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WATERBORNE

LOUISIANA'S PORTS
& WATERWAYS



James P. Schweitzer

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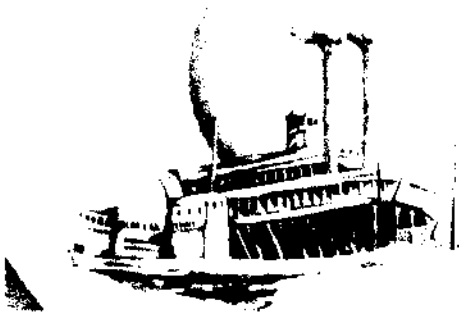
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INTRODUCTION

WATERBORNE! Louisiana's Ports and Waterways is intended to serve as a supplementary text in Louisiana junior high schools. Its purpose is to provide Louisiana students with a better understanding of the importance to the state's economy of foreign trade, deepwater port operations, and inland water transportation. Marine and inland water commerce did much to shape the history of the state. In modern times, about 20 percent of Louisiana's economy is directly or indirectly attributable to foreign trade, and most of this trade is dependent entirely on marine and inland waterway transportation.

This project is a cooperative effort funded by the Board of Commissioners of the Port of New Orleans, the Greater Baton Rouge Port Commission, and the South Louisiana Port Commission, and published by the Louisiana Sea Grant College Program. The author wishes to acknowledge the assistance of Dr. Mark T. Carleton of the LSU Department of History and Mr. Leonard Huber, Louisiana historian, for their thorough reviews of this manuscript.

The Mississippi River System: A Funnel of Commerce



The Mississippi River drains the heartland of North America. This drainage area is rimmed on the west by the Rocky Mountains and on the east by the Alleghenies. It includes more than three million square kilometers of land, or nearly half of the United States. The region has some of the world's most productive farm lands. Its agriculture, commerce, and industry support a population of nearly 90 million people.

The Mississippi's drainage area is shaped much like a funnel. The funnel moves water seaward to the Gulf of Mexico. Along the way it gathers water from hundreds of smaller streams. In time, the water flows through the lower Mississippi River, the main stem of the drainage system.

Two-thirds of the drainage area lies west of the Mississippi River, but nearly half of the waters enter from the eastern side. The Missouri River is the longest tributary in the system, but the Ohio River has the most water.

A glance at a map of the Mississippi River system reveals its value as a means of transportation. European nations fought to control the valley during the eighteenth and early nineteenth centuries. Many towns in the region were located to take advantage of river transportation.

Commerce on the river flourished during and before the era of the Mississippi River steamboat. Steamboat traffic on the river rose to a peak in the 1850s. During that time, the Mississippi's steamboats carried more freight and passengers than all of the steamboats of the British empire.

Most river commerce was funneled downriver to New Orleans. In the 1850s more than half of the U.S. exports and imports moved through New Orleans. The city was the world's largest seaport and the nation's fourth largest city.

The Western Rivers

The Mississippi River and its tributaries are known as the "western rivers." Actually, waterborne commerce in the United States began on the eastern

rivers: the Hudson, the Delaware, the Susquehanna, and others. These rivers are small and flow slowly by comparison with the western rivers, which are larger and longer and require different kinds of river boats.

The eastern and western rivers are separated by the Appalachian Mountains. This separation set the pattern of transportation in the United States before the railroad era. Commerce between the eastern and western rivers had to move by river and ocean, passing through New Orleans. This movement was slow, but less costly than an overland trek across the mountains.

But transportation patterns changed after the War Between the States. The change was brought on mainly by the westward expansion of railroads. Trains offered the speed and flexibility that steamboats lacked. There was a steady decline of commerce on the western rivers. Soon the Mississippi River steamboats became relics of a brief but golden era in American history.

Mississippi River commerce declined but did not die. By the middle of the twentieth century, commerce returned to the western rivers on a larger scale than before. This rebirth was caused by the development of modern diesel-powered towboats. Barges pushed by towboats, including those of the western rivers, now carry about 10 percent of the nation's commerce.

The vessels of the western rivers move raw materials from one stage of production to the next. The rivers are well suited for transporting petroleum products, chemicals, grains, ores, and coal. Many heavy, bulky products are best moved by barge. The western rivers are a national resource that won't be exhausted.

River traffic supports thousands of jobs in businesses and industries. River transportation is especially important to jobs in agriculture, forestry, papermaking, petroleum refining, and chemical processing. All of these industries are basic to Louisiana's economy. Many jobs in Louisiana depend on water transportation.

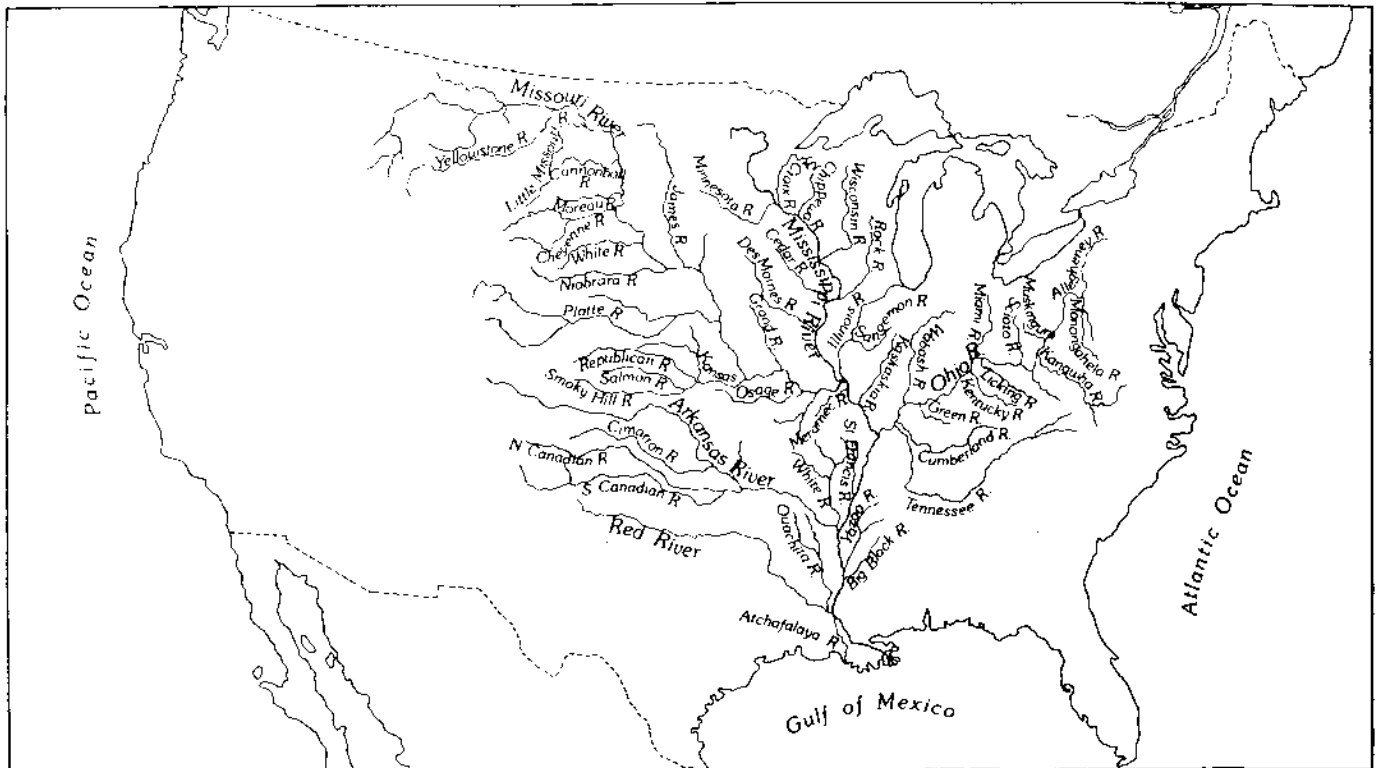


Figure 1-1. *The western rivers.*

The Six Basins of the Western Rivers

The great Mississippi River Valley is in fact composed of six large basins. Each of these basins is drained by a major river system:

- The Ohio-Tennessee
- The Upper Mississippi
- The Missouri
- The Arkansas-White
- The Red-Ouachita
- The Lower Mississippi

Five of the river systems flow into the sixth, the lower Mississippi. It is the trunk stream of the western rivers. Each river system is important to commerce and transportation within its basin.

Each basin gave birth to several American cities, both great and small. The cities grew according to their ability to foster trade on the western rivers. Pittsburgh, Wheeling, Louisville, and Cincinnati became the principal cities of the Ohio. Minneapolis, St. Paul, Alton, and St. Louis dominated the upper Mississippi. Sioux City, Omaha, Kansas City, and St. Joseph became principal ports on the Missouri. The Arkansas supported Fort Smith, Little Rock, and Pine Bluff, and more recently, Tulsa and Muskogee. The Red-Ouachita's port cities included Shreveport, Alexandria, and Monroe. Finally, the lower Mississippi produced a string of cities that added to the lore of the western rivers. These cities included Cairo, Memphis, Helena, Greenville, Vicksburg,

Natchez, Baton Rouge, Donaldsonville, and New Orleans.

The U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers maintains the western rivers for navigation. The Corps began removing sand bars, snags, and wrecks on the Ohio as early as 1824. Since then it has improved navigation throughout the six basins of the western rivers.

There are many laws dealing with the use of inland waterways. Many steps must be taken before a waterway project is considered or completed. These steps include congressional reviews and authorizations, public hearings, feasibility studies, environmental impact studies, and congressional appropriations. Waterway projects are often delayed many years by one or more law suits. The process is designed to eliminate all but the most worthy projects.

Before 1929, 53 locks and dams were built on the Ohio between Cairo, Illinois, and Pittsburgh, Pennsylvania. This distance is about 2,500 kilometers. The locks and dams formed watery stairsteps by which barges were lifted 150 meters between the two port cities. In 1954, work began on 19 new and larger locks and dams to replace the original locks on the Ohio. These improvements were needed because of increased barge traffic on the Ohio.

With a nine-foot depth, the upper Mississippi has been navigable to Minneapolis and St. Paul since

1938. The Illinois Waterway connects Chicago to the upper Mississippi. A six-foot depth has been authorized on the Missouri up to Sioux City, Iowa. The Arkansas River supports barge traffic up to Catoosa, the port city for Tulsa. A six-foot depth has

also been provided on the Ouachita up to Monroe, Louisiana, and Camden, Arkansas. The Red is the last of the rivers to be improved. Work is now underway to enable barges to be moved up to Alexandria and Shreveport, Louisiana, and to Daingerfield, Texas.

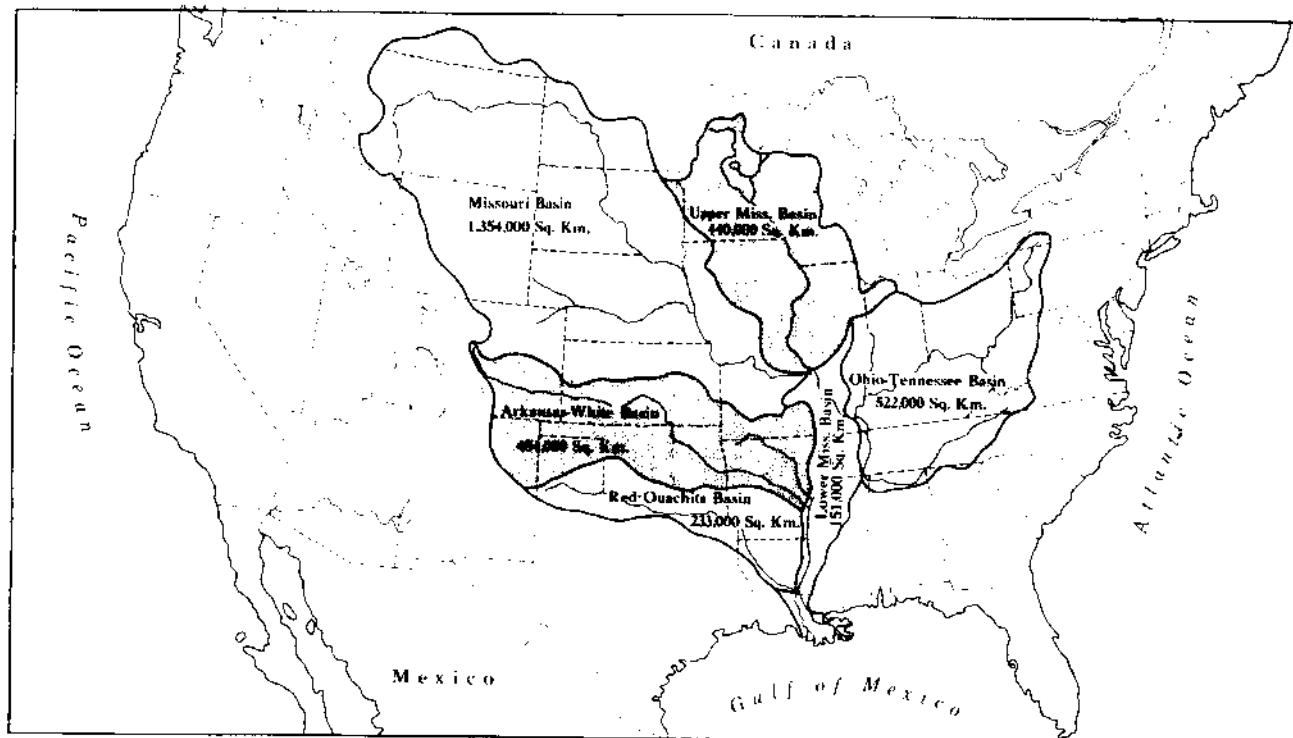


Figure 1-2. The six basins of the western rivers.

The Gulf Intracoastal Waterway

Louisiana ports also occupy key positions in the Gulf Intracoastal Waterway (GIWW) system. This east-west waterway extends nearly 1,800 kilometers from Brownsville, Texas, to St. Marks, Florida. Barges that move along the GIWW are sheltered from the hazards of the Gulf of Mexico.

The GIWW is a series of man-made canals, natural bayous and rivers, and protected bays and sounds. It was completed in 1949 after 40 years of planning and work. Originally it was expected to move five million tons of cargo each year, but now its yearly total exceeds a hundred million tons. In Louisiana the GIWW has a spur that connects Morgan City with the Mississippi through the Port Allen Canal. Also, the Atchafalaya connects Morgan City to the Mississippi.

The GIWW crosses the Mississippi River system. It provides 12-foot draft access to all ports and connecting waterways of the Gulf Coast. The hub of the waterway, however, is the 425-kilometer stretch that crosses Louisiana. The Louisiana portion accounts for about 60 percent of the entire waterway's yearly traffic total.

The 100-kilometer spur between Morgan City and Port Allen (Port of Baton Rouge) carries about 20 percent of the waterway's tonnage. The cargoes include crude petroleum, fuel oil and other petroleum products, nonmetallic minerals, and marine shells.

Barge companies want to extend the Gulf Intracoastal Waterway across Florida to Jacksonville. The extension would connect the GIWW with the Atlantic Intracoastal Waterway. The Atlantic Intracoastal Waterway provides sheltered passage between Miami and Norfolk, Virginia. Environmentalists, however, have objected to the proposal, and the project may never be completed.

Louisiana's Waterway Network

The deepwater ports of Louisiana play important roles in the transportation system of the western rivers and the Gulf Intracoastal Waterway. Cargoes on the Mississippi float downstream to Louisiana for shipment to overseas markets. Cargoes imported from abroad are also funneled through Louisiana's ports to markets in America's heartland. The east-west traffic on the GIWW is concentrated in

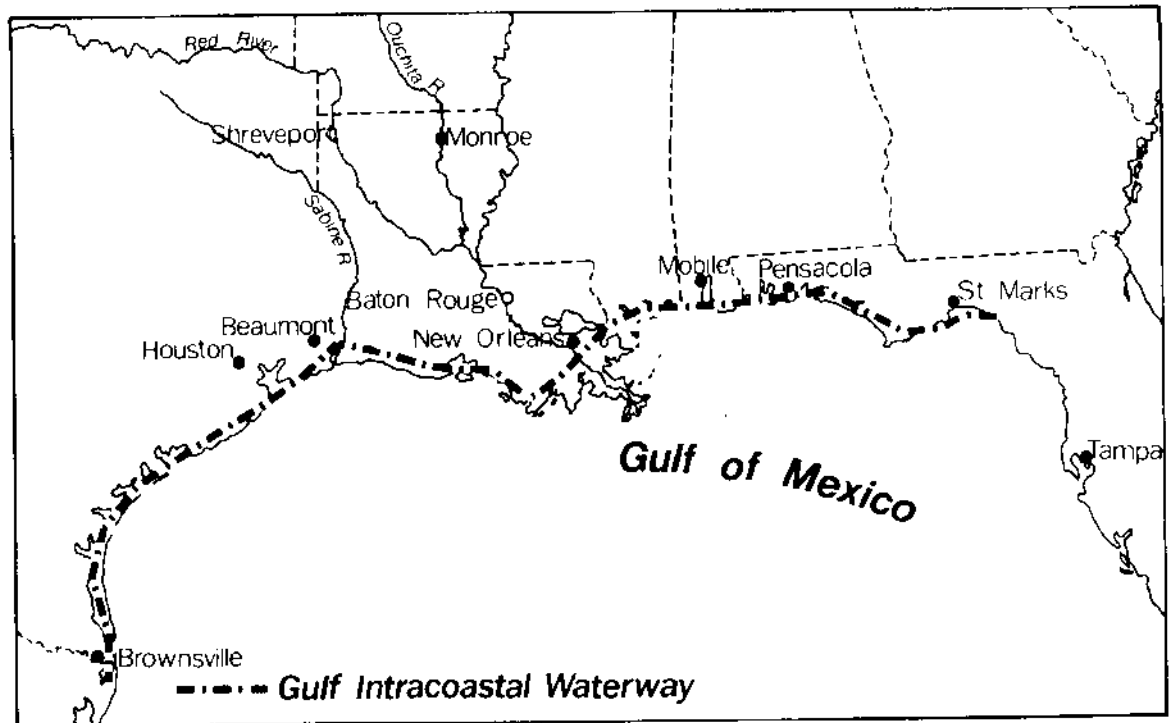


Figure 1-3. *The Gulf Intracoastal Waterway.*

Louisiana largely because it connects with north and south traffic on the Mississippi.

Louisiana's rivers, bayous, lakes, sounds, bays, passes, and canals provide a transportation network that has become very attractive to industries. Thousands of jobs in Louisiana depend on the movement of goods along the state's waterways.

There are several ports along Louisiana's portion of the Mississippi. In addition, there are port and docking facilities on the state's principal rivers and bayous. But Louisiana's major contribution to the commerce of the world is its major deepwater ports at New Orleans, Baton Rouge, the Port of South Louisiana, and Lake Charles.



Navigation on the Western Rivers

The Era Before the Steamboat

The Mississippi River system was a funnel of commerce even before the arrival of Europeans. The American Indians used various kinds of canoes to transport trade goods that included flints, pelts and hides, semiprecious stones, and, most important, salt.

Birchbark canoes were used in the Ohio Valley. Their light weight made them easy to carry overland between streams. Pirogues—canoes made from hollowed-out tree trunks—were used where streams were larger and where larger trees were available. Some pirogues were 8 or 9 meters long, with beams of 1½ meters.

Bullboats were common on the upper Missouri. Bullboats were made of buffalo hides stretched over a frame of willow limbs. Most were circular or oval in outline. Fur trappers later introduced larger versions of the bullboat. These were cargo vessels often 9 meters in length.

European fur trappers of the upper Mississippi and Ohio rivers also used Mackinaw boats or

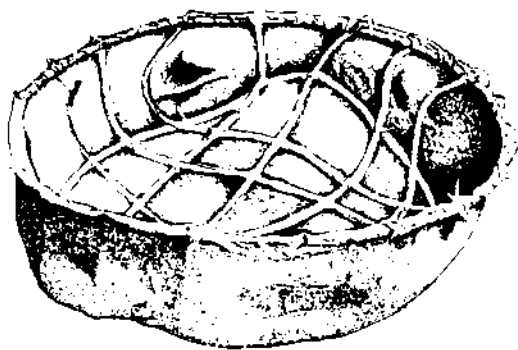


Figure II-4. The bullboat, made of animal skin stretched over a frame of willow limbs, was commonly used by Indians and European trappers of the Missouri and upper Mississippi rivers. It could be carried easily around waterfalls and rapids.

“mackinaw bateaux.” These were crudely built wooden boats with flat bottoms and square ends. They were up to 12 meters long and 3 or 4 meters in beam. Their crews included a steersman perched high on the stern and several oarsmen on either side of the vessel. The cargo of pelts was piled amidships and was covered with hides stretched over a wooden frame. Mackinaw boats were used well after the arrival of the steamboat. They moved cargo downstream to the “head of navigation” where goods were then transferred to steamboats.

The flatboat, an improvement over the Mackinaw boat, appeared on the Mississippi during the latter half of the eighteenth century. From 8 to 20 meters in length, with 3 to 8 meters of beam, these rectangular barges were made of oak or pine and were used to move freight and passengers downstream.

Flatboats had decks and living quarters astern. The cabin would often have a fireplace and chimney. The vessels were guided by a steersman astern and two forward oarsmen on either side. The forward oars gave these craft the appearance of having horns and were called “broad-horns.”

Flatboats were too clumsy and bulky to move upstream, and so were usually broken apart for lumber and firewood at their downstream destination. For more than a century, scrapped flatboats provided New Orleans with much lumber and firewood. Some older houses in New Orleans still contain wood salvaged from flatboats. Many of the early sidewalks or “banquettes” in New Orleans were built of flatboat wood.

Building large boats for a one-way passage downstream was costly. In time, the keelboat was developed for commerce on the Mississippi River. Keelboats were well-built vessels up to 25 meters long, with beams of about 9 meters. They had pointed bows and sterns and an amidships cabin for freight and passengers. A narrow gangway ran along either side of the vessel. The gangways were used as walkways for the crew, which was usually composed of four or five men on each side.



Figure 11-5. "The Jolly Flatboatmen No. 2" is a painting by the American frontier painter, George Caleb Bingham (1811-1879). The flatboat depicted here has a crew of six oarsmen and one steersman and is perhaps of better construction than most. This is the second painting of

flatboatmen by the same artist. In 1978, the painting sold for one million dollars, at that time the largest price ever paid for a painting by an American artist. (By permission of the Daniel J. Terra Collection, Terra Museum of American Art, Evanston, Illinois.)

The keelboats were an improvement over the flatboats because they could be moved upstream. The upstream passage, however, was slow and difficult. In shallow water, the keelboats were propelled by long poles. Crewmen would sink their poles into the river bottom. Then on command they walked astern while pushing against the poles.

In water too deep for poling, the boat was pulled upstream by a towline called a "cordelle." A cordelle might be as long as 300 meters. One end of the cordelle was tied to the vessel. The other was extended to the shore where the boat was towed by the crew or by mule teams. On the Ohio River, the cordelle was called a "hawser."

Sometimes a warping process had to be used. The shore end of the cordelle was tied to a tree upstream. The vessel was then pulled upstream by hauling in the line. Sometimes sails and oars were used to move the boats.

From 1750 to about 1860, keelboats provided

employment for hundreds of men. The work was very hard and keelboatmen developed strong muscles. Most keelboatmen were decent and honest, but some were given to hard drink, gambling, and robust living. They loved playing practical jokes on rival keelboat crews. They were always looking for a contest. Many keelboatmen later became steamboat pilots, captains, and mates.

Steam on the Western Rivers

No one is sure who invented the steamboat. In 1807 Robert Fulton of Pennsylvania was commissioned by Robert R. Livingston to build the *Clermont*. She was not the first steamboat, but she was the first to show a profit for her owners. The *Clermont* ran on the Hudson River between Albany and New York City.

Fulton and Livingston and their engineer, Nicholas J. Roosevelt, built the *New Orleans* at Pittsburgh in 1810. She was to become the first

steamboat on the western rivers. In 1811, Nicholas Roosevelt and his family set out from Pittsburgh on board the *New Orleans* bound for the Crescent City. It was an exciting voyage indeed. The vessel arrived in the vicinity of New Madrid, Missouri, in December of 1811. At New Madrid the crew and vessel experienced the most violent earthquake in the history of North America. The vessel survived, however, and was greeted by large crowds at every river port on the way to New Orleans.

