

MILESTONES IN HISTORY



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The Building of New York's PENNSYLVANIA STATION

BY JILL JONNES



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Seventh Pennsylvania Railroad President Alexander Johnston Cassatt died in 1906, just four years before the rail station was completed.

In spring of 1901, Pennsylvania Railroad President Alexander J. Cassatt debarked his Pullman Palace car at the Jersey City Exchange Place Terminal, and joined the crowds streaming onto his company's huge double-decker ferries to cross the Hudson River. For 30 years, it had galled Cassatt to know that every New York-bound Pennsylvania Railroad (PRR)

passenger—some 40 million people a year—had to take a ferry. “I have never been able to reconcile myself,” Cassatt had once said, “to the idea that a railroad system like the Pennsylvania should be prevented from entering the most important and populous city in the country by a river less than a mile wide.”

The very waters that encircled the port city of New York and made her so rich and powerful were now starting to strangle her rambunctious growth, for no bridge or tunnel connected New York City to the mainland. Ten railroads came to a halt at the Jersey shore, while the Vanderbilts' New York Central trains steamed into

the city by crossing the river higher up at Poughkeepsie, traveling down the east bank of the river, and in to northern Manhattan over the Harlem River. Under Cassatt's aggressive leadership, the mighty PRR hoped at long last to enter New York by backing the construction of the long-planned North River Bridge, a gargantuan \$90 million, three-decker span [equivalent to \$2.3 billion today] that could accommodate all the

railroads stuck on the Jersey shore. But by summer of 1901, the bridge was dead: the other railroads balked at paying their share.

While in Paris that August visiting his sister, the artist Mary Cassatt, the PRR president inspected one of the city's train stations, the Gare d'Orsay, there finding the possible solution. Perhaps the PRR, too, could use electric-powered locomotives to enter Manhattan under, rather than over, the river. (Steam engines operating in a mile-long tunnel would asphyxiate the passengers.)

Cassatt quickly sailed back to New York with Charles Jacobs, the preeminent English engineer of sub-aqueous tunnels, and Jacobs was soon spending nights on a PRR tugboat secretly probing the Hudson's riverbed. Jacobs informed Cassatt on Nov. 8 that the PRR could indeed build its tunnels 40 feet below the riverbed.

The caveat? The grade of those tunnels dictated that they emerge—not at a derelict railyard on the far west side of Manhattan as Cassatt hoped—but in the West 30s, the city's infamous vice district known as the Tenderloin. Soon, the PRR was quietly buying up 28 acres of real estate in the shabby blocks filled with bordellos, opium dens and wild dance halls. By January 1903, after a fierce political battle to obtain the needed city franchise, demolition and clearing began.

Cassatt's colossal engineering project, known as the New York Tunnels and Terminal Extension, would begin in the Jersey Meadowlands, blast two tunnels through the Bergen Highlands, and then begin descending far below the Hudson River. Those two tunnels would then enter 40 feet below Manhattan at

Riding the Rails

During World War II, when Penn Station served only the PRR and the Long Island Rail Road, 109 million passengers arrived or departed on trains in 1945.

Today, Penn Station serves the Long Island Railroad, Amtrak and the New Jersey commuter lines, and about 200 million passengers pass through each year, making it the busiest station in the United States. Both Waterloo Station in London and the Gare du Nord in Paris handle comparable numbers.

But it is Japan, a nation famous for its top-speed rail travel, that boasts the world's truly busiest train stations. Tokyo's Shinjuku Station serves 3.6 million passengers a day, followed by another Tokyo Station, Ikebukuro, which serves about 2.7 million people a day. In two months, as many passengers come and go in Shinjuku Station as go through Penn Station in a year!

the new West 34th Street train station. From there, four tunnels would cross town below the city streets, heading down again under the East River. The two PRR tunnels would end in the new Sunnyside Yards in Queens, while the two Long Island Rail Road tunnels would continue on out to the island. All told, 16 miles of tunnels had to be built. Samuel Rea, who had joined the PRR as a 16-year-old rod-and-chainman, supervised this \$100 million engineering project that would forever transform the physical and psychic geography of New York City.

Pennsylvania Station would serve as the visible crown jewel of this monumental but largely subterranean work. On April 23, 1902, Cassatt bestowed that plum commission upon architect Charles F. McKim of McKim, Mead & White, who had never designed a train station in his life. But McKim



New York architectural firm McKim, Mead & White used glass-and-steel train sheds in 1904 for the construction of the station.

understood, as no other man in America, grandeur, the city nicknamed Gotham and the monumental. Inspired by the great buildings of Rome, McKim designed Penn Station to be of imperial scale, its façade an imposing colonnaded temple to transportation. Inside, McKim's Penn Station would evoke the classical past in its luminous General Waiting Room, a space of extraordinary height and grandeur that drew on the architect's memories of a visit to the ruins of the Roman Baths of Caracalla.

