

## **The Transportation Revolution**

The expansion of internal American trade greatly increased with the adoption of canals, steamboats, and railroads. These collective advances in technology became known as the **Transportation Revolution**. This increase in American industrialization in the nineteenth century directly influenced the rapid settlement of the West. The economic development and stability of the western states depended on their capability to export farm products in exchange for imports from the eastern states such as sugar, coffee, and salt. Yet transportation was costly and time-consuming, with methods limited to sailing vessels and perilous overland trails. The successive developments of the steamboat, the canal system, and the steam-powered locomotive alleviated the cost and time of the journey, produced growth in manufacturing, encouraged western settlement, and led to increased foreign trade.

### **Early Sailing Vessels**

In *Storm King on the Hudson*, Samuel Colman depicts a period of time during the mid-nineteenth century where schooners, sloops, and steamships operated simultaneously on the Hudson River. The inclusion of both old and new methods of river transportation suggests the passage of time, when man-powered rowboats and sailing vessels were giving way to steamships. Two sailing vessels are depicted on the river at the base of Storm King Mountain, near the shore at Cornwall Landing. The sailing vessel on the left of the painting is a **sloop**, while the vessel on the right is a **schooner**. The sloop a sailing vessel commonly used one hundred years earlier, in the middle of the eighteenth century. By 1850, shipbuilders had perfected a distinct type of sailing ship adapted for Hudson River navigation. This boat, known as the Hudson River or North River sloop (the North River was another name for the Hudson), was the pre-eminent vessel in Hudson River shipping and trade for 150 years and continued to be used for transportation more than a half-decade after the introduction of steamships in the early nineteenth century.

Colman has included a later version of a Hudson River sloop in *Storm King*, visible as the second sailing vessel on the right near the shoreline. These early sloops were solidly-built, and weighed 60-80 tons. They were wide with plenty of room for cargo and had a shallow hull design that allowed the boat to navigate shallow areas of the river. Sloops carried both cargo and passengers. With the development of agriculture and timbering in the Hudson River Valley and areas further north, the sloops carried cargo down the river to the burgeoning Port of New York. They carried grain, produce, flour, hay, lumber, and fur pelts. When these bulky cargoes were unloaded at New York City or ports along the way, this freed the vessel to carry passengers northward on the return trip to Albany and points along the way. In the early

nineteenth century, the average Hudson River sloop could carry 25 to 30 passengers. The sloops also transported manufactured goods for sale up the river, including rum, hardware, fabrics, and luxury goods. Sloop owners often placed newspaper advertisements soliciting freight consignments and announcing the arrival of goods for sale in a particular port. But sloops could not compete with schooners, which came to monopolize the Atlantic coastal trade.

The numbers of sloops built began to decline around 1855 due to the competition from the schooner. Larger than sloops, the two-masted schooners had the advantage of being easier to sail than the sloops and they could be easily managed with a small crew of only 3 to 4 people. Sloops had always had difficulty navigating the stretch of the river below Storm King Mountain, because the massive form of the mountain blocked the flow of air onto the river and sloops were often stranded and had to sit at anchor until the wind changed. The schooner's individual sails covered less area and therefore were lighter and easier to furl and unfurl.

### Steamboats Replace Sailing Vessels

While sloops and schooners were vying for supremacy on America's eastern rivers, another type of vessel was slowly developing, one that would transform the shipping industry. Sloops and schooners were adequate enough, but they had major disadvantages. Both were relatively slow and their speed (and consequently how fast their cargo could get to port) depended entirely on wind power. Enter American artist-turned-inventor/ engineer **Robert**



[View of the Hudson](#), ca. 1865, Frances Flora Bond Palmer, color lithograph, Smithsonian American Art Museum

**Fulton** (1765-1815). Fulton began his career in portrait painting, studying in London with **Benjamin West**, where he had the opportunity to paint Benjamin Franklin's portrait. Despite this high profile commission, it was not enough to guarantee success in the arts. Consequently Fulton turned his efforts to another interest – canal and shipbuilding.

It is a common misconception that Fulton was the inventor of the steamboat, but it was Fulton who was instrumental in making steamboat travel a reality, transforming it from mere concept to actuality. Along with his financial partner **Robert Livingston**, Fulton built upon knowledge

gleaned from years of experimenting with different designs in England and France to finally develop and build a working steamboat in the United States. In August 1807, his steamboat made its historic voyage navigating the Hudson River from New York to Albany. The trip took an incredible thirty-two hours. By comparison, the same trip took sailing vessels four days to complete.

Livingston, who had helped engineer the **Louisiana Purchase** during President Thomas Jefferson's administration, saw the potential for the use of steam power on the mighty Mississippi River. Livingston commissioned Fulton to design the *New Orleans*, the first steamboat in America to sail on waters west of the Appalachian Mountains. The ship made its maiden voyage on the Mississippi River in 1812, traveling from Pittsburgh, Pennsylvania to New Orleans, Louisiana. During the nineteenth century, the steamboat would become the preeminent form of commercial and passenger transportation on the nation's great rivers such as the Mississippi, the Ohio, and the Hudson. Trade flourished; western products were shipped downriver, while European and eastern products like sugar and coffee were carried upriver.

