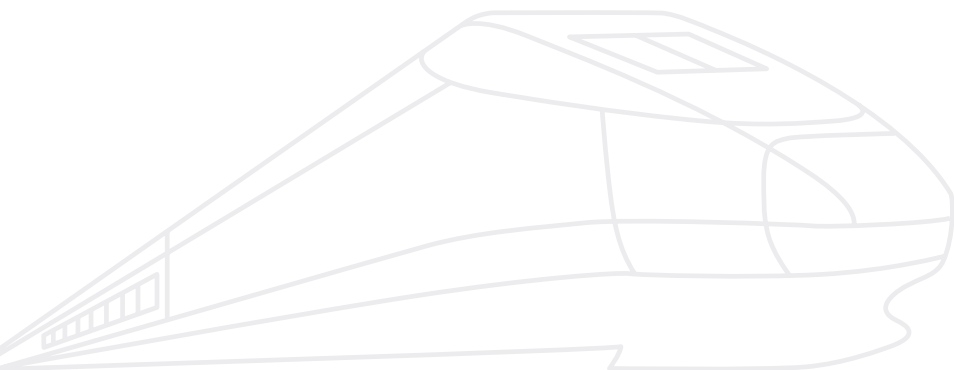
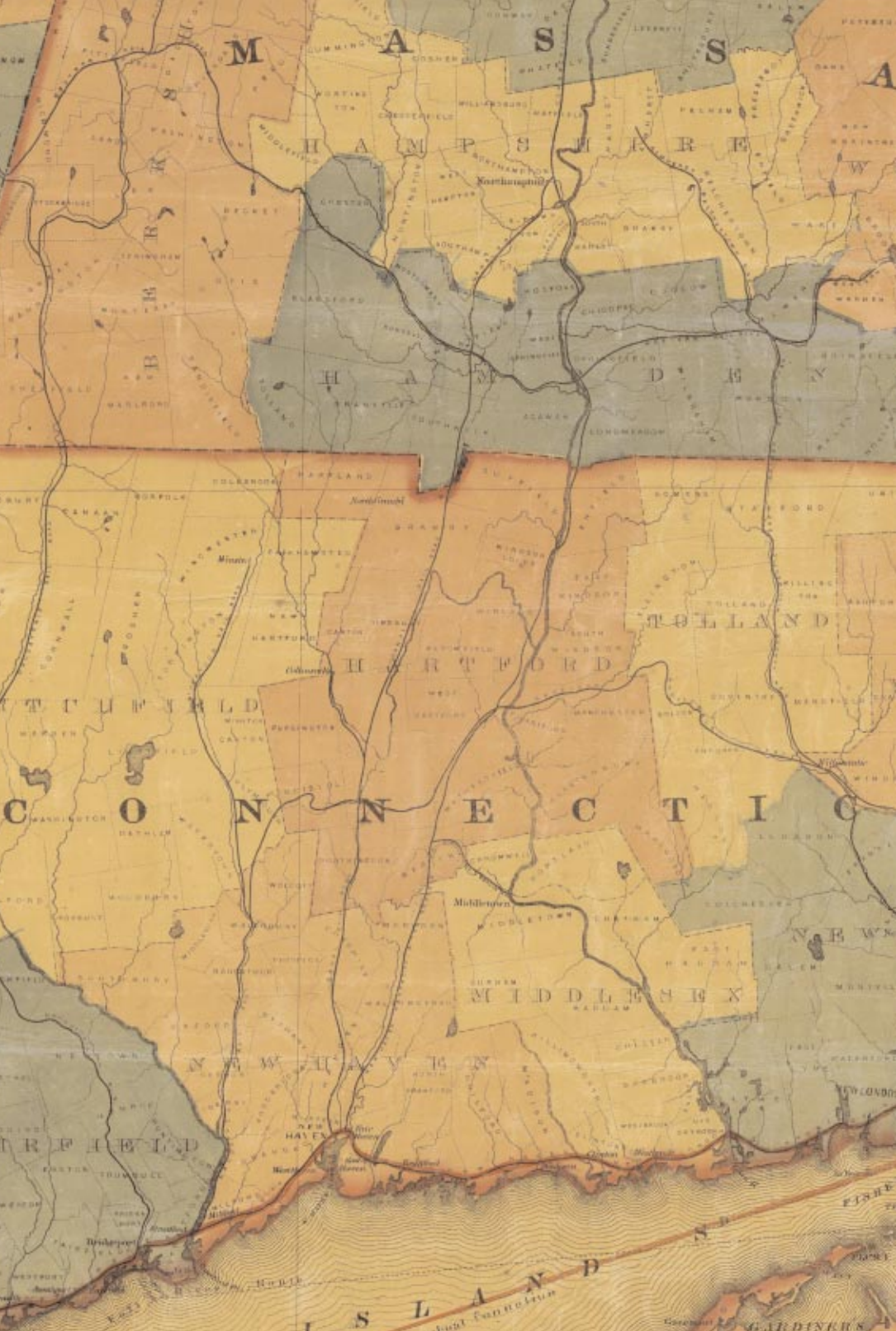




AMTRAK'S HIGH SPEED RAIL PROGRAM
N E W H A V E N T O B O S T O N
HISTORY AND HISTORIC RESOURCES





M A S S A C H U S E T T S

H A M P S H I R E

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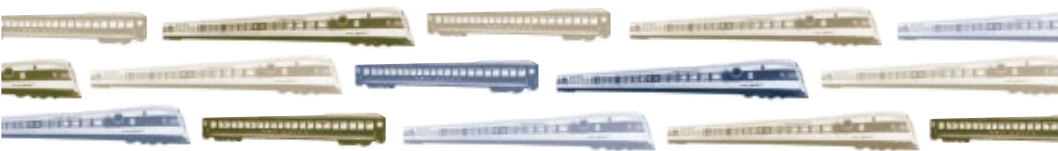
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AMTRAK'S HIGH SPEED RAIL PROGRAM
NEW HAVEN TO BOSTON
HISTORY AND HISTORIC RESOURCES

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In the year 2000, Amtrak inaugurated its new Acela Express high-speed rail service on the Northeast Corridor, ushering in a premium level of service that will set the standard for transportation in this country. Achieving this milestone has required a Herculean effort by many states, agencies, companies and individuals. Indeed, between 1992 and 1999, the railroad between New Haven and Boston was transformed from a sleepy, 1940s era line to the premier rail line in North America, capable of train speeds up to 150 mph. This has required some \$1.7 billion in new rails and ties, signal system upgrades, bridge replacements, capacity and station improvements, curve realignments, and at-grade crossing upgrades. In addition, the electrification system that was first installed between New Haven and New York some 90 years ago was extended to Boston. This single project alone has shaved some 30 minutes of travel time from Boston-New York trains.

This program of improvements was not without its opponents and controversies. Many important issues were raised by residents living near the rail line, boaters, and state environmental and transportation agencies. The project and region are clearly better off for these efforts and Amtrak sincerely appreciates the hard work of those who insisted that local environmental, historic and quality of life issues be respected.

We leave the region better off than when we began, with a vastly improved rail passenger system and better communications with those impacted by the rail line. This program has been a success. Amtrak looks forward to continued efforts to improve the region's transportation system.

David J. Carol
Vice President, High Speed Rail



INTRODUCTION

In the year 2000, the National Railroad Passenger Corporation, Amtrak, ushered in a new era of railroading in America with the initiation of Acela high-speed service in the Northeast. Acela, which is derived from the words "excellence" and "acceleration," is the brand name for Amtrak's new approach to passenger rail service. Its centerpiece will be a fleet of ultramodern, high-speed electric trains capable of attaining speeds up to 150 miles per hour. Acela is the first of many high-speed rail systems that Amtrak plans to implement in its effort to reintroduce Americans to train travel as a viable and attractive alternative to driving or flying.

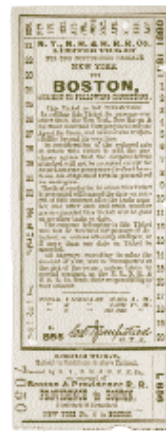
A major key to the implementation of Acela service is the electrification of the Northeast Corridor between New Haven, Connecticut and Boston, Massachusetts. That section of the line is a descendent of four early railroads that were consolidated into a single unit in 1893 by the New York, New Haven,



and Hartford Railroad. The corridor south of New Haven to Washington, DC was electrified in the first half of the twentieth century. The completion of the electrification project will allow passengers to travel the entire Northeast Corridor without switching trains at New Haven.

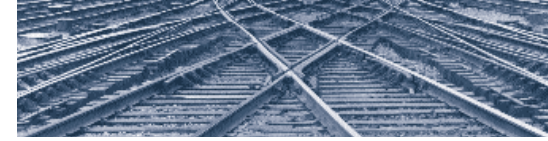
The electrification project involved the installation of an overhead catenary system composed of wires suspended over the railroad tracks and supported by steel poles with cantilevered arms; the construction of a number of electrical switching, paralleling, and substations; and raising bridges or lowering the tracks at 40 locations along the route to

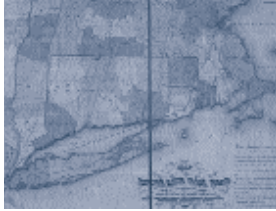
provide sufficient clearance for the installation of the overhead wires. The construction of these improvements was determined to constitute a major federal undertaking, requiring the Federal Railroad Administration (FRA) to conduct various studies to identify the impacts that the project might have on the environment and consider ways of mitigating those impacts judged to be adverse. Among the environmental impact studies completed was a survey to locate, document, and evaluate historic properties on the New Haven to Boston section of the Northeast Corridor. Under federal law the term "historic property" is applied to those resources that are either listed or eligible for listing in the National Register of Historic Places. The National Register is the nation's official federal list of significant buildings, sites, structures, objects, landscapes, and districts. The basic criteria for listing in the National Register are that a property be at least 50 years old and retain its historic appearance, or integrity, to a high degree. Properties must also have associations with important people, trends, or events significant in American history, architecture, archaeology, engineering, or culture.



Conducted in 1992-1993, the survey of historic properties included not only resources directly on or adjacent to the railroad right-of-way, but also those whose setting might suffer from visual impacts of the electrification elements. In all, about 140 properties within the project area were identified as being listed or potentially eligible for listing in the National Register. A number of the properties surveyed were directly related to the railroad. They included train stations, signaling and switching towers, and railroad bridges. Many others, however, were recorded simply because they were located near the rail line. Among them were numerous historic commercial and residential districts, individual residences, factories, agricultural landscapes, cemeteries, and public buildings.

During the survey, judgements were made about the potential affect of the project on each of the historic resources identified. While the electrification project did not require a large amount of demolition, it was determined that a number of properties would be adversely affected by the visual impact caused by the installation of the catenary poles, which are set an average of about 200 feet apart along the 156-mile route. In those cases, additional mitigative measures were agreed upon during consultation among Amtrak, the FRA, and the state historic preservation offices in Connecticut, Rhode Island, and Massachusetts. In most instances, the mitigation took the form of Historical American Buildings Survey/Historic American Engineering Record (HABS/HAER) documentation, which involved taking large-format negative, archivally stable photographs and producing a written description and history of the properties before the improvements were constructed. Copies of all the HABS/HAER documentation were deposited in the Library of Congress and safe archives within each state.





HISTORY

The production of this booklet is one of the final pieces of mitigation for the construction of the electrification improvements. It grew out of a stipulation in a Memorandum of Agreement among Amtrak, the FRA, and the Connecticut State Historic Preservation Officer that asked for an illustrated report covering historic resources directly associated with the railroad in Connecticut. The parties later agreed, however, to expand the scope of the work to encompass the entire New Haven to Boston section of the Northeast Corridor. The booklet is intended to serve as an educational tool and will be distributed to libraries and schools within Connecticut, Rhode Island, and Massachusetts.

The booklet is divided into two major sections. The first provides a history of the development of the New Haven to Boston portion of the Northeast Corridor. The material for the history was distilled from some of the many books available on railroading in New England and research materials collected during the historic property investigations for

the electrification project. The second section focuses on the resources constructed by or because of the railroad. Included are discussions about passenger and freight stations; bridges, underpasses, and tunnels; signal and routing systems; and crossings and cuts that represented major engineering projects, promoted safety, and changed the built environment in the towns and cities where they are located.

Acela promises to revolutionize train travel in the Northeast Corridor, but it is important to remember that the system is just the next advancement in a long continuum of railroad innovations, each representing for previous generations as dramatic an improvement in speed, comfort, safety, and service. The sleek new trains will travel over portions of right-of-way that date from the earliest period of railroading in the United States. Ample physical evidence of all periods of the Northeast Corridor's development can be seen along the New Haven to Boston section of the line. It is hoped that this booklet will alert readers to the historic resources that remain and that they will gain an understanding of the importance of the Northeast Corridor in the history of the region it services.

The introduction of railroads beginning in the 1820s and their rapid deployment throughout the nation during the nineteenth and early twentieth centuries fundamentally altered the way Americans lived, worked, and played. During that period, railroads became the dominant means of long-distance travel for people and goods. They opened up new areas for settlement, fueled the Industrial Revolution by allowing the rapid transport of raw materials to factories and finished goods to marketplaces, and created new opportunities for Americans to travel to other parts of the country for business and pleasure. The history of Amtrak's Northeast Corridor extends to the earliest period of railroad development and parallels in many ways the general history of railroading in the United States. The following narrative traces that history, highlighting the important national trends and events that influenced the development of the Northeast Corridor between New Haven and Boston and providing a context from which to view the history of the individual resources that are the focus of the remaining sections of this book.

below: *Early nineteenth-century Currier and Ives depiction of steamboat and barge traffic on the Hudson River.*



TRAVEL BEFORE THE RAILROAD

Before the advent of the railroad, there was no single comprehensive transportation system to connect the various regions of the United States. The country grew up around coastal seaports and along navigable rivers where ships and boats supplied the primary means for importing and exporting goods and supplies. Port towns relied heavily upon and owed much of their growth to maritime trade, exporting locally produced products and importing goods for distribution within the community and its hinterlands. Even today, all but four of the nation's 20 largest cities have major harbors.

Communities in interior sections of the country had to be much more self-sufficient. The only way they could be reached was by foot or horse-drawn conveyance on roads that were often little more than slightly improved former Native American trails. Early coaches offered little in the way of luxury, were usually crowded, and lacked suspension systems that could effectively cushion the ride against the numerous obstacles that characterized most early roads. Road construction methods improved during the late eighteenth and early nineteenth centuries. In New England, numerous turnpikes crisscrossed the region, with branches of smaller, shorter routes to outlying areas extending from them. These toll roads were often chartered and constructed by private companies that sought profit by providing a decent surface for wheeled vehicles to travel. Only large cities, where financial resources and demand for intercity travel were great, could afford to construct and maintain smooth public roads.

Early wagons and stagecoaches slowly evolved into more comfortable and faster modes of transportation. A major evolution occurred in the first three decades of the nineteenth century, as coaches began to take on new shapes, with springs and cushioned seats to allow for a more comfortable ride. Finally, in the 1820s, the "Concord Coach," a flat-topped carriage, had evolved as the style and shape of choice. The Concord Coach ultimately found wide popularity throughout the United States, South Africa, South America, and Australia, and continued to be used until the early days of the automobile.



