with paper stock and miscellaneous freight. A distillery company operated 2 boats between Cumminsville and Cincinnati, and there were 4 sand boats bringing sand to Cincinnati from banks between Cincinnati and Lockland. It is stated that there is no traffic movement of any account on the stretch of canal between Dayton and Defiance. This section of the canal is badly run down, and it is said that in places it is almost possible for a person to step across the canal. The portion of the canal between Defiance and Toledo is said to be in fair condition, having a depth of 6 feet and being 100 feet wide in places. The State of Ohio is expending some $250,000 in improving the locks and dams on the canal between Dayton and Cincinnati and for deepening this portion to a depth of 5 feet. This slight improvement in depth will hardly improve the value of the canal as a transportation agency except possibly for local traffic in a few commodities. Attempts made to install electric haulage on the canal have failed and the company organized for that purpose is involved in litigation. The State canal office reported to the Census 82,000 tons of freight carried on the Miami and Erie Canal in 1906. In 1880 the traffic was 323,737 tons and in 1889 it was 969,477 tons. The total traffic of the Ohio canals was 791,962 tons in 1880, 1,107,176 tons in 1889, and 84,052 tons in 1906.

[a] History Ohio Canals, pp. 48, 49.

Section 5. River traffic at Cincinnati.

The extent of freight tonnage to and from Cincinnati by river representing commodity transportation can not be definitely stated.[a]

River coal from the Monongahela and Kanawha districts, with some from Pomeroy Bend and Huntington, W. Va., on the Ohio River, forms a considerable factor in the local trade at this point. There are 14 elevators at Cincinnati for unloading coal from river craft and 8 more on the Kentucky side of the river. Formerly Cincinnati was an important distributing point for river coal, but this trade has largely disappeared. No coal is now shipped by river from Cincinnati except such cargoes as may be held there for a time on its way down river, and these cargoes are not rehandled at Cincinnati. Shipments of coal arriving by river are made by rail to southeastern Indiana, to towns and cities in the district outlined by a line drawn from Jeffersonville, through Indianapolis, and thence to Richmond, although some shipments are made to Indiana points outside of this territory, such as Mitchell, La Fayette, Marion, and Muncie. Some of these points are reached only at a premium over all-rail shipments from the mines, but in such cases where river coal is shipped it is for the reason that it is more desirable for domestic use because of the rescreening it receives when unloaded from river craft to railroad cars at Cincinnati. Much the greater amount of coal distributed by rail from Cincinnati is of coal received there by rail. This coal is brought in by the Chesapeake and Ohio, Norfolk and Western, Baltimore and Ohio Southwestern, Louisville and Nashville, and the Queen and Crescent. A great deal of this rail coal is also consumed at Cincinnati and vicinity, but for domestic purposes the river coal is said to be much more generally used there. The greater part of the rail coal is turned over to other railroads at Cincinnati, such as the Cleveland, Cincinnati, Chicago and St. Louis, the Cincinnati, Hamilton and Dayton, and the Pennsylvania lines, for transportation to points in the Northwest. This all-rail trade to the Northwest includes Chicago and points in Wisconsin, Minnesota, North and South Dakota, and Iowa. The territory supplied by the all-rail coal has broadened during recent years, gradually encroaching upon the markets of the river coal, until the latter is now practically restricted to the district mentioned above. This matter will be discussed in a subsequent part of this report. At North Bend, a few miles down the Ohio River, are 2 elevators from which also rail shipments of river coal are made. The receipts and shipments

[a] Fifty-eighth Annual Report of Cincinnati Chamber of Commerce, 1906, p. 73.

of coal by rail and by river at Cincinnati for a series of years prior to 1907 are shown in the following table:

TABLE 203.—RECEIPTS AND SHIPMENTS OF COAL BY RAIL AND BY RIVER AT CINCINNATI, 1895-1906.

[Compiled from the Report of Cincinnati Chamber of Commerce, 1906, p. 121.]

Year.	Receipts.						Shipments.	
	Rail.	River.					Rail.	River.
		Pittsburg (Monongahela River coal).	Kanawha River district.	Other river coal.	Total.	Per cent.		
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*		*Bushels.*	*Bushels.*
1895	28,346,823	26,675,823	15,106,095	14,400	41,796,318	60	15,336,500	3,458,825
1896	20,847,000	36,696,759	22,015,133	130,217	58,842,109	74	12,150,000	2,784,324
1897	25,719,250	35,040,790	17,941,769	60,217	53,042,776	67	15,664,000	3,509,056
1898	26,962,925	41,271,142	19,949,098	95,590	61,315,830	69	14,921,400	1,786,379
1899	31,464,050	33,339,381	18,987,364	29,533	52,356,278	62	14,043,600	1,195,436
1900	28,778,500	19,066,472	24,586,857	917,206	44,570,535	61	11,780,850	2,811,771
1901	40,275,600	22,379,828	27,516,166	1,219,387	51,115,381	56	22,047,025	5,207,771
1902	44,570,550	37,506,783	21,035,945	1,487,315	60,030,043	57	30,524,150	6,113,597
1903	56,919,925	27,018,901	26,400,194	2,012,871	55,431,966	49	36,635,750	2,787,000
1904	74,366,000	22,528,563	21,158,513	130,707	43,817,783	37	41,228,000	3,448,000
1905	87,885,000	40,689,000	31,936,000	310,000	72,935,000	45	57,541,000	6,433,000
1906	117,218,000	31,118,000	23,651,000	1,970,000	56,739,000	33	93,212,000	5,833,000

Logs for sawmills at Cincinnati are also an important commodity received by river at this point. From its tributaries in West Virginia and Kentucky the Ohio River receives great quantities of logs of poplar, oak, walnut, and other woods, which are brought by tramroads to the smaller rivers and creeks from points as far as 50 miles from these streams. The logs are floated down the creeks and rivers of the Ohio, where they are made into rafts and towed to mills at points along the Ohio. This business begins at about Parkersburg, W. Va. (at the mouth of the Little Kanawha), and continues down the Ohio at various points adjacent to the mouths of the tributaries. A good deal of this towing on the Ohio is done by small local towboats towing logs to such points as Huntington, Ashland, and Ironton. Many of the logs go to Cincinnati, where there are several large sawmills. At the mills of one of the largest companies all the logs used are brought by river, the cost of the river transportation being estimated at about 50 cents per thousand feet, as against a railroad rate for the same service of about $4.50 per thousand.

There are several companies dredging sand and gravel from the bed of the Ohio near Cincinnati, where it is largely used in building operations, especially for concrete work. Some of this sand and gravel is shipped out to near-by points by rail. The railroads also

use these materials for concrete bridges, culverts, etc. Some brick comes to Cincinnati for local building purposes by barge from Blairsville, a few miles above Cincinnati.

In 1906 there were 27 steamers engaged in the package-freight and passenger traffic on the Ohio in service between Cincinnati and other ports. Steamers operate to Pittsburg, Wheeling, Charleston, and Pomeroy, and to Louisville and Memphis, touching at all important intermediate landings. Besides these there are a few boats doing a local business running to points such as Maysville, Chilo, and Madison, on the Ohio, near Cincinnati.

The Census Report on Transportation by Water in 1906 shows river shipments at Cincinnati of 231,368 tons, and receipts by river of 2,131,847 tons, a total of 2,363,215 tons. Including 72,000 tons of harbor movement, the total river freight handled was 2,435,215 tons. Coal receipts amounted to 1,904,242 tons; sand, stone, etc., to 113,920 tons; all other merchandise, 113,685 tons; coal shipments by river were 33,384 tons, and other merchandise 197,984 tons.

The following table shows the receipts and shipments of merchandise by river at Cincinnati for the years 1905 and 1906, as far as statistics are available:

TABLE 204.—SHIPMENTS AND RECEIPTS OF MERCHANDISE BY RIVER AT CINCINNATI, 1905 AND 1906.

[Report of Cincinnati Chamber of Commerce, 1906, p. 129.]

Articles.	Shipments.		Receipts.	
	1905.	1906.	1905.	1906.
Ale, beer, and porter.....barrels..	9,523	8,714	67	103
Apples, green.....do....	3,004	2,597	15,242	16,101
Boots and shoes.....cases..	12,944	13,410	1,831	1,374
Butter.....tubs, etc..	440	440	3,941	4,612
Butterine.....pounds..	56,630	116,450	200	2,180
Castings.....tons..	231	358	558	977
Cattle.....head..	916	1,868	6,927	7,263
Cement and plaster.....barrels..	3,591	6,468	914	730
Cheese.....boxes..	7,615	6,417	188	324
Coffee.....bags..	10,079	10,235	326	148
Cooperage.....pieces..	11,083	17,010	29,754	37,121
Corn.....bushels..	8,042	6,085	35,659	30,572
Cotton.....bales..	127	378	1,353	2,349
Crockery.....packages..	2,846	4,473	14,527	12,362
Eggs.....cases, etc..	3,151	2,624	22,118	33,959
Feathers.....pounds..	3,300	4,125	26,773	35,910
Flour.....barrels..	6,663	6,215	6,136	8,691
Fresh meats.....pounds..	11,400	29,950	1,300	.....
Fruit, dried.....do....	93,000	144,000	207,453	159,410
Furniture.....packages..	17,723	22,105	.....	.....
Glass, window.....boxes..	1,872	3,364	1,520	980
Glassware.....packages..	37,092	58,309	52,726	50,842
Hardware.....do....	30,845	38,322	15,240	23,354

TABLE 204.—SHIPMENTS AND RECEIPTS OF MERCHANDISE BY RIVER AT CINCINNATI, 1905 AND 1906—Continued.

Articles.	Shipments.		Receipts.	
	1905.	1906.	1905.	1906.
Hay.....tons..	189	174	3,199	1,884
Hides.....number..	3,628	6,590	21,705	22,075
Hog products:				
Bacon.....pounds..	524,215	442,866	16,540	7,624
D. S. meats—				
Loose.....do....	40,900	49,950	.....	.....
In boxes.....do....	1,056,500	875,500	65,000	6,000
Hams.....do....	329,310	236,445	41,070	1,250
Lard.....do....	1,000,037	1,138,033	85,950	54,220
Pork.....barrels..	103	269	57	8
Hogs.....head..	331	433	44,696	57,683
Horses.....do....	1,384	2,144	2,127	2,678
Iron and steel.....tons..	1,509	1,465	2,346	897
Scrap.....do....	.....	4	87	228
Iron, pig.....do....	.....	.....	1	10
Leather.....bundles..	2,170	2,958	3,685	4,630
Lumber.....square feet..	75,000	135,000	9,315,000	3,615,000
Manufactures, sundry.....pieces..	5,228	12,362	.....	.....
Merchandise.....tons..	16,656	17,570	42,326	27,161
Molasses.....barrels..	431	251	183	336
Nails.....kegs..	5,399	11,156	7,560	12,792
Oats.....bushels..	9,969	14,516	7,577	612
Oil.....barrels..	5,394	7,343	1,434	892
Petroleum.....do....	979	1,177	206	62
Potatoes.....bushels..	18,025	18,637	30,222	28,615
Rice.....barrels..	588	545	20	9
Rye.....bushels..	2,760	2,790	34,385	6,909
Salt.....barrels..	7,576	8,998	20,555	19,469
Seed, clover and timothy.....bags..	4,577	5,413	612	14,766
Sheep.....head..	651	898	11,720	12,662
Sugar.....barrels..	3,693	4,299	23	832
Tobacco:				
Leaf.....hogsheads.....	4,186	7,226	14,907	24,777
Leaf.....cases and bales..	48	139	45	43
Manufactured.....packages..	2,158	2,513	430	680
Wheat.....bushels..	8,258	9,064	54,104	36,068
Whisky.....barrels..	13,914	16,047	18,720	15,554
Wines and liquors.....barrels.....	1,266	810	81	307
Wines and liquors.....boxes and baskets..	11,437	15,024	11,791	26,385
Wool.....bales..	603	522	399	553

Section 6. Middle Ohio and tributaries—Cincinnati to Evansville.

The steamboats operating between Cincinnati and Louisville encounter local competition from a number of gasoline boats, especially in the stretch of river between Madison, Ind., and Louisville, Ky. Gasoline boats are not much of a factor in the freight traffic at Cincinnati. Between Madison and Louisville, however, on local business their competition is continuous. They do not compete for through business. One gasoline boat will pick up business for 15 or

20 miles, and then another boat for about the same distance, and so on. Some of the boats are operated regularly between certain points, while others go wherever business offers. The net result of their competition is in many cases to drive the steamboat out, or seriously to deplete her revenue from the transportation of local freight and passengers. Thus steamboats operating on short runs feel the competition more keenly than the steamboats operating between points some distance apart. Madison and Bethlehem, Ind., are centers of the gasoline-boat traffic. A number of these crafts run to Louisville from upriver points. During the summer they carry passengers and market produce, and in the harvest season they tow barges laden with tobacco, wheat, corn, hay, straw, and other articles, taking these commodities at any point on the river where they are offered for shipment.

KENTUCKY RIVER.—There is considerable traffic on the Kentucky River, entering the Ohio River at Carrollton, Ky., nearly opposite Madison, Ind. The principal commerce on this river is lumber, much of it being loose logs. Work is under way to continue the improvement of the river to its headwaters, where it is hoped that coal lands may be developed and the product shipped by the river. A packet boat from Louisville operates as far up the Kentucky River as Valley View and Highbridge, Ky. This boat handles considerable quantities of grain and whisky, delivering wheat shipped from Kentucky River landings to mills at Madison, Ind., and a good deal of whisky at Louisville from distilleries on the Kentucky River. A gasoline boat doing a general freight business operates between Madison and Monterey, Ky., on the Kentucky River. Gasoline boats tow corn to distilleries on the river and engage also in towing logs and grain.

The statistics of commerce passing through the locks of the river for the calendar year 1906 are as follows:

TABLE 205.—COMMERCE ON KENTUCKY RIVER, 1906, BY ARTICLES.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907, pp. 1790–1793.]

Articles.	Lock 1.	Lock 2.	Lock 3.	Lock 4.	Lock 5.	Lock 6.	Lock 7.	Lock 8.	Lock 9.	Lock 10.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Lumber and timber..	80,285	65,140	65,013	65,491	118,686	133,509	128,286	127,630	140,327	121,188
Coal.....	73,217	66,095	63,484	62,619	10,830	5,976	5,735	502	42	.....
Grain.....	5,174	4,959	4,650	4,802	2,958	3,298	2,885	97	.....	.....
Tobacco.....	4,163	2,257	925	282	186	118	80	64	.....	.....
Hay.....	1,303	948	943	1,019	63	64	55	2	.....	.....
Whisky.....	1,384	1,448	1,403	1,454	1,374	1,049	979	52	.....	.....
Flour.....	2,074	1,457	971	907	247	136	112	69	.....	.....
Cement.....	2,147	225	192	149	42	21	63	36	.....	.....
Total[a].....	184,244	154,699	146,269	143,819	135,832	145,180	139,154	128,952	140,369	121,188
Passengers, number..	12,045	6,239	4,014	4,442	3,597	3,670	2,770	2,254	30	.....

[a] Includes miscellaneous freight.

TABLE 206.—COMMERCE ON KENTUCKY RIVER, 1903-1906.

[Report of Chief of Engineers, U. S. Army, 1907, p. 1793.]

Lock.	1903.	1904.	1905.	1906.	Lock.	1903.	1904.	1905.	1906.
	Tons.	*Tons.*	*Tons.*	*Tons.*		*Tons.*	*Tons.*	*Tons.*	*Tons.*
No. 1.....	125,722	126,284	169,685	184,244	No. 6.....	126,881	122,430	201,510	145,180
No. 2.....	113,674	114,007	150,832	154,699	No. 7.....	111,023	131,651	194,963	139,154
No. 3.....	104,592	101,280	137,305	146,269	No. 8.....	132,236	149,389	178,856	128,592
No. 4.....	104,596	102,122	134,249	143,819	No. 9.....	42	149,236	184,437	140,369
No. 5.....	126,695	127,618	195,389	135,832	No. 10.....	.....	.....	153,429	121,188

LOUISVILLE.—The river coal traffic at Louisville is of importance. Here the coal fleets coming down from Pittsburg are moored at Jeffersonville, Ind., opposite Louisville, above the Falls of the Ohio River at this point, the harbor for these craft extending as far up the river as Six-Mile Island. Here the coal craft are towed through the Louisville and Portland Canal, or over the falls. Below the falls and canal they are reassembled in full-sized fleets (one of the largest fleets consisting of 56 boats of about 1,000 tons coal capacity each) for towing to New Orleans, or to be dropped off at intermediate points. This breaking up and reassembling of coal fleets may be compared to the handling of cars at a railroad freight yard. When there is "falls water," i. e., when there is sufficient water in the river so that boats can pass over the falls without damage, tows are sent through without break. No figures are available to show the aggregate receipts of river coal delivered at Louisville, but such receipts are somewhat in excess of half a million tons per annum. Most of this coal is consumed locally at Louisville and vicinity. The coal used in the neighboring interior towns is from Kentucky and Tennessee mines, and only small quantities of the river coal are shipped by rail from Louisville, consisting of a car or two at a time when the supply of other coal is short. The river coal probably supplies the greater part of the demand for domestic use at Louisville, although in this trade rail coal is also an important factor. The latter is also used largely for steam purposes. Rail coal comes from southeastern and western Kentucky and northern Tennessee and from mines in West Virginia. A small amount of river coal is shipped by rail from Jeffersonville and New Albany, Ind., opposite Louisville, by dealers at those points, to places in Indiana and southern Illinois.

Some logs are received by river at Louisville for use at sawmills. Sand and gravel are dredged from the bed of the Ohio River between Twelve-Mile Island and Louisville for use at Louisville and vicinity.

Regular steamboat lines operate from Louisville to Cincinnati and intermediate points and to points on the Kentucky River, as has been mentioned, to Owensboro, Evansville, Cairo, Memphis, and way landings.

The Census Report on Transportation by Water in 1906 shows river shipments from Louisville of 86,772 tons, and receipts by river at Louisville of 1,116,955 tons, a total of 1,203,727 tons. Coal constituted more than half of the receipts, stone and sand amounted to 235,000 tons, and miscellaneous merchandise received amounted to 197,180 tons.

The movement of traffic through the Louisville and Portland Canal and the open river channel over the Falls of the Ohio is shown in the following table:

TABLE 207.—COMMERCE ON OHIO RIVER AT LOUISVILLE, 1895–1907.

[Report of Chief of Engineers, U. S. Army, 1907, p. 1805.]

Year ended June 30—	Via Louisville and Portland Canal.			Via open river.			Grand total.
	Coal.	Other freight.	Total.	Coal.	Other freight.	Total.	
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1895	564,281	162,776	727,057	383,015	20,572	[a] 402,587	1,129,644
1896	989,957	285,766	1,275,723	390,260	35,954	426,214	1,701,937
1897	807,441	264,873	1,072,314	730,571	84,549	815,120	1,887,434
1898	859,411	289,353	1,148,764	516,728	53,226	569,954	1,718,718
1899	735,479	251,653	987,132	765,758	95,155	[a] 860,923	1,848,055
1900	1,008,524	273,274	1,281,798	274,215	18,181	292,396	1,574,194
1901	863,047	264,540	1,127,587	904,239	94,949	999,188	2,126,775
1902	496,278	351,344	847,622	530,555	95,424	625,979	1,473,601
1903	754,306	230,026	984,332	939,856	108,269	1,048,125	2,032,457
1904	1,413,063	144,328	1,557,391	498,808	43,119	541,927	2,099,318
1905	594,169	138,438	732,607	479,434	30,209	509,643	1,242,250
1906	867,514	186,012	1,053,526	352,005	31,143	383,148	1,436,674
1907	953,187	126,347	1,079,534	401,474	52,318	453,792	1,533,326

[a] Total does not agree with sum of items.

During the year ended June 30, 1907, 12,496 passengers were carried through the canal and 4,001 over the falls.

TABLE 208.—COMMERCE THROUGH THE LOUISVILLE AND PORTLAND CANAL AND FALLS OF OHIO RIVER AT LOUISVILLE, KY., 1902–1907, BY ARTICLES.

[Compiled from the Monthly Summary of Commerce and Finance.]

Articles.	1902.	1903.	1904.	1905.	1906.	1907.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Coal	866,793	1,203,790	1,498,216	1,592,487	1,154,991	1,476,980
Iron ore, and manufactures	13,472	24,923	34,543	43,571	35,720	25,341
Lumber	81,104	71,092	45,851	49,112	21,012	27,046
Miscellaneous merchandise	61,589	67,309	36,043	76,818	72,158	78,342
Other articles	[a] 975,831	96,720	40,959	67,171	60,023	44,690
Total	1,988,789	1,463,834	1,655,612	1,829,159	1,343,904	1,652,399

[a] Includes total tonnage of all articles over Falls of the Ohio.

In the stretch of the Ohio River between Louisville and Evansville numerous gasoline boats compete with the steamboats for the local traffic. Three of these boats ply between Louisville and Leavenworth, Ind., a distance of about 60 miles; 4 between Brandenberg and Stephensport, Ky., a distance of about 60 miles; 3 at Tell City, Ind., operate up and down the Ohio River for 12 or 15 miles each way. Several of the craft at Owensboro go up and down the river for 25 miles each way and 3 run up the Ohio River from Evansville as far as Enterprise, Ind. Some of the boats have regular schedules. All carry freight and many of them also carry passengers. Besides these there are other gasoline boats that go anywhere on the river where business offers. At Louisville the gasoline boats bring in wheat, hay, corn, and all sorts of produce that they pick up at points along the river. They also take orders from country grocers, which they fill at Louisville, these goods and all sorts of manufactured articles giving them return cargoes. Corn, which was formerly carried in considerable quantities by steamboat to distilleries at Owensboro, is now carried by gasoline boats. Live stock, however, can not be handled by the "gasoliners," and this business is retained by the steamboats. Wheat, apples, and produce are shipped to Louisville by such boats during the harvest season from points along the river as far as Stephensport, Ky. Considerable quantities of logs, lumber, and ties that have been floated down Salt and Big and Little Blue rivers and other creeks are picked up along the Ohio above Stephensport, loaded into barges, and most of them taken to New Albany, Ind. Below Stephensport these shipments are made to Evansville. Some timber and staves also are towed to Tell City, Ind., where there are mills and furniture factories.

EVANSVILLE, IND., AND THE GREEN AND BARREN RIVERS.—Evansville is an important Ohio River point, situated just below the point where the Green River enters the Ohio, making the territory through which the Green, Barren, and Rough rivers flow easily accessible by water from Evansville, which is thus the natural market of that territory.

No coal is shipped from Evansville by river, but there is a river coal trade into Evansville and other towns along this section of the Ohio River from mines in Kentucky, located near the mouth of the Green River, but large shipments from these mines to lower river points are prevented because of the small size of the locks on the Green River. From these mines some shipments are also made up the Green River and to Bowling Green. Considerable quantities of coal from the Green River mines are handled at Evansville and at neighboring towns for steam and domestic uses, although the most of the coal used for these trades comes in by rail from adjoining

mines in southern Indiana. Coal used for gas-making purposes at Evansville comes from Pittsburg by river.

Grain, principally corn, grown in Vanderburg, Gibson, and Posey counties, Ind., and in the adjoining counties in Illinois, is shipped by river to Evansville and to Henderson, Ky., for market in the southeastern cotton-growing States. This grain-growing territory tributary to Evansville extends up the Ohio River for about 25 miles above Owensboro, Ky., and as far down as Paducah, Ky.; up the Wabash for a distance of 40 or 50 miles; and also up the lower courses of the Saline and Little Wabash rivers. Farmers haul the grain to the rivers, selling it delivered there to buyers. At several points along the river buyers maintain warehouses and landings. From these points the grain is brought to Evansville and Henderson both by packets and barges, shipments being made in bulk whenever practicable. From Evansville and Henderson this grain goes south both by rail and by river. When there is sufficient water in the Cumberland River, the shipments can be made by river directly to Nashville for distribution at that point. Through freight rates on this traffic to points in the Southeastern States give this water route an advantage of several cents per hundred pounds, and farmers receive more than when shipments must be made from Evansville and Henderson by rail, this difference amounting sometimes to as much as 2 cents per bushel.

Many logs and railroad ties are brought to Evansville by river from the Green, Wabash, Tradewater, Saline, and Cumberland rivers. The towing of these logs and ties on the river is done chiefly by small job towboats. The logs are sawed at Evansville, and quite a little of the lumber enters the export trade, being routed by rail via Norfolk, Pensacola, and Mobile.

One steamboat packet line of 4 boats operates from Evansville to Green River and Barren River landings as far as Bowling Green and Mammoth Cave, Ky. Prior to 1898 there were 4 or 5 competing steamboats in this trade. Much of the local freight of Green River is handled by a gasoline boat running between Evansville and Hartford, Ky., on the Rough River, at rates considerably under the steamboat rates. Other steamboat lines touch at Evansville, one line running to Louisville and one to Paducah, where connections are made for Cairo, Ill. Another line operates between Evansville, Ind., and Nashville, Tenn., and through boats between Memphis and Cincinnati call at Evansville.

The Census Report on Transportation by Water in 1906 shows river shipments at Evansville of 57,762 tons, and receipts by river of 358,371 tons, a total of 416,133 tons. Of the receipts 111,988 tons were coal, 169,783 tons miscellaneous merchandise, and 73,600 tons stone and sand.

The total shipments on the Green River in 1906, according to the Census Report on Transportation by Water, amounted to 305,144 tons, and receipts to 80,902 tons, excluding logs and rafts.

The following tables show the traffic through the locks of the Green and Barren rivers, by commodities, for the fiscal year 1907, and the total traffic by fiscal years 1889 and 1898 to 1907:

TABLE 209.—COMMERCE ON GREEN AND BARREN RIVERS, YEAR ENDED JUNE 30, 1907, BY ARTICLES.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907, p. 1816.]

Articles.	Green River.						Barren River, Lock 1.
	Lock 1.	Lock 2.	Lock 3.	Lock 4.	Lock 5.	Lock 6.	
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Timber	153,237	122,641	89,815	38,124	32,363	23,644	3,605
Railroad ties	111,568	100,707	94,640	70,963	46,830	28,814	4,913
Lumber and staves	24,355	23,129	667	210	91	16	478
Coal	51,970	556	4,509	13,556	1,562	80	14,168
Miscellaneous	31,785	24,729	15,866	12,467	14,253	6,067	20,829
Total	372,915	271,762	205,497	135,320	95,099	58,621	43,993
Passengers.....number	13,270	8,226	11,086	7,484	1,490	1,460	1,461
Boats.....do	4,907	2,733	2,456	2,438	1,436	1,300	1,530

TABLE 210.—COMMERCE ON GREEN AND BARREN RIVERS, YEARS ENDED JUNE 30, 1889 AND 1898–1907.

[Report of Chief of Engineers, U. S. Army, 1907, page 1818.]

Year ending June 30—	Green River.						Barren River, Lock 1.
	Lock 1.	Lock 2.	Lock 3.	Lock 4.	Lock 5.	Lock 6.	
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1889	[a]819,278	.....	.....	.....	.....	.....	.....
1898	193,475	161,841	109,107	84,761	.....	.....	28,483
1899	257,104	184,895	84,139	43,973	.....	.....	43,504
1900	378,684	288,948	172,016	139,530	47,098	.....	33,355
1901	452,522	285,744	183,512	117,054	57,058	.....	46,445
1902	385,548	242,722	153,037	110,468	47,940	.....	30,616
1903	457,386	259,142	165,746	106,119	59,525	.....	48,738
1904	329,896	253,979	179,702	108,294	69,226	.....	32,982
1905	466,015	303,274	257,181	157,268	107,848	.....	38,486
1906	342,495	242,601	201,012	111,316	75,468	34,325	61,030
1907	372,915	271,762	205,497	135,320	95,099	58,621	43,993

[a] Total traffic of the river. United States Census Report on Transportation by Water, p. 44.

Section 7. Lower Ohio and tributaries—Evansville to Cairo.

In the local river traffic between Evansville, Ind., and Paducah, Ky., corn, wheat, and groceries are moved both ways; live stock is shipped to Evansville; also fluorspar from deposits at Rosiclare, Ill., which is shipped from Evansville by rail to different points in the United States. Flour and tobacco also move in considerable quantities.

Railroads touch this stretch of the Ohio at several points, but do not parallel it, although both the Illinois Central and the Louisville and Nashville compete with boats for through business between Evansville and Paducah. The steamboats here also feel the competition of gasoline boats, which is strongest between Shawneetown and Golconda, Ill. There are, however, not many gasoline freight-carrying boats operating at Evansville, although there are a few at Paducah.

In Union County, Ky., in the region about Sturgis, Dekoven, and Caseyville, are coal deposits that are being developed and facilities provided for shipment of this coal by river. This trade has not as yet assumed proportions of any considerable size, but appears to be growing.

CUMBERLAND RIVER.—At Smithland, Ky., the Cumberland River enters the Ohio. This river, flowing through eastern Kentucky, middle Tennessee, and western Kentucky, provides a waterway over 500 miles in length into these districts. The Cumberland is crossed at several points by railroads and is paralleled by the Tennessee Central Railroad from Nashville to Clarksville. The most important traffic on the river is that in forest products, especially railroad ties. Steamboats from Nashville ply to Carthage, Burkesville, Burnside, and local points and to Paducah and Evansville on the Ohio. Their freight consists principally of tobacco, live stock, grain of all kinds, lumber, fertilizers, pig iron, poultry, eggs, and general merchandise. The commerce on the Cumberland River is indicated in the following tables, by commodities for the year 1906 and the total traffic by years from 1901 to 1906. There is probably some duplication in the figures for the lower river and that through the locks, but the movement above and below Nashville seems in the main to be distinct.

TABLE 211.—COMMERCE ON CUMBERLAND RIVER, 1906, BY ARTICLES.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	Above Nashville.	Lock 1.	Lock A.	Below Nashville.[a]
	Tons.	*Tons.*	*Tons.*	*Tons.*
Logs	52,103	14,522	397	5,987
Lumber	39,540	635	888	2,744
Railroad ties	28,626	1,288	38,706	151,148
Poles, posts, and piling	50,209	782	286	1,000
Staves and wood	69,650	1,157	445	155
Sand and gravel	42,930	15,145	.....	31,680
Grain	7,743	13,820	14,377	13,920
Tobacco	1,764	446	471	1,440
Other farm products	21,750	1,244	1,101	11,650
Miscellaneous	20,036	7,516	6,774	4,175
Total	334,351	56,555	63,445	223,899
Passengers .....number..	12,365	7,660	6,977	6,000

[a] Open river.

TABLE 212.—COMMERCE ON CUMBERLAND RIVER, 1901–1906.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

Year.	Above Nashville.	Lock 1.	Lock A.	Below Nashville.[a]
	Tons.	*Tons.*	*Tons.*	*Tons.*
1901	267,211	.....	.....	255,557
1902	192,270	.....	.....	263,531
1903	304,462	.....	.....	297,438
1904	242,112	.....	.....	275,371
1905	382,807	59,858	89,027	253,430
1906	334,351	56,555	63,445	223,899

[a] Open river.

The Census Report on Transportation by Water in 1906 shows shipments on the Cumberland River amounting to 348,697 tons and receipts amounting to 178,951 tons, excluding logs and rafts.

TENNESSEE RIVER AND TRIBUTARIES.—A few miles below the mouth of the Cumberland River the Tennessee River flows into the Ohio, opposite Brookport, Ill., and just above Paducah, Ky., forming with its principal tributaries a system of internal waterways capable of being navigated by steamboats for a distance of more than 1,300 miles. In addition to this its tributaries are navigable by rafts and flatboats for a farther distance of more than 1,000 miles. The drainage area of the system is about 44,000 square miles.[a] The river is paralleled from Chattanooga to Tuscumbia, Ala., by the Southern Railway, and is crossed by other roads between Tuscumbia and its mouth. Local boat lines have headquarters at the principal towns along the river. The longest boat service is between Chattanooga and Paducah, Ky., when the stage of water permits.[a] A through line between Waterloo, Ala., and St. Louis, Mo., is also in operation.

Above Chattanooga there is considerable local traffic, including freight moving to and from the French Broad, Holston, Clinch, and Hiwassee rivers, tributaries of some commercial importance.

The commerce in 1906 of the more important tributary rivers flowing into the Tennessee River above Chattanooga was as follows:

TABLE 213.—COMMERCE ON TRIBUTARIES OF THE TENNESSEE RIVER, 1906, BY ARTICLES.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	French Broad.	Clinch.	Hiwassee.	Holston.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Brick	136	286	.....	.....
Coal	215	405	.....	.....
Fertilizer	113	443	.....	.....
Flour	59	259	30	.....

[a] Report of Chief of Engineers, U. S. Army, 1906, p. 497.

TABLE 213.—COMMERCE ON TRIBUTARIES OF THE TENNESSEE RIVER, 1906, BY ARTICLES—Continued.

Articles.	French Broad.	Clinch.	Hiwassee.	Holston.
	Tons.	*Tons.*	*Tons.*	*Tons.*
General merchandise	1,624	6,284	665	.....
Grain	5,384	11,814	822	.....
Hay	2,275	2,915	75	.....
Live stock	1,192	2,232	75	.....
Logs	400	68,092	80	.....
Lumber	5,570	4,284	1,200	.....
Marble	24,750	.....	.....	.....
Produce	1,277	2,181	136	.....
Railroad ties	17	250	250	.....
Sand	90,000	5,625	.....	.....
Straw	215	384	30	.....
Wood	5,930	6,430	.....	.....
Tan bark	.....	400	200	.....
Logs (rafted)	.....	.....	.....	19,800
Total	139,157	112,284	3,563	19,800

TABLE 214.—COMMERCE ON TRIBUTARIES OF THE TENNESSEE RIVER, 1897–1906.

[Report of Chief of Engineers, U. S. Army, 1907, pp. 1647 and 1649.]

Year.	French Broad.	Clinch.	Year.	French Broad.	Clinch.
	Tons.	*Tons.*		*Tons.*	*Tons.*
1897	70,756	102,629	1902	157,819	129,925
1898	124,960	160,345	1903	102,076	161,716
1899	102,263	185,691	1904	258,847	100,701
1900	100,827	132,511	1905	188,700	126,800
1901	103,340	164,586	1906	139,157	112,284

Tables 215 and 216 show the movement of commerce on the Tennessee River by sections—above Chattanooga, between Chattanooga and Florence, Ala., and between Florence, Ala., and Paducah, Ky. On the upper river the principal articles are iron ore, sand, and logs, most of the latter being rafted. On the middle section most of the traffic is between local points. Sixty thousand and forty tons of freight and 11,822 passengers included were carried by railroad transfer boats between Hobbs Island and Guntersville, Ala., and 12,474 tons of logs were rafted. On the lower river below Florence the principal movement is of railroad ties and other forest products. Most of the traffic is carried by steamboats and barges, but 50,135 tons of logs and poles were rafted.

TABLE 215.—COMMERCE ON THE TENNESSEE RIVER, 1906, BY ARTICLES.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	Above Chattanooga.	Chattanooga to Florence.	Florence to Paducah.	Articles.	Above Chattanooga.	Chattanooga to Florence.	Florence to Paducah.
	Tons.	*Tons.*	*Tons.*		*Tons.*	*Tons.*	*Tons.*
Iron ore	160,000	.....	.....	Cotton and cotton seed	.....	9,651	5,882
Sand	141,375	84,000	3,750	Peanuts	.....	300	7,780
Marble	25,800	.....	322	Fertilizers	463	7,200	1,522
Logs	85,434	41,796	39,920	Flour	305	7,621	5,530
Lumber and wood	16,678	158,863	88,310	Miscellaneous	12,882	59,232	48,635
Railroad ties	6,517	15,834	544,506	Total	475,515	413,751	766,118
Grain	15,991	11,744	16,990				
Hay	4,665	2,032	1,474	Passengers, number	7,004	24,380	23,744
Coal and coke	5,405	15,478	1,497				

TABLE 216.—COMMERCE ON THE TENNESSEE RIVER, 1897–1906.

