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100 Years of Grandeur

By **SAM ROBERTS**

One hundred years ago, on Feb. 2, 1913, the doors to Grand Central Terminal officially opened to the public, after 10 years of construction and at a cost of more than \$2 billion in today's dollars. The terminal was a product of local politics, bold architecture, brutal flexing of corporate muscle and visionary engineering. No other building embodies New York's ascent as vividly as Grand Central. Here, the tale of its birth, excerpted from "Grand Central: How a Train Station Transformed America," by Sam Roberts, the urban affairs correspondent for The New York Times, to be published later this month by Grand Central Publishing.

The idea for the new **Grand Central Terminal** came to **William J. Wilgus** "in a flash of light," he recalled decades later. "It was the most daring idea that ever occurred to me," he said.

Wilgus, the New York Central Railroad's chief engineer since 1899, had supervised the costly renovation of Grand Central Depot just a few years before. Born in Buffalo in 1865, he studied for two years under a local civil engineer and later took a Cornell correspondence course in drafting. His creativity and expertise propelled him through the ranks of various railroads and finally to the New York Central.

A fatal 1902 crash, in which the morning local from White Plains had slammed into the rear car of a Danbury, Conn., train stopped on the tracks of the Park Avenue Tunnel, killing 15 passengers instantaneously, had convinced Wilgus that it was no longer possible to run a chaotic railroad yard two avenue blocks wide in what was becoming the very heart of the nation's largest city.

In a three-page letter to W. H. Newman, the railroad's president, dated Dec. 22, 1902, the 37-year-old Wilgus recommended an audacious and extravagant remedy: Raze the existing Grand Central and replace the egregious steam locomotives with electric trains.

The technological advantages were clear-cut. Electricity required less maintenance. Unlike steam or, later, diesel locomotives, electric trains did not need the fuel or machinery to generate power on board. Electricity let trains accelerate more quickly, a decided amenity for short-haul commuter service. Another advantage, an obvious one in retrospect, provided the rationale that made Wilgus's suggestion so revolutionary and, in the end, so inevitable.

Electric motors produced fewer noxious fumes and no obfuscating smoke or steam. Moreover, as Wilgus explained, electricity “dispenses with the need of old-style train sheds,” because it made subterranean tracks feasible.

Absent the smothering smoke, soot and cinders, the depot could be expanded on the same footprint by delivering trains to platforms on two levels, the lower for suburban commuters and the upper for long-distance trains. For the first time, the entire rail yard all the way to 56th Street, to where the maze of rails that delivered passengers to the platforms coalesced into four main-line tracks, could be decked over. The “veritable ‘Chinese Wall’ ” that bisected the city for 14 blocks could be eliminated. The air above the yards could be magically transformed into valuable real estate in the heart of Manhattan.



William J. Wilgus, the chief engineer for the New York Central Railroad, who came up with the idea of building the mammoth structure.

For starters, Wilgus envisioned a 12-story, 2.3-million-square-foot building above the terminal that could generate rents totaling \$2.3 million annually. Those advantages not only benefited “humanity in general,” as [Cornelius Vanderbilt](#), known as the Commodore, would have put it, an ingratiating by-product, but also fulfilled the primary mission of his New York Central and Hudson River Railroad: that “we first see that we are benefiting ourselves.” Wilgus’s overarching remedy to the “Park Avenue problem,” he unabashedly proclaimed, “marked the opening of a remarkable opportunity for the accomplishment of a public good with considerations of private gain in behalf of the corporation involved.”

The terminal, he explained later, “could be transformed from a nonproductive agency of transportation to a self-contained producer of revenue — a gold mine, so to speak.”

Wilgus was asking the railroad’s directors to accept a great deal on faith. His projected \$35 million price tag for all the improvements nearly equaled half the railroad’s revenue for a full year. Moreover, the railroad made most of its money hauling freight, not people. Why invest so much in a project that benefited only passengers? But the chief engineer was persuasive. By Jan. 10, 1903, the Central’s board of directors had embraced the project and promoted him. Six months later, on June 30, 1903, the board — whose directors included the Commodore’s grandsons Cornelius II and William K. Vanderbilt, as well as William Rockefeller and J. P. Morgan — in a daring validation of the chief engineer’s vision, formally empowered Wilgus to proceed with his bold agenda for a regal terminal that would be a gateway to the continent.

Even before the first spadeful of earth was turned, before the first boulder of Manhattan schist was blasted, a forest of exclamation points began sprouting with what was dubbed the city's largest individual demolition contract ever. On 17 acres bought by the railroad, 120 houses, three churches, two hospitals and an orphan asylum would have to be obliterated, as would the stables, warehouses and other ancillary structures.