1776

1776 Colonies declare Independence from Britain.

American John Jeffries of Boston become the first balloonists to successfully

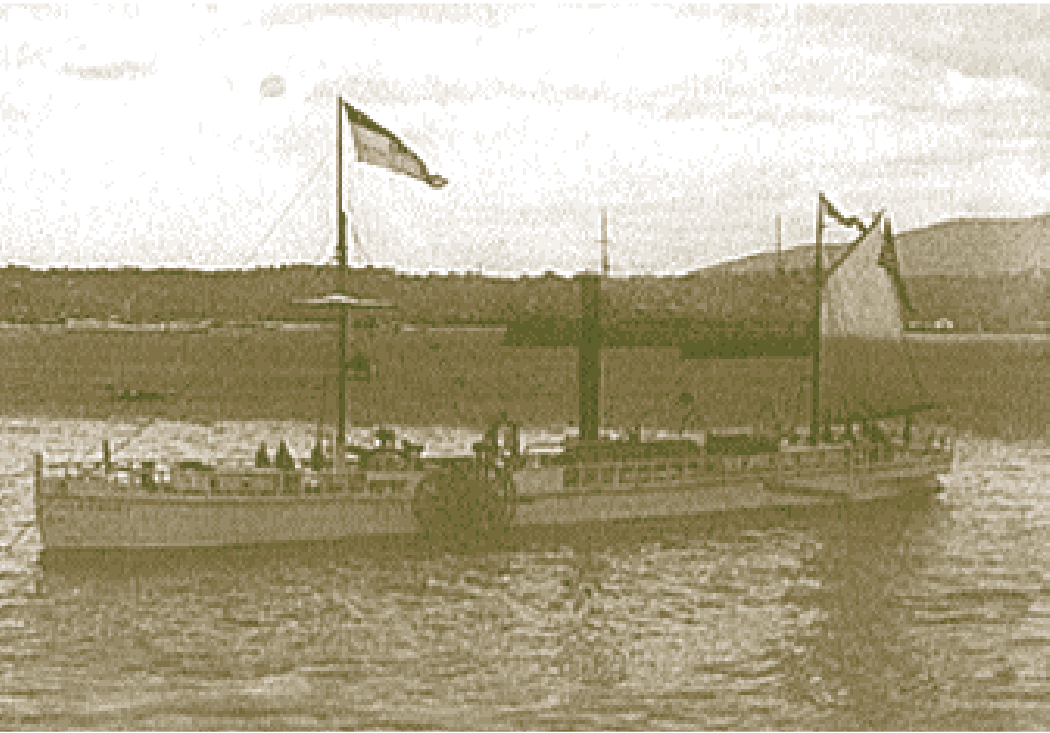
1789 George Washington becomes first U.S. President.

1780s First canals in New England built. 1785 Frenchman Jean-Pierre Blanchard and
cross the English Channel. 1787 U.S. Constitution is written, Northwest Ordinance.

1803 Louisiana Purchase. 1804 Richard Trevithick of England builds first locomotive.

below: “Fulton’s Folly,” as Robert Fulton’s *Clermont* was nicknamed, was the first of many technological advances in transportation that transformed American society in the nineteenth century. Traveling against the current of the Hudson River, Fulton made the 150-mile trip from New

York City to Albany in a record 32 hours. Within three years of the maiden voyage, Fulton’s steamboats were regularly plying the Hudson and Delaware rivers and soon after were making possible settlement of the lands acquired through the Louisiana Purchase of 1803.



below: The completion of the Erie Canal and others like it focused new attention on the potential for tapping resources and opening new areas to settlement in the interior sections of the country. Canals, however, were extremely expensive to build and maintain, and required water sources at both ends, restricting where they could be constructed. Railroads, which were faster, relatively cheap to construct, and could be laid almost anywhere, brought the canal era to an abrupt end. Courtesy of MCA

The introduction of the steamboat and construction of several major canals during the early nineteenth century represented major advancements in the movement of goods and people into the interior sections of the country. In 1807, Robert Fulton ushered in a new era for internal travel with the historic first run of his steamboat, *Clermont*. Several years later, construction began on the 360-mile Erie Barge Canal between Albany and Buffalo, New York. Partially opened in 1819 and completed in 1825, the Erie Canal enabled for the first time an efficient means of carrying products and

resources from the Great Lakes region to the port of New York City. Its immediate success prompted the formation of numerous canal companies in other parts of the United States. In New England several modestly successful canals were constructed in the early nineteenth century. They included the Middlesex Canal from Boston to Lowell, Massachusetts (1803–1852); the Blackstone Canal from Providence, Rhode Island to Worcester, Massachusetts (1825–1849); and the New Haven (Connecticut) & Northampton (Massachusetts) Canal (1825–1847).

1807

1807 **Fulton’s Folly**—Robert Fulton’s *Clermont* makes successful run on the

1815 Battle of New Orleans. 1816 **First high-pressure steamboat introduced by Henry M. Shreve.**

1821 Missouri Compromise. 1823 Monroe Doctrine.

Hudson River between New York City and Albany. 1812 War of 1812 begins.

1817 Erie Canal construction begins. 1800–30 Stagecoach improvements, Concord Coach (ca. 1830).

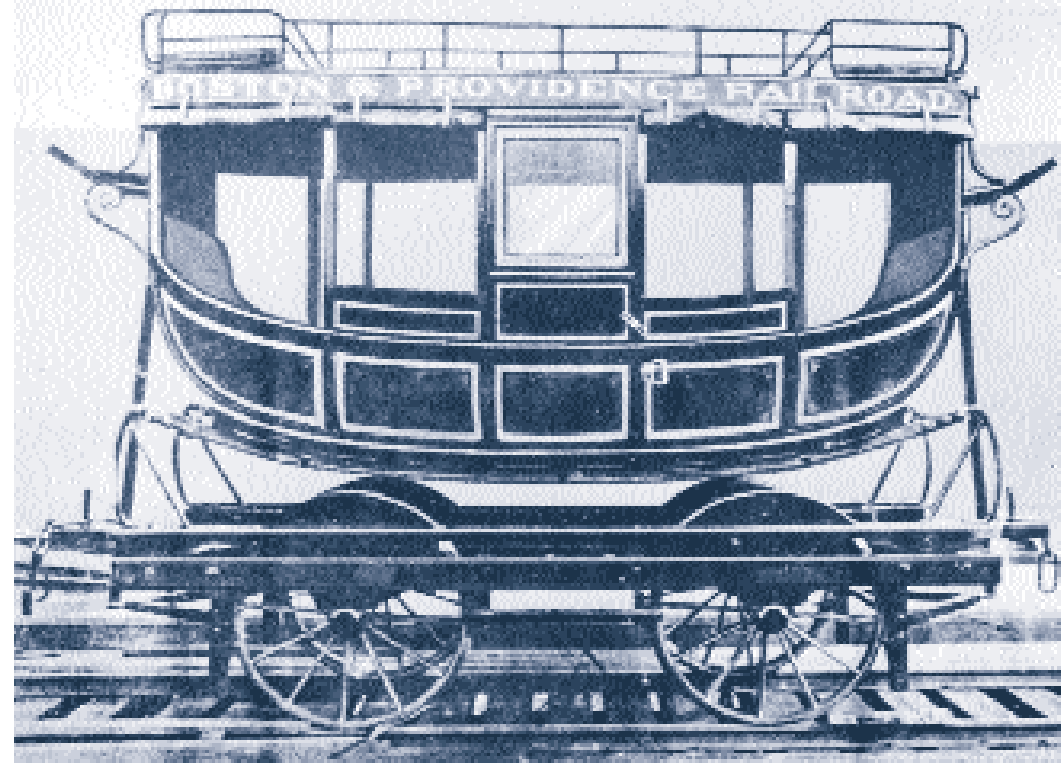
1824 General Survey Act allows survey of roads and canals considered nationally important.

below: Driving the “Golden Spike” on May 10, 1869 at Promontory Summit in Utah. The ceremony marked the completion of the first transcontinental railroad in the United States. The rapid expansion of railroads in the post-Civil War era allowed settlement in previously

remote sections of the country. Between 1865 and 1890, the total amount of railroad track in the United States rose from 35,000 to 200,000 miles.

right: Original Boston & Providence Railroad Car, 1834. In many cases, early trains were horse-drawn

and little more than road coaches mounted on railway axles and wheels. Each was given a name, continuing a tradition that began with stagecoaches of previous years. The names were often passed on to successor trains that plied the same routes. Courtesy of BPL.



EARLY RAILROAD DEVELOPMENT IN UNITED STATES

The development of the railroad in the United States fostered three major social and economic changes: the growth of cities, the spread of heavy industry, and western expansion. Railroad expansion initiated the “transportation revolution,” which unified the American people, and transformed the United States from a primarily agricultural economic state to the preeminent industrial nation. Events such as the California Gold Rush of 1849 and the passing of the Homestead Act of 1863, which established a system for the free distribution of federal lands, created demand for railroads to carry settlers to their new homes and directly connect the east coast marketplaces with west coast resources and

trade routes. The federal government did what it could to foster railroad expansion, turning over more than 300,000 square miles of public lands and furnishing large loans, grants, and subsidies to railroad companies. During the period between 1830 and 1900 the railroad trackage in the United States increased from 23 miles to 186,000 miles.

Railroad technology in the United States is traced back to 1764 when a cable-operated tramway made of grooved logs was constructed in Lewiston, New York. Major advances occurred after 1804 when Richard Trevithick of England made the first “locomotive” able to run on wheels and 1807 when Robert Fulton pioneered use of the steam

engine as a viable means to propel vehicles on water. By the 1820s the railroad’s potential for improving travel and freight shipping was well-recognized in the United States.

The first successful freight and passenger railroad was the Baltimore & Ohio Railroad, which was chartered on February 28, 1827 by the City of Baltimore in hopes of expanding its economic base by funneling products of the Ohio River Valley to the city’s port. Charles Carroll, the last surviving signer of the Declaration of Independence, broke ground for the road on July 4, 1828. Other cities soon followed Baltimore’s lead, and the pace of railroad development along the east coast quickened.

New England’s first railroad, the Quincy Granite Railroad, was constructed in 1826, to move the stone for the Bunker Hill Monument from the quarries to a wharf on the Neponset River, a distance of four miles. During the mid-1830s, several freight and passenger lines were organized in New England, including the Boston & Worcester, the Boston & Maine, and the Boston & Providence. This trio of lines radiated out from Boston, providing direct service to three important interior areas. Within the next three decades, numerous independent railroad companies were formed in states throughout the eastern seaboard.

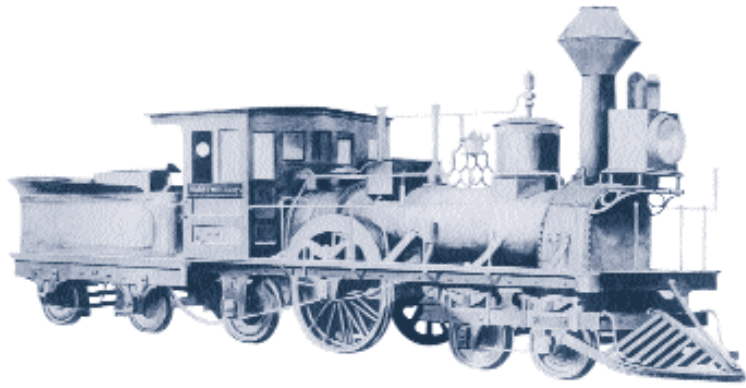
1825

1825 Erie Canal completed, joining Albany to Buffalo on Lake Erie.

1826 Former Presidents John Adams and Thomas Jefferson die on July 4.

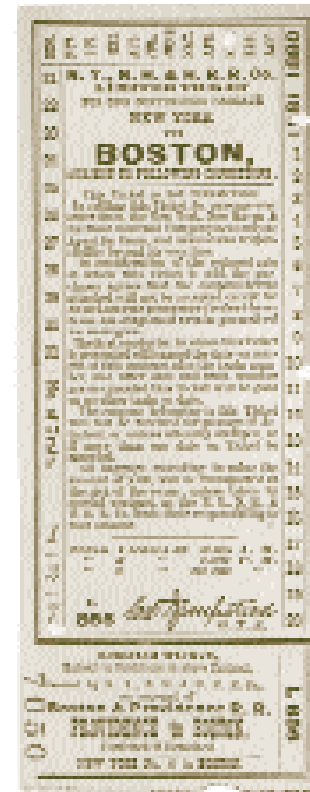
1826 Early horse-drawn, single purpose railway, in Massachusetts, the Quincy Railway.

1827 First common carrier railroad in U.S., Baltimore & Ohio Railroad extended to Ohio River.



left: *The locomotive Roger Williams, built in 1837, was the first engine to run on the Providence & Stonington Railroad.* Courtesy of RIHS, neg.(x3)2263

below: *1881 passenger ticket for the Boston & Providence section of the New York, New Haven, & Hartford Railroad.* Courtesy of RIHS.



THE BEGINNINGS OF THE NORTHEAST CORRIDOR

The portion of Amtrak's Northeast Corridor from New Haven to Boston was assembled from four historic railroad lines: the Boston & Providence; the New York, Providence, & Boston; the New Haven & New London; and the New London & Stonington. The Boston & Providence, chartered in 1831, was New England's first viable common carrier railroad. Surveyed by prominent early American engineers Captain William Gibbs McNeill and George Washington Whistler, the railroad right-of-way made an almost straight line between its namesake cities. Initially there was little

support for the project in Providence, which feared that the success of the recently-completed Blackstone Canal would be threatened by competition from the railroad. Opposition waned quickly, however, when the advantages of a direct link with Boston, New England's largest city and port, were realized. Construction began in Boston in 1832 and the first trains were operated between that city and Dedham in June 1834. The line was extended to Canton the following September, and was completed to Providence in 1835 after construction of the massive Canton Viaduct.

Travel between New York and Boston before the construction of a rail route was difficult and often perilous. The overland journey along winding Post Road, which later formed the basis for U.S. Highway 1, took days to complete. Ship travel, while faster and more comfortable, required rounding the arm of Cape Cod, where strong tidal currents and unpredictable weather could make the trip extremely hazardous. The completion of the Boston & Providence Railroad in 1835 provided the first viable alternative to ship travel around the Cape. Goods could be transported by rail from Boston to India Point in Providence and off-loaded onto ships bound for New York via Narragansett Bay. The Stonington Road, which was put into service in 1837, made the trip safer still, allowing shippers to bypass the sometimes treacherous sea passage around Point Judith at the southwest corner of Narragansett Bay in favor of direct access to relatively calm Long Island Sound.

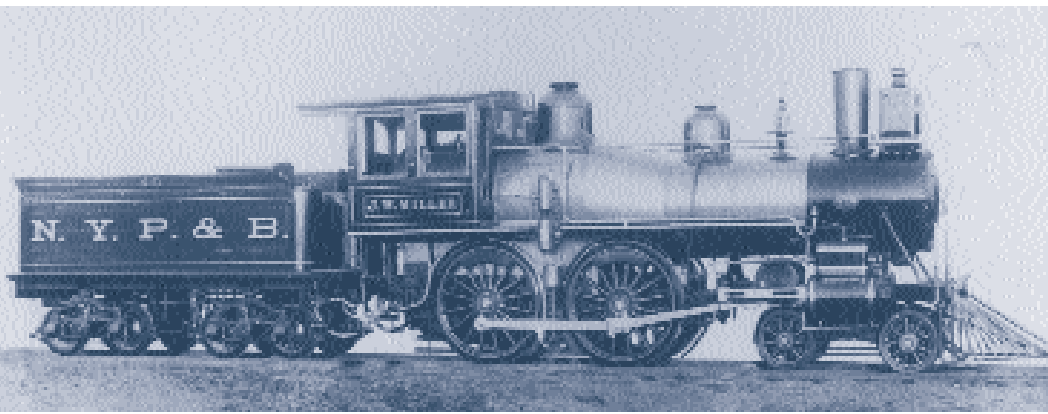
1830s

Mid-1830s First major New England rail lines, including the Boston
1831 Nat Turner Rebellion. 1831 Boston & Providence (B&P)

1837 New York, Providence, and Boston line (Stonington Line), completed from

& Worcester, the Boston & Maine (B&M), the Boston & Providence (B&P), are built.
chartered, completed 1835. 1836 Fall of the Alamo.

South Providence to Stonington, CT. 1840s Concept of Manifest Destiny first espoused.