[Compiled from the Report of Chief of Engineers, U. S. Army.]

Year.	Above Chattanooga.	Chattanooga to Florence.	Florence to Paducah.	Year.	Above Chattanooga.	Chattanooga to Florence.	Florence to Paducah.
	Tons.	*Tons.*	*Tons.*		*Tons.*	*Tons.*	*Tons.*
1897	256,331	247,422	390,167	1902	478,268	137,861	1,056,270
1898	218,378	224,456	602,916	1903	552,268	297,851	848,758
1899	269,552	253,340	462,307	1904	562,677	173,406	871,380
1900	380,697	229,160	1,237,009	1905	486,406	175,800	663,606
1901	294,607	129,160	658,102	1906	475,515	413,751	766,118

The traffic reported for these different sections and tributaries of the Tennessee River includes some duplications. Eliminating these, the aggregate commerce of the Tennessee and tributaries for 1906 amounted to 1,578,760 tons.

According to the Census Report on Transportation by Water in 1906, shipments on the Tennessee River amounted to 678,501 tons and receipts to 472,759 tons, excluding logs and rafts.

PADUCAH, KY.—Paducah, Ky., is an important river point. Through steamers between Cincinnati and Memphis and between St. Louis, Mo., and Waterloo, Ala., touch here. Other packet steamers operate to Evansville, Ind., Cairo, Ill., Waterloo, Ala., and Chattanooga, Tenn. Both the Illinois Central and the Nashville, Chattanooga and St. Louis railroads enter Paducah and compete to some extent with the boat lines. Ties, lumber, and other freight brought out of the Cumberland and Tennessee rivers by steamboat are landed at Paducah, as well as at Brookport and Joppa, Ill., whence shipments are made by rail—the Illinois Central Railroad from Brookport and the Chicago and Eastern Illinois Railroad from Joppa. Some freight from Paducah also appears to go to the railroads at Cairo, Ill.

The Census Report on Transportation by Water in 1906 shows river shipments from Paducah of 48,977 tons and receipts of 190,831 tons, a total of 239,808 tons.

Cairo, Ill., is at the mouth of the Ohio, at its junction with the Mississippi. Steamboats touching at Cairo land on the side of the city fronting on the Ohio River. Cairo is, however, more important as a port of the Mississippi River than of the Ohio, and will therefore be considered in connection with a description of the commerce on the lower Mississippi River.[a]

Section 8. Total traffic on the Ohio River and tributaries.

It is impossible to make an accurate statement of the total commerce of the Ohio River and its tributaries. A board of engineers of the United States Army appointed to examine the Ohio River estimated the total of both through and local shipments on the main stream at approximately 9,000,000 tons annually.[b] Detailed statistics of freight traffic by steamers and coal companies compiled by the United States engineers, however, show a total movement on the Ohio River in 1905 of 13,163,656 tons and in 1906 of 11,427,784 tons. A third estimate, based on the following table of freight shipments and receipts at the various ports on the Ohio River (excluding tributaries), indicates a movement in 1905 of 13,955,928 tons. In presenting this table to the board of engineers referred to above, the secretary of the Ohio Valley Improvement Association, by whom much of the data was compiled, says:[c]

> It is proper to say that, in the opinion of the writer, who has been connected for thirty years with the traffic of the Ohio River, some of the figures show that they are exaggerated, while others are underestimated. It is further the belief of the undersigned that the figures as a whole can be considered as fairly accurate.

It appears that some duplication is involved, shipments at one port being also included as receipts at another.

TABLE 217.—RECEIPTS AND SHIPMENTS OF FREIGHT ON THE OHIO RIVER IN 1905, BY PORTS.[d]

[H. Doc. No. 492, 60th Cong., 1st sess., pp. 41–43.]

Place.	Received upstream.	Sent upstream.	Received downstream.	Sent downstream.	Total.
Pennsylvania:	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Pittsburg, Allegheny, and Elliott	164,196	.....	.....	4,114,186	4,278,382
Rochester	1,900	400	16,740	1,000	20,040

[a] See pp. 302–305.

[b] H. Doc. No. 492, 60th Cong., 1st sess., p. 2.

[c] Ibid., pp. 40–41.

[d] No data available for Bellevue, Coraopolis, Baden, Freedom, and Beaver, Pa.; Wellsville, Toronto, Mingo Junction, Brilliant, Syracuse, Minersville, Gallipolis, Crown City, Proctorsville, Soutb Point, Coal Grove, Sciotoville, Aberdeen, Moscow, New Richmond, and Nortb Bend, Obio; Lazearville, McMechens, Powbatan, Henderson, Ripley, Guyandot, and Kenova, W. Va.; Catlettsburg, Russell, Quincy, Concord, Dover, Augusta, Bradford, Foster, Ludlow, Warsaw, West Point, Brandenburg, Lewisport, Patesville, and Smithland, Ky.; Brooksburg, Hanover, Alton, Cannelton, Troy, and Newburg, Ind.; and Olmsted, Ill. Data for Martins Ferry, Bridgeport, West Wheeling, and Bellaire included in total for Wheeling, W. Va.

TABLE 217.—RECEIPTS AND SHIPMENTS OF FREIGHT ON THE OHIO RIVER IN 1905, BY PORTS—Continued.

Place.	Received upstream	Sent upstream.	Received downstream.	Sent downstream.	Total.
Ohio:	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
East Liverpool	30,000	2,000	19,000	11,400	62,400
Empire	.....	.....	.....	1,250	1,250
Steubenville	11,000	1,000	1,250	11,500	24,750
Powhatan Point	.....	200	.....	.....	200
Clarington	200	3,650	3,000	300	7,150
Hannibal	300	700	1,260	300	2,560
New Matamoras	2,500	2,000	5,000	1,000	10,500
Grandview	100	100	300	25	525
Newport	1,600	1,200	1,750	500	5,050
Marietta	4,000	5,000	4,000	6,000	19,000
Racine	2,200	100	200	25	2,525
Pomeroy	1,000	2,204	500	147,923	151,627
Middleport	650	100	450	4,600	5,800
Athalia	100	800	920	300	2,120
Ironton	3,500	3,500	251,725	4,000	262,725
Hanging Rock	107	102	1,237	4,395	5,841
Portsmouth	7,500	.....	8,500	.....	16,000
Buena Vista	300	200	100	2,000	2,600
Manchester	10,015	6,000	28,300	9,100	53,415
Ripley	.....	.....	47,100	.....	47,100
Neville	50	300	400	650	1,400
Cincinnati	100,000	500,000	2,900,000	500,000	4,000,000
West Virginia:					
New Cumberland	550	500	750	200	2,000
Wellsburg	300	150	150	700	1,300
Wheeling and Benwood	.....	.....	.....	.....	241,500
Moundsville	2,500	2,500	2,000	4,440	11,440
New Martinsville	1,500	1,400	1,600	2,500	7,000
Sistersville	900	1,250	1,400	300	3,850
Friendly	50	200	25	20	295
St. Marys	800	3,500	1,700	1,850	7,850
Parkersburg	3,000	1,000	1,000	1,000	6,000
Ravenswood	4,800	200	300	200	5,500
New Haven	15	20	10	10	55
Hartford	600	1,800	300	3,000	5,700
Mason	10	10	30	450	500
Clifton	150	150	50	20	370
West Columbia	2	1	1	2	6
Spilman	.....	.....	.....	6,235	6,235
Point Pleasant	450	450	400	650	1,950
Huntington	5,000	3,250	4,000	3,250	15,500
Ceredo	300	250	700	250	1,500
Kentucky:					
Ashland	33,500	8,000	126,200	8,200	175,900
Greenup	1,000	1,000	750	2,500	5,250
Vanceburg	250	75	150	1,800	2,275
Maysville	4,000	17,000	87,372	34,000	142,372
California	900	.....	1,475	900	3,275
Newport	10	.....	.....	.....	10
Covington	10,125	.....	160,000	.....	170,125
Ghent	750	920	5,050	440	7,160
Carrollton and South Carrollton	6,600	8,550	41,080	6,100	62,330
Milton	3,803	4,121	7,210	1,498	16,632

TABLE 217.—RECEIPTS AND SHIPMENTS OF FREIGHT ON THE OHIO RIVER IN 1905, BY PORTS—Continued.

Place.	Received upstream.	Sent upstream.	Received downstream.	Sent downstream.	Total.
Kentucky—Continued.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Louisville	74,830	58,102	818,590	66,004	1,017,526
Peckenpaugh	75	500	50	50	675
Stephensport	250	1,500	1,500	150	3,400
Cloverport	1,450	200	675	175	2,500
Hawesville	350	200	350	400	1,300
Owensboro	9,550	10,580	20,780	3,450	44,360
Henderson	75,155	7,000	108,500	10,000	200,655
Uniontown	9,115	1,000	3,160	250	13,525
Dekoven	.....	.....	.....	38,106	38,106
Caseyville	800	625	750	450	2,625
Tolu	250	250	125	125	750
Weston	25	50	50	20	145
Birdsville	25	1,000	25	1,450	2,500
Carrsville	150	1,200	300	200	1,850
Bayou	150	900	200	1,200	2,450
Paducah	14,300	41,500	153,905	618,375	828,080
Ogden	500	700	800	400	2,400
Indiana:					
Lawrenceburg	6,560	4,500	39,540	4,400	55,000
Aurora	20,180	10,000	39,222	6,800	75,202
Rising Sun	625	2,365	8,900	3,250	15,140
Patriot	600	1,650	1,200	1,650	5,100
Vevay	750	2,000	15,198	2,400	20,348
Madison	3,839	4,197	252,310	1,600	261,946
Jeffersonville	200	2,150	48,450	2,730	53,530
New Albany	1,255	958	125,960	1,177	129,350
Mauckport	500	200	250	5,200	6,150
Tobacco Landing	25	2,000	1,200	.....	3,225
Amsterdam	980	11,520	7,520	1,025	21,045
Leavenworth	100	1,500	1,500	900	4,000
Schooner Point	50	400	400	100	950
Derby	100	350	350	100	900
Rome	135	1,750	200	750	2,835
Tell City	8,221	1,516	20,115	1,162	31,014
Grandview	1,500	5,000	600	10,000	17,100
Rockport	1,075	2,075	21,300	2,935	27,385
Evansville and Howell	65,500	16,000	288,940	5,120	374,560
Mount Vernon	13,760	1,810	35,460	1,575	52,605
Illinois:					
Shawneetown	9,180	175	63,926	3,410	76,691
Cave in Rock	500	1,350	1,900	6,650	10,400
Elizabethtown	575	1,200	1,950	9,725	13,450
Rosiclare	500	12,400	3,000	300	16,200
Golconda	456	600	500	200	1,756
Hamletsburg	30	10	50	20	110
Brookport	2,200	300	14,975	350	17,825
Metropolis	4,509	3,687	33,787	1,325	43,308
Mound City	154,070	300	18,500	105	172,975
Cairo[a]	267,741	109,200	1,200	18,000	396,141
Total	.....	.....	.....	.....	13,955,928

[a] Includes freight at Cairo to and from the Mississippi River.

None of the foregoing estimates include the local traffic on the tributaries of the Ohio, the movement from one tributary to another, nor, generally, the commerce from a tributary of the Ohio to points on the Mississippi. The total traffic of the Ohio system of rivers includes not only that on the main stream, but these other items, which in several cases are of no little importance. Thus, on the Monongahela, the tributary of the Ohio of greatest commercial importance, there is an annual traffic of about 11,000,000 tons, of which it is probable that between 7,000,000 and 8,000,000 tons move locally. So, too, on the Tennessee, of the total traffic of 1,579,000 tons in 1906 only about 766,000 tons moved on the lower section of the river, and not more than this amount could have moved to or from the Ohio. On other tributaries the local traffic is of less importance.

Table 218 summarizes the available statistics as to the traffic of the Ohio River and its principal tributaries. The shipments and receipts represent the same traffic to a large extent, and a total of the traffic, as reported by the United States Engineers, would duplicate traffic shipped on one stream and received on another. The aggregate of shipments, 15,226,805 tons, indicates the traffic of the Ohio River system, excluding logs and rafts and harbor traffic. The harbor movement on the Ohio River system amounted to 2,354,147 tons in 1906, and, allowing for logs and rafted lumber, the total movement on the Ohio River and tributaries was probably about 20,000,000 tons.

The greatest volume of the traffic centers at Pittsburg, where the movement on the Monongahela and Allegheny rivers is combined. The movement down the Ohio from Pittsburg is indicated by the traffic at Davis Island Dam, and this is increased by the traffic from the Ohio and other tributaries and by local freight. Much of this down-river movement stops at Cincinnati and Louisville. The through traffic to the lower Ohio and the Mississippi is indicated by the traffic at Louisville.

TABLE 218.—SUMMARY OF COMMERCE ON THE OHIO RIVER AND TRIBUTARIES, 1906.

[Shipments and receipts taken from Census Report on Transportation by Water; total from Report of Chief of Engineers, U. S. Army, 1907.]

River.	Shipments.[a]	Receipts.[a]	Total.[b]
	Net tons.	*Net tons.*	*Tons.*
Monongahela	8,925,923	545,716	11,817,128
Muskingum	13,826	11,073	28,433
Little Kanawha	11,239	6,953	70,289
Kanawha	975,031	63,832	1,327,703
Big Sandy	1,776	4,887	205,452
Kentucky	.....	.....	184,244
Green and Barren rivers	305,144	80,902	416,908
Wabash	42,427	30,537	.....
Cumberland	348,697	178,951	558,250
Tennessee	678,501	472,759	1,578,760
Ohio	3,142,097	12,296,037	11,427,784
Other rivers [c]	782,144	345,299	.....
Total	15,226,805	14,036,946	.....

[a] Excluding logs and rafted lumber. [b] Including logs and lumber. [c] Allegheny and Kentucky rivers

The Census figures show a decline on practically all of these rivers except the Monongahela from 1889 to 1906, and a small decline on the Ohio system as a whole from 15,796,968 tons to 15,226,805 tons. A very large decline is indicated in lumber, but this is mainly because the rafted movement was partly included in 1889, but was omitted entirely in 1906. Shipments of miscellaneous merchandise declined from 2,818,778 tons in 1889 to 1,313,831 tons in 1906. On the other hand, there has been a large increase in the movement of coal, especially on the Monongahela River, and of sand; and there has also been some increase in shipments of cement, brick and lime, and agricultural products. On the Cumberland, Green, and Tennessee rivers the movement of miscellaneous freight has increased. Apart from coal and sand, the total traffic has declined; but, including coal, sand and rafted timber, the total volume of traffic on the Ohio system seems to have increased to some extent.

II. UPPER MISSISSIPPI RIVER AND TRIBUTARIES.

Section 9. Source to mouth of Missouri River.

SOURCE TO MINNEAPOLIS.—On the reservoirs at the headwaters of the Mississippi River, above Grand Rapids, Minn., and on the river above Minneapolis, the volume of traffic in floating logs renders other forms of navigation impossible in many places. The log traffic during the year 1907 between Grand Rapids and Brainerd amounted to some 410,000,000 feet b. m., or about 1,435,000 tons. In addition to loose logs, the movement included rafts of logs, railroad ties, cedar poles, and posts floated down the river, but no record of the actual quantities is available. Between Brainerd and St. Cloud numerous rapids prevent boat navigation. There is some boat traffic on the section of the river between St. Cloud and Minneapolis, one small steamer, a steam barge, and several boats from 5 to 15 tons having been in operation during the season of 1907, as well as one steamboat plying regularly between Grand Rapids and Aiken and between Aiken and Sandy Lake.

MINNEAPOLIS TO MOUTH OF MISSOURI RIVER.—Between Minneapolis and St. Paul the principal commerce of the river is that of drifting loose logs over the upper and middle sections and rafting the same with steamboats on the lower section. This trade amounts to about 75,000,000 feet b. m. annually. Between Minneapolis and St. Paul the river is used largely by numerous pleasure craft. The Minnesota River enters the Mississippi between these two cities, but navigation of the Minnesota in recent years has been confined chiefly to the operation of excursion steamers.

On the stretch of the Mississippi River between the Falls of St. Anthony, at Minneapolis, and the mouth of the Missouri River during

1905 the traffic, including the movement of logs and lumber, amounted to approximately 4,089,318 tons, and during 1906 to 3,847,319 tons. The ton-mileage in these years was 765,081,964 and 698,031,841, respectively. Of this commerce the greater part was in forest products for the lumber trade. This trade, although of decreasing importance owing to the depletion of the pine forests in Minnesota and Wisconsin, gave employment in 1906 to 20 raft boats, which distributed logs from the upper waters to the various mills scattered along the river from Minneapolis to St. Louis, and also brought down much lumber from the St. Croix River to points below the Des Moines Rapids. From Stillwater, Minn., on the St. Croix, during 1906 a fleet of 16 steamers was engaged rafting. On the river above Stillwater some 93½ million feet b. m. of loose logs were run out, and from the mouth of the St. Croix, which empties into the Mississippi nearly opposite Hastings, Minn., there moved 40 million feet b. m. of rafted logs, 86½ million feet b. m. of lumber, 10 million shingles, and 34 million laths.[a]

The statistics of lumber manufactured in the valley of the upper Mississippi River during the years 1905 and 1906 are shown in Table 219. The greater part was floated, either as logs or lumber, for some distance on the Mississippi River, forming two-thirds of the traffic on the upper Mississippi.

TABLE 219.—LUMBER MANUFACTURE, UPPER MISSISSIPPI RIVER VALLEY, 1905 AND 1906.

[Reports of Chief of Engineers, U. S. Army.]

Locality.	Lumber.		Shingles.		Laths.	
	1905.	1906.	1905.	1906.	1905.	1906.
	1,000 ft. b. m.	*1,000 ft. b. m.*	*Thousands.*	*Thousands.*	*Thousands.*	*Thousands.*
Above Minneapolis	524,390	576,641	36,945	31,332	119,654	143,310
Minneapolis	368,947	291,020	1,107	1,401	65,699	54,744
St. Paul to Missouri River	304,075	184,714	33,658	6,721	62,006	40,918
St. Croix River	146,147	102,768	15,399	13,775	34,498	32,366
Chippewa River	173,631	89,473	34,307	25,293	29,588	32,357
Black River	.....	400	.....	.....	.....	50
Total	1,517,190	1,245,016	121,416	78,522	311,445	303,745

The Census Report on Transportation by Water in 1906 shows shipments on the upper Mississippi of 595,885 tons and receipts of 597,025 tons, excluding logs and rafts. The greater part of the traffic included was stone, sand, etc. Table 220, on the succeeding page, summarizes the available statistics of traffic on the upper Mississippi.

[a] Report of Chief of Engineers, U. S. Army, 1907, p. 1588.

TABLE 220.—COMMERCE ON UPPER MISSISSIPPI RIVER, 1906, BY ARTICLES.

[Receipts and shipments compiled from Census Report on Transportation by Water, pp. 179 and 183; total from Report of Chief of Engineers, U. S. Army, 1907, p. 1558.]

Articles.	Shipments.[a]	Receipts.[a]	Total.[b]
	Net tons.	*Net tons.*	*Tons.*
Logs	.....	.....	2,525,390
Rafted lumber, shingles, etc	.....	.....	104,751
Stone, sand, etc	363,859	363,503	.....
Grain	30,813	7,406	.....
Coal	20,110	20,145	.....
Cement, brick, and lime	14,546	15,026	.....
Fruits and vegetables	10,845	5,190	.....
Lumber	6,494	[c]7,870	.....
United States material	.....	.....	215,311
Miscellaneous	149,218	177,885	1,001,867
Total	595,885	597,025	3,847,319

[a] Excluding logs and rafts. [b] Including logs and rafts. [c] Estimated from figures in thousand feet.

The number of craft employed between Minneapolis and St. Louis during 1905 and 1906 is shown in the following table:

TABLE 221.—CRAFT EMPLOYED ON MISSISSIPPI RIVER BETWEEN MINNEAPOLIS AND ST. LOUIS, 1905 AND 1906.

[Compiled from reports of Chief of Engineers, U. S. Army, 1906 and 1907.]

Class of vessel.	1905.	1906.
Raft boats	42	20
Packets	27	26
Towboats	21	48
Ferryboats	13	20
Pleasure boats	105	125
Government boats	20	20
Total	228	259
Gross tonnage	16,500	14,625
Passengers	[a]1,674,518	[b]2,023,332

[a] Including 682,431 ferry passengers. [b] Including 669,896 ferry passengers.

In addition to the above, in both years there were about 200 barges of various sizes used for transporting freight.

Through package freight on the upper Mississippi is carried by the fleet of a packet line operating between St. Louis and St. Paul, also operating a division between St. Louis and Keokuk. Much of the local freight business between intermediate points is handled by a number of small steamboats in the section of the river between St. Louis and Lyons, Iowa. Besides these there are a few other vessels owned by individuals. At these intermediate points the merchandise traffic is small. The more important places are Alton, Quincy,

Davenport, Burlington, and Rock Island, but at none of these were the merchandise shipments and receipts by river over 25,000 tons. There is also some local river traffic in sand and stone at various points, but including this none of them have a traffic of 100,000 tons.[a] Other ports are Clinton, Dubuque, Muscatine, and Moline.

The through line between St. Paul and St. Louis does a passenger traffic business almost altogether. Such freight business as is done by this line is mostly a through general merchandise business between St. Louis and St. Paul. Nearly the entire course of this section of the river is paralleled by the Chicago, Burlington and Quincy and the Chicago, Milwaukee and St. Paul railways, and the river is crossed at several points by other roads. The railroads are said to attract considerable business from the river steamboats by naming special or commodity rates at river points where shipments of such commodities are made by one or two factories, such rate being named with the understanding that the railroads shall receive all the business of the shippers. This is the case at and below Burlington. Above that point the season of navigation is so short that the railroads do not find it necessary to adopt this method. Navigation is impeded for several months in winter by ice and in summer by low stages of water. Under favorable conditions flour shipments could be made by river from mills at Minneapolis, St. Paul, La Crosse, Winona, and Redwing. Formerly the through line between St. Paul and St. Louis enjoyed a considerable trade in flour from Minneapolis mills to St. Louis, but navigation of the river was so difficult for the boats, principally due to low water, that this trade was practically abandoned and has gone to the railroads. There is practically no grain movement by river, wheat raised in territory adjacent to the river being consumed by local mills, although there is a small movement of the flour into St. Louis by boat. As conditions now exist both shippers and consignees are getting located on railroad tracks farther and farther back from the river, which makes it possible to load a car directly from the warehouse at the mill and to unload the car directly into the consignee's warehouse at destination, thus doing away with rehandling and drayage charges, an important consideration in the shipment of carload quantities. With a sufficient stage of water assured it is said that much of the business, as well as new business, would be attracted to the river. Some ten years ago the boats enjoyed a good trade in carrying oats to St. Louis from upriver points, but these are not now shipped, being consumed locally. Considerable live stock, however, is still brought to St. Louis by river from points as far as 200 miles north.

There is no barge trade in package freight at all on the upper Mississippi, nor do the packets on that section encounter any competi-

[a] United States Census Report on Transportation by Water, p. 184.

tion from gasoline boats. It is said that this is due largely to the strong current of the river, which appears to be too strong to make the operation of gasoline boats profitable, and, too, the river trade is between towns too far apart for their successful operation.

ST. CROIX RIVER.—The log and lumber movement on the St. Croix River has already been referred to. There are also a few steamboats on the river making trips between Stillwater and Taylors Falls and one between Taylors Falls and Osceola.

GALENA RIVER.—The Galena River, which flows into the Mississippi at Galena, Ill., is improved by a lock and dam near its mouth. During the fiscal year ended June 30, 1907, it was open for navigation for 235 days, during 56 days of which time it was flooded by backwater from the Mississippi River. During the time it was open for navigation 3,131 boats and barges passed through the lock, carrying 12,540 passengers and 4,128 tons of merchandise. During the year ended June 30, 1906, the lock was open for navigation for 237 days, during 123 days of which it was flooded by backwater from the Mississippi. During this time 2,840 craft passed through the lock, carrying 14,791 passengers and 4,245 tons of merchandise.[a]

ROCK RIVER—ILLINOIS AND MISSISSIPPI CANAL.—The Rock River enters the Mississippi about 4 miles below Rock Island, Ill. The Illinois and Mississippi (Hennepin) Canal enters the Rock River at Milan, Ill., near its mouth. During the fiscal year ended June 30, 1907, it was open for 247 days, during which time there passed through it 1,243 boats and barges, carrying 3,472 tons of freight and 2,862 passengers. Corresponding figures for the year ended June 30, 1906, show the passage of 703 steamers of 11,869 tons and 202 barges of 19,963 tons. The number of passengers was 2,733, and freight amounted to 699 tons.[b]

DES MOINES RAPIDS CANAL.—In connection with the statistics of the freight movement on the upper Mississippi, it is of interest to note the figures of traffic passing the canal around the Des Moines Rapids in the Mississippi, where records of traffic passing through are kept. During the fiscal year ended June 30, 1907, the canal was open for navigation for 249 days, during which time there passed through 999 steamboats (578 upstream and 421 downstream) and 144 barges. These boats carried 48,825 passengers, 13,489 tons of merchandise, and 12,271 bushels of grain. There also passed through the canal 7,358,000 feet b. m. of lumber, 6,700,000 feet of logs, 1,300,000 shingles, and 4,232,000 laths. Corresponding figures for the fiscal year ended June 30, 1906, show 526 steamboats passing upriver and 290 downstream, 644 barges, 38,005 passengers, 14,098 tons of merchandise, 24,835 bushels of grain, 3,622,000 feet b. m. of lumber,

[a] Report of Chief of Engineers, U. S. Army, 1907, pp. 1574–1575.
[b] Ibid., p. 495; 1906, p. 1431.

425,000 feet of logs, 637,000 laths, and 400,000 shingles.[a] The figures of traffic for 1907, are, however, said to be small, because of prevailing high stages of water, which permitted most of the rafts and many boats to pass over the rapids instead of through the canal, making impracticable the collection of full statistics of this traffic.

ILLINOIS RIVER.—The Illinois River has some local commerce in grain and general merchandise. A packet line from St. Louis operates up this river as far as Peoria, and the traffic to and from St. Louis is noted in connection with the river commerce at that city. From Peoria another packet line runs to La Salle. River shipments from Peoria amounted to 21,409 tons in 1906, receipts 7,868 tons, total 29,277 tons. The larger part of the traffic on the Illinois River is, however, carried in barges and canal boats. The commerce for 1906 is shown in the table below:

TABLE 222.—COMMERCE ON THE ILLINOIS RIVER, 1906, BY ARTICLES.

[United States Census Report on Transportation by Water, pp. 181, 183.]

Articles.	Shipments.	Receipts.
	Net tons.	*Net tons.*
Grain	31,936	31,936
Coal	6,245	6,260
Miscellaneous	67,645	66,806
Total[a]	105,826	105,002

[a] Carried in steam vessels, 32,764 tons; in unrigged craft, 73,062 tons.

CANALS CONNECTING WITH THE GREAT LAKES.—The commercial advantages to be derived from navigable communication between the Great Lakes and the upper Mississippi River have led to various projects for its accomplishment. In Wisconsin the proximity of the Fox and Wisconsin rivers, the former flowing into Green Bay, an arm of Lake Michigan, and the latter into the Mississippi, early suggested a route between the two great waterway systems by the construction of a short canal between the points of closest approach of the two rivers. The construction of such a canal and the work of river improvement were undertaken by the State of Wisconsin, with the assistance of the United States Government, in the period between 1840 and 1850. In 1853 the unfinished work passed into the hands of a private corporation, by which the work was completed and put in operation in 1856. In 1872 the United States took possession of the waterway. The portions of the route through the Wisconsin River, which had

[a] Report of Chief of Engineers, U. S. Army, 1906, p. 1428; 1907, p. 494.

never been brought into good condition, proved extremely unsatisfactory, and the improvement of that portion of the waterway was abandoned by the Government in 1887, subsequent improvement being devoted to the portion between Green Bay and Portage, Wis. Considerable local traffic still moves over the portion between Portage and Green Bay.

The Illinois and Michigan Canal (now owned by the State of Illinois) is another route by which navigable communication has been attempted between the Lakes and the Mississippi River. This canal extends from the Chicago River, about 5 miles from its mouth, to the Illinois River at La Salle, the Illinois River being considered navigable from this point to its mouth, although navigation of the river is not altogether satisfactory and is confined to boats of shallow draft. The construction of the Chicago Sanitary and Ship Canal lowered the depth of the summit level of the Illinois and Michigan Canal, and on the completion of two locks at Joliet it is expected that the drainage canal will replace the Illinois and Michigan Canal from Joliet to the lake. Traffic on the Illinois and Michigan Canal has fallen from 751,360 tons in 1880 and 917,047 tons in 1889 to 6,470 tons in 1906. Traffic on the Chicago Sanitary and Ship Canal in 1906 amounted to 446,080 tons, mostly stone and sand.[a]

The Illinois and Mississippi Canal, built by the United States Government from Hennepin, Ill., to the Mississippi River at the mouth of Rock River, 4 miles below the city of Rock Island, was completed in October, 1907. It is intended as a link in a waterway between the upper Mississippi and Lake Michigan at Chicago, the portion between Hennepin and Chicago being identical with the route by the Illinois and Michigan Canal. The report of the United States engineers states that as a through route between the Mississippi River and Lake Michigan the usefulness of the canal is likely to be of comparative unimportance until improvements are made between La Salle and Lockport.

Section 10. Missouri River and tributaries.

About 20 miles above St. Louis the Missouri River enters the Mississippi, its waters having followed a course of 2,547 miles from the three forks of the river northwest of Yellowstone Park to their meeting with the waters of the Mississippi. Notwithstanding its physical greatness, its present commerce is insignificant. As early as 1819 a steamboat ascended the river as far as the mouth of the Chariton River, but owing to the limited demands of commerce, principally the fur trade, there were only a few primitive boats on the river prior to 1840. From 1840 to 1858 its commerce gradually

[a] United States Census Report on Transportation by Water, pp. 43, 210.

increased, reaching its height in the latter year, when packet lines were in operation from its mouth to Miami, Kansas City, St. Joseph, Omaha, and Sioux City. As on the Mississippi, however, many of the boats were lost during the civil war. When gold was discovered in Montana, in 1862, the Missouri furnished the most feasible means of transportation to the new fields, and for a time the river trade revived, but with the development of railroads in the Northwest its prosperity was short lived. In 1890 merchants of Kansas City inaugurated a line of steamboats to St. Louis, but owing to the competition of the railroads the line was soon forced out of business. From the time that this line discontinued business until late in the summer of 1906, when a new line was projected, no through lines were in operation between Kansas City and St. Louis.[a]

Up to June 30, 1907, the Government had expended the sum of $11,191,045.28 for all purposes to improve the Missouri River for navigation. The report of the Chief of Engineers for 1907,[b] in commenting on these expenditures, says:

> The result of these expenditures has been to demonstrate the possibility of regulating the river in such manner as to make it navigable for a channel of commerce; that the cost of such regulation would be very great, and no permanent good to navigation can be accomplished by appropriations for specific localities not so connected as to form part of the systematically improved reaches. The result of the expenditures at separated localities has been beneficial locally by protecting the banks, and in this manner preserving private property from the ravages of the river, but has given little, if any, encouragement to through navigation. * * *
>
> The river formerly carried an active commerce, which has been entirely diverted to other channels. This commerce now shows healthy signs of reviving.

Upper Missouri and Yellowstone rivers.—On the Missouri above Sioux City, Iowa,[c] during 1906, 10 boats were engaged in carrying freight and passengers, exclusive of ferriage. The freight carried by these boats included 9,540 tons of grain, 8,250 tons of live stock, 5,567 tons of lumber and wood, 11,780 tons of sand and building material, and 8,850 tons of general merchandise. The ton-mileage was 2,722,307, and the number of passengers 185.[d] Several gasoline boats operate in this section of the river, several of them doing a ferry business.

---

[a] The Improvement of the Missouri River, by Lawrence M. Jones, in Annals of the American Academy of Political and Social Science, Vol. XXXI, No. 104, pp. 178 et seq.

[b] Part 1, pp. 512–513.

[c] Apparently on the stretch of river between Sioux City and Pierre, S. Dak.

[d] Report of Chief of Engineers, U. S. Army, 1907, p. 1600.

From Bismarck, N. Dak., a line of steamboats and barges operates to Chamberlain and to points on the Yellowstone River as far as Glendive, Mont. This line handles grain and general merchandise. No detailed statistics of the commerce of this stretch of the upper Missouri or of the Yellowstone River are available.

LOWER MISSOURI RIVER.—From Sioux City to the mouth of the Missouri the principal traffic consists of sand and stone, especially at Kansas City. There is also a small movement of grain and general merchandise in local packet steamers and a small amount of rafted lumber. The following table shows the traffic from 1899 to 1906:

TABLE 223.—COMMERCE ON THE LOWER MISSOURI RIVER, 1899-1906.

[Report of Chief of Engineers, U. S. Army, 1907, pp. 1600-1601.]

Year.	Long-trade packets.	Short-trade packets.	Sand and wood steamers and barges.	Rafts.	Material for bank protection.	Total.	Total ton-miles.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	
1899	715	37,610	218,514	6,275	.....	263,114	1,057,761
1900	4,397	34,787	232,395	5,727	.....	277,306	1,433,600
1901	7,806	87,588	463,340	10,935	.....	569,669	2,903,538
1902	7,989	38,051	334,164	12,073	18,250	410,527	3,226,909
1903	2,376	51,505	678,878	1,985	15,547	750,291	2,229,331
1904	4,677	19,480	402,149	4,459	24,235	455,000	2,240,656
1905	.....	23,468	305,373	550	14,044	343,435	760,144
1906	.....	34,332	471,173	14,368	53,475	573,348	2,324,379

During the spring of 1907 a new line to operate between Kansas City and St. Louis was inaugurated by merchants of Kansas City. These boats were in operation during the summer of 1907, and appear to have met with success. At Kansas City there are ample harbor facilities and sufficient river front on which to build docks and wharves. The new line built a warehouse at East St. Louis for the receipt of goods from the East by rail consigned to Kansas City and intermediate points.

The traffic of the Missouri river is indicated by the freight receipts in the Census Report on Transportation by Water in 1906. This shows a total of 1,045,300 tons (excluding logs and rafts), of which 910,371 tons consisted of stone and sand, and 26,932 tons of grain; there were 3,091,000 feet of lumber, and the remainder consisted of miscellaneous commodities.

OSAGE RIVER.—The Osage River is navigable from its mouth, where it enters the Missouri, a few miles below Jefferson City, to Warsaw, Mo., a distance of about 171.5 miles. The Government has undertaken certain works to improve navigation of the river. It flows through the Osage Valley, and its commerce is chiefly in

forest products. Its traffic fell off very considerably in 1903, and in 1906 amounted to only a little more than one-fifth of the traffic in 1900 and 1902. During 1906 steamboat traffic on the Osage was carried principally by three small packets, which carried 10,419 tons of freight and about 1,500 passengers. The remainder of the freight was rafted.

The commerce from 1898 to 1906 is shown in the following table:

TABLE 224.—COMMERCE ON THE OSAGE RIVER, 1898–1906, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army, 1907, p. 1603.]

