Harnessing the Iron Horse

Fifth District companies pioneered railroading in the United States

BY KARL RHODES AND BETTY JOYCE NASH

In 1829, Horatio Allen sought to persuade the directors of the South Carolina Canal and Rail Road Co. to invest in steam locomotives, instead of horses, to pull their trains.

"There is no reason to expect any material improvement in the breed of horses in the future," said Allen, the company's chief engineer. "While, in my judgment, the man is not living who knows what the breed of locomotives is to place at [our] command."

The company purchased a locomotive, named it "The Best Friend of Charleston," and demonstrated the new technology on Christmas Day, 1830, on six miles of track in Charleston, S.C. The railroad's first 141 passengers "flew on the wings of the wind at the speed of fifteen to twenty-five miles per hour, annihilating time and space," the *Charleston Courier* reported.

Six months later, the Best Friend's boiler exploded and killed the fireman, but by then the engine had earned its place in history as the first steam locomotive to power regular rail service in the United States. Within three years, the company's 136-mile line from Charleston to Hamburg, S.C., was the longest in the world.

Motivated by money and imagination, Allen and the other early visionaries of railroads in the Fifth District understood that the marriage of iron rail to steam locomotion would profoundly change the sprawling new nation. They boldly claimed that trains would unify the country, create wealth in the East, and tap untold riches in the West. Many of their wildest predictions eventually came true.

A Better Way

The quest for better trade routes pervades the early economic history of the Fifth District and North America. Christopher Columbus searched for a superior passage to India. Christopher Newport and John Smith, leaders of the Jamestown settlement, tried to find a river route from Virginia to the Pacific Ocean, and George Washington proposed canals to connect the nation's eastern and western waterways.

Many of America's most ambitious canal schemes ultimately failed, but when the Erie Canal opened in 1825 — spanning 360 miles from Lake Erie to the Hudson River — New York became the economic envy of East Coast commerce. The canal dramatically reduced the cost of transporting cargo from Buffalo to New York City. Maryland responded to the Erie Canal with two grandiose plans, the Chesapeake and Ohio Canal and the Baltimore and Ohio Railroad (B&O). Both projects broke ground with patriotic exuberance on July 4, 1828. The canal, using proven technologies, connected Washington, D.C., to Cumberland, Md., but the railroad, using largely untested technologies, extended past Cumberland to the Ohio River by 1853.

"The Baltimore and Ohio was the first leg of a national rail system," wrote historian James Dilts in his 1993 book, *The Great Road*. "Its early engineers formed the core of the railroad engineering profession in America; their theories of survey and location laid the groundwork for future textbooks. Building the B&O Railroad through 200 miles of mountain wilderness between Cumberland and Wheeling was a major feat of civil engineering."

The B&O offered short passenger excursions before the South Carolina Railroad did, but those early efforts were sporadic and experimental. They featured cars powered by horses, wind, cranks, even dogs. By 1830, however, the B&O started testing steam locomotives, most notably those built by Peter Cooper and his colleagues. One of their engines — later called the "Tom Thumb" — lost a legendary race against a railcar pulled by a horse on a parallel track. A witness described a "neck and neck, nose and nose" contest won by the horse-drawn car only after the Tom Thumb threw a belt.

The Tom Thumb's troublesome belt foreshadowed the many problems — technical, legal, financial, and managerial — that the B&O encountered as it chiseled its way westward through the Allegheny Mountains. From incorporation to completion, it took the railroad a quarter century to reach the Ohio River. Only one of the company's original entrepreneurs made the celebratory train ride to Wheeling, W.Va., for the dedication in 1853, but the B&O's founders understood the importance of their work from the outset, according to Dilts. Charles Carroll, the old patriot who laid the railroad's cornerstone back in 1828, said the only document he ever signed of greater consequence than the incorporation papers of the B&O was the Declaration of Independence.

"The Baltimore entrepreneurs sensed that they were not just building a railroad," Dilts wrote. "They were following George Washington's plan of binding together a young nation, commercially and politically, and they were tracing a route Washington himself had picked out. They expanded the country's horizons."