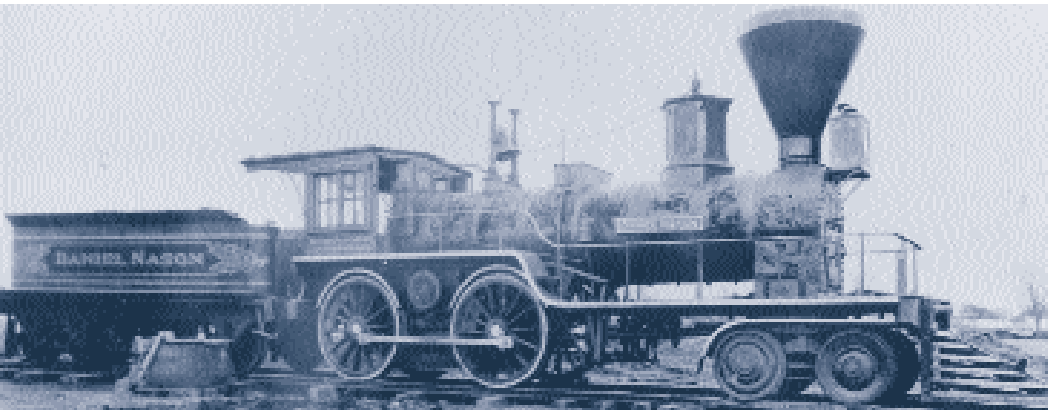


Several locomotives that operated along the predecessor lines of the New York, New Haven & Hartford Railroad are shown on the left. These locomotives share a wheel arrangement consisting of two small front idler wheels under the smokebox, and two larger drive wheels under the boiler. Developed in the 1840s, this configuration was referred to as a "4-4-0", or "American", wheel arrangement.

top left: Locomotive "J.W. Miller", Courtesy of UCONNASC, Allyn Fuller Collection

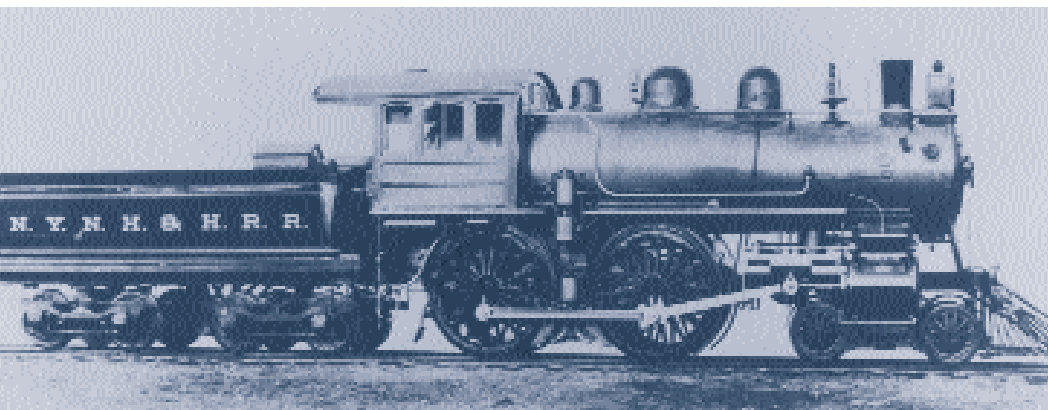
center left: Locomotive "Daniel Nason", Courtesy of BPL

bottom left: Compound-Type Locomotive. Courtesy of UCONNASC, Charlie Gunn Collection



Shortly after the Boston & Providence was chartered, plans were set in motion to extend rail service farther south toward New York. In 1832 the Providence & Stonington Railroad and the New York and Stonington steamship line were chartered to construct a rail line from Providence to Stonington, Connecticut and provide steamer transport across Long Island Sound to New York. The two companies merged in 1833 to form the New York, Providence & Boston. Completed in 1837, the "Stonington Road," as the line was known, was 47

miles in length. The six miles of the line in Connecticut constituted the first operating railroad in that state. It allowed passengers from Boston to use the Boston & Providence to reach Providence, then ferry across the harbor to the Stonington Road railhead at South Providence, and proceed to Stonington where they could take a steamship to New York. Direct rail service from Boston to Stonington was established in 1848 when the Stonington Road and Boston & Providence were joined at Providence's Union Station.



1846

1846 Introduction of telegraphy and expansion of railroads forms nationwide

1848 Through Service to Boston completed on Stonington

1848 New Haven and New London line chartered to connect with the

transportation and communication linkages.

Line when line was extended to Providence, joining the B&P at Union Station.

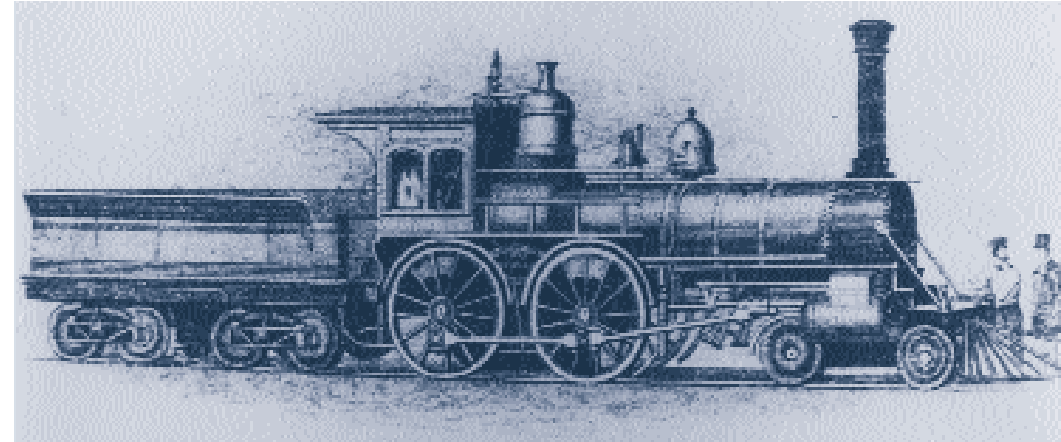
New York and New Haven line. 1849 California Gold Rush.

The New Haven & New London Railroad was chartered in 1848, and construction began in 1850. Yale University engineering professor Alexander C. Twining surveyed the route, which traveled along the scenic shoreline of Long Island Sound. In New Haven passengers and freight traveling south to New York were ferried across the Quinnipiac River to make connections with the New York & New Haven Railroad. Among the promoters of the New York & New Haven were prominent New York capitalists Robert and George L. Schuyler, Anson G. Phelps, and Elihu Thompson and Connecticut businessmen Joseph E. Sheffield and Samuel J. Hitchcock, president of the Hartford & New Haven Railroad. Originally laid out as a single track system, the New York & New Haven added a second track in 1854. Over time this route became the “funnel” through which nearly all New York-bound traffic from New England passed.

The last link in the route between New Haven and Boston, the section between New London and Stonington, was completed in 1858. Initially chartered in 1853 as the New London & Stonington Railroad, this short 13-mile stretch made it possible, with the

exception of ferry rides across the Connecticut and Thames rivers at Old Saybrook and New London, to travel by rail from New York to Boston. Problems in financing the road, however, forced the New London & Stonington into bankruptcy within four years. In 1857, the line was absorbed by the New Haven & New London and that company was reorganized under the name New Haven, New London & Stonington. In 1864, the New Haven, New London & Stonington, unable to meet its interest payments, went into receivership. The eastern portion of the line between Groton and Stonington was sold to the Stonington Railroad and subsequently became known as the “Groton Extension.” The western section was reorganized as the Shore Line Railway. With its debt restructured, the Shore Line began to prosper. In 1870, it financed a rail drawbridge over the Connecticut River. That same year, the line was leased to the New York & New Haven.

top: Lithograph of a Dimpfel Locomotive Coal Burner operated by the New Haven Railroad. Courtesy of UCONNASC, Allyn Fuller Collection



bottom: Map of the four original railroads that later formed the New York, New Haven, Hartford main line.



1852

1852 New London and Stonington (NL&S) line chartered to connect with

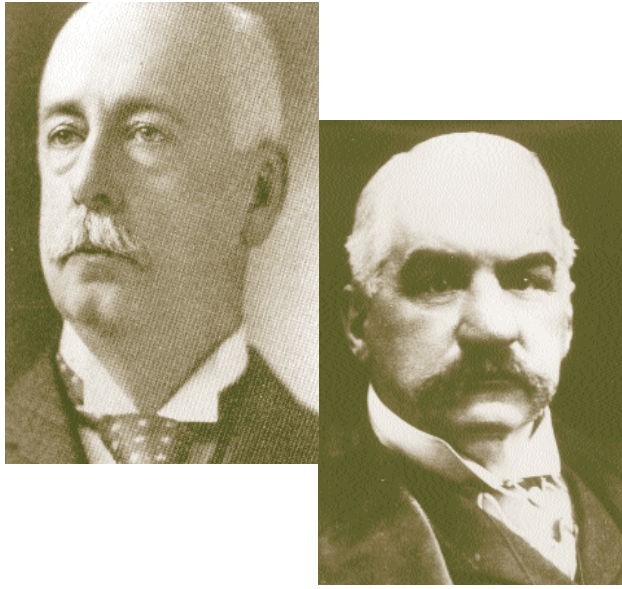
1854 Kansas-Nebraska Act. 1857 New London and Stonington line merges into the

1861 Civil War Begins. 1862 Homestead Act enacted. 1863 Emancipation

New York, Providence, and Boston line (service is completed from Boston to New York).

New Hampshire and New London line under the name New Haven, New London & Stonington.

Proclamation issued. 1865 Abraham Lincoln Assassinated. 1865 Civil War Ends.



RAILROAD CONSOLIDATION—CREATION OF THE NEW YORK, NEW HAVEN & HARTFORD RAILROAD

The history of railroads in America between about 1870 and 1930 is characterized by expansion and consolidation. The trend began in earnest during the Civil War, when efficient interregional transportation became a priority for national defense purposes. At the close of the conflict vast markets in the west and south, where railroad capabilities had been seriously degraded during the war, awaited the vision of railroad tycoons like J.P. Morgan. The completion of the Transcontinental Railroad in 1872 sparked a furious period of railroad construction and consolidation as

large railroad conglomerates sought to capitalize on untapped markets and gain monopolistic control of lines within regions already served by railroads.

Approximately 100 small, independent railroads were built in southern New England between 1850 and 1860. By 1865, the number of railroad companies had dwindled through merger and acquisition to about 30. By 1890, 11 major systems controlled railroad traffic in the region. The New York and New England Railroad, with 500 miles of track, was the largest running from Boston through Hartford to the Hudson River.

left: *Charles Sanger Mellen: Installed by Morgan as President of the New Haven, Mellen had for a time also been its Vice President. Under his leadership, the New Haven implemented a disastrous campaign to gain control of all forms of transportation in New England.* Courtesy of TR

above: *J. Pierpont Morgan: A Hartford native, the wealthy and influential Morgan was once referred to as a “one-man Federal Reserve.” Morgan, who had served on the Board of Directors for the New York, Providence & Boston Railroad since 1887, came to the New Haven after the former railroad’s absorption in 1892.* Courtesy of TR

The New Haven’s success led a group of wealthy New York investors to seek control of the organization’s board. Headed by J. Pierpont Morgan, the group set about creating a complete monopoly on transportation in New England. Throughout the late nineteenth century, the New Haven had acquired several trolley companies and had undertaken several trolley line experiments of its own. Now, under this new leadership, the focus shifted to the acquisition of all lines and means of transportation within the “Consolidated’s” territory. Morgan’s ambitions led to the buyouts of numerous steamboat lines, trolley companies, and railroad lines regardless of price. In 1903, Charles S. Mellen was installed as president of the railroad. The New Haven Railroad’s reach under Mellen extended far beyond its tracks. Along with supplying rail service, the railroad made a concerted effort to buy up steamship lines within its territory in an effort to gain full control over the main routes of transportation. The New Haven owned its own steamship service and, when competition from automobiles arose in the early twentieth century, organized the New England Transportation Company, which was at one time one of the largest bus lines in New England. Like some other railroad companies, the New Haven supplemented revenues from their transportation services by buying or constructing utility supply companies.

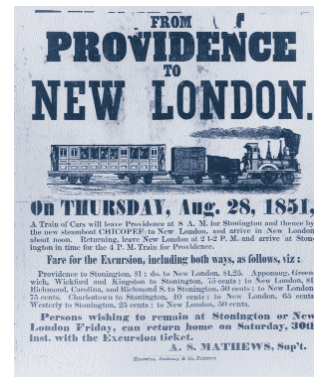
Other prominent railroads included the New York, New Haven & Hartford, the New York, Providence & Boston, the Providence & Worcester, the Old Colony, and the Boston & Maine.

The consolidation process for the Northeast Corridor line from New Haven to Boston began in 1864 with the Stonington Road's purchase of the Groton to Stonington portion of the former New Haven, New London & Stonington Railroad. In 1870, the New York & New Haven leased the Shore Line Railway between New Haven and New London and began coordinating operations with the Hartford & New Haven Railroad, providing a link to Boston. Two years later those two lines merged to form the New York, New Haven & Hartford Railroad, commonly known as the New Haven.

In addition to the absorption of smaller lines through buyouts and mergers, the New Haven also leased several lines in an attempt to dominate the railroad market in southern New England. The New Haven reached as far north as Providence following the lease of the New York, Providence & Boston in 1892. Its efforts to complete its route to Boston were hampered by the Old Colony Railroad, which began leasing the Boston & Providence Railroad in 1888. The Old Colony also had its own line of steamers connecting with New York. Finally, in 1893 the

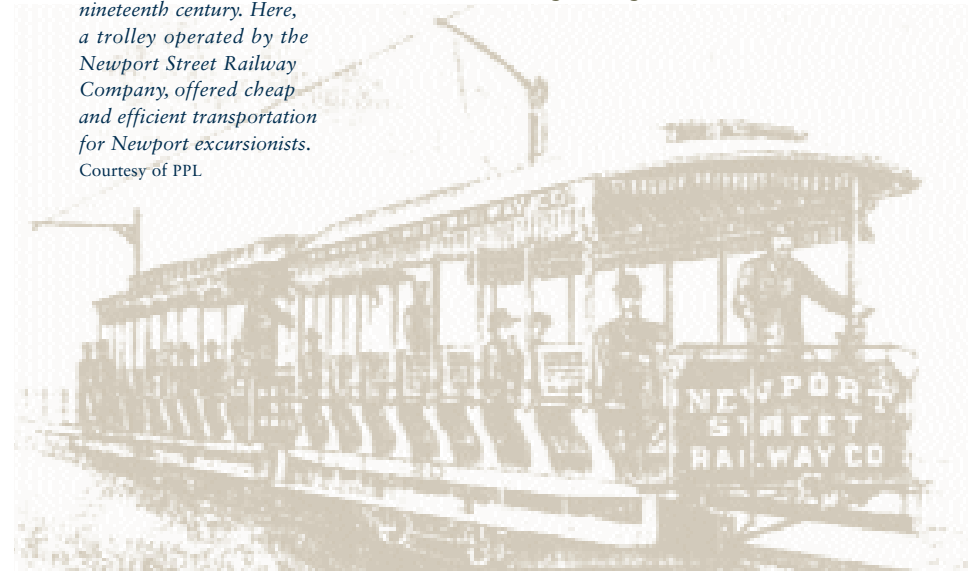
New Haven was able to lease the line, creating direct service on a single railroad from New York to Boston for the first time. The acquisition of the Boston & Providence made the New Haven, which then leased or owned 644 miles of track, the largest railroad system in New England. The dominance of the railroad in the region increased after lawsuits brought against the New York & New England Railroad forced it into receivership in 1895. During the ensuing sale of assets the New Haven bought up nearly all of the New York & New England's stock. By the turn of the century, the New Haven had a virtual monopoly over rail travel in Connecticut, southeastern Massachusetts, and Rhode Island, and maintained the most popular route of travel between New York and Boston.

By the end of the nineteenth century the rail lines of Massachusetts, Rhode Island, and Connecticut formed one of the densest rail networks in America, crisscrossing southern New England and leaving few centers of population unserved. Numerous intercity routes had been established, making it easy to travel or ship goods almost anywhere in the region. The consolidation of New England's railroads was largely complete, with three railroad systems—the New Haven, the New York Central (Boston & Albany), and the Boston & Maine—controlling all of the major routes.



above: As shown by this notice from 1851, rail lines had begun purchasing and/or organizing their own steamship lines to provide passage over water. Here, the steamship *Chicopee* provided passage between Stonington and New London. Courtesy of RIHS, neg.(X3)9124

below: The popularity of excursions into the country or to waterfront amusements began in earnest in the late nineteenth century. Here, a trolley operated by the Newport Street Railway Company, offered cheap and efficient transportation for Newport excursionists. Courtesy of PPL



At first the only competition to the railroad were stagecoaches, ships, and canal boats. By 1870, however, almost every large city in the region had a network of horse-drawn trolley lines, which supplied a cheap mode of transportation for factory workers and “Sunday excursionists.” A team of horses could draw 10 or 12 passengers in omnibuses over dirt or cobble stone streets. These same horses could haul up to 75 passengers on street rails. By the late 1870s, an active search was under way for a mechanical substitution due to the large amount of money needed for boarding and feeding the horses. Cable systems were installed in many cities in the 1880s and 1890s. During the early twentieth century intercity electric railways were popular for relatively short trips to neighboring towns and resorts.