The *New Orleans* entered trade on the lower Mississippi. For almost two years she was a financial success. She made 13 round trips per year between New Orleans and Natchez. A one-way trip lasted about 10 days. She usually carried 10 to 20 passengers at \$18 each on the downstream trips. On the upstream trips, she carried 30 to 40 passengers at \$25 each. Her first-year profits netted her owners \$20,000, a handsome sum in that time. Unfortunately, the *New Orleans* snagged and foundered near Baton Rouge on July 13, 1814. She was soon replaced by the *Vesuvius*, also owned by Fulton and Livingston.

In 1814, the Port of New Orleans received 598 flatboats, 324 barges, and 21 river steamboats. Ocean-going steamboats began calling at New Orleans in 1820. During that year Robert Fulton began regular steamship service between New Orleans and New York.



Figure II-7. Henry Miller Shreve (1785-1851) established practical steam navigation on the western rivers by designing shallow-draft boats with high-pressure engines mounted on deck.

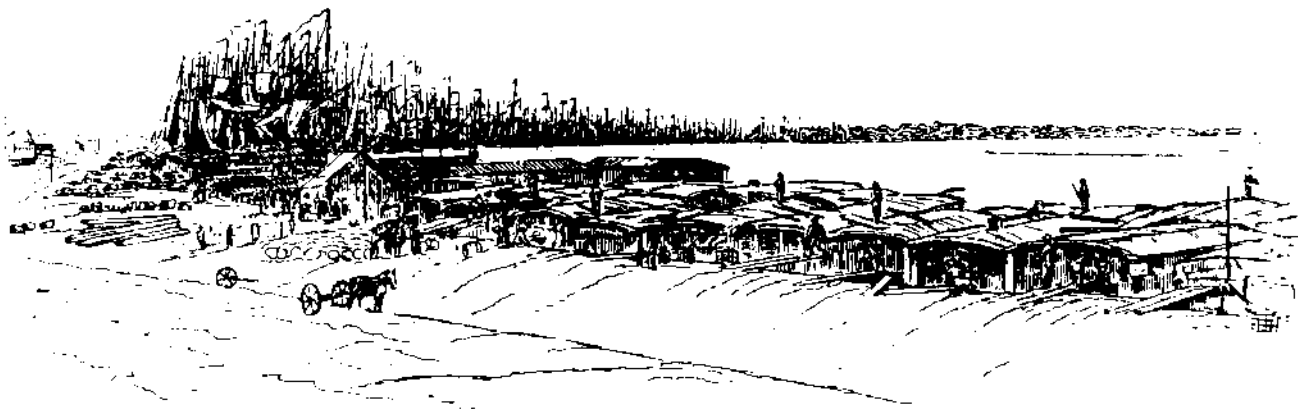


Figure II-6. Flatboats and sailing ships crowd river banks at New Orleans in the era before the steamboat (Troy H.

Middleton Library, Louisiana State University).

Steamboat Construction and Design

Actually the boats designed by Fulton were not well suited for the Mississippi River system. They were underpowered and required too deep a draft. In 1815 Henry Miller Shreve, also of Pennsylvania, completed work on the *Washington*. The *Washington* marked a revolution in steamboat design. Shreve obtained a very shallow draft by placing the engine and boilers on the main deck rather than in the hold. He designed a high-pressure engine with horizontal, rather than vertical, cylinders. The horizontal engine

provided a low profile and allowed the addition of a second deck.

Shreve's *Washington* was the forerunner of the large, multidecked Mississippi River steamboats of the 1830s and later. The lower deck, called the main deck, contained the engines, boilers, and space for fuel and cargo. The second deck was called the cabin deck. The cabin deck was for passenger use. It had a central, fore-and-aft main cabin used for meals and social events. Rows of small passenger cabins surrounded the main cabin. Passenger cabins were



Figure II-8. Robert Fulton (1765-1815) was an American inventor and portrait painter. He designed about 20 steamboats, including the *Clermont* and the *New Orleans* (Troy H. Middleton Library, Louisiana State University).

identified by the names of states. Thus the term *stateroom* entered the language.

The roof of the cabin deck forward of the smoke stacks was called the hurricane deck. The part behind the stacks often supported a line of cabins called the *texas*. The *texas*, so-named because Texas became a state at about that time, was used mainly as quarters for officers and crew. The pilot house was built on the roof of the *texas*. It had windows on all sides and contained the engine controls and the large steering wheel.

In the 1820s and 1830s, passengers slept in open berths on each side of the main cabin. These were usually separated by curtains or sliding partitions. Enclosed staterooms appeared during the 1840s. Staterooms were about 2 meters square before the War Between the States. Following the war, however, they were about twice as large.

Steamboats grew larger and more luxurious. Some were 90 meters long and had beams of 15 or more meters. The main cabins of the 1850s and later had crystal chandeliers, thick carpeting, carved furniture, and fine china. Many of the vessels could carry 600 or more passengers.

The steamboats of the western rivers were marvels. Engineers and investors from Asia, Europe, and Africa came to America to see the vessels. They wanted to adapt the Mississippi River boats for use in other parts of the world.

Two methods of propulsion emerged, the side and the stern paddle wheelers. The screw propellers used on ocean steamers were not suited to the western rivers because of the need for shallow draft. Sternwheelers provided more power and allowed for shallower water. But the sidewheelers were easier to maneuver because the sidewheels could help in steering the vessel. The sidewheelers also provided more weight amidships, thus relieving hull stress. By the 1840s nearly all new designs used sidewheels. The sternwheel was all but forgotten. In about 1880, freight rather than passengers became the main business of the steamboat. At that time the sternwheel was reborn, as it was more suited for pushing barges.

Steamboat construction and repair became a big business in the Ohio Valley. Between 1820 and 1880, more than 6,000 steamboats were built for the western rivers. The principal yards were at Pittsburgh, Wheeling, Portsmouth, Marietta, Louisville, Cincinnati, and St. Louis. The yards were located where there were good foundries and machine shops. Later, the yards specialized. Some built only hulls or superstructures, while others specialized in machinery and engines.

A major difference between the eastern and western steamboats was the engine design. Eastern boats used a low-pressure steam engine while western vessels required a high-pressure engine. The high-pressure engine was more powerful and allowed more speed, but it was more subject to boiler explosions.

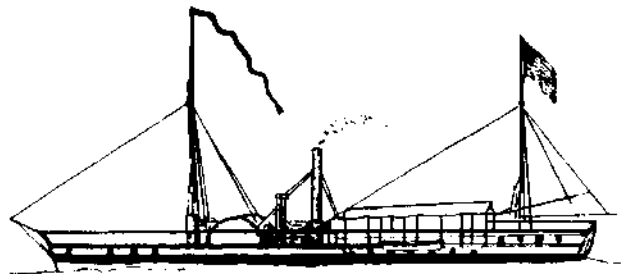


Figure II-9. The *Clermont*, first steamboat to show a profit, was built by Robert Fulton, Nicholas Roosevelt, and Robert Livingston, who held a 14-year contract with New York for steam navigation on state waters. The *Clermont* operated on the Hudson River between New York City and Albany, beginning in August 1807, and was powered by sails and a Watt-Boulton steam engine built in England. She could make only four knots against the tranquil Hudson River current, was subject to frequent breakdowns, and set up a noise that could be heard two miles away. Fulton, however, had an artist's eye for clean lines in vessel design, and the handsome, 130-foot *Clermont*, painted white and sky blue, brought glamour to steamboat travel.

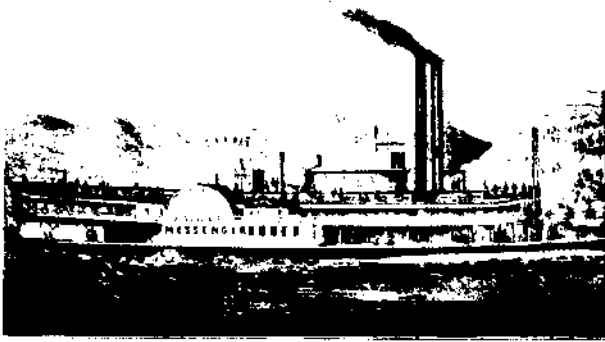


Figure II-10. *The Messenger* was one of eight steamboats operated on the Ohio River by the Pittsburgh and Cincinnati Packet Line, beginning in 1842. Trade on the Ohio, bolstered by heavy westward immigration, was very lucrative in the 1840s, but after 1854, railroad competition forced serious cutbacks in the company's operations. The Pittsburgh and Cincinnati Packet Line was dissolved in 1856, and most of the remaining packet lines on the Ohio shifted to the more affluent waters of the Mississippi. (A History of Transportation in the Ohio Valley. Arthur H. Clark Co.)

The Quest for Speed

Speed became an obsession on the western rivers, and detailed records were kept of the fastest times between major ports. The record-holder had the honor of *holding the horns*, a gilded pair of deer antlers proudly displayed on the pilothouse. The horns were passed from boat to boat as new records were set.

Steamboat racing became very popular, both as a sport and as a way of attracting new business. Most races were by chance, but some were planned well in advance. The most famous race occurred in 1870 between the *Natchez* and the *Rob't E. Lee*. The race caught the public's fancy and was the object of wagers as far away as London. Interest was great because Captain Cannon of the *Lee* and Captain Leathers of the *Natchez* were business rivals and personal enemies. Both captains denied that they were racing, but secretly made plans for the contest. The four-day race to St. Louis started at New Orleans with the *Lee* leaving four minutes ahead of the *Natchez*. The *Lee* gradually pulled away from the *Natchez* and the boats were never close together as shown in many pictures of the event.

The *Lee* was refueled (almost secretly) by a coal barge a little north of Vicksburg. Many *Natchez* supporters claimed this to be a foul and the matter was argued for many years. At Memphis the *Lee* was ahead by an hour. Both vessels ran into fog north of Cairo, Illinois, and had to slow down. The *Natchez* also suffered engine trouble. The *Lee* won the race, arriving in St. Louis six hours ahead of the *Natchez*.

Figure II-11. *The Princess* at a wooding stop, as depicted in a Currier and Ives print. Wood stops were made twice daily at established woodyards along the river. Steamboats burned great quantities of cordwood, but coal became the preferred fuel after the War Between the States. The *Princess*, built in Cincinnati in 1855, shows all the classic structural features of the prewar Mississippi River steamboat: a main or lower deck, a boiler deck whose roof forms the hurricane deck, a texas deck, and a gazebo. Decorative features include an eagle painted on the paddlewheel housing and the statue of an Indian princess above the pilot house. The *Princess's* boilers exploded below Baton Rouge in 1859, resulting in the loss of 75 lives (Library of Congress).



Figure II-12. *The famous race in 1870 between the Natchez and the Rob't E. Lee* as depicted in a Currier and Ives print. Actually, the boats were never as close together during the race as they are shown in this and other illustrations of the race. The race was from New Orleans to St. Louis and was won by the *Rob't E. Lee*. Both vessels are issuing great quantities of smoke and sparks, and steam from the engines is being discharged from smaller stacks amidships. The constant loss of steam indicates that the boats did not use fuel efficiently (Troy H. Middleton Library, Louisiana State University).

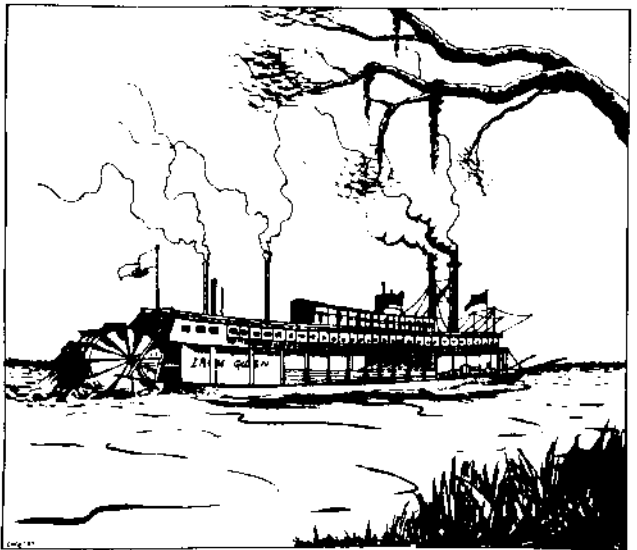
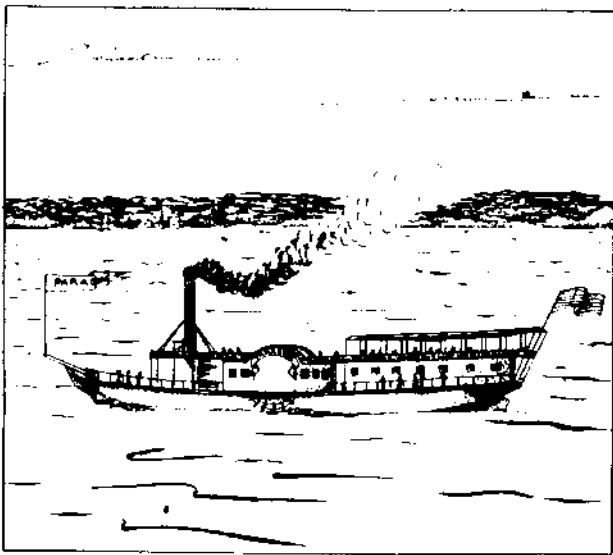
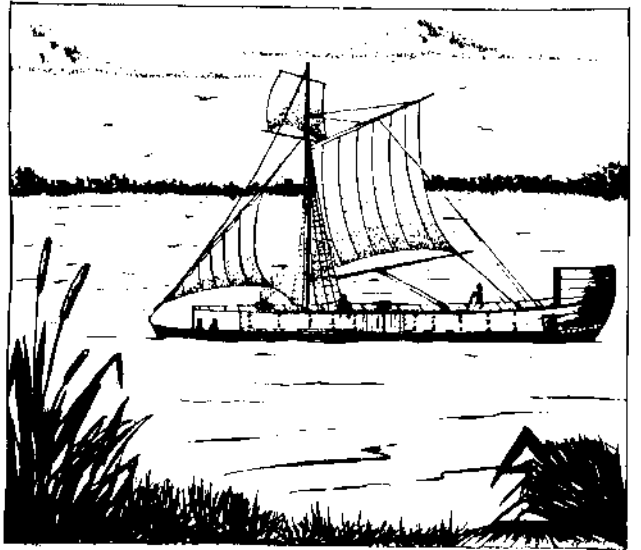
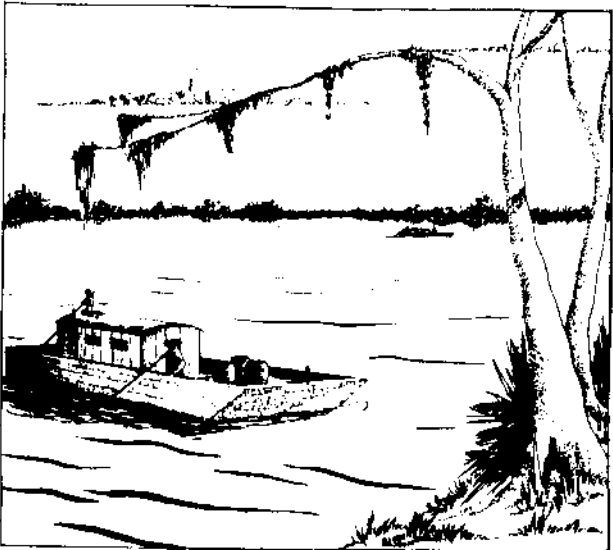
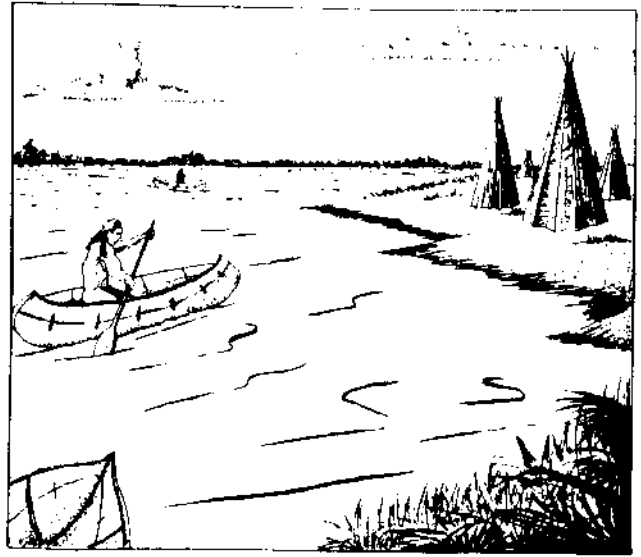


Figure II-13. Water transportation took many forms throughout the history of Louisiana waterways. From top left, clockwise, a pirogue, a birchbark canoe, a keelboat under sail, a sternwheeler (the Iron Queen), a sidewheeler (the Paragon), and a flatboat.

Steamboat Losses

The quest for speed contributed to many steamboat disasters. The high-pressure engines of the western boats made the danger of fire and explosion far greater than that for boats on the eastern rivers. The *Ben Sherrod* burned in 1837 while racing another boat on the Ohio River near Louisville. The firemen, said to have been drunk, were feeding the boilers with pine knots and rosin. Fire from the open boiler doors spread to a stack of cordwood nearby and burned the tiller ropes. Without steerage, the captain could not beach the vessel. Meanwhile barrels of brandy and gunpowder caught fire and exploded as did the boilers. More than 300 passengers and crew were killed by fire, scalding, and drowning.

There are no official records of steamboat losses before 1852. A private report, however, listed 998 accidents between 1817 and 1852. The list provides a breakdown of the causes of the losses: collisions (44); fires (166); explosions (209); snaggings and obstructions (579). The safety record on the western rivers was dismal indeed. But the record improved somewhat when Congress passed a steamboat-inspection bill (the Davis Act of 1852).

Up to about 1850, snaggings caused more than half of the steamboat sinkings. Snagging caused less loss of human life than did other causes, however, because often a boat that struck a snag could make the shore before sinking.

Most snags were tree trunks partly buried in the river bottom. Some were jagged and weighed more than 75 tons. When a tree fell into a river, its roots lodged in the riverbed while its top swung downstream. In time the limb stubs formed snagheads called either "sawyers" or "planters" pointing downstream. They were called sawyers if they moved up and down with a saw-like action caused by the current. They were called planters if the log was firmly embedded in the river bottom. As a rule, snags caused more danger to boats moving downstream because of the greater speed of the downstream vessels.

The task of removing snags was assigned to the U.S. Army Corps of Engineers in about 1824. Several designs for snagboats were devised, including one by John Bruce of Kentucky. Bruce tied two flatboats together with cross timbers. A large wooden lever and iron claw between hulls removed the snags. The lever was operated manually by a windlass.

A larger, steam-powered snagboat was designed by Henry M. Shreve in 1838. It could remove logs weighing up to 75 tons. Shreve-designed snagboats were used between the 1830s and 1880s to clear the

"Great Raft," a large log jam on the Red River. Snagboats were called "Uncle Sam's Toothpullers." They were also used to remove submerged boulders and sunken vessels.

Ice often halted river trade during the winter on the Ohio, upper Mississippi, and Missouri rivers. Many vessel losses were caused by the pressure of ice against the hull. Even vessels on the lower Mississippi had to be wary of floating ice in winter, though floating ice seldom moved farther south than Vicksburg. But on February 17, 1899, large chunks of river ice reached New Orleans. Eight thousand people lined the levees in New Orleans to view the spectacle.

Steamboat Captains, Mates, Pilots, and Engineers

Steamboats of the western rivers evolved their own customs. Each vessel had officers, including the captain, mate, pilot, clerk, and engineer. The role of the riverboat captain differed from that of the seagoing captain. In many instances the captain was part owner of the vessel. He was mainly concerned with the business affairs of the boat. Navigation and boat operations were left to the pilot and mate. Anyone with enough money could set himself up as a captain, as there were no requirements for a master's license. Even so, many riverboat captains knew much about navigation and vessel operations because they had risen through the ranks.

Captains The captain was the legal authority of the vessel after it left port. Until 1900 he could perform marriages. He was responsible for the safety



Figure II-14. Stoking the boilers was hot, dangerous work in unpleasant surroundings. Steamboat boilers were placed forward on the main deck, where their weight balanced that of the engines and wheels aft. Before the Steamboat Inspection Act of 1852, most boilers and steam pipes were of inexpensive cast iron, but thereafter wrought iron and copper were used. The act also required the installation of safety valves and gauges for steam pressure and water level (Harper's Weekly).

of passengers and the vessel. A misbehaving passenger was usually restrained and put ashore at the next port. Bad conduct among passengers usually involved fighting, rowdiness, drunkenness, cheating at cards, and lewdness.

Mates The mate on a riverboat was the captain's assistant. He was not required to navigate as was a seagoing mate. The mate directed the loading and unloading of passengers and cargo, and he supervised the work of the deckhands. He was also responsible for repair and maintenance. One of his chief concerns was the placement of cargo. A badly loaded vessel could not be operated safely and efficiently. Occasionally the mate took charge of a vessel during an emergency. A typical emergency might be the need to pull the vessel across a bar.

Pilots The pilot was the most skilled boatman. From the pilothouse, he took charge of the vessel's course. His art required knowledge of the vessel's handling qualities and the river's changing moods. Many secrets of the trade had to be learned. Slight ripples in the current might signal a snag ahead. A rising river is generally higher in the center and lower on either side, causing a boat to "slide" toward the bank. If the river is falling, the opposite is true—the vessel tends to follow the mid-currents.

While guiding a vessel downstream the pilot usually sought the fastest current. This meant keeping to the outside on river bends to find the deeper water and faster currents. Moving upstream was more complicated. The pilot had to find slower currents without running into water too shallow for the vessel's draft. This required repeated crossings of the midstream.

Pilots learned their trade by practice and experience. They kept notes of landmarks along the river banks. Many pilots specialized in certain rivers or stretches of a river. Young men in pilot training were called *cubs*.

Navigation aids and guides were few and not always reliable. Most pilots were willing to share their knowledge with other pilots. Several associations of pilots were organized. These helped to improve safety on the western rivers. After the Davis Act of 1852, pilots were required to be licensed.

In the early days, steamboats traveled only during daylight. Pilots gradually began nighttime trips. But this was usually on clear, moonlit nights and on safe rivers. The Missouri and Red rivers were slow to develop nighttime travel.

Beacon lights were placed on the lower Ohio in about 1869 by the Louisville Pilots Association. Congress authorized federal funds in 1875 for lighted beacons throughout the western rivers. This happened as the electric-arc search light was invented, and search lights were soon placed on most steamboats. Much of the mystery went out of the art of piloting. River travel became much safer.

Engineers The high-pressure steam engines of the western rivers created a shortage of engineers.

Many engineers were hired away from the eastern rivers. Some disliked working with high-pressure steam. Engineers had to work in hot, greasy engine rooms. They had little contact with the public. There was no time for relaxation because engines and boilers could never be left unattended. Many engineers began as firemen feeding the boilers. Then they became "strikers," and finally engineers.

A steam engine on a vessel was far more difficult to operate than one on land. Stresses on the hull could rupture steam lines and cause breakdowns. The engines and boilers had to be operated for long periods. There was little time for cleaning and repair. Most breakdowns seemed to occur in remote places.

Muddy river water was a problem. Silt collected in boiler valves and water lines and clogged them. The frequent need to change speeds, stop, or reverse engines was a serious problem for engineers. At each landing along the river, the engines shut down. But boiler pressure increased when the engines were idle. To avoid an explosion, the engineer had to vent the boilers, a necessary but fuel-costly practice.

At first, wood was the fuel used on the western rivers. Typically a vessel would take on wood once or twice daily, obtaining it from woodyards at every river port. Huge quantities of wood were burned, much of it wasted. The cutting and hauling of cordwood made jobs for many rural people at the time. Coal gradually replaced wood as fuel beginning about 1870. Coal required less deck space and was a better fuel.

Steamboat Passengers

Passengers included planters and businessmen and their families and emigrants on the way west. Many upstream deck passengers were flatboat crewmen returning north. (The flatboat trade lingered on the rivers until about 1870.) Most passengers enjoyed watching the scenery and observing the operations of the boat crew.