Articles.	1898.	1899.	1900.	1901.	1902.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Hay and grain	3,418	4,077	8,722	4,232	6,000
Live stock	1,038	873	934	1,058	153
Lumber, wood, and ties	74,881	57,663	76,583	56,221	74,385
Building material and gravel	3,015	9,945	7,500	8,000	12,369
General merchandise, farm machinery, etc.	1,934	4,144	2,335	2,738	2,284
Barytes	.....	.....	70	90	3
Total	84,286	76,702	96,144	72,339	95,194
Packets.....ton-miles	349,955	393,136	545,107	277,106	675,705
Rafts, etc.....do	3,825,099	2,968,121	3,060,215	2,425,710	3,334,065
Total.....do	4,175,054	3,361,257	3,605,322	2,702,816	4,009,770

Articles.	1903.	1904.	1905.	1906.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Hay and grain	1,498	466	1,092	2,494
Live stock	489	827	141	1,487
Lumber, wood, and ties	24,256	18,375	5,983	11,644
Building material and gravel	10,639	14,573	204	474
General merchandise, farm machinery, etc	1,534	1,430	1,164	4,407
Barytes	85	75	94	.....
Total	38,501	35,746	8,678	20,506
Packets.....ton-miles	263,018	294,104	557,195	362,906
Rafts, etc.....do	970,723	980,416	158,009	457,074
Total.....do	1,233,741	1,274,520	715,195	819,080

GASCONADE RIVER.—The Gasconade River flows into the Missouri a short distance above Hermann, Mo. This river is navigable to Arlington, Mo., a distance of 107 miles from its mouth. To maintain navigation the Government conducts snagging operations and other work along the river. In 1906 three small packets were in operation, carrying 7,624 tons of freight and 597 passengers. The ton-mileage for these boats was 159,150. By rafts 19,980 tons of lumber, wood, and railroad ties were moved on the river, a ton-mileage of 405,629.

The commerce of the Gasconade River for the years 1898 to 1906 is shown in the following table:

TABLE 225.—COMMERCE ON THE GASCONADE RIVER, 1898-1906, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army, 1907, p. 1605.]

Articles.	1898.	1899.	1900.	1901.	1902.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Grain and hay	1,667	2,100	4,796	2,437	4,446
Live stock	708	414	255	485	167
Lumber, wood, and ties	27,134	19,864	15,504	14,869	28,305
Building material	320	6	166	418	9,845
General merchandise, farm machinery, etc.	1,152	1,875	859	1,251	1,617
Total	30,981	24,259	21,580	19,460	44,380
Packets.....ton-miles..	162,594	307,376	236,992	369,223	1,231,183
Rafts.....do....	1,669,669	1,079,753	1,187,280	1,347,300	2,508,270
Total.....do....	1,832,263	1,387,129	1,424,272	1,716,523	3,739,453

Articles.	1903.	1904.	1905.	1906.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Grain and hay	196	1,896	3,764	4,235
Live stock	15	227	242	359
Lumber, wood, and ties	10,551	11,733	22,814	21,736
Building material	2	93	82	523
General merchandise, farm machinery, etc	24	842	2,735	751
Total	10,788	14,791	29,637	27,604
Packets.....ton-miles..	9,139	226,247	425,285	159,150
Rafts.....do....	691,500	664,680	1,172,895	405,629
Total.....do....	700,639	890,927	1,598,180	564,779

Section 11. River commerce at St. Louis.

St. Louis is the converging point for traffic from the upper and lower Mississippi, the Missouri, the Illinois, and to some small extent from the Ohio, the Cumberland, and the Tennessee rivers. The traffic by river at St. Louis was formerly, even as late as 1890, of much greater importance than at present. Table 226 shows the receipts and shipments at St. Louis from 1890 to 1906. It will be noted that traffic from the Ohio River fell off after 1890, but at present represents about one-half of the entire river receipts. This consists almost wholly of coal from the Pittsburg district. The receipts from both the upper and the lower Mississippi have also fallen off to a considerable extent. The decline in river traffic is still more clearly shown by comparing it with the total rail traffic for each of the years. The river shipments from St. Louis have also declined steadily. The traffic to the upper Mississippi and Illinois rivers, although small, nevertheless shows a slight tendency to increase.

On the other hand, the shipments to the lower Mississippi have fallen to less than 7 per cent of the shipments in 1890.

TABLE 226.—SHIPMENTS AND RECEIPTS OF FREIGHT AT ST. LOUIS, BY RAIL AND SPECIFIED RIVERS, 1890–1906.

[Compiled from the St. Louis Merchants' Exchange reports.]

Shipments.

Year.	Upper Mississippi River.	Lower Mississippi River.	Illinois River.	Missouri River.	Ohio River.	Cumberland and Tennessee rivers.	Red, White, Arkansas, and Ouachita rivers.	Total by river.	Total by rail.	Grand total.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1890	22,547	543,805	3,620	10,035	.....	15,675	6,180	601,862	5,270,850	5,872,712
1891	18,630	445,150	4,305	19,280	.....	22,435	3,130	512,930	5,216,228	5,729,158
1892	51,595	392,635	7,755	29,455	1,000	19,665	110	502,215	5,969,754	6,471,969
1893	54,230	342,785	5,785	12,775	.....	21,325	.....	436,900	[a] 5,554,593	5,991,493
1894	52,190	281,635	4,495	4,075	.....	16,535	4,150	363,080	4,780,256	5,143,336
1895	30,780	241,155	7,040	5,505	.....	17,535	1,340	303,355	5,349,327	5,652,682
1896	31,510	508,960	11,780	1,355	.....	18,805	.....	572,410	5,400,728	5,973,138
1897	36,225	406,315	7,065	.....	.....	19,700	.....	469,365	6,137,265	6,606,630
1898	33,805	339,435	8,828	300	.....	17,215	.....	399,583	7,079,319	7,478,902
1899	33,675	151,135	9,090	.....	.....	9,305	.....	203,205	[a] 8,266,393	8,469,598
1900	36,675	187,385	5,020	1,225	.....	15,275	.....	245,580	9,180,309	9,425,889
1901	23,392	158,493	9,090	7,185	.....	11,111	.....	209,271	10,653,065	10,862,336
1902	23,130	174,517	10,445	4,840	.....	11,334	.....	[a]224,266	11,035,586	[a]11,259,852
1903	44,855	146,498	8,825	2,345	.....	9,684	.....	212,207	12,971,173	13,183,380
1904	21,775	46,320	5,605	2,620	.....	6,245	.....	82,565	13,731,194	13,813,759
1905	25,730	35,295	6,225	4,705	.....	8,620	.....	80,575	15,225,973	15,306,548
1906	36,000	34,905	7,835	3,565	.....	6,880	.....	89,185	17,672,006	17,761,191

Receipts.

Year.	Upper Mississippi River.	Lower Mississippi River.	Illinois River.	Missouri River.	Ohio River.	Cumberland and Tennessee rivers.	Upper Mississippi River by rafts.	Total by river.	Total by rail.	Grand total.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1890	128,960	222,075	22,770	21,350	102,500	33,135	132,940	663,730	9,969,291	10,633,021
1891	90,865	209,095	31,190	25,065	63,890	29,945	142,090	592,140	10,098,729	10,690,869
1892	135,435	212,545	49,520	13,065	96,930	49,485	130,220	687,200	11,229,005	11,916,205
1893	111,710	216,300	50,605	8,000	33,490	52,790	126,510	599,405	10,408,039	11,007,444
1894	111,400	219,195	41,380	5,480	35,375	42,345	128,335	583,510	9,512,910	10,096,420
1895	78,170	239,090	30,600	3,270	35,440	23,575	98,685	508,830	10,489,344	10,998,174
1896	61,165	345,105	30,325	1,245	62,640	87,275	84,010	671,765	10,763,116	11,434,881
1897	51,435	311,540	38,130	250	26,915	78,835	69,565	576,670	11,921,279	12,497,949
1898	33,910	311,915	20,415	790	37,130	45,365	57,060	506,585	12,962,850	13,469,435
1899	45,410	238,140	32,585	565	39,440	38,510	71,960	466,610	14,805,872	15,272,482
1900	50,070	274,445	20,905	2,725	2,700	87,825	73,340	512,010	15,375,441	15,887,451
1901	68,470	233,885	27,395	3,860	57,315	21,330	50,550	462,805	17,433,523	17,896,328
1902	38,005	248,905	13,525	6,030	59,890	19,690	30,875	416,920	18,060,809	18,477,729
1903	32,705	160,085	12,035	1,415	111,435	18,035	4,700	340,410	21,580,403	21,920,813
1904	25,405	132,585	9,430	2,685	102,400	18,920	3,945	295,370	23,319,871	23,615,241
1905	31,190	107,520	8,725	3,580	125,755	11,870	1,210	289,850	23,915,690	24,205,540
1906	31,140	106,670	14,550	2,485	160,120	10,935	1,770	327,670	27,292,617	27,620,287

[a] Corrected.

The table following shows the decline in river commerce both in shipments and receipts by steamboats and barges. This decline, especially of shipments, may be attributed largely to the diminution of the grain trade. The table also shows the falling off in the receipts of log rafts.

TABLE 227.—COMMERCE AT ST. LOUIS, BY STEAMBOATS, BARGES, AND RAFTS, 1890–1906.

[St. Louis Merchants' Exchange Report, 1906, p. 98.]

Year.	Received by steamboats and barges.	Received by rafts.	Shipped by steamboats and barges.	Total receipts and shipments.
	Tons.	*Tons.*	*Tons.*	*Tons.*
1890	530,790	132,940	617,980	1,281,710
1891	450,050	142,090	512,930	1,105,070
1892	556,980	130,220	502,215	1,189,415
1893	472,895	126,510	436,900	1,036,305
1894	455,175	128,355	363,080	946,610
1895	410,145	98,685	303,355	812,185
1896	587,755	84,010	572,410	1,244,175
1897	507,105	69,565	469,365	1,046,035
1898	449,525	57,060	399,583	906,168
1899	394,650	71,960	203,205	669,815
1900	438,670	73,340	245,580	757,590
1901	412,255	50,550	209,271	672,076
1902	386,045	30,875	224,262	641,182
1903	335,710	4,700	212,207	552,617
1904	291,425	3,945	82,565	377,935
1905	288,640	1,210	80,575	370,425
1906	325,900	1,770	89,185	416,855

The Chief of Engineers, U. S. Army, reports a total river traffic at St. Louis during the calendar year 1906 of 483,681 tons, excluding stone, sand, and gravel. This traffic is summarized as follows:

TABLE 228.—SUMMARY OF RIVER COMMERCE AT ST. LOUIS, 1906, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army, 1907, p. 2661.]

Articles.	Tons.	Articles.	Tons.
Grain and its products	32,617	Logs	87,797
Cotton	1,392	Iron, steel, and metals	1,120
Cotton seed and its products	673	Groceries and provisions	33,533
Live stock	23,432	Miscellaneous and unclassified	121,822
Coal and coke	170,530		
Lumber	10,765	Total	483,681

Passengers to the number of 550,223, including 440,860 passengers in the local excursion traffic, were also carried in and out of port during the year.

The Census Report on Transportation by Water in 1906 shows total shipments and receipts by river at St. Louis of 743,981 tons (including 309,391 tons of sand, stone, etc.), and a harbor movement (excluding freight ferried in railway cars) of 969,002 tons, a total of 1,712,983 tons.

TABLE 229.—SHIPMENTS AND RECEIPTS AT ST. LOUIS, 1906, BY ARTICLES.

[United States Census Report on Transportation by Water, pp. 184-185.]

Articles.	Shipments.	Receipts.	Total.
	Net tons.	*Net tons.*	*Net tons.*
Coal	71	191,914	191,985
Stone, sand, etc	35	309,391	309,426
Other merchandise	77,795	164,775	242,570
Total	77,901	666,080	743,981
Harbor traffic	.....	.....	969,002
Grand total	.....	.....	1,712,983

The shipments and receipts by river during 1906 consisted of the articles shown in the following table:

TABLE 230.—RIVER SHIPMENTS AND RECEIPTS AT ST. LOUIS, 1906, BY ARTICLES.

[Compiled from the St. Louis Merchants' Exchange Report, 1906, pp. 99, 249-259.]

Shipments.

Articles.	By Illinois River boats.	By Missouri River boats.	By Memphis and way points boats.	By Tennessee River boats.	By upper Mississippi River boats.
Apples ..... barrels	45	20	2,600	1,150	5,410
Ale and beer ..... packages	3,230	300	41,180	1,040	10,135
Bagging ..... pieces	115	.....	1,665	1,485	375
Barbed wire ..... pounds	51,950	67,700	395,500	37,300	147,400
Butter ..... do	.....	200	2,290	50	5,890
Bran ..... sacks	240	20	420	1,965	120
Cattle ..... head	412	.....	762	8	1,788
Corn ..... sacks	.....	.....	5,895	6,945	170
Corn meal ..... barrels	220	.....	3,095	5,150	90
Cotton ..... bales	102	.....	3	.....	27
Eggs ..... packages	30	.....	40	.....	70
Flour ..... barrels	375	255	8,135	7,615	1,380
Hay ..... tons	110	25	737	232	89
Horses and mules ..... head	312	55	2,008	278	763
Hogs ..... do	225	.....	.....	.....	1,130
Hominy and grits ..... barrels	.....	60	290	.....	85
Pork ..... do	.....	10	.....	.....	5
Hams ..... pounds	2,200	1,000	663,900	61,700	29,125
Meats ..... do	21,200	4,000	1,125,940	230,650	94,100
Lard ..... do	13,600	17,000	626,800	134,040	125,300
Malt ..... sacks	.....	.....	3,645	.....	.....
Oats ..... do	660	220	16,275	1,905	225
In bulk ..... bushels	.....	.....	370	.....	.....
Onions ..... packages	450	340	2,185	10	1,505
Potatoes ..... do	705	715	8,395	100	5,162
Rye ..... sacks	100	.....	.....	.....	.....
Sheep ..... head	253	.....	520	.....	269
Tobacco ..... hogsheads	.....	.....	10	.....	.....
Manufactured ..... pounds	3,100	13,100	61,965	37,245	64,015
Wheat ..... sacks	.....	.....	120	160	.....
Whisky ..... barrels	185	45	1,827	76	959
White lead ..... pounds	117,600	41,500	274,000	35,500	1,179,625
Merchandise and sundries ..... packages	76,160	23,950	449,410	132,045	310,555
Total shipments ..... tons	7,835	3,565	34,905	6,880	36,000

TABLE 230.—RIVER SHIPMENTS AND RECEIPTS AT ST. LOUIS, 1906, BY ARTICLES—Continued.

Receipts.

Articles.	From Illinois River.	From Missouri River.	From lower Mississippi River.	From Ohio, Cumberland, and Tennessee rivers.	From upper Mississippi River.
Apples.....barrels..	42,939	1,222	1,394	.....	108,931
Apples.....boxes...	.....	.....	70	.....	341
Butter.....pounds..	700	5,050	47,820	50	11,550
Beans.....sacks and barrels..	.....	.....	20	.....	15
Boots and shoes.....cases..	.....	60	.....	.....	.....
Bran and ship stuff.....sacks..	.....	455	.....	.....	1,065
Cattle.....head..	2,245	169	10,601	176	4,792
Coal.....tons..	.....	.....	.....	160,120	.....
Corn.....sacks..	4,726	3,534	36,246	.....	15,856
Cotton, local.....bales..	.....	.....	3,917	1,520	.....
Cotton seed.....tons..	.....	.....	305	175	.....
Dried fruit.....packages..	1,222	10	1,455	10	915
Eggs, local.....do....	1,925	3,731	19,710	1,334	7,071
Fish.....do....	45	.....	175	.....	440
Flour.....barrels..	720	320	6,845	.....	3,515
Grease.....pounds..	.....	.....	.....	.....	45,600
Hay, local.....tons..	.....	10	.....	.....	215
Horses and mules.....head..	162	12	957	3	1,336
Hides.....pounds..	14,900	4,500	232,450	11,450	78,950
Hogs.....head..	23,092	1,127	47,189	931	16,719
Lard.....pounds..	.....	1,500	3,000	.....	135,100
Lumber.....M feet..	.....	10	2,548	1,639	51
Merchandise and sundries.....packages..	17,325	6,140	101,260	79,720	100,535
Oats.....sacks..	.....	.....	.....	.....	5,434
Oatmeal and rolled oats.....packages..	.....	.....	.....	.....	175
Onions.....sacks and barrels..	.....	70	3,095	.....	1,515
Peltries and furs.....packages..	3	8	749	53	222
Pork products:					
Barreled.....barrels..	22	.....	.....	.....	.....
Hams.....pounds..	.....	.....	.....	.....	2,000
Meats.....do....	.....	.....	300	.....	702,500
Potatoes.....sacks and barrels..	365	170	25,375	.....	841
Rye.....sacks..	124	.....	248	.....	672
Rice.....packages..	.....	.....	40	.....	.....
Seeds.....sacks and barrels..	177	20	81	.....	1,697
Sheep.....head..	3,262	92	9,018	45	2,727
Staves.....M..	3	.....	177	.....	2
Tallow.....pounds..	8,800	600	312,400	9,100	182,400
Tar and pitch.....barrels..	.....	60	.....	.....	3
Tobacco, manufactured.....pounds..	.....	.....	11,200	15,000	83,500
Wheat.....sacks..	25,786	14,071	158,523	.....	106,409
Wines and liquors.....barrels..	.....	30	.....	.....	.....
Wines and liquors.....boxes and cases..	30	.....	70	.....	.....
Wool.....pounds..	5,160	27,240	109,970	3,000	84,820

There is a movement of lumber and railroad ties on barges to St. Louis from the Tennessee River and the lower Mississippi. The comparative shipments and receipts of lumber at St. Louis by rail and by river during the years 1902 to 1906 are shown in the table following.

TABLE 231.—SHIPMENTS AND RECEIPTS OF LUMBER AT ST. LOUIS BY RAIL AND RIVER, 1902–1906.

[Compiled from the St. Louis Merchants' Exchange reports.]

Shipments.

	1902.	1903.	1904.	1905.	1906.
By rail.....cars..	71,727	81,572	76,101	85,988	97,441
By river.....feet..	2,086,000	1,836,000	(a)	1,435,000	1,841,000

Receipts.

By rail.....cars..	131,576	125,847	124,045	137,083	146,741
By river:					
Lumber.....feet..	51,957,800	33,083,600	21,663,800	11,773,300	5,312,800
Shingles.....pieces..	6,455,000	3,271,400	658,000	.....	.....
Laths.....do....	7,067,000	428,800	.....	34,350	.....
Pickets.....do....	216,000	.....	.....	.....	.....
Logs.....superficial feet..	1,561,830	4,426,000	3,747,360	7,176,700	8,958,800

a Records of shipments for 1904 not available.

The comparative receipts of cotton by rail and by river at St. Louis for 17 seasons ended with the season 1906 are shown in the following table. The river receipts in 1906 formed less than 1 per cent of the total receipts.

TABLE 232.—COTTON RECEIPTS AT ST. LOUIS BY RAIL AND RIVER, SEASONS ENDED AUGUST 31, 1890–1906.

[Compiled from the St. Louis Merchants' Exchange reports.]

Year.	River receipts.			Rail receipts.	Grand total.
	By lower Mississippi River boats.	By Cumberland and Tennessee river boats.	Total.		
	Bales.	*Bales.*	*Bales.*	*Bales.*	*Bales.*
1890	12,198	1,341	13,539	525,371	538,910
1891	11,449	3,149	14,598	691,871	706,469
1892	8,167	2,444	10,611	713,017	723,628
1893	3,605	1,259	4,864	469,160	474,024
1894	2,137	1,308	3,445	621,976	625,421
1895	7,842	1,371	9,213	917,072	926,285
1896	5,930	528	6,458	559,225	565,683
1897	9,841	1,823	11,664	558,749	570,413
1898	6,065	440	6,505	892,724	899,229
1899	10,237	1,254	11,491	1,016,882	1,028,373
1900	6,922	250	7,172	873,079	880,251
1901	3,491	1,216	4,707	1,108,818	1,113,525
1902	4,039	670	4,709	928,126	932,835
1903	2,785	2,735	5,520	739,483	745,003
1904	872	646	1,518	522,069	523,587
1905	1,112	1,927	3,039	674,619	677,658
1906	1,974	2,241	4,215	546,876	551,091

Sand and gravel dredged from the river bed is an article of river traffic at St. Louis and at other river towns. This trade at St. Louis is carried on extensively.

Coal is received at St. Louis by river from the Monongahela River and is used for gas-making purposes. In 1904 the amount brought to St. Louis was 101,200 tons; 1905, 125,755 tons; and in 1906, 160,120 tons.[a] There is no other coal brought to St. Louis by river. The coal used for domestic and steam purposes at St. Louis is from mines in southern Illinois, which may be said to be within a distance extending for 30 miles north, 50 miles east, and 110 miles south of East St. Louis, Ill. This coal comes by rail to East St. Louis, and is hauled to St. Louis by dray. Coal for steamboat use is loaded on barges at East St. Louis and towed across the river. Coal from the mines in Illinois north and east of the territory described above goes to Chicago.

The receipts of grain from the rivers at St. Louis at the present time is altogether a packet business. This grain comes to St. Louis from a radius of 100 miles up the Mississippi and from points down the Mississippi as far as Commerce, Cape Girardeau, and Thebes. A little comes out of the Missouri River from as far up as Miami, Mo. It is all handled in sacks, not in bulk. As shown by Table 230 only 5,434 sacks of oats were received by river in 1906, and these all came from upper Mississippi River points. Of corn, 15,856 sacks came from the upper Mississippi, 36,246 from the lower Mississippi, 4,726 from the Illinois River, and 3,534 from the Missouri River. The river receipts of wheat were somewhat greater, being 106,409 sacks from the upper Mississippi, 158,523 from the lower Mississippi, 25,786 from the Illinois, and 14,071 from the Missouri.

Grain at St. Louis is no longer a commodity for river shipment. Formerly, as shown in Table 234, large quantities of wheat, corn, and some oats were sent by river to New Orleans for export, but the building of railroad lines direct to Gulf ports from points in the grain-growing territory west of St. Louis and the neglect of systematic river improvement in the Mississippi below St. Louis have been factors that have cut off the river shipments from St. Louis. The last of the river shipments to New Orleans were taken by the St. Louis Steel Barge Company in 1902 and by the St. Louis and Mississippi Valley Transportation Company, which went out of business shortly afterwards. During the last six or seven years several elevators that were formerly used for storing the export grain at St. Louis while awaiting the arrival of barges for southern shipment have been dismantled or destroyed by fire and not rebuilt. It is stated, however, that with a reasonable stage of water in the river

[a] Trade and Commerce of St. Louis, Report of Merchants' Exchange, 1906, p. 88.

and a steady volume of business assured barges of large carrying capacity can profitably handle grain from St. Louis to New Orleans at 3 cents per bushel. Return cargoes of sugar and lumber can be found in the lower river, or the barges could even return without a cargo on account of the better time they could make by not being subject to delays of loading and unloading the return freight.

The shipments and receipts of grain and flour by rail and by river at St. Louis for a period of years are shown in the following table:

TABLE 233.—SHIPMENTS AND RECEIPTS OF GRAIN AND FLOUR AT ST. LOUIS BY RAIL AND RIVER, 1890–1906.

[Compiled from the St. Louis Merchants' Exchange reports.]

Grain (wheat, corn, oats, barley, and rye).

Year.	Shipments.			Receipts.			Total.		
	River.	Rail.	Total.	River.	Rail.	Total.	River.	Rail.	Total.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1895.....	2,640,631	17,043,272	19,683,903	1,964,297	30,885,984	32,850,281	4,604,928	47,929,256	52,534,184
1896.....	11,652,027	20,791,121	32,443,148	1,555,097	49,579,247	51,134,344	13,207,124	70,370,368	83,577,492
1897.....	6,813,450	32,889,506	39,702,956	819,438	56,781,201	57,600,639	7,632,888	89,670,707	97,303,595
1898.....	7,276,668	38,317,507	45,594,175	1,327,763	52,945,452	54,273,215	8,604,431	91,262,959	99,867,390
1899.....	2,669,180	29,234,279	31,903,459	1,293,411	46,950,326	48,243,737	3,962,591	76,184,605	80,147,196
1900.....	3,943,266	39,254,806	43,198,072	1,831,503	59,313,301	61,144,804	5,774,769	98,568,107	104,342,876
1901....	2,975,974	42,849,364	45,825,338	1,943,192	58,106,606	60,049,798	4,919,166	100,955,970	105,875,136
1902.....	3,900,041	44,704,186	48,604,227	2,408,700	68,028,372	70,437,072	6,308,741	112,732,558	119,041,299
1903.....	3,295,141	51,609,930	54,905,071	554,454	68,205,532	68,759,986	3,849,595	119,815,462	123,665,057
1904.....	155,355	54,796,963	54,952,318	835,431	61,505,507	62,340,938	990,786	116,302,470	117,293,256
1905.....	87,628	49,546,816	49,634,444	864,010	60,975,001	61,839,011	951,638	110,521,817	111,473,455
1906.....	136,455	60,263,917	60,400,372	866,199	79,405,510	80,271,709	1,002,654	139,669,427	140,672,081

Flour.

	Barrels.	*Barrels.*	*Barrels.*	*Barrels.*	*Barrels.*	*Barrels.*	*Barrels.*	*Barrels.*	*Barrels.*
1890.....	542,156	2,338,168	2,880,324	69,623	1,160,352	1,229,975	611,779	3,498,520	4,110,299
1891.....	380,946	2,386,960	2,767,906	49,646	1,303,994	1,353,640	430,592	3,690,954	4,121,546
1892.....	342,483	1,971,250	2,313,738	78,957	1,376,385	1,455,342	421,445	3,347,635	3,769,080
1893.....	274,808	1,769,919	2,044,727	66,173	1,104,852	1,171,025	340,981	2,874,771	3,215,752
1894.....	284,834	1,883,554	2,168,388	78,031	1,183,278	1,261,309	362,865	3,066,832	3,429,697
1895.....	345,386	1,800,273	2,145,659	93,847	919,497	1,013,344	439,233	2,719,770	3,159,003
1896.....	206,652	1,739,429	1,946,081	84,001	1,264,600	1,348,601	290,653	3,004,029	3,294,682
1897.....	205,608	1,413,075	1,618,683	106,980	1,222,070	1,329,050	312,588	2,635,145	2,947,733
1898.....	72,430	1,511,682	1,584,112	56,075	1,302,013	1,358,088	128,505	2,813,695	2,942,200
1899.....	87,847	1,939,794	2,027,641	59,285	1,455,030	1,514,315	147,132	3,394,824	3,541,956
1900.....	107,927	2,427,279	2,535,206	49,670	1,819,400	1,869,070	157,597	4,246,679	4,404,276
1901.....	83,046	2,878,517	2,961,563	23,038	2,147,510	2,170,548	106,084	5,026,027	5,132,111
1902.....	70,242	2,614,209	2,684,451	20,173	2,197,512	2,217,685	90,415	4,811,721	4,902,136
1903.....	27,470	3,099,626	3,127,096	26,545	2,314,150	2,340,695	54,015	5,413,776	5,467,791
1904.....	26,735	3,279,463	3,306,198	13,905	2,341,655	2,355,560	40,640	5,621,118	5,661,758
1905.....	18,254	3,454,355	3,472,609	8,055	2,521,725	2,529,780	26,309	5,976,080	6,002,389
1906.....	17,760	2,660,185	2,677,945	11,400	2,393,345	2,404,745	29,160	5,053,530	5,082,690

The river shipments to New Orleans from St. Louis by Mississippi River boats for the years 1870 to 1903, inclusive, are shown in the table below. Grain shipments to New Orleans ceased in the latter year (1903).

TABLE 234.—SHIPMENTS OF BULK GRAIN FROM ST. LOUIS TO NEW ORLEANS VIA MISSISSIPPI RIVER BOATS, 1870–1903.

[Compiled from St. Louis Merchants' Exchange reports.]

Year.	Wheat.	Corn.	Rye.	Oats.	Total.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1870	66,000	.....	.....	.....	66 000
1871	.....	309,077	.....	3,000	312,077
1872	.....	1,711,039	.....	.....	1,711,039
1873	.....	1,373,969	.....	.....	1,373,969
1874	365,252	1,047,794	.....	10,000	1,423,046
1875	135,961	172,617	.....	.....	308,578
1876	37,142	1,737,237	.....	.....	1,774,379
1877	351,453	3,578,057	171,843	.....	4,101,353
1878	1,876,639	2,857,056	609,041	108,867	5,451,603
1879	2,390,897	3,585,589	157,424	30,928	6,164,838
1880	5,913,272	9,804,392	45,000	.....	15,762,664
1881	4,197,981	8,640,720	22,423	132,823	12,993,947
1882	5,637,391	2,529,712	15,994	150,320	8,333,417
1883	1,435,043	9,029,509	205,430	389,826	11,059,808
1884	1,318,688	4,496,785	344,864	487,221	6,647,558
1885	50,000	8,180,039	36,093	401,787	8,667,919
1886	743,439	7,501,730	.....	598,755	8,843,924
1887	3,973,737	7,365,340	.....	217,722	11,556,799
1888	1,247,952	5,844,042	.....	160,584	7,252,578
1889	1,651,950	12,398,955	17,432	89,707	14,158,044
1890	1,409,440	8,717,849	.....	89,960	10,217,249
1891	6,940,215	1,482,731	45,600	.....	8,468,546
1892	5,149,708	3,228,645	.....	36,587	8,414,940
1893	3,710,360	3,293,808	.....	75,430	7,079,598
1894	1,042,193	1,263,310	.....	40,000	2,345,503
1895	438,614	1,251,803	.....	.....	1,690,417
1896	1,732,563	8,358,087	.....	436,558	10,527,208
1897	1,191,032	3,827,963	190,968	265,379	5,475,342
1898	2,747,994	3,006,488	212,720	633,505	6,600.707
1899	234,720	1,748,517	.....	249,998	2,233,235
1900	169,241	2,871,870	.....	273,049	3,314,160
1901	1,828,244	535,705	.....	.....	2.363,949
1902	2,308,714	226,400	28,212	28,409	2,591,735
1903	1,724,220	1,025,221	.....	.....	2,749,441

It is said that if the systematic improvement of the Mississippi River by the Government on an adequate scale becomes assured the establishment of barge lines of modern equipment, operating craft of large carrying capacity, will be warranted. Such a line has been in contemplation. The promoters received promises of support from officials of various railroads; the millers of Minneapolis; the implement manufacturers of Moline, Ill.; the importers of

New Orleans; and lumber manufacturers of the lower river. The promoters point out also the possibilities of the shipment of coal from the mines of southern Illinois.

Upper Mississippi River packet lines at St. Louis include one through line to the upper Mississippi to St. Paul; a service to Keokuk, Iowa; a line to Illinois River points as far as Peoria; and another on the Mississippi to points in Calhoun County, Ill., a county in which there is no railroad. On the Missouri regular steamboat packet service between St. Louis and Kansas City, Mo., was inaugurated during the summer of 1907, and a small steamer operates from St. Louis to Osage River landings as far as Tuscumbia. On the lower Mississippi a line operates to Memphis, connecting at Cairo with Ohio River steamers and at Memphis with steamboats for points south. Two packet lines operate from St. Louis to Commerce and Cape Girardeau, Mo., and way landings. A regular line of steamers operates from St. Louis to Tennessee River points as far as Waterloo, Ala.

III. LOWER MISSISSIPPI RIVER AND TRIBUTARIES.

Section 12. St. Louis to Cairo.

Mention has already been made of the difficulties of navigation due to irregularity of the stage of water in the Mississippi between St. Louis and Cairo. One cause of this is the comparatively great slope on this stretch of river; another is the great influx of sediment from the Missouri River.

On the Illinois side of the river the St. Louis, Iron Mountain and Southern Railway parallels the stretch of the Mississippi between St. Louis and Cairo as far as Thebes, Ill., where it crosses the river. Both the Illinois Central and the Mobile and Ohio (Southern) operate between St. Louis and Cairo, although at some distance from the river, so that they do not compete to any extent for the local river trade. On the west bank of the Mississippi the tracks of the St. Louis and San Francisco Railroad (Frisco) run along the river from St. Louis to Commerce and Cape Girardeau, Mo. Prior to the building of this division of the Frisco the boat lines handled some through business by way of Cape Girardeau, but none since rail connection has been made with St. Louis. The shipment of clay from Cape Girardeau to points on the railroads out of St. Louis, to Chicago and other manufacturing points, is a business that might be profitably developed by the boat lines, but since the Frisco Railroad has entered this territory this trade has been lost to the river, being shipped by rail to St. Louis and there turned over to other rail connections. Practically all the freight now handled on this stretch of the river is local freight to and from the river towns. During 1906 a steamboat line that had been operating

for several years between St. Louis, Ste. Genevieve, Chester, and Grand Tower withdrew its service on account of the development of railroads in the territory reached by the line, because of competition with other boat lines, and because of a favorable offer for the lease or sale of the boats to the new company now operating boats between St. Louis and Kansas City.

At Grand Tower, Ill., there is a "river dump" used for loading coal for fuel on steamboats, but the commercial movement of coal from that point by river is comparatively unimportant.

The traffic movement on the Mississippi River between St. Louis and Cairo, Ill., for the period 1901 to 1906, both inclusive, is shown in the following table:

TABLE 235.—COMMERCE ON MISSISSIPPI RIVER BETWEEN ST. LOUIS AND CAIRO, 1901-1906, BY ARTICLES.

[Compiled from reports of Mississippi River Commission (Annual Reports of Chief of Engineers, U. S. Army).]

Artieles.	1901.	1902.	1903.	1904.	1905.	1906.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Grain and its produets	137,954	194,175	103,114	26,699	50,441	28,858
Cotton	308	3,144	585	471	1,991	1,177
Cotton seed and its products	.....	.....	340	1,481	912	673
Live stock	31,981	46,458	18,010	16,266	21,048	11,542
Coal and coke	80,950	110,090	119,727	108,955	131,756	170,830
Lumber	94,704	130,595	120,231	38,510	21,143	10,765
Logs	37,600	77,089	89,662	65,990	101,111	120,113
Iron, steel, and metals	29,122	3,873	82,797	1,400	135	325
Groceries and provisions	83,656	105,171	35,485	18,581	18,958	7,779
Railroad ties	.....	.....	18,243	.....	.....	.....
Gravel, sand, and stone	.....	.....	.....	14,559	.....	37,800
Miscellaneous and unclassified	67,573	280,859	60,987	93,574	69,526	68,154
Total	563,848	951,454	649,181	386,486	417,021	458,016

CAIRO AS A RIVER PORT.—Cairo, Ill., is situated at the point where the Ohio River flows into the Mississippi. It is an important port for the commerce of both rivers, as well as that of the Cumberland and the Tennessee. By the Illinois Central and the Cleveland, Cincinnati, Chicago and St. Louis railroads from Cairo, Chicago and points north and east are reached. The receipt of logs, lumber, and railroad ties from the several rivers for shipment over these railroads from Cairo or for manufacture at Cairo is an important business. At Joppa, Ill., also, where the Chicago and Eastern Illinois reaches the Ohio River, the traffic in these commodities is considerable.

Pulp wood for paper mills at Dayton, Ohio, is brought to Cairo for shipment by rail. This is picked up in barges at points on the Mississippi from about Hickman, Ky., down not quite to Memphis, and for some 10 or 12 miles above Cairo.

The river grain trade at Cairo is a thing of the past, though in former days, when through packet boats were operated between St. Louis and New Orleans, many shipments of grain, drawn from all over Illinois, were made from Cairo. The movement of oats was particularly large, oats being a feed for animals well adapted for the climate of the South. With the building of railroad connections from Cairo into the southern territory the boat lines lost the business. The railroads made the rate low enough to get the business, allowed the bulk grain to be stopped in transit for sacking without extra charge, and put in switch connections at the large plantations. These advantages and others of a similar nature drew the grain business to the railroads.