1872 New York and New Haven merge with the Hartford and New Haven line, forming the New York, New Haven, and Hartford railroad. **1876** Custer's last stand at the Battle of Little Bighorn. **1877** Great Railroad Strike. **1879** Edison invents electric light. **1885** Karl Benz builds the world's first gasoline powered vehicle. **1886** Statue of Liberty dedicated in New York Harbor. **1890** Battle of Wounded Knee. **1892–93** New York, Providence & Boston, and the Boston &

Providence merge into the New Haven system linking the Boston–New York route under one railroad.

below: Photograph of a New Haven car prior to the advent of the new streamlined image. Courtesy of BPL

right: Timetable showing stops included on the New Haven's Shoreline route in 1901. As shown by the table, the New Haven provided commuters with the convenience of a number of morning and evening departure and arrival times. Courtesy of RIHS, neg. (x3)9126

bottom right: Bird's-Eye View of Providence showing the comprehensive transportation network in place by the early twentieth century. By this period, transportation developments had made it possible for even the remotest of villages within the state to be easily accessible. Courtesy of PPL



East of New London and Willimantic.		EAST OF NEW LONDON AND WILLIMANTIC.	
New York New Haven and Hartford RAILROAD.		New York New Haven and Hartford RAILROAD.	
CONDENSED TIME-TABLE		CONDENSED TIME-TABLE	
POINTS EAST OF NEW LONDON		POINTS WEST OF NEW LONDON	
VIA SHORE LINE ROUTE		VIA SHORE LINE ROUTE	
FOR 1901		FOR 1901	
STATION	TIME	STATION	TIME
New York	7:00 AM	New York	7:00 AM
Yonkers	7:15 AM	New Roch.	7:15 AM
White Plains	7:30 AM	Westchester	7:30 AM
Port Jervis	7:45 AM	Putnam	7:45 AM
Orangeburg	8:00 AM	W. Point	8:00 AM
W. Point	8:15 AM	W. Point	8:15 AM
W. Point	8:30 AM	W. Point	8:30 AM
W. Point	8:45 AM	W. Point	8:45 AM
W. Point	9:00 AM	W. Point	9:00 AM
W. Point	9:15 AM	W. Point	9:15 AM
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LATE NINETEENTH AND EARLY TWENTIETH CENTURY PEAK

The forty years between 1890 and 1930 represented the golden era for train travel on the New Haven. Through its mergers and acquisitions the company positioned itself as a dominant force in transportation in the northeast. During the late nineteenth and early twentieth centuries, the railroad initiated an intensive program to upgrade facilities and improve safety along the line. In the 1890s, demand for service was so high that the New Haven added a third and then a fourth track between New York and New Haven to accommodate the increased passenger

and freight traffic. Numerous sections of track were rerouted to eliminate dangerous curves and grade crossings, and new switching mechanisms and automatic block signals were installed to improve safety. Issues of passenger comfort and convenience were addressed by the improvement of station facilities and the upgrade of locomotives and coaches. A massive electrification project, undertaken during the period when colorful railroad mogul Charles S. Mellen served as president of the New Haven, was completed between New York and New Haven in 1914.

By the late nineteenth century, railroads had influenced a significant change in the American landscape—the evolution of suburban zones around the periphery of cities. The dense railroad and streetcar networks allowed people who formerly lived and worked in the cities to establish residences in more attractive areas within cheap, practical commute of the cities. In this period sections of the New Haven's main line became some of the nation's busiest commuter lines. In addition to its intercity express service, the New Haven offered numerous daily morning and evening commuter trains to the suburbs. Suburbanization transformed the character of communities surrounding the major cities on the line. Early housing subdivisions grew up within easy walking distance of the railroad, which built pleasing, comfortable new stations to complement increasingly busy town centers.



1890s

1890s J.P. Morgan gains control of New Haven, seeking to monopolize

1900 All major rail lines in southern New England merged into one of three large systems:

1903 Wright brothers make first airplane flight.

transportation market in New England. 1898 Spanish American War.

the New Haven, the New York Central (Boston & Albany), and the Boston & Maine Railroads.

1905 Hepburn Act enacted to tighten Federal controls over railroads.



above: 1901 map showing vast transportation network created by New York, New Haven & Hartford Railroad. Note steamer routes still operated in conjunction with rail lines at this time. Courtesy of RIHS, neg. (x3) 9128

Despite the improvements to the line, the company experienced numerous setbacks during the first quarter of the century. As a result of the heavy spending under Morgan and Mellen's control, the New Haven was reported as being on the "brink of financial disaster" in a report from 1907. Investigations led by Boston attorney and later Supreme Court Justice, Louis D. Brandeis, shed light on the sometimes nefarious tactics of Morgan and Mellen in their attempts to control all forms of transportation in New England. One such attempt began when a Canadian firm, the Grand Trunk Railroad, began constructing the "Southern New England Railroad," which would have provided heavy competition to the New Haven. Planned as a rail line from the Boston & Albany at Palmer, MA to Providence, the line was eagerly anticipated by Providence businesses, who could benefit from competitive rates. Construction of the railroad was well underway when the company's president, Charles Melville Hays, died while on the Titanic. Hays was succeeded by a childhood friend of Mellen, and soon the project was abandoned under suspicious circumstances. These events so enraged Brandeis, among others, that several lawsuits were brought against the company in an effort to halt their attempts at a monopoly. Mellen was later indicted for violating the Sherman Anti-Trust Act.



right: Baggage being loaded onto the famous Federal, which ran from Providence to Washington, D.C. Courtesy of BPL

below: Debuted in 1935, the New Haven's 110-mile-per-hour Comet stream-liner, built by the Goodyear Zeppelin Corporation, was dedicated to Boston-Providence service. Courtesy of BPL

In the late 1910s, the New Haven endured a brief, but unsettling period during which its stranglehold on the transportation market in the northeast was challenged. The aggressive improvement and expansion programs instituted in the previous two decades had been costly, and competition from other lines and an increased reliance on automobiles for daily travel began to seriously impact profits. In addition, several anti-trust lawsuits, which threatened to break

up the system, were leveled at the company. The solvency of the New Haven was in serious question in 1918 when the federal government seized control of all major railroads in the country to support the war effort during World War I. Recovery after the return of the railroad to private ownership in 1920 was slowed by the national economic depression of 1921 and by strikes of coal miners and railway shopmen in the following year.



1906

1906 Henry Ford implements high-volume automobile manufacture.

1914 Electrification of New Haven line between

1910s New Haven experiences financial trouble due to overspending and threats from anti-trust lawsuits.

New York and New Haven. 1914 Panama Canal opened. 1917 U.S. enters World War I.



above: Interior view of passenger car offering all the luxuries of home. Train travel was viewed by many as civilized and stylish. Noted American industrial designers were involved in the creation of a cohesive “modern” look to both the interior and exteriors of the trains. Note the carpeting, seat covers, and curtains as well as the sleek and “streamlined” chairs. Courtesy of BPL



above: A ticket envelope from the early twentieth century touts the New Haven's new streamlined passenger trains with all the “modern” conveniences, including air conditioning, dining cars, and a new look. Courtesy of UCONNASC, Advertising Materials file

Fortunately for the New Haven, the 1921 depression was followed by a period of general economic prosperity that enabled the railroad to regain much of its former glory. Programs were instituted by the company to upgrade and modernize services to meet the changing demands of its passengers and shippers. This effort to streamline operations and reduce losses resulted in overall improvements to both services and equipment on the lines. Once again, a significant attempt was made to cater to passenger comfort. During the decade, outdated coaches were replaced by more than 400 new, lightweight air conditioned cars. Schedules were sped up and higher standards were set for service. By 1929, the company reached the peak of its operational reach, controlling 2,131 miles of track in New York, Connecticut, Rhode Island, and Massachusetts.

Like nearly every other facet of the national economy, the railroad industry in the United States was hit hard by the Great Depression. Dozens of railroads were forced into bankruptcy and had to either reorganize or suspend operations. On October 23, 1935, the New Haven petitioned the Federal Court for reorganization under Section 77 of the bankruptcy laws. Efforts were then made to eliminate lines and services that were no longer profitable. As part of this reorganization, the rail network was judiciously pruned and the company's steamship lines were abandoned.

Streamlined

1918

1918 Government wartime takeover of all rail lines, New Haven Railroad is used to

1919 18th Amendment to the U.S. Constitution ratified, Prohibition takes effect.

ship men and freight throughout the Northeast.

1927 Charles Lindbergh makes first trans Atlantic flight in the *Spirit of St. Louis*.

Throughout the first few decades of the twentieth century, the New Haven updated and replaced most of its locomotives and passenger cars in an effort to increase ridership. Steam heat and electric lights replaced stoves and oil and gas lamps on trains, thereby decreasing the chance of fires. Most of the older wooden coaches were replaced with modern steel rolling stock. The New Haven operated many famous New England "name trains" on its main line, including the Merchant's Limited, Yankee Clipper, and the Federal. This period marks the advent of the "Luxury Liners." These streamlined trains were of more light-weight construction than conventional passenger trains, and offered many amenities not found on earlier cars, including air conditioning. Custom-built trainsets, such as the New Haven's Comet, were hailed throughout the nation as the quickest, most efficient, and modern of machines. Inaugural-run celebrations were held for these trains, which were put on view for the general public. These trains were not only fast, they looked the part as well. New color schemes and logos sprang up on the cars, following the modern and futuristic look of the day.

right: *Railroads still captured the heart and imagination of the American public and were often used for political campaign "whistlestops." Here the New Haven's Yankee Clipper is used for a promotional event.* Courtesy of BPL

below: *New Haven Railroad promotional image of modern streamlined passenger car operated by the railroad in the 1930s.* Courtesy of BPL



1929

1929 Great Depression begins. 1929 Many railroads declare bankruptcy,

1930-80 Number of railway miles cut in half.

steamship lines abandoned. 1929 Greyhound becomes largest busline in America.

1933 Franklin Roosevelt's New Deal recovery program begins. 1941 U.S. enters World War II.

below left: A matchbook advertisement reinforces the new image and presents the dual services offered by the New Haven Railroad. Courtesy of Victor Russo private collection

below: New Haven FL-9 diesel locomotive pulls a passenger train on the New Haven main line. In the late 1950s the New Haven ordered 60 new FL-9 diesel locomotives from General Motors. The New Haven's FL-9s were the last classic streamlined diesel locomotives manufactured in the United States; later diesel locomotives adopted a more boxy look. Courtesy of UCONNASC, Charley Gunn Collection

right: As part of its new image after the reorganization of the line in 1947, the New Haven changed its corporate logo to a block capital "N" and "H" in red-orange, black, and white. The new logo was designed by renowned graphic designer Herbert Matter. Patrick McGinnis' wife is said to have developed the paint scheme for the trains. Courtesy of BPL

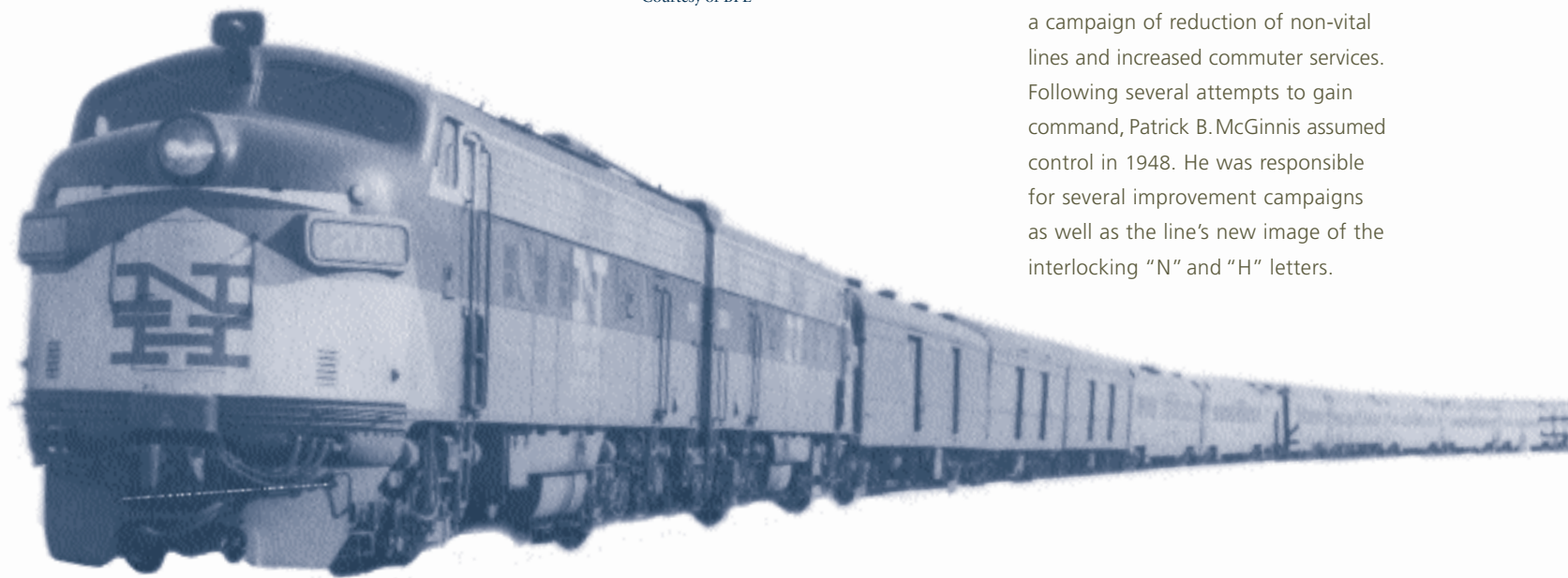
POST-WORLD WAR II DECLINE

After the Great Depression, the reorganization of the New Haven allowed it to continue its railroad operations, but the company's position within the regional transportation market had been seriously eroded. The New Haven's prospects brightened during World War II when it played an important role in moving troops and freight throughout

the northeast region. Civilian ridership also increased as the rationing of gasoline, oil, and rubber, along with the federal takeover of automobile factories for war material production, made travel by car a luxury. Like saving scrap metal for recycling, the use of mass transit systems was considered a patriotic way to support the war effort.



Another reorganization of the company was completed on September 18, 1947 with the installation of Frederic C. Dumaine Sr. as head of the line. He, along with others, began a campaign of reduction of non-vital lines and increased commuter services. Following several attempts to gain command, Patrick B. McGinnis assumed control in 1948. He was responsible for several improvement campaigns as well as the line's new image of the interlocking "N" and "H" letters.



1941 1941-45 New Haven experiences brief resurgence of prosperity during World War II.

1946 Post-World War II prosperity leads to suburban boom. 1946 Cold War begins.

1950s Air transport becomes foremost transporter of mail and passengers over long distances.

right: *This mid-1940s publicity portrait of the New Haven Railroad's three major types of streamline-era locomotives—diesel, steam, and electric—captures the pride and spirit of the New Haven during its last period of prosperity in the years around World War II.*

Any hopes that the New Haven and other railroad companies in similar situations gained during the war for a return to their early-twentieth-century dominance, were dashed in the post-war era by rapidly shifting societal trends. The flight of families from urban centers to the suburbs—which railroads first made possible in the late nineteenth century—accelerated, but this time the automobile became the primary mode of transportation for commuters. The construction of the interstate highway system in the 1950s and 1960s greatly facilitated intercity and long-distance travel by automobile. For the New Haven, the construction of the Connecticut Turnpike, which paralleled the line, resulted in decreased passenger counts despite the post-war suburban boom in the northeast.

The proliferation of interstate and state highways in the post-war era gave rise to an explosion in the long-haul trucking industry. At the same time, New England's industrial-based economy entered a period of precipitous decline, as a large percentage of the region's

manufacturing companies, some with roots dating back to the earliest years of the Industrial Revolution, left in search of cheaper labor, lower taxes, and more favorable business incentives. Competition from trucking and a decline in demand for raw materials for industry seriously cut into the New Haven's freight shipping.