Losing Steam

Fifth District companies pioneered large-scale railroading in the United States with the B&O and the South Carolina Railroad, but three decades later, the region's railroads were

substandard by all accounts, noted James Ward, a railroad historian at the University of Tennessee at Chattanooga, in a 1973 article in the *Journal of Southern History*.

Because the South had more navigable rivers, its railroads developed in a piecemeal pattern. "Their primary function was to transport produce and people to the nearest markets, most of which were connected to other market centers via water," Ward wrote. This river-rail approach led to shorter routes that served their purposes, often profitably, but they were less interconnected than railroads in the North. The South Carolina Railroad, for example, initially extended to the small town of Hamburg, S.C., to intercept freight — chiefly cotton — headed down river to Savannah, Ga.

Ward points out that in the 1830s, Southern railroads were better capitalized than Northern railroads on average. That changed drastically, however, with the depression of 1839, when cotton prices fell from more than 15 cents per pound to less than 6 cents per pound. The depression lasted longer in the South than in the North, and investment in railroads slowed considerably for 10 years in Fifth District states. Wealthy planters hesitated to invest in railroads because they had witnessed previous failures of public works and because they needed liquidity to ride out the depression and cover potential crop losses.

Early American railroads received substantial government support, especially from states in the South. Beginning in 1848, with a policy called "hypothecation," Southern legislatures guaranteed returns on railroad stocks and bonds. This practice attracted more European investors and encouraged wealthy planters to participate, either by investing directly or by accepting stocks and bonds as payment for slave labor to build and operate railroads. As a result, slave labor almost completely supplanted immigrant labor among the Southern railroads. In addition to railroad construction, slaves worked as repairmen, brakemen, firemen, and enginemen.

In the North, railroads promoted greater industrialization, but in the South they mostly reinforced the plantation system. They opened up more land for agriculture (particularly cotton production) and drove up prices for slaves. They also lowered the cost of exporting produce and importing other goods, allowing the South to further exploit its comparative advantages in agriculture. As a result, plantations became larger, more specialized, more productive, and more valuable.

Just as state-backed stocks and bonds had begun to attract more investors, however, Southern railroads encountered other limiting factors. "The Mexican War and the pent-up demand for engineering services in other parts of the country prevented the region from securing competent technical talent," Ward wrote. "Moreover, when the Crimean War unsettled the European money markets between 1853 and 1855, the South was deprived of a prime source of capital."

Southern railroads finally started to catch up with their Northern counterparts in the late 1850s, but the Civil War halted their progress. Soldiers on both sides demolished

A bridge on the Orange & Alexandria, Va., Railroad, as repaired by Union army engineers ca. 1865.

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great swaths of rail infrastructure. The B&O bridge at Harper's Ferry was repeatedly destroyed, and the South Carolina Railroad was badly damaged. But as the war progressed, Union forces rebuilt, expanded, and improved railroads under their control. The rails' ability to transport and supply troops — a huge advantage for the Union — showed how vital the technology had become in just three decades.

Reconstruction and Expansion

After the Civil War, railroads expanded rapidly throughout the nation, partly in response to federal land grants to encourage them to push west from the Mississippi River and east from the West Coast. The Union Pacific and the Central Pacific joined tracks in 1869, just four years after the surrender at Appomattox, to form the first transcontinental route.

Southern railroads also cobbled together longer lines, but with great difficulty. "Capital was lacking, labor proved exceedingly scarce, and plant, tools, and equipment could be obtained only in the North or abroad," wrote historian Maury Klein in a 1968 *American History Review* article. Initially, Southern railroads formed alliances with each other to expand their reach, but those pacts often fell apart as each line acted independently. "Yet in less than 30 years the South more than tripled its railway mileage, and the worn, disconnected roads of 1865 were transformed into a cohesive network dominated by a handful of giant systems."

"The center of gravity shifted towards the lines that were integrated," says Steven Usselman, who teaches the history of technology at the Georgia Institute of Technology and wrote *Regulating Railroad Innovation*. "So the Pennsylvania reached St. Louis in 1876; Norfolk & Western got out to Louisville. You had these increasingly long through-lines, and that's what the key to success was."