Shipments of coal are received at Cairo from Pittsburg by river and from adjacent mines in southern Illinois, but Cairo is not itself a river shipping point for coal.

The river freight handled at Cairo in 1906, exclusive of logs and rafts, is shown by the following table:

TABLE 236.—RIVER COMMERCE AT CAIRO, 1906, BY ARTICLES.

[United States Census Report on Transportation by Water, p. 184.]

Articles.	Shipments.	Receipts.	Total.
	Net tons.	*Net tons.*	*Net tons.*
Coal	122	62,007	62,129
Stone, sand, etc	.....	25,000	25,000
Other freight	13,008	147,102	160,110
Total	13,130	234,109	247,239
Harbor traffic [a]	.....	.....	14,600
Grand total	.....	.....	261,839

[a] Exclusive of freight ferried in railway cars.

The vessel movement on the Mississippi and Ohio rivers at Cairo during the calendar year 1907 is shown in the table on the following page.

TABLE 237.—MOVEMENT OF VESSELS AT CAIRO, 1907.

Monthly Summary of Commerce and Finance, December, 1907, p. 1202.]

Port.	Arrivals.		Clearances.	
	Number.	Tons.	Number.	Tons.
Arkansas City, Ark.	6	5,314	.....	.....
Brookport, Ill.	2	176	2	176
Cape Girardeau, Mo.	6	2,006	7	2,054
Caseyville, Ill.	.....	.....	11	4,453
Cincinnati, Ohio	87	52,024	70	39,979
Columbus, Ohio	.....	.....	2	313
Commerce, Mo.	2	746	5	1,546
Dycusburg, Ky.	.....	.....	1	254
Evansville, Ind.	8	4,445	3	985
Grand Tower, Ill.	7	4,011	6	3,972
Greenville, Miss.	38	19,104	29	22,604
Helena, Ark.	10	6,357	.....	.....
Hickman, Ky.	7	2,306	10	3,637
Jacket Point	.....	.....	2	1,314
Joppa, Ill.	158	107,663	132	86,869
Kansas City, Mo.	1	242	.....	.....
Louisville, Ky.	1,448	1,078,557	1,759	1,291,995
Maryland City	19	8,203	16	10,067
Memphis, Tenn.	467	263,477	423	253,128
Metropolis, Ill.	1	208	1	208
Mound City, Ill.	5	2,137	12	8,399
Nashville, Tenn.	5	1,810	6	1,867
Natchez, Miss.	35	25,485	9	6,847
New Madrid, Mo.	5	2,131	20	16,859
New Orleans, La.	1,212	984,170	973	743,559
Ogdens Landing	.....	.....	4	1,738
Paducah, Ky.	499	198,060	494	192,104
Pittsburg, Pa.	.....	.....	52	50,639
Point Pleasant, W. Va.	1	192	.....	.....
Prices Landing, Mo.	1	372	1	372
Riverton, Ky.	46	16,089	49	17,047
Rosiclare, Ill.	12	5,850	14	10,086
St. Louis, Mo.	701	387,225	732	397,377
St. Paul, Minn.	.....	.....	2	213
Shreveport, La.	1	19	.....	.....
Red River	4	3,314	.....	.....
St. Francis River	.....	.....	4	2,191
Tennessee River	51	15,826	67	24,245
Lower Mississippi River	898	524,856	993	570,143
Upper Mississippi River	19	6,302	23	7,590
Upper Ohio River	13	4,138	24	12,161
Total through movement	5,775	3,732,815	5,958	3,786,991
Local at Cairo	2,761	1,508,099	2,578	1,453,923
Grand total	8,536	5,240,914	8,536	5,240,914
Total, 1906	7,640	4,409,754	7,640	4,409,754

NOTE.—Of these vessels, passing Cairo or having a terminus there, 1,930 were loaded with coal; 679 with lumber, logs, piling, and wood; 61 with railroad cross-ties; 556 with merchandise; 23 with rocks; 5 with grain; 1 with blocks; 9 with brick; 4 with sugar; 9 with manufactured iron; 6 with wheat; and 1 with wire.

Section 13. Cairo to Memphis.

In the section of the Mississippi between Cairo and Memphis the Illinois Central Railroad, although at some distance back from the river, parallels the river on the Kentucky-Tennessee side, and on the Missouri-Arkansas side the St. Louis Southern (Cotton Belt) runs from Cairo through the southeastern corner of Missouri to Fair Oaks, a station in northeastern Arkansas, from which point it connects with a branch of the St. Louis, Iron Mountain and Southern, running from Bald Knob, Ark., to Memphis, Tenn. These railroads are thus in a position to compete with the river lines on both sides of the river for through business between Cairo and Memphis, but not to any great extent for the local business at river towns, since the railroads do not touch the river except at a few points.

One packet line only operates on this part of the river, running boats between Memphis and St. Louis and Cincinnati, touching at way landings. The coal fleets from the Ohio bound for the lower Mississippi pass through this entire stretch of river, as do also the lumber-carrying fleets from points below Memphis with cargoes destined for Cairo. There are no important towns on the Mississippi between Cairo and Memphis.

The traffic movement on the Mississippi River between Cairo and Memphis for the period 1901 to 1906 is shown in the following table:

TABLE 238.—COMMERCE ON MISSISSIPPI RIVER BETWEEN CAIRO AND MEMPHIS, 1901–1906, BY ARTICLES.

[Compiled from reports of the Mississippi River Commission (Annual Reports of Chief of Engineers' U. S. Army).]

Articles.	1901.	1902.	1903.	1904.	1905.	1906.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Coal and coke[a]	1,359,462	1,289,830	1,266,378	1,250,467	1,328,930	1,030,000
Grain, and its products	103,599	91,593	100,222	8,782	51,123	4,551
Cotton	13,647	50,315	10,065	15,455	9,573	10,903
Cotton seed, and its products	21,750	23,813	10,850	12,064	11,069	13,288
Live stock	1,903	536	15,040	618	200	.....
Lumber	228,493	287,294	209,541	192,481	242,070	254,156
Logs	309,395	386,977	430,530	503,465	486,051	238,464
Iron, steel, and metals	55,572	247,565	77,331	43,549	55,153	58,449
Groceries and provisions	37,340	15,317	4,836	3,745	4,844	762
Railroad ties	.....	.....	5,397	.....	.....	.....
Gravel, sand, and stone	.....	.....	13,000	29,700	5,800	21,300
Miscellaneous	175,141	155,121	107,070	92,978	43,550	88,020
Total	2,306,302	[b]2,548,361	2,250,260	[b]2,153,304	2,238,363	1,719,893

[a] Mostly through movement, duplicated in tables for other sections of the river.
[b] Total corrected to agree with sum of items.

OBION AND FORKED DEER RIVERS.—About 5 miles below the point opposite the State line between Missouri and Arkansas the Obion and Forked Deer rivers enter the Mississippi. These two

rivers, which unite about 3½ miles from the Mississippi, are navigated by 4 steamboats and 3 gasoline boats. The traffic on these two rivers is tributary to Memphis. The commercial statistics of these rivers during the calendar year 1906 are shown in the following table:

TABLE 239.—COMMERCE ON OBION AND FORKED DEER RIVERS, 1906, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army, 1907, pp. 1608-1610.]

Articles.	Obion River.	Forked Deer River.	Articles.	Obion River.	Forked Deer River.
	Tons.	*Tons.*		*Tons.*	*Tons.*
Logs	8,639	8,000	Live stock:		
Lumber	1,111	.....	Large	580	1,262
Railroad ties	1,500	.....	Small	2	108
Grain	107	107	Total	12,358	9,746
Other farm products	125	45			
Lime and cement	3	18	Passengers.....number..	1,750	1,800
General merchandise	291	206			

Section 14. Memphis to Vicksburg.

The Mississippi River between Memphis and Vicksburg carries a large traffic in logs and lumber, chiefly from the tributaries that enter the river between these two cities. In 1906 three-quarters of a million tons of these commodities were handled. Bituminous coal from the upper Ohio consigned to Mississippi River points below Memphis, including that to New Orleans, passes through this section of the river. Cotton, cotton seed, and its products also constitute an important part of the freight movement.

Packet steamboats operate between Memphis and Vicksburg and intermediate points, including boats from Memphis to Little Rock and way landings on the Arkansas River, and occasionally a boat goes up the St. Francis River. The log movement on the St. Francis, White, and Arkansas rivers is of considerable volume. Statistics of this stretch of the Mississippi and these tributaries are shown in the table on pages 311 to 313.

MEMPHIS, TENN.—Memphis is of large importance as a lumber center. Logs are towed in barges from the Mississippi below Memphis and from the St. Francis, White, and Arkansas rivers and other streams, and the barges are towed back empty. Logs from points on the river north of Memphis are generally towed in rafts, a more economical method. Raft towing against the current is impracticable, and for that reason the northbound logs are handled in barges. The logs are handled on the river for a radius of about 250 to 300 miles from Memphis, mostly from the south as far down the Mississippi as Greenville, Miss., and the river operations are carried on

during the entire year except for about three months in summer, when the stage of water on the tributaries becomes too low for navigation. Complete statistics of the annual log and lumber movement by water at Memphis are not available.

Coal is towed to Memphis in barges and boats from the upper Ohio for local consumption at Memphis and for rail distribution to the surrounding territory. This territory may be marked out as follows: Caruthersville and Springfield, Mo.; Bald Knob, Little Rock, Hot Springs, and Pine Bluff, Ark.; Jackson and Byhalia, Miss.; Jackson, Grand Junction, Hollow Rock, and Humboldt, Tenn., and Fulton, Ky. The points are largely determined by the local rail rates out of Memphis. The distance from Memphis varies according to the direction and the lines of railroads. Eastward to Jackson, Tenn., is only 85 miles, while northwestward to Springfield, Mo., is 282 miles. To these towns and intermediate rail points the river coal is shipped by rail in carload lots, although not more than 3 or 4 carloads are sent during the year to some of these places. The river coal meets competition from coal mined in southern Illinois, western Kentucky, and also to some extent from the coal mined in southeastern Kentucky, eastern Tennessee, and northern Alabama, all these competing coals coming in by rail. West of the Mississippi, in Arkansas, there is competition from mines at Russellville, Ark., and mines in Oklahoma (Indian Territory). The river coal is used for steamboat fuel and for local consumption at Memphis as well as for the distributing trade. The river coal trade at Memphis is reported at 199,945 tons in 1906.[a]

Iron and steel products, consisting of wire, nails, horseshoes, cotton ties, etc., from mills in the Pittsburg district, are brought by barge to Memphis, whence rail shipments to the surrounding country are made from the warehouse as orders are received.

Before the civil war the levees at Memphis teemed with commerce. The era of railroads in the adjoining territory had but little more than begun, and the river steamboats were the chief vehicles of commerce. Through lines of boats ran from Cincinnati and St. Louis to New Orleans, bringing down the products of the upper rivers, such as flour, pork, grain, hay, woodenware, and all sorts of supplies for plantations and the lower river towns, returning with sugar, molasses, and other products of the lower river. The Mississippi was the main artery of the passenger travel, and receipts by the boats from that source and from the transportation of the United States mail were great. One of the principal lines of packets running out of Memphis was the Memphis and New Orleans Packet Line. Some of these boats carried over 5,000 bales from Memphis to New Orleans in a single cargo, returning from New Orleans with supplies for plantations en route and on the tributary rivers, including a large amount for Mem-

[a] Report of Chief of Engineers, U. S. Army, 1907, p. 2661.

phis. Among other early lines at Memphis were the Memphis and St. Louis Packet Line, afterwards merged into the famous Anchor Line; the Memphis and Cincinnati Line, which was succeeded at a comparatively recent date by the Memphis-Cincinnati service of the present line between these points, and a line between Memphis and Louisville. Several boats ran from Memphis to points on the lower Ohio, touching at Cairo, Evansville, and other points, this service afterwards being restricted to Cairo. Their principal freight consisted of cotton northward and grain southward. Large shipments of cotton were made to Cincinnati, and some went as far as Pittsburg, where there were several cotton mills, as well as at other points on the Ohio River. Other packet boats ran up the Cumberland River to Nashville. Out of the Cumberland and Tennessee rivers many large boats operated as far south as New Orleans. Those boats would bring out large cargoes of cotton. This trade was all before the war, which destroyed it. A number of small steamers operated from Memphis to the tributary rivers, such as the Hatchee, Obion, and Forked Deer rivers. Below Memphis, besides the New Orleans steamers, there were boats to Vicksburg and to points on the Arkansas, White, and St. Francis rivers.

The building of railroads along the river diverted the passenger traffic, and was a severe blow to the boats in this respect and also in the loss of much freight. The owners of the Anchor Line, between St. Louis and New Orleans, not being able to cope with the railroads, let the boats run down and finally sold out to a new company in 1895, which in turn failed.

At the present time the packet lines at Memphis include a line operating boats to Cincinnati, St. Louis, Ashport, Tenn., and Friar Point, Miss.; a line to Arkansas City and intermediate points; one to Vicksburg and to Little Rock and way landings, and another to points as far as O. K. Landing, Miss. Rail competition on freight at river points between Memphis and Arkansas City is encountered from the St. Louis, Iron Mountain and Southern Railway in Arkansas and from the Yazoo and Mississippi Valley Railroad in Mississippi. The Rock Island, Iron Mountain, and Cotton Belt railroads connect Memphis and Little Rock, and the two latter roads connect Memphis and Pine Bluff.

Freight moving between lower river points and Memphis consist of shipments of general merchandise and plantation supplies shipped south from Memphis and of return shipments of cotton and cotton seed. The traffic in cotton is an important one, for which the railroads are keen competitors. Much of it goes to the boat lines. Arrangements had been completed in the summer of 1907 for the through shipment of export cotton by river from points on the Arkansas River to New Orleans by barge from Memphis.

The river commerce at Memphis in 1905 and 1906 is shown in the following table:

TABLE 240.—RIVER COMMERCE AT MEMPHIS, 1905 AND 1906, BY ARTICLES.

[Compiled from reports of Chief of Engineers, U. S. Army.]

Articles.	1905.	1906.	Articles.	1905.	1906.
	Tons.	*Tons.*		*Tons.*	*Tons.*
Grain and its products	12,362	8,932	Groceries and provisions	10,044	9,087
Cotton	26,724	25,392	Stone, sand, and gravel		462,158
Cotton seed and its products	18,786	15,838	Miscellaneous and unclassified	64,843	67,956
Coal and coke	132,419	199,945	Total	484,045	885,201
Lumber	18,067	10,708			
Logs	200,800	85,185	Passengers .....number	73,744	92,473

The following table shows freight shipments and receipts by river and harbor traffic at Memphis in 1906:

TABLE 241.—SHIPMENTS, RECEIPTS, AND HARBOR TRAFFIC IN THE RIVER COMMERCE AT MEMPHIS, 1906, BY ARTICLES.

[Compiled from the United States Census Report on Transportation by Water, pp. 184-185.]

Articles.	Shipments.	Receipts.	Total.
	Net tons.	*Net tons.*	*Net tons.*
Sand, stone, etc	330,113		330,113
Coal		103,706	103,706
Other merchandise	65,381	163,108	228,489
Total	395,494	266,814	662,308
Harbor traffic[a]			195,000
Grand total			857,308

[a] Exclusive of freight ferried in railway cars.

ST. FRANCIS RIVER.—The St. Francis River and its tributary, the L'Anguille River, have been improved by the Government to some extent by the removal of snags and overhanging timber. The head of navigation on the St. Francis River during high stages is near Wappapello, Mo., about 100 miles above Kennett, Mo. Below Kennett for a distance of 80 miles there is a vast swamp, known as the Sunken Lands of the St. Francis, through which the river flows in several channels, none of which is well defined. The practical head of navigation of the river in Arkansas is Lesters Landing. Boats pass above to Kennett only at high stages, and then with great difficulty.

During the year ended May 31, 1907, the St. Francis below Madison was at a comparatively good boating stage, but above Madison the river was too shoal for profitable navigation during the summer. Commerce in the Sunken Lands above the town of Marked Tree is handled mainly by small gasoline boats. This commerce, which is estimated at about 12,000 tons, is included in Table 242.

WHITE RIVER AND TRIBUTARIES.—The White River and its tributaries, the Black, Current, and Cache rivers, are of some commercial importance, and improvements of these streams are maintained by the Government. From the mouth of the White River to Jacksonport, a distance of 264 miles, the river is considered navigable at any season for boats not exceeding 3 feet in draft. Between Jacksonport and Batesville a lock has been constructed. Forsyth, Mo., 505 miles above the mouth of the river, is the head of steamboat navigation. Practically one-third of the commerce of the river is made up of saw logs and railroad ties floated downstream.

The lower White River is navigated by steam and gasoline boats. The latter boats exchange considerable freight with the packet lines on the Mississippi at the mouth of the White.

On the upper White River there is some traffic in logs, wheel and cooperage stock, railroad ties, and miscellaneous freight. A barge line is contemplated from Batesville to points above.

The following table gives incomplete statistics of commerce on the St. Francis River, on the White River in Arkansas, and on the Black and Current rivers, tributaries of the latter, for the year ended May 31, 1907. In addition, 13,050 tons of freight were handled on the Cache River during the same year.

TABLE 242.—COMMERCE ON THE ST. FRANCIS RIVER AND THE WHITE RIVER IN ARKANSAS, AND TRIBUTARIES, YEAR ENDED MAY 31, 1907, BY ARTICLES.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907.]

Articles.	St. Francis River.	White River.	Black River.	Current River.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Saw logs and piling	137,126	81,894	46,828	14,436
Railway ties	.....	10,952	5,701	7,940
Lumber	6,447	13,685	27,685	.....
Staves and bolts	1,082	4,000	25,691	25,610
Cotton	912	1,309	624	400
Cotton seed	1,184	130	330	100
Miscellaneous	4,264	15,842	1,055	.....
Total	151,015	127,812	107,914	48,486

Shipments and receipts on the White River, excluding logs and rafts, were as follows:

TABLE 243.—SHIPMENTS AND RECEIPTS ON THE WHITE RIVER, 1906, BY ARTICLES.

[Compiled from the United States Census Report on Transportation by Water, pp. 182–183.]

	Lumber.	Cotton.	Miscellaneous.	Total.
	Net tons.	*Net tons.*	*Net tons.*	*Net tons.*
Shipments	13,250	282	30,401	43,933
Receipts	13,250	282	11,901	25,433

ARKANSAS RIVER.—The Arkansas River has been improved by the Government by the removal of sand bars, shoals, and snags. Fort Gibson, on Grand River, 2 miles above the point where the latter enters the Arkansas and 463 miles above the mouth of the Arkansas, is the head of steamboat navigation, although Congress has provided for an examination of the river to Muskogee, Okla., with a view to improvement to that point. Saw logs constitute over 50 per cent of the commerce, although there is considerable traffic in cooperage stock and plantation supplies and products, including cotton and cotton seed.

Mention has already been made of the traffic between Memphis and Little Rock and points on the Arkansas River. Besides these boats, others operate as local packets. There are also local towboats on the river, including some gasoline boats, as well as some steam towboats operating to Cairo, Ill. The statistics of the river commerce for the year ended May 31, 1907, are as follows:

TABLE 244.—COMMERCE ON THE ARKANSAS RIVER, YEAR ENDED MAY 31, 1907, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army, 1907, p. 1520.]

Articles.	Tons.	Articles.	Tons.
Saw logs	56,223	Provisions	2,987
Lumber	15,659	Staves and bolts	4,838
Cotton	7,613	Shingles	1,743
Cotton seed	4,280	Miscellaneous freights	7,444
Grain	3,102		
Live stock	704	Total	104,593

Shipments and receipts on the Arkansas River in 1906, excluding logs and rafts, were as follows:

TABLE 245.—SHIPMENTS AND RECEIPTS ON THE ARKANSAS RIVER, 1906, BY ARTICLES

[Compiled from the United States Census Report on Transportation by Water, pp. 180, 183.]

	Lumber.	Cotton.	Grain.	Miscellaneous.	Total.
	Net tons.	*Net tons.*	*Net tons.*	*Net tons.*	*Net tons.*
Shipments	3,130	4,489	1,777	15,598	24,994
Receipts	[a]2,104	1,399	9,849	22,519	35,871

[a] Estimated from figures in thousand feet.

GREENVILLE, MISS.—At Greenville, Miss., a few miles below the mouth of the Arkansas River, is a coal tipple erected about 1895 by the Southern Railway for the purpose of handling coal brought to Greenville by rail from mines in Walker and Jefferson counties, Ala. From this tipple the coal was loaded on river craft for transportation to New Orleans and lower river territory. The tipple is built on a wooden trestle and has a capacity of about 1,000 to 1,100 tons of coal

a day. Prior to 1895 there was an antiquated tipple of little importance at Greenville. For some years after 1895 shipments were made to New Orleans, to plantations, sugar and rice mills on the lower Mississippi, Red River, and other waterways through southern Louisiana. After oil had been discovered in Texas its proximity to the market for this Greenville coal and its cheapness for fuel caused it to make serious inroads into the coal trade in that part of Louisiana south and west of Greenville, and the tipple at Greenville ceased operations, except for occasional lots loaded on steamboats for fuel. For two or three years the tipple remained idle, until August, 1907, when shipments to New Orleans were resumed. Some coal from the Pittsburg district is brought by river to Greenville, but there is no regular trade in it except for local use and for steamboat fuel. Very little of this river coal goes out by rail from Greenville, and then only for some special purpose, such as blacksmithing, etc.

The Census Report on Transportation by Water in 1906 shows river shipments at Greenville of 16,189 tons and receipts of 73,330 tons (including 19,101 tons of coal), a total of 89,519 tons.

The movement of traffic on the Mississippi River between Memphis and Vicksburg for the years 1901 to 1906 is shown in the following table:

TABLE 246.—COMMERCE ON MISSISSIPPI RIVER BETWEEN MEMPHIS AND VICKSBURG, 1901–1906, BY ARTICLES.

[Compiled from the reports of Chief of Engineers, U. S. Army.]

Articles.	1901.	1902.	1903.	1904.	1905.	1906.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Coal and coke [a]	1,281,393	1,248,046	1,281,311	1,077,693	1,097,758	842,513
Grain and its products	143,791	119,197	114,974	16,017	47,960	33,000
Cotton	49,553	55,075	31,695	87,581	66,556	64,906
Cotton seed and its products	39,855	37,175	145,988	52,757	64,699	60,525
Live stock	5,200	14,719	4,830	3,966	4,091	3,236
Lumber	55,747	124,763	80,026	76,357	128,697	462,486
Logs	129,286	175,409	236,521	630,226	334,499	288,250
Iron, steel, and metals	32,851	51,052	44,369	16,246	16,409	35,898
Groceries and provisions	74,221	47,289	31,191	28,739	30,471	32,507
Railroad ties	.....	.....	3,131	.....	.....	.....
Gravel, sand, and stone	.....	.....	10,000	19,000	19,336	491,458
Miscellaneous	44,442	67,301	34,186	32,016	45,354	41,122
Total	1,856,339	1,940,026	2,018,222	2,040,598	1,855,830	2,355,901

[a] Through movement duplicated in traffic in other sections.

Section 15. Vicksburg to New Orleans.

On the Mississippi River between Vicksburg and New Orleans the local traffic is larger than on the preceding sections below St. Louis. Logs and lumber are less important, but there is a larger movement of miscellaneous merchandise, as well as of sand and gravel. The commerce of this section of the Mississippi is fed by a number of

tributaries. The Yazoo, with its tributaries, drains the Yazoo Delta famous for its cotton, and enters the Mississippi at Vicksburg. Other tributary streams are the Ouachita and Red rivers, while the Atchafalaya and connecting waterways and other bayous furnish an outlet to the waters of the Gulf. Besides Vicksburg, river ports of some importance in this section are Natchez and Baton Rouge.

YAZOO RIVER AND TRIBUTARIES.—Through the Yazoo River the waters of the Sunflower, Tallahatchie, and Coldwater and other smaller rivers find their outlet into the Mississippi. On the Yazoo a small steamboat operates to Belzona, Miss., 175 miles up river, and one on the Sunflower operates to Woodburn, Miss., when the stage of water permits. On the Tallahatchie and Coldwater rivers steamboats operate from Greenwood as far as Duncan and Lone Star. Some small steam towboats and gasoline launches also run on these rivers.

The commercial statistics of this group of rivers for the fiscal year ended June 30, 1907, is shown in the following table:

TABLE 247.—COMMERCE ON THE YAZOO, TALLAHATCHIE, COLDWATER, AND BIG SUNFLOWER RIVERS, YEAR ENDED JUNE 30, 1907, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army, 1907, pp. 1513-1514.]

Articles.	Yazoo River.	Tallahatchie and Coldwater rivers.	Big Sunflower River.	Articles.	Yazoo River.	Tallahatchie and Coldwater rivers.	Big Sunflower River.
	Tons.	*Tons.*	*Tons.*		*Tons.*	*Tons.*	*Tons.*
Cotton	3,793	558	4,060	Provisions	9,523	1,125	2,900
Cotton seed	6,208	6,307	4,755	Grain	7,975	400	2,658
Live stock	617	50	198	Miscellaneous	114,996	428	2,864
Lumber	2,700	4,525	4,365				
Staves	12,189	625	3,073	Total	227,611	29,358	145,160
Saw logs	69,610	15,340	120,287				

Shipments and receipts on the Yazoo River in 1906, excluding logs and rafts, were as follows:

TABLE 248.—SHIPMENTS AND RECEIPTS ON THE YAZOO RIVER, 1906, BY ARTICLES.

[Compiled from United States Census Report on Transportation by Water, pp. 180, 183.]

Articles.	Shipments.	Receipts.	Articles.	Shipments.	Receipts.
	Net tons.	*Net tons.*		*Net tons.*	*Net tons.*
Cotton	22,454	10,761	Canned goods	.....	3,257
Lumber	3,452	[a]3,354	Miscellaneous	78,908	25,554
Grain	2,315	9,952			
Cement, brick, and lime	1,228	2,307	Total	108,357	62,325
Flour	.....	7,140			

[a] Estimated from figures in thousand feet.

VICKSBURG, MISS.—Vicksburg is a center of considerable river trade. Packet lines operate on the Mississippi from Vicksburg to

Natchez and New Orleans and intermediate points; to the "Bends" for some 30 miles above and below Vicksburg; and to Arkansas City, Memphis, and way landings. As noted above, small steamers operate from Vicksburg on the Yazoo and Sunflower rivers.

Much cotton formerly came to Vicksburg out of these rivers. A line of 7 or 8 boats ran in this trade, 3 or 4 boats leaving Vicksburg each week, some of the boats carrying as much as 4,000 bales of "big" or uncompressed cotton, while most of them had a capacity of 1,000 to 2,000 bales in times of good water. Two or three of the boats were built for the through trade to New Orleans, but this service was discontinued, as it was more profitable to reload the cotton in boats at Vicksburg. The boats were sold to a new company about 1888. The latter operated for about ten years, finally succumbing to rail competition.

The opening of the Louisville, New Orleans and Texas Railroad, now known as the Yazoo and Mississippi Valley Railroad, and at present controlled by the Illinois Central, marked the beginning of the end of through steamboat traffic on the lower Mississippi. The railroad parallels the river from Memphis to New Orleans, and the rates by rail soon reached a point where the operation of boats began to be unprofitable. The decline in river traffic has been going on for nearly a generation, until at present only a few local lines remain in operation.

With the spread of cotton compresses through the South, the conditions under which cotton is transported have altogether changed. Formerly the only compresses were located at important centers, as at Memphis, Vicksburg, and New Orleans. Nowadays, however, towns of comparative insignificance otherwise have their own compresses. Practically all of these compresses have excellent facilities for receiving and shipping the bales by rail. The track of the railroad is at the door of the compress, and on cotton that has been brought to the compress by rail a refund is allowed if the cotton is sent from the compress by rail. This has overturned the old system of handling cotton by river. Some planters still send cotton to the commission merchant or factor, and the latter sells it to the buyer, who has it compressed. The buyer, however, now more generally buys cotton at the plantation or of the country merchants, and ships it directly from the compress on a through bill of lading to mills in New England, to Liverpool, Havre, or elsewhere. Export cotton is generally routed via New Orleans, and the cotton for New England may go by one of several routes, a considerable part being handled by rail. Much of this latter cotton formerly went by river to Cairo or to Cincinnati, whence it was forwarded by rail to New England.

Considerable coal is received at Vicksburg by river from Pittsburg, most of this being used locally. There is no regular rail trade in

this coal from Vicksburg, although a small amount of coal is unloaded at Delta, La., opposite Vicksburg, principally for use by the Vicksburg, Shreveport and Pacific Railroad, and a little goes to Tallaluh, La., a few miles back from Delta. In 1906 a few carloads of Pittsburg coal were sent to Port Gibson, Miss., from Vicksburg by rail, and some 4,000 tons were sent to Yazoo City up the Yazoo River in the barges in which the coal had been brought down from the Monongahela River, for use at cotton-oil mills and ice factories. The gas-making qualities of the Pittsburg coal creates a demand for its use in blacksmithing. Coal for this purpose is sacked and sent by rail or by packet steamers within a radius of about 20 or 25 miles around Vicksburg. Besides the above, there is also a trade in the river coal in supplying steamboats with fuel and for local steam and domestic use. At Vicksburg the river coal encounters competition from coal from mines on the tracks of the Illinois Central Railroad in southern Illinois and western Kentucky, and also from coal mined in Walker and Jefferson counties, Ala.

The following table shows the river commerce at Vicksburg in 1905 and 1906:

TABLE 249.—RIVER COMMERCE AT VICKSBURG, 1905 AND 1906, BY ARTICLES.[a]

[Compiled from the reports of Chief of Engineers, U. S. Army.]

Articles.	1905.	1906.	Articles.	1905.	1906.
	Tons.	*Tons.*		*Tons.*	*Tons.*
Grain and its products	35,889	35,133	Stone, sand, and gravel	3,000	17,000
Cotton	42,158	45,302	Miscellaneous and unclassified	16,375	16,713
Cotton seed and its products	47,665	49,128	Total	299,669	319,176
Coal and coke	53,803	75,807			
Lumber	14,414	14,320	Passengers.....number..	60,583	61,875
Logs	72,500	52,500			
Groceries and provisions	13,865	13,273			

[a] Not including the traffic on the Yazoo River and its tributaries.

The Census Report on Transportation by Water in 1906 shows river shipments from Vicksburg of 232,061 tons and river receipts of 143,393 tons, a total of 375,454 tons.

NATCHEZ, MISS.—At Natchez some river coal from Pittsburg is delivered, chiefly for local consumption. The packets plying between New Orleans and Vicksburg call at Natchez, and, besides these, other boats do a general passenger and package-freight business between Natchez and Vicksburg, and Natchez and Melville and Harrisonburg, La., reaching points on the Black, Ouachita, Red, Little, and Tensas rivers. Points on these rivers are also reached by packets from New Orleans. These boats handle grain, cotton, cotton seed, live stock, lumber, groceries and provisions, and miscellaneous merchandise. Logs are also towed to Natchez for sawing.

The Census Report on Transportation by Water in 1906 shows river shipments from Natchez of 14,531 tons and river receipts of 42,435 tons, including 36,085 tons of coal. Shipments and receipts aggregate 56,966 tons.

RED RIVER.—The commerce of the Red River consists of shipments of cotton, cotton seed and its products, lumber, staves, timber, etc., with return freights of general merchandise and plantation supplies. The commerce and navigation reported for seventeen years show great variations, ranging from 66,376 tons to 279,946 tons per annum, due to the changing crop conditions, occasional periods of extraordinarily low water during the busy season, and other causes. At present steamers seldom run above Fulton, Ark., but at high stages the river is navigable in fact to Denison, Tex. Alexandria and Shreveport, La., are important points on the Red River.

OUACHITA AND BLACK RIVERS.—The Ouachita River enters the Red River through the Black River. At moderately high stages of water New Orleans steamboats ascend the Ouachita to Camden, Ark.; at medium stages, to Monroe, La.; but during the periods of low water they go only to Harrisonburg, La., 72 miles above Red River, which is considered the head of navigation, though small local packets make trips between points on the river above. At high stages the river is navigable in fact to Arkadelphia, Ark.

The commerce of Ouachita River and its tributaries is considerable, and consists of shipments of saw logs, lumber and staves, cotton, cotton seed, and miscellaneous articles, with return freights of general merchandise and plantation supplies. Most of the cotton is shipped to New Orleans, and considerable quantities of staves for export are sent to that city.

Commercial statistics for the Red, Ouachita, and Black rivers are shown in the following tables:

TABLE 250.—COMMERCE ON THE RED, OUACHITA, AND BLACK RIVERS, YEAR ENDED JUNE 30, 1907, BY ARTICLES.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907, pp. 1497 and 1501.]

Articles.	Red River.	Ouachita and Black rivers.	Articles.	Red River.	Ouachita and Black rivers.
	Tons.	*Tons.*		*Tons.*	*Tons.*
Saw logs	60,000	70,144	Grain	177	4,473
Lumber and staves	12,483	18,538	Miscellaneous	29,097	41,383
Cotton	3,013	19,021			
Cotton seed	5,131	5,253	Total	112,273	171,952
Provisions	1,772	13,140			

TABLE 251.—SHIPMENTS AND RECEIPTS ON THE RED, OUACHITA, AND BLACK RIVERS, 1906, BY ARTICLES.[a]

[Compiled from United States Census Report on Transportation by Water, pp. 180, 183.]

Articles.	Red River.		Ouachita and Black rivers.	
	Shipments.	Receipts.	Shipments.	Receipts.
	Net tons.	*Net tons.*	*Net tons.*	*Net tons.*
Cotton	6,480	480	7,933	1,750
Grain	365	625	1,357	2,650
Lumber	432	458	3,638	736
Sand, stone, etc	.....	.....	3,016	3,000
Fertilizer, etc	.....	125	.....	1,525
Flour	.....	416	.....	1,760
Miscellaneous	7,140	6,377	9,192	7,577
Total	14,417	8,481	25,136	18,998

[a] Excluding logs and rafts.

BATON ROUGE, LA.—Coal is shipped by river from Pittsburg to Baton Rouge, where the market is largely a local one. The river coal held at Baton Rouge is kept in boats at a coal harbor some 8 miles above the city, so that when orders are filled at various river points the craft may be towed with the current of the river and not against it. This is true also at other points on the Mississippi where coal is held for delivery by river. River deliveries are made from Baton Rouge as far as Simmesport and Melville, La. Occasional cargoes of river coal are shipped from Baton Rouge by river in the craft in which the coal has been brought down the Ohio and Mississippi, to sugar and rice mills, from Melville to Donaldsonville, and to levee contractors on the Red River for distances of 25 to 50 miles from the mouth of the Black River. Some of the river coal is shipped by rail from Baton Rouge, though there can hardly be said to be a rail trade of any regularity, occasional carloads being sent to Alexandria, La., and Port Gibson, Miss. At Alexandria the coal used is largely from the mines at Russellville, Ark. In Mississippi the river coal from Baton Rouge meets the competition of river coal coming from mines in Illinois and western Kentucky. The latter coal is sold in carload lots in Mississippi territory and at Baton Rouge.

In addition to the coal trade, there is also a movement of package freight, principally to and from New Orleans in the packet steamboats operating on this section of the river.

The Census Report on Transportation by Water in 1906 shows river receipts at Baton Rouge of 10,612 tons (mostly coal), and river shipments of 4,896 tons, a total of 15,508 tons. In addition a harbor traffic of 42,400 tons is reported, probably in large part the movement of coal described above, making the total river commerce at Baton Rouge 57,908 tons.