In an effort to adjust to the new climate of the post-war era, the New Haven underwent another major reorganization in 1947. The focus of the reorganization centered on further reducing the number of non-vital lines and increasing commuter services. The company maintained its dominant niche in providing regional railroad service for the next two decades before again filing for bankruptcy in 1961. The railroad was subsequently operated under court supervision until it was incorporated into the Penn Central Railroad system in 1969. This union put under single control the entire mainline route of what became known as the Northeast Corridor between Washington, D.C. and Boston.



above left: *The American Locomotive Company ("Alco") DL-109, delivered beginning in 1941, was the first heavy-duty, diesel-engine "road" locomotive to run on the New Haven. DL-109s were equally capable of pulling 90-mile-per-hour passenger express trains by day, and dragging, slow, heavy freight trains by night. Diesel-powered locomotives were three times as fuel efficient as steam locomotives, far cleaner, and much easier to maintain.*

above center: *The Baldwin Locomotive Company 1-5 was the last of the steam engines built for the New Haven. The bullet-nosed 1-5s were delivered in the late 1930s, and held down the crack "name train" passenger express schedules between New Haven and Boston. Featured heavily in company advertising, they came to symbolize the New Haven's fast express train service during the 1930s and 1940s.*

above right: *The General Electric Company EP-4 was also built specifically for the New Haven. The 3,600 horsepower EP-4s were dedicated to high-speed passenger service in electrified territory between New Haven and New York. Their 8,460 horsepower EF-3 sisters handled freight traffic in the electrified zone. Electrification was employed in densely populated urban areas to alleviate problems associated with dirt and smoke from coal-fired steam locomotives.* Courtesy of UCONNASC, Charley Gunn Collection

1951

1951 Korean War begins. 1956 Passage of the Federal Highway Act leads to construction of a national interstate highway system. 1959 Hawaii becomes 50th U.S. State. 1961 New Haven Railroad forced into bankruptcy. 1963 President John F. Kennedy assassinated. 1964 Civil Rights Act enacted. 1969 New Haven Railroad incorporated into Penn Central Railroad. 1969 Astronaut Neil Armstrong first man to step on the moon.

1961 New Haven Railroad forced into bankruptcy. 1963 President John F. Kennedy assassinated. 1964 Civil Rights Act enacted. 1969 Astronaut Neil Armstrong first man to step on the moon.

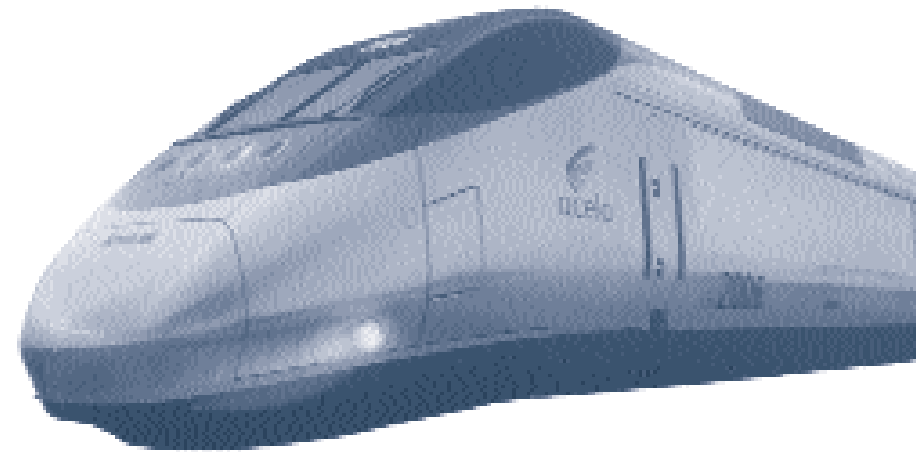
below left: *Amtrak diesel traveling the Northeast Corridor along the Connecticut shoreline.*
Courtesy Amtrak.

below center: *A new Amtrak Diesel.* Courtesy Amtrak.

below right: *The Acela Express high-speed train.*
Courtesy Amtrak.



acela



AMTRAK

Even with the merger of the New Haven into the Penn Central, and the potential for additional markets that the line could tap, the prospects for its survival were bleak. The drastic cutbacks in service that railroads were forced to implement to stay solvent in the post-World War II era led to numerous complaints to Congress by the 1960s. The general dissatisfaction resulted in still fewer people riding the rails. Due to a combination of unprofitable passenger operations, poor management, and overwhelming freight traffic confusion generated by the biggest merger in American corporate history, the Penn Central declared bankruptcy soon after its forced absorption of the New Haven.

The collapse of regional freight service and the threat to passenger service on what was still one of the busiest commuter lines in the country precipitated what became known as the “Northeast Rail Crisis.” In 1970 Congress finally addressed the problem by passing the Rail Passenger Service Act (RPSA), which created the the National Railroad Passenger Corporation (NRPC), or “Amtrak,” as it more commonly known. Amtrak, a quasi-public agency, was charged with the responsibility for keeping intercity passenger rail service in the Northeast and Midwest running. In 1971 the Penn Central line between Washington, D.C. and Boston was designated Amtrak’s “Northeast Corridor” route.

1970

1970 Rail Passenger Service Act, government sponsored passenger service created Washington, D.C. and Boston incorporated into Amtrak’s Northeast Corridor.
1976 U.S. bicentennial. 1981 U.S. hostages released by Iran. 1984 Apple Computer

called Railpax later named Amtrak. 1971 Penn Central Railroad mainline between
1973 Last American troops leave Vietnam. 1973 Regional Rail Reorganization Act.
introduces the Macintosh, the first viable personal computer. 1991 Persian Gulf War.

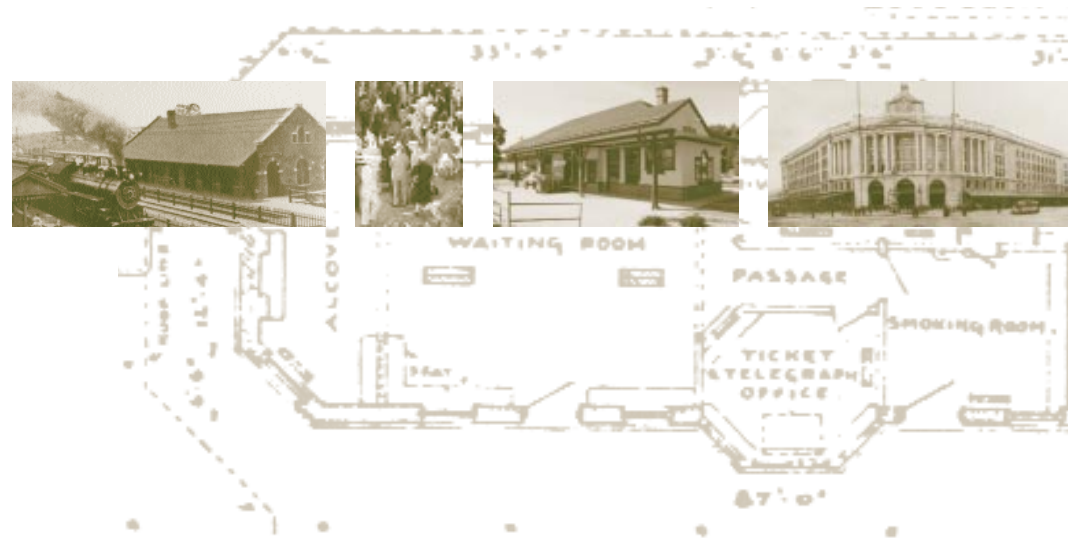


From its inception, Amtrak was inadequately funded and subject to the whims of Congress. It was forced to pool together existing passenger equipment from participating railroads and drop about half of the passenger trains that were being run before it took over. Some of those services were later restored, although Amtrak operates a much smaller system of passenger trains than was operated by the railroads before 1971. In recent years, Amtrak has implemented a program aimed at improving service and modernizing its

stations and equipment in an effort to reintroduce Americans to rail travel. Today, Amtrak serves 45 states and operates over 22,000 route miles. Its busiest route remains the Northeast Corridor, which comprises most of the 730 miles of track owned by the corporation. Other routes are run on host freight railroad lines. In 1999 Amtrak operated as many as 265 trains per day, of which 117 were run on the Northeast Corridor and its feeder lines, and served more than 21 million passengers.



left: Acela Express, Regional, and Commuter service routes. Featuring a fleet of ultramodern, high-speed electric trains, Acela promises to reinvigorate passenger train travel on the Northeast Corridor by significantly cutting travel time between New York and Boston and providing a high level of passenger service and amenities.
Courtesy Amtrak.



STATIONS

The surviving historic passenger stations of the New Haven to Boston section of the Northeast Corridor are the most prominent and architecturally interesting of the structures found along the line. They range from small-town, wood-frame depots with Victorian period designs to the large, ornate union stations found in the cities of New Haven, Providence, and Boston. Their designs are representative of a period during which railroads throughout the country began to view stations as a projection of their corporate image. Because stations were the first point of contact for railroad customers, they were important in establishing the tone for the travel experience. For similar reasons, the communities in which the stations were located viewed the size and design of the railroad station as a measure of importance, and local officials often spent long periods negotiating with the railroad for larger and more architecturally pleasing buildings.



Early in the history of the railroad it became evident that buildings positioned at strategic and populated locations were needed to shelter agents, passengers, and freight, hence the development of the railroad station, or “depot,” as it was often called in small towns. Initially, there was little precedent to rely on for the design of such buildings. As a functional design problem, the railroad station presented highly specific needs. It was more than simply a waiting place for the convenience of passengers. It had to have rooms for handling and storing mail, baggage, and freight, and it required a centrally-located ticket and telegraph office that afforded clear views of the interior spaces as well as the tracks in both directions. The earliest solutions were simple, long, narrow buildings resembling small barns, with their long axis parallel to the railroad

tracks. These buildings were usually functional structures designed by railroad construction departments, which gave little thought to aesthetics. By the mid-nineteenth century the railroad station had evolved into an identifiable building type. Externally, these buildings typically echoed the revival and Victorian styles of their time. Many had Gothic- and Stick-style features, including vertical board-and-batten siding and prominent roof brackets. Visibility requirements resulted in the common feature of a protruding bay on the track side of most small stations. The ticket office usually included levers to control an “order board,” a prominent manual rooftop signal that informed approaching trains to stop for instructions. Wide doors on one end of the building indicated the location of the baggage room.



left: As this 1870s view of the Canton Junction, Massachusetts Station shows, the depot was a popular place for people to congregate. The clicking telegraph and passing travelers brought news from the outside world. Mail and packages handled by the railway postal service were exchanged there. Small freight items were handled, and traveling salesmen hawked their wares. As the railroad became a new element of the landscape, it changed the organization of small-town life. The station became the focus of social activity, and invariably became the nucleus of commercial development that often eclipsed the “old” center of the towns the railroad passed through. Courtesy CHS

right: *Constructed in 1875, Kingston Station in South Kingstown, Rhode Island is the only station built by the New York, Providence & Boston Railroad that is still in use. Its construction fostered the development of the village of West Kingstown, and influenced the location of the University of Rhode Island. In 1876 the Narragansett Pier Railroad was built from the station south to serve mills in Peace Dale and seaside resorts at Narragansett. The station was originally surrounded by a complex including a roundhouse, freight house and yard, and turntable. Only the Interlocking Tower, now moved back from the tracks east of the station, survives today.* Courtesy UCONNASC, James Klarr Collection, Box 2



Toward the end of the nineteenth century many railroads began to standardize their passenger station designs in the hopes that a consistent appearance would promote a sense of confidence in the railroad as a cohesive “system.” The Old Saybrook, Connecticut station (circa 1900) is an example of a New Haven standardized wood-frame station design. It was built according to a design used by the railroad in the segment between New Haven and New York after the 1890s.

There are several surviving examples of small, late-nineteenth-century, wood-frame depots on the New Haven to Boston section of the Northeast Corridor.

These buildings vary widely in condition and use. The stations at Old Saybrook and Mystic, Connecticut (1905), and Kingston, Rhode Island (1875), are still in use as Amtrak passenger stations. The Noank, Connecticut (circa 1880), and East Greenwich, Rhode Island (1870), stations are in good condition, but no longer used by the railroad. Others, due to their age or location, were replaced or discontinued by the New Haven. Examples of these stations that were sold to private owners and altered and/or moved for adaptive reuse include stations in Clinton and Westbrook, Connecticut (circa 1890), and Warwick, Rhode Island (1882).



above: Old Saybrook became a railroad junction when the Connecticut Valley Railroad, which served the area between Hartford and Long Island Sound, was completed in 1872. The line reached its junction with the New Haven at Old Saybrook in 1871 and was extended south over a series of causeways to Saybrook Point and ultimately to the borough of Fenwick, an exclusive shoreline resort area. The current Old Saybrook Station was built about 1900 with an unusual bent plan to accommodate passengers on both the main and Fenwick lines. The angled portion of the station that served the Fenwick line, which was abandoned in 1922, is visible at the left in this historic view. Courtesy UCONNASC, Leroy Roberts Collection, Box 6

far left: *The Old Saybrook Station was built according to standard New Haven wood-frame station designs first used in the New Haven–New York section of the line. The 1936 freight house, visible at the right, was attached to the station rather than made a physically separate building.* Robert Brewster, WJP

top right: *The Mystic, Connecticut Station, built in 1905, generally follows the New Haven’s turn-of-the-century standard passenger station plan, however, details including paneled doors with transoms, elaborate window glazing, and large Palladian windows give it a distinctive appearance of its own.* PAL

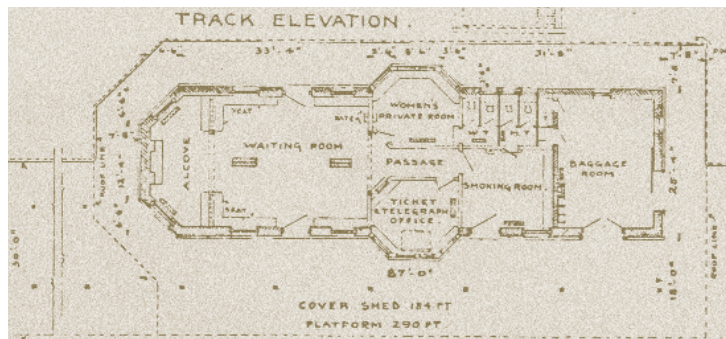
bottom right: *The interior of the Old Saybrook Station, remodeled in 1936, includes a ticket office, visible at the right, at the apex of the angled waiting room.* Robert Brewster, WJP





Some small communities had enough freight traffic to require a separate freight house to handle goods. Freight houses were sometimes incorporated into the station building itself, such as at Old Saybrook, Connecticut. More commonly, however, they were separate buildings located adjacent to the passenger station. Most resembled country passenger stations in their size, materials, and features. Freight houses usually contained

one large room and often had large doors and raised platforms to facilitate movement of freight. They were designed to handle less-than-carload, or “LCL” freight. This included large parcels, hardware, perishables, milk, newspapers, and all manner of household items that could be purchased from mail order catalogs. Examples include freight houses in Guilford and West Mystic, Connecticut, both dating from about 1880.



top left: Sharon Station was constructed in 1936 to handle increasing commuter demands in Sharon and surrounding towns that essentially became suburbs of Boston during the early twentieth century. Courtesy SPL

center: The twin Attleboro, Massachusetts, stations are components of a massive downtown Attleboro grade crossing elimination project that began in 1905. The one-story northbound station was built as a simple passenger station in 1906. In 1908, increasing volume of freight associated with Attleboro’s burgeoning jewelry industry prompted the New Haven to build a larger, two-story station for southbound traffic. The southbound station included baggage, express, telegraph facilities, and a freight elevator. Both buildings were designed by New Haven Railroad staff, and are Romanesque in style, with red terra cotta tile roofs and long platform canopies. Courtesy VGMJ

top right: This modern view into the womens’ lounge at Canton Junction Station shows the elaborate woodwork and excellent state of preservation of this station. Robert Brewster, WJP

bottom left: This plan-view drawing of the Canton Junction Station shows the additional amenities provided for passengers in suburban commuter stations, including separate smoking and womens’ private rooms. The ticket and telegraph office provides views of the waiting rooms and platform area. Courtesy HCJ, Drawing Collection of A. Lawrence

above: The Canton Junction Station, shown here in 1928, was built in 1893 at the junction of the New Haven to Boston main line and the Stoughton Branch Railroad. After the Civil War, Canton Junction became the busiest freight station between Boston and Providence due to the concentration of industries, such as the Revere Copper Company, in the surrounding area. The station’s designer was Bradford Lee Gilbert (1853–1911), a prominent New York City architect best known for his remodeling of old Grand Central Station in New York City. Gilbert also designed several other stations on the New Haven system, including the Old Colony Railroad stations at North Abington and Bridgewater, Massachusetts. This station shows strong Richardsonian Romanesque stylistic influences, notably the use of rough-faced granite and brownstone trim. Courtesy HCJ, J.R. Snopek Photo Collection



above: New London Union Station was completed in 1887 by the New London & Northern Railroad, which subsequently became part of the New Haven system. It was designed by Henry Hobson Richardson (1838–1886), one of the most influential architects in the history of the United States. The “Richardsonian” style, based on a mixture of French and Spanish Romanesque precedents and the innovative use of native building materials, is considered the first uniquely American architectural style. New London Station is typical of Richardson’s work in its massive proportions, prominent hipped roof, broad Romanesque arches, and spare geometric lines. This historic postcard view shows the original New London Union Station passenger canopy, no longer extant. Courtesy UCONNASC, Leroy Roberts Collection, Box 6



left center: *This detail view of the New London Union Station shows H.H. Richardson’s use of decorative brickwork and bold geometric forms. Broad Romanesque arches like this were repeated in many of the architect’s designs.* Courtesy UCONNASC, James Klar Collection, Box 1

right center: *The interior of the Pawtucket-Central Falls Station was dominated by the expansive, open waiting room. Materials included slate floor tile, Caen stone walls, and marble staircases. Decorations included painted scenes of railroad motifs and skylights bearing the official seals of the two cities and the state. The station included a restaurant, barber shop, men’s and women’s lounges, telephone and telegraph, and a newspaper booth.* Courtesy SHRL

right: *The Pawtucket-Central Falls Railroad Station was completed in 1916, during a period when these two Rhode Island cities were at their peak of their industrial and population growth. The station, which straddles the tracks on the Pawtucket-Central Falls line, was part of a grade crossing elimination project. The Beaux Arts-style building was designed by New Haven Railroad architect F.W. Mellor and cost \$250,000 to construct. After it opened, the station was hailed as the finest railroad facility on the line between Boston and New York. It handled some 140 trains a day and seventy thousand departures a month.* Courtesy SHRL



Between the 1880s and 1930s the New Haven replaced a number of passenger stations in response to changing demographic and social factors, including the growth of commuter suburbs, urban areas, and seaside resort communities. In most cases, the new stations represented a substantial upgrade over the previous facility. Intended to be symbols of permanence and confidence, these stations were more substantial in size and were typically built of stone or brick. The larger stations offered increased amenities including dining facilities, shoeshine parlors, and newsstands. Separate waiting rooms and lounges for men and women were common. The station grounds were landscaped with curved driveways and naturalistic



planting schemes to help blend them into their surroundings.