In the early days, passengers complained about filthy, crowded cabins and poor food. But by 1850 the rivers were graced with beautiful floating palaces. These vessels made the steamboat famous in American history. For settlers in the backwoods, the steamboat was a contact with the outside world. The vessels provided a touch of luxury and elegance.

The steamboat emerged in the Victorian age. That era had a love of ornate decor and fancy woodwork. "Steamboat Gothic" adorned every feature of the riverboat's superstructure. The pilothouse became a gazebo complete with wooden lacework. Smokestacks were painted bright colors and topped with iron finials. Decks were supported with many columns. Paddlewheel covers were painted with river scenes or patterns.

The most grandeur, however, was seen in the main cabin or grand saloon. The grand saloon ran the length of the cabin deck. The main cabin was the

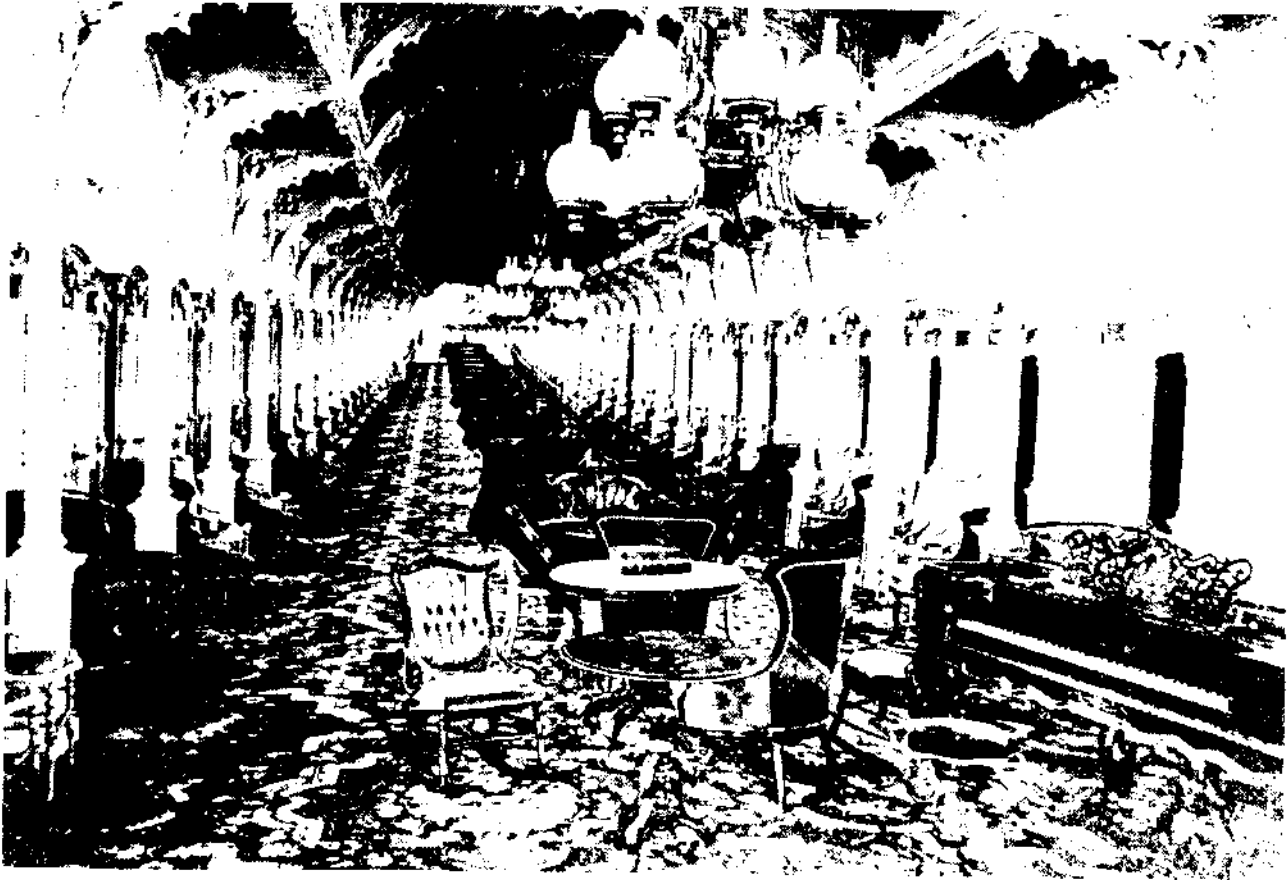


Figure II-15. The main cabin of the Grand Republic (originally named the Great Republic) was large and elegant. Built in Pittsburgh at a cost of \$235,000, the vessel was not a financial success and had bankrupted her original owners by 1871. In 1872, her hull was lengthened from 335

feet to 350 feet, and she was outfitted as the most luxurious vessel on the Mississippi River. Her name was changed to the Grand Republic in 1876. In 1877 she burned to the waterline while moored at Carondelet, Missouri (Library of Congress).

center of the boat's social life. There were musicals, dancing, lectures, card playing, and, on Sundays, religious services.

During the 1850s, the cost of a steamboat passage from St. Louis or Louisville to New Orleans was \$12 or \$15 on the American Plan (cost of board included in cabin fare). Passengers could buy deck passage for about \$3. Space for deck passengers was limited. "Deckers" usually slept on cotton bales or on sacks of grain. They either brought their own food or paid extra for food. Deckers could sometimes get a reduction in fare if they worked with the deck crew. Deckers were generally used to load cordwood. Crew members, as a rule, resented deck passengers.

The riverboat gambler with fancy waistcoat and derby hat is more common in fiction than in fact. Even so, gamblers did haunt the Mississippi because the riverboats provided an unending source of new and affluent "marks." Many gamblers ran shell games. A common riverboat game was three-card monte, a variation of the shell game. Each of three cards had a picture of a man, a woman, or child. The



Figure II-16. First-class passengers lounge on the boiler deck to enjoy the passing scenery. Steamboat travel on the Mississippi often had elegance and glamour, but it soon gave way to competition from the railroads (Harper's Weekly).

object of the game was to pick the child card after the cards had been moved around. High-stakes poker and bourré were usually played in private quarters.

The Packet Boats

Most early steamboats of the western rivers were operated as tramps. Tramp boats ran irregular service for passengers and freight between river ports. There was little or no scheduling of trips to a given port. In the main, a tramp boat captain took his vessel to wherever he thought business might be good. In about 1850, there evolved a new kind of steamboat operation, the packet line. A packet boat carried mail, passengers, and freight over a regular route with a published schedule. A packet line had two or more vessels under the same management.

Before the War Between the States, most packet lines were little more than agreements among river steamboat owners. The packet line did not own vessels but scheduled the use of several boats so as to reduce competition.

The first packet line on the lower Mississippi was the Mississippi Steamboat Navigation Company

owned by Robert Fulton and Robert Livingston. This company had been granted a steamboat monopoly for the lower Mississippi in 1810. The monopoly was broken, however, in a famous court decision in 1818. The challenge came from its chief rival, Henry Miller Shreve.

After the War Between the States, the packet lines became much stronger. Many lines owned their own boats and became private stock companies. Packet line operations reached a peak between 1870 and 1885. The packet boat had become smaller, less ornate, and more efficient, but its use declined because of competition from the railroads.

The Decline of the Steamboat on the Western Rivers

The years from 1850 to 1860 were most prosperous ones for the western rivers steamboat. But even during this golden age, events signaled a decline. At least six trends led to the decline:

- (1) steamboat disasters
- (2) low-water periods



Figure 11-17. The Kate Adams III was built at Jeffersonville, Indiana, in 1899 for the Memphis and Arkansas City Packet Company. "Lovin' Kate" was among the last packet steamers and served for nearly 30 years in the lower Mississippi trade out of Memphis. During the

1920s, she starred in the silent movie version of Uncle Tom's Cabin. The Kate burned at Memphis in January 1927. (From A History of Transportation in the Ohio Valley, Arthur H. Clark Co.)

- (3) river ice
- (4) canals to the Great Lakes
- (5) the growth of railroads
- (6) the emergence of towboats and barges

During the 1850s, a series of major riverboat losses occurred, caused by fire, boiler explosions, and collision. The accidents caused the deaths of hundreds of people. Steamboat disasters were events of high drama and were reported in lurid detail by the newspapers. Despite the danger, steamboats continued to attract passengers and freight. Steamboats had a certain glamour, and there was often no other suitable way to travel.

In the 1850s and 1880s there were many years of low water. Low water was not often a problem on the lower Mississippi. But it was a problem on the Red, Arkansas, Missouri, upper Mississippi, and the Ohio. Low water could halt operations except for boats with the shallowest draft. Low water meant disruption of schedules, inconvenience to passengers, and loss of business to the railroads. The low-water problem was vexing because little could be done about it.

During several winters of the 1850s, the Ohio, upper Mississippi, and Missouri were closed by river ice. The Ohio was closed for 90 days from December 1854 to March 1855, and it iced over again from January to March 1856. The 1856 freeze followed a period of low water during the summer and fall, in which the river had been closed for more than 200 days. This happened just as competition from railroads was becoming keen.

The growth of railroads and canals posed the most serious threat to the steamboats of the western rivers. In the United States prior to 1830, most goods moved by water. The eastern and western rivers were separated by the Appalachian Mountains, and most goods moving between the east coast and the Mississippi and Ohio valleys had to go by sea, passing through New Orleans. The slow sea route benefited both New Orleans and steamboat commerce on the western rivers. The eastern states wanted direct east-west trade routes. This was done in time by building turnpikes and railroads across the Appalachians and canals around the Great Lakes. Some of the turnpikes built over the Appalachians were part of the national post road system. The post roads were the early nineteenth century's version of the modern interstate highway system.

Several canals were built between 1810 and 1850 for direct waterborne transportation between the east coast and the midwest. Four of the canals were the Erie (1825), the Ohio (1832), the Pennsylvania (1834), and the Illinois-Michigan (1848).

The Erie Canal was built by DeWitt Clinton in upstate New York between Troy (on the Hudson) and Buffalo (on Lake Erie). The canal was dug along an east-west valley called the Mohawk depression. It is

the only break nearly at sea level in the Appalachians between New York and Alabama. The Erie Canal was a great success. It enabled New York City to become the major seaport of the east coast.

The Ohio Canal carried barge traffic between Portsmouth (on the Ohio River) and Cleveland (on Lake Erie). The Pennsylvania Canal connected Pittsburgh on the Ohio River to the seaport of Philadelphia. The canal used a series of rivers. It also had a 60-kilometer portage railroad where barges were lifted over the Allegheny Mountains. The



Figure 11-18. Mike Fink was the legendary and notorious hero of the keelboatmen, who said that Fink could out-shoot, out-cuss, out-fight, and out-fiddle any man on the western rivers. A real-life counterpart of Mike Fink is said to have been born in Allegheny County, Pennsylvania, about 1781. As a boy he played an important part in the Indian Wars of the time. Early in life he answered the call of the rivers, gradually moving westward in advance of the steamboats. Fink often displayed his marksmanship by shooting objects placed on the heads of volunteers at a distance of 100 paces. (From *A History of Transportation in the Ohio Valley*, Arthur H. Clark Co.)

Pennsylvania Canal was intended to rival the Erie Canal, but the tonnage it carried never equaled the Erie's. It was used until the Baltimore and Ohio and the Pennsylvania railroads linked Baltimore with Wheeling, and Philadelphia with Pittsburgh.



Figure 11-19. Broad-wheeled, canvas-covered Conestoga wagons were the only direct trade connection between the east coast and the western rivers before the barge canals and railroads. The alternative was the slow sea route via New Orleans and the Mississippi River. The wagons, each pulled by six horses, usually moved in convoys of a dozen. (From *A History of Transportation in the Ohio Valley*, Arthur H. Clark Co.)

The Erie, Ohio, and Pennsylvania canals improved trade between the Ohio Valley and the east coast. Waterborne freight moving to the east coast from the Ohio River now had two alternatives to the Mississippi-New Orleans sea route. Goods could be shipped to New York via the Erie Canal or to Philadelphia and Baltimore through the Pennsylvania Canal.

The canals on the Ohio were so successful that businessmen in Chicago called for a canal between Lake Michigan and the upper Mississippi. This was done in 1848 with the opening of the Illinois-Michigan Canal. New Orleans, Memphis, St. Louis, and Cincinnati had long been friendly rivals. Each wanted to control commerce in the Mississippi River Valley. Unfortunately, none of these cities regarded Chicago as a serious contender until it was too late, but Chicago opened her canal to the Mississippi and began attracting railroads like a magnet.

On the night of November 29, 1852, a railroad train pulled into Pittsburgh. It had left Philadelphia the night before and spent most of the day climbing the steep mountain grades of the Alleghenies. Six weeks later another railroad, the Baltimore and Ohio, reached Wheeling on the Ohio River. The iron horse had crossed the mountain barrier between the eastern and western rivers.

A "railroad mania" swept the towns of the Ohio and upper Mississippi valleys. Local boosters in every

town hatched schemes to attract the railroads. The railroad promised more than new business. It seemed needed for survival. The craze was kept alive by new immigrants from Europe. Both the discovery of gold in the far west and federal money increased railroad growth. Most importantly, the McCormick reaper changed farming in the midwest. There would be enough business, it was thought, for both railroads and steamboats.

Finally, it was hoped that the railroad would bind the nation together. Mistrust and jealousy had surfaced between the northeast and the south. If the railroads did not unite the nation, then they could tie the midwest and north west together against the south.

The growth of the railroad was rapid during the 1850s. By 1860 all major river ports were joined by rail. Most of the midwestern lines ran east and west, while most southern trunk lines ran north and south. There was a steady loss of passengers and freight from the steamboats to the railroads.

During the 1870s and 1880s, the supremacy of the railroad over the steamboat became final. The decline of the steamboat can be seen in rail-traffic volume at St. Louis. In 1890 rail business at St. Louis was 12 times greater than steamboat loadings. By 1900 the ratio had risen to 30 to 1. Similar changes took place in other river ports.

Steamboats were like dinosaurs: they could not adjust to changes that demanded speed and flexibility. Steamboats were confined to the rivers, while railroads could be built almost anywhere and could add new branches and railspurs at will. Railroads could deliver freight to any factory loading platform rather than to the nearest riverbank. The steamboat's small price advantage was erased by fees for dockage and cargo handling.

Most Americans regarded the passing of the Mississippi River steamboat with sadness. In the end, these magnificent boats died a slow death. They plied the rivers in search of dwindling business. A few became excursion boats or floating theaters and restaurants; others became ferryboats. But most simply decayed or were scrapped.

The Emergence of Towboats and Barges on the Western Rivers

The towboat appeared on the western rivers in the 1840s. Unlike the passenger-carrying steamboats, the towboats carried bulk freight only. Early towboats actually towed or pulled barges, which looked like rafts and flatboats. Later the barges were pushed or lashed on either side of a towboat. Steam-powered towboats used sternwheels because they delivered more power than sidewheelers. The steam packet had a fixed capacity. But the towboat could adjust its load to business needs by adding or dropping barges.

Timber was the main cargo on the upper Mississippi. This business was brisk until the

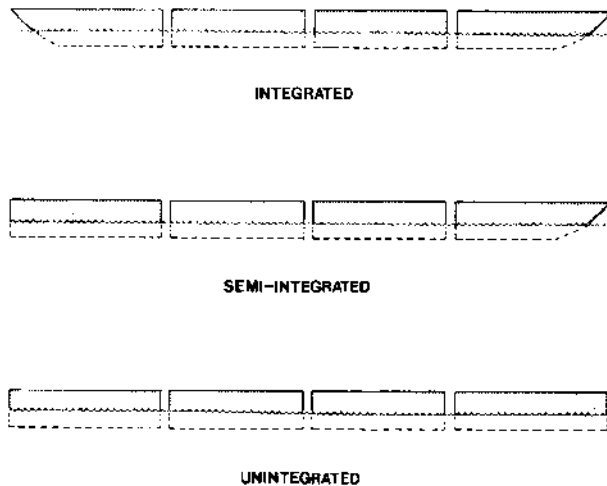


Figure 11-20. A tow may be integrated, semi-integrated, or unintegrated. An integrated tow is the most efficient one, because it creates less drag as it moves through the water.

northern forests were depleted in the 1890s. Most coal hauling on the Ohio was done by towboats in the 1850s and later, because towboat rates were far cheaper than rail tariffs.

It was cheaper to build towboats and barges than to operate steam packets. Towboats had no passenger cabins. They could pick up and drop off loaded barges at various ports, and so reduce costly delays in cargo handling. The major advantage of the towboat, however, was that it spread cargo over a wide area and thus had a shallow draft.

A "tow" of a dozen or more barges was difficult to handle in river bends. Most towboats had multiple rudders for improved steering. They also developed the technique of "flanking" while moving downstream in tight river bends. As the tow entered a bend, the engines were reversed. The reversed paddle wheel drove water against the rudders and created more turning force. This maneuver kept the tow in midchannel, thus taking advantage of the current in the bend.

By the end of the nineteenth century, the railroads had virtually replaced steam packets. The railroads were the best way to move most freight, especially on short hauls, but the movement of bulk freight over long hauls was assigned to barge lines. The close of the nineteenth century also saw a trend toward monopolies of river traffic. The Monongahela River Consolidated Coal and Coke Company (known as "the Combine"), for example, controlled most marine tonnage on the western rivers after 1900.

Between 1900 and World War I (1914), river trade declined. The timber trade from Michigan, Wisconsin, and Minnesota was exhausted; the movement of wheat from St. Louis to New Orleans slowed because of railroad competition; and the discovery of oil in Louisiana and Texas reduced the need for coal.

By World War I, river commerce was down to a mere trickle. A few truck and bus companies were in business, but they were all local and hauled freight only for short distances. As the nation prepared for war, it had only the railroads to serve its transportation needs. The railroads were, in fact, poorly prepared for the task. There were several large and many small railroad companies. But there was little organization among the many competing lines. The lack of coordination and a shortage of railroad equipment hurt the war effort. Many people deplored the loss of river commerce. The nation, they said, should never rely on only one mode of transportation.

After World War I, business leaders proposed that the government operate a barge line. As a result, in 1918 Congress authorized the formation of the Federal Barge Line, administered by the U.S. Railroad Administration. The Federal Barge Line began with five towboats and 25 barges. Its operations were successful and additional towboats and barges were placed into service. There was also more activity among private barge lines. Boatmen had long said that the river offered the cheapest way to move cargos. This premise was to have another chance.

The nagging problem of low water on the major tributaries continued, however. The barge lines wanted improvements made on the Mississippi and its major tributaries. They asked for a nine-foot depth to most of the important river ports. The program called for extensive channelization and canalization, which were to be done by the U.S. Army Corps of Engineers. Channelization shortens distances between river ports by cutting chutes across river bends. Canalization is the building of locks and dams to increase water depth.

The towing industry and the inland waterways served the nation well as it entered World War II in 1941. The nation's transportation system (railroads, truck and bus lines, airlines, pipelines, and inland waterways) was placed under the control of the Office of Defense Transportation. At that time there were 1,000 towboats and 5,000 barges on the western rivers and other waterway systems.

During World War II enemy submarines blockaded American seaports. They sank many cargo vessels and oil tankers, but the inland waterways were relatively safe. The inland systems carried more than one million barrels of petroleum products daily during World War II. The inland waterway system made it possible to locate war industries in the interior of the country. Ocea-going tankers, for example, were built in Minnesota. Some of the Navy's largest submarines were built in Wisconsin and moved under their own power to Chicago. There they were loaded onto floating drydocks for passage through the Illinois-Mississippi waterway. Then they moved down the Mississippi to New Orleans for later service in the Atlantic or Pacific.

The value of low-cost waterborne transportation

was proved during World War II. Many of the war industries on inland waterways continued as production shifted to peacetime products. Communities knew that water transportation, along with adequate highway and rail service, helped local business and industry. The public had faith in waterborne commerce, and there was support for the improvement of inland waterways, especially on the western rivers.

Present-Day Towboats, Tugboats, and Barges

Inland waterway freight is carried in unnamed barges that are moved in groups or strings by either a towboat or a tugboat.

Towboats are square at the bow and almost square on the stern. The bow has two uprights called *towing knees*, used as pusher plates. Barges fit snugly against the towing knees and are lashed securely during a tow. Actually towboats push rather than pull their barges. A tow is made up of a towboat and one or more barges.

Modern towboats have powerful diesel engines. The era of the paddle wheel steam towboats ended in the 1930s. Modern towboats use screw propellers and multiple rudders. Often the propellers are mounted inside a tunnel-like structure called a Kort nozzle. The Kort nozzle concentrates the flow of water through the blades and provides more thrust.

Towboats move barges on quiet, inland waters. They appear to sit low in the river, and often water laps their decks. Tugboats sit higher in the water. They are used in open water and are subject to waves and wind. They haul barges astern on a towing cable called a hawser. Sometimes tugboats lash barges on either side. They can also push barges.

Barges are designed to handle difficult cargoes. Coal and gravel are usually carried in hopper barges. These are basically double-skinned, open-topped, rectangular boxes. Covered barges for dry bulk cargo are used to ship grain, dry chemicals, cement, sugar, and some packaged goods. Tank barges are used to transport machinery, lumber, and oddly shaped equipment. Carfloats are often seen in coastal ports. These are barges designed to move railroad boxcars or truck trailers—a waterway version of the “piggyback” service.

Some 30 years ago, most river barges were designed as single units. Each barge had a “rake,” or slope, at each end. This is still the most efficient design for a single barge. But a tow of many such barges is inefficient. This is because drag is created by the water-breaking rakes in the middle of the tow. Some barges are now designed to fit into “integrated” tows that act as a single vessel. In an integrated tow, the leading barges have a raked bow and a square stern. Intermediate barges are squared at bow and stern. Trailing barges are squared at the bow but raked at the stern. Integrated tows are far more efficient than unintegrated tows. An integrated tow is most useful for long trips with one destination. If the tow has to be remade at several ports along the way, then a semi-integrated tow may be more desirable.

The towing industry has a colorful language of its own. For example, a *dumb barge* is one having no power of its own. A *bastard tow* is made up of dissimilar or uneven barges.

The towing industry moves about one-tenth of all the freight in the U.S. About 80,000 persons are employed in inland water transportation. The crews on most towing operations work 12 hours per day (six hours on, six off), seven days a week. They usually receive one day off at regular pay for each three days worked.

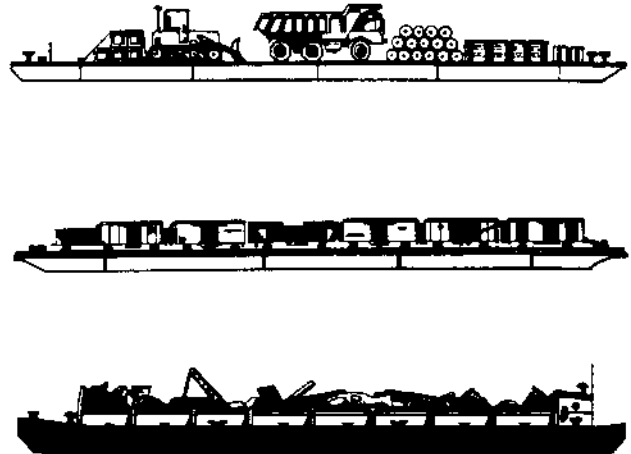
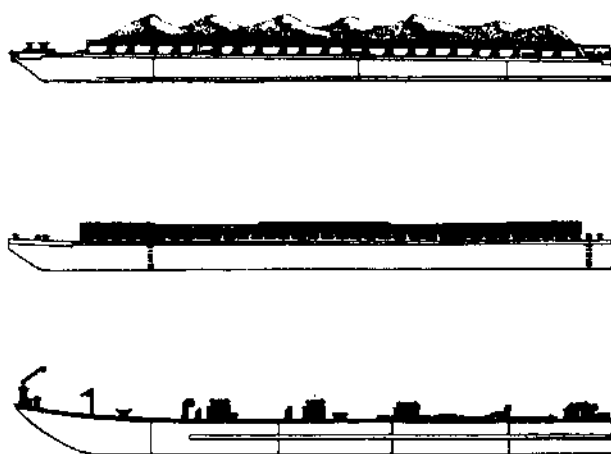


Figure 11-21. There are many types of barges, including (top to bottom, left) the open hopper barge, the covered dry cargo barge, and the liquid cargo (tank) barge. From top to

bottom, right, are the deck barge, the carfloat, and the scow.