The B&O, though twice bankrupted in the late 19th century, reached Pittsburgh and Chicago in 1876 and got a piece of the industrial development in Ohio and Indiana. The Norfolk & Western, which enjoyed heavy local traffic in coal, nevertheless built more through routes, established a

new line to the Ohio River, pushed for new western connections with the East Tennessee, and completed the Shenandoah Valley Railroad as a rival route to the Danville's Virginia Midland.

Driving Innovation

Technological improvements accelerated after the war as railroad-related patents grew from 50 to 500 annually. Improvements in metallurgy — using steel rather than iron — allowed tracks and bridges to last longer and carry more weight, and coal completely replaced wood as the fuel for locomotives. Railroads also started converting their tracks to a standard gauge, which boosted productivity and connectivity.

The rail firms resisted some advances, however. They were slow to adopt telegraph and signaling technologies, and they embraced hand-operated brakes and couplers only after federal legislation forced the change. Early on, railroads viewed such improvements as complicating the business, Usselman says. Rail firms wanted simply to ship commodities in bigger and bigger trains over longer and longer distances without getting sidetracked by complex devices. "The railroads were trying to follow the path of least resistance," he says. "They did the stuff that was easy and were getting large productivity returns for doing it."

In the 1870s, the industry again struggled to find capital as intense competition forced cuts in shipping rates. "Years of massive land grants and liberal investment had left segments of the industry overbuilt and vulnerable," and low commodity prices cut trade volume, according to Usselman. Rail companies competed for business through price wars, secret rebates, and price concessions. States could not regulate rates across borders, so the federal government passed the Interstate Commerce Act of 1887, creating the Interstate Commerce Commission. (Railroad rates remained regulated until Congress passed the Staggers Rail Act of 1980.)

Driven by necessity, railroads cut operating costs so they could handle higher volumes in an orderly fashion. This required efficiency experts who ultimately made railroads the model for modern management. Tough times also forced railroads to produce major innovations in corporate finance, organization, and labor relations.

By the end of the century, railroads had become big business. Between 1870 and 1900, for example, the Pennsylvania Railroad was the largest private employer in the United States. Railroads helped grow urban centers, which in turn intensified and expanded demand for rail transportation. Railroads cut freight rates from 2.25 cents per ton mile in 1860 to less than a penny per ton mile in 1890. They also transported people and products with unprecedented speed. This raised productivity and changed the way Americans think about and value time: Scientists enlisted the help of railroads to adopt standard time zones, vital for railroad scheduling, and critical for scientists who wanted to coordinate observations across great distances.

This massive taming of time and space began in the Fifth District. By 1860, the South Carolina Railroad and its allied lines were serving much of the South, with one line reaching all the way to Memphis on the Mississippi River. The South Carolina was the earliest predecessor line of Norfolk Southern Railways, which today operates roughly 20,000 route miles throughout the eastern half of the United States. Likewise, the B&O was the earliest predecessor line of CSX Transportation, which today runs about 21,000 route miles in the eastern United States. The B&O is sometimes called the nation's first railroad. It harnessed the iron horse and drove it across the Alleghenies — proving that railroads could forge the cross-country trade routes long sought by America's European explorers and pioneers. **RF**

Railroad Milestones

1828 — The Baltimore and Ohio Railroad (B&O) breaks ground in Baltimore with plans to reach the Ohio River.

1830 — South Carolina Canal and Rail Road begins first regular rail service powered by a steam locomotive in the United States.

1833 — South Carolina Railroad completes 136-mile line to Hamburg, S.C., the longest in the world at the time.

1839 — Depression of 1839 stalls railroad development in the South for 10 years.

1853 — B&O reaches the Ohio River at Wheeling, W.Va.

1861 — The Civil War demonstrates the strategic importance of railroads.

1865 — Railroads start rebuilding and expanding after four years of war.

1869 — Union Pacific and Central Pacific railroads meet in Utah to create the nation's first transcontinental connection.

1873 — Panic of 1873 marks the end of a railroad building boom. Many railroads go bankrupt.

1886 — Railroads complete their conversion to standard-gauge tracks.

1887 — Congress passes the Interstate Commerce Act, primarily to regulate railroads.

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