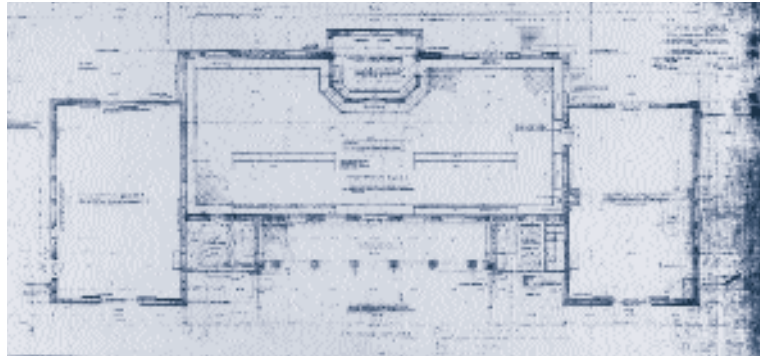
The development in the late nineteenth century of “railroad suburbs” in communities within an hour’s train ride of major cities gave rise to stations designed primarily for commuter traffic. This was especially evident in the greater Boston area where numerous businessmen chose to leave the increasingly crowded and dirty city and move their families to new residential neighborhoods in outlying towns. The stations at Pawtucket—Central Falls, Rhode Island (1916), Canton Junction, Massachusetts (1885), and Sharon, Massachusetts (1936) are examples of stations that were constructed in response to the high commuter volumes in the Boston area.



The term “union station” was applied to stations that serviced more than one major railroad. These large buildings were the ultimate evolutionary step in the development of highly efficient railroad terminals. As the most visible and impressive symbols of the railroad, no expense was spared to project the corporate image through a powerful architectural statement. Commissions for their designs were usually given to architects of national or regional prominence. Almost like small, self-contained cities, union stations housed offices for the railroad, restaurants, dry cleaners, cobbler shops, newsstands, and a host of other services. The latest equipment and technology were employed to

efficiently move hundreds of trains and thousands of people and their baggage every day. Union stations on the New Haven to Boston section of the Northeast Corridor are located in New Haven, Providence, and Boston.

Ten of the 17 historic stations along the line remain in active service as Amtrak intercity and/or local commuter rail stops. The others are in communities no longer served by the railroad and have been converted for commercial or other uses. Their preservation, often undertaken at great cost, is a testament to the enduring romantic affinity that Americans still feel for railroading and the landmark status that the buildings have attained within their communities.



left: Westerly (Rhode Island) Station was a product of intense negotiations between local officials and the New Haven Railroad. Negotiations with the railroad for a new station to replace its 1873 wood-frame depot began in 1899. Town officials lobbied for a station that would enhance the town’s position as an important southern New England industrial center and gateway to Rhode Island’s seaside resorts. The station also had to fit harmoniously with a number of other important civic buildings that were being constructed as part of a major local civic improvement campaign. Several designs proposed by the railroad were rejected

because they did not measure up to the town’s vision for the station. The parties finally agreed to a design that incorporated elements of the Mission style, which was then gaining popularity throughout the United States in part because it was applied to numerous train stations in California and states in the Southwest. Elements of the Mission style present on the station include a low-pitched hip roof with red terra cotta tiles, stucco walls, and an elaborate, broken arch parapet over the entrance. In 1999 Amtrak undertook a multi-million dollar restoration project to return the station to its initial glory. Courtesy MLaw



center: *When Westerly Station was completed in 1913, the local newspaper reported that the “town can now boast of having the finest layout for the handling of freight and passenger traffic of any place on the Shore Line division of the New York, New Haven and Hartford road between New York and Boston.” This original plan view drawing of the station clearly shows the efficient design, with baggage and freight handling rooms separated at the east and west ends of the building, and the central ticket office opening onto the large, open waiting room and providing a view of the tracks.* Courtesy Amtrak

right: *The interior of the Westerly Station is relatively unchanged and features its original ticket booth, visible at the left in this view.*

Robert Brewster, WJP



left: Boston's South Station, a five-story Neoclassical-style building with pink granite walls, was built between 1897 and 1899. The station project began in 1896 with the incorporation of the Boston Terminal Company, which was composed of a consortium of host railroads, including the Boston & Albany and the New Haven. It was designed by the architectural firm of Shepley, Rutan, and Coolidge, the principals of which had served as H.H. Richardson's chief draftsmen. After Richardson died in 1886, the partners took over his office and quickly established their own reputation as one of the leading architectural firms in the United States. Their commissions included office, public, and hospital buildings in major cities, most notably Chicago,

as well as commissions for colleges and universities such as Harvard, Brown, Stanford, Vassar, and the University of Chicago. South Station was the first, and now the only remaining, monumental Neoclassical-style public building in Boston. It influenced the design of other large stations constructed in the country during the early twentieth century, including New York's Pennsylvania and Grand Central stations and Union Station in Chicago. When it opened in 1899 the station was the largest and busiest railroad passenger facility in the United States. By 1916 it was handling 16 million more passengers per year than Grand Central Station. Courtesy PPL



left center: A 1940s view of the busy interior of Providence Union Station. Courtesy PPL

right center: *New Haven Union Station was completed in 1920 to replace a previous station which burned in 1918. The monumental four-story brick building is an example of the Italian Renaissance style, featuring the use of tall, three-story arches that illuminate the open passenger concourse within. It was designed by Cass Gilbert (1858–1934), who came out of the renowned firm of McKim, Mead and White to establish himself as one of the country's foremost architects for major public buildings. Gilbert is best known for his 66-story Woolworth Building, an important early New York City skyscraper, and state capitol*



building commissions in Minnesota, Arkansas, and West Virginia. New Haven Union Station was the central station and home office for the New Haven Railroad. It provided an elegant gateway to the city and symbolized the New Haven Railroad's importance to its namesake city and to transportation in New England. PAL

right: *The Providence Union Station was built between 1896 and 1898. The station is comprised of an 870 ft long, linear complex of five yellow brick buildings with granite foundations and brownstone trim. The central passenger station building includes a short clock tower, a reflection of the importance of the railroad as the standard timekeeper of the day. The flanking buildings, housed*

a restaurant, baggage and freight areas, and offices. The centerpiece of the complex was the single open passenger concourse inside the central building. Pedestrian subways once linked the station concourse with the outside tracks. A large, three acre, steel and glass train shed, now demolished, sheltered the tracks, which have been relocated to their present location closer to the Rhode Island State House. The building now contains commercial office space. The Providence Union Station was designed by Stone, Carpenter, and Willson, the leading architectural firm in Providence during the late nineteenth and early twentieth centuries. Other prominent buildings designed by the firm in Providence included the

County Court House, Public Library, Central Police Station and District Court, Rhode Island State Prison, and Y.M.C.A. Building. Providence Union Station is significant as a major component of a comprehensive design scheme for central Providence that included construction of grade crossing elimination infrastructure, a new Federal building and public square in front of the station, and the choice of Smith Hill for the site of the Rhode Island State House. This view shows the network of Union Railroad streetcar tracks that originally served the station. Courtesy PPL





RAILROAD MAINTENANCE AND SERVICE FACILITIES

Railroad equipment required frequent service and maintenance, forcing railroads to develop facilities to keep their rolling stock supplied and operating safely. Early steam locomotives needed to be inspected, lubricated, and replenished with fuel and water after each run. Most junctions and important stations had steam engine service facilities, including a coal tower and water tank. The locomotives were pulled up next to these facilities, and the coal and water compartments in the tender behind the locomotive were refilled. Sand, which was sprayed on the driving wheels for traction in slippery conditions, was added to the sand domes on the top of the locomotive's boiler, and running gear was inspected and lubricated. Many of these facilities included a turntable for reversing the direction of locomotives. Passenger and freight cars also required inspection, repairs, and lubrication of their wheel bearings. Some locations included a small building for conducting light repairs.



above: In the 1890s the New Haven consolidated its freight and passenger car facilities on the north end of the line at Readville, in the Hyde Park section of Boston. Billed as “the largest and most practical” shop in New England, the 70-acre Readville Car Shops employed 1,000 people and could service 180 passenger and 1,000 freight cars per month after it opened in 1902. The shops were notable for their efficiency, and employed early use of electricity and innovative materials handling equipment. This view shows the largest of several surviving buildings at Readville. PAL

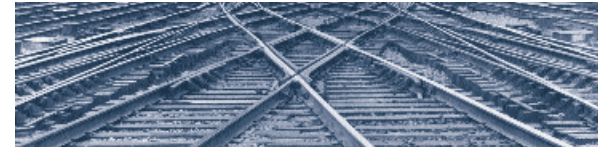
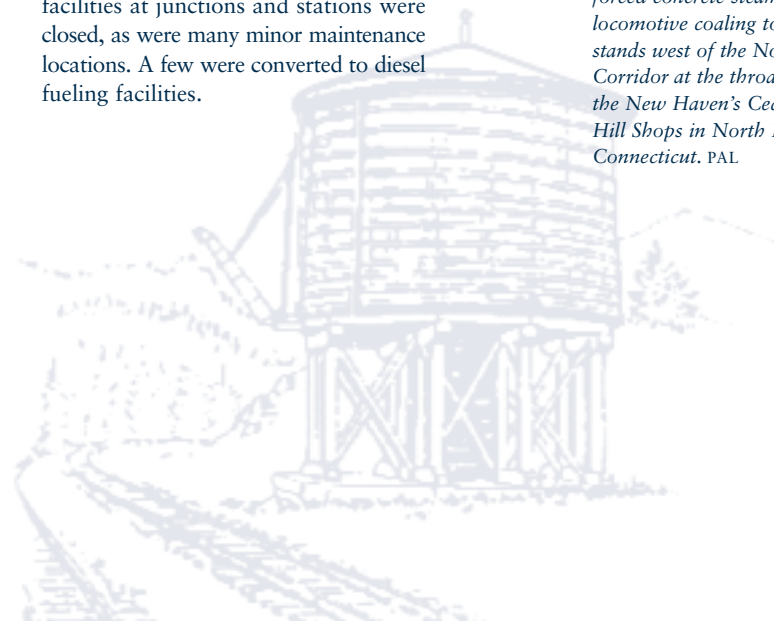
When the original constituent railroads that made up the New Haven to Boston section of the Northeast Corridor were consolidated into the New Haven system in the 1890s, the railroad inherited a multitude of redundant service facilities. In 1909, the New Haven system had 42 roundhouses, 180 water stations, 74 coaling stations, and 109 turntables. As locomotives became larger and more efficient they required less frequent replenishment, allowing the railroad to abandon some of those facilities in favor of larger, centralized complexes or “shops.”



left: An extremely rare example of a nineteenth-century steam locomotive service facility survives at Guilford, Connecticut. This 1920s view shows the circa 1875 brick Water Tank and Locomotive Repair Building. Courtesy UCONNASC, Leroy Roberts Collection, Box 4

right: This massive reinforced concrete steam locomotive coaling tower stands west of the Northeast Corridor at the throat of the New Haven's Cedar Hill Shops in North Haven, Connecticut. PAL

The World War II-era introduction of the diesel locomotive dramatically altered railroad service and maintenance patterns. Diesel locomotives required far less frequent service and repair compared to their steam predecessors, and the need for coaling and watering facilities disappeared. Most of the small service facilities at junctions and stations were closed, as were many minor maintenance locations. A few were converted to diesel fueling facilities.



SIGNALS AND SWITCHES

The need for effective warning or signaling systems became a paramount safety concern as soon as railroads began to operate more than one train at a time on the same track. Trains have no “steering wheels” and can only operate forward or backward along their track. Unlike earlier transportation systems, trains moved so fast that they could not stop within the distance that the driver could see. As a result, the railroads were forced to develop systems to control movement in situations where trains met from opposite directions, crossed paths, or passed one another. In the early days of railroading, most lines had a single track, trains were short, and trips quite frequent. Train movement was regulated by timetables that gave specific times for trains to meet each other at stations. Train crews and station agents were responsible for following the timetables. Delayed trains slowed down the entire system, creating a dangerous situation for other trains operating on schedule. Too frequently the result was a catastrophic collision.



above: *Interlockings could be as simple as a junction between two lines, or as complex as the trackage at the “throat” of a major terminal, such as at Boston’s South Station shown here.*

Courtesy BPL

below: *Saybrook Tower, Old Saybrook, Connecticut, as it appeared in the 1940s.*

Courtesy JSW



right: *Manual interlocking levers, some of which controlled switches hundreds of feet from the tower, were nicknamed “armstrong” levers, as they required great strength (and knowledge of their idiosyncrasies) to operate, particularly in extremely hot or cold weather.* Courtesy BPL

The first major advance toward solving this problem was the electrical telegraph, developed by American artist and inventor Samuel F. B. Morse, for whom morse code is named. In 1844, the first telegraph wire system in the United States was strung along the right-of-way of the Baltimore and Ohio Railroad between Baltimore and Washington. Telegraph operators communicated by tapping a series of dots and dashes corresponding to the letters of the alphabet that was sent over the wires to a telegraph sounder at another station. This system enabled station agents to confirm train arrivals and departures, permitting locomotive engineers to safely proceed between stations. The B & O Railroad quickly developed the train order, a telegraph message changing the posted timetable meeting point between two trains to facilitate more efficient train movement. This system caught on, and by 1860 American railroad communication was linked by 23,000 miles of telegraph lines.

The combination of timetable, telegraph, and train order led to the creation of standardized rules governing train movement. This increased safety, but was still time-consuming, as it required direct human communication and limited train speeds. By the 1880s railroads began to develop systems of mechanical and electrical signal systems to increase safety and efficiency. This



new technology led to the development of the manual block system, where “blocks,” sections of track between junctions and other busy points, were governed by a human operator who controlled the switches and signals that gave trains permission to proceed. Manual block systems became popular on heavily-traveled eastern roads, including the New Haven, and by the turn of the century, manual block signal systems, with their mysterious colored lights and moving semaphore indicators, were installed all along the line.

