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Accelerating Transportation

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At the outset of the 19th century, the lack of reliable, low-cost transportation was a major barrier to American industrial development. The stagecoach, slow and cumbersome, was the main form of transportation. Twelve passengers, crowded along with their bags and parcels, traveled at just 4 miles an hour. In Connecticut and Massachusetts, Sunday travel was still forbidden by law.

Wretched roads plagued travelers. Larger towns had roads paved with cobblestones; and in major highways potholes were filled with stones. But most roads were simply dirt paths left muddy and rutted by rain. The presence of tree stumps in the middle of many roads posed a serious obstacle to carriages. Charles Dickens aptly described American roads as a "series of alternate swamps and gravel pits."

In addition, the cost of overland transportation remained prohibitive; tolls on "post roads" were extremely high. It cost more to transport a ton of freight 300 miles over land than to ship it from Philadelphia to Europe. In New Jersey, a one-horse cart was charged 3 cents a mile.

In 1791, builders first inaugurated a new era in transportation with the construction of a 66-mile-long turnpike between Philadelphia and Lancaster, Pennsylvania. This stimulated a craze for toll road construction. By 1811, 135 private companies in New York had invested $7.5 million in 1,500 miles of road. By 1838, Pennsylvania had invested $37 million to build 2,200 miles of turnpikes.

Despite the construction of turnpikes, the cost of transporting freight over land remained high--at least 15 cents to move a ton of goods a mile. Because water transportation was cheaper, farmers often shipped their produce down the Mississippi, Potomac, or Hudson rivers by flatboat or raft. Unfortunately, water transportation was slow and few vessels were capable of going very far upstream. The trip downstream from Pittsburgh to New Orleans took a month; the trip upstream against the current took four months. Steampower offered the obvious solution, and inventors built at least 16 steamships before Robert Fulton successfully demonstrated the commercial practicality of steam navigation. In 1807, he sailed a 160-ton side-wheeler, the Clermont, 150 miles from New York City to Albany in only 32 hours. "Fulton's folly," as critics mockingly called it, opened a new era of faster and cheaper water transportation.

Water transportation was further revolutionized by the building of canals. Prior to the War of 1812, construction companies had built scarcely 100 miles of canals. Construction costs ran $25,000 to $80,000 a mile. But the spectacular success of the Erie Canal touched off an enormous wave of canal construction. On Wednesday, October 25, 1825, the state of New York opened the Erie Canal, which connected the Great Lakes to the Atlantic Ocean. To celebrate the opening, New Yorkers fired cannons, placed at 8-mile intervals along the 364-mile length of the canal. The canal was a stupendous engineering achievement. Three thousand workers, using hand labor, toiled for 8 years to build the canal. They had cut through forests, dug through rock, and built over mosquito-infested swamps. They built 84 locks, each 15 feet wide and 90 feet long, to raise or lower barges 10 feet at a time. They even raised a river 9 feet with a 900-foot dam and built 18 aqueducts, one more than 800 feet long, over rivers and valleys. Perhaps most impressive was the fact that the Erie Canal was built by four principal engineers who had never seen a canal. Lacking modern engineering tools, they designed the canal "by guess and by God."

The canal was built in the face of intense opposition. Thomas Jefferson said that "making a canal 350 miles through a wilderness is little short of madness," and President James Madison vetoed a bill that would have provided federal land grants to help New York with the project. Nevertheless, despite scoffing at the project known as "Clinton's Ditch"--named after the canal's chief backer, Governor DeWitt Clinton--the engineers, diggers, and political leaders and voters in New York persisted. Altogether, roughly 85 percent of the capital for the Erie Canal came from the New York state government and local governments along the route.

The "big ditch" sparked an economic revolution. Before the canal was built, it cost $100 and took 20 days to transport a ton of freight from Buffalo to New York City. After the canal was opened, the cost fell to $5 a ton and transit time was reduced to 6 days. By 1827, as a result of the canal, wheat from central New York State could be bought for less in Savannah, Georgia, than wheat grown in Georgia's interior.

The success of the Erie Canal led other states to embark on expensive programs of canal building. Pennsylvanians, aware that it cost more to transport goods 150 miles within their state than it did for New Yorkers to ship goods 750 miles between New York City and Ohio, spent $10 million to build a canal between Philadelphia and Pittsburgh. The states of Illinois, Indiana, and Ohio launched projects to connect the Ohio and Mississippi rivers to the Great Lakes. By 1840, 3326 miles of canals had been dug at a cost of $125 million.

Cities like Baltimore and Boston, which were unable to reach the West with canals, experimented with the railroad, a novel form of transportation. At first, a railroad was simply a highway lined with a double track of wood rails along which a horse or mule pulled a stagecoach or wagon. In 1829 the Delaware and Hudson Canal Company imported two English steam locomotives but found the engines too heavy for American rails and trestles. Finally, in 1830 the first American-built locomotives were put into regular operation on the Baltimore and Ohio, Charleston and Hamburg, and Mohawk and Hudson railroads.

Early railroads suffered from nagging engineering problems and vociferous opposition. The first rails were simply wooden beams with a metal strip nailed to the surface. The strips frequently curled up, cutting through the train's floor. Brakes were wholly inadequate, consisting of wooden blocks operated by a foot pedal. Boilers exploded so frequently that passengers had to be protected by bales of cotton. Engine sparks set fire to fields and burned unprotected passengers. One English traveler counted 13 holes burned in her dress after a short ride.

Opposition to railroads was widespread. Vested interests, including turnpike and bridge companies, stagecoaches, ferries, and canals, sought laws to prohibit trains from carrying freight. A group of Boston doctors warned that bumps produced by trains traveling at 15 or 20 miles an hour would lead to many cases of "concussion of the brain." An Ohio school board declared that "such things as railroads … are impossibilities and rank infidelity."

In spite of such objections, it quickly became clear after 1830 that railroads were destined to become the nation's chief means of moving freight. During the 1830s, construction companies laid down 3,328 miles of track, roughly equal to all the miles of canals in the country. With an average speed of 10 miles an hour, railroads were faster than stagecoaches, canalboats, and steamboats, and, unlike water-going vessels, could travel in any season.

The transportation revolution sharply reduced the cost of shipping goods to market and stimulated agriculture and industry. New roads, canals, and railroads speeded the pace of commerce and strengthened ties between the East and West.