Living conditions are usually good on towboats. Crews sleep in air-conditioned quarters set apart from the noisier areas of the vessel. Most vessels have

laundry service, television, and a recreation room. Employment is stable and salaries are considered good compared with those in most industries.

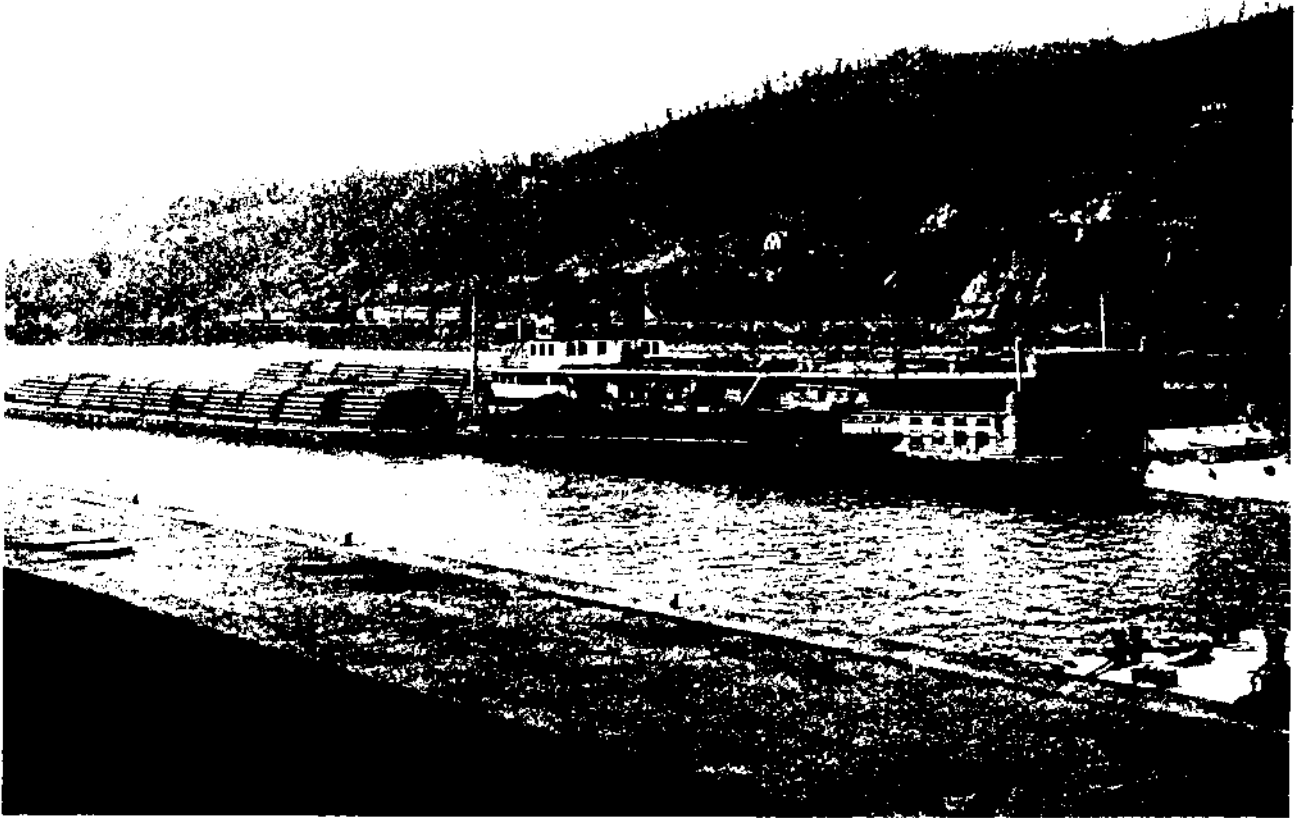


Figure II-22. The steam-powered towboat, Iowa, pushes three barges containing 6,000 tons of iron pipe through Lock No. 2, Ohio River. This photograph was taken about

1928. The steam-driven, sternwheel towboats were replaced by diesel towboats in the early 1930s. (From *A History of Transportation in the Ohio Valley*, Arthur H. Clark Co.)



CHAPTER III

The Port of New Orleans



Figure III-23. *New Orleans in 1850, with a population of 117,000, was the world's largest seaport and the nation's fourth largest city. The steepled building at right is the St. Louis Cathedral. Canal Street is the wide, dark avenue left of the cathedral, and the large building one block to the left*

of Canal Street divided the Creole section (downriver) from the American section (upriver). The congestion of steamboats at the foot of Canal Street and of sailing ships at lower left was common (Troy H. Middleton Library, Louisiana State University).

Port Development: The Early French Period

Throughout its history, the Port of New Orleans has received the products of America's heartland and has shipped these goods to distant markets. In return, the port has received and sent products from overseas to ports in middle America. New Orleans is well situated for this function, as it lies near the mouth of a great river system with direct access to the sea. New Orleans did not happen entirely by accident. It was planned by eighteenth-century Europeans who had claimed the vast central valley of North America.

The Spanish were probably the first Europeans to see the Mississippi River Valley. But they were interested mainly in gold and silver, and when they saw a vast wilderness of forests and rivers with little evidence of this wealth, they lost interest in the Mississippi River and turned their attention to Mexico, South America, the Caribbean, and the Philippines.

For nearly 150 years, few Europeans set eyes on the great central valley. In 1682, the French, led by René Robert Cavelier, Sieur de La Salle, descended the river to its mouth. He claimed all the lands drained by the great river for France. He named it *Louisiane* in honor of Louis XIV, King of France. New Orleans and Louisiana were to speak French, not Spanish.

The French had long known of the great river that flowed south to the "Goulfe de Mexique." They had towns and ports in Canada. French fur traders were active in the Ohio Valley, Illinois, and the land that later became Michigan, Minnesota, and Wisconsin. Control of the Mississippi River was becoming vital to the French in North America. French control of the valley would confine the British to their coastal colonies east of the Alleghenies. The river would also provide the French with a southern route to the ocean. The role of New Orleans as a seaport serving the midcontinent was defined even before the city was founded.

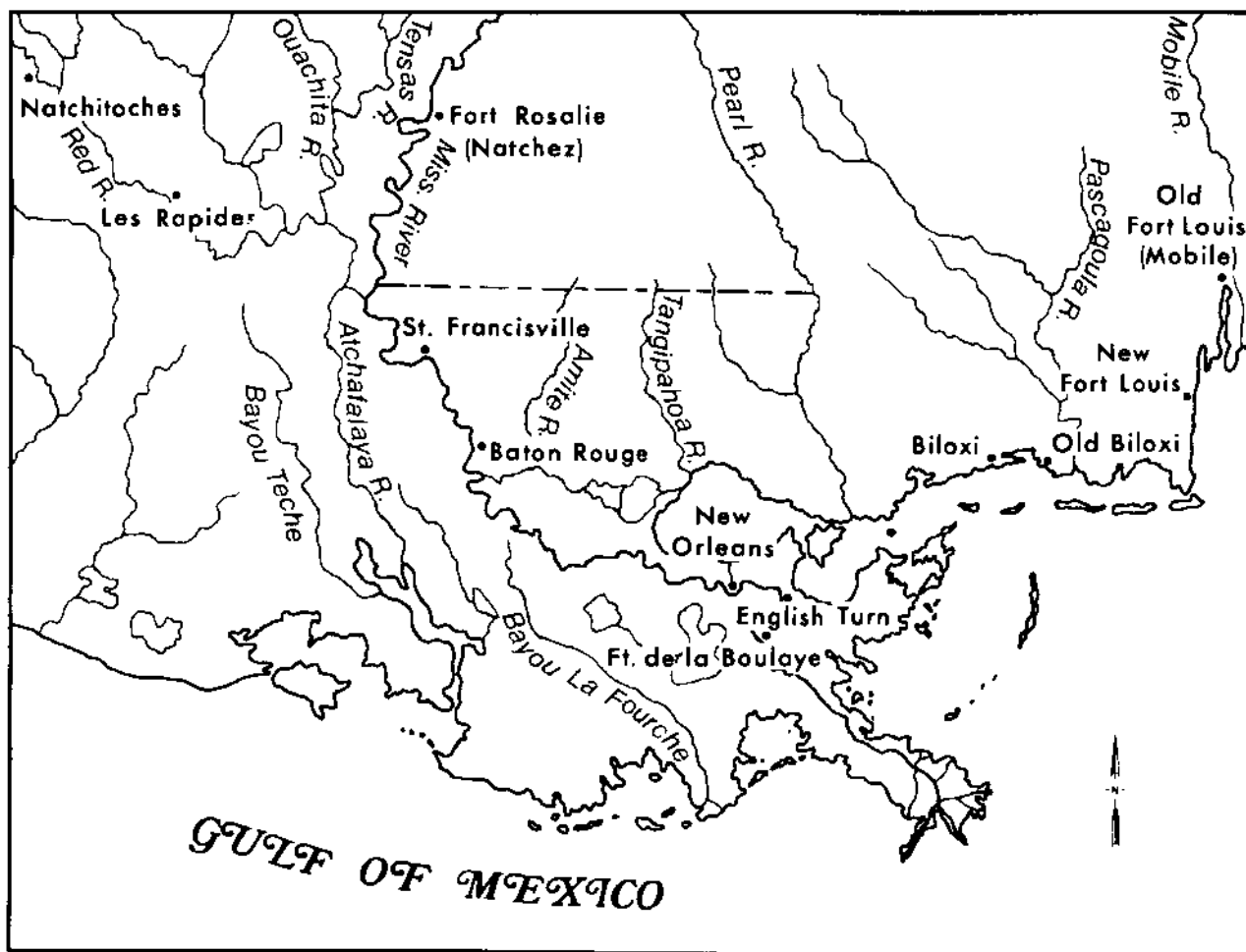


Figure III-24. There were about a dozen major settlements in the colony of Louisiana shortly after the founding of New

Orleans in 1718. The population of the colony was less than 1,000.

La Salle knew that if France were to hold the Mississippi River, she needed a port near the river's mouth. In 1684 he returned from France with several hundred colonists to begin the settlement. The expedition, however, missed the mouth of the Mississippi and landed in Texas. The colony failed and La Salle was killed. But a port near the Mississippi's mouth was clearly necessary.

A new attempt began in 1698 by a Canadian-born French explorer, Pierre Lemoyne, Sieur d'Iberville, who wanted to establish for France a colony that extended from Canada to the Gulf of Mexico. Two ships with almost 200 colonists landed near Biloxi, Mississippi.

Iberville and Bienville From Biloxi, Iberville began to look for the mouth of the Mississippi. With him was his teenaged brother, Jean Baptiste Lemoyne, Sieur de Bienville. Iberville made several important discoveries. He found the river and went upstream many kilometers against a very strong current. At one place he met some of the Indians he had left behind in Biloxi. When he asked how they arrived there, the Indians took him to the future site of New Orleans. There, they pointed out the portage that led to Bayou St. John.

Bayou St. John was something of a back door for New Orleans. It flowed away from the Mississippi and into Lake Pontchartrain. From Lake Pontchartrain one could move through the Rigolets into Lake Borgne and then into Mississippi Sound or into the Gulf of Mexico. Perhaps the Bayou St. John portage would be the best site for the new port, but Iberville wanted to look further.

He continued up the river and discovered a large stream (Bayou Lafourche) flowing from the west side of the river to the Gulf. Farther upstream, he discovered Bayou Plaquemine, which was also on the



Figure III-25. Jean-Baptiste Lemoyne, Sieur de Bienville (1680-1768), founded the city of New Orleans and served three times as governor of Louisiana.

west bank and flowed out of the river. A few more kilometers upstream, he discovered yet another stream (Bayou Manchac). It flowed out of the river, this time to the east. North of Bayou Manchac, Iberville saw the first of the bluffs on the Mississippi. These bluffs, free from the threat of flooding, later became the site of Baton Rouge.

The explorers continued upstream as far as Pointe Coupee Parish and onward to the present site of Angola. Then they returned to Bayou Manchac. The Indians told Iberville that Bayou Manchac was part of an inland water passage to the Gulf. It flowed into the Amite River and then into lakes Maurepas and Pontchartrain. From Lake Pontchartrain there was easy passage into Lake Borgne. The passage continued through the Rigolets into Mississippi Sound and then into the open Gulf. Iberville followed this route, but found that Bayou Manchac was small. The Amite River had many sunken logs. Even so, Bayou Manchac on the Mississippi was another possible site for the new river port.

Actually, Iberville had encircled the "Isle of Orleans." President Thomas Jefferson later wanted to buy the Isle of Orleans from the Emperor Napoleon. The trip around the Isle of Orleans occurred in the spring of 1699. Undoubtedly that spring was one of very high water on the Mississippi River. Iberville was astonished by the swift current in the river and had serious doubts that the Mississippi could ever be navigated by ocean-going vessels. He returned to Biloxi, which was to continue as the capital and port city of *Louisiane*. From Biloxi there was passage to the Mississippi River by Bayou St. John or Bayou Manchac.

In May 1699 Iberville sailed for France for more supplies and colonists. He chose the Sieur de Sauvolle to command the Louisiana colony, with Bienville as second in command. The colony numbered fewer than 100 and did not fare well. The colonists were mostly soldiers and Canadian woodsmen, and neither cared much for raising crops.

In about September of 1699, Bienville set out to learn more about the Mississippi River. A few kilometers below the Bayou St. John portage, he met the English ship, *Carolina Galley*. The British also wanted to establish a colony near the mouth of the Mississippi. Bienville told the English captain that he was trespassing on French territory and must leave at once. He convinced the British that a fleet of French warships was at anchor upstream. The place of Bienville's encounter with the British on the Mississippi River has since been called "English Turn."

Iberville returned to Biloxi in December 1699 with supplies and colonists. When told of the English ship, he ordered Bienville to build a fort on the Mississippi, on the first solid ground above Head of Passes.

Iberville made another trip to France to obtain more supplies and colonists. When he returned to the settlement at Biloxi, in December 1701, he found that

all but 150 of the colonists had either died or left. In 1702 most of the remaining colonists were moved. Some went to Dauphin Island; others were sent to Mobile.

Iberville returned to France in 1702, leaving Bienville in command of the colony because Sauvolle had died of yellow fever. The French government assigned Iberville to other duties, and he did not go back to Biloxi. In 1706 he died in Havana, Cuba, of yellow fever.

By 1708, the colony had a population of 279 people, most of them in Mobile. The settlers were plagued with yellow fever and poverty. The fur trade with the upper Mississippi and the western Great Lakes had begun in 1700. At that time the French explorer Henri de Tonti arrived with 50 Canadians and a cargo of pelts. Fur pelts were among the few goods available for export. Some trade also took place between Louisiana and the Spanish colonies at Pensacola and Havana.

Antoine Crozat From its beginning Louisiana had been governed as a royal colony. It was under the direction of the French Minister of Marine Affairs, the *Compte de Pontchartrain*. From 1712 to 1717, a wealthy French merchant, Antoine Crozat, was given all the trading rights in Louisiana. He chose a Canadian, Antoine de la Mothe Cadillac, to govern Louisiana. The colony grew under Cadillac, but it did not prosper.

In 1714, Cadillac ordered Louis Juchereau de St. Denis to establish a fort and settlement on the Red River. The Spanish were making inroads into Louisiana from Texas. Cadillac wanted, if possible, to push them back to the western side of the Sabine River. St. Denis chose a place on the Red River below the Great Raft, the log jam later cleared by Captain Henry Shreve, at the present site of Natchitoches. It became the first permanent settlement in the Louisiana Purchase.

The Natchitoches settlement succeeded because of trade with the Spanish and because St. Denis was well liked by the local Indians. The rich Red River soil also helped to make Natchitoches a success. Natchitoches set a pattern for settlement in Louisiana. Settlement always occurred first on fertile lands near the rivers, and the backswamps, hills, and flat piney woods remained unsettled for decades.

By 1717, Crozat had suffered great losses from Louisiana investments. He asked the ministers of France to end his contract. The right to colonize and exploit Louisiana was then given to John Law, a Scottish financier who had found favor with the Duke of Orleans, the Prince Regent of France. Law organized a stock company, the Company of the West, to manage Louisiana. The colony then had a population of about 750, including about 200 slaves. Most of the colonists were at Mobile, Dauphin Island, and Biloxi. Scarcely more than 65 lived in the area that later became the state of Louisiana.

Within the colony there was ill feeling between

the native European French and the French Canadians. The Europeans held themselves to be superior in matters of education and good manners. The Canadians were men of the woods whose frontier backgrounds showed in their speech and conduct.

The division between the Europeans and Canadians was more than cultural. It was central to the welfare and future of the colony. The Europeans thought that the colony should trade mostly with the Spanish in Florida, Cuba, and the Caribbean. The Canadians wanted the colony to trade primarily with the French in the Great Lakes and upper Mississippi and Ohio valleys. If trade with the Spanish were to be the main business of the colony, then Mobile might be the best site for a permanent capital. But if trade with the upper Mississippi were to be its main purpose, then a site on the river seemed better.

The site of the capital was to be chosen by the board of directors of the Company of the West. Bienville, himself a French Canadian, had long favored Bayou St. John on the Mississippi. The officers of the company in Paris favored Bayou Manchac near Baton Rouge. The native European French colonists wanted the permanent fort at Mobile.

The Founding of New Orleans In 1717 Bienville wrote the directors of the Company of the West, outlining his reasons for wanting the capital at Bayou St. John. The directors agreed with Bienville. In February of 1718, Bienville left Mobile with about 50 men to build the new capital and port city. He chose a place near Bayou St. John where the river forms a crescent. Bienville named the new settlement Nouvelle Orleans in honor of Phillippe, Duc d'Orleans and Prince Regent of France. In June 1718, when the city was four months old, its population was 68.

In March 1721, Adrien de Pauger, an engineer, arrived in New Orleans to lay out the streets. Pauger designed a gridiron pattern for the streets, with a central square, the *Place d'Armes* (later renamed Jackson Square), facing the river. Drainage ditches and canals were dug, a low levee was erected, and a wharf was built. Places were chosen for a hospital, magazine, cemetery, market, and other public buildings. The *Place d'Armes* was a parade ground. It had military barracks on the right and the central market on the left. The Church of St. Louis faced the square and the river.

New Orleans did not wait for growth to become a city; it became one by decree from the beginning. Not until 1800 were there enough people to fill the 66 square blocks of Pauger's gridiron. Much later, New Orleans was to take its place among the great American cities. But it always remained a little apart from other American cities because, during its first 100 years, it was a European city.

Louisiana made slow progress under the Company of the West. In 1731, when the company failed, the population had reached almost 7,500.

Port Activity in New Orleans Trade within the colony was growing. The Mississippi River and its tributaries were becoming important waterways of commerce. All types of boats, canoes, pirogues, and flatboats were used to transport goods to New Orleans. The boats usually left Illinois and Ohio in February. The spring thaw assured fast river currents. The boats often traveled in convoys for protection against Indians and river pirates.

The downstream cargos included wheat, corn, lard, salted and dried meats, tallow, bear oil, beeswax, fur pelts, animal hides, and lead from Missouri. The trade in fur pelts and hides was very important. By 1731, as many as 1,500 persons were involved in this trade, most of which was channeled through New Orleans.

The return trip to the north was by land. The journey from New Orleans or Natchez usually began in August or September. The north-bound cargos consisted of rice, indigo, sugar and molasses, tobacco, and manufactured goods from France and elsewhere. The trappers also carried animal traps, Louisiana oranges, trinkets used in trade with the Indians, and *tafia*, an alcoholic drink made from molasses.

Goods arriving downstream were either sold locally or were exported. There were a few wharves built along the river banks, some open to the weather and others covered by sheds. Most commodities, however, were kept on the levee.

The regulations of the Port of New Orleans were made by the Minister of Marine Affairs in Paris and enforced in New Orleans by the Superintendent of Marine Affairs. Often the superintendent would close the port to Americans out of whim. American colonists had begun using the port as early as 1725. They were concerned about the "right of deposit," the right to unload and store goods in New Orleans for later export.

Port activity at New Orleans was the lifeblood of the colony. All businesses in the colony depended on the movement of goods through the port. In the first 12 years of the colony, a dozen ships arrived from France with goods. During the next five years (1712-1717) more than 25 ships visited the colony. Between 1717 and 1731, more than 100 ships called at New Orleans. That number increased to 175 ships from 1731 to the late 1750s.

Ships arriving from France brought textiles, cutlery, kitchen utensils, wines, flour, gunpowder, and other manufactured goods. When they returned to France they carried fur pelts and hides, indigo, tobacco, myrtle wax (for candles), lumber, naval stores, and molasses.

Trade with the Caribbean was also important. Louisiana exported corn, peas, beans, rice, salted and dried meats, bear oil, naval stores, and lumber. Bricks and tiles manufactured in the colony also found markets in the West Indies. From the West Indies and central America, Louisiana obtained sugar, coffee, cocoa, spices, fine hardwoods, leather, and tortoise

shell. Much of the trade with the Spanish and English was illegal, but the desire for profit often found ways around legal restrictions.

The End of the French Period

The 38 years between 1731 and 1769 were a period of hard times in Louisiana. The population did not grow; in fact, it declined a little. The hurricane of 1740 destroyed nearly every crop in the colony, and there was frequent warfare with the Indians, especially the Natchez and the Chickasaws. During this period, however, sugarcane was introduced to Louisiana from Santo Domingo by the Jesuits. Cotton was reintroduced to Louisiana in 1740 having been grown previously at Natchitoches on a limited basis.

The French and Indian War in the north, which pitted the French against the British empire, had been won by the English. In Europe this war was called the Seven Years War (1755-1763). The victory won for England all of Canada, all of Louisiana east of the Mississippi (except the Isle of Orleans), and the Spanish colony of East Florida.

In 1762 France secretly gave the remaining part of Louisiana to Spain. At first Spain did not want Louisiana because the colony had been a financial drain. But the Spanish realized that Louisiana would separate the English from the Spanish colonies in Mexico and Texas. The colonists learned of the transfer two years later and were most unhappy, as they were loyal Frenchmen and feared the military government typical of Spanish colonies.

The Spanish Port of New Orleans

Don Antonio de Ulloa, the first Spanish governor, arrived in 1766 and was coldly received. Ulloa, an astronomer, was one of Europe's well-known scientists, but he had poor qualities for governorship. He was tactless and lacked good management skills. He left Louisiana in October of 1768 under an ultimatum issued by the leading Creoles of the colony.

The second Spanish governor was General Don Alejandro O'Reilly, an exiled Irishman in the service of the Spanish king. Arriving in August 1769 with 2,000 troops, he quickly brought order to the colony and executed several Creole leaders. Spanish control of Louisiana lasted 35 years (1766-1801) under eight governors.

Actually, the Spanish brought better government to Louisiana. Under the French, Louisiana had been a weak, struggling outpost, but under the Spanish the colony became stronger and provided more opportunities for new settlers.

In 1766, the last year of French government, the population numbered fewer than 7,500, but under the Spanish the population expanded to 50,000. During the Spanish period, Louisiana became the refuge for 5,000 Acadians, who had been forced from their home in Canada by the British. The Acadians were

hard-working farm families who settled on the fertile lands along the bayous of southern Louisiana. Several other groups came to the colony. These included the Germans and Swiss, as well as Spaniards from the Canary Islands. A slave rebellion in Santo Domingo expelled many planters, most of whom chose Louisiana as their new home.

In the early 1800s New Orleans became a city in fact as well as in spirit. Two major fires required the rebuilding of the city. The result was a beautiful city with buildings made of tile and brick in the Spanish style. New Orleans had professional theatrical performances, a newspaper, street lights, and a police force. The rebuilt Church of St. Louis became a cathedral. Within a few years, New Orleans had several theaters and America's first opera company.

New Richmond), Natchez, Mobile, and Pensacola.

The Spanish had very restrictive attitudes about trade with the English and, later, with the Americans. Actually this trade flourished but was illegal under Spanish law. On occasions when they did allow trade, they exacted a tariff of up to 15 percent of the goods deposited. Tension mounted between the Spanish officials and the boatmen from Tennessee, Kentucky, and Ohio. On more than one occasion the American tradesmen threatened to invade Louisiana and seize New Orleans.