The traffic movement on the Mississippi River between Vicksburg and New Orleans for the period 1901 to 1906 is shown in the following table:

TABLE 252.—COMMERCE ON MISSISSIPPI RIVER BETWEEN VICKSBURG AND NEW ORLEANS, 1901–1906, BY ARTICLES.

[Compiled from reports of Mississippi River Commission (Annual Reports of Chief of Engineers, U. S. Army).]

Articles.	1901.	1902.	1903.	1904.	1905.	1906.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Coal and coke[a]	1,225,970	1,220,057	1,263,372	1,020,500	1,080,075	832,410
Gravel, sand, and stone	.....	.....	27,983	377,415	526,852	858,572
Grain and its products	112,314	102,544	125,236	23,878	26,881	24,298
Cotton	71,925	64,774	39,519	46,997	25,349	53,269
Cotton seed and its products	60,936	80,973	53,909	63,901	39,454	25,224
Lumber	37,359	49,350	80,500	25,358	33,203	67,720
Logs	.....	52,433	212,375	133,638	233,388	184,591
Iron, steel, and metals	31,272	51,714	52,891	116,371	24,062	29,928
Groceries and provisions	154,887	193,099	157,540	118,458	86,833	77,839
Live stock	2,954	4,814	7,337	4,858	3,945	3,358
Miscellaneous[b]	137,557	339,500	187,030	186,466	382,932	397,127
Total	1,835,174	2,159,258	2,207,692	2,117,840	2,462,974	2,554,336

[a] The statistics of the coal movement on this stretch of river over which all the river coal from the upper Ohio passes en route to New Orleans, as shown in this table, are less than the figures for the receipts at New Orleans, shown below. Saward in his Coal Trade (1908) estimates these receipts at 1,250,000 tons annually.

[b] The figures for miscellaneous include commerce in oil as follows: 1903, 122,061 tons; 1904, 111,624 tons; 1905, 259,296 tons, and 1906, 303,159 tons.

Section 16. New Orleans as a river port.

At Donaldsonville, about 75 miles above New Orleans, begins what may be termed the territory of the New Orleans local river traffic, which extends to the mouths of the Mississippi. In this part of the river the local movement of cotton, cotton seed, sugar, molasses, and rice to the New Orleans market is of importance, as is also the movement of river coal from the Ohio River, which is kept in harbor at Donaldsonville and distributed by agencies at New Orleans.

On the river above New Orleans the Yazoo and Mississippi Valley Railroad parallels the east bank as far as Bayou Sara. The tracks of the Louisiana Railway and Navigation Company connect New Orleans and Baton Rouge, crossing the Mississippi at Angola and paralleling the Red River as far as Shreveport. The Texas and Pacific runs from New Orleans to Shreveport and competes for traffic at river points on the Mississippi as far as the mouth of the Red River.

The receipts of bituminous coal at New Orleans by river from Pittsburg, including some small shipments from the Kanawha River and coal fields in western Kentucky, are estimated at about 1,200,000 tons annually. Other coal brought to New Orleans comes by rail

from the mines of Alabama, western Kentucky, and southern Illinois. Since August, 1907, a comparatively small amount has been shipped by river from the tipple at Greenville, Miss., to which point it is brought for shipment by rail from mines near Corona, Ala. The rail coal from Alabama, Kentucky, and Illinois finds its market in the local steam coal trade of New Orleans and in the adjoining territory east of the Mississippi River. The river coal is consumed in the gas, domestic, and steam coal trade of New Orleans; in the bunker trade for fueling coastwise and foreign ocean steamships; in fueling the locomotives of the Southern Pacific and Texas and Pacific railways; and at sugar and rice mills of southern Louisiana along the Mississippi and through the Teche country of southern Louisiana west of the Mississippi. Practically none of the river coal is used east of the Mississippi except for local consumption at New Orleans and at points along the east bank of the Mississippi. None of this coal is sent by water to domestic ports on the Gulf beyond New Orleans, the cost of reloading the coal into craft suitable for Gulf navigation making such shipments impracticable.

Of the 1,200,000 tons of river coal estimated to be received at New Orleans annually, about 500,000 tons is used in the bunker trade of ocean steamships. Included in this amount are some shipments for consumption at Central American ports, part being used by the Nicaragua Railroad. Some coal for local consumption is also shipped by steamship to Mexican ports.

Approximately 400,000 tons of the river coal is unloaded from the river craft at coal elevators on the west bank of the Mississippi, opposite New Orleans, for fueling the locomotives of the Southern Pacific and Texas and Pacific railways and for commercial use at points on those lines. Some coal is also delivered at plantation landings and sugar and rice mills through the Teche country in the boat in which it has come from the upper river. This latter trade was an extensive one before the discovery of Texas petroleum. A coal harbor was maintained, as it still is, at Donaldsonville. The coal towed from Donaldsonville entered the Red River and passed through the Atchafalaya River and Grand Lake to its destination. At present, however, not more than 25,000 to 30,000 tons annually take this route, while 40,000 to 50,000 tons goes out through this section by rail to plantations on the lines of the Southern Pacific and Texas and Pacific railways. Some Alabama coal, shipped by river from Greenville, Miss., and some river coal from mines near Sturgis, Ky., are also used in filling the railroad fuel contracts. River coal sold at New Orleans for river steamboat fuel amounts to about 50,000 tons annually. After deducting the amount of coal used in the bunker trade and foreign shipments, that used for railroad and steamboat fuel, and that sent by rail and boat to plantations and

mills in the Teche country, the remainder (about 180,000 tons) will represent the local consumption of river coal at New Orleans and the amount delivered at Mississippi River landings in New Orleans territory below Donaldsonville.

The following table shows the receipts of cotton at New Orleans by various routes, both rail and river, for the four years ended August 31, 1904 to 1907:

TABLE 253.—COTTON RECEIVED AT NEW ORLEANS, YEARS ENDED AUGUST 31, 1904–1907, BY ROUTES.

[Compiled from reports of New Orleans Cotton Exchange.]

From—	1904.	1905.	1906.	1907.
	Bales.	*Bales.*	*Bales.*	*Bales.*
Mississippi River, etc	133,908	202,302	99,749	[a] 169,484
Red River	11,584	11,861	6,040	27,582
Ouachita River	47,350	60,188	28,392	53,275
Yazoo and Mississippi Valley and Illinois Central R. Rs.	880,797	1,197,400	753,584	938,544
Southern Pacific R. R. (M. L. & T. R. R. and S. S. Co.)	202,873	235,851	134,391	190,412
Texas and Pacific Ry	505,777	664,475	374,113	575,682
Northeastern Ry	223,776	199,634	147,190	187,546
Louisiana Railway and Navigation Co	.....	.....	.....	55,579
Louisville and Nashville R. R	20,532	50,972	20,447	15,024
New Orleans Great Northern Ry	.....	.....	100	5,206
New Orleans Belt and Terminal Co	.....	102,187	110,261	95,100
Total	2,026,597	2,724,870	1,674,267	2,313,434

[a] Includes so-called "city crop" of New Orleans, of 18,960 bales, made up of samples taken from bales by cotton buyers and others, and from oil mills. These figures not included in other years.

From these figures it appears that in the year ended August 31, 1907, 231,381 bales of cotton were received by river, about 10 per cent of the total receipts. Much of the cotton received at New Orleans is destined for through shipment. Regarding the cotton movement, it is said:

> The bulk of the movement [in 1906–7] was through cotton in which our [New Orleans] merchants, of course, had a large interest. Special rates accorded by the transportation lines operated in favor of the through cotton movement and against the export of local cotton. The tendency is nevertheless unmistakably in the direction of direct shipments from the interior.[a]

The receipts of rough rice in sacks at New Orleans during the seasons ended in 1905 and 1906, by rail, steamboats, schooners, and wagons are shown in the table following.

[a] New Orleans Picayune, Sept. 1, 1907.

TABLE 254.—ROUGH RICE RECEIVED AT NEW ORLEANS, SEASONS ENDED IN 1905 AND 1906, BY ROUTES.

[Report of New Orleans Board of Trade, 1906, p. 51.]

Route.	1904–5.	1905–6.	Route.	1904–5.	1905–6.
	Sacks.	*Sacks.*		*Sacks.*	*Sacks.*
Southern Pacific R. R.	945,599	624,163	Louisiana Southern R. R.	2,166	5,028
Illinois Central and Yazoo and Mississippi Valley R. Rs.	53,954	26,572	Steamboats	277,174	199,680
Texas and Pacific R. R.	74,143	14,254	Schooners	402	117
Grand Isle and Fort Jackson R. R.	9,681	9,458	Wagons	1,249	.....
			Total	1,364,368	879,272

There is some traffic on the Mississippi in the delivery of petroleum between Plaquemine, La., and New Orleans, and between Plaquemine and Memphis, Tenn. This oil is delivered at Plaquemine by pipe line from the oil district at Jennings, La., where it is taken on barges and towed to destination. The trade to Memphis is for gas-making purposes. Many plantations on the Mississippi between Baton Rouge and New Orleans use oil as fuel. At one point oil is pumped from the river to a plantation tank through a pipe 1½ miles in length. For this trade the oil is loaded at both ends of the route. For the down trip cargoes are loaded from the pipe line at Plaquemine, and for the return trip at Amesville, La., opposite upper New Orleans, where there are several tanks filled with oil that has been brought from Port Arthur, Tex., by tank vessels. Petroleum is also supplied by barges at plantations on Bayou Lafourche, but this oil has to be pumped across the dam at the head of Bayou Lafourche from the Mississippi River barge to the barge from which deliveries are to be made on the bayou.

Staves are towed to New Orleans from the Ouachita, Yazoo, and other rivers. No detailed statistics of the river traffic in logs, timber, etc., at New Orleans are available. Cotton, cotton seed, cotton-seed products, sugar, molasses, and rice are received by river at New Orleans and chiefly handled by packet boats. The traffic in these commodities are referred to below in connection with the packet lines.

Packet lines at New Orleans run to Vicksburg and the "Bends" above Vicksburg as far as Harwood, Ark., to Bayou Sara, Donaldsonville, Plaquemine, the Ouachita, Red, Boeuf, and Atchafalaya rivers, and the Mississippi River below New Orleans, and all of these lines make landings at intermediate points. The freight carried by these lines consists chiefly of cotton, cotton seed and its products, sugar, rice, molasses, and general merchandise. No full statistics of the operation of these lines are available, but partial statistics of the receipts at New Orleans during the period from November 23, 1904, to April 30, 1905, inclusive, show the most important of these items to have been 13,669 sacks, 87,473 barrels, and 250 hogsheads of sugar, 50,284

barrels of molasses and sirup, 11,778 sacks of rice, 115,450 bales of cotton and linters, and 119,477 sacks of cotton seed. No record is kept of the shipments by river from New Orleans, of the receipts of miscellaneous merchandise from the river above New Orleans, nor of any freight between New Orleans and points on the Mississippi below that city.

MISSISSIPPI RIVER BELOW NEW ORLEANS.—Several small packets operate from New Orleans to points on the "lower coast," as the territory on the Mississippi below New Orleans is known. These boats handle rice, sugar, molasses, oysters, oranges, moss, vegetables, fish, and general merchandise. The trade is competed for by gasoline boats, and the New Orleans, Fort Jackson and Grand Isle and the Shell Beach railroads.

TOTAL RIVER COMMERCE AT NEW ORLEANS.—It is difficult to state definitely the total river commerce at New Orleans. According to the reports of the United States engineers, the total waterborne traffic at the port of New Orleans for 1906, including exports and imports and the domestic (coastwise and river) business, is given as 5,702,496 tons. The total foreign traffic is given as 3,342,486 tons and the coastwise shipments and receipts as 694,108 tons. This leaves 1,665,902 tons for the river trade at New Orleans in 1906. It seems probable, however, that this is too low an estimate. As stated above, the receipts of river coal at New Orleans in 1906 are believed to be not far from 1,200,000 tons. The oil movement by water at New Orleans is reported by the United States engineers at 439,527 tons, a considerable proportion of which moved as river traffic. The movement of coal and oil alone must thus have approximated 1,600,000 tons, leaving a relatively insignificant figure for the traffic in other commodities, such as cotton, cotton seed, sugar, rice, logs and lumber, and package freight.

The Census Report on Transportation by Water in 1906 shows river shipments at New Orleans of 58,483 tons, and river receipts of 978,130 tons (including 702,906 tons of coal), a total of only 1,036,613 tons. The harbor traffic of 107,500 tons increases the total river movement to 1,144,113 tons, excluding logs and rafts and freight ferried in railway cars. But this total is also much below that indicated by the foregoing discussion of commodities. If the Census figures for miscellaneous merchandise be added to the estimates for the movement of coal and oil, a total river traffic at New Orleans of over 1,800,000 tons is indicated.

Section 17. Summary of traffic on the Mississippi River and tributaries.

In the foregoing sections the traffic on the numerous rivers of the Mississippi system has been indicated as far as the figures are available, but it is difficult to combine these so as to make an exact statement of the total traffic of this system. On the one hand, the various

tables do not cover all the existing traffic. On the other hand, the commercial statistics compiled by the United States engineers treat the commerce of each river as a distinct unit, and thus include numerous duplications, shipments at one point being reported as receipts at other points, and the traffic of one river passing to another being counted as traffic of both. Thus traffic between Nashville, Tenn., and St. Louis, Mo., would be counted on the Cumberland and again on the Mississippi River, and perhaps also on the Ohio. The United States engineers also divide the lower Mississippi into four sections, treating the commerce of each section separately, so that through traffic passing between St. Louis and New Orleans is reported four times, and that between Cairo or any point on the Ohio River and New Orleans is counted at least three times.

Bearing in mind these conditions, an estimate of the total traffic may be made. As already noted, the United States engineers report the movement of logs and timber on the Mississippi River above Minneapolis as equivalent to 1,435,000 tons in 1906, the freight movement between Minneapolis and St. Louis for the same year is reported as 3,847,319 tons, and the freight traffic on the Missouri River is reported as 573,348 tons. These items include little or no duplication and aggregate a total movement of 5,855,000 tons for the upper Mississippi system, most of this traffic being logs, rafts, and sand.

On the lower Mississippi the following table brings together the statistics of freight movement on each of the four sections for the year 1906:

TABLE 255.—COMMERCE ON LOWER MISSISSIPPI RIVER, 1906, BY ARTICLES AND SECTIONS OF RIVER.

[Report of Chief of Engineers, U. S. Army, 1907, p. 2661.]

Articles.	St. Louis to Cairo.	Cairo to Memphis.	Memphis to Vicksburg.	Vicksburg to New Orleans.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Coal and coke	170,830	1,030,000	842,513	832,410
Lumber	10,765	254,156	462,486	67,720
Logs	120,113	238,464	288,250	184,591
Stone, sand, and gravel	37,800	21,300	491,458	858,572
Grain and its products	28,858	4,551	33,000	24,298
Cotton	1,177	10,903	64,906	53,269
Cotton seed and its products	673	13,288	60,525	25,224
Live stock	11,542	.....	3,236	3,358
Iron, steel, and metals	325	58,449	35,898	29,928
Groceries and provisions	7,779	762	32,507	77,839
Miscellaneous	68,154	88,020	41,122	397,127
Total	458,016	1,719,893	2,355,901	[a] 2,554,336
Passengers.....number.	48,357	68,920	117,109	79,004

[a] Includes 303,159 tons of oil.

Taking the largest traffic for each class of commodities shown in the preceding table on any one section of the river gives a total movement on the lower Mississippi of 3,340,000 tons. This leaves out of account much of the local traffic shipped and received within each of the sections and on the various tributaries, and is therefore an underestimate. Combining this estimate for the lower Mississippi with that for the upper Mississippi gives a total movement of 9,195,000 tons for the Mississippi and Missouri rivers in 1906.

The following table summarizes the Census statistics of traffic on the Mississippi River and tributaries, exclusive of the Ohio system, and excluding harbor traffic, logs, and rafts:

TABLE 256.—SUMMARY OF SHIPMENTS AND RECEIPTS ON THE UPPER AND LOWER MISSISSIPPI SYSTEMS, 1906.[a]

[United States Census Report on Transportation by Water, pp. 179–183.]

River.	Shipments.	Receipts.
Upper Mississippi system:	*Net tons.*	*Net tons.*
Upper Mississippi	595,885	597,025
Illinois	105,826	105,002
Missouri and other tributaries	1,056,390	1,051,474
Total	1,758,101	1,753,501
Lower Mississippi system:		
Lower Mississippi	[b]2,329,350	3,487,137
White	43,933	25,433
Arkansas	24,994	35,871
Yazoo	108,357	62,325
Ouachita and Black of Louisiana	25,136	18,998
Red	14,417	8,481
Other rivers	.....	[b] 102,401
Total	2,546,187	3,740,646

[a] Excluding logs and rafted lumber.

[b] Including the Atchafalaya, Black of Arkansas, Black Bayou, Lafourche, Macon Bayou, St. Francis, and Tensas.

In the foregoing table it should be noted that the shipments on the lower Mississippi do not include the important coal movement from the Ohio; and the receipts on this system are a better indication of the traffic. Shipments on the upper Mississippi and receipts on the lower Mississippi indicate a movement in vessels of 5,498,000 tons (exclusive of harbor traffic) on the Mississippi and tributaries other than the Ohio system. Including harbor movement of 482,090 tons on the upper Mississippi system and 2,354,054 tons on the lower Mississippi system, gives a traffic of 8,334,000 tons on the upper and lower Mississippi systems, exclusive of logs and rafts. The movement of logs and rafts, according to the reports of the United States engineers, would bring the total to more than 12,000,000 tons.

For the entire Mississippi system, including the Ohio, the shipments and receipts in vessels of over 5 tons from one port to another, according to the Census, amounted, as shown below, to 19,531,093 tons, or, including harbor traffic, 24,721,384 tons. In addition, the freight ferried in railway cars is estimated at 6,905,597 tons, and the movement of logs and rafts approximated at least 6,000,000 tons.

TABLE 257.—SUMMARY OF FREIGHT SHIPMENTS AND RECEIPTS, MISSISSIPPI RIVER AND TRIBUTARIES, 1906.[a]

[Compiled from United States Census Report on Transportation by Water, pp. 179-189.]

Shipments.

Articles.	Ohio River system.	Upper Mississippi system.	Lower Mississippi system.	Total.
	Net tons.	*Net tons.*	*Net tons.*	*Net tons.*
Coal	10,968,307	27,421	37,283	11,033,011
Stone, sand, etc	1,969,732	1,274,785	759,742	4,004,259
Lumber	279,436	12,676	222,838	514,950
Grain	230,705	92,868	57,148	380,721
Petroleum and other oils	18,477	526	346,476	365,479
Cotton	40,628	.....	106,347	146,975
Tobacco	112,453	318	1,229	114,000
Iron ore	171,777	2	.....	171,779
Cement, brick, and lime	70,329	15,238	9,876	95,443
Fruits and vegetables	39,743	11,397	4,563	55,703
Ice	11,387	1,792	4,050	17,229
Miscellaneous merchandise	1,313,831	321,078	996,635	2,631,544
Total	15,226,805	1,758,101	2,546,187	19,531,093
Harbor traffic	2,354,147	482,090	2,354,054	5,190,291
Car ferries (partly estimated)	.....	.....	.....	6,905,597
Grand total	.....	.....	.....	31,626,981

Receipts.

Coal	9,798,750	27,492	1,206,769	11,033,011
Stone, sand, etc	1,925,442	1,274,654	804,163	4,004,259
Lumber[b]	325,260	14,113	175,577	514,950
Grain	229,212	68,750	82,759	380,721
Petroleum[b]	13,720	490	351,269	365,479
Cotton	40,218	50	106,707	146,975
Tobacco	112,480	548	972	114,000
Iron ore	171,777	2	.....	171,779
Cement, brick, and lime	65,970	15,803	13,670	95,443
Flour	57,617	5,726	18,557	81,900
Canned goods	46,793	6,258	10,646	63,697
Fruits and vegetables	39,748	5,674	10,281	55,703
Pig iron and steel rails	54,410	400	536	55,346
Fertilizer, etc	36,094	264	8,055	44,413
Ice	11,687	2,297	3,245	17,229
Naval stores	105	108	557	770
Miscellaneous merchandise	1,107,663	330,872	946,883	2,385,418
Total	14,036,946	1,753,501	3,740,646	19,531,093

[a] Excluding logs and rafts.

[b] Tons of lumber and petroleum estimated from Census statistics in feet and barrels.

Of the freight movement in 1906, of 19,531,093 tons, exclusive of rafts and harbor traffic, coal amounted to more than 56 per cent; stone, sand, etc., to more than 20 per cent, these minerals constituting over three-quarters of the whole traffic; but in this connection it should be remembered that no account is taken of the extensive movement of logs, ties, and timber and its products when rafted or floated. Including rafts, coal is about 40 per cent of the total. The lumber movement of 514,950 tons reported appears to be such as was moved on barges, etc., towed by boats of 5 tons or over. Agricultural products, including grain, cotton, tobacco, flour, and fruits and vegetables, made up not quite 4 per cent of the total. Miscellaneous merchandise, including package freight and canned goods, amounted to 2,631,544 tons, or about 13½ per cent. The movement of petroleum and other oils, which was confined largely to the lower Mississippi at and around New Orleans, amounted to 365,479 tons.

A most significant feature of the freight traffic on the Mississippi system is the marked predominance of barge traffic, in comparison with the freight carried on steamers. As shown in the table below, somewhat less than one-eighth of the freight is carried in steamers, the proportion of barge traffic being largest on the Ohio River system.

TABLE 258.—SUMMARY OF FREIGHT SHIPMENTS ON STEAM VESSELS AND UNRIGGED CRAFT, MISSISSIPPI RIVER AND TRIBUTARIES, 1906.

[United States Census Report on Transportation by Water, pp. 181-182.]

System.	Carried on steamers.	Towed on unrigged craft.	Total.
	Net tons.	*Net tons.*	*Net tons.*
Ohio River	1,246,437	13,980,368	15,226,805
Upper Mississippi	273,362	1,484,739	1,758,101
Lower Mississippi	835,587	1,710,600	2,546,187
Total	2,355,386	17,175,707	19,531,093

Practically all of the coal, stone and sand, petroleum, and iron ore and most of the lumber were moved in barges. Nearly half of of the miscellaneous merchandise and over a third of the grain was carried in barges. Cotton, flour, fruits and vegetables, and tobacco were mainly carried in steamers.

The Census reports show a large decrease in traffic on both the upper and lower Mississippi and for the whole Mississippi system from 1889 to 1906. The extent of this decrease, is however, somewhat exaggerated by the omission of rafted logs and lumber from the statistics of 1906, although these were partially included in 1889, and the largest decrease indicated is in the movement of lumber.

But the movement of grain, cotton, and miscellaneous merchandise has fallen to small proportions; and while coal, petroleum, and sand have increased, the total traffic on the whole system is undoubtedly a good deal less than in 1889. The most important increase has been in the coal traffic of the Monongahela; there has been an increase of miscellaneous freight on the Cumberland, the Tennessee, and the Yazoo rivers, and the total volume of traffic on the Yazoo has increased to some extent.

58953—PT 2—09——23

CHAPTER IX.

PACIFIC COAST AND RIVERS.

Section 1. General conditions.

Domestic water routes in this section may be divided into two main classes—(1) the trunk routes along the coasts of California, Oregon, and Washington, and the more extended routes to Alaska, Hawaii, and ports on the eastern coast of the United States, and (2) the local routes on rivers and bays, which are used not only for the movement of local traffic, but as feeders in a measure for the trunk lines.

In spite of the multiplication of transcontinental and local lines of railroad and the rapid growth of the Pacific Coast States—California, Oregon, and Washington—in recent years, the industries of this section are still essentially extractive and agricultural. The main sources of their prosperity are wheat and its products, barley, live stock, fruits, hops, and the products of forests and streams. The great staple crop of California has been, and still is, wheat, and it will probably remain so for many years to come, although recent years have witnessed the extension of the fruit, wine, alfalfa, and beet acreage. Another change that has taken place in the industrial activities of California has been the development of the petroleum industry.

During the past few decades several important political events have contributed much toward the development of commerce on the Pacific coast. These, briefly, include the annexation by this country of Hawaii, the war with Spain and our acquisition of the Philippines and other outlying Pacific possessions, the discovery of gold in Alaska, together with the commercial development of that region, and, finally, the increased demand on the part of oriental countries, especially since the Chino-Japanese and Russo-Japanese wars, for the products of western industries. These events, not to mention the extension of railroad facilities across the continent and the introduction of new crops and industries on the Pacific, have given rise to an enormous increase both in population and industrial activity throughout the territory under consideration and a corresponding increase in the volume of traffic moved.

One great hardship to the progress of navigation interests in this section has been the scarcity of coal, but this difficulty is now being

partially met by an increase in the oil production of southern California and its use by steamships for fuel purposes.

PACIFIC PORTS.—As seen in Table 259, the four leading ports on the Pacific are San Francisco, Cal., Portland, Oreg., and Seattle and Tacoma, Wash. Of these, San Francisco overshadows in importance its three rivals, occupying on the Pacific, with reference to water routes and commerce, a commanding position comparable to that of New York on the Atlantic. Each of the four important Pacific ports is the center of numerous water routes, which, in connection with transcontinental and local lines of railroad, assume a more or less dominant place respecting the traffic peculiar to the territory adjacent to such port. Other Pacific ports of importance are Grays Harbor and Humboldt Bay, for lumber shipments; Port Harford, in San Luis Obispo Bay, for petroleum shipments; the ports of Los Angeles, and San Diego.

TABLE 259.—SUMMARY OF VESSEL MOVEMENT AND FREIGHT TRAFFIC AT PACIFIC COAST PORTS, 1906.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907, and the Monthly Summary of Commerce and Finance.]

Port.	Number of vessels.		Vessel tonnage.		Freight tonnage.
	Entered.	Cleared.	Entered.	Cleared.	
Seattle, Wash.	869	849	1,442,405	1,388,920	.....
Tacoma, Wash.	1,715	1,676	1,836,555	1,794,322	1,120,070
Olympia, Wash.	36	36	36,336	36,336	82,024
Grays Harbor, Wash.	697	697	.....	.....	614,854
Willapa Harbor, Wash.	116	116	.....	.....	117,077
Everett, Wash.	219	219	197,428	197,428	159,103
New Whatcom, Wash.	226	226	106,119	106,119	292,592
Astoria, Oreg.:					
Domestic	1,279	1,248	1,618,447	1,516,342	.....
Foreign	91	115	258,855	333,700	.....
Portland, Oreg.:					
Domestic	503	436	529,141	389,936	639,497
Foreign	41	104	98,402	236,386	561,476
Coos Bay, Oreg.	79	79	2,4767	24,767	184,455
Coquille River, Oreg.	25	25	5,423	5,423	67,288
Humboldt Bay, Cal.	1,002	1,004	475,954	476,903	739,749
San Francisco, Cal.:					
Domestic	.....	.....	2,700,435	2,671,889	.....
Foreign	.....	.....	1,166,280	1,037,271	.....
San Luis Obispo Bay, Cal.	236	236	194,950	194,950	580,564
The Ports of Los Angeles, Cal.:					
Domestic	1,410	1,407	629,592	628,374	991,691
Foreign	7	7	12,564	12,564	15,785
San Diego, Cal.	407	411	319,440	327,203	216,761

The Census Report on Transportation by Water in 1906 shows freight shipments in American vessels from San Francisco of 1,656,614 tons, from Portland of 492,573 tons, from Seattle of 856,988 tons, and from Tacoma of 270,256 tons. San Francisco shipments were

12.5 per cent of the total shipments in American vessels on the Pacific coast, and for those four ports were a fourth of the total. Foreign trade is a larger proportion of the traffic in American vessels on the Pacific coast than on the Atlantic coast.

As shown in section 2, lumber constitutes the most important article in the Pacific trade. Stone, sand, etc., are next in volume. Petroleum and other oils are third in volume and one of the most important articles of water-borne traffic in this section. There is a considerable movement of grain and other agricultural products. Coal is of minor importance.

Section 2. Bulk freight.

In several respects certain peculiarities connected with the water-borne traffic of this territory afford interesting contrasts to similar movements on the Great Lakes and Atlantic coast. This is especially true of the movements of the products of forests, including logs and lumber, which represent in point of volume by far the most important commodities shipped by water in this territory.

LOGS AND LUMBER.—The movement of logs is an especially prominent feature of traffic on Puget Sound and its numerous tributaries and inlets, where the principal points for their initial movement are four booms located, respectively, at Shelton, Olympia, Priest Point, and Stillaguamish Boom, the latter on the east end of Puget Sound and at the mouth of the Stillaguamish River. Logs thus boomed are not infrequently transported from the various logging camps to points of shipment both by water and by rail. There is also some movement of logs floated downstream on the Columbia and Willamette rivers.

The coastwise movement of lumber embraces pine and fir from ports on Puget Sound and Grays Harbor, as well as from the Willamette and Columbia River sections, together with redwood from upper California. Such shipments are forwarded to San Francisco and points in southern California, which serve as distributing centers for a more or less extensive stretch of country. There appears to be no general movement of logs coastwise, although huge rafts sometimes find their way to San Francisco; but both Oregon and Washington being now well supplied with sawmills of their own it is claimed to be cheaper to move the finished product than the raw material.

Tables 260 and 261 show the shipments of lumber from Washington and Oregon since 1894, and shipments by districts from 1905 to 1907. The total shipments from Washington and Oregon have more than trebled since 1894. The largest shipping point is Aberdeen, in the Grays Harbor district, which sent out 230,684,679 feet in 1907; Tacoma was second, with 166,097,661 feet, and Bellingham third, with 151,308,674 feet; while the aggregate for the Puget Sound shipping points was more than half of the total shipments from Washing-

ton, and more than a third of the total shipments of pine and fir from Washington and Oregon. A comparatively small amount of lumber (67,193,208 feet in 1907), is also shipped from British Columbia.

Lumber shipments from upper California consist of redwood from Mendocino, Humboldt, and Del Norte counties. The most important shipping point is Humboldt Bay.

The great increase in lumber shipments in 1906 over 1905 was due in large part to the unusual demand from San Francisco after the earthquake and fire. The domestic shipments for 1907 show a slight decrease from 1906, as more normal conditions returned, but show a large increase over the shipments for 1905 and previous years.

TABLE 260.—CARGO SHIPMENTS OF LUMBER FROM WASHINGTON AND OREGON, 1894-1907.

[From American Lumberman, February 8, 1908, p. 36.]

Year.	Domestic.			Foreign.	Grand total.
	Washington.	Oregon.	Total.		
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
1894			321,349,288	76,961,984	398,311,272
1895			409,977,544	131,055,817	541,033,361
1896			375,026,327	145,153,109	520,179,436
1897			374,096,853	153,679,787	527,776,640
1898			379,176,352	106,893,041	486,069,393
1899			442,548,096	137,228,990	579,777,086
1900			462,678,297	159,942,663	622,620,960
1901			475,913,308	198,401,355	674,314,663
1902	498,338,964	155,218,821	653,557,785	190,208,450	843,766,235
1903	523,326,169	97,319,000	620,645,169	279,811,579	900,456,748
1904	480,889,911	147,297,071	628,186,982	215,317,731	843,504,713
1905	622,495,737	153,567,337	776,063,074	262,101,485	1,038,164,559
1906	879,249,420	274,640,782	1,153,890,202	333,878,634	1,487,768,836
1907	830,128,486	249,596,340	1,079,724,826	363,372,088	1,443,096,914

TABLE 261.—CARGO SHIPMENTS OF LUMBER ON THE PACIFIC COAST, 1905-1907, BY PORTS.

[Compiled from Pacific Lumber Trade Journal.]

Port.	1905.	1906.	1907.
Puget Sound district:	*Feet.*	*Feet.*	*Feet.*
Tacoma	77,251,527	140,524,492	166,097,661
Everett	43,278,197	97,721,862	77,334,606
Mukilteo	36,916,339		
Bellingham	102,784,655	123,846,357	151,308,674
Seattle-Ballard	[a] 3,006,955	40,566,250	38,435,781
Blaine-Anacortes		2,796,304	
Port Blakeley	106,060,041	98,523,812	
Port Gamble	67,436,234	60,829,588	
Hadlock	31,684,439	37,037,861	[b] 151,321,932
Olympia	20,148,105	28,756,337	
Port Ludlow	8,762,949	43,828,744	
Total	497,329,441	674,431,607	584,498,654

[a] Seattle only.

[b] West side Puget Sound.

TABLE 261.—CARGO SHIPMENTS OF LUMBER ON THE PACIFIC COAST, 1905–1907, BY PORTS—Continued.

Port.	1905.	1906.	1907.
	Feet.	*Feet.*	*Feet.*
Grays Harbor district:			
Aberdeen	220,988,972	229,351,367	230,684,679
Hoquiam	70,374,899	98,247,568	143,422,180
Cosmopolis-Montesano	[a] 8,130,000	14,400,580	9,073,211
Total	299,493,871	341,999,515	383,180,070
Southwestern district (South Bend, Raymond, Vancouver, Knappton)	61,148,446	84,170,014	125,170,298
Washington shipments	857,971,758	1,100,601,136	1,092,849,022
Oregon shipments	211,421,527	387,167,700	350,247,892
Upper California (Redwood)	347,679,159	409,702,576	437,514,653
Grand total	1,417,072,444	1,897,471,412	1,880,611,567

[a] Cosmopolis only.

The following table shows the shipments of lumber from the State of Washington during the five years 1902 to 1906, by water and by rail:

TABLE 262.—LUMBER SHIPMENTS FROM WASHINGTON, BY WATER AND BY RAIL, 1902–1906.

["Seattle and Western Washington—A Statement of Resources," published by the Seattle Chamber of Commerce.]

Year.	Cargo.	Rail.	Total.
	Feet.	*Feet.*	*Feet.*
1902	571,542,226	562,605,000	1,134,147,226
1903	770,057,846	640,515,000	1,410,572,846
1904	667,034,906	658,290,000	1,325,324,906
1905 [a]	857,971,758	1,095,570,000	1,953,541,758
1906	1,100,601,136	1,535,180,000	2,635,781,136

[a] Statistics for 1905 corrected from Pacific Lumber Trade Journal.

The following tables show the destination of lumber shipments from the various shipping districts, and the receipts of lumber at San Francisco Bay and southern California. From these it is evident that the great bulk of the lumber movement is coastwise. The larger part goes to San Francisco and other ports on San Francisco Bay; but there is also an important movement to southern California. The report of the Shipowners' Association of the Pacific coast for the year ended March 31, 1907, reports the largest amount of lumber received at San Francisco in a single day as 13,019,000 feet, on March 12, 1907. Most of the lumber sent to southern California is delivered at the ports of Los Angeles, but there are also receipts in considerable amount at Santa Barbara, San Diego, and other places.

TABLE 263.—DESTINATIONS OF DOMESTIC CARGO SHIPMENTS OF LUMBER FROM WASHINGTON AND OREGON, 1894–1907.

[From American Lumberman, February 8, 1908, p. 36.]

Year.	California.	Hawaii.	Alaska.	Philippine Islands.
	Feet.	*Feet.*	*Feet.*	*Feet.*
1894	309,799,933	11,549,355	.....	.....
1895	394,493,048	15,484,496	.....	.....
1896	354,226,472	20,799,855	.....	.....
1897	347,298,269	26,798,584	.....	.....
1898	346,494,388	32,681,968	.....	.....
1899	379,656,816	59,166,907	.....	3,724,373
1900	370,258,913	59,540,163	29,004,031	3,875,190
1901	403,245,540	47,231,366	8,835,140	16,601,262
1902	606,102,982	28,284,523	9,001,531	10,168,749
1903	544,264,333	22,571,671	8,577,456	45,231,709
1904	589,303,364	12,338,270	92,461,178	17,299,170
1905	740,394,931	20,726,606	2,362,447	12,579,090
1906	1,078,660,665	27,603,865	14,513,353	15,671,117
1907	1,014,500,977	24,584,482	21,957,775	10,645,375

TABLE 264.—DESTINATIONS OF REDWOOD SHIPMENTS FROM UPPER CALIFORNIA, 1905–1907.