Steam power did not just revolutionize river transportation, but coastal transportation as well. By 1860 the number of steamships operating in Atlantic trade had grown exponentially. While an increase in foreign trade accounts for some of this increase, a large part of this growth was due to the technical improvements of ships. One of these improvements was the use of iron for the ship's **hull**. The strength of the iron made steamships more durable and less likely to need frequent repair.

As steam power increased in popularity, sloops and schooners needed to be able to compete with steamships which could carry larger cargo and passenger loads and were not subject to wind conditions. As steamboats became faster, safer, and larger, shipbuilders modified the sloop's design to make the vessels competitive with steamships. However, some passengers still preferred sailing vessels due to the dangers of boiler explosions on steamships. Thus, steamships led to the decline of sailing vessels. As for Robert Fulton, he would continue his career in canal and shipbuilding, serving on the 1812 commission that recommended the building of the Erie Canal.

### **The Erie Canal**

Proposed in 1808, the Erie Canal proved to be a vital shipping route from Albany to Buffalo, and opened up the land west of the Appalachian Mountains to settlers. The idea of the canal was proposed as early as the mid-eighteenth century. Its purpose was two-fold: to enable settlers easy access across the Appalachians and to provide a trade route across the mountains. The

year 1817 saw the beginning of the canal's construction. When the canal was opened in 1825, shipping traffic on the Hudson River ballooned as a result.

The canal connected Lake Erie with the Hudson River, enabling cargo to travel efficiently between Ohio and New York City. Additionally, the Erie Canal provided settlers an easy route to the West, many of them migrating to western New York, Ohio, Illinois, Michigan, and Wisconsin. The success of the Erie Canal started a canal-building boom during the late 1820s and 1830s. Canals were advantageous because they reduced shipping costs significantly: costs dropped from approximately thirty cents a ton per mile in 1820, to two or three cents a ton per mile in 1830. The opening of canals and the canal system had the immediate effect of stimulating the economic growth of previously underserved or unreachable land-locked areas. But when an economic depression hit in the late 1830s, plans to build new, costly canals were scrapped. It was at this time when the railroad was primed to come of age.

### **Railroads Replace Steamships**

The introduction of the steamboat had reduced the cost and time of cargo shipments and made upriver traffic easier. At the time, the steamboat was hailed as an impetus to western expansion. But while river transportation had improved greatly, it still could not compete with the expanse and speed of the railroad system. Though not depicted in *Storm King*, the railroad and steam-powered locomotive had arguably had the greatest impact on both transportation and western expansion.

Railroads had the distinct ability to connect small, isolated farm towns to much larger national and international markets, a capability that had been lacking from prior modes of water and land transportation. The railroad also opened up parts of the South, most notably Florida, to greater economic development and settlement. The railroad had major advantages over previous modes of transportation, being both flexible and dependable; they were not subject to winter ice as canals were, and were faster and more reliable than steamships. This was especially important when transporting agricultural products. By 1840,

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*The project for construction of a great Railroad through the United States of America . . . has been in agitation for over fifteen years. It is the most magnificent project ever conceived. . . . It connects these two great oceans. It is an indissoluble bond of union between the populous States of the East, and the undeveloped regions of the fruitful West. It is a highway which leads to peace and future prosperity. An iron bond for the perpetuation of the union and independence which we now enjoy. – Theodore Dehone Judah, 1857*

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more than three thousand miles of railroad track had been laid, predominately in the northeastern region of the country.

In 1851 the *American Railroad Journal* declared that the railroad had become, “the great agent of civilization and progress, the most powerful instrument for good the world has yet reached.” By 1860 the United States had more railroad track than the rest of the world combined: over thirty thousand miles. Yet, the amount of track was disproportionately split between the North and South, with more track in the North. This factor led to a decisive tactical advantage for the North during the Civil War, further explained in the section **War and Technology**.

## **Glossary**

**Benjamin West:** (1738-1820) American painter who became court painter to King George III and was president of the Royal Academy in London, where he became a mentor to many American painters.

**hull:** the watertight body of a ship or boat.

**Louisiana Purchase:** (1803) purchased from France during President Thomas Jefferson’s administration, the region of the United States encompassing land between the Mississippi River and the Rocky Mountains.

**Robert Fulton:** (1765-1815) American engineer and inventor, credited with inventing the first commercially successful steamship.

**Robert Livingston:** (1746-1813) New York politician, lawyer, and diplomat who financed Robert Fulton’s steamship project.

**schooner:** a sailing vessel with two or more masts.

**sloop:** a small sailing vessel with one mast.

**Transportation Revolution:** a period in the U.S. when transportation became cheaper and more efficient with the rapid development of new technology. Many canals, roads, and railroads were built at this time.