Manual block signaling resulted in a new architectural form—the interlocking tower. The word “interlocking” was also a new part of the railroad vocabulary. It referred to the complex arrangement of tracks, switches, and signals found at railroad junctions, and to the machine in the tower that controlled them. Interlocking towers were typically small, two-story buildings placed close to the tracks. Second-story windows and an overhanging roof gave the tower operator a clear, glare-free view of the tracks. The first floor of the tower contained the interlocking machine, an intricate assembly of sliding bars and

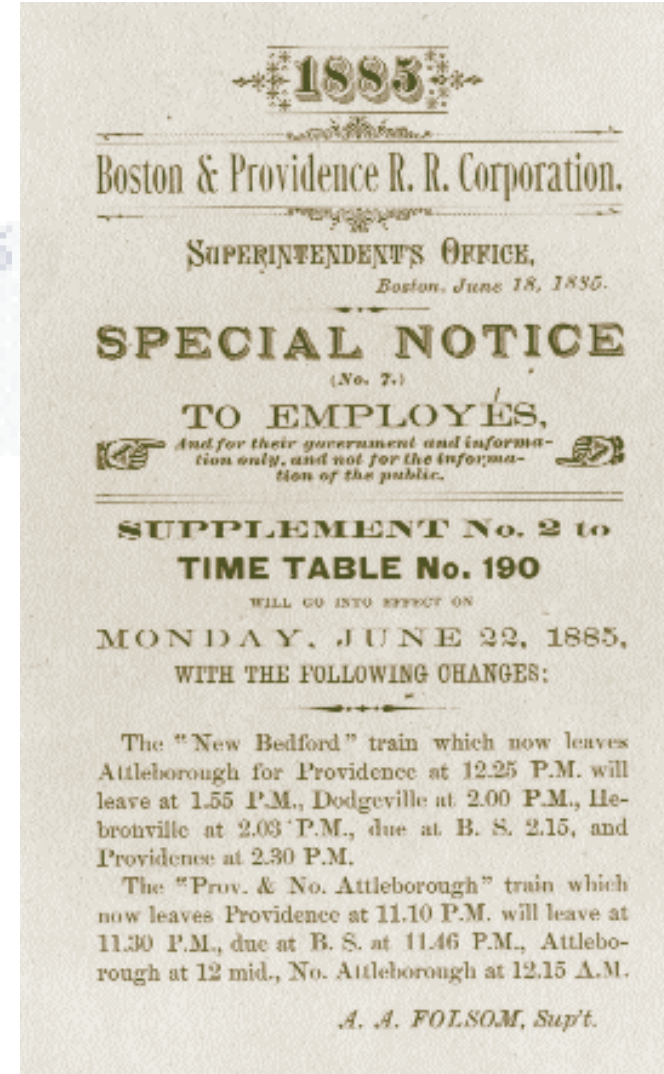


levers. This machine was connected to mechanical rods that fanned out from the tower to move switches and signals in the immediate vicinity. A bank of mechanical levers rose from the machine and dominated the floor space in the second story of the tower. The tower operator could manually set the switches and signals by moving the levers. The mechanisms in the interlocking machine below prevented the operator from directing trains onto collision courses, and gave them correct signals. By the 1920s, some components of mechanical interlocking equipment were replaced by electrical relays. These early electro-mechanical devices can be considered early forms of computers. Tower operators were responsible for controlling the interlocking, and keeping meticulous records of train activity in the area under their control.

New Haven interlocking towers were built in several types. The earliest towers, built about 1900, were wood-framed, with hip roofs, clapboard siding, and wood trim. A surviving example of a wood tower is located in Attleboro, Massachusetts. By World War I, New Haven Railroad architect F.W. Mellor introduced a more distinctive design influenced by the popular Mediterranean Revival style. The interlocking towers from this period show this influence, particularly in their flared hip roofs with terra cotta tile surfaces. The Groton, Connecticut Tower, and the Boston Switch Tower at Central Falls, Rhode Island, both built about 1920, have brick walls and concrete trim. More refined examples of this style include the Westerly Tower, built in 1930, and Tower A at the Northrup freight yard in Providence, Rhode Island, built in 1940.

far left: Westerly Tower, Westerly, Rhode Island. The concrete walls include cast decorative moldings and milestone signs. PAL
left: The circa 1920 Groton, Connecticut, Interlocking Tower controls the approach

to the Thames River Bridge and the junction between the Northeast Corridor and the Providence & Worcester Railroad's New London—Worcester, Massachusetts freight line. PAL



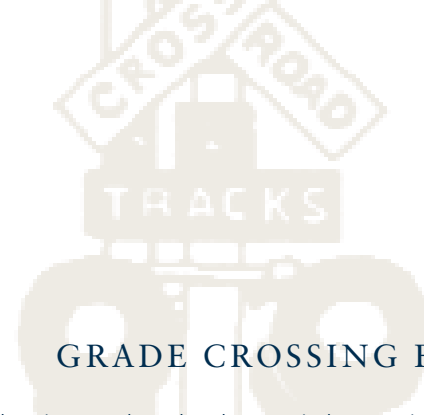
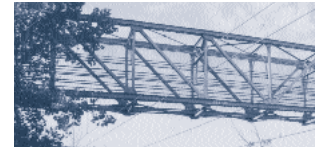
left: Cover of 1885 Boston & Providence Railroad Employee Timetable, noting changes in train times and meeting places. Courtesy RIHS, Neg. RH1 (x3) 9130

above: The semaphore-type signal blades visible above this steam locomotive are part of an "order board," an early type of manual signal attached to train stations that used a combination of a colored light and positioned blade signals to warn locomotive engineers to stop and pick up written instructions. PAL



Technological advances in the mid-twentieth century made many of the interlocking towers on the line obsolete, and most are now no longer in use. Automatic block signals eliminated the need for manned interlockings. Signal systems now provide signals in the locomotive cab, and the trains now have automatic emergency stopping capability. Computers, fiber-optic cable, and microwave radio systems have made possible centralized traffic control, or “CTC,” which allows a central dispatcher to change signals and throw switches all along the line. Where train movement on the line was formerly governed by solitary operators stationed at many lonely outposts, it is now controlled by a handful of people in a central location.

above: The difficulty of operating interlocking levers was increased significantly during periods of extreme heat or cold. Here a crew at South Station in Boston use heating devices to melt snow and ice from the switches. Courtesy BPL.



GRADE CROSSING ELIMINATIONS

During the nineteenth and early twentieth centuries, railroads and the cities and towns they served coexisted in mutually beneficial, although not always friendly, relationships. As rail traffic increased in speed and volume, and cities became more densely developed, serious safety and quality-of-life issues emerged. The multitude of at-grade crossings in urban areas caused street traffic congestion when trains passed, and grade crossing accidents increased. In many instances the only way to insure safety was to eliminate the crossings by raising, lowering, or relocating the track bed. Legal battles between municipalities and the railroads over responsibility for preventive safety measures were common. These costly improvements were major civil works projects for their day. More than discrete, individual resources, such as bridges or stations, they are large-scale evidence of how the railroad shaped our environment in ways that still impact how we move around.



Several examples of such projects can be seen on the section of the Northeast Corridor between New Haven and Boston. New Haven was the scene of two massive turn-of-the-century grade crossing elimination projects. The New Haven Cut (1905–1907) involved the elimination of grade crossings, straightening of the route alignment, and construction of 13 new bridges in the area immediately east of New Haven Station, where the Shoreline, Hartford Line, and Air Line converged. This area was a bottleneck to efficient train movement and often flooded as the tracks were almost at sea level. The Fair Haven Cutoff (1887–1893), just east of New Haven, involved rerouting several miles of the Shoreline to the east to avoid multiple at-grade street crossings in the densely-developed residential and industrial Fair Haven area. The project required the construction of several new bridges,



including the stone arch Clifton Street Bridge (1890). The largest component of the project was the New Haven Tunnel. Completed in 1893, this granite-faced, brick-lined structure is 1,179 ft long and 30 ft wide. It is the longest masonry tunnel in Connecticut.

In Providence, efforts to improve the railroad's impact on the downtown area began in 1888, when a terminal facilities commission recommended the demolition of the previous station, which stood southeast of the present one. Completed in 1898, the new station was part of a grander urban planning scheme. Although not all aspects of the plan were realized, the new station location did allow construction of a public park at Exchange Place, and also influenced the location of the Rhode Island State House, which was completed in 1901. Further east, in the neighboring cities of Pawtucket and Central Falls, through which 155 passenger trains

far left: A wide, gently-banked section of the New Haven Cut, looking northeast from Grand Avenue. PAL

left: The New Haven's right-of-way cut a wide swath through urban areas such as Providence, Rhode Island, shown here about 1940. Courtesy UCONNASC, James Wall Collection, Box 2

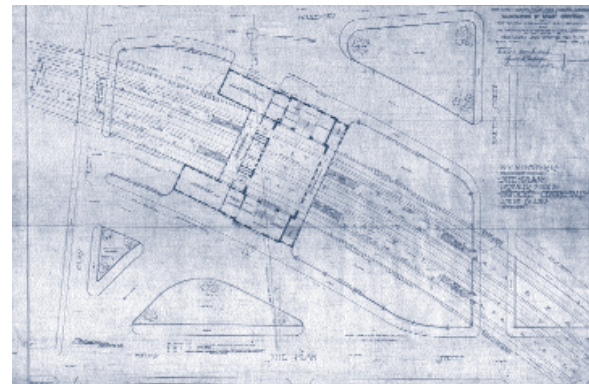


above: The southern approach to Boston was placed in a deep cut through the densely populated neighborhoods of Jamaica Plain, Roxbury, and the South End. This view shows the cut in Roxbury, on the approach to Boston. The Oliver Ditson Brewery can be seen in the background. When Boston's beer brewing industry was in its heyday, the Roxbury neighborhood hosted more operating breweries than Milwaukee, Wisconsin. PAL



above right: Southbound two-story passenger station and Mill Street Bridge, two elements of a massive \$1 million grade crossing elimination project constructed between 1905 and 1908 in Attleboro, Massachusetts. PAL

below: Original drawing of the Pawtucket—Central Falls (Rhode Island) Passenger Station, showing the boundary between the two communities splitting the building. Flanked by street overpasses spanning the new lowered track bed, the plan incorporated landscaping to beautify the new station. Courtesy RISCJRC





left: A number of footbridges were constructed over the cut, or approach to Boston, to connect the bisected areas. In Forest Hills, the tracks are crossed by the Mount Hope Footbridge, a 75-foot long, steel-truss structure built about 1910. PAL

passed daily, competition between the two communities delayed a much-needed grade lowering project until 1912. The small, but fiercely independent city of Central Falls, refused to be outdone by its larger neighbor and demanded its own railroad station. The New Haven did not want to build two stations so close together. The three parties ultimately compromised, building the station on a site straddling the city line between the two communities. The project involved moving and lowering the track bed and the construction of eight new road bridges and one footbridge. The entire project including the station cost \$2.5 million, 35 percent paid by the cities of Pawtucket and Central Falls and 65 percent paid by the railroad.

In 1891 Attleboro, Massachusetts petitioned the New Haven to eliminate a number of dangerous crossings in the downtown area by elevating the tracks there. Construction was delayed, however, until 1905, when 200 Irish laborers descended on Attleboro to begin work. This \$1 million project involved the elimination of 13 grade crossings; construction of four attractive granite arch bridges to carry the four-track main line over Park, Peck, Mill, and South Main streets; and construction of new junction trackage and interlocking equipment. The New Haven also built opposing northbound and southbound passenger stations, completed in 1908.



BRIDGES

Construction of the Northeast Corridor between New Haven and Boston required a significant amount of bridge construction to cross the numerous rivers, inlets, tidal marshes, and roadways along the route. These obstacles sometimes posed serious engineering problems, delaying the completion of the line until 1889, when the first Thames River Bridge was constructed. Throughout the history of the line, railroad engineers employed a variety of methods and materials in the construction of bridges. Examples of many bridge types from all periods of the railroad's development survive along the New Haven to Boston route.

Stone was used for the higher or wider spans during the initial construction of the line. The stone arch bridge is an ancient structural type developed by Roman engineers to carry roads and aqueducts across river valleys. These structures rely on individual, carefully trimmed stones arranged in semicircular arches to carry gravitational forces outward from a central keystone and downward to supporting piers. A handful of original stone bridges survive from the earliest days of the line. Granite was readily available at several locations along the route and could be easily transported along the railroad's own right-of-way to construction sites. The most impressive stone structure on the line is the Canton Viaduct in Canton, Massachusetts. Completed by the Boston & Providence Railroad and opened June 28, 1835, the viaduct is a multiple-arch, granite structure measuring 615 feet in length, 22 feet in width, and rising approximately 70 feet above the East Branch of the Neponset River. It was designed by noted nineteenth-century railroad construction engineers William Gibbs McNeill and George Washington Whistler, the father of American artist James McNeill Whistler. The viaduct is one of the oldest surviving multiple-arch

stone railroad bridges in the United States, along with the Baltimore & Ohio Railroad's Carrollton and Thomas viaducts, constructed in 1829 and 1835, respectively.

Numerous smaller examples of granite bridges also exist. The two-span King Street overpass in East Greenwich, Rhode Island (1835–36), and the Ocean Point Road Bridge in Warwick, Rhode Island (circa 1837) are notable as some of the earliest surviving masonry structures on the line. Dozens of other masonry arch bridges were constructed in Connecticut, Massachusetts, and Rhode Island between the 1880s and 1915 and are associated with the addition of extra tracks. Due to the short distances they were required to span and the availability of local granite, these bridges were cheaper and easier to build with stone rather than iron or steel, which had by then become common materials for railroad bridges. Masonry was also chosen where appearance was a concern. In 1905 the New Haven elevated the tracks through downtown Attleboro, Massachusetts and built several attractive granite arch overpasses to carry the tracks over four downtown streets.



left: A streamlined New Haven I-5 type locomotive whisks a passenger train over Canton Viaduct sometime in the early 1940s. When completed in 1835 it was hailed as “the most elegant and massive structure of masonry in the United States,” and is now a registered National Civil Engineering Landmark. Courtesy UCONNASC, James Wall Collection, Box 1, Trains Folder 1



above: Many of the earliest bridges on the line were timber trestles supported by multiple wood piles driven into tidal mud. These wood structures were subject to rot and required frequent maintenance to keep them safe. Many were subsequently replaced by steel or concrete structures, but timber bridges continued to be used at some locations. Courtesy UCONNASC, James Wall Collection, Box 1, Trains Folder 2

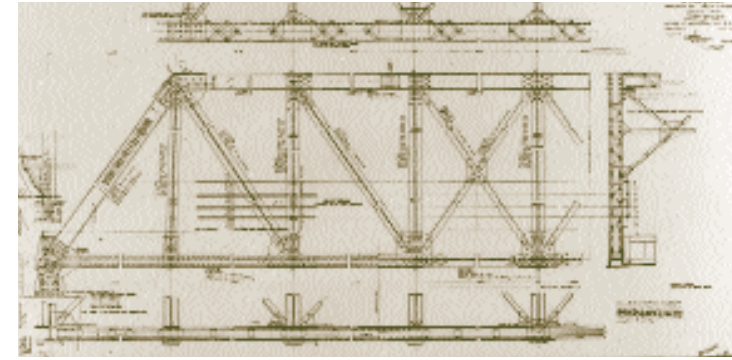
below: *West Street Bridge, Westerly, Rhode Island.*
Robert Brewster, WJP

right: *A detail of the West Street Bridge shows a Pratt type truss.*



below: This engineering drawing of the West Street Bridge illustrates how bridge engineering during the late nineteenth century evolved from an art into a science, as

mathematical calculations were required to determine the safest and most economical arrangements and quantities of material needed. Courtesy Amtrak



Another type of early bridge construction, the truss, was largely an outgrowth of American railroad development. The earliest truss bridges were made of wood timbers. But as the speed and weight of trains increased, iron, and later, steel members replaced wood. Iron and steel were fireproof and strong in compression like masonry, but were also elastic and had superior capacity to withstand tension and torsion. Compared to their masonry counterparts, these bridges required less volume of material to build and could span longer distances between supporting members. Individual bridge components were built up from metal plates, and

angle sections joined by pins and rivets were used as braces. Numerous designs, most named for their inventors, were patented during the mid-nineteenth century. By the early twentieth century, bridge engineers, challenged by ever-increasing bridge loads, settled on several variations of the simple Pratt and Warren truss types, with stronger, longer, steel members, all-riveted connections, and web patterns reduced to vertical posts and single diagonals. The line between New Haven and Boston includes more than a dozen significant truss bridges. An example of a Pratt-type truss is the West Street Bridge in Westerly, Rhode

Island (1913). The Pawtuxet River Bridge in Cranston, Rhode Island (1906) is an example of a Warren-type truss.

Where steel truss bridges crossed navigable waterways, provision had to be made for the passage of marine vessels, hence the development of the moveable-span bridge. In this type of bridge, the approach spans are fixed, and a central span located over the shipping channel is swung or lifted out of the way. Three examples of this type of bridge are located in Connecticut. All are of the bascule type, where the movable span, driven by electrical motors and balanced by counterweights, pivots up at one end.