The Times acknowledged that "in describing it, the superlative degree must be kept in constant use." It would be the biggest, it would contain the most trackage and, on top of that, it would be self-supporting.

In 1906, nearly two years before a state-imposed ban on the use of steam-powered locomotives from 42nd Street all the way to the Harlem River, the Central began operating electric cars from the existing Grand Central Station. (The New Haven followed suit a year later, using direct current from the Central's third rail but switching to alternating current delivered from overhead lines on its own tracks in Connecticut, as it does today.)

After electrification, Wilgus's second challenge was how to build a terminal without inconveniencing the passengers on the railroad's hundreds of daily long-haul and commuter trains. To meet the challenge, the railroad temporarily relocated some of the station's functions to the nearby [Grand Central Palace Hotel](#).

Wilgus devised an ingenious construction strategy. The arduous process of demolishing existing structures, excavating rock and dirt 90 feet deep for the bi-level platforms and utilities, razing the mammoth train shed and building the new terminal would proceed in longitudinal "bites," as he called them — troughs bored through the middle of Manhattan, one section at a time and proceeding from east to west. Construction would take fully 10 years, and by the time it was barely halfway finished, Wilgus would be gone and his guess as to the cost of the project would have doubled, to about \$2 billion in today's dollars.

As construction on the terminal progressed, the New York Central was keeping one very wary eye on what was happening just across town. Its archrival, the Pennsylvania Railroad, was challenging the Central's monopoly by finally providing direct service to Manhattan. The Central and the Pennsy were like Coke and Pepsi, perennial rivals for routes, passengers, and market share. In the 19th century, the Pennsylvania was an also-ran in New York City. Because it had no Midtown station, passengers had to be transported between Exchange Place in Jersey City and Manhattan by boat.

Building a bridge across the river would have required a joint project with other New Jersey railroads, but none were game. Electrification, though, would make a Hudson River tunnel feasible. On Dec. 12, 1901, a little less than a month before the Park Avenue Tunnel crash,

Alexander Cassatt, the Pennsylvania's president, announced that the railroad would bore under the river and run trains to a grand station of its own, to be built on two square blocks bounded by 31st and 33rd Streets and Seventh and Eighth Avenues.

Ground was broken on May 1, 1904, for McKim, Mead & White's colossal gateway. The breathtaking pink-granite-colonnaded station — a “great Doric temple to transportation,” the historian Jill Jonnes called it — was modeled on the public baths built in Rome 1,700 years earlier by Emperor Caracalla. The station would open in 1910 and, with the expense of two sets of tunnels, cost \$114 million, or about \$2.7 billion in today's dollars.

William Wilgus was an engineer, not an architect, but he hoped to impose his own aesthetic on the new terminal. He knew what he didn't like about the old depot: its “unattractive architectural design” and its “unfortunate exterior color treatment,” as well as the “great blunder” of dividing the city for 14 blocks and obstructing Fourth Avenue.

In 1903, the Central invited the nation's leading architects to submit designs for the new terminal. Samuel Huckel Jr. went for baroque, a turreted confection with Park Avenue slicing through it. McKim, Mead & White proposed a 60-story skyscraper — the world's tallest — atop the terminal (a modified version was later incorporated into the firm's design for the 26-story municipal building, completed in 1916), itself topped by a dramatic 300-foot jet of steam illuminated in red as a beacon for ships and an advertisement (if, even then, an anachronistic one) for the railroad.

Reed & Stem, a St. Paul firm, won the competition. The firm began with two big advantages. It had designed other stations for the New York Central. Moreover, like the Central itself, Reed & Stem could count on connections: Allen H. Stem was Wilgus's brother-in-law. Yet in the highly charged world of real estate development in New York, another firm's connections trumped Reed & Stem's. After the selection was announced, Warren & Wetmore, who were architects of the New York Yacht Club and who boasted society connections, submitted an alternative design. It didn't hurt that one of the firm's principals, Whitney Warren, was William Vanderbilt's cousin.

The Central's chairman officiated at a shotgun marriage of the two firms, pronouncing them the Associated Architects of Grand Central Terminal. The partnership would be fraught with dissension, design changes and acrimony and would climax two decades later in a spectacular lawsuit and an appropriately monumental settlement.

To Wilgus's dismay, the Warren & Wetmore version eliminated the revenue-generating office and hotel tower atop the terminal. It also scrapped proposed vehicular viaducts to remedy the obstruction of Fourth Avenue, now Park, created by the depot.