In 1795 the Treaty of Deposit between Spain and the United States was signed. The Americans had long sought the right of deposit at New Orleans, so that they could deposit and store goods in New

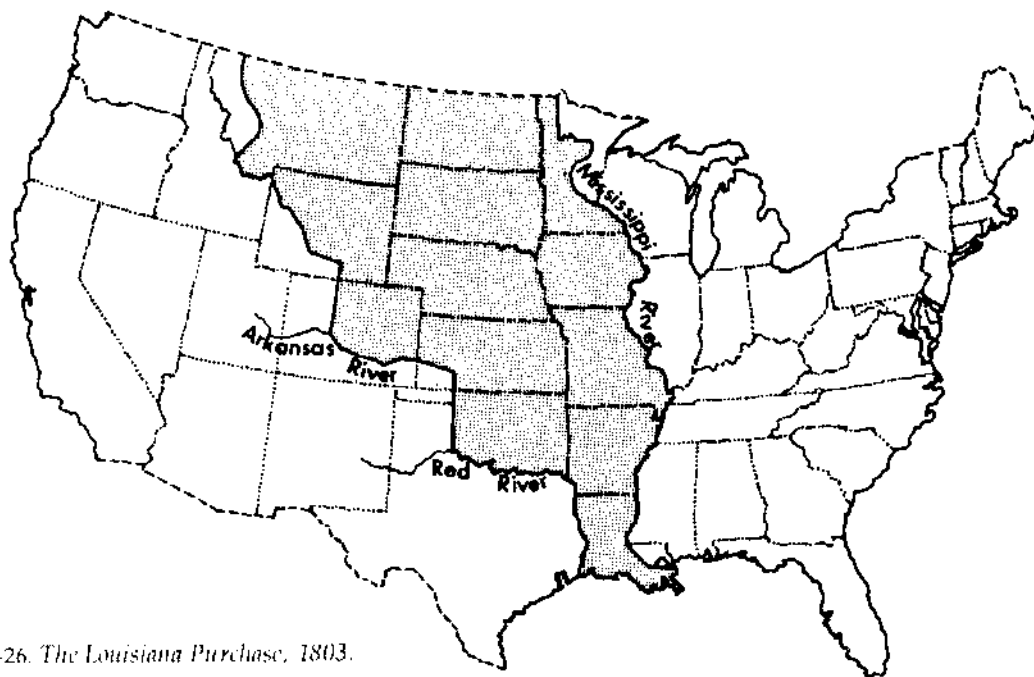


Figure III-26. *The Louisiana Purchase, 1803.*

The main business of the city centered on the port, which thrived as never before. In the last year of Spanish occupation (1802), 265 ocean vessels departed the Port of New Orleans. Of these, 158 were American and 104 were Spanish or French.

American Independence The Spanish watched closely as the Americans began their war of independence from the British. Great Britain was a hated enemy. The Spanish allowed New Orleans to become a base for Americans fighting the English in the Ohio Valley and West Florida.

In 1779 Spain declared war on England. At the time, Louisiana's governor was Don Bernardo de Galvez. Governor Galvez led military attacks against the British. These attacks resulted in the capture of Baton Rouge (which the British had renamed Fort

Orleans until such goods were loaded on ships destined for foreign markets. The treaty guaranteed the right of deposit for three years. It was later extended for another three years, but in 1802 the right of deposit was abruptly refused.

The Louisiana Purchase

Meanwhile, in 1800, Louisiana was returned to France under the Treaty of San Ildefonso between Napoleon and the Spanish king. In exchange for Louisiana, Spain obtained a large district in northern Italy. Napoleon sent an army to occupy Louisiana, but the army never arrived. It was defeated in the French colony of Santo Domingo by a native uprising and, in addition, suffered many deaths from yellow fever. Moreover, Napoleon was soon to be at war

with England. He could neither occupy nor defend Louisiana.

President Thomas Jefferson offered to buy the Isle of Orleans from Napoleon. He wanted to obtain for Americans the use of the Port of New Orleans. Robert Livingston and James Monroe were the American agents sent to bargain for the sale. Francois Barbe-Marbois, acting for Napoleon, amazed the two Americans with an offer to sell all of Louisiana for \$15 million. They accepted the offer and hoped that Congress would approve the sale. James Monroe later became the fifth president of the United States, and Robert Livingston became one of the owners of the first steamboat to reach New Orleans.

What did the Americans obtain for \$15 million? The Louisiana Purchase more than doubled the size of the United States. Eleven new states were carved out of the territory. The former colony had some of the most fertile lands on earth. Eventually, 90 million Americans would occupy the new land. When Napoleon was told that the transaction was final, he said: "This accession of territory affirms forever the power of the United States, and I have just given England a maritime rival that sooner or later will lay low her pride."

The Territory of Orleans

Congress divided the Louisiana Purchase into two territories: the Territory of Orleans (the future state of Louisiana) and the Territory of Louisiana (later renamed the Territory of Missouri). William C. Claiborne was the first governor of the Territory of Orleans. A legislative council (later the Territorial Legislature) was elected and met in February 1805. Its first resolution was to appoint James Brown and Moreau Lislet to draft a civil code by which the new territory would be governed.

These two attorneys completed their work in 1808. It was expected that the new code would be similar to codes governing the other American states. Instead, it was like the 1804 code adopted in France under Napoleon, but with a few Spanish and Roman twists. History does not reveal why Brown and Lislet departed from their instructions. But in at least one respect the new code greatly benefited port management in Louisiana.

Article 665 of the code was copied almost entirely from the 1804 Napoleonic code. It gave to the public the use of the batture land—banks—on all navigable rivers, even if the land was privately owned. The government had the right to construct levees, roads, wharves, and other public or common works on the banks without payment to the owner. This doctrine has been contested many times in the courts of Louisiana and the United States (including the Supreme Court), but it has never been denied.

New Orleans Becomes An American City

Following the Louisiana Purchase, there was an

influx of Americans and European immigrants. The population of New Orleans doubled each ten years between 1800 and 1840, reaching 100,000 by 1840. In 1836, Louisiana produced 225,000 bales of cotton and 35,937 tons of sugar. The economy was booming. About 2,000 river steamboats and an equal number of ocean vessels were calling at New Orleans annually.

The city had outgrown the original area laid out by Pauger (called the Vieux Carré). Americans and Europeans coming to the city settled in the uptown area (upriver from Canal Street). For the most part, the mayor and city councilmen were Creole and lived in the old city. The theaters, Opera House, hotels, and city hall were all in the old quarter. Americans wanted improvement in the uptown section and took their complaints to the Louisiana General Assembly. The Assembly passed a law dividing New Orleans into three municipalities.

The first municipality was the old city proper (the French Quarter). The second was the uptown area, and the third was downriver from the French Quarter. Each of the three cities had its own mayor, councilmen, and authority to enact ordinances and issue bonds. The uptown city was very aggressive. It granted permits for theater construction, authorized wharves and warehouses to be built, and opened the uptown Garden District for residential development. The Americans built the St. Charles Hotel, opened the Canal Bank, and authorized the construction of the New Basin Canal. By 1852, however, the Creoles and Americans were beginning to work together, and the three municipalities were recombined into a single city.

From 1840 until the War Between the States, business at the Port of New Orleans prospered despite a shortage of wharves. Most of the general commerce of the port was deposited on bare levees. Cotton was the main cargo, followed by sugar. At times so many steamboats lined the levees that it was possible to walk from one boat to the next for great distances. Very often there were two and three steamboats at a single wharf. Cargo had to be carried across one or two decks before reaching the wharf or river bank.

The War Between the States erupted in April 1861, and New Orleans fell to the Union Army in May 1862. The war brought commerce in the port to a standstill. The Mississippi River itself became a battlefield, adding many sagas to the history of naval warfare. Many civilian steamboats were burned or sunk by their southern owners. The war lasted four years and the resulting reconstruction added 12 more years of hardship to the city and its port.

Port Development After the War Between the States

Following the war, business at the Port of New Orleans gradually resumed, and by 1870 the port was handling as much cargo tonnage as before the war. But the dollar value was down. Actually, the port was

in serious trouble because of several major problems that had to be solved to insure New Orleans' eminence as a port. The problems faced by the city were varied:

- (1) Shoal (shallow) depths at the mouth of the Mississippi
- (2) Decline of the steam packets and the advent of railroads
- (3) Yellow fever
- (4) Loss of confidence in the port and city
- (5) Inefficient port management
- (6) Obsolete port facilities.

Shoal Depths at the River's Mouth. Even Iberville in 1699 had difficulty crossing the bar at the mouth of the Mississippi. The Mississippi River carries a great amount of silt. The river slows down as it reaches the Gulf. As the current slows, much of the silt settles and clogs the channels or "passes" at the mouth of the river, making passage by large boats very difficult.

The solution to the problem had been suggested in 1712 by Adrien de Pauger, the architect-engineer who designed New Orleans, though later engineers did not believe that his scheme would work. Pauger had suggested that jetties be built at the mouth of the river. These long, parallel, rock levees would confine the river current to a narrow channel, and the increased speed of the river's current would flush the silt out of the mouth.



Figure III-27. In 1879, engineer James Buchanan Eads (1820-1887) built a jetty system at the mouth of the Mississippi River to keep the South Pass channel at the proper depth for navigation.

In 1879, a jetty system made of willow mats and stone was completed on South Pass by James Eads. Eads was an engineer from St. Louis who had a contract with the Corps of Engineers. Pauger's suggestion and Eads' jetties were successful. The jetty system at South Pass assured a minimum depth of nine meters. A later jetty system made of large rocks at Southwest Pass provided even greater depth of entrance to the Mississippi River.

The Decline of the Steamboat The decline of the steam packets, mainly a result of the growth of railroads in the north, posed a threat to New Orleans. Railroads were able to move freight directly between the midwest and the east coast, bypassing New Orleans. Actually, steamboat traffic at New Orleans continued briskly during the 1870s and 1880s, but the trade was based on an obsolete technology. New Orleans was too far removed from the agricultural and industrial midwest, a principal source of the port's business.

In 1860, St. Louis, a rail and river center, passed New Orleans in population. Five years later, Chicago, an even bigger rail center, passed both St. Louis and New Orleans.

In time, however, the railroads did support port activity in New Orleans. The first through train service between New Orleans and Chicago was begun in 1873 by the Mississippi Central Railroad, which became the Illinois Central in 1877. Through train service between New Orleans and California was begun in 1883 by the Southern Pacific. Although New Orleans never became a major rail center, it did acquire good rail service to its markets in the midwest.

Yellow Fever When the French first came to Louisiana they had many complaints. The loudest ones were about the mosquitoes. Paul du Poisson, a missionary priest, wrote bitterly: "... the greatest torture is the mosquitoes, the cruel persecution of the mosquitoes ..." It was not known at the time, but mosquitoes of the species *Aedes aegypti* caused the spread of yellow fever. Throughout the history of the colony, this dreadful disease caused untold suffering. It was always present, but every few years it increased in fury and took thousands of lives. In 1853 New Orleans reported 40,000 cases of yellow fever and 11,000 deaths from the disease.

A group of American and Cuban physicians discovered the cause of the disease—a virus transmitted by mosquito bites. There is still no cure for the disease, but it can be prevented by vaccination and mosquito control. Until yellow fever was brought under control, its epidemics depressed port activity in Louisiana. Northern businessmen did not want to expose themselves to the disease. Fortunately, there has been no serious threat from yellow fever since the last New Orleans epidemic in 1905.

The reconstruction period after the War Between the States clouded the business climate in New Orleans. Cities in the north were expanding in the

wake of a vigorous, postwar prosperity, but New Orleans and other southern cities languished in a pall of defeat.

It was decided that New Orleans should have a world's fair, an expensive, year-long extravaganza with pavilions sponsored by several nations and industries. It would announce to the world that the War Between the States was over and that New Orleans was back in business. The fair would emphasize that New Orleans was the best port connection between middle America and world markets—especially the markets in Latin America.

The celebration was called the World's Fair and Cotton Centennial Exposition (1884-1885), and it was held in a large wedge-shaped tract of land between the uptown section and the suburb of Carrollton. The fair was not a complete success, but it accomplished at least two objectives: It did much to restore confidence in the future business and port activity in the city and it left a large tract of land available for urban use. The part of the land on the river side of St. Charles Avenue became Audubon Park. The other part, on the lake side of St. Charles Avenue, became the home of Tulane University and Loyola University of the South.

Inefficient Port Management From 1865 to 1896, the Port of New Orleans suffered from the lack of good management. During that time, most of the port facilities were leased to private companies. The companies charged fees and rates that put New Orleans at a competitive disadvantage. Most of the wharves were old and needed repair. The port had grown in size to include river frontage in three parishes: Orleans, St. Bernard (downriver), and Jefferson (upriver). Various unnecessary fees were charged vessels moving from Orleans to St. Bernard or Jefferson parishes.

Business leaders in New Orleans realized that the port had to be managed by a single authority. Only a single management could assure fair and uniform rates. They asked the General Assembly of Louisiana for help and, in 1896, the assembly passed Act Number 70. The act created the Board of Commissioners of the Port of New Orleans as an agency of the state of Louisiana. This agency has since been known as the "Dock Board." The Dock Board took over management of the legal servitude of the batture and banks of the Mississippi River, which included the wharf system in Orleans, St. Bernard, and Jefferson parishes. Many private interests challenged the legality of the Dock Board, but the Louisiana Supreme Court has always upheld the law that created the board.

After the new board took over the wharf system, it reduced wharfage rates on all vessels. The Dock Board wanted to make New Orleans a nearly free port, but sufficient fees had to be charged so that wharves could be maintained and new facilities could be built.

Obsolete Port Facilities The Dock Board took possession of the wharves in 1901, but had no money

for a much-needed construction program. The board obtained a loan at no interest from the Leyland Steamship Company to build a modern, covered wharf. Under the agreement, the Leyland Company had first use of the wharf for its own ships. When not in use by Leyland's ships, the port could assign the wharf to other companies. The loan was repaid out of fees collected from the other users of the wharf.

Similar agreements were made with other companies, including the Harrison Line, the Southern Pacific Railroad, the New Orleans Terminal Company, and the United Fruit Company. The first-choice provision is called "the first call on berth privilege," and it has remained the policy of the Dock Board since its beginning.

In 1908 the legislature authorized the Dock Board to issue bonds for construction. Such authorization also had to be approved by voters as an amendment to the state constitution. This was accomplished in 1913. In time, the board issued bonds for the construction of the Public Cotton Warehouse, the Public Grain Elevator, and the Inner Harbor Navigation Canal, which connects the Mississippi River to Lake Pontchartrain.

After 1896, the membership of the Dock Board was determined by the governor of Louisiana, who could appoint and remove members at will. But since this method of selection often resulted in unworthy appointments and unethical conduct, the Louisiana legislature changed the procedure in 1940. Board members now must meet certain qualifications. They must be nominated by designated business and professional organizations, and members may not be removed except by legal proof of misconduct at a public hearing.

The Modern Port of New Orleans

The Port of New Orleans has grown to be one of the largest and busiest in the nation; in the past few years, it has handled more cargo tonnage than any other port. The port is state-owned and is managed by the Board of Commissioners of the Port of New Orleans. Its facilities include the public wharf system on the Mississippi River in Orleans, St. Bernard, and Jefferson parishes. This wharf system contains about 100 berths that stretch almost continuously for about 12 kilometers along the banks of the river. In addition, the Dock Board manages port facilities on the Inner Harbor Navigation Canal (the Industrial Canal). This canal extends from the Mississippi River to Lake Pontchartrain. The board also manages the Public Commodity Warehouse complex and the Foreign Trade Zone Number Two. It leases the Public Grain Elevator to a private operator. The New Orleans Bulk Terminal and France Road Container Terminal are recent additions to the Port of New Orleans.

Most of the wharves are of the "quay" type, which means that they run parallel to the river rather than jut out into it. Typically, a wharf consists of a

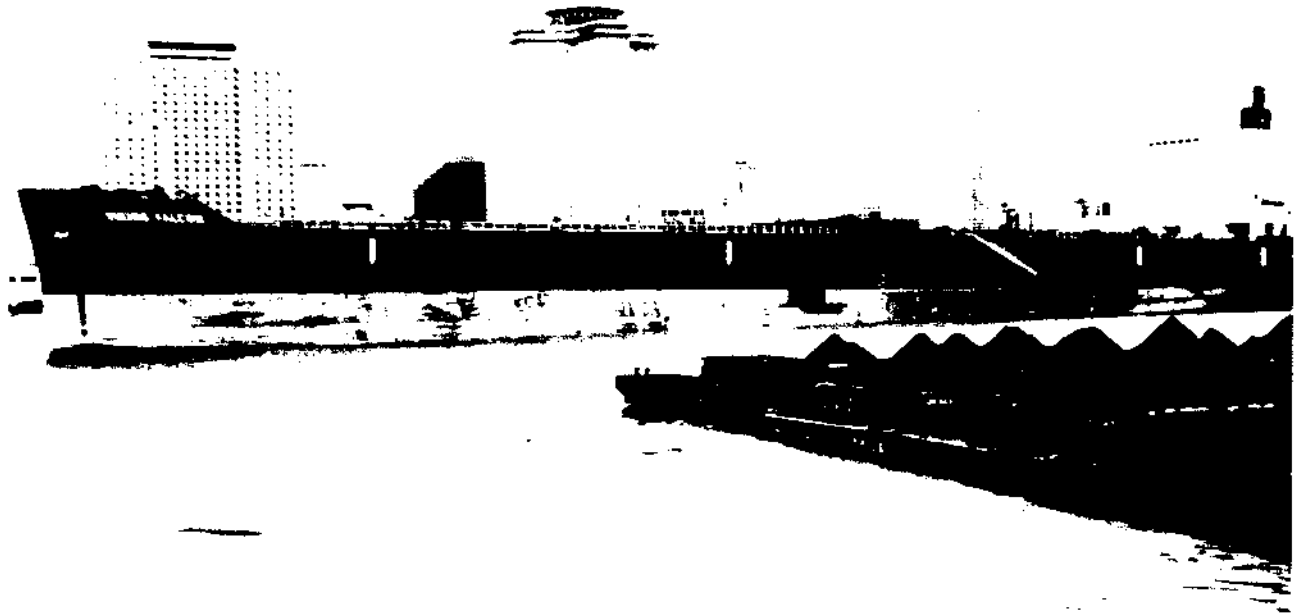


Figure III-28. *The modern port of New Orleans. (Photo Office of Tourism.)*

riverside apron (platform), a transit shed, and a landside apron. "Open" wharves have a continuous apron with no shed. Nearly all wharves are served by a rail track on the land or river side, allowing cargos to be easily loaded and unloaded.

A wharf and its transit shed are used for the loading, unloading, and short-term storage of cargo. They are not storage warehouses. When a company leaves cargo too long in the transit shed, it will be assessed a fee, called a demurrage charge.

Foreign Trade Zone Number Two The port operates Foreign Trade Zone Number Two under the authority of the federal government. This zone is a special section of the port where foreign and domestic goods may be received, processed, and manufactured without payment of customs duties. The duties become payable only after the goods enter normal commerce. Foreign goods imported into the zone may be manufactured for export without ever incurring customs duties.

The Foreign Trade Zone Number Two was established shortly after World War II. Its purpose was to allow American business to compete with foreign manufacturers on a more equitable basis. The Trade Zone has stimulated business at the port, as the value of goods moving through it is well over \$100 million annually.

The Public Belt Railroad Eight railroads operated in New Orleans at the beginning of the twentieth century. Railroad lines, arranged in spider web fashion, served the many public and private wharves along the river. The port and its customers found great difficulty and confusion in switching freight cars from one carrier to another. There was too much duplication of rail service. The transfer of freight among the carriers meant unending delays and unnecessary costs. The situation badly needed correction.

In 1905 the city of New Orleans passed an ordinance forming the Public Belt Railroad. The city-owned railroad is unique among railroads. Its chief job is switching freight cars brought to New Orleans and delivering them to their final destination in the city. A charge is made for each car handled without regard to mileage and weight. No charge is made for returning empty cars to the trunkline railroads. The Public Belt Railroad has made port operations in New Orleans much more efficient.

In recent years, however, the Public Belt Railroad has become controversial. Because the railroad operates at a loss and is a financial burden on the city, New Orleans would like to turn it over to another agency.

Artificial Waterways in New Orleans

Throughout its history, the Port of New Orleans recognized the need for canals to supplement its river-ocean commerce. The Mississippi River serves well for north-south traffic. But the city also needed improved means for the east-west movement of freight.

The first artificial waterway (the Carondelet Canal) was built by the Creoles to provide a water route from the rear of the Vieux Carré to Lake Pontchartrain through Bayou St. John (the Bienville Passage). The second (the New Basin Canal) was built by the Americans in 1832 to move freight between the uptown section and Lake Pontchartrain. Both of these canals were later abandoned because they were difficult to maintain and they did not connect Lake Pontchartrain with the river. But a river-lake connection was still a long-cherished ambition of the port.

In the early 1920s, the Dock Board and the city jointly built a deepwater canal between the river and the lake. The canal was finished in 1921 and the river locks in 1923. (Water level in the river is at least three meters higher than that in Lake Pontchartrain.) It is officially named the Inner Harbor Navigation Canal but is more commonly known as the "Industrial Canal." Actually, Lake Pontchartrain is too shallow for ocean vessels. But the new canal provided more dock space and room for industrial development.

In 1934, the improved West Bank Harvey Lock and Canal were completed. The waterway linked the Mississippi River with Bayou Barataria so that barges could move from the river to Morgan City, Lake Charles, and the Texas coast. By 1945, barge traffic on the Harvey Canal became so brisk that it had to be supplemented with another waterway, the Algiers Canal.

Throughout the 1920s and 1930s, work proceeded on the Gulf Intracoastal Waterway. This waterway is nearly 1,800 kilometers long. Barges can be moved on the waterway between Brownsville, Texas, and St. Marks, Florida, through New Orleans, without entering the open Gulf. The Industrial Canal in New Orleans was made part of the Gulf Intracoastal Waterway.

The Mississippi River-Gulf Outlet By the 1950s, the Port of New Orleans extended for more than 40 kilometers along the banks of the Mississippi River and the Industrial Canal. With nearly 5,800 ships calling each year, it had become one of the world's busiest and most congested seaports. Much of the export cargo came by barge, but increasing amounts were arriving by rail and truck. There was a great need to enlarge the port and to find additional space for support facilities.

In 1956, after many years of hearings and investigations, the Corps of Engineers recommended the dredging of a new canal between New Orleans and the Gulf. The canal would be east of New Orleans. It would afford ocean-going ships a new access to the port without using the Mississippi River. The resulting waterway, called the Mississippi River-Gulf Outlet (MR-GO), put the Port of New Orleans 65 kilometers closer to the sea. The MR-GO was finished in 1963.

The MR-GO was part of a plan to rebuild the Port of New Orleans. The Dock Board and the business community of New Orleans wanted to shift much of the heavier traffic to new facilities in the open areas of east New Orleans and St. Bernard Parish. Shipping companies would then have a choice. They could use either a riverfront wharf or one in the newly developing port area in the east at the head of the MR-GO. The new port area east of the river came to be known as the tidewater area.

Much of today's cargo is moved in sealed containers the size of boxcars or truck trailers. Containerized cargo requires huge cranes for lifting and large areas for the storage of containers awaiting shipment. The space along the riverfront was not adequate to accommodate large container facilities, but the new port in the tidewater area is large enough to support this cargo.

The Port of New Orleans is important, not just to New Orleans, but to the entire state. Port activities in New Orleans, Lake Charles, Baton Rouge, and elsewhere in the state directly or indirectly support thousands of jobs.



The Port of Baton Rouge

The Discovery of Baton Rouge

Most cities have a definite beginning in history, with the establishment of a settlement that later became a town or city. But Baton Rouge seems to have been discovered rather than founded. Indian settlements occupied the bluffs of Baton Rouge for perhaps centuries before Europeans came to North America.

The discovery of Baton Rouge occurred March 17, 1699, and was made by Pierre Lemoyne, Sieur d'Iberville, during his ascent of the Mississippi River from Biloxi. Iberville, whose party of about three dozen men included his brother, Bienville, ascended the Mississippi River to the present site of Baton Rouge. The explorers noticed several impressive geographical features that were different from the flatland southward to the Gulf of Mexico. First, the river at Baton Rouge abandoned its winding

habit to form a "reach," or straight stretch between bends, about 15 kilometers long.