All are flanked by multiple, fixed approach spans. They are either Scherzer-or-Strauss-type bridges, named for their inventors, and represent the state-of-the-art in moveable bridge technology at the time of their construction. The longest river crossing is the 1,585 foot-long, ten-span Connecticut River Bridge at Old Saybrook, Connecticut (1907). The bascule lift span is a 158 foot-long Warren truss located over the navigation channel at the center of the river. Like the other moveable bridges, it is manned by a bridge operator housed in a small operator's building mounted to the bridge next to the moveable span.



THE BERLIN IRON BRIDGE



HEAVY PLATE GIRDER

The Thames River Bridge joining Groton and New London, Connecticut (1919) is a 1,394 foot-long structure consisting of a central Warren truss bascule span flanked by pairs of Pratt truss approach spans. The Niantic River Bridge at East Lyme, Connecticut (1907) has a similar configuration, but employs deck girder spans.

Another type of steel bridge, the deck girder type, was developed just before the turn of the twentieth century to carry increasingly heavy loads over relatively short spans. This type of bridge consisted of heavy, deep girders built up using rivets and wide-flange structural steel members. The track was laid on top of these large beams, which could be installed individually or in a long series. They were used to replace many aging spans along the line. A notably long example is the 376 foot-long Blackstone River Bridge (1897) in Pawtucket, Rhode Island, the longest deck bridge in the state.

Concrete was also used for railroad bridges on the line. When cured properly, concrete, like conventional stone masonry is capable of withstanding great compressive loads. The first use of concrete in America was for the footings of the Starrucca Viaduct, built in Pennsylvania in 1848 by the Erie Railroad. After the development in the 1870s of artificial Portland cement, a denser composition better-suited to underwater applications, concrete was increasingly used in bridges for piers, footings, and small arches. During the first decade of the twentieth century bridge engineers began to experiment with a new, highly versatile construction method using concrete reinforced with steel. The addition of steel rods and bars cast into the concrete allowed the material to be used for horizontal bridge members, such as decks. Concrete, which was generally cheaper than other materials, could now be used to construct the entire bridge.

left: *Pawtucket River Bridge, Cranston, Rhode Island. Robert Brewster, WJP*

center: *Bridges were also constructed to carry people over the railroad tracks. Few examples of historic footbridges survive. A particularly decorative example is the Rocky Neck Park Trail Bridge (1934), which carries a foot trail over the railroad in Rocky Neck Park in East Lyme, Connecticut. Rocky Neck Park was constructed in the 1930s by the Works Progress Administration. The 356 foot-long Rocky Neck Park Pavilion, the largest WPA-built structure in Connecticut, is visible at right in this 1965 view. Courtesy CSP*

above: The moveable bridges are usually kept in the open position, and are closed for approaching trains. Constructed in the early twentieth century, these bridges replaced earlier moveable spans erected at their sites. Depending on the weather, the bridge operator's isolated post can be an idyllic—or frightening—place to be. This view shows the Connecticut River Bridge at Saybrook, Connecticut, opened for a passing sailboat. PAL

left: *The 1907 Grand Avenue Bridge in New Haven is significant as an early example of a reinforced concrete arch bridge and is a component of the New*

Haven Cut grade crossing elimination project. PAL

right: *Greenwood Bridge, Warwick, Rhode Island. Robert Brewster, WJP*



Two of the earliest examples of concrete bridges on the railroad are located in New Haven. The Mill River Bridge, built in 1906, is a 116 foot-long structure notable for its two elliptical reinforced arches. The Grand Avenue Bridge, built in 1907, is a three-span structure notable for the use of scrap metal rails for reinforcement. The use of crude scrap metal reinforcement and reliance on the arch shape were typical features of early concrete bridges. Another, more advanced type of early concrete and steel bridge construction, developed in

the 1890s, made use of steel beams entirely encased in concrete. Three examples are Rhode Island's Greenwood Bridge in Warwick (1930), Hunt River Bridge in North Kingstown (1930), and Route 138 Bridge in South Kingstown (1936). These three bridges carried public roads over the railroad. By the 1920s bridge engineers had analyzed the properties of steel and concrete structures and developed new bridge types using less and less material, especially steel, which then took the form of the special reinforcing rods, or "re-bar" familiar to us now.

FREIGHT AND INDUSTRIES

Unlike many American railroads that made most of their money hauling freight, the New Haven derived a large portion of its revenues from intercity and commuter passenger traffic. Even so, the New Haven was an important freight carrier, carrying fuel and raw materials to the numerous industrial concerns that lined its route, and transporting finished products to markets or transshipment points.



left: *An early freight train on New Haven rails.*
Courtesy PPL

below left: *Detail of the Browne & Sharpe machine factory.* Courtesy RIHS Neg. RHi (x32) 64



Freight-hauling equipment was not purchased by any of the predecessor railroads of what became the New Haven system until the 1850s. Most long-haul freight between the Midwest and New England had to be carried across the Hudson River between New York City and railroad docks in New Jersey. These railroad carfloat interchange operations, primarily done in conjunction with the Pennsylvania Railroad, were time-consuming and inefficient. Until 1888, the only railroad bridge across the Hudson was 150 miles north at Albany, New York, where heavy New England-bound traffic was carried by the New York

Central—Boston & Albany railroad system. This situation changed in 1888, when the Central New England & Western Railroad built an immense railroad bridge across the Hudson at Poughkeepsie, New York. The Central New England, which became the Philadelphia, Reading & New England in 1892, was funded by Philadelphia interests seeking a direct route to market Pennsylvania coal to the homes and factories of New England.

In 1904, the expansionist New Haven acquired the Philadelphia, Reading & New England “Poughkeepsie Bridge Route.” This addition allowed the New Haven to bypass New York City, and gave them connections with several railroads at junctions at Campbell Hall and Maybrook, New York. These

below right: *Chesebrough-Pond was originally founded in Rome, New York in 1846 and moved to Clinton, Connecticut in 1888. At that time their principal product was “Pond’s Extract,” a popular witch hazel extract cure-all medicine. In 1906, the product line was expanded to include Pond’s cold cream and vanishing cream, both of which became internationally-known products.*

By World War 11 Pond’s was the world’s largest producer of face creams. After the war Pond’s merged with Chesebrough to form Chesebrough-Ponds. By 1959 Chesebrough’s Vaseline line was also manufactured in Clinton. The plant is still served by rail. The concrete-frame buildings in this view were built between 1929 and 1935. PAL

‘blue coal’





above: *The C.W. Campbell Grain Mill in Stonington, Connecticut, built in 1905, is an unusual industrial building type for Connecticut. It was designed for the gathering, storing, grinding, packaging, and distribution of agricultural grain products for farms in the Stonington-Westerly region. PAL*

right: *The New Haven was the primary route for the delivery of foodstuffs into southern New England. Priority “hotshot” freight trains with special refrigerated “reefer” cars delivered fruit, meat, vegetables, and other perishable items to special train-to-truck transfer terminals in New Haven, Providence, and Boston.*

The foods were transloaded for processing, packaging, and distribution throughout the cities and their environs. The Providence Fruit and Warehouse Company Building, pictured here, was the city’s main processing and transshipment center for fresh fruits and vegetables arriving by rail. It was part of a larger area known as the Provisions Warehouse District. A number of the buildings in the district, however, were recently torn down to make way for highway ramps designed to provide access to the new Providence Place Mall.

Robert Brewster, WJP

far right: *The Walter M. Lowney Chocolate Company was founded in Boston in 1883 to*

produce cocoa and chocolate. The company moved to Mansfield in 1903, choosing this site because of its ready access to the railroad. It is a typical multi-story brick New England mill building, with a long, rectangular plan. Although it has been modernized, the plant has been operated continuously as a cocoa processing facility by owners including the Rexall drug store chain, Nabisco, and now Archer Daniels Midland. The manufacturing process, aided by gravity flow, starts with raw materials on the top floor and finished product on the bottom. PAL

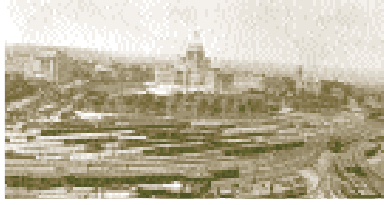
below: *“N.Y., N.H. & H.” logo on side of flatcar. PAL*

railroads included the New York—Pennsylvania regional railroads Lehigh & Hudson River, Lehigh & New England, New York, Ontario & Western, and the Erie, which connected New York with Buffalo and Chicago. The New Haven soon gained control of the New York, Ontario & Western, which gave them a line to Lake Ontario, and more importantly, direct connections with the northern anthracite coal belt at Carbondale and Scranton, Pennsylvania. This new line, dubbed “The Maybrook,” became the principal route for freight from the west and made the railroad a major player in New England railroad freight traffic, which was brought to the sprawling Cedar Hill freight yard complex in East Haven, and reclassified for distribution all over southern New England.

The New Haven experienced varying success as a freight hauler during the twentieth century. The Great Depression of the 1930s caused a serious decline in regional industrial production, with a corresponding loss of freight revenue. New England’s textile industry all but abandoned the region in favor of low labor-cost operations in the South. Prior to World War II, 19 percent of New Haven’s freight traffic was less-than-carload, or “LCL” freight. With the advent of gasoline-powered delivery trucks, motor transport took LCL and short-haul traffic away from the railroad, especially in rural areas. In response to this challenge, the New Haven developed Trailer-On-Flat-Car (TOFC) technology, which allowed for the placement of truck trailers on top of specially-designed flat cars.



N. Y. N. H. & H.



This so-called “piggyback” service combined the flexibility of highway trucks with the economy and speed of the railroad.

Freight tonnage on the New Haven line more than doubled during World War II, but the resulting profits dried up when the war ended in 1945. Oil, delivered by pipeline, replaced anthracite coal as the main home heating fuel, eroding the New Haven’s traffic base. Construction of the parallel Connecticut Turnpike siphoned off heavy volumes

of traffic to trucks. During the 1960s, traffic continued to decline as the regional economy shifted from manufacturing to high-technology and service-oriented businesses. Freight service on the line suffered after the New Haven was merged into the Penn Central system in 1969. In 1974, a fire on the Poughkeepsie Bridge ended through service on the Maybrook line. Today the New Haven to Boston section of the Northeast Corridor hosts limited freight traffic operated by the Providence & Worcester Railroad.

top left: In this early twentieth-century view, the Rhode Island State House looms over an extensive freight yard complex that was located on the fringe of downtown Providence. The freight yard has since been removed. Courtesy PPL

center left: In Boston, perishables were unloaded and distributed at the New Haven’s Boston Market Terminal freight house complex in South Boston. Freight House No. 12, shown here, was one of four similar structures that once stood on this site. The Union Freight Railroad, jointly operated by the New Haven, New York

Central and Boston & Maine railroads, delivered freight cars to sidings at night on a dense network of tracks. PAL

bottom left: Founded in Providence in 1883, Browne & Sharpe began as a manufacturer of precision machine tools, and also produced a line of sewing machines. Browne & Sharpe was responsible for some of the most significant machine tool inventions, including the micrometer caliper, screw and gear making machines, and the Universal line of milling and grinding machines. This factory was constructed over a period

from 1876 to 1916, and was renowned as an outstanding example of efficient industrial building construction and arrangement. Today a portion of it has been rehabilitated as office space. Courtesy RIHS Neg. RHi (x32) 64

below: The Atlantic Coal Company Storage Elevators in Providence, Rhode Island were built early in the twentieth century for the storage and distribution of Pennsylvania anthracite home heating fuel. Coal was unloaded from railroad hopper cars, and stored in the bins. Chutes at the bottom were used for loading delivery trucks. PAL



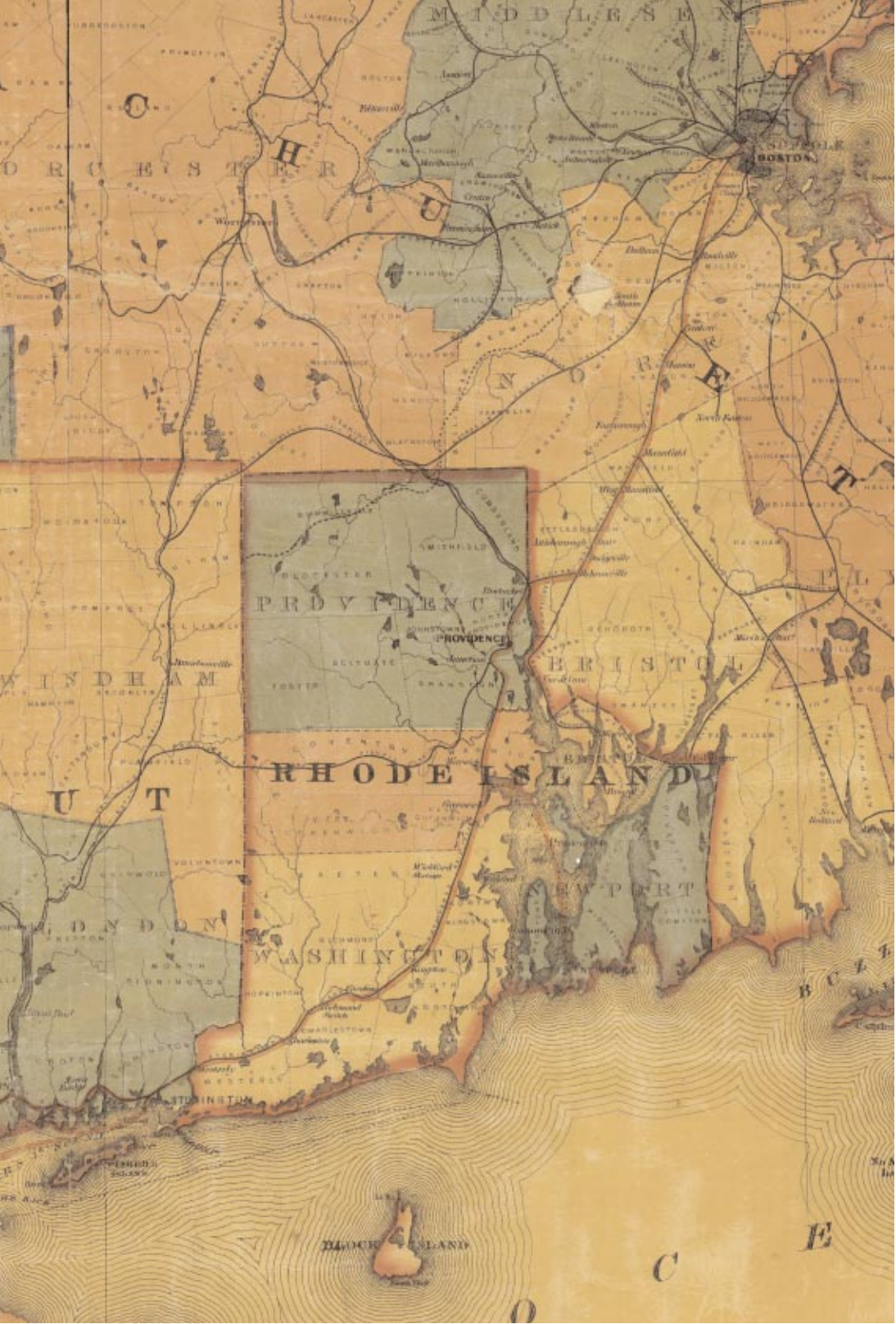


IMAGE CREDITS

- AMTRAK** National Railroad Passenger Corporation
- BPL** Boston Public Library Print Department
- CHS** Canton Historical Society, Canton, Massachusetts
- CSP** Connecticut State Parks
- EGPS** East Greenwich Preservation Society, East Greenwich, Rhode Island
- HCI** *History of Canton Junction* E.D. Galvin
- JWS** J.W. Swanberg Collection
- MLAW** Memorial and Library Association of Westerly, Rhode Island
- MCA** Middlesex Canal Association
- PPL** Providence Public Library
- RIHS** Rhode Island Historical Society
- RISCJRC** Rhode Island Supreme Court Judicial Records Center, Pawtucket, Rhode Island
- WJP** Robert Brewster, Warren Jagger Photography
- SPL** Sharon Public Library, Sharon, Massachusetts—Packard Postcard Collection
- SHRL** Spaulding House Research Library, Pawtucket, Rhode Island
- TR** *Titanic Railroad: The Southern New England—The Story of New England's Last Great Railroad War*. Larry Lowenthal
- UCONNASC** University of Connecticut, Archives and Special Collections
- VGMJ** Voltera, Goldberg, Mangiaratti & Jacobs Law Firm, Attleboro, Massachusetts

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