[Monthly Summary of Commerce and Finance, December, 1907, p. 1195.]

Destination.	1905.	1906.	1907.
	M feet.	*M feet.*	*M feet.*
San Francisco Bay	232,031	287,237	304,361
Southern California	84,536	79,598	85,423
Other ports	31,112	42,867	47,731
Total	347,679	409,702	437,515

TABLE 265.—RECEIPTS OF LUMBER AT CALIFORNIA POINTS, 1905–1907.

[Monthly Summary of Commerce and Finance, December, 1907, p. 1196.]

	1905.	1906.	1907.
San Francisco Bay:	*M feet.*	*M feet.*	*M feet.*
Redwood	232,032	287,237	304,361
Pine and fir	507,178	704,518	767,052
Total	739,210	991,755	1,071,413
Southern California:			
Redwood	84,536	79,598	85,423
Pine and fir	521,991	487,604	548,330
Total	606,527	567,202	633,753
Grand total	1,345,737	1,558,957	1,705,166

Early in the year 1907 many of the lumber-carrying vessels engaged in the Pacific coast trade were laid by, owing to a shrinkage in the

demand for lumber. Prices for carrying from Puget Sound and way ports to San Francisco appear to have dropped from $10.50 to $5.50 per thousand feet during the spring. This was attributed to the diminution in demand, but was perhaps due in some measure to the breaking up of combinations following the passage of the California antitrust law, known as the "Cartwright law." As more fully pointed out in another part of this report, the coastwise movement of lumber in the Pacific coast territory is largely controlled by the Shipowners' Association of the Pacific coast.

The assistant manager of a large lumber company at San Francisco attributed the depression in charter rates for carrying lumber partly to car shortage for eastern shipment in the early part of 1907 and illustrated his remarks as follows: He thought that there was a great deal of lumber put into San Francisco and along the coast because of the car shortage, claiming that a great many mills that had been shipping lumber east were naturally forced to put their lumber into San Francisco.

An unusual feature of the lumber trade of 1907 was the shipment of a consignment of timber from Tacoma to Chicago by water to San Pedro and thence east over the Santa Fe Railway to Chicago. The shippers could not take chances with the slow movement of lumber by the northern transcontinental railroads, and although the route involved an excess journey of over 1,600 miles, both shipper and consignee found the routing advantageous in the saving of time effected.[a]

MOVEMENT OF OIL.—Next to lumber the most important movement of bulk freight on the Pacific coast is that of petroleum oil. This comes from five fields in southern California, known as Kern River, Coalinga, Olinda, Newhall, and Santa Maria, their relative importance being in the order named. According to the Report of the Bureau of Corporations on the Petroleum Industry, the total production in California in 1904 amounted to 29,649,434 barrels.

Several pipe lines have been constructed in southern California from these oil fields, but the greater proportion of long-distance transportation of crude oil in that State is still by rail or water. Transportation by water is an important movement for several reasons. Most of the oil fields are comparatively near the coast, and the crude oil is brought to the shipping ports by pipe lines[b] for shipment to the refineries at Point Richmond, on San Pablo Bay near San Francisco. Shipments are also made from the refineries to the consuming markets, many of which are seaports. Much of the oil is not refined, but is used for fuel purposes; and this brings the business into close

[a] Pacific Lumber Trade Journal, January, 1908, p. 21.

[b] See map in Report of Bureau of Corporations on the Petroleum Industry, Pt. I, p. 150.

relation with steam navigation on account of the scarcity of coal. Several of the oil companies have established a business in fuel oil in Hawaii, as well as in Washington and British Columbia, in competition with coal.

The principal oil-shipping ports are Ventura, Alcatraz, Port Harford, Monterey, and Point Richmond. Oil is shipped coastwise from these ports both in barrels and in cases, but the greater part of the movement on the Pacific coast, as elsewhere, appears to be in tank steamers or tank barges, from which oil is delivered at the seaport towns for local consumption or for reshipment to the interior. The export movement of petroleum is also chiefly in tank steamers.

The principal companies handling oil on the Pacific coast are the Standard (which has acquired the Pacific Coast Oil Company), the Associated Oil Company, and the Union Oil Company.[a]

The Census Report on Transportation by Water in 1906 shows shipments of petroleum and other oils in American vessels on the Pacific coast at 10,929,939 barrels, or 1,699,536 tons.

The following table shows the shipments and receipts at some of the more important ports:

TABLE 266.—MOVEMENT OF OIL AT CERTAIN PACIFIC COAST AND RIVER PORTS, 1906.

Port.	Shipments.	Receipts.	Port.	Shipments.	Receipts.
	Barrels.	*Barrels.*		*Barrels.*	*Barrels.*
San Diego[a]	344	90,734	Portland	[b] 9,271	[d] 748,326
San Luis Obispo (Port Harford)[a]	3,188,381	.....	Seattle[b]	50,356	.....
Ports of Los Angeles[a]	29,647	235,159	Alaska[b]	31,689	.....
San Francisco	[b] 62,120	[c] 4,060,401	Hawaii[c]	.....	[e] 973,845
Sacramento[b]	64,432	.....	Total, including other ports	[b] 10,929,939	.....
Stockton[b]	33,160	.....			

[a] Report of Chief of Engineers, U. S. Army, 1907, pp. 2133, 2138, 2139. Statistics for San Diego reduced from tons to barrels on a basis of 6.1444 barrels to the ton.

[b] United States Census Report on Transportation by Water, 1906, p. 105.

[c] Monthly Summary of Commerce and Finance, December, 1907, pp. 1090, 1197.

[d] Receipts for last six months of 1906. Compiled from Monthly Summary of Commerce and Finance.

[e] Gallons reduced to barrels at 42 gallons to the barrel.

According to the reports published by the Bureau of Statistics, the receipts of oil in 1907 at San Francisco, Portland, and Hawaii were as follows: San Francisco, 7,001,517 barrels; Portland, 2,251,297 barrels; and Hawaii, 41,240,398 gallons.

MOVEMENT OF GRAIN.—The grain trade on the Pacific is one of growing importance, and the principal ports of shipment now are Portland, Seattle, and Tacoma, which have become especially prominent with the increase of wheat acreage in Oregon and Washington, as contrasted with the stationary acreage of California, and since the

[a] Bureau of Corporations Report on the Petroleum Industry, Pt. I, pp. 7, 150, 151.

development of elevators and mills. Before the construction of railroads wheat grown in eastern Washington appears to have found its way down the Columbia to Portland; but as early as 1881 farmers began sending their wheat over the mountains to tide water by rail, and this, with the construction of elevators and flour mills, has made Seattle and Tacoma important milling centers and shipping ports.

In 1881–82 one cargo of wheat, consisting of 38,216 centals (hundredweight) and valued at $51,000, was shipped from Puget Sound. This trade had grown by 1887–88 to 11 cargoes, consisting of 717,510 centals, valued at $894,585. In 1897–98 wheat shipments amounted to 4,741,804 centals; and from 1890 to December, 1898, the total volume of the Puget Sound wheat trade is represented by 20,762,416 centals.

The growth of large milling interests in Washington and Oregon has increased the domestic demand for wheat on Puget Sound. In 1890–91 the first shipment of flour, consisting of 23,921 barrels, was shipped from this territory, and during the eight years from 1890 to December, 1898, the total shipments amounted to 2,368,612 barrels.

The visible supply of wheat from Oregon, Washington, and Idaho is held at Portland, Seattle, and Tacoma. According to a report prepared for the Industrial Commission, these are common points, having the same freight rates from all parts of the three States. The milling prices at interior mills and at tide water are governed entirely by export values at these ports, the producer securing the same price from both millers and exporters. All wheat must be sacked for delivery, the cost of burlap sacks being 3⅓ cents per bushel, which is added to the expense of distribution.

The supply of oats for the Portland market comes principally from the Willamette Valley—Eugene (123 miles from Portland), Albany (80 miles), Salem (52 miles), and Gervaise (41 miles) being good shippers. Supplies are also received from Fishers Landing, Wash., and from Dayton, Oreg., on the Yamhill River. All these points have the benefit of river competition in the regulation of freight rates.[a]

These changes, together with the development of the trade with Alaska and with the Orient, have shifted the export grain business from San Francisco to ports in the States of Oregon and Washington. The decline of San Francisco's exports of grain is seen in the fact that whereas, in 1872–73, 136 American ships and 203 foreign ships were engaged in the European grain trade at this port, in 1905–6 only 29 foreign ships and no American ships were so engaged. This decline in importance on the part of San Francisco as a grain-exporting center is shown in Table 267.

San Francisco is, however, the great receiving port for cereals on the Pacific coast, the coastwise movement of flour, wheat, barley,

[a] Industrial Commission Report, Vol. VI, pp. 94, 100–102.

and oats being largely measured by the receipts at San Francisco from Oregon and Washington by sea.

The following table shows the proportion of American to foreign ships engaged in the European grain trade from San Francisco each year from 1872 to 1906:

TABLE 267.—AMERICAN AND FOREIGN VESSELS IN THE GRAIN TRADE FROM SAN FRANCISCO, 1872-73 TO 1905-6.

[Report of San Francisco Merchants' Exchange, 1905-6, p. 26.]

Year.	American.	Foreign.	Total.	Year.	American.	Foreign.	Total.
1872-73	136	203	339	1889-90	55	229	284
1873-74	91	156	247	1890-91	52	213	265
1874-75	62	203	265	1891-92	39	234	273
1875-76	82	92	174	1892-93	29	201	230
1876-77	94	213	307	1893-94	26	163	189
1877-78	50	59	109	1894-95	13	150	163
1878-79	83	186	269	1895-96	13	195	208
1879-80	113	160	273	1896-97	24	226	250
1880-81	132	224	356	1897-98	8	207	215
1881-82	154	405	559	1898-99	12	54	66
1882-83	169	202	371	1899-1900	3	159	162
1883-84	81	210	291	1900-1901	10	149	159
1884-85	116	255	371	1901-2	8	208	216
1885-86	88	161	249	1902-3	2	135	137
1886-87	55	227	282	1903-4	1	86	87
1887-88	33	165	198	1904-5	1	51	52
1888-89	60	229	289	1905-6	.....	29	29

A peculiarity of the Pacific coast wheat movement lies in its short rail haul to the coast and ocean haul to Europe, giving it a relatively low rate of freight from producer to consumer when compared, for example, with Kansas wheat.

Contrary to the methods of handling grain in the Eastern and Central States, wheat, barley, and all small grains, and frequently flour, are handled in sacks rather than by bulk. These sacks are usually of burlap, 22 by 26 inches, and contain as a rule the following amounts in pounds: Wheat, 140; barley, 110; oats, 90; corn, 125, and beans, 80.

The grain is threshed in the field and hauled in sacks to the nearest railroad or shipping station. Thence it is transported to tide water either by river or rail.

According to the Census Report on Transportation by Water in 1906, shipments of grain in American vessels on the Pacific coast amounted to 691,779 tons, and of flour to 350,918 tons.

A partial index to the coastwise traffic in grain is supplied by the receipts at San Francisco. The following table shows the total re-

ceipts of cereals at San Francisco and the receipts from Oregon and Washington by sea for the year 1907:

TABLE 268.—RECEIPTS OF GRAIN AT SAN FRANCISCO, 1907.

[Compiled from the Monthly Summary of Commerce and Finance.]

Articles.	From Oregon and Washington.	Total receipts.	Articles.	From Oregon and Washington.	Total receipts.
	Bushels.	*Bushels.*		*Bushels.*	*Bushels.*
Flour	1,783,739	4,339,365	Corn		72,999
Wheat	812,803	2,337,948	Rye		23,108
Barley	162,172	6,904,907			
Oats	1,0 9,559	2,162,457	Total	3,848,273	15,840,784

MOVEMENT OF COAL.—There is no regular and exclusive coal-carrying fleet on the Pacific coast. While there is a considerable movement of coal by water, it is chiefly by foreign tramp vessels and by American vessels engaged also in carrying lumber and general merchandise. Australia and British Columbia furnish a large part of the coal received at San Francisco. Washington is the only State within the United States territory of the Pacific coast that produces a considerable quantity of marketable coal; Oregon produces a small amount; California produces none available for water transportation.

Rates for carrying water-borne coal are not regular. The cost per ton appears to be seldom quoted, contracts for carrying being usually made with carriers on the basis of a single voyage or per month or annually. The price of coal to the consumer depends chiefly on the cost of carrying, which is dependent in turn on the availability of vessels as well as upon labor conditions and the congestion or freedom of water traffic.

Most of the coal shipped to San Francisco Bay is transported by tramp vessels. These are usually foreign craft arriving with a cargo and going out with or without one, or coming in with coal or merchandise for San Francisco, clearing for north-coast points, and taking lumber or merchandise to any port. Owing to their small capacity very few of the lumber schooners are adapted to the carrying of coal.

The secretary of a business house at Oakland made the following statement:

> Water-borne coal arriving at Oakland and San Francisco for consumption and distribution comes chiefly from Wellington, B. C., Coos Bay, Oreg., and New Castle, Australia. * * * Vessels arriving here with coal from Australia usually clear coastwise for Eureka or Portland for lumber cargoes. At present the small demand for lumber necessitates some of them returning in ballast. * * * The only extensive competition of rail-hauled

coal in the Oakland market is coal brought from New Mexico via the Santa Fe. The American Fuel Company has erected a coal depot on the Santa Fe tracks at North Oakland within the past year.

Further information relative to the movement of coal by water in the Pacific coast territory was furnished by another business man of San Francisco, who stated:

> There is such a scarcity of coal now that we are using a good deal of Australian coal, which we buy of the local agents; we buy it laid down and have nothing to do with the transportation; we get British Columbia coal only occasionally, which is purchased from the Western Fuel Company. Our present arrangement is with the Pacific Coast Steamship Company, which has chartered to us two vessels on time charters by the day, the former coal charters having expired. When we need coal from our own mines near Seattle the Pacific Coast Steamship Company brings it down under these charters.

The Oregon Railroad and Navigation Company owns and operates one vessel employed in general freighting and the carrying of coal from its own mines at Libbey, Oreg. The product of the mines is sold to the Western Fuel Company, San Francisco, at a delivered price. A rate per ton for carrying the coal is not considered, as the steamer often earns enough in the carrying of other freight to reduce the whole cost of coal carrying. In fact, it appears that whatever the steamer earns carrying general freight and passengers reduces in like amount the cost of carrying coal.

The Western Fuel Company owns and operates coal mines at Nanaimo, B. C., and is also agent for the Wellington Collieries Company, at Ladysmith and Comax, B. C., and handles the coal output of the Oregon Coal and Navigation Company, at Coos Bay (Libbey, Oreg.).

An official of the Western Fuel Company explained to an agent of this Bureau that British Columbia coal is carried usually in foreign vessels which are chartered, and that Coos Bay coal is delivered by the Oregon Coal and Navigation Company in its own vessel. He gave the names and capacities of three foreign vessels, all Norwegian, then under charter. He continued:

> These are all the regular charters now in operation. The usual plan is to make a charter party for a term of six months, with the option of renewing for an additional six months. These ships run from British Columbia collieries to San Francisco, Oakland, and San Diego. A new ship is being built for the use of this company, especially adapted to operations on this coast. She will have a capacity of 6,500 tons of coal, having very large hatches, and be self-trimming; she will be chartered on a basis of per ton carrying capacity per month—about £1,500 per month. This ship is being built at Tonsberg, Norway, and will probably be ready in December, 1907.

On Puget Sound the shortage of coal for steamships is a subject of complaint. The Seattle Post-Intelligencer of May 28, 1907, reports that the output of the Black Diamond mine had been seriously curtailed by labor troubles there, which had also affected the general coal situation. The general coal agent of the Pacific Coast Company is quoted as follows:

> We believe, however, that we will be able to handle the situation. At the present time there is almost no coal in the bunkers, but we will supply the steamships loading here regularly * * *.
>
> The primary cause of the shortage is the increased tonnage entering Puget Sound. Formerly much of the San Francisco coal was secured from Australia. Now the duty has been raised from 14s. to 18s. and as high as 20s. This has cut down the consumption of Australian coal in California. To replace this the coal has been sent down from British Columbia. When the British Columbia coal companies can get $12 and $15 per ton for their coal in San Francisco when it is used for domestic purposes there is not much chance of them sending it over this side, where they could get $4 per ton for it to be used as steam coal. The result has been that many of the tramp steamships that formerly coaled in British Columbia ports are now forced to come here for their fuel, but we ourselves are short of steam coal, and in some cases have to refuse to sell it * * *.
>
> The matter of the duty on coal from British Columbia, which is only 67 cents, does not figure in the importation of coal. If it was possible to get the steam coal on the British Columbia side, the duty would be gladly paid. But the increased demands of the consumers in San Francisco have caused the surplus supply of British Columbia coal, and they are still taking all they can get.
>
> Unless conditions change, there is a serious shortage of fuel threatened. The shortage of labor in the mines has had much to do with the present shortage here. Even if there were new mines there is not enough labor to open them. The increased tonnage is of course directly responsible for the shortage. Companies that formerly used 6,000 tons now use 12,000 and 14,000 tons, and the others have increased at the same ratio.[a]

The Census Report on Transportation by Water in the United States in 1906 shows shipments of coal from Seattle in American vessels of 178,805 tons; from Tacoma, 29,468 tons; from San Francisco, 30,865 tons; and the total from all Pacific ports, 451,781 tons.

The following table, compiled from various sources, shows the movement of coal by sea at various Pacific coast ports.

[a] Commercial News, San Francisco, June 3, 1907, quoting Seattle Post-Intelligencer.

TABLE 269.—MOVEMENT OF COAL ON THE PACIFIC COAST, 1906 AND 1907.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907; Monthly Summary of Commerce and Finance; and Report of San Francisco Chamber of Commerce.]

Port.	Shipments.	Receipts.	Total.	Port.	Shipments.	Receipts.	Total.
1906.	*Tons.*	*Tons.*	*Tons.*	1906—Continued.	*Tons.*	*Tons.*	*Tons.*
Tacoma	143,483		143,483	Coos Bay	40,033		40,033
Seattle	461,324		461,324	Humboldt Bay		4,712	4,712
Lakes Union and Washington			10,360	Napa River			2,374
Duwamish River			6,800	San Francisco		[b] 811,947	811,947
New Whatcom	520	5,464	5,984	Oakland			[c] 180,000
Grays Harbor		[a] 4,860	4,860	San Joaquin River		170	170
Lower Columbia River			4,789	San Diego	2,483	26,700	29,183
Portland		3,378	3,378	1907.			
Through Cascades			348	Tacoma	136,215		136,215
Upper Columbia River			5,656	Seattle	564,413		564,413
				San Francisco		[b] 797,756	797,756

[a] Coal and iron.
[b] Domestic receipts by sea at San Francisco, 1906, 313,173 tons; 1907, 299,528 tons.
[c] Coal, coke, wood, and oil.

Section 3. Puget Sound ports and rivers.

SEATTLE, WASH.—Seattle occupies a unique position, being situated on the shortest route between the Eastern States of the United States and the countries of the Orient and Alaska, at the point where the transcontinental railroads from the East, the South, and the Middle West meet the ships of the world in the large and increasing traffic of the Pacific coast. This fact gives her natural advantages in the trade with the Orient.

All the transcontinental railway lines which reach the States of the Pacific Northwest have their terminals in Seattle. The Great Northern and Northern Pacific systems have just completed the construction of their extensive new terminals, and the Canadian Pacific, Union Pacific, and Burlington systems reach the port over the tracks of other roads.

The resources behind Seattle include its commercial and manufacturing interests, together with the agricultural, fishing, and mining industries of the North Pacific States and Alaska and the great lumbering industry of western Washington.

The grand total of goods shipped and received by water at Seattle during 1907 amounted to $139,090,405, which is an increase of nearly $10,000,000 over the volume of the preceding year. The exports show a loss of nearly $2,000,000 from 1906, which was $9,042,194, or 28.5 per cent, below 1905. This is attributed to the results of the Russo-Japanese war, together with the generally disturbed conditions existing in the Orient. The imports, however, have increased to a remarkable degree, the gain in two years being $17,663,294, or 156

per cent. There appears to have been a slight falling off in the domestic receipts in 1906, attributable to the California earthquake and fire, which for a time seriously disturbed the coastwise trade, but this was more than regained in 1907.

The following is a summary showing shipments and receipts for 1905, 1906, and 1907, with a more detailed comparison of the figures for 1905 and 1906:

TABLE 270.—SUMMARY OF THE VALUE OF SHIPMENTS AND RECEIPTS AT SEATTLE, 1905–1907

[Compiled from the report of harbor master at Seattle and Monthly Summary of Commerce and Finance.]

Trade.	Shipments.			Receipts.		
	1905.[a]	1906.[a]	1907.	1905.[a]	1906.[a]	1907.
Foreign[b]	$31,700,401	$22,658,207	$20,798,619	$11,206,584	$27,868,771	$28,959,878
Domestic	40,228,039	48,063,325	52,658,861	31,124,500	30,735,326	36,673,047
Total	71,928,440	70,721,532	73,457,480	42,421,084	58,604,097	65,632,925

[a] The figures for 1905 and 1906, from the detailed statements of the harbor master, do not agree exactly with the totals in the Monthly Summary of Commerce and Finance for these years.

[b] Including trade with Philippine Islands.

TABLE 271.—SHIPMENTS AND RECEIPTS AT SEATTLE, 1905 AND 1906, BY DESTINATIONS AND SOURCES OF ORIGIN.

[Compiled from the report of harbor master at Seattle.]

Shipments, by destinations.

	1905.	1906.	Increase (+) or decrease (−).
Domestic:			
Coastwise	$14,175,683	$16,614,655	+$2,438,972
Southeast Alaska	6,564,581	7,052,952	+ 488,371
Bering Sea	5,114,746	8,021,270	+ 2,906,524
Hawaii	1,147,486	1,417,998	+ 270,512
Local	13,225,543	14,712,490	+ 1,486,947
New York	.....	243,960	+ 243,960
Total	40,228,039	48,063,325	+ 7,835,286
Philippine Islands	860,287	1,007,331	+ 147,044
Foreign:			
Orient	26,183,347	15,168,574	−11,014,773
British Columbia	1,850,661	2,006,074	+ 155,413
Australia	106,569	100,871	− 5,698
Siberia	558,351	676,464	+ 118,113
England	1,358,403	2,956,577	+ 1,598,174
Mexico	28,908	4,000	− 24,908
Panama	80,768	.....	− 80,768
South Africa	99,962	5,115	− 94,847
Germany	38,123	2,500	− 35,623
South America	535,022	730,701	+ 195,679
Total	30,840,114	21,650,876	− 9,189,238
Grand total	71,928,440	70,721,532	− 1,206,908

TABLE 271.—SHIPMENTS AND RECEIPTS AT SEATTLE, 1905 AND 1906, BY DESTINATIONS AND SOURCES OF ORIGIN—Continued.

Receipts, by sources of origin.

	1905.	1906.	Increase (+) or decrease (−).
Domestic:			
Coastwise points	$16,766,448	$16,097,514	− $668,934
Alaska	6,341,347	6,015,465	− 325,882
Local ports	8,016,705	8,622,347	+ 605,642
Total	31,124,500	30,735,326	− 389,174
Philippine Islands	457,604		− 457,604
Foreign:			
Orient	4,619,592	14,387,736	+ 9,768,144
British Columbia	1,575,413	1,950,137	+ 374,724
England	264,623	642,867	+ 378,244
Germany	447,850	752,784	+ 304,934
South America	65,130	63,967	- 1,163
Sydney, Australia		259,000	+ 259,000
For interior points	3,866,372	9,812,280	+ 5,945,908
Total	10,838,980	27,868,771	+17,029,791
Grand total	42,421,084	58,604,097	+16,183,013

The business of the coastwise ports includes that of Alaska. The shipments to Alaska in 1906 amounted to $15,074,222, and the receipts from Alaska amounted to $6,015,465. The commerce of the port of Seattle for the year 1905 amounted to $114,349,524. The gain for 1906 over 1905 was $14,976,105; for 1907 over 1906 the gain was $9,764,776.

There appears to have been great activity in the development of the commerce of the Pacific during the past ten years. Prior to 1898 the only American ships engaged in the oriental trade were those of the Pacific Mail Steamship Company, running from San Francisco to Asiatic ports. The foreign commerce of Portland and Puget Sound ports was handled by foreign vessels. The first regular line of steamships was established by the Nippon Yusen Kaisha between Seattle and Japan in 1896. In the summer of 1900 the China Mutual Steam Navigation put on a line of vessels running between Seattle and Liverpool, making monthly sailings and calling at the chief Asiatic ports. The Boston Steamship Company and Boston Towboat Company entered the field in 1902, and in 1905 the Great Northern Steamship Line was established, with the steamships *Minnesota* and *Dakota*, running between Seattle, Yokohama, Shanghai, Hongkong, and Manila. These latter vessels were the largest freight carriers afloat. In 1897 the total tonnage of American steamships engaged in the foreign commerce of the Pacific Ocean was 23,426.

In 1906 it had increased to 149,685 tons. According to the report of the Seattle Chamber of Commerce for 1907, notwithstanding the large increase in tonnage, "it has been necessary for the steamship companies engaged in the foreign trade to charter 17 large steamships during the past year to carry the freight offered in excess of the capacity of the vessels of the lines which are operated upon a regular time schedule."

Timber is the greatest single resource of the Pacific Northwest at the present time. The annual output of the lumber mills of Washington is about 2,000,000,000 feet, and according to the report of the Seattle Chamber of Commerce for 1907 there are within the State upward of 900 sawmills and shingle mills and about 300 logging and bolt camps, together with a large number of planing mills and other woodworking establishments. A large part of this immense lumber business is handled through the central offices of the companies located in Seattle, and this city enjoys the benefit of an extensive trade growing out of this industry.

The following statement shows the principal articles shipped from Seattle coastwise for the calendar years 1906 and 1907, and also domestic shipments to Hawaii, New York, and local ports:

TABLE 272.—DOMESTIC SHIPMENTS FROM SEATTLE 1906 AND 1907.

[Monthly Summary of Commerce and Finance, December, 1907, p. 1199.]

Articles.	1906.	1907.	Articles.	1906.	1907.
Coastwise:			Coastwise—Continued.		
Merchandise.....tons..	159,423	203,185	Piles.....pieces..	7,290	.....
Coal.....do....	461,324	564,413	Live stock.....head..	1,179	2,092
Lumber.....M feet..	21,009	14,919	To Hawaii: Merchandise..tons..	15,444	21,858
Laths and shingles, thousands.....	14,005	36,461	To local ports: Merchandise.do...	115,996	117,812
			To New York: Salmon.....cases.	[a]60,990	.....

[a] Report of the harbor master at Seattle.

The Census Report on Transportation by Water in 1906 shows shipments in American vessels from Seattle of 856,988 tons. The principal articles were coal, 178,805 tons; flour, 108,087 tons; grain, 58,411 tons; lumber, 58,056 M feet, and miscellaneous merchandise, 322,850 tons.

The coal fields of Washington are contiguous to deep-sea harbors. Except those of the Roslyn district, they are located within 50 miles of Seattle, and the Roslyn district is less than a hundred miles distant in a direct line. Washington and British Columbia furnish most of the coal used on the Pacific coast. The output of the Washington mines, according to the report of the Seattle Chamber of Commerce, exceeds 3,000,000 tons per annum. The products of these

mines are shipped both by water and by rail. Coal shipments by water from Seattle during the past ten years have been as follows:

TABLE 273.—COAL SHIPMENTS FROM SEATTLE, IN SPECIFIED YEARS, 1897–1907.

["Seattle and Western Washington—A Statement of Resources," published by the Seattle Chamber of Commerce.]

Year.	Tons.	Year.	Tons.
1897	281,513	1905	423,613
1899	441,948	1906	461,324
1901	470,269	1907	[a] 564,413
1903	464,186		

[a] Monthly Summary of Commerce and Finance, December, 1907, p. 1199.

The fisheries of Puget Sound have in recent years assumed large proportions and are looked upon as one of the leading industries of western Washington. The output of the Puget Sound canneries runs from $5,000,000 to $8,000,000 a year, according to the run of salmon. In addition to the Puget Sound fisheries, Seattle is the headquarters and base of supplies of a large number of the leading companies engaged in the salmon-packing industry of Alaska and other places. The value of this canned salmon put up by these companies is estimated by the Seattle Chamber of Commerce approximately at $20,000,000 each year. In addition to the salmon, the fisheries take large quantities of halibut, cod, and other salt-water fish. The cod fisheries of Bering Sea are growing in importance, and their product is cured and marketed in Seattle. The product of the sealing and whaling industries also adds largely to the value of this industry.[a]

The fine grass of certain portions of Washington makes it especially important as a dairy country. This is particularly true of the eastern slope of the Cascades and the northern timber portion of eastern Washington. There are a large number of creameries and condensed-milk factories throughout the coast section, and this industry is assuming large proportions. Seattle is one of the best markets on the Pacific coast for fruits, vegetables, and dairy products, owing to the fact that it is the base of supplies for the logging camps, lumber mills, and mining interests of Washington, Alaska, and the Northwest Territory. These products promote the growth and development of water transportation.

The market for the lumber and fish products shipped from Seattle is the whole civilized world. The principal markets for her other products are the Eastern States, the Pacific slope, Alaska, Mexico, Central and South America, the countries of the Far East, and the Philippine and Hawaiian Islands.

[a] Report of Seattle Chamber of Commerce.

Flour and wheat from the Western and Middle States, cotton from the South, iron from Birmingham and Pittsburg, agricultural implements from Ohio, Indiana, and Illinois, locomotives from New Jersey, lumber from the forests of Washington, and the various products of the farms, mills, factories, and forests of the Pacific Northwest come to the port of Seattle for shipment to Australia, the Orient, Alaska, the South Sea Islands, and the countries of Europe and Africa, while tea, coffee, sugar, silk, mattings, copra, spices, wool, hides, manila, jute, and many other products of those countries are imported for distribution in the various States of this country.

TACOMA, WASH.—The port of Tacoma, the second city in size and importance on Puget Sound, is situated on the southern shore of Commencement Bay, at its head. Old Tacoma, also on the southern shore, is about 3 miles westward of Tacoma proper.

The active harbor extends from the southerly end of the city waterway at Twenty-third street in a northerly direction for a distance of about 9,000 feet to the mouth of the city waterway, thence northwesterly for a distance of about 20,000 feet to the property of the Tacoma Smelting Company. Within this area there is a space of about 4,500 feet where vessels do not operate except in passing, because the space is unimproved. The commerce of this harbor is of a large and extremely varied character, including that carried by sound and river types of boats as well as by the largest steam and sailing vessels.

Lumber, wheat, and flour are the chief articles of coastwise shipment from Tacoma. The harbor master's reports are the only available original source of information as to shipping. These reports show the barrels of flour, bushels of wheat, and board measure of lumber shipped out of Tacoma to coastwise ports, but show only the value of shipments received, the articles being unnamed; but these are chiefly merchandise from California, fruits, oil, and sugar from California, ores and concentrates from Alaska and California, hemp from Manila, although many of the articles named are received also from foreign ports.

Imports from foreign countries also include raw silk, tea, mattings, rice, and other oriental products from China and Japan; grain bags from India, and cement, fire brick, liquors, wines, etc., from Western Europe.

The greater part in bulk and value of Tacoma's outward cargoes originates in the territory directly tributary to the port and is furnished to the vessels calling at this port by local manufacturers, dealers, and exporters. It is estimated by the Tacoma Chamber of Commerce and Board of Trade that fully $20,000,000 worth of outward cargo from this port in 1905 consisted of native local products.

Grain (mostly wheat) and flour form the most important outward cargoes, and in shipments of grain Tacoma exceeds all other ports on Puget Sound. But most of this is exported to foreign countries. During the year 1905, 3,329,511 bushels of wheat were exported, and 1,979,513 bushels were shipped to California, besides 836,632 barrels of flour for export and 107,923 barrels for coastwise ports. The value of the wheat and flour shipments was estimated at $7,853,357, or 21.5 per cent of the total value ($36,578,430) of merchandise shipped in that year. In 1906 the total shipments of wheat had increased to 7,242,687, but the coastwise shipments declined to 863,721 bushels. The total shipments of flour in 1906 were 1,071,016 barrels, of which 140,566 were to coastwise ports. In 1907 the total shipments of wheat were 7,027,776 bushels, and of flour 1,269,416 barrels.

Next in value among the products of local origin entering into Tacoma's ocean commerce are bullion and copper from the Tacoma smelter. The Monthly Bulletin of the Chamber of Commerce and Board of Trade estimates that in 1905 bullion to the value of $5,856,889 and 612,115 copper ingots, valued at $1,727,687, were shipped by water from the smelter. It is estimated that these items amounted to $7,584,576, or 20.7 per cent of the total value of Tacoma's outward shipments for the year.

Water shipments of lumber from Tacoma in 1905 amounted to 91,692,859 feet, valued at $996,259. In 1906 the total shipments of lumber had increased to 141,524,492 feet, of which about 50 per cent was coastwise. In 1907 the total shipments of lumber were 198,589,603 feet.

Coal mined near Tacoma and shipped by water in 1905 amounted to 208,762 tons, destined to San Francisco, Honolulu, and South American ports.[a] In 1906 the cargo coal shipments to all points were reduced to 143,483 tons, owing to the increased demand for bunker coal by steam schooners and steamships. The increase in the number of steam schooners operated in the lumber trade and running out of San Francisco partially explains this increased demand for bunker coal. Exports of coal amounted to only 3,500 tons. In 1907 the coal shipments from Tacoma were 136,215 tons.

The total shipments from Tacoma in American vessels in 1906 were 270,256 tons, as shown by the Census Report on Transportation by Water. The principal articles were lumber, 78,174 M feet; grain, 34,137 tons; coal, 29,468 tons, and miscellaneous merchandise, 55,339 tons.

[a] Tacoma Chamber of Commerce and Board of Trade Monthly Bulletin, January, 1906.

The following table shows the character and volume of coastwise shipments out of the port of Tacoma for the year 1906:

TABLE 274.—COASTWISE SHIPMENTS FROM TACOMA, 1906, BY ARTICLES.

[Compiled from the report of the harbor master at Tacoma.]

Articles.	Quantity.	Articles.	Quantity.
Flour.....barrels..	140,566	Box shooks.....bundles..	55,694
Lumber.....feet..	72,954,582	Lime.....barrels..	8,000
Coal.....tons..	142,740	Feed.....tons..	10,107
Wheat.....bushels..	863,721	Tallow.....casks..	.....
Oats.....tons..	2,450	Hay.....tons..	3,528
Barley.....bushels..	33,092	Milk.....cases..	19,071
Flaxseed.....tons..	226	Bottled beer.....barrels..	6,273
Hides.....do....	196	Furniture.....packages..	3,028

LOCAL COMMERCE.—Most of the channels of Puget Sound proper have ample depth for the purpose of navigation, and a number of streams and rivers tributary to Puget Sound are of great value for boat navigation and for logging purposes. The distance upstream to which boats run is extremely variable, depending upon the stage of water and tide.

The water traffic of Puget Sound and its tributary waters is large and rapidly growing. It includes vessels of almost every type and size in use throughout the world. All these streams are used for floating logs and shingle bolts and for towing log rafts, and the timber handled constitutes the main part of the commerce. In 1906 over 1,200,000,000 feet b. m. of saw logs were moved, and in addition large quantities of poles, piling, and wood. The miscellaneous local traffic of lumber and package freight amounted in 1906 to about 500,000 tons, not including the lumber moved coastwise.