Secondly, the east bank rose from the river as bluffs, high enough to be free from the annual spring overflow of the river. Behind these bluffs were occasional quiet streams, grassy meadows, and lovely forests of oak and pine. The rich soil enabled the local Indians to grow crops of corn and beans. The Indians lived in small cabins with roofs of palmetto leaves.

The French noticed a reddened "maypole" without branches to which the heads of fish and bears were attached in sacrifice. The pole may have been a cypress tree. The Indians told the French that the pole marked the hunting boundary between the Bayougoulas (downriver) and the Houmas (upriver). The Indians called the red pole *Istrouma*, which translated into French as *Baton Rouge*, or "red stick." The local Indians became enduring friends of the French.



Figure IV-29. In its early days, the port of Baton Rouge, seen here from across the Mississippi River, supported a mixture of steamboat and flatboat commerce. The width of the river seems understated in this undated drawing. The

skyline is dominated by the Old State Capitol, completed in 1850, and the steeple of St. Joseph Church, completed in the late 1850s (Howard Tilton Memorial Library, Tulane University).

Baton Rouge During the French Era

During the period from 1698 to 1762, Louisiana struggled as a French colony. Actually, history does not reveal very much about Baton Rouge during that time. It was a river landing of minor importance, and appears on several maps as a point of reference rather than as a thriving settlement. Various members of the Dartaguet family attempted settlement in the area. In 1727, however, Father Paul du Poisson camped overnight in the area and reported that the settlement had been abandoned. Some historical accounts refer to a fort at Baton Rouge, but such a fort may not have existed. Baton Rouge under the French seems to have been mainly a settlement of widely scattered plantations. But better times were coming.

Baton Rouge Becomes English

In 1763, the French and Indian War ended with the victory of the English and their Spanish allies. France lost all of Canada to England, as well as all of Louisiana east of the Mississippi (except the Isle of Orleans, which included New Orleans).

The eastern part of Louisiana became known as West Florida. It extended from the Mississippi River to the Perdido River (the present boundary between Alabama and Florida). The English also obtained from the Spanish East Florida, now the state of Florida.

Duc Etienne de Choiseul, the French foreign minister, urged King Louis XV to get rid of the rest of Louisiana. The French had offered all of Louisiana to the English, but the English chose West Florida instead. They regarded Florida as a far more strategic possession.

The French foreign minister renewed efforts to transfer Louisiana to Spain. The Spanish were reluctant at first, but later changed their minds. Louisiana as a Spanish colony would keep the English at some distance from the Spanish mines in Mexico.

The Spanish acted slowly in taking possession of their newly acquired colony of Louisiana, but the English quickly began to organize and develop West Florida. The French had shown almost no interest in Baton Rouge, but the English did. They saw that Baton Rouge was well situated. It was on the Mississippi River, with direct access to the upper Mississippi River Valley. It was on bluffland well above the floodplain of the river and was very close to Bayou Manchac. Bayou Manchac, with improvements, could provide a waterway to the Gulf of Mexico through Lake Maurepas and Lake Pontchartrain.

The English were determined to control commerce and traffic on the Mississippi River. They were indeed successful in this ambition. The plan was to cut off trade at New Orleans by building a port at Manchac. Boats could then move from the Mississippi to the Gulf through Bayou Manchac, the Amite River, and lakes Maurepas and Pontchartrain. Bayou Manchac and the Amite River together were called

the Iberville River.

A small English fort was built at Manchac and a larger one at Baton Rouge. The English renamed Baton Rouge "New Richmond," but the new name was ignored by most people.

West Florida and Baton Rouge began to grow and prosper. The English monopolized trade with the Indians, to the dismay of the Spanish officials in Louisiana. Baton Rouge soon became a bustling village. Its booming economy was aided by illegal trade with Spanish Louisiana.

The Spanish had very restrictive attitudes about trade. They wanted Louisiana to trade only with Spain or with other Spanish colonies. The prohibition of trade with the English caused severe shortages in Louisiana; consequently, Baton Rouge became a haven for English smugglers ready to sell goods to the French and Spanish in Louisiana at fair prices. At first the Spanish officials ignored the illegal trade, but in later years the issue became increasingly sore.

West Florida was very attractive to settlers from other English colonies in North America. Streams of immigrants from the colonies east of the Mississippi poured into the new territory. They were enticed there by offers of cheap land. Although the village of Baton Rouge had French and Spanish residents, it soon became dominated by Anglo-Saxons. This cultural influence prevailed in Baton Rouge thereafter.

The Anglo-Saxons who came to West Florida represented two different backgrounds. The first were frontiersmen from Kentucky, Tennessee, and Mississippi. Others were Tories who were very loyal to the British crown. The Tories, cultured gentry from Virginia and the Carolinas, resented the growing radicalism and talk of independence on the east coast.

Baton Rouge Becomes Spanish

In 1776 the 13 English colonies of the east coast declared their independence from England and soon were fighting for their lives against the might of the British army and navy. The American Revolution began only 12 years after England had gained possession of East and West Florida.

The citizens of West Florida were divided in their loyalties. The Tories despised the American bid for independence, which they regarded as radical and anarchistic. The majority in West Florida, however, were frontiersmen who felt a kinship with the Americans. They hoped that someday West Florida would become part of a new American nation.

At first the Spanish officials in Louisiana had to remain neutral. But their hatred of the English resulted in much sympathy for the Americans, and, in time, the Spanish entered the war against England. Don Bernardo de Galvez, the Spanish governor of Louisiana, launched attacks against the English forts at Manchac, Baton Rouge, and Natchez. All three forts fell to the Spanish with little resistance, and Galvez then subdued the other English forts at Mobile

and Pensacola. As a result of the war, the Americans won their independence. Spain regained East and West Florida, and Baton Rouge became a Spanish village.

Spanish rule of Louisiana and the Floridas was in the main moderate and considerate of local needs and wishes. Where possible, the Spanish appointed local people to governmental offices. The Spanish governors had to tread lightly, however. Louisiana was predominantly French, and West Florida was mostly Anglo-Saxon. Neither group had strong feelings of loyalty to the Spanish throne.

The English in West Florida had set up a form of government based on elected representatives. But the Spanish had little patience with republican institutions and no such elective body was permitted.

The port operations at Manchac, which the English had encouraged, dwindled to nothing. Baton Rouge under the Spanish continued as a river landing, but it was overshadowed by more important settlements at Bayou Sara (St. Francisville) and Pointe Coupee.

In 1800, France—under Napoleon—was the seat of power in Europe. By treaty that year, Louisiana once again became a French colony, though the Spanish retained West and East Florida.

Three years later, in 1803, the United States completed negotiations to purchase the Isle of Orleans and the rest of Louisiana from the French. President Jefferson later insisted that the Louisiana Purchase had also included West Florida, but the Spanish refused to withdraw so Baton Rouge remained a Spanish city for a few more years. By this time, its population was two or three thousand, mostly Anglo-Saxon.

The new Spanish governor of West Florida was Vizente Folch and Pensacola was the capital city. The Spanish became fearful of losing Baton Rouge because of its excellent position on the Mississippi River. The richest lands in West Florida were near Baton Rouge, and the town was surrounded by hostile Americans. It soon became a storm center of political unrest.

Governor Folch had to govern a colony of citizens who generally resented Spanish rule. There was endless talk of rebellion, especially in Baton Rouge and St. Francisville. There were rumors that Aaron Burr was leading a private army to invade West Florida and seize Baton Rouge. The United States laid claim to West Florida, but did nothing to assert the claim.

The Republic of West Florida

Resolution finally came in 1810. The West Floridians organized their own army and quickly captured St. Francisville, Baton Rouge, and all of West Florida west of the Pearl River. They proclaimed West Florida an independent republic with St. Francisville as its capital. Its emblem was a large white star on a blue background.

Some of the West Floridians wanted annexation to the United States. Others wanted to stand alone as an independent republic. Many of the Tories had little love for the United States, while others resented the United States for doing nothing to help West Florida in its struggle against the Spanish. But on December 10, 1810, the blue and white flag of West Florida was lowered and the American stars and stripes were raised at Baton Rouge. The infant republic had lasted only 74 days.

Baton Rouge: An American City and Port

In 1812 Louisiana was admitted to the Union as the eighteenth state. Baton Rouge, with a population of about 3,000, had at last become American. Already the town had changed flags five times. In that same year the steamboat *New Orleans* passed through Baton Rouge on her way to New Orleans. Soon the vessel entered the river trade between New Orleans and Natchez. The future of Baton Rouge as a river port seemed assured.

Actually, Baton Rouge was to become a major inland seaport and metropolitan center. Three events,



Figure IV-30. Freighters from all over the world call at the modern port of Baton Rouge.

widely spaced in time and influenced by the city's excellent geographical location, enabled Baton Rouge to grow and prosper.

The first was the selection of Baton Rouge as the capital of Louisiana in 1849. The choice, a compromise between Louisiana's northern and southern legislators, gave Baton Rouge important recognition. It also assured the city of political influence and a source of employment in state government.

The second event was Louisiana's decision to make its major investment in higher education in Baton Rouge. In 1869, Louisiana State University was moved to Baton Rouge from Pineville. In 1881, Southern University was moved to Baton Rouge from New Orleans. The presence of these two land-grant universities provided Baton Rouge with important educational and employment resources.

The third event is related to the development of Baton Rouge as an inland seaport. In 1909, the Standard Oil Company decided to build its major southern refinery in Baton Rouge. The company's decision was based on the discovery of large petroleum deposits in north Louisiana and on the fact that Baton Rouge was the head of navigation on the Mississippi River for ocean-going tankers. Again, the port city's fortunate location paid off.

The arrival of Standard Oil (now called Exxon) in Baton Rouge set the stage for the area's most dramatic growth in population and port activity. The refinery was the first of many petrochemical industries to locate their plants along the lower Mississippi. During the next 70 years, almost 100 petrochemical plants were constructed on the river banks between Baton Rouge and New Orleans.

Steamboat Operations (1812-1920)

Baton Rouge was a frequent way-stop for steam packets serving the river trade between New Orleans and the major tributaries of the Mississippi River. Many of the packets calling at Baton Rouge took on freight and passengers at the foot of Florida Street.

Many packets also made a "wood stop" at Clay's Landing in Port Allen. This landing was about three kilometers upriver from Florida Street on the west bank.

Clay's Landing was the site of Louisiana's first steamship loss. In July of 1814, the *New Orleans* snagged on a planter and sank. Fortunately all of the passengers and crew were saved and most of the cargo was retrieved.

The Port of Baton Rouge

Ocean-going vessels were calling at Baton Rouge long before the city officially became a port. Many of the larger industries like the Standard Oil Company then operated their own port facilities and continue to do so today.

In the early 1920s, the need became apparent for a public docking facility to handle cargo for smaller



Figure IV-31. The first mate in the control room of a modern-day freighter.

shippers and port users. As a result, the city authorized the construction of the Municipal Dock in the mid-1920s. The Municipal Dock was located on the east bank a short distance below the present Interstate Highway 10 bridge. In 1936 the city leased the dock to the Federal Barge Line, which operated the facility for 12 years. In 1949 the East Baton Rouge City-Parish Council created the Baton Rouge Port Authority, which operated the dock until 1952 when the Authority was dissolved.

The Greater Baton Rouge Port Authority

The old Baton Rouge Port Authority had limitations. For example, it did not have the economic resources to construct and operate a large, modern seaport. It also lacked territorial jurisdiction. It could operate only in East Baton Rouge Parish. If the port were to expand, it would have to move some of its operations to the west bank of the river, as the west bank had deeper water and more room for industrial growth.

In 1952 the Louisiana legislature and the voters of the state created the Greater Baton Rouge Port Authority. This authority included jurisdiction in Iberville, Ascension, and East and West Baton Rouge parishes.

The new Port Authority has had enterprising leadership. It began to construct new and larger general cargo facilities in Port Allen on the west bank. In time, the general cargo facilities were expanded to include 250,000 square feet of covered storage space and 250,000 square feet of open docks. A large area is maintained for the storage of imported automobiles, an important commodity of the port. The old Municipal Dock on the east bank was abandoned about 1960.

Baton Rouge has a bulk terminal for handling molasses, much of which is imported. The Port

Authority constructed a grain elevator that could accommodate 7.5 million bushels. Both of these facilities are leased to private industry. They are located near the Port Allen Lock, convenient to barge traffic using the Port Allen-Morgan City canal, part of the Gulf Intracoastal Waterway system.

Metallic ores are an important part of the port's business. They are handled at the Burnside Terminal in Ascension Parish, some 50 kilometers south of Baton Rouge. The Burnside Terminal is one of the largest ore handling facilities in the world. All types of ores can be stored or transferred to ships, barges, or rail cars.

At Scotlandville, north of Baton Rouge, the Port Authority operates a unique barge terminal. This publicly owned dock facility is for the exchange of domestic cargo between water and land. The Baton Rouge Canal was built to provide more waterfrontage for industries coming to the Baton Rouge area.

By the late 1970s, cargo handled by the Port of Baton Rouge reached more than 70 million tons annually. This total included the cargo moving across private and public docks in the Port Authority's jurisdiction. In the 1980s, Baton Rouge ranked among the top ten U.S. ports in amount of tonnage handled. Port operations in Baton Rouge have provided a significant number of jobs in the Baton Rouge area and throughout Louisiana.

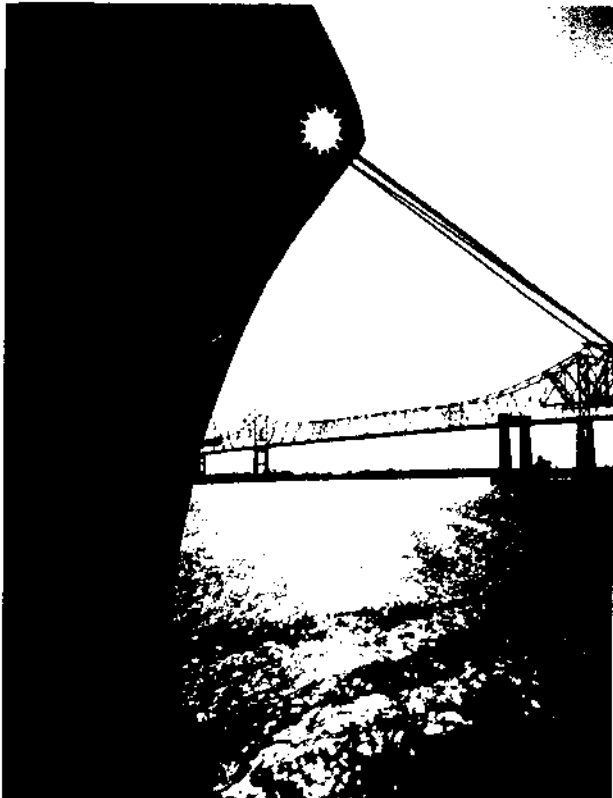


Figure IV-32. Baton Rouge ranks as one of the major U.S. ports in tonnage handled. (Photo Office of Tourism.)



CHAPTER V

The Port of South Louisiana

Between Baton Rouge and New Orleans, the Mississippi flows through Louisiana's historic river parishes. On both sides, the river is flanked by fertile agricultural lands that have for two centuries



Figure V-33. *The Port of South Louisiana extends for about 40 miles along the banks of the Mississippi and includes river frontage in St. James, St. John the Baptist, and St. Charles parishes. The region contains one of the world's largest marine shipping complexes. (Photo courtesy of the Port of South Louisiana.)*

produced a variety of crops including indigo, cotton, sugar cane, and, most recently, soybeans. The river parishes are well known for their stately plantation houses, moss-draped live oak trees, and rich cultural traditions. The culture is indeed varied, a blend of influences that are African, Caribbean, native American Indian, Acadian, German, French and Spanish Creole, Swiss, English, and American.

The Mississippi River was and is the backbone of the river parishes. The most valuable land is that fronting the river. Before roadways were built, the river provided the best means of transportation.

Today, agriculture is still important in the river parishes, but petrochemical industries, steel and aluminum plants, grain elevators, electric power stations, port activities, and marine transport operations have taken more and more of the valuable land facing the river.

Growth of Industry

The development of large industries in the river parishes began in the 1950s and is continuing with more than 40 major industrial plants in operation there. These industries chose the river parishes because they offer efficient waterborne transportation. The area has direct access to the Gulf of Mexico and to the midwest by way of the Mississippi River system. It also has east-west access to all ports of the northern Gulf of Mexico by way of the Gulf Intracoastal Waterway.

South Louisiana Port Commission

During the late 1950s, it became apparent that the river between Baton Rouge and New Orleans was developing into a port of considerable importance, but without the services that a port authority could provide. At the time it did not seem feasible to enlarge the limits of the ports of New Orleans or Baton Rouge to include the remaining river parishes outside the jurisdiction of either port authority.

In 1960, the Louisiana legislature authorized the South Louisiana Port Commission to manage a public deep-draft port on the Mississippi River for the three

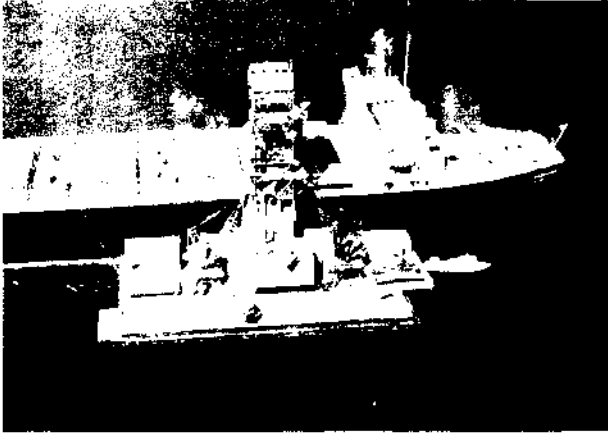


Figure V-34. A bulk cargo carrier, Port of South Louisiana. (Photo by R. J. Lautner, courtesy of Port of South Louisiana.)

river parishes: St. Charles, St. John the Baptist, and St. James. These parishes included all of the Mississippi River between the limits of the ports of Baton Rouge and New Orleans.

The South Louisiana Port Commission's area includes 53 miles on the river with berthing for more than 60 ocean vessels and extensive facilities for barge docking and fleetling. Nearly 5,000 ocean-going vessels use the facilities at the Port of South Louisiana annually. Waterborne commerce, both foreign and domestic, exceeds 200 million tons annually.

The port handles the largest volume of cargo in the United States. In tonnage and dollar value of goods handled, it is bigger than its sister deepwater ports of Baton Rouge and New Orleans and its tonnage is larger than that of the Port of Houston.

The types of facilities financed by the South Louisiana Port Commission include grain elevators;

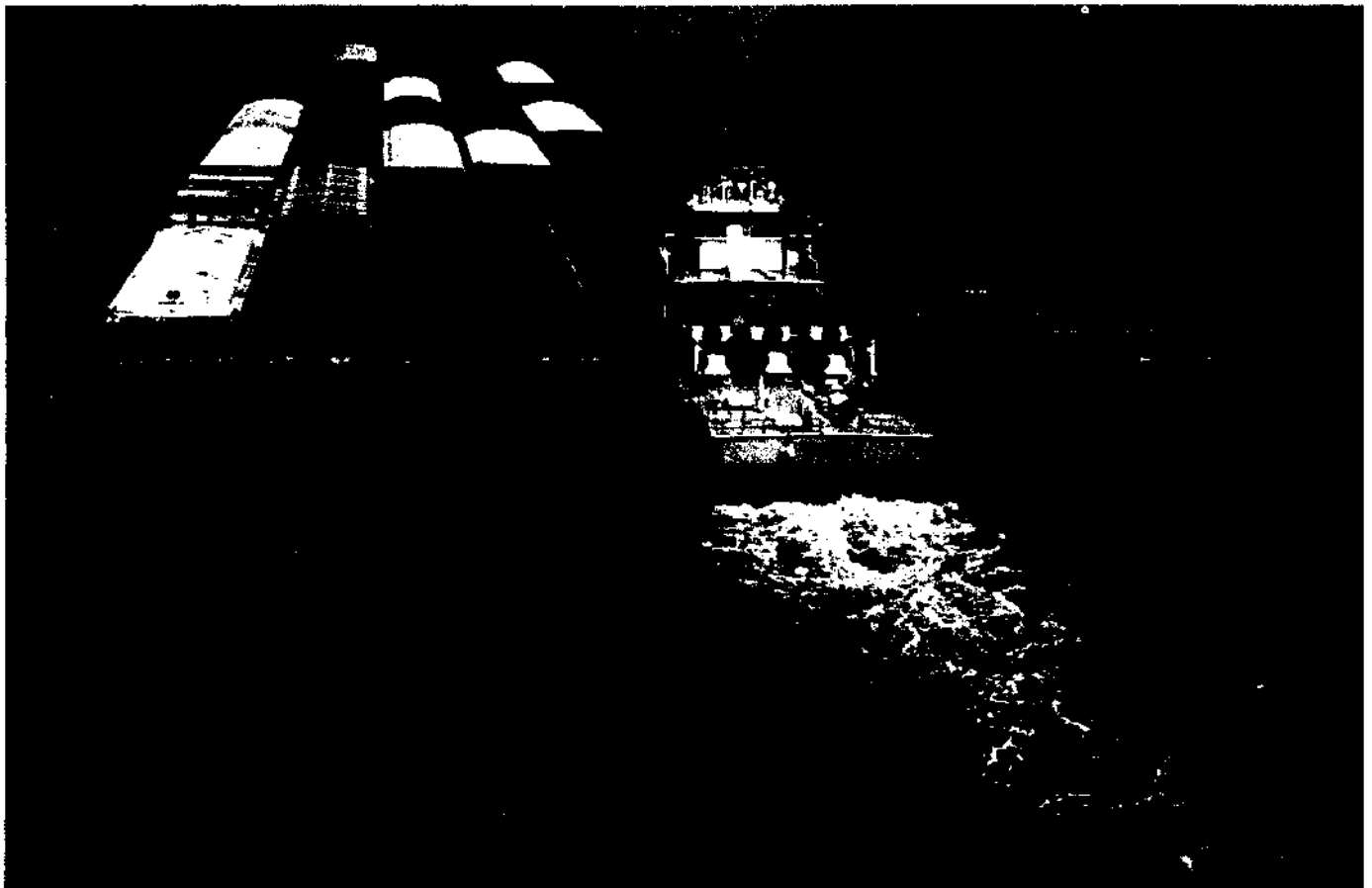


Figure V-35. The motor vessel Miss Kae-D pushes a record tow near Memphis on May 6, 1981. This tow, assembled near Baton Rouge and bound for Hickman, Kentucky, contained 70 empty barges and two barges loaded with magnesium. The previous record was set in 1906 by the steam vessel W. W. O'Neil, which pushed 63 empty wooden barges smaller than the steel ones pushed by the

Miss Kae-D. Miss Kae-D's tow covered nearly 13 acres. Built in 1977 and owned by the Flowers Transportation Co., the Miss Kae-D is powered by three diesel engines having 10,500 horsepower. She and four sister vessels now plying the Mississippi River are the world's largest towboats. (Photo used by permission of the Flowers Transportation Co., Greenville, Mississippi.)

chemical docks and storage tanks; dry-bulk terminals for handling products such as coal, alumina, and bauxite; steel mill docks to handle scrap iron and steel products; fertilizer handling docks; and storage areas for handling liquid and dry fertilizers. Between 1976 and 1983, the South Louisiana Port Commission sold over \$200 million in industrial revenue bonds to finance the construction of specialized port facilities and has pledged to issue over \$300 million more for port projects being planned or now under construction.



Figure V-36. Tugboats like this one docked at Morgan City are a common sight in modern Louisiana ports.

Industrial Development

The rapid growth of the port reflects the growth of the area. During the period from 1960 to 1980, when the U.S. increased its population by 26 percent and the state of Louisiana grew by 29 percent, the port grew by 56 percent. Representatives from the state government and the governing authorities of the three parishes compose the South Louisiana Port Commission. As they are aware of local needs and the local economy, they can respond quickly to the needs of business and industry interested in operating there.

The speed of industrial development has been remarkable. During the five-year period from 1977 to 1981, approximately 25 percent of money spent for industrial plant construction or expansion in Louisiana was spent within the port's boundaries. During the same period, almost \$3 billion was invested by new industry in the port area. The main reason for this increase is the Mississippi River, which flows through the hearts of St. Charles, St. James, and St. John the Baptist parishes, carrying the greatest supply of water in the nation. The river makes the region accessible to the markets of the world and to the population centers of the Mississippi Valley, which stretches from Pennsylvania to Wyoming.