On June 24, 1903, Charles Jacobs gathered with his junior engineers on the west side and drilled the historic first hole for the Hudson River tunnels, dispatching the drill to Cassatt as a souvenir. And so began the actual digging for a civil engineering work of extraordinary ambition, scale and peril. Engineers pushed the two Hudson and four East River tunnels simultaneously. As soon as the shafts were sunk, the engineers began assembling on each end of the tunnels the Greathead shields, strange 193-ton behemoths of machines, gigantic mechanical moles that would burrow deep under the river, leaving in their laborious wake the new tunnel. Greathead shields were assembled at the ends of each tunnel. Once under the rivers, the "sand hogs," as the tunnel workers were nicknamed, worked in compressed air (with serious risk of the

"bends" or decompression sickness, where excess nitrogen can form dangerous bubbles in the body) as they pushed the shields forward, assembling the 13 sections of each 23-foot-wide cast-iron tunnel ring one after another. The tunnels grew, looking in their raw state like long, segmented snakes.

The PRR tunnelers had to be sure not to damage the New York piers or harbor bulkheads overhead. Once out in the rivers, problems arose with quicksand. The tunnels were piped full of compressed air, which held the river water at bay. But sometimes that compressed air found a way to escape, and these deadly "air blows," as they were called, especially plagued the East River tunnels. When the tunnel "blew," terrifying floods of water cascaded in. Every foot of the way, the alignment engineers were measuring to be sure the tunnels were on track to meet up and join in the middle of the rivers.

Meanwhile, a gigantic hole was being blasting and excavated in the Tenderloin, for the site for Penn Station had to be 50 feet deep. Such was the spectacle, that day and night, crowds watched the blasting, peering into the evermore gargantuan canyon, where little trains hauled away the debris via specially constructed elevated rail lines that led to the West Side piers and awaiting barges. The amount of debris was so

substantial that it was used to fill in wetlands in Greenville, N.J., to create an additional rail yard for the PRR.

As the tunnels neared completion in 1908, New Yorkers were amazed to watch what seemed to be an ancient monument rising on shabby 7th Avenue—McKim's magnificent Roman temple, a strange classical vision with its austere columns carved from rosy-hued Milford sandstone. By now, sadly, Alexander Cassatt, 67, had died, succumbing in late 1906 to the strains of the PRR presidency. Samuel Rea, who assumed full charge of the project, had his own tragedy: the death of his only son, a junior engineer, from a flu contracted working in the PRR tunnels. Charles McKim's health was also failing. And yet, the great PRR project moved inexorably forward.

On the Saturday evening of Nov. 26, 1910, at 9:30 p.m., huge crowds of New Yorkers swarmed in for their first glimpse of the newly opened station that would finally connect their island to the mainland. Penn Station was so vast—covering 7.5 acres and occupying a volume of 40 million cubic feet—it absorbed the multitudes in grandeur. The station's General Waiting Room had a timeless quality, its towering classical columns lifting the eyes to the groin-vaulted ceiling. The marble had a spare and somber beauty, its feeling of antiquity belied by the massive chandeliers and

elegant pale blue map murals depicting the PRR's rail lines. "In thousands the [throngs] flooded the acres of its floor space," reported the *Tribune*, "and gazed like awestruck pygmies at the vaulted ceilings far above them, inspected curiously the tiny details of the place, so beautifully finished."

Passengers catching the first trains from the new concourse marveled at McKim's version of the familiar Victorian train shed: a railroad cathedral of light and dramatic motion, an airy rhythmic space of repeating, vaulted lacy steel-truss umbrella arches, the glass skylights supported by tall slender steel pillars. Cassatt and Rea had bestowed a gateway worthy of the nation's most important city.

As the decades passed, the great age of passenger rail was ending. In 1945, the war forced the station's use to a new high-water mark: 109 million passengers. Thereafter, automobiles and airplanes became the glamorous post-war modes of transportation. By the late 1950s, the once-mighty PRR was struggling, and management, viewing New York's Penn Station as a shabby albatross, sold the area above the station to the developer of the new Madison Square Garden and skyscraper.

On Oct. 28, 1963, as the very skies seemed to weep a gentle rain, desecration and demolition began. Penn Station's main clock was sentimentally set at



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Inspired by Roman Baths of Caracalla, the station's main waiting room is approximately the scale of St. Peter's nave in Rome.

10:53 to signal the opening date of the station, 1910, and its lifetime, 53 years. It would take three years to destroy and dismantle McKim's noble work. Only when Penn Station was gone did New Yorkers realize what they had lost. The ensuing Landmarks Preservations Law would eventually save Grand Central Station from a similar destruction.

Where once Penn Station had been a glorious gateway, now it had been reduced to an underground remnant. And so for the past decade there have been a variety of plans to re-establish Penn Station at the former U.S. Post Office across 8th Avenue, a McKim, Mead & White building that promises a return to former grandeur. Hopes wax and wane, and as of fall 2009, New York Gov. David Paterson asserts that the new Moynihan Station, to be named in honor of longtime U.S. Senator Daniel Patrick Moynihan, is back on track. ◀

Jill Jonnes is author of Conquering Gotham: Building Penn Station and Its Tunnels (Penguin), and Empires of Light: Edison, Tesla, Westinghouse and the Race to Electrify the World (Random House). Her current book is Eiffel's Tower: and the World's Fair Where Buffalo Bill Beguiled Paris, the Artists Quarreled, and Thomas Edison Became A Count (Viking Press).

The original East 7th Avenue façade showcased a sequence of pink granite columns.



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