The commerce of Olympia Harbor is of a general character and is carried by ocean-going sailing vessels engaged in the lumber trade and by a variety of the similar classes of boats plying between the ports of Puget Sound. Sufficient depth for seagoing vessels has not yet been secured in the dredged channel and basin, though vessels of the deepest draft can go as far as the entrance of the dredged channel, and sailing vessels carrying lumber now reach wharves near the entrance to the dredged channel at high tide and lie in the dredged basin while loading. The commerce for 1905 was reported as 62,804 tons, valued at $2,069,289, and for 1906 at 82,024 tons, valued at $2,363,433.

Port Townsend, a small town at the entrance to Puget Sound, is a port of entry.

TABLE 275.—VESSEL MOVEMENT AND LOCAL COMMERCE AT MINOR PORTS AND ON RIVERS OF PUGET SOUND, 1906.

[Compiled from Report of Chief of Engineers, U. S. Army, 1907.]

	Vessels operating.			Freight handled, excluding logs and piling.			Saw logs.	Poles and piling.	Wood.
	Number.	Tonnage.	Maximum draft.	Outbound.	Inbound.	Total.			
			Feet.	*Tons.*	*Tons.*	*Tons.*	*Feet b. m.*	*Linear ft.*	*Cords.*
Olympia	6	.....	8.5	60,516	21,508	82,024	109,000,000	32,250	2,025
Tacoma	21	.....	15.0	.....	.....	.....	320,000,000	32,000	.....
Lakes Union and Washington	14	1,086	.....	.....	.....	36,170	[a] 71,627,800	.....	.....
Salmon Bay	.....	.....	.....	38,729	8,980	47,709	[a] 52,764,600	.....	.....
Duwamish River	.....	.....	.....	.....	.....	75,412	13,500,000	475,140	.....
Everett	23	4,000	18.0	130,213	28,990	159,203	.....	.....	.....
Swinomish Slough	11	1,962	6.7	44,824	8,437	53,261	20,500,000	.....	.....
Snohomish River	[b] 4 [c] 20	700	4.0	29,570	30,037	59,607	244,000,000	723,154	1,000
Stilaguamish River	8	903	5.0	4,343	2,719	7,062	44,000,000	45,200	20,300
Skagit River	[b] 8 [d] 16	1,743 138	5.0 4.0	17,926	6,742	24,668	59,360,000	32,000	65,460
Nooksak River	1	133	3.5	297	151	448	4,000,000	1,320	23,500
New Whatcom	14	3,885	13.7	.....	.....	.....	234,000,000	.....	.....

[a] Computed on basis of 5 net tons equal 1,000 feet.
[b] Steamers.
[c] Tugs, engaged in towing logs.
[d] Launches.

Section 4. Portland and the Columbia River.

PORTLAND, OREG.—Portland is situated on the west bank of the Willamette River, about 9 miles from its mouth. It is a large and prosperous city, with extensive warehouses and wharves.

The chief shipping and commercial district of the port is situated on the west side, as also are the terminal facilities for river and coastwise traffic. The deep-sea or foreign vessel docks are chiefly situated on the east side.

East Portland is situated on the peninsula extending approximately 15 miles to the northwest and the width of from 5 to 10 miles, formed by the Willamette River on the south and the Columbia River (the dividing line between Oregon and Washington) on the north.

In common river and shipping parlance the Willamette is spoken of as flowing northward. In the summer season this stream is practically a backwater from the Columbia River, into which the Willamette flows at a point about 5 miles north of St. Johns; in the winter and spring seasons the Willamette is a natural river, fed from the mountain streams and snows.

The Willamette is navigable all the year as far south as Corvallis, the practical head of navigation, distant about 100 miles (air line) from its confluence with the Columbia, but requiring very light-draft

steamboats south of the Oregon City locks in summer. Neither the harbor at St. Johns nor the locks at Oregon City come within the limits or control of Portland Harbor, but both are closely related to it.

The chief commodities of importance now shipped from Portland by water are wheat, flour, and lumber. Most of the salmon, formerly shipped by water, now goes by rail. Very little lumber goes to New York by water. In 1894, 1895, and 1896 lumber was shipped from Portland to New York by water around Cape Horn. This was due to the fact that a number of merchant sailing vessels used to sail to Portland via the Horn to go into the Alaska trade, but many of these tramp ships found themselves out of business. They loaded with lumber for New York and only a few of them appear to have come back, many having been cut down into coal barges. Lloyd's surveyor made the following statement in the summer of 1907 regarding wheat, flour, and lumber shipments at Portland.

> Eighty-five per cent of the grain and flour shipped from Portland goes out from the east-side docks [the docks on the east side of the river]. Contracting for grain shipments is done directly with the shippers; brokers buy some flour and wheat for export to China and Japan. Ninety per cent of the grain and flour is handled directly with the shipping firms or manufacturers. Much flour is shipped to San Francisco.
>
> Wool goes direct by rail, but not much of it finds its way to Portland. Most of it is bought on the ranches and is baled in the small towns. The hop business is principally from the interior and goes by rail. * * *
>
> Four years ago we sent nearly 30 per cent of the wheat from Oregon and Washington to San Francisco; there is some going now. In the same year (1903) we shipped 40 per cent to Chicago and St. Louis and exported in that year only 27 cargoes and in 1902 only 100 cargoes. Sailing vessels carry about 3,000 tons, steamships average 6,000 tons of wheat; the coastwise vessels carry 800 to 2,500 tons.

The manager for a firm of ship brokers and shipowners made the following statement to an agent of the bureau in the summer of 1907 on the subject of coal shipments at Portland:

> The coal coming here from Washington is mostly of poor quality. It is practically all used by the Northern Pacific Railway. The Carbon Hill coal is all sold to the railroad, as the only cars they could get last season were for the railroad, and the same condition exists this season. Some 10,000 tons of coal have been sold to the Canadian Pacific Railway.
>
> Coal for domestic use in Portland comes from Seattle by rail and from the Australian mines by water. There are about 60,000 tons of Australian coal on the way to Portland for this winter's supply and probably that will be too much. Some comes from Cardiff in barges and a little British Columbia coal will come here, but the fire in the Comax mine reduces its

supply. * * * The main difficulty is to mine a sufficient supply of coal; we can find the ships to carry it if we can get the coal fast enough.

The fuel supply for Portland has in the past been chiefly mill refuse and slabs from the sawmills, but the price has been so high coal is now being used.

It appears that many of the coastwise vessels use oil fuel, but the foreign ships and steam schooners on the coast use coal. Two lines of foreign tramps and only two American steamers use oil for fuel.

TABLE 276.—SHIPMENTS FROM PORTLAND, 1906 AND 1907.

[Compiled from data furnished by Portland Merchants' Exchange.]

Articles.	Domestic.		Foreign.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
CALENDAR YEAR 1906.						
Lumber.....feet..	128,894,264	$1,933,694	118,013,853	$1,544,772	246,908,117	$3,478,466
Flour.....barrels..	155,752	623,008	621,566	2,424,483	777,318	3,047,491
Wheat.....bushels..	1,478,615	1,128,374	5,479,213	3,989,525	6,957,828	5,117,899
FISCAL YEAR 1907.						
Lumber.....feet..	119,760,909	2,004,316	107,592,925	1,619,494	227,353,834	3,623,810
Flour.....barrels..	115,528	502,112	1,256,102	4,714,496	1,371,630	5,216,608
Wheat.....bushels..	900,904	644,244	7,198,999	5,197,584	8,099,903	5,841,828

TABLE 277.—DOMESTIC SHIPMENTS AND RECEIPTS AT PORTLAND, 1907.

[Monthly Summary of Commerce and Finance, December, 1907, p. 1198.]

Articles.	Shipments.	Receipts.	Articles.	Shipments.	Receipts.
Lumber.....feet..	89,217,732	1,349,000	Coal.....tons..	.....	3,378
Flour.....barrels..	164,486	.....	Lime.....barrels..	.....	1,978
Wheat.....bushels..	1,196,683	.....	Cement.....sacks....	.....	12,977
Oats.....do....	301,424	.....	Cement.....barrels..	435	11,618
Barley.....do....	40,292	.....	Asphaltum.....do....	.....	5,450
Rice.....bags..	20,924	5,440	Paint and oil...packages..	.....	37,204
Potatoes.....sacks..	23,762	.....	Tan bark.....tons..	.....	964
Mill feed.....tons..	12,536	.....	Matting.....rolls..	2,872	1,650
Lath.....bundles..	20,450	.....	Grain bags.....bales..	.....	2,603
Shingles.....do....	2,979	25,988	Canned goods.....cases..	.....	35,562
Sash and doors..packages..	.....	6,501	Fruit and vegetables.tons..	.....	6,448
Staves and box shooks, tons.....	4,774	.....	Electrical goods.packages..	.....	2,506
Paper.....tons..	12,418	.....	Dynamite.....cases..	.....	1,800
Hardware.....packages..	37,178	.....	Sulphur.....bags..	.....	1,492
Hardware.....tons.....	.....	2,315	Hides.....number..	2,896	.....
Oil.....barrels..	.....	2,251,297	Beer.....barrels..	2,390	1,386
Sugar.....sacks..	.....	247,623	Liquors.....cases..	192	7,668
Salt.....do....	.....	177,111	Liquors.....casks..	21	2,483
Coffee.....do....	.....	20,146	Sirup.....cases..	267	.....
Iron.....bundles..	8,986	10,663	Salmon.....do....	800	[a] 42,941
Machinery.....packages..	1,861	2,410	Merchandise.....tons..	41,120	18,175
			Miscellaneous...packages..	.....	360,979

[a] Boxes.

The Census Report on Transportation by Water in 1906 shows shipments from Portland in American vessels of 492,573 tons. The principal articles were lumber, 145,023 M feet; grain, 55,019 tons; flour, 40,049 tons; and miscellaneous merchandise, 117,606 tons.

COLUMBIA RIVER AND TRIBUTARIES.—Before the days of the railroads this river, in connection with the portage railroad at the Cascades, formed the main highway of commerce between eastern and western Oregon. This continued until 1882, but after the river was paralleled by the Oregon Railroad and Navigation Company's railroad navigation was practically suspended. Navigation was continued after that date on the 76 miles of the Snake River between the point of railroad crossing at Riparia Junction and the important city of Lewiston, Idaho. The suspension of traffic on the lower Snake and upper Columbia rivers continued until the revival of interest in open-river navigation by the completion of the portage road at Celilo by the State of Oregon in 1905.

The commerce transported on the upper Columbia and Snake rivers during the calendar year 1905 amounted to 28,380 tons, valued at $1,191,960; for the calendar year 1906, 71,556 tons, valued at $2,671,882. This traffic consisted principally of farming and milling machinery, grain, fruit, and general merchandise.

The first step taken in opening the Columbia River was the commencement, many years ago, of the building of locks and canal at the Cascades of the Columbia. This task appears to have been delayed, but finally the State, at a considerable cost, built a portage railway at the Cascades. The benefits from the improvements were then demonstrated and it was not long before the locks and canal were completed, opening through navigation to The Dalles.

The down river commerce through the locks at the Cascades consists principally of wheat, flour, miscellaneous grain, cattle, horses, wool, and country produce. The up river commerce is principally general merchandise, machinery, and railroad supplies. The total movement for the fiscal year ended June 30, 1906, was 46,884 tons, valued at $2,813,040, and for the year ended June 30, 1907, 53,770 tons, valued at $3,226,200.

The commerce of the Willamette River consists of farm products, which are raised on the rich land adjacent to the river and generally shipped to the Portland market. The adjacent forests also produce a large supply of logs and timber, which are brought down to the river in annually increasing quantities, the products being either shipped by boat or floated to the sawmills along the river or to the paper-pulp mills at Oregon City. The amount of traffic handled by steam craft on the Willamette River during the calendar year 1906, including some saw logs towed, was 383,911 tons, valued at approximately $7,591,623.

The export commerce on the lower Columbia and Willamette rivers below Portland consists principally of grain and lumber, while imports are in a great measure composed of goods from oriental countries; also cement, coal, lumber, silver, etc. The light-draft freight consists mostly of fish and dairy, farm, and lumber products; also miscellaneous machinery and mercantile supplies. There are numerous small settlements and landings on this stream, but the business is centered principally at Astoria and Portland. The total traffic handled by river vessels in 1906 was estimated at 2,331,121 tons, valued at $26,377,640. The commerce of seagoing vessels for the same year was reported as 1,200,973 tons, valued at $34,407,991.

TABLE 278.—VESSEL MOVEMENT AND LOCAL COMMERCE ON THE COLUMBIA RIVER AND TRIBUTARIES, 1906.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

	Vessels.			Freight handled, excluding logs and piling.			Saw logs.	Poles and piling.	Wood.
	Number.	Tonnage.	Maximum draft.	Outbound.	Inbound.	Total.			
			Feet.	*Tons.*	*Tons.*	*Tons.*	*Feet b. m.*	*Linear ft.*	*Cords.*
Okanogan River	5	1,433	5.0	599	1,361	1,960	.....	.....	.....
Pend Oreille River	2	419	4.0	31,769	1,174	32,943	.....	.....	.....
Wenatchee-Bridgeport [a]	5	1,433	5.5	38,405	14,855	53,260	.....	.....	.....
Upper Columbia and Snake rivers.	10	2,842	6.3	.....	.....	71,556	.....	.....	.....
Through Cascades	19	4,378	9.0	27,081	26,689	53,770	.....	.....	.....
Willamette River above Portland				.....	.....	223,747	73,726,598	99,000	7,154
Yamhill River	100	.....	.....	.....	.....	2,638	895,000	.....	.....
Columbia River below Portland				.....	.....	863,120	686,526,899	2,869,709	25,036
Cowlitz River	.....	.....	.....	.....	.....	23,189	184,357,000	1,076,000	7,600
Lewis River	.....	.....	.....	.....	.....	16,684	60,528,000	117,000	.....
Clatskanie River	.....	.....	.....	.....	.....	5,679	2,230,000	10,000	.....

[a] Columbia River between Wenatchee and Bridgeport.

Section 5. The coast north of San Francisco Bay.

Along the Pacific coast of Washington, Oregon, and northern California are a number of bays and rivers, some of large importance in the coastwise lumber trade and the centers of some local trade. The most important of them are Grays Harbor, Willapa Bay, Coos Bay, and Humboldt Bay.

Grays Harbor is a large bay in the southwestern part of the State of Washington, and is, next to Puget Sound, the most important lumber-shipping point on the Pacific coast. Large lumber

and shingle mills are located at Hoquiam, Aberdeen, and Cosmopolis. General merchandise and machinery are received. Logs are rafted and floated down the Hoquiam and Chehalis rivers in large quantities.

Willapa Bay, in the extreme southwestern part of the State of Washington, is also of considerable commercial importance. Lumber, fish, and oysters are shipped and general merchandise is received. Logs are rafted and floated down the tributary rivers.

From Tillamook Bay, 50 miles south of the Columbia River, some lumber and dairy products are shipped to Portland and San Francisco, and general merchandise is brought in by coasting vessels.

On Yaquina Bay and River there are several small settlements. At one time there was considerable commerce, but it has now decreased to a few hundred tons a year.

At Siuslaw River some lumber is shipped and general merchandise is received.

Coos Bay, about 400 miles north of San Francisco Bay, is, next to Humboldt Bay, the best harbor between San Francisco and the Columbia River. Considerable quantities of lumber and coal are shipped from Marshfield in increasing amounts; there is also some farm and dairy produce sent out by water and general merchandise received. The total movement for 1906 was 184,455 tons. The Coos River is navigated by light-draft steam vessels engaged in towing logs and freighting farm and dairy produce.

Coquille River has some trade in lumber, coal, live stock, and farm products, loaded on small coasting vessels along the 25 miles of river from the mouth to Coquille.

Humboldt Bay is the first important harbor north of San Francisco. A large amount of lumber is shipped from here to domestic and foreign ports, and there is also a considerable amount of farm and dairy products, most of which are shipped to San Francisco. The total commerce has increased from 162,614 tons in 1885 to 739,749 tons in 1906. Shipments in American vessels from Eureka (Humboldt Bay) in 1906 were 489,521 tons.

Between Humboldt and San Francisco bays there are no important harbors, but lumber, ties, tan bark, and farm and dairy produce are shipped irregularly by coasting vessels from a number of points, at most of which the loading and unloading of vessels is accomplished by the use of wire cables or chutes. From Fort Bragg Landing there is an average of two steamers a week to San Francisco, and considerable lumber is shipped, with some other traffic. Other points of less importance are Shelter Cove, Mendocino Bay, Little River, Greenwood Landing, Arena Cove, Fort Roso Cove, Tomales Bay, and Bodega Bay.[a]

---

[a] Coast Pilot. Pacific Coast, pp. 87–94.

The following tables show the commerce of some of the more important bays and rivers from 1897 to 1906:

TABLE 279.—COMMERCE OF SPECIFIED BAYS AND COAST RIVERS IN WASHINGTON AND OREGON, 1897-1906.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

Year.	Grays Harbor.	Willapa Bay.	Siuslaw River.	Tillamook Bay.	Coos Bay.	Coos River.	Coquille River.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1897	.....	.....	2,239	29,405	115,896	16,534	25,620
1898	168,468	32,399	4,350	35,885	103,039	22,674	24,556
1899	265,918	51,150	4,907	36,835	116,567	[a] 70,007	26,654
1900	259,692	42,090	18,675	17,640	104,294	[a] 229,225	30,727
1901	299,607	39,538	22,351	21,147	97,500	62,402	32,975
1902	527,047	51,999	25,213	24,883	122,232	46,000	37,458
1903	458,268	74.475	25,337	16,862	135,178	28,109	48,249
1904	495,495	73,808	24,816	13,823	136,958	49,907	60,944
1905	579,759	76,713	13,090	13,919	178,945	44,398	45,455
1906	614,854	116,717	14,344	13,627	184,455	35,537	67,288

[a] Including stone for the government jetties.

TABLE 280.—VESSEL MOVEMENT AND LOCAL COMMERCE OF SPECIFIED BAYS AND RIVERS ON THE PACIFIC COAST, 1906.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

	Vessels operating.			Freight handled, excluding logs and piling.			Saw logs.
	Number.	Tonnage.	Maximum draft.	Outbound.	Inbound.	Total.	
			Feet.	*Tons.*	*Tons.*	*Tons.*	*Feet b. m.*
Grays Harbor	72	1,260	12.0	.....	.....	11,567	553,904,580
Willapa Bay	79	845	14.0	.....	.....	11,558	117,517,000
Tillamook Bay	5	624	12.4	8,272	5,355	13,627	(a)
Yaquina Bay	7	.....	15.0	492	90	582	(a)
Siuslaw River	10	2,016	10.0	12,234	2,110	14,344	(a)
Coos River	11	.....	5.0	31,940	3,597	35,537	(a)
Coquille River	25	5,423	.....	63,388	3,900	67,288	(a)

[a] No data.

TABLE 281.—COMMERCE OF HUMBOLDT BAY, 1905 AND 1906, BY ARTICLES.

[Compiled from Reports of Chief of Engineers, U. S. Army.]

Shipments.

Articles.	1905.	1906.
	Tons.	*Tons.*
Lumber	474,995	594,009
Produce	13,698	11,970
Miscellaneous	13,688	20,011
Total	502,381	623,990

TABLE 281.—COMMERCE OF HUMBOLDT BAY, 1905 AND 1906, BY ARTICLES—Continued.

Receipts.

Articles.	1905.	1906.
	Tons.	*Tons.*
General merchandise	86,534	93,084
Iron	7,461	878
Coal	3,106	4,712
Hay	2,690	1,432
Fuel oil	.....	8,469
Miscellaneous	14,582	7,184
Total	114,373	115,759
Grand total	616,754	739,749

Section 6. San Francisco Bay and tributaries.

PORT OF SAN FRANCISCO.—As already pointed out, San Francisco Bay is the most important as well as the largest harbor on the Pacific coast of the United States. Its commerce, both foreign and domestic, is extensive. Much of the local navigation is carried on by means of light-draft river steamers and barges and by flat-bottomed scow schooners that ascend the Sacramento and San Joaquin rivers. Grain is exported, together with other native products.

San Francisco Bay from its junction with San Pablo Bay extends southeastward about 40 miles. San Francisco, the largest city on the bay, is situated on the northern end of the peninsula separating the southern arm of the bay from the ocean. Oakland, the second largest city on the bay, is on the eastern shore opposite San Francisco.

The development of this port is indicated by the following table, showing the tonnage of vessels arriving from 1884 to 1907:

TABLE 282.—VESSEL ARRIVALS AT SAN FRANCISCO, 1884–1907.

[Annual Report San Francisco Merchants' Exchange, 1905–6, p. 22; Monthly Summary of Commerce and Finance, December, 1907, p. 1196.]

Year ending June 30—	Foreign.	Domestic.	Total.	Year ending June 30—	Foreign.	Domestic.	Total.
	Tons.	*Tons.*	*Tons.*		*Tons.*	*Tons.*	*Tons.*
1884	1,094,276	934,609	2,028,885	1897	1,263,042	1,318,816	2,581,858
1885	884,954	1,023,038	1,907,992	1898	1,099,334	1,375,415	2,474,749
1886	783,734	1,019,943	1,803,677	1899	1,108,640	1,405,117	2,513,757
1887	854,359	1,087,060	1,941,419	1900	1,369,136	1,486,250	2,855,386
1888	799,834	1,453,749	2,253,583	1901	1,346,003	1,832,825	3,178,828
1889	904,303	1,343,341	2,247,644	1902	1,351,536	1,808,978	3,160,514
1890	1,016,333	1,320,642	2,336,975	1903	1,206,479	1,887,557	3,094,036
1891	1,136,892	1,241,139	2,378,031	1904	1,184,322	2,040,169	3,224,491
1892	1,357,480	1,268,848	2,626,328	1905	1,050,727	2,355,742	3,406,469
1893	1,153,100	1,308,666	2,461,766	1906	2,631,506	1,033,143	3,664,649
1894	1,127,441	1,214,019	2,341,460	1906 [a]	1,166,280	2,700,435	3,866,715
1895	1,153,798	1,238,486	2,392,284	1907 [a]	1,415,073	3,252,509	4,667,582
1896	1,213,331	1,333,307	2,546,638				

[a] Calendar year.

In the following table will be found a further analysis of the vessel movement at this port for the years 1906 and 1907. It will be seen that the domestic trade is mainly along the coasts of continental United States, but that there is some trade to the Hawaiian Islands, Alaska, the Philippine Islands, and the eastern or Atlantic ports. The larger part of the foreign trade is with other American countries, notably British Columbia and South America, but with a considerable movement to and from China and Japan, and some with Australia and Europe.

TABLE 283.—VESSEL MOVEMENT AT SAN FRANCISCO, 1906 AND 1907.
[Monthly Summary of Commerce and Finance, December, 1907, p. 1196.]

	Arrivals.		Clearances.	
	1906.	1907.	1906.	1907.
Domestic:	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Coastwise	2,332,567	2,933,412	2,452,145	3,264,989
Hawaiian	227,417	171,445	142,232	205,997
Alaska	56,166	61,520	51,240	48,170
Eastern (Atlantic)	84,285	86,132	26,272	4,937
Total	2,700,435	3,252,509	2,671,889	3,524,093
Philippine Islands	66,894	57,369	69,808	63,559
Foreign:				
British Columbia	261,555	294,692	292,827	352,836
Mexico	18,187	112,942	11,254	34,403
South America	122,037	108,053	122,869	119,060
Pacific islands	22,790	19,270	32,015	23,530
China and Japan	303,246	347,631	259,749	282,410
Australia	100,594	252,828	80,189	115,143
United Kingdom or Continent	78,500	82,054	78,410	69,250
Europe	168,015	140,224	68,443	85,413
Various	24,462	.....	21,707	12,031
Total	1,099,386	1,357,704	967,463	1,094,136
Grand total	3,866,715	4,667,582	3,709,160	4,681,788

In the preceding discussion of lumber trade on the Pacific coast will be found statistics of receipts at San Francisco Bay. This evidently includes lumber received at various points besides those included in the port of San Francisco. Below will be found a statement of receipts at this port from 1902 to 1906:

TABLE 284.—RECEIPTS OF LUMBER AT THE PORT OF SAN FRANCISCO, 1902–1906.
[Report of San Francisco Merchants' Exchange, 1905–6, p. 23.]

Year ending June 30—	From California.	From Oregon and Washington.	Total.	Year ending June 30—	From California.	From Oregon and Washington.	Total.
	M feet.	*M feet.*	*M feet.*		*M feet.*	*M feet.*	*M feet.*
1902	187,067	276,854	463,921	1905	258,946	500,867	759,813
1903	213,076	355,391	568,467	1906	285,835	517,324	803,159
1904	249,368	429,736	679,104				

The total exports of lumber from San Francisco for the year ending June 30, 1906, were 27,437 M feet, of which 3,560 M feet were destined for Central America and Panama, 1,448 M feet for South America, 2,109 M feet for Mexico, 12,951 M feet for Australia, 400 M feet for Europe, 1,618 M feet for the Pacific islands, 4,461 M feet for the Hawaiian Islands, and 890 M feet for various points.

The annual receipts of coal at San Francisco from various sources of supply from 1904 to 1907 are shown in the table below:

TABLE 285.—RECEIPTS OF COAL AT SAN FRANCISCO, 1904-1907.

[Report of San Francisco Chamber of Commerce, 1908, p. 147.]

Sources.	1904.	1905.	1906.	1907.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Eastern	29,055	11,663	14,967	18,146
Seattle	139,063	84,965	98,751	87,412
Tacoma	182,313	81,480	91,260	89,028
Mount Diablo, Coos Bay, and Tesla	96,520	114,930	108,195	104,942
Total domestic by sea	446,951	293,038	313,173	299,528
British Columbia	335,137	348,515	318,712	312,419
Australia	148,409	85,031	62,950	77,810
Great Britain	66,330	65,087	67,362	61,734
Japan, and Rocky Mountains by rail	54,245	40,219	49,852	52,265
Grand total	1,051,072	831,890	[a] 811,947	[a] 797,756

[a] Total as published does not agree with the sum of the items.

The apparent diminished quantity of coal in 1907 was more than made good by an output of fully 3,000,000 barrels of fuel oil in excess of 1906.

The total deliveries of coke by sail at San Francisco in 1907 aggregated 72,146 tons, a little more than for the preceding year.

Fish and certain fish products form an important part of the movement by water at San Francisco, as shown in the table below:

TABLE 286.—RECEIPTS OF SALMON AND CODFISH AT SAN FRANCISCO, 1901-1907.

[Report San Francisco Merchants' Exchange, 1907-8, p. 25.]

Year.	Alaska salmon.		Codfish.[a]	Year.	Alaska salmon.		Codfish.[a]
	Cases.	*Barrels.*	*Thousands*		*Cases.*	*Barrels.*	*Thousands*
1901	1,421,462	13,817	.....	1905	1,190,532	117,213	2,145
1902	1,444,551	17,652	2,016	1906	1,130,401	15,283	2,490
1903	1,387,916	20,729	1,942	1907	1,209,193	17,338	1,912
1904	1,516,523	10,613	3,023				

[a] Years ended June 30.

San Francisco is one of the leading whaling ports of the world. The following table for selected years shows the product of the industry since 1874:

TABLE 287.—WHALING INDUSTRY AT SAN FRANCISCO IN SPECIFIED YEARS 1874–1907.

[Report San Francisco Chamber of Commerce, 1908, p. 146.]

Year.	Vessels.	Oil.	Bone.	Ivory.	Year.	Vessels.	Oil.	Bone.	Ivory.
		Barrels.	*Pounds.*	*Pounds.*			*Barrels.*	*Pounds.*	*Pounds.*
1874	11	10,300	86,300	7,600	1903	19	6,487	64,790	1,536
1880	20	23,200	339,000	15,300	1904	23	6,940	85,188	697
1890	44	14,985	247,360	4,000	1905	8	2,073	38,550	.....
1900	19	4,910	177,700	580	1906	10	2,475	31,170	235
1901	16	6,745	76,680	1,139	1907	9	300	128,800	900
1902	21	10,976	110,662	15,566					

As already noted, the relative importance of San Francisco in the export grain trade has declined with the development of the Puget Sound ports. Nevertheless, San Francisco is still the principal point for the receipt of grain coastwise, and is also a shipping point of some importance. The following table shows the receipts and shipments of flour and grain at San Francisco for 1906 and 1907:

TABLE 288.—RECEIPTS AND SHIPMENTS OF FLOUR AND GRAIN AT SAN FRANCISCO 1906 AND 1907.

[Monthly Summary of Commerce and Finance, December, 1907, p. 1196.]

Articles.	Receipts.		Shipments.	
	1906.	1907.	1906.	1907.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*
Flour (reduced to bushels)	3,865,237	4,339,365	1,711,033	2,821,131
Wheat	2,641,724	2,337,948	650,328	760,611
Barley	7,460,163	6,904,907	4,329,175	3,876,991
Oats	1,670,398	2,162,457	1,320	2,465
Corn	172,304	72,999	19,775	2,278
Rye	41,594	23,108	.....	.....
Malt	.....	.....	29,944	25,444
Total	15,851,420	15,840,784	6,741,575	7,488,920

The following table shows in detail the receipts by sea of domestic grain, etc., at San Francisco from 1887 to 1906:

TABLE 289.—RECEIPTS OF FLOUR, GRAIN, POTATOES, FLAX, AND WOOL AT SAN FRANCISCO, BY SEA, FROM OREGON AND WASHINGTON, 1887-88 TO 1905-6.

[Annual Report San Francisco Merchants' Exchange, 1905-6, p. 12.]

Year.	Flour.	Wheat.	Barley.	Oats.	Potatoes.	Flax.	Wool.
	½ *barrels.*	*Centals.*	*Centals.*	*Centals.*	*Sacks.*	*Sacks.*	*Bales.*
1887-88	434,938	1,183,727	.....	289,261	78,332	80,050	15,871
1888-89	413,062	831,107	.....	541,675	240,339	81,650	37,512
1889-90	326,184	573,595	.....	466,371	65,948	57,121	19,404
1890-91	362,441	1,442,358	266,585	381,066	106,687	78,166	13,032
1891-92	474,653	1,613,718	53,272	447,204	142,619	61,765	13,118
1892-93	494,703	1,225,844	1,828	284,102	231,164	18,060	10,073
1893-94	677,588	1,141,993	102,970	388,598	106,053	8,516	12,250
1894-95	1,282,101	1,542,748	416,515	515,545	212,540	44,145	8,588
1895-96	1,075,038	466,136	69,466	509,944	266,149	93,188	4,902
1896-97	1,261,117	575,282	.....	320,078	139,818	11,423	11,993
1897-98	1,453,240	1,209,382	251,471	519,491	225,692	20,434	9,100
1898-99	1,643,868	964,858	548,380	533,492	205,100	12,086	6,224
1899-00	1,572,890	201,697	80	233,635	236,690	29,751	6,917
1900-1	[a] 1,605,097	32,935	.....	154,677	174,279	58,820	2,201
1901-2	1,305,533	4,525	789	169,735	262,894	94,656	2,581
1902-3	1,273,524	584,356	41,650	229,746	175,440	122,997	1,894
1903-4	1,527,800	834,213	97,818	233,526	233,526	13,919	1,302
1904-5	1,645,196	1,287,353	38,717	289,848	100,200	44,522	1,187
1905-6	1,417,713	3,143,941	13,477	165,785	88,976	12,769	977

[a] Includes 101,061 quarter barrels by rail.

Other agricultural products are received in large quantities at San Francisco, both for local consumption and for reshipment. These include potatoes, beans, and other vegetables, dairy products, and fruit of various kinds—apples, oranges, lemons, bananas, and raisins. Some of these articles come entirely by water from the interior rivers and points on the bay and coastwise, and a very large proportion of the total receipts and shipments at San Francisco cross the bay in railroad-car ferries; but there are no records to distinguish between the water-borne and the railroad traffic.

The total shipments from San Francisco in American vessels for 1906 amounted to 1,656,614 tons, as shown by the Census Report on Transportation by Water. The principal articles shipped were grain, 117,856 tons; lumber, 86,829 M feet; cement, brick, and lime, 55,524 tons, and miscellaneous merchandise, 1,157,213 tons.

Oakland, on the eastern side of San Francisco Bay, is the terminus of the Southern Pacific Railroad, including both transcontinental lines and those connecting the Pacific Coast States. About two-thirds of the total tonnage of Oakland Harbor is overland railroad freight transferred across the bay on ferryboats. There is also, however, a considerable movement of coal, wood, coke, oil, hay, grain,

flour, lumber, building material, and other articles, amounting in 1906 to 1,541,182 tons, as shown below:

TABLE 290.—COMMERCE AT OAKLAND HARBOR, 1906, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army, 1907, p. 2143.]

Articles.	Tons.
Coal, wood, coke, and oil	180,000
Hay, grain, flour, etc	121,000
Lumber	980,000
Building materials	250,000
Miscellaneous	10,182
Total	1,541,182
Freight handled by ferries for six months	1,437,447

SAN PABLO BAY, a circular basin in the northeast of San Francisco Bay, communicates with Suisun Bay by Karquines Strait, and by Mare Island Strait northward with Napa River. There is considerable traffic through the bay, deep-water vessels passing through to load grain at points in Karquines Strait, and to South Vallejo to load flour and discharge lumber; light-draft vessels, sail and steam, for points in Suisun Bay and Sacramento and San Joaquin rivers, and for points in Petaluma Creek and Napa River.[a]

On Petaluma Creek and Napa River there is a considerable amount of farm and dairy produce carried on light-draft vessels, and a small amount of general merchandise. Vallejo, on Mare Island Strait, the southern portion of Napa River, supplies a large amount of provisions to the naval station, and also serves as a distributing point for a considerable area in its vicinity.

CALIFORNIA RIVERS.—Vessels operating on the Sacramento, San Joaquin, Mokelumne, Old, and Middle rivers in California handle fruits and vegetables from river landings to San Francisco for local consumption and canneries, and to Sacramento for local consumption, canneries, and transcontinental shipment. Return cargoes consist of general supplies and such manufactured products as are consumed in agricultural districts. Other shipments are grain, dried fruits, live stock, general merchandise, and machinery.

In the earliest days of California, before the advent of railroads, handsome, fast, and commodious steamboats, drawing from 6 to 7 feet, ran regularly on the Sacramento River between San Francisco and Sacramento. All traffic was necessarily by boats, which were crowded with passengers and freight at rates greatly in excess of present rates. The depth of water at that time in the shoalest

[a] Coast Pilot, Pacific Coast, p. 68.

places below Sacramento was about 7 feet at low water and low tide. Thereafter, largely in consequence of hydraulic mining, shoaling resulted, until on the worst bars at certain low-water periods only 4-foot channel depth could be carried to Sacramento. Government work has resulted in obtaining at the present time a least low-water channel depth of 7 feet to Sacramento, 4 to 5 feet depth to Colusa, and 24 to 30 inches depth to Red Bluff.

The commerce of the Sacramento River is variable and depends principally upon the crops. Up river freight is general merchandise, groceries, and farming implements; down river freight consists of wheat, barley, fruit, vegetables, cord wood, and brick. The total tonnage carried on the Sacramento River in 1905 was reported as 366,000 tons, and in 1906 as 375,000 tons. The average yearly tonnage for the preceding twelve years has been about 430,000 tons. The maximum tonnage reported carried was in 1892, which amounted to 579,574 tons.

Freight on the Feather River is carried on a small gasoline steamboat and a gasoline launch, and is estimated at 5,000 tons per annum.