The Port of South Louisiana has access to facilities that provide passenger and freight service to almost every major city in the world. Four trunkline railroads serve the port—the Illinois Central Gulf and the KCS-Louisiana and Arkansas on the east bank of the Mississippi, and the Texas Pacific and the Missouri Pacific on the west bank.

The port area contains two interstate highways, Interstate 10 and Interstate 55, giving direct routes to Los Angeles, Chicago, and Jacksonville, Florida. The construction of Interstate 49 is proceeding along a route that connects north and south Louisiana. This highway will terminate in Shreveport and provide access to Dallas, Little Rock, and Memphis.

Two bridges span the Mississippi River within the port area. The Sunshine Bridge in St. James Parish was constructed in the 1960s to open the west bank of the river to industrial development. In 1983 the Luling-Destrehan Bridge was completed to provide a safer and more convenient means of crossing the river. The need for the Luling-Destrehan Bridge became apparent in October of 1976 when a tragic accident involving a freighter and a ferry claimed 78 lives. The construction of an additional bridge across the Mississippi is underway. The new bridge will connect Wallace on the west bank with Gramercy on the east bank.

The port area is served by the New Orleans International Airport, which has over 300 arrivals and departures daily. It provides nonstop and connecting service to most U.S. cities and parts of Central America, South America, and Europe. The airport is located in Jefferson Parish and is scheduled to expand into adjacent St. Charles Parish in the near future.

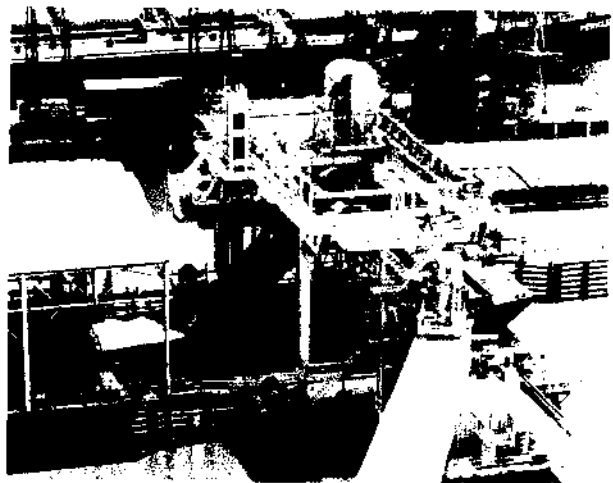


Figure V-37. The transfer of grain from barge to ship or to dockside grain elevators has become a highly mechanized operation. This grain unloader handles up to 100,000 bushels of corn, wheat, or soybeans per hour. About 40 percent of American grain exported to foreign markets moves through the lower Mississippi River. Jobs in port operations and agriculture are thus closely linked. (Photo by Heyl & Patterson, Engineers and Constructors.)



The Port of Lake Charles

Establishing the Port

In 1926, Lake Charles, with a population of about 15,000, was Louisiana's sixth largest city. In April of that year, the steamship *Seawell's Point* entered Sabine Pass and moved through the newly completed Lake Charles Deep Water Channel. The vessel then made her way up the Calcasieu River to Lake Charles. The town had become a deepwater seaport. By 1932, 1,000 ocean-going vessels had called at Lake Charles.

Of Louisiana's deepwater ports, Lake Charles is the closest to the ocean. Despite its nearness to the Gulf, the city's status as a deepwater port was slow to develop.

For a hundred years before, Lake Charles had existed as a "schooner port." Several of the Gulf coast seaports began as schooner ports, which were ports too shallow for anything larger than schooners and sloops in the coastal lumber trade. The schooners served the smaller ports for several decades after the major shipping companies had converted to steamships.

Since the mid-1800s, Lake Charles had wanted to become a significant seaport. All that was needed was a way to dredge the Calcasieu River, which empties into the Gulf. In the 1870s, and again in the 1880s, unsuccessful efforts were made to dredge a channel in the shallow Calcasieu River and lake. In 1916 the federal government again rejected a request to develop a channel through Calcasieu Pass.

In 1921 Calcasieu Parish voters approved a bond issue to dig a ship channel between the Calcasieu River and the existing seaway on the Sabine River. This was a roundabout way of getting to the Gulf, but the Lake Charles Deep Water Channel was completed in 1926. Finally, in 1939, the Corps of Engineers opened the Calcasieu Ship Channel, which put the Port of Lake Charles within 50 kilometers of the Gulf. The new ship channel was finished just before World War II. The war and the ship channel created an industrial boom in Lake Charles.

Early Economic Development in Southwest Louisiana

Lake Charles began in about 1780. It was a way-station on the Old Spanish Trail between New Orleans and the Spanish territories west of the Sabine. The first settlers are said to have been Martin LeBleu and Charles Sallier. "Charlie" Sallier gave his name to a beautiful lake near the settlement, and, in time, Charlie's Lake became Lake Charles.

Pioneers moving into southwest Louisiana found three different kinds of land. South of Lake Charles there were large coastal and tidal marshes, which were interrupted here and there by long sandy ridges called "cheniers." Most of the lands east of Lake Charles were prairies and savannas. Sometimes the prairies contained isolated stands of longleaf pine (*Pinus palustris*), but otherwise they resembled those of the American midwest. The area north of Lake Charles came to be known as "the flatwoods." The flatwoods were covered with dense forests of longleaf pine.

Lake Charles became the economic center for southwest Louisiana. It was near the Gulf and was on the Calcasieu River. By 1970, Lake Charles had grown to be a metropolitan area for about 150,000. The port city's history is one of a series of booms. First came the timber and cattle booms, followed by the shipbuilding, rice, sulfur, and oil booms. Most recently, the city has experienced a petrochemical, industrial boom. All of these economic developments were closely linked to the city's port activities.

The Timber Boom

The nineteenth-century settlers in southwest Louisiana were most impressed by the magnificent virgin pine forests. Many of these trees were as tall as a 12-story building, and some of the trunks were a meter in diameter.

The longleaf pines were an enormous natural

resource. Because of annual winter burnings, the forests were remarkably free of undergrowth. The flat terrain made lumbering far easier than in the hilly forests of the north and the west.

The forest industry gave Lake Charles its first major source of employment. Several lumber mills were built in Lake Charles and southwest Louisiana. Among these companies were Kirby Lumber; Litcher Lumber; Calcasieu Long Leaf Lumber; and North American Land and Timber. Much of the lumber and timber moved through the Port of Lake Charles by schooner. This schooner trade continued until the mid-1920s when the Lake Charles Deep Water Channel was opened.

The forest industry also influenced the extension of railroads into southwest Louisiana and Lake Charles. The first was the Western Louisiana Railroad

completed in 1880, which ran from Morgan City to the Sabine River. It provided through service between New Orleans and Houston and eventually became part of the Southern Pacific. Later on, the Kansas City Southern Railroad (KCS) was extended southward to Lake Charles and Port Arthur, Texas. The main business of the KCS in western Louisiana was the movement of midwestern grain southward to the ports of Lake Charles and Port Arthur, Texas, and Gulf coast lumber northward to midwestern markets.

Shipbuilding

The need to export lumber also resulted in a small shipbuilding industry in Lake Charles. Three or more "shipways" operated in Lake Charles between 1880 and 1910. The shipways built schooners and sloops for service to small ports on the Gulf and



Figure VI-38. The general cargo docks of the Port of Lake Charles are located on the Calcasieu River (foreground) and Contraband Bayou (upper right). Additional public and

private terminals are in operation at other sites near Lake Charles. (Photo courtesy of Lake Charles Harbor and Terminal District.)

Atlantic coasts. This industry reached a peak about 1910 and then began a slow decline.

The Cattle Boom

The prairies of southwest Louisiana were well suited to raising cattle, which were introduced when Louisiana was a Spanish colony. They were raised using methods developed by the Spanish, though French descriptive terms were used instead of Spanish ones. For example, a *ranch* became a *vacherie*.

Cattle were driven to market or to the nearest boat landing that would carry them to markets in New Orleans or the Caribbean. Lake Charles exported many cattle before the railroads provided direct transportation to New Orleans. In modern times, cattle production has grown in importance in southwest Louisiana.

The Rice Boom

With the coming of the railroads in 1880, there was a great spirit of optimism in southwest Louisiana. Local citizens envisioned an era of prosperity because of the area's abundant natural resources and the potential of Lake Charles as a seaport. Aid was sought from the federal government to deepen the Calcasieu River so that larger ships could call at Lake Charles. This ambition, however, was not fulfilled for several decades.

Another ambition was to attract new settlers to the area by offering farm land at low prices. Much of the land was held by a few large landowners. Among the largest was the North American Land and Timber Company which gained control of one and one-half million acres in southwest Louisiana.

In 1885 the North American Land and Timber Company and others organized the largest land sale in the state's history. Advertisements in newspapers throughout the nation praised the virtues of farming in southwest Louisiana. Much of the land was offered for sale at 50 cents per acre.

Because the Louisiana prairies resembled those of the American midwest, an effort was made to attract midwestern grain farmers. It would be ideal to have a large farming industry so close to a seaport such as Lake Charles. Grain could be exported without the added cost of transporting it from the midwest to a seaport.

It was hoped that wheat and corn could become the major crops. Unfortunately, southwest Louisiana has too much rainfall for wheat. Corn also did not do as well in southwest Louisiana as in Iowa because the soil was not as fertile.

The North American Land and Timber Company decided to employ an agricultural scientist to develop a crop suitable for soil and climate conditions in southwest Louisiana. The company selected Seaman Knapp, then president of Iowa State University. Knapp lived in the Lake Charles area for about 18

years. He knew that southwest Louisiana was well suited to grow rice.

Rice had been introduced into southwest Louisiana previously, as early French Acadian settlers in the area had grown rice along the prairie streams. It was called "providence" rice. This meant that if Providence provided favorable growing conditions, there would be a crop. But it was Seaman Knapp and other agricultural scientists who developed strains of rice that could be grown on a large scale.

Rice requires a growing season of at least 200 days. It is best grown in fields covered with 30 or 40 centimeters of water, which serves to control the growth of weeds. Southwest Louisiana has a claypan, a hard subsoil layer that does not allow water to seep through. These conditions and the abundance of rainfall and surface water make rice a good crop for southwest Louisiana.

The midwesterners who came to southwest Louisiana knew about cereal farming, but rice was a new crop. They became successful rice farmers, however, by adapting familiar farm machinery and techniques to the new crop.

Much of the rice crop was exported through the Port of Lake Charles. After 1926 when the city became a deepwater port, rice was its principal export. In time Lake Charles became the world's largest rice port.

The Sulfur Boom

The discovery of oil at Titusville, Pennsylvania, in 1859 sent waves of excitement throughout the United States. Seven years later investors in New Orleans organized the Louisiana Petroleum and Mining Company. Its purpose was to explore for oil and other minerals in the coastal region. In 1886 the company sank a well in Calcasieu Parish between Lake Charles and the community of Edgerly. At a depth of about 170 meters, the drillers found instead of oil, a large dome-like deposit of pure sulfur.

Unfortunately, the sulfur was beneath layers of gravel, quicksand, and limestone, and these layers made mining operations difficult if not impossible. During the next nine years, several companies attempted to mine the sulfur, but none succeeded. On one occasion five men were killed in the collapse of a mine shaft.

At that time the world's only source of sulfur was on the island of Sicily in the Mediterranean Sea. Because the owners of the Sicilian mines charged a high price for their sulfur, there was obviously a strong reason to recover the sulfur near Lake Charles.

Herman Frasch, then a research scientist for the Standard Oil Company, developed a theory for recovering the sulfur without a mine shaft. He knew that sulfur had a relatively low melting point (between 96 and 120 °C). His plan was to inject super-heated steam down into the deposit. The melted sulfur would then be returned to the surface through one or more pipes nearby.

Frasch came to Lake Charles to test his theory. He and another scientist, Jacques Tonietto, were supported by two executives at Standard Oil who had invested money in the scheme. The mineral rights to the sulfur were owned by the American Sulphur Company. (The spelling, "sulfur," is the only one used by modern scientists.) The Frasch group and American Sulphur formed a new company called the Union Sulphur Company and then drilled recovery wells to test the patented Frasch process. The process worked and the first sulfur was brought to the surface on December 28, 1895.

The Union Sulphur mine was the lifeblood of the town of Sulphur, Louisiana, for 19 years. The mine closed in December of 1924 after producing 9.4 million tons of sulfur. The sulfur at the surface continued to be shipped for many years. Calcasieu Parish sulfur helped the United States win World War I because it was the principal source of this valuable mineral, called "brimstone" in the Bible. Long after it closed, the mine had a lingering influence on the future of Lake Charles. It signaled the dawn of a vast chemical industry that soon developed around the Port of Lake Charles.

The Oil Boom

After the accidental discovery of sulfur the Louisiana Petroleum and Mining Company drilled several test wells near Lake Charles. One of these test wells, drilled in 1886, passed through the sulfur deposit and struck oil at a depth of about 420 meters. The *Lake Charles Echo* reported that oil gushed out with enough force to knock a man down. Another test well 150 meters away also struck oil. Both wells were "gushers." They then settled down to a production rate of about 25 barrels per day (through a $\frac{3}{8}$ -inch opening). After several days, both wells went dry. The unrefined crude oil is said to have been sold as a lubricant to local sawmills and to the Southern Pacific Railroad.

A more important oil discovery occurred in 1901 on a farm near Jennings (some 60 kilometers east of Lake Charles). In 1901 there were at least seven oil companies operating in Lake Charles, including the Jennings Oil Company, the Lake Charles Oil Company, the Triumph Oil Company, the Pelican Oil Company, the Pennsylvania and Louisiana Oil Company, and the Texas and Louisiana Oil Company. Most of these companies were later merged into larger ones.

But the oil boom was on! In hotel and bank lobbies and on street corners, the one topic was oil and oil leases. There was much excitement and many dreams of great wealth based on oil. Indeed, many fortunes were made.

By 1933, southwest Louisiana wells were producing more than 35,000 barrels of oil per day. In fact, Louisiana and other states were producing too much oil, and during the 1930s the price of oil dropped to ten cents a barrel. Still there was money

to be made in oil. Most importantly for Lake Charles, oil was the basis of the next and biggest boom of all.

Following World War II, the emphasis in the oil and gas industry shifted to the Gulf of Mexico. Eventually thousands of oil and gas wells were drilled in the shallow waters of the northern Gulf of Mexico. Oil production in the Gulf reached a peak in the early 1970s at about one million barrels a day. More than 90 percent of this production was from the waters adjacent to Louisiana. Lake Charles became one of several coastal cities that provided the shore-based support for the offshore oil industry.

The Petrochemical-Industrial Boom

During the 1930s and 1940s, Lake Charles and Calcasieu Parish entered a new era. The area became a major industrial center for the refining and processing of petroleum products. The petrochemical boom coincided with World War II and the completion of the Calcasieu Ship Channel.

The boom continued during the 1950s and 1960s. Some of the nation's largest petrochemical companies built plants in or near Lake Charles. These included Olin-Mathieson, Continental Oil, Cities Service, PPG, Firestone, Columbia-Southern, Hercules, and Southern Alkali. These industries have provided thousands of jobs paying wages well above the national average for industrial workers.

The petrochemical industrial complex in Lake Charles is remarkably integrated. Often the product of one plant is used by other plants in the area. In fact, many of the plants were located in Lake Charles solely to use the output of local industries already "on stream."

At least three factors made the area's industrial economy possible.

1. There was a local abundance of raw materials (petroleum and natural gas).
2. The area had excellent transportation systems. Industries were attracted to Lake Charles because of its location on the Gulf Intracoastal Waterway and its position as a deepwater port. Waterborne transportation was supplemented with good rail and highway systems.
3. Lake Charles had efficient leadership within its civic and business communities. Without this leadership there would have been no seaport and little or no industrial development. Economic growth continues so long as local citizens have vision and determination. Elected officials can promote a community's well-ordered existence, but a city's growth and prosperity depend on its civic and business community.

Each of the economic booms in southwest Louisiana left a permanent imprint on the port city's destiny. Each one in its own way reshaped the urban landscape of Lake Charles. In time, the once slow-paced coastal and agricultural town became an industrial city. The industrial growth of Lake Charles

occurred primarily in the twentieth century, but its origin lies in the nineteenth century when local citizens agreed among themselves to make Lake Charles a deepwater port.

The Modern Port of Lake Charles

The Port of Lake Charles is managed by the Board of Commissioners of the Lake Charles Harbor and Terminal District. This five-member commission was established by the Louisiana legislature in 1924. The commissioners are appointed by the governor from a list submitted by local interest groups.

The general cargo facility of the port is located on a peninsula between the Calcasieu River and Contraband Bayou. The Port has 10 transit sheds totaling 745,086 square feet on the waterfront. In addition, there are 606,300 square feet of covered warehouse storage. The general cargo facility can handle up to 13 ships at one time.

The goods handled are typical of the products seen on any waterfront. However, the port's main general cargos are linerboard, grain products, rice, plywood, and imported automobiles. During the late 1970s, the port handled about 30 million tons of cargo annually.

The port has four bulk terminals. Three of these are leased to private companies, and one is operated by the port. The bulk terminals handle grain, petroleum coke, woodchips, and ores. The Calcasieu River also has several private bulk terminals owned

and operated by local industries. The Port of Lake Charles owns a belt railroad 70 kilometers long and has a police force of about 20 officers.

The most recent addition to the port is the Industrial Canal. It is located about 20 kilometers south of the port near the junction of the Gulf Intracoastal Waterway and the Calcasieu Ship Channel. The Industrial Canal is surrounded by an area designated for industrial growth and development. Land on the canal is leased to private industries needing deepwater frontage.

One company on the Industrial Canal operates a primary aluminum plant. A facility for handling liquified natural gas was completed in 1982. Liquified gas imported at Lake Charles from overseas is reconverted to its gaseous state at the facility for transmission through pipelines in the area.

There is steady employment of about 500 persons at the Port of Lake Charles. In addition, there are about 250 part-time or "call-out" employees. The employees work for the port, various stevedoring companies, freight forwarders, governmental agencies, and steamship companies. Thousands of persons in the trucking, rice milling, forest product, and petrochemical industries owe their jobs to the port's existence.

The Port of Lake Charles has a reputation for being the cleanest and one of the most efficient ports on the Gulf of Mexico. For more than six decades, the port has prided itself as being "the port that cares."



CHAPTER VII

LOOP: *Louisiana's Superport*

In May of 1981 a huge ship, the *Texaco Caribbean*, entered the Gulf of Mexico. A few days earlier the ship had left the Persian Gulf carrying 1.5 million barrels of crude oil from Saudi Arabia. The massive tanker was the first ship to unload crude oil at the Louisiana Offshore Oil Port, or LOOP, some 30 kilometers from Grand Isle, Louisiana.

The *Texaco Caribbean* is a supertanker—a ship that has a capacity of more than 175,000 tons. These huge oil carriers are several times larger than ordinary oil tankers. Their great size enables them to carry oil at less cost per barrel.

The U.S. Department of Transportation and the Louisiana Offshore Terminal Authority issued licenses for the construction of the nation's first crude oil "superport" in 1977. The licenses to build and operate the port in the Gulf of Mexico were issued to LOOP, INC., a corporation owned by five oil companies. (These include the Murphy Oil Co., Texaco, Ashland Oil Co., Shell Oil Co., and Marathon Pipe Line Co.)

The Need for a Deepwater Oil Port

During the 1960s it became apparent that the United States was using more oil than it produced. The nation was depending more and more on oil imported from overseas. By the late 1970s, half of the oil used in the United States was foreign.

The decade of the 1970s was the era of the supertankers, huge oil carriers several times larger than ordinary oil tankers. Since the late 1960s, supertankers have been delivering crude oil from the Middle East and other producing areas to markets around the world. But the United States had no natural harbor that could receive the supertankers, which draw up to 30 meters of water.

Before LOOP, all supertankers delivering crude oil to the United States had to "lighter" their cargo offshore. In this process, the supertanker, anchored offshore, pumped its crude oil into other tankers small enough to enter the local port. The process was expensive but necessary, because the supertankers

could not enter American ports. LOOP offered an alternative to the lightering process for oil imported through Louisiana.

The idea behind LOOP was simple: Because supertankers could not reach existing American ports, a port was built offshore, in water deep enough to receive the large ships. Crude oil delivered through LOOP moves through a pipeline system to oil refineries in Louisiana, Texas, and the midwest. A continuing source of crude petroleum is needed to supply the petrochemical industries of the lower and upper Mississippi River Valley.

How Does LOOP Work?

LOOP's offshore facilities consist of one (and eventually three) single anchor leg moorings (SALMs) and two platforms. The SALMs and platforms are connected by a system of pipelines buried in the seabed.

Ships arriving at LOOP tie up at a SALM located about three kilometers from the control and pumping platforms. The ship's pumps discharge crude oil through floating hoses to the SALM and then to LOOP's offshore pumping platform. The pumping platform moves the crude oil through a pipeline to the Fourchon Booster Station on shore. There it is pumped to the Clovelly Salt Dome for temporary storage. Crude oil from the Clovelly Salt Dome is delivered by pipeline to the St. James Terminal on the Mississippi River. About half of the oil is used in Louisiana and Texas. The remaining stock moves through CAPLINE, a pipeline leading to refineries in the midwest.

Economic Issues and Environmental Concerns

For almost six years before LOOP was built, the plan was studied carefully to determine whether it was financially practical and environmentally safe. These studies showed that LOOP would reduce the cost of importing crude oil because the supertankers

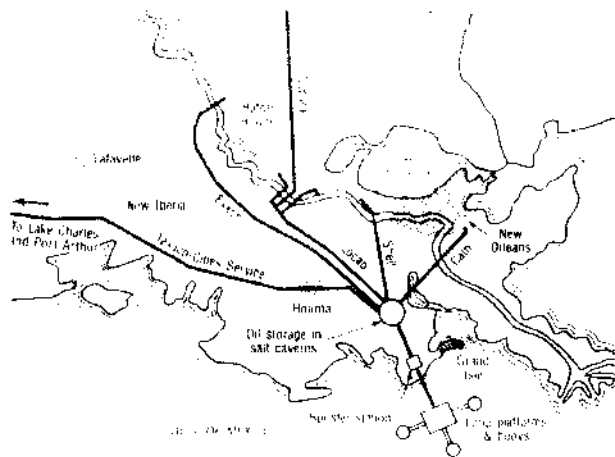


Figure VII-39. The crude oil pumped through LOOP is delivered via pipeline to various points in Louisiana and Texas and to refineries in the Midwest.

was safer and less expensive than building a tank farm for storage.

There was also an environmental risk in *not* building the offshore oil port. Without LOOP, crude oil would continue to be delivered at inland ports along the Mississippi River, which is already congested with barges, ships, and other kinds of vessels. LOOP reduces traffic on the lower Mississippi, thus lessening the chance of collisions and oil spills.

made offshore lightering unnecessary.

There were some important environmental risks taken in building the superport, especially the possibility of oil spills. Because the pipeline and other shore installations were to be built in an area of extensive marshes and swamps, they had to be designed so that they would not injure these valuable wetlands. Most of the shore facilities were buried to reduce the damage of an oil spill if one occurred. It was decided to store the oil in a salt dome because it

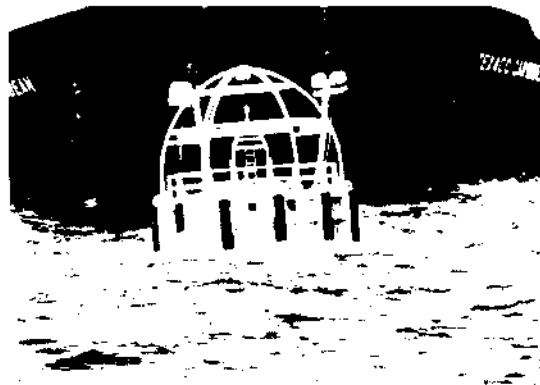


Figure VII-40. A supertanker ties up offshore to unload its crude oil through floating hoses into LOOP's offshore pumping platform. The pumping platform then moves the

oil to a booster station on shore. (Photo of supertanker courtesy of Irem Melancon, Deepwater Port Services, Inc.)