The commerce on the lower San Joaquin River between Stockton and San Francisco is large and important. During the year 1905 a total of 362,295 tons of freight, and in 1906, 440,300 tons, principally grain, farm produce, flour, mill stuffs, and general merchandise, was reported to have been carried by the two transportation companies running regular boats. In 1906 the commerce of this river was reported by the secretary of the Stockton Chamber of Commerce, who took great pains in compiling the statistics, as reaching 971,382 tons, valued at $14,770,730, exclusive of freight carried by the steam and gasoline launches plying between Stockton and the many river islands which are in cultivation, and which carry large amounts of supplies and produce, but of which no accurate account can be obtained. The commerce of the upper river is small, the amount of trade reported as carried in 1905 being 10,891 tons.

There have been no records kept of the tonnage of the Mokelumne River. It has been estimated by various parties as between 50,000 and 100,000 tons. It is largely carried by scow steamers on irregular trips. A steamboat company operating on the river gives the amount of tonnage carried by its steamers as 25,000 tons, at an estimated value of $1,500,000. The imports are lumber, coal, live stock, and merchandise; the exports are grain, fruit, vegetables, and other produce.

The following tables show the total movement of commerce on California rivers for the year 1906, and the steamboat traffic of San Joaquin River and shipments from Sacramento and Stockton in some detail.

TABLE 291.—COMMERCE ON CALIFORNIA RIVERS, 1906.

[Compiled from the Report of Chief of Engineers, U. S. Army, 1907.]

River.	Vessels operating.	Freight handled, excluding logs and piling.		
		Outbound.	Inbound.	Total.
		Tons.	*Tons.*	*Tons.*
Sacramento River	30	.....	.....	[a] 375,000
San Joaquin River	.....	.....	.....	971,382
Mokelumne River	.....	.....	.....	[b] 50,000
Petaluma Creek	40	15,446	159,579	175,025
Napa River	.....	.....	.....	182,642

[a] Steamboat lines only. [b] Estimated.

TABLE 292.—COMMERCE OF STEAMBOAT LINES ON SAN JOAQUIN RIVER, 1906, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army, 1907, p. 2145.]

Shipments.	Tons.	Receipts.	Tons.
Flour and mill stuffs	140,623	General merchandise	53,483
Grain	109,427	Lumber	10,714
General merchandise	65,248	Live stock	534
Fruits and vegetables	50,823	Coal	170
Miscellaneous	9,278		
Total	375,399	Total	64,901

TABLE 293.—SHIPMENTS BY AMERICAN VESSELS FROM SACRAMENTO AND STOCKTON, 1906, BY ARTICLES.

[United States Census Report on Transportation by Water, p. 105.]

Articles.	Sacramento.	Stockton.	Articles.	Sacramento.	Stockton
Flour.....net tons..	297	108,343	Stone, sand, etc....net tons..	.....	3,000
Grain.....do....	2,936	85,461	Canned goods.....do....	700	.....
Fruits and vegetables..do....	46	30,352	Miscellaneous merchandise, net tons.....	211,171	20,768
Coal.....do....	3,099	.....			
Cement, brick, and lime..do....	8,078	1,256			
Lumber.....M feet..	7,511	2,031	Total.....net tons..	254,023	260,195
Petroleum and other oils, barrels.....	64,432	33,160			

Section 7. The coast south of San Francisco Bay.

There are but few good natural harbors along the coast of California south of San Francisco Bay, and consequently there are few places of commercial importance. Among the bays and ports in this section may be mentioned Monterey Bay, Port Harford on San Luis Obispo Bay, Santa Barbara, the ports of Los Angeles and San Diego.

Half Moon Bay, a few miles south of the entrance to San Francisco Bay, has a small amount of domestic trade. General merchandise is received and grain and farm products are shipped.

Monterey Bay, farther south, is a broad open roadstead about 20 miles long, and has some domestic trade. At Santa Cruz Harbor, on the northern shore, general merchandise is received, and lime, fruit, and farm produce are shipped. At Monterey, on the southern end of the bay, general merchandise and lumber are received, and fish, fruit, and farm produce are shipped.[a]

SAN LUIS OBISPO BAY.—The commerce of San Luis Obispo Bay consists principally of lumber and general merchandise received, and grain, farm and dairy produce, and crude oil shipped. The volume for 1905 was 445,153 tons, an increase of 445 per cent over that of the previous year. This great increase is due to the large shipments of crude oil. In 1906 the volume of commerce was 580,564 tons, an increase of 30 per cent over that of 1905. The value of the commerce for 1905 is estimated at $4,196,000 and for 1906 at $4,730,000.

The Union Oil Company pumps crude oil through a 6-inch pipe from its lines in the northern part of Santa Barbara County, a distance of 40 to 45 miles, to the landing at Port Harford, and thence ships it in tank vessels to the Hawaiian Islands and coast points. The Standard Oil Company also ships oil from this port.[b]

Santa Barbara, on the northern shore of Santa Barbara Channel, is a stopping place for regular coasting steamers. Lumber and general merchandise are received, and fruit, farm produce, and abalone meat shipped.[c]

PORTS OF LOS ANGELES.—The water-borne commerce of Los Angeles is handled at several ports on the coast. Port Los Angeles, on Santa Monica Bay, has considerable domestic and a small amount of foreign trade. General merchandise and coal are received, and grain, fruit, and farm produce are shipped. At Redondo Beach, 12 miles southeast, there is some domestic commerce by schooners and steamers. Wilmington, on the north shore of Wilmington Lagoon, and San Pedro, on the west shore of the channel connecting Wilmington Lagoon with San Pedro Bay, are the most important seaports for Los Angeles. The principal traffic is in lumber, received from northern California, Oregon, and Washington and shipped inland by rail. Considerable crude oil and some grain and general merchandise are also received, and some oil and general merchandise are shipped.

---

[a] Coast Pilot, Pacific Coast, pp. 60, 61.

[b] Report of Chief of Engineers, U. S. Army, 1906, vol. 1, pp. 717, 718; 1907, vol. 1, pp. 738, 739.

[c] Coast Pilot, Pacific Coast, p. 46.

The commerce of these harbors for 1906 is reported at 1,007,476 tons, of which 991,691 tons were domestic.

The commerce of San Luis Obispo Bay and of the ports of Los Angeles for 1906 is shown in the tables below:

TABLE 294.—VESSEL MOVEMENT AT SAN LUIS OBISPO BAY AND PORTS OF LOS ANGELES, 1906.

[Report of Chief of Engineers, U. S. Army, 1907, pp. 2138-2139.]

Port.	Steam.		Sailing.		Total.		Tonnage.	
	Arrivals.	Departures.	Arrivals.	Departures.	Arrivals.	Departures.	Arrivals.	Departures.
Ports of Los Angeles:								
Foreign	3	3	4	4	7	7	12,564	12,564
Domestic	1,009	1,005	401	402	1,410	1,407	629,592	628,374
San Luis Obispo Bay	236	236	.....	.....	236	236	194,950	194,950

TABLE 295.—COASTWISE COMMERCE OF SAN LUIS OBISPO BAY AND OF PORTS OF LOS ANGELES, 1906, BY ARTICLES.

[Report of Chief of Engineers, U. S. Army, 1907, pp. 2138, 2139.]

Articles.		Ports of Los Angeles.		San Luis Obispo Bay.	
		Receipts.	Shipments.	Receipts.	Shipments.
Lumber	M feet	447,182	.....	9,303	.....
Crude oil	barrels	235,159	29,647	.....	3,188,381
Grain	tons	21,633	.....	55	15,818
General merchandise	do	11,950	13,647	10,722	2,194
Miscellaneous	do	2,866	3,097	305	1,468
Total	do	991,691		580,564	

SAN DIEGO, CAL.—San Diego, on the eastern shore of San Diego Bay, is the best natural harbor south of San Francisco Bay.

Following is a statement showing the shipping at this port and the tonnage as reported by the harbor improvement committee of the San Diego Chamber of Commerce:

TABLE 296.—VESSEL MOVEMENT AT SAN DIEGO, 1902-1906

Year.	Arrivals.		Departures.		Year.	Arrivals.		Departures.	
	No.	Tonnage.	No.	Tonnage.		No.	Tonnage.	No.	Tonnage.
1902	331	230,195	116	48,792	1905	380	318,856	374	310,185
1903	226	194,824	125	67,330	1906	407	319,440	411	327,203
1904	354	254,090	345	136,452					

In the report above referred to occurs the following statement:

> In February [1907] the first of the great liners of the American-Hawaiian Steamship Company reached here from Salina Cruz, the Pacific terminal of the Tehuantepec Line. Since that date the arrivals of vessels of this company have been regular. The company has purchased additional ships to handle the traffic, and now that this great ocean highway of commerce is being traversed and it has been demonstrated that shipments can be made from New York City as quickly as by rail, and during traffic congestion or car shortage the goods are received much more quickly by this route, merchants are ordering their goods shipped by way of Tehuantepec. This applies not only to the merchants of San Diego, but to those of Los Angeles, New Mexico, and Arizona points. This, in itself, means a large increase in the number of vessels to arrive at this port.
>
> Lumber shipments for inland points are being brought here and sent north by rail.

The commerce of San Diego was 216,761 tons for the calendar year 1906, an increase of 36 per cent over that of the previous year. It consists principally of lumber shipped, and also some coal, cement, crude oil, and general merchandise. The value of this commerce for 1906 is estimated to be $10,523,498, and for 1905, $11,614,000. The coastwise trade is carried in vessels drawing from 12 to 20 feet of water, and is benefited but little by the improvement of the harbor. The American-Hawaiian steamers of 8,000 to 10,000 tonnage each enter this port once a month. These vessels draw about 26 feet of water and carry 1,000 to 2,000 tons of freight every month to San Diego. Freight for San Diego carried by the Panama steamers is delivered by coastwise steamers from San Francisco. Foreign cements are received in this port in sailing vessels drawing 22 to 23 feet of water.

The following table shows the commerce of San Diego for the year 1906:

TABLE 297.—VESSEL MOVEMENT AND COMMERCE AT SAN DIEGO, 1906.

[Report of Chief of Engineers, U. S. Army, 1907, p. 2133.]

Vessel movement.

Class of vessels.	Incoming.	Outgoing.
Steam	325	327
Sailing	82	84
Total	407	411
Tonnage	319,440	327,203

TABLE 297.—VESSEL MOVEMENT AND COMMERCE AT SAN DIEGO, 1906—Continued.

Commerce.

Articles.	Incoming.	Outgoing.	Articles.	Incoming.	Outgoing.
Lumber.....M feet..	45,525	2,097	Onyx.....cubic feet..	5,742	.....
Coal.....tons..	26,700	2,483	Ores.....tons..	1,370	193
Coke.....do....	2,948	63	Live stock.....head..	8,293	.....
Cement.....do....	27,070	595			
Crude oil.....do....	14,767	56	Total.....tons..	216,761	
General Merchandise....do....	33,115	7,550			

Section 8. Commerce on the Colorado River.

In a letter to the Bureau of Corporations, dated January 30, 1907, Mr. J. A. Mellon, master of the steamer *Cochan*, operating on the Colorado River, gives the following brief history of transportation on that stream:

> In the year 1851 it became necessary for the United States to establish a military post at Yuma. The troops marched from San Diego. To supply the troops by the desert route was found impossible, and a contract was let by the quartermaster to G. A. Johnson to transport 75 tons by water from San Francisco to Yuma. Johnson shipped the stores on the schooner *Sierra Nevada* to the mouth of the Colorado, with lumber enough on deck to build flatboats for the river transportation, and with the same he cordelled the freight to Yuma, making a successful trip. The next contract let was for 100 tons, and a man by the name of Turnbull was the successful bidder. He shipped the goods to the mouth of the river on the *Invincible*, and with material for building a small boat, which he named the *Uncle Sam*. His boat did not have power enough to stem the current of the Colorado. When he reached a point 50 miles from Yuma he landed his freight, and from there it was hauled to Yuma by teams. The charge for hauling it was so great that it broke Turnbull. The next contract was awarded to George A. Johnson, and he built a steamer which he named the *General Jessup*. Johnson formed an association with Ben Hartshorn and another man of the name of Mintron, and the firm was known from that time (1853) until the year 1871 by the name of G. A. Johnson & Co. Their agent in San Francisco was George F. Hooper, who was also sutler at Yuma from 1853 until the Southern Pacific Railroad reached Yuma, in April, 1877. George A. Johnson was connected with the transportation of all government and all other stores from San Francisco to El Dorado Canyon, on the Colorado River. The river route was 525 miles, and the sea route was 1,950 miles by the Pacific and Gulf of California. In 1871 G. A. Johnson & Co. incorporated under the name of the Colorado Steam Navigation Company and put on the steamships *Newborn* and *Montana* to connect with the river boats. These ships made a trip from San Francisco every twenty days to the mouth of the river. Previous to 1871 freight was received on

the river boats from sailing vessels, with an occasional steamship, when there was a rush of government supplies and troops. Civilian freight first became an item on the Colorado River in 1859, when the Gila placer mines were struck, and from that time until the Southern Pacific Railroad reached Yuma there was a steady increase in river trade.

Mr. Mellon estimates that there were 110 men employed on the boats and barges and in the shipyards on the river belonging to the Colorado Steam Navigation Company. He continues:

> When the railroad reached a point 30 miles from Yuma, in March, 1877, the P. I. Company, a branch of the Southern Pacific Railroad, bought out the Colorado Steam Navigation Company, and from that year until 1886 the P. I. Company ran the river boats in connection with the Southern Pacific Railroad. In September, 1886, the P. I. Company sold their interests to Polhamus & Mellon, who controlled the trade until 1903, at which time Polhamus withdrew, and at present the transportation is controlled by Joe J. Thornton, J. A. Mellon, John Gandolfo, Frank Monaghan, and Dan Murphy. They own the steamer *Cochan* and the barge *Silas J. Lewis*. The *Cochan* is 237 tons, custom-house measure. She is 157 feet over all and 32 feet beam, and draws 20 inches of water when light, and for every 10 tons of freight displaces 1 inch of water. The barge *Silas J. Lewis* is 150 feet over all, 32 feet beam, 4 feet deep. She measures 100 tons, draws 7 inches without load, and carries 11 tons to every inch you sink her in the water, or 178 tons on a draft of 2 feet. We are not incorporated, although we work under the name of the Colorado Steam Navigation Company, the reason for which is that I have been on the boats constantly since 1863, first with G. A. Johnson & Co., then with the Colorado Steam Navigation Company, next with the P. I. Company, which still retains the name of the Colorado Steam Navigation Company, and when Polhamus and I bought out the boats we continued to call it the Colorado Steam Navigation, and so down to the present time.

Mr. Mellon states that the profits of his company are far less now than before the advent of the railroad into Arizona. He states that the *Cochan* was built in 1899, at a cost of $26,000, starting on her first run January 7, 1900. The barge *Silas J. Lewis* was, according to his statement, launched September 29, 1901.

Referring to the subject of competing boat lines, Mr. Mellon writes that the first competitive boat put on the Colorado was in 1864, the name of the vessel being *Esmeralda* and her owner Thomas E. Trueworthy. Owing to Trueworthy's ignorance of navigating the Colorado she went to the wall and, according to the statement of Mr. Mellon, was sold to G. A. Johnson & Co. for a nominal sum. Mr. Mellon writes that the next competitive boat was the *Ninatilden*, in 1868, which appears to have gone the same way as the *Esmeralda*. No further competition appears to have been encountered until 1902, when the Mexican-Colorado Navigation Company was formed in Los Angeles, Cal., and put on a small boat called the *St. Vallier*. When

Mr. Mellon wrote, this boat had been in the hands of the sheriff for a year.

Mr. Mellon, in his letter, thus summarizes the history of vessel building on the Colorado River:

TABLE 298.—VESSELS BUILT ON THE COLORADO RIVER.

Name.	Class.	When built.	Name.	Class.	When built.
Uncle Sam	Steamer	1852	Mohave No. 2	Steamer	1876
General Jessup	do	1853	Mohave No. 3	do	1884
Colorado No. 1	do	1856	Cochan	do	1899
Explorer Lieut. J. C. Ives (government boat).	do	1857	St. Vallier (iron)	do	1898
			Searchlight	do	1903
Cocopah No. 1	do	1858	No. 1	Barge	1864
Colorado No. 2	do	1862	No. 2	do	1866
Mohave No. 1	do	1864	No. 3	do	1867
Esmeralda	do	1864	No. 4	do	1872
Ninatilden (built in San Francisco).	do	1865	Black Crook	do	1864
			White Swan	do	1868
Cocopah No. 2	do	1867	Silas J. Lewis	do	1901
Gila	do	1872			

Referring to the subject of barges, Mr. Mellon writes that all of these, except the *Silas J. Lewis*, were rebuilt a number of times. He ends his letter with this statement:

> I have come to the conclusion that any river that has over 4 feet fall to the mile can not compete with a railroad for freight or passengers.

According to the Census the freight carried on the Colorado River in Arizona in 1906 amounted to 4,800 tons.

Section 9. Commerce between Pacific and Atlantic ports of the United States.

Water-borne commerce between the Pacific and Atlantic coast ports of the country may take the route via Cape Horn, via the Isthmus of Panama, or via the Tehuantepec route of Mexico. The route around Cape Horn is an all-water route, the Panama route is operated in connection with the Panama Railway, and the Tehuantepec route in connection with the Tehuantepec National Railway of Mexico, water transportation by these two latter routes involving transshipment with steamship lines at Panama and Colon, and at Salina Cruz and Coatzacoalcos, Mexico, respectively. There is also an important rail and water movement by way of southern ports, particularly New Orleans and Galveston.

CAPE HORN ROUTE.—Table 299 shows the movement of vessels via Cape Horn between the Pacific and Atlantic ports of the United States during the fiscal year 1906. No statement of the quantities or values of the merchandise carried by these vessels is available.

One line of sailing vessels operating between New York and Honolulu reports that outward cargoes consist of coal, cement, manufactures of iron, steel, wood, and other goods; and return cargoes generally of sugar from Honululu to New York.

TABLE 299.—MOVEMENT OF VESSELS BETWEEN PACIFIC AND ATLANTIC COASTS OF THE UNITED STATES VIA CAPE HORN, YEAR ENDED JUNE 30, 1906.

[Commerce and Navigation of the United States, 1906, p. 1273.]

From—	Entered at San Francisco.		Cleared for San Francisco.		Cleared for other Pacific ports.		Total cleared.	
	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.
New York	21	74,522	17	62,169	1	[a] 5,621	18	67,790
Philadelphia	.....	.....	5	16,283	2	[b] 4,404	7	20,687
Baltimore	2	2,461	1	2,334	1	[c] 1,993	2	4,327
Total	23	76,983	23	80,786	4	12,018	27	92,804

From—	Entered at New York.		Cleared for New York.		Cleared for other Atlantic ports.		Total cleared.	
	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.
Hawaii	6	29,236	.....	.....	.....	.....	.....	.....
Puget Sound	2	4,002	5	8,597	1	[d] 1,062	6	9,659
Willamette	.....	.....	.....	.....	1	[d] 1,241	1	1,241
San Francisco	12	44,410	16	47,688	1	[e] 1,993	17	49,681
San Diego	.....	.....	.....	.....	1	[f] 2,014	1	2,014
Total	20	77,648	21	56,285	4	6,310	25	62,595

[a] For San Diego.
[b] For Hawaii.
[c] For Willamette.
[d] For Boston.
[e] For Philadelphia.
[f] For Baltimore.

PANAMA ROUTE.—The value of the domestic merchandise shipped between San Francisco and New York via the Isthmus of Panama during the fiscal years 1899 to 1906 is shown in the following table:

TABLE 300.—VALUE OF DOMESTIC MERCHANDISE SHIPPED BETWEEN SAN FRANCISCO AND NEW YORK VIA THE ISTHMUS OF PANAMA, 1889–1907.

[Commerce and Navigation of the United States, 1906, p. 1271.]

Year ended June 30—	Eastbound.	Westbound.	Year ended June 30—	Eastbound.	Westbound.
1889	$940,638	$2,299,414	1899	$926,373	$4,963,409
1890	968,955	2,089,554	1900	1,765,729	5,052,051
1891	1,129,893	2,560,132	1901	2,216,803	5,805,697
1892	1,338,260	2,123,534	1902	2,680,424	5,975,340
1893	1,951,130	3,252,865	1903	2,292,249	5,151,890
1894	1,068,250	2,248,864	1904	3,130,311	5,178,703
1895	1,971,431	3,389,414	1905	2,569,957	5,087,418
1896	1,785,652	3,975,391	1906	2,002,907	3,766,789
1897	1,266,837	3,054,988	1907[a]	2,278,112	3,302,475
1898	1,111,138	3,428,114			

[a] Commerce and Navigation of the United States, 1907, p. 1308. The figures for 1907 cover shipments from San Francisco to all Atlantic ports, and from New York to all Pacific ports.

TEHUANTEPEC ROUTE.—The route via the Isthmus of Tehuantepec was not in use until January 1, 1907. From that date until June 30, 1907 (six months), the value of merchandise shipped from United States ports passing over the route is shown in the following table:

TABLE 301.—VALUE OF DOMESTIC MERCHANDISE SHIPPED FROM PORTS OF THE UNITED STATES VIA THE ISTHMUS OF TEHUANTEPEC, JANUARY 1 TO JUNE 30, 1907.

[Commerce and Navigation of the United States, 1907, p. 1308.]

Eastbound.	Value.	Westbound.	Value.
San Francisco to Atlantic ports	$366,792	New York to Pacific ports	$4,891,108
Hawaii to Atlantic ports	5,517,965	New York to Hawaii	608,047
Total	5,884,757	Total	5,499,155

Section 10. Commerce with noncontiguous territory in the Pacific.

Trade with noncontiguous territory in the Pacific includes the commerce with Alaska, Hawaii, the Philippine Islands, Guam, Tutuila, and the Midway Islands. The commerce with Alaska, Hawaii, and the Philippine Islands is of importance, but that with Guam, Tutuila, and the Midway Islands is small. The movement of vessels between United States ports and Alaska and Hawaii in 1906 and 1907 is shown in the following table:

TABLE 302.—VESSEL MOVEMENT BETWEEN UNITED STATES PORTS AND ALASKA AND HAWAII, 1906 AND 1907.

[Monthly Summary of Commerce and Finance, December, 1907, p. 1115.]

From—	To Alaska.				To Hawaii.			
	1906.		1907.		1906.		1907.	
	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.
Pacific ports:								
Puget Sound, Wash.	423	362,220	424	381,989	60	95,366	43	88,126
San Francisco, Cal.	60	53,641	65	65,959	182	284,729	170	320,351
Los Angeles, Cal.	.....	.....	.....	.....	.....	.....	16	27,106
Other Pacific ports	6	5,141	3	3,581	6	3,479	9	12,300
Total	489	421,002	492	451,529	248	383,574	238	447,883
Atlantic ports:								
New York, N. Y.	.....	.....	.....	.....	2	1,885	3	3,714
Baltimore, Md.	.....	.....	.....	.....	.....	.....	3	8,488
Newport News, Va.	.....	.....	.....	.....	.....	.....	4	11,762
Norfolk and Portsmouth, Va.	.....	.....	.....	.....	.....	.....	3	7,243
Total	.....	.....	.....	.....	2	1,885	13	31,207
Grand total	.....	.....	.....	.....	250	385,459	251	479,090

ALASKA.—Traffic between ports in the Pacific Coast States and Alaska is carried by water, there being no through rail lines. Most of the steamship companies operate from Puget Sound ports, principally Seattle; one line operates from San Francisco, but none from Portland.

The routes to Alaska may be classed as (1) the southeastern Alaska route, covering all points in Alaska as far as Juneau and Skagway; (2) the southwestern (western) Alaska route, extending from Yakutat on the east to Kodiak on the west, although sometimes taken as extending as far as Dutch Harbor, which is on the route of the ships to Bering Sea; and (3) the Bering Sea or Nome route, to Nome, St. Michael, and the whole Seward Peninsula south of Bering Strait.

North of Bering Strait there is practically no commerce except that sometimes steamers go up to Kotzebue Sound during the month of August. The southeastern and southwestern Alaska routes are open for the entire year, while the route to Bering Sea is open only from about the first of June to about the middle of October.

Several steamship lines operate between San Francisco and Seattle to Skagway and intermediate points on the southeastern route. The principal articles carried in this trade consist of northbound shipments of general merchandise, machinery, live stock, lumber, oats, mill feed, and hay; southbound, of ore, concentrates, bullion and treasure, canned salmon, fresh fish, marble, and gypsum.

On the southwestern route one company operates from San Francisco and two from Seattle. The traffic on this route consists of northbound shipments of general merchandise and mining machinery; and southbound, of ore and fish. There is said not to be sufficient business to be attractive to tramp vessels.

On the Nome route to such points as Unalaska, Nome, and St. Michael the northward shipments are of the same general character as the shipments to southeastern Alaska, while the southbound shipments are of treasure and a limited quantity of ore.

The only commodities that go to Alaska in straight carload lots are coal and lumber. Outside of local business, coal is carried by large ships, generally foreign chartered ships, from British Columbia points, although small quantities are also shipped by the regular lines from ports on Puget Sound. Lumber goes to all main points by the regular lines, although there are occasional charters of good-size ships.

River transportation in Alaska.—Besides the ocean traffic mentioned above, there is also considerable traffic on the Yukon River and its tributaries. The steamship lines running on the southeastern Alaska route connect at Skagway with a railway line, through Canadian territory, which transports freight to White Horse, B. C.,

where it is transferred to river steamboats operated by the railway company on the Yukon River as far as Dawson. A stage service on sleds is maintained during the season when navigation is closed. Between Dawson and St. Michael, as well as to points on the Koyukuk and Tanana rivers, transportation is carried on principally by the steamboats and barges of two American companies. At St. Michael the ocean steamships on the Bering Sea route connect with the Yukon River steamboats. Thus, freight is transferred at both ends of the Yukon River.

The traffic on the Yukon River consists of general merchandise, feed, hardware, and mining machinery, and also oil handled for steamboat fuel. A railway is projected to extend in a northerly direction from Seward on the southwestern Alaska route for a distance of about 450 miles to Tanana River, a tributary of the Yukon. On September 1, 1907, 52 miles of this railway were completed and in operation from Seward north, and 60 miles additional were under construction. Another railway is projected from Valdez to Fairbanks and Dawson.

The value of shipments of domestic and foreign merchandise to Alaska from United States ports in 1905, 1906, and 1907 is shown in the following table:

TABLE 303.—SHIPMENTS FROM PACIFIC COAST PORTS TO ALASKA, 1905–1907

[Monthly Summary of Commerce and Finance, December, 1907, pp. 1082, 1083.]

Customs district.	Domestic merchandise.			Foreign merchandise.		
	1905.	1906.	1907.	1905.	1906.	1907.
Puget Sound, Wash	$11,874,256	$15,177,499	$14,963,179	$171,919	$293,406	$365,552
San Francisco, Cal	1,970,568	1,397,237	1,723,904	118,868	232,429	200,658
Oregon, Oreg	94,419	122,318	160,936	14,938	33,215	10,035
Willamette, Oreg	50,376	112,972	80,093	.....	550	8,917
Los Angeles, Cal	.....	8,400	.....	.....	.....	.....
Total	13,989,619	16,818,426	[a]16,928,411	[b]305,727	[b]559,613	[b]585,170

[a] Includes $299 from Memphremagog, Vt.

[b] Includes $2 in 1905, $13 in 1906, and $8 in 1907, from Bangor, Me.

The following table shows the principal shipments from Seattle to southern Alaska for 1906 and 1907 and to Bering Sea ports for 1906:

TABLE 304.—SHIPMENTS FROM SEATTLE TO SOUTHERN ALASKA AND BERING SEA PORTS, 1906 AND 1907, BY ARTICLES.

[Reports of harbor master at Seattle, and Monthly Summary of Commerce and Finance, December, 1907, p. 1199.]

Articles.	Southern Alaska.			Bering Sea ports, 1906.	
	1906.		1907, quantity.	Quantity.	Value.
	Quantity.	Value.			
Merchandise		$5,056,958			$6,094,665
Hardware.....cases..	30,086	257,954	33,916	35,201	298,701
Machinery.....packages..	3,623	212,788	25,490	7,578	487,846
Powder.....cases..	62,277	431,407	48,564	1,460	9,549
Clothing.....do....	4,626	221,649	4,816	4,349	364,854
Meat.....do....	23,073	223,570	26,208	25,509	253,878
Flour.....harrels..	7,290	29,192	14,437	16,304	69,550
Oats.....bushels..	16,726	12,287	79,444	34,666	39,084
Feed.....tons..	466			695	14,898
Hay.....do....	2,510	52,471	5,186	4,484	93,995
Live stock.....head..	2,381	198,333	2,373	1,074	78,194
Lumber.....M feet..	4,499	56,626	10,849	8,138	87,218
Ties.....pieces..			26,410	43,703	11,107
Rails.....do....	14,922	153,271	35,445	18,189	100,509
Tie plates.....bundles..	25,765	92,913			

Shipments from Alaskan ports in American vessels in 1906 amounted to 218,515 tons. The principal articles were canned goods, 44,029 tons; lumber, 6,753 M feet; petroleum and other oils, 31,689 barrels; and miscellaneous merchandise, 144,793 tons.

HAWAII.—Shipments to Hawaii consist principally of oil, manufactures of iron and steel, cotton manufactures, and breadstuffs, and there is also a considerable movement of meat and dairy products and lumber. There is a small amount of coal shipped from the Pacific coast. Return cargoes consist mainly of raw and refined sugar.

San Francisco is the most important point of shipment, but there is also a considerable movement from Puget Sound, and in 1907 a considerable increase of trade from New York. This latter seems to be connected with the new route of the American-Hawaiian Steamship Company via the Isthmus of Tehuantepec.

Traffic from Honolulu to ports in the other islands of the Hawaiian group consists largely of general merchandise, with return shipments of sugar, rice, live stock, etc.

TABLE 305.—SHIPMENTS OF MERCHANDISE TO HAWAII, 1905-1907, BY CUSTOMS DISTRICTS AND BY ARTICLES.

[Monthly Summary of Commerce and Finance, December, 1907, pp. 1087, 1093.]

By customs districts.

	1905.	1906.	1907.
New York, N. Y.	$265,840	$145,363	$2,035,940
Puget Sound, Wash.	944,983	1,405,481	1,847,722
San Francisco, Cal.:			
Domestic merchandise	10,763,160	10,560,851	10,969,404
Foreign merchandise	137,299	335,971	374,165
Oregon, Oreg.	.....	.....	25,082
Willamette, Oreg.	46,871	57,253	18,000
Los Angeles, Cal.	60,300	53,609	238,160
Total, including minor ports	12,259,565	12,630,955	15,732,074

By principal articles (domestic merchandise).

Breadstuffs	$1,457,417	$1,373,756	$1,644,309
Meat and dairy products	541,019	586,215	676,695
Manufactures of cotton	956,859	1,049,646	1,685,010
Manufactures of iron and steel	1,434,074	1,425,345	2,070,863
Lumber and manufactures of wood	642,527	867,094	931,465
Oils	1,368,144	1,250,829	1,027,553

GUAM AND TUTUILA.—There is only a trifling commerce with the isolated United States islands in the Pacific—Guam, the Midway Islands, and Tutuila. Most of the small trade of these islands is with other countries, except the exports from Tutuila. The following table shows the movement between the United States and Tutuila and Guam for the fiscal years ended June 30, 1903 to 1907.

TABLE 306.—COMMERCE BETWEEN UNITED STATES AND TUTUILA AND GUAM, 1903-1907.

[Statistical Abstract of United States, 1907, p. 557.]

Year.	Tutuila.		Guam.	
	Imports.[a]	Exports.[b]	Imports.[a]	Exports.[b]
1903	$44,688	$9,588	$24,974	$1,075
1904	31,148	25,877	151,578	4,015
1905	26,245	47,453	14,116	573
1906	23,824	53,245	12,392	.....
1907	15,122	42,935	17,552	.....

[a] From United States. [b] To United States.

PHILIPPINE ISLANDS.—Trade with the Philippine Islands is carried by way of Hongkong, as there is no direct line from the Pacific coast to Manila. Until recently the Boston Steamship Company operated two vessels and was the only commercial line making regular trips to

Manila, but on account of foreign competition, and for other reasons, decided to sell its vessels and withdraw from business.

As shown by the following table, the larger part of the trade with the Philippine Islands is from New York, but a considerable amount is carried on by way of San Francisco and Puget Sound. A notable part of the return movement comes to Boston. The total shipments from the United States has nearly doubled from 1905 to 1907, but the return movement shows a decline during this period. To what extent this includes government supplies is not shown.

TABLE 307.—COMMERCE BETWEEN THE UNITED STATES AND THE PHILIPPINE ISLANDS, 1905–1907.

[Monthly Summary of Commerce and Finance, December, 1907, pp. 1110–1112.]

Shipments to Philippine Islands.

Customs districts from which shipped.	1905.	1906.	1907.
New York	$2,841,094	$4,059,067	$6,990,437
Philadelphia	93,935	66,316	174,276
Norfolk and Portsmouth	119,694	.....	171,088
San Francisco	1,356,232	1,152,092	2,051,816
Puget Sound	949,881	1,611,577	1,165,731
Willamette, Oreg	73,930	147,121	54,795
Total, including minor ports	5,736,960	7,101,831	10,926,071

Receipts from Philippine Islands.

Customs districts into which imported.	1905.	1906.	1907.
Boston and Charlestown	$3,176,574	$1,702,819	$3,768,095
New York	10,266,800	6,628,518	6,652,269
Chicago	472,783	207,524	1,774
San Francisco	674,097	925,689	830,979
Puget Sound	946,783	525,139	912,354
Willamette, Oreg	121,168	92,526	71,784
Total, including minor ports	15,567,736	10,104,544	12,264,478

The following tables show the increase in the shipments from San Francisco and shipments from Seattle to the Philippine Islands:

TABLE 308.—SHIPMENTS FROM SAN FRANCISCO TO THE PHILIPPINE ISLANDS, 1896–1907.

[Report of San Francisco Merchants' Exchange, 1906–7, p. 25.]

Year ended June 30—	Value.	Year ended June 30—	Value.
1896	$20,817	1902	$873,628
1897	6,739	1903	807,490
1898	3,955	1904	893,654
1899	142,068	1905	1,102,464
1900	595,023	1906	1,215,267
1901	953,668	1907	2,049,492

TABLE 309.—SHIPMENTS FROM SEATTLE TO THE PHILIPPINE ISLANDS, 1906 AND 1907, BY ARTICLES.

[Monthly Summary of Commerce and Finance and report of harbor master at Seattle.]

Articles.	1906.		1907.	Articles.	1906.		1907.
	Quantity.	Value.	Quantity.		Quantity.	Value.	Quantity.
Flour.....barrels..	22,802	$79,876	46,342	Photographic goods.....cases..	56	$1,039	.....
Milk.....cases..	18,205	75,305	7,104	Live stock...head..	979	111,350	492
Beer.....barrels..	3,250	24,858	1,728	Lumber...M feet..	3,299	49,110	52,340
Cotton.....bales..	200	11,644	250	Tobacco.....hhds..	310	15,938	91
Meat.....cases..	6,700	75,435	2,304	Salmon.....cases..	7,727	27,719	19,872
Merchandise.....	.....	174,666	.....	Total.....	.....	[a]1,007,331	.....
Machinery...pkgs..	991	20,973	81				
Oats.....bushels..	560,199	250,384	512,915				
Hay.....tons..	5,423	84,903	3,732				

[a]Included $4,131, value of other freight.

INDEX OF NAVIGABLE STREAMS AND CANALS.

NAVIGABLE STREAMS.

CANALS.

INDEX OF PORTS AND HARBORS.

58953—PT 2—09——27

GENERAL INDEX.

O