CHAPTER VIII

Deepwater Port Operations

A Port and Its Hinterland

Ports exist to load, unload, and store the goods and commodities being transported in commerce. Ports serve an area called a hinterland. The hinterland of the Port of Lake Charles, for example, is southwest Louisiana and southeast Texas. The hinterland of the Port of New Orleans is much larger and includes all of the Gulf states and the entire area drained by the Mississippi River System.

The economic well-being of a port depends on activity in the port's hinterland. The economy of a region may also depend on port operations. This is most true where the region depends on imported and exported goods.

Most ports are owned by the public, but they are usually operated like private companies. This results from competition in the transportation industry. Furniture from Nashville, Tennessee, for example, can be exported through any of several ports on the Gulf and Atlantic coasts. It is up to each port to attract as much business as it can handle.

Trade Development

Ports attract business by offering customers various services at the lowest possible cost. Some ports have agents to help customers who want to use the port's facilities. The Port of New Orleans, for example, has trade offices in several American cities as well as in Japan, Europe, Australia, and Latin America. A goal of trade development is to build new business for the port; thus, trade development serves port-related industries in the port's hinterland.

Port Security

Ports must be concerned with security. Some ports, including New Orleans and Lake Charles, have their own harbor police. The Port of Baton Rouge employs security guards to patrol its terminals and cargo sheds. As a result, these ports have a low rate of theft.

Port Tariff

All ports publish a "port tariff," which is a book containing the port's rules and regulations. The tariff also describes the facilities available in the port and lists the port's charges and rates. Individual pages in the tariff can be removed and new pages added as information is revised.

Cargo Handling

A basic activity in any port is the loading and unloading of cargo on vessels docked in the port. In its simplest form, this is done by a worker (a longshoreman or stevedore) who moves the goods on or off the ship. Stevedoring has long been a major cost in the movement of goods through a port.

Cargo Nets There are many ways of reducing the cost of loading and unloading cargo. Among the first was the use of cargo nets. These are large nets supported by booms or cranes. Such nets have been used for hundreds of years and are still seen in ports handling many small items of varying sizes and shapes.

Palletized Cargo Much of the general cargo in modern times is moved on wooden platforms called "pallets." This method of cargo handling began in the 1920s with the invention of the forklift truck. A skilled operator with a forklift truck can move as much cargo as 10 or 15 longshoremen.

The pallets are well suited for loading sacked goods, such as coffee beans, grain, livestock feed, and Portland cement.

Bulk Cargo Bulk cargos are those loose materials not contained in packages or divided into smaller units. Many ports operate one or more bulk terminals. These large facilities are built to handle specific bulk cargoes like coal, gravel, coke, grain, ores, and salt. Liquid bulk includes crude and refined petroleum, molasses, industrial alcohol, and various fluid chemicals. Liquid bulk is pumped to and from tanker vessels through pipes. Most dry bulk cargo is

handled by large conveyers. Grains are often moved to and from ships by large air suction hoses, or by conveyers with scoops or buckets.

Containerized Cargo Containerization was the biggest change in cargo handling during the twentieth century. This system makes use of cargo containers, some as large as highway truck trailers. Goods manufactured in north Louisiana, for example, can be packed into sealed containers and moved by rail or truck to a port in south Louisiana. The containers are then shipped overseas and moved by truck to their final destination. The sealed containers protect the cargo from damage and theft.

Containerization is not a new idea. In 1801, James Anderson of Great Britain devised a scheme for containerization, but the plan was never fully promoted. Containers were used in trade between England and France during the 1890s. Other containerized systems were attempted by the U.S. railroads in 1922 and by the U.S. Army in the 1950s. The Matson Steamship Line is said to have operated a container service between California and Hawaii in the 1950s.

The major plunge into containerization, however, was made in the 1950s by the McLean Trucking Company of North Carolina. McLean organized a separate company, later known as Sea-Land, to specialize in the container business. Sea-Land developed a standard 35-foot container.

Previously, container operations emphasized cargo protection for valuable cargo. Sea-Land emphasized the ease of handling for all types of general cargo. By the late 1970s, about 80 percent of all general cargo in American seaports was shipped in containers. That percentage is increasing.

The main advantage of containerization is the great reduction in the cost of handling cargo. The disadvantages are that containers require larger ships and expensive shoreside facilities for handling and storage.

Among the Louisiana seaports, the major container facilities are at the France Road Container Terminal on the Inner Harbor-Navigation Canal in New Orleans. The France Road Container Terminal can accommodate more than a thousand containers. Additional container facilities have been built on the river in New Orleans (including the Napoleon Avenue and Henry Clay-Nashville Avenue wharves) and at the Port of Baton Rouge.

LASH and Seabee Containerization was a major revolution in the transportation industry. It simplified the shipment of freight from land to ship and back again to land. It tied rail and truck freight much closer to ocean transportation. Very soon, containerization caught the attention of river barge companies, who began to wonder how the container concept could be applied to the inland waterway barge industry.

The idea also caught the attention of a New Orleans naval architecture firm, Friede and Goldman.



Figure VIII-41. Louisiana is very much a marine state, as waterborne commerce and port operations provide the state's largest source of employment. (Photo Office of Tourism.)

Friede and Goldman invented a system of ships that could carry fully loaded barges. The new ships were called LASH ships. LASH is a made-up word meaning "Lighter Aboard Ship." "Lighter" is an old nautical term for a barge.

The LASH system is simple. Consider a shipment of linerboard from Bastrop, Louisiana, to Bottrop, Germany. The linerboard is moved by truck to Monroe on the Ouachita River. At Monroe it is then loaded into a barge. The sealed barge is then towed to New Orleans where it is lifted aboard a LASH ship bound for Rotterdam, Netherlands, on the Rhine River. At Rotterdam the barge is unloaded and towed up the Rhine River to Bottrop. The barge remains sealed during the entire trip.

In 1972, the Lykes Line of New Orleans completed the development of its Seabee (sea barge) system. The Seabee system combines inland water barges, containers, and huge ocean carriers. Seabee differs from LASH in several ways. First, it can carry larger barges. LASH barges are typically about 18 meters long while Seabee barges are about 30 meters long—large enough for sixteen 40-foot containers.

LASH barges are lifted aboard the ocean carrier by a shipboard crane. Seabee barges are floated into an opening in the stern of the ocean carrier. Once in the opening, the barges are lifted by a shipboard elevator to any of three decks inside the vessel. About 80 percent of the world's LASH and Seabee vessels operate from New Orleans.

Roll-On/Roll-Off (Ro/Ro) In the early 1970s, another shipping technology began to develop in New Orleans and other American ports. The new concept, called Roll-On/Roll-Off, or simply Ro/Ro, is well suited for wheeled goods such as cars, trucks, and construction equipment, including bulldozers, tractors, and draglines. It is possible, for example, to land helicopters on the deck of a Ro/Ro ship and stow them in the hold by using the ship's built-in cranes. Equipment of all sorts (including containers pulled by trucks) can be driven aboard a Ro/Ro ship under its own power. It is then secured in place for the ocean voyage.

Most Ro/Ro ships have built-in cranes, elevators, and ramps. A trend was begun in both Seabee and Ro/Ro—cargo handled by equipment on the ship rather than on the shore at dockside. Ro/Ro is a very simple concept. It goes back to early port operations when there were no heavy dockside loading facilities.

The Ro/Ro concept grew from necessity. During the 1970s, there was much cargo destined for the Middle East and other places with limited port development. Few ports in developing nations could handle cargo delivered by complex, containerized ships. But Ro/Ro ships are self-contained cargo-handling units. They can unload at any pier by lowering their ramps and having their cargo driven off.

The Port of New Orleans has two specialized

berths for Ro/Ro operations. These are located at the Florida Avenue and Dwyer Road terminals on the Inner Harbor Navigation Canal.

Project Cargo Varied cargo ordered by a customer on a large scale for a specific project is called project cargo. Examples of project cargo include an entire steel mill bound for the Soviet Union, a complete oil refinery destined for Saudi Arabia, and all the equipment and building components for three hospitals in Indonesia.

Persons in charge of project cargo are called accumulators. They are responsible for ordering, assembling, packaging, and shipping the cargo for a specific project. Most accumulators are private agents who do not work for a port authority. The accumulating is usually done at very large seaports like New Orleans, as only the larger ports can handle such cargo. The accumulator must know the capabilities of both the domestic and the foreign ports.

Project cargo moving through New Orleans has increased during recent years. A recent Indonesian project included a broad range of materials for several thousand people living on a job site. Another project included an 18-press newspaper, along with all its accessories, for shipment to Australia. Another was an entire hotel.

The Importance of Deepwater Ports to Louisiana's Economy



Louisiana Is A Marine State

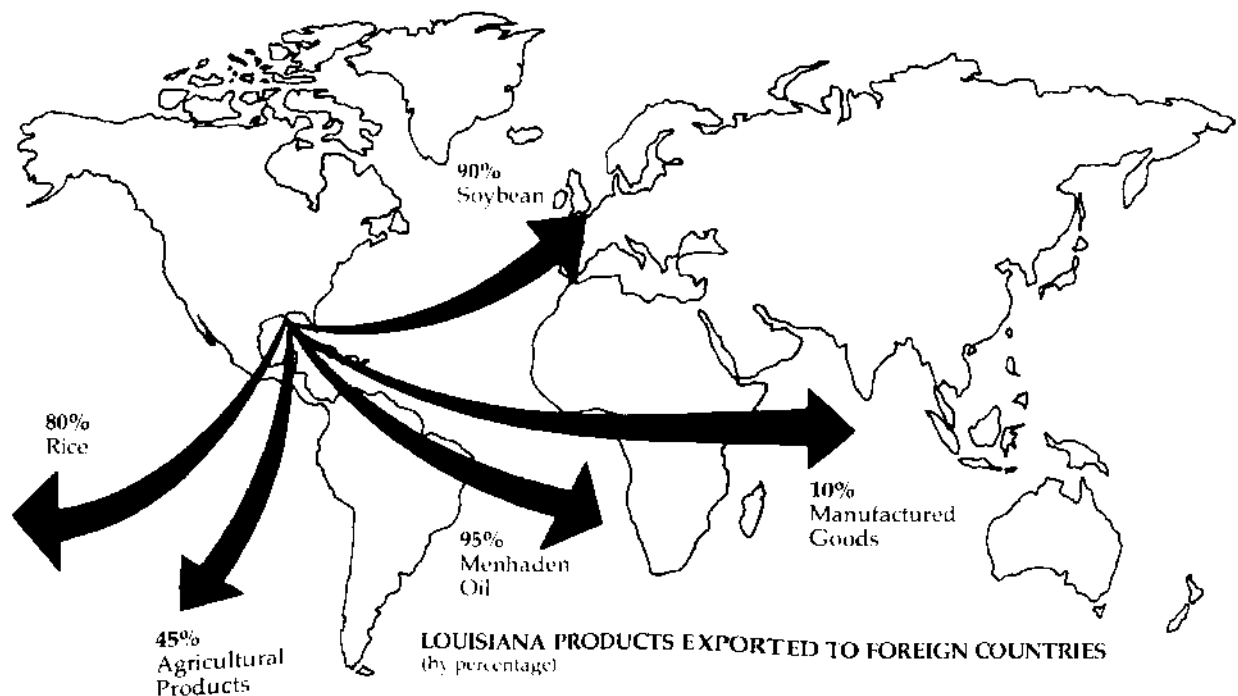
Louisiana is at the bottom of a gigantic transportation funnel created by the nation's most important waterway system—the Mississippi River and its tributaries. Louisiana also occupies the central position along the Gulf Intracoastal Waterway, another of the nation's important waterways. All of the state's principal cities are located along a network of natural and improved waterways and are served by excellent rail and truck systems.

Waterborne commerce, port operations, and port-related industries are by far the state's largest source of employment. Louisiana is very much a marine state.

Louisiana's Foreign Exports

The state's deepwater ports provide Louisiana industry and agriculture with access to world markets. Louisiana industry and agriculture depend more on foreign trade than do industry and agriculture in most other states. For example, American soybean farmers export about half of their product. But Louisiana soybean farmers produce almost exclusively for foreign markets. More than 90 percent of Louisiana's soybean crop is exported.

While other American rice farmers export about 60 percent of their harvest, Louisiana's rice farmers export 80 percent of theirs. Altogether, nearly 45 percent of the state's agricultural output enters world



commerce through deepwater ports.

Louisiana farmers find export more profitable than domestic markets. In part, this profit margin is allowed by the nearness of port facilities. Louisiana farmers are closer to deepwater ports than most other farmers.

Louisiana's mineral and fisheries industries also depend on export. The state's sulfur industry needs both foreign markets and domestic waterborne transportation. Nearly all of Louisiana's sulfur is moved initially by barge. About one-third of the sulfur is exported.

Louisiana produces about 80 percent of the nation's menhaden fish oil. Almost all of this product is sold to foreign markets.

A vast chemical industry has developed in Louisiana since 1940. This industry, too, depends on export. The American chemical industry exports only 6.5 percent of its output. But Louisiana exports about 10 percent of its industrial chemicals. Louisiana became an important producer of chemicals because of its petroleum resources. The state's inland waterways and ports are also important to the chemical industry.

Louisiana has employment for many people in the processing of primary metals. Louisiana is a major producer of aluminum, an industry that depends almost entirely on imported ores. The United States exports 2.5 percent of its primary metal but Louisiana sells 8.1 percent of its metallic products abroad. Louisiana offers advantages to industries that depend on inland waterways and marine transportation.

Louisiana is among the leading producers of pulp and paper products. This industry provides jobs for

15,000 people in the state's pulp and paper mills. In addition, the industry employs about the same number of pulpwood cutters and haulers. Over 30 percent of the pulp and about 7 percent of the paper are exported. At least one in 10 jobs in the state's pulp and paper industry exists because of foreign trade.

Economic Impact of Louisiana's Foreign Trade

More than most states, Louisiana depends on transportation via inland waterways and deepwater ports. Louisiana is also more deeply committed to foreign trade than most other states, as indicated by the percentages of products exported to foreign countries:

90 percent of the state's soybean crop

80 percent of the state's rice

45 percent of the state's total agricultural products

95 percent of the state's menhaden oil

10 percent of the state's manufactured goods

Louisiana's industries depend to a large degree on imported raw materials. The major imported raw materials are crude petroleum, raw sugar, coffee beans, and metallic ores. About 58 percent of these raw materials are used in Louisiana industries.

Port operations and related services alone provide about 35,000 jobs in Louisiana. About one out of every five dollars spent for goods and services is directly or indirectly related to foreign trade, which provides about 135,000 jobs in Louisiana and supports 11.3 percent of the state's population.

GLOSSARY

- Abaft** — To the rear of.
- Alumina** — Aluminum oxide, a compound needed in the production of aluminum.
- Amidships** — Midway between the bow and stern on a vessel.
- Barge** — A boat, usually flat-bottomed, unpowered, and towed or pushed by other craft, used for transporting freight.
- Bastard tow** — A tow made up of uneven or dissimilar barges.
- Batture** — The land on either side of a river between the low-water stage of the river and the top of a levee. In Louisiana the use of the batture is reserved for the public, even though the land may be privately owned.
- Beacon** — A signal, especially a lighted one, used to guide vessels along a waterway.
- Berth (n)** — A space at a wharf for a ship to dock or anchor.
- Berth (v)** — To bring a vessel to a berth.
- Bow** — The forward end of a vessel.
- Breakbulk cargo** — General cargo packaged or handled as separate units. Grain, for example, becomes breakbulk if it is packaged in sacks.
- Bulk cargo** — Cargo not packaged or broken into smaller units. Bulk cargo is either dry (grain) or liquid (petroleum).
- Bulkhead** — A wall or partition separating a vessel's interior into rooms or compartments. Also, a wall or embankment at the water's edge to prevent the bank from sliding into the water.
- Bullboat** — A boat made of animal skins stretched over a wooden frame. Such boats were used by Indians and trappers of the upper Mississippi and Missouri rivers during the late eighteenth century.
- Bunker fuel** — A petroleum product used to fuel steamships. The most common grade is "bunker C."
- Cabin deck** — The second deck on most river steamboats. It is lined with staterooms surrounding the main cabin.
- Canalization** — Raising the water level in a waterway by building a dam or a dike so as to deepen the channel.
- Cargo** — Freight carried by a ship.
- Channelization** — Reducing the length of a waterway by cutting a new channel across the land between bends in the waterway.
- Chenier** — A sandy ridge extending above the coastal marshes in southwest Louisiana and southeast Texas.
- Chute** — A smaller channel in a river separated from the main flow by a long, narrow island.
- Code** — A set of laws by which people are governed.
- Common carrier** — A regulated person or company engaged in carrying people or freight for a fee.
- Container** — A large box that holds freight or cargo. Such containers are easily transferred from railroad cars or trucks to ships. Containers are standardized in lengths of 20, 36, and 40 feet.
- Containerized cargo** — Cargo shipped or stored in containers.
- Cordelle** — A hawser; a towline such as those used to pull keelboats in the French-speaking parts of North America.
- Creole** — A person descended from or culturally related to the European French or Spanish settlers in early Louisiana.
- Cub** — A person in training to become a pilot.
- Customs** — Duties, tolls, or taxes imposed by a government on commodities imported into or exported from that country.
- Customhouse broker** — An agent who handles a foreign company's imports at a port (freight forwarder).
- Demurrage** — A fee levied against cargo that has been stored too long at a port.
- Distributary** — A branch of a river that flows away from the main stream and does not return to it.
- Dock** — An area of water alongside a pier that receives a vessel for loading, unloading, or repairs. Also a pier or wharf.
- Dockage** — A fee charge against a vessel for berthing at a wharf.
- Dock Board** — A popular name for the Board of Commissioners of the Port of New Orleans.
- Double-skinned** — Refers to a barge, especially one designed for liquid bulk cargo, in which the tank walls are separate from the walls of the barge.
- Draw (v)** — To displace a specified depth of water by a vessel. For example, a vessel that draws 32 feet of water rests that low in the water. It must have water that deep or deeper to navigate.
- Dumb barge (slang)** — A barge that does not have its own power.
- Duty** — A tax imposed by a government on imports.
- Engineer** — A person responsible for operating and maintaining the power system on a vessel.
- Flatboat** — A rectangular, flat-bottomed boat used on the western rivers during the eighteenth and nineteenth centuries.
- Free time** — A period of time (usually 15 days) during which cargo may be stored on port property free of wharf demurrage.
- Freight forwarder** — An agent who handles a company's freight or cargo destined to be exported (customhouse broker).

- Foreign Trade Zone** — An isolated, guarded area in certain ports where foreign goods may be unloaded for transshipment or processing without payment of import duties. The Port of New Orleans operates Foreign Trade Zone No. 2.
- General cargo** — Cargo not included as bulk cargo.
- Hawser** — A towline.
- Head of navigation** — The most distant (upriver) location on a river deep enough for navigation.
- Head of Passes** — A point near the mouth of the Mississippi River where the three principal distributaries diverge. It is the point from which river distances are measured.
- Hold** — The interior of a vessel below the decks where cargo is stored.
- Hurricane deck** — The lowest roof deck of a vessel.
- Inner Harbor Navigation Canal** — A canal in the Port of New Orleans. It extends from the Mississippi River to Lake Pontchartrain. It is also called the Industrial Canal.
- Integrated tow** — A tow made up of barges designed and arranged in a way that reduces drag or water resistance.
- Jesuit** — A member of the Society of Jesus, a religious order within the Roman Catholic Church. The Jesuits, along with the Capuchins, another religious order, were active in the religious affairs of colonial Louisiana.
- Jetty** — A levee built into a body of water to influence the current.
- Keelboat** — A long, flat-bottomed boat with a keel used to haul freight and passengers before the appearance of steamboats on the western rivers.
- Lash** — "Lighter aboard ship." A cargo handling system which involves the shipment of loaded barges (lighters) aboard a specially designed ocean carrier.
- Lighter (n)** — A barge.
- Lighter (v)** — To unload cargo from a large ship to a smaller vessel.
- Linerboard** — A heavy brown paper used in corrugated pasteboard.
- Liquid bulk** — Bulk cargo such as crude petroleum, petroleum products, molasses, alcohols.
- Longshoreman** — One who loads or unloads ships.
- Mackinaw boat** — A crudely built flatboat used on the Ohio and upper Mississippi rivers during the eighteenth century.
- Main deck** — The lowest deck on a river steamboat, supporting the vessel's engines and boilers, with space for fuel and cargo.
- Mate** — An officer on a boat serving as an assistant to the captain.
- Mississippi River-Gulf Outlet** — A man-made seaway from the Inner Harbor Navigation Canal to the Gulf of Mexico east of New Orleans.
- Naval stores** — Materials such as tar, pitch, and resins, originally used to caulk the seams of wooden vessels.
- Packet** — A boat, usually a coastal or river steamer, that plies a regular route, carrying passengers, freight, and mail.
- Pass** — Any one of several distributary channels near the mouth of the Mississippi River.
- Piggyback** — A transportation concept whereby truck trailers are hauled on railroad flat cars.
- Pilot** — The helmsman on a river boat. Also one who is licensed to guide a vessel into and out of a port or through dangerous waters.
- Pirogue** — A boat or canoe made from a hollowed tree trunk.
- Planter** — A submerged or partly submerged tree trunk in a river.
- Portage** — An overland passage connecting two bodies of water.
- Port tariff** — A set of rules and regulations governing a port along with the published fees for using a port's facilities.
- Preferential assignment** — An agreement whereby one company is given first choice in the use of a particular facility in the port. Also called "first call on berth privilege."
- Project cargo** — Large shipments on varied cargo destined for one location and one specific project.
- Public Belt Railroad** — A railroad operated by the city of New Orleans intended to reduce the duplication of service by several competing lines within the city.
- Reach** — A straight stretch of a river between bends.
- Riparian** — Of or pertaining to the banks of a river or a lake. Riparian rights define what uses may be made of a river bank.
- Roll On/Roll Off (Ro/Ro)** — A simplified cargo handling system whereby cargo is driven on and off specially designed vessels under its own power.
- Savanna** — A flat, treeless grassland in tropical or subtropical regions.
- Seabee** — A cargo handling system in which barges are stacked on board an ocean carrier. Seabee means sea barge. The lifting equipment is aboard ship.
- Shut-out cargo** — Cargo intended for a specific shipment, but remaining at the wharf after the shipment has left.
- Silt** — River sediment having a grain size larger than clay particles, but smaller than sand.
- Steamboat Gothic** — An elaborately ornamental architectural style that is an imitation of river steamboats of the middle nineteenth century on the Ohio and Mississippi rivers.
- Steamship agent** — A company or individual representing the business interests of a steamship company.
- Steamship company** — A company involved in the hauling of freight or passengers on the high seas.

Stevedore — One who works at or is responsible for loading and unloading ships in a port.

Stern — The rear part of a vessel.

Supertanker — A very large ocean carrier weighing about 175,000 tons or more, with a draft of at least 50 feet.

Surveyor — One who appraises the value and condition of a vessel.

Tanker — A vessel specially designed to haul liquid bulk cargo.

Tariff — A tax on trade.

Terminal — A port facility owned by or leased to a company to handle a specific type of cargo, for example, a liquid bulk terminal.

Texas — The part of the upper deck of a river steamboat abaft the stacks used for officers quarters.

Ton — Any of several units of weight. A short ton is 2,000 pounds; a long ton is 2,240 pounds; a metric ton is 1,000 kilograms.

Tories — (Singular: Tory) In England, members of a British political party, founded in 1689, that opposed the Whigs. The Tories were the conservative party. In America, any American who favored the English

side during the War of Independence.

Tow — A towboat with one or more barges in tow.

Tramp — A cargo vessel that has no regular schedule but takes on freight wherever it may be found and discharges it wherever required.

Tributary — A stream or river flowing into a large river.

Tug (tugboat) — A small but powerful vessel designed for moving larger vessels or for towing barges. Also called a towboat or a pushboat.

Turnpike — A highway.

Victorian — Referring to the period in history roughly between 1837 and 1901 when Victoria was queen of England.

Western rivers — Generally, the Mississippi River System—the part of the Mississippi above the Huey P. Long Bridge, the Red River, the Port Allen-Morgan City Waterway, and that part of the Atchafalaya River above its junction with the Port Allen-Morgan City Waterway.

Wharf — A landing place where vessels may tie up for the loading and unloading of cargo.

Wharfage — The charges for using a wharf.

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