Once the design was agreed upon, building Grand Central was a gargantuan undertaking. Wheezing steam shovels excavated nearly 3.2 million cubic yards of earth and rock to an average depth of 45 feet to accommodate the subterranean train yards, bi-level platforms and utilities — some as deep as 10 stories. The daily detritus, coupled with debris from the demolition of the old station, amounted to 1,000 cubic yards and filled nearly 300 railway dump cars. The lower tracks were 40 feet below street level and sprouted “a submerged forest” of steel girders. Construction required 118,597 tons of steel to create the superstructure and 33 miles of track. At peak periods, 10,000 workers were assigned to the site and work progressed around the clock. Beneath the 770-foot-wide valley he created in Midtown Manhattan, Wilgus dug a six-foot-diameter drainage sewer about 65 feet deep that ran half a mile to the East River.

The first electric locomotive barreled through the Park Avenue Tunnel from Highbridge in the Bronx on Sept. 30, 1906. Thirty-five 2,200-horsepower electric locomotives could accelerate to 40 miles per hour; multiple-unit suburban trains could hit 52 m.p.h. The Vanderbilts and the New York Central were immensely proud of their all-electric terminal and their mostly electric railroad. The maze of tracks and trains was commanded from a four-story switch-and-signal tower south of 50th Street. On one floor was a machine with 400 levers, the largest ever constructed, to sort out the suburban trains. On the floor above, another machine with 362 levers controlled the express tracks. A worker was assigned to each battery of 40 levers, and tiny bulbs on a facsimile of the train yard would automatically be extinguished as a train passed a switch and illuminated again when it reached the next switch.

On June 5, 1910, the Owl, as the midnight train was known, left Grand Central Station for Boston. It was the last to depart from the old station. Demolition began immediately.

While Pennsylvania Station opened earlier and to rave reviews, it could not compare to Grand Central in magnitude. Penn Station and its yards spanned 28 acres. Grand Central covered 70. Penn Station had 16 miles of rails that converged into 21 tracks serving 11 platforms. The comparable figures for Grand Central originally were 32 miles, 46 tracks and 30 platforms. Grand Central required twice as much masonry and nearly twice the steel that Penn Station did. Fifteen hundred columns were installed to support the street-level deck and the buildings that would rise on it. Another \$800,000 was spent on steel reinforcement, not needed for the terminal itself, but to support



Neal Boen i/The New Yor Times

a skyscraper that eventually might rise above it. The terminal alone cost \$43 million to build, the equivalent of about \$1 billion today. The entire project set the Central back about \$80 million. 1954.

Passengers' comfort was of paramount concern. When it was finally completed, Grand Central could boast a separate women's waiting room with oak floors and wainscoting and maids at the ready, a ladies' shoe-polishing room out of sight of the rickshaws and staffed by colored girls in neat blue uniforms, a telephone room for making calls, a salon gilded with walls and ceilings of Carrara glass where none but her own self will see while she had her hair dressed, a dressing room attended by a maid at 2 cents, and a private barbershop for men which could be rented for 1 an hour and a public version where the customer may elect to be shaved in any one of 30 languages.

No amenity was spared. Timid travelers may assist themselves with no fear of being rebuffed by harrising trainmen or imposed upon by hotel runners, chauffeurs or others in blue uniforms. A promotional brochure boasted, instead of walking encyclopedias in gray frock coats and white caps were available. Passengers would be protected from unwanted contact as well as glances. Special accommodations are to be provided for immigrants and gangs of laborers. The Times reported. They can be brought into the station and enter a separate room without meeting other travelers. Grand Central the brochure proclaimed is a place where one delights to loiter, admiring its beauty and symmetrical lines—a poem in stone.

Just how much loitering could have been done on the opening day is arguable. Railroad officials estimated that by 4 p.m. on Monday, Feb. 2, 1913, more than 10,000 people had visited the terminal since the doors were thrown open at midnight. The first train to leave was the Boston Express No. 2 at 12:01 a.m. The first to arrive was a local on the Harlem line. William of Yonkers bought the first ticket.

Grand Central was billed as the first great stairless station, one in which the flow of passengers was speeded by gently sloping ramps that were tested out at various grades and ultimately designed to accommodate everyone from the old infirm traveler to the little tot toddling along at his mother's side to the man laden down with baggage which he declines to relinquish to any one of the most cordial attendants to the women trailing a long and preposterous train. The flow would now empty from 32 upper-level and 1 lower-level platforms fed from as many as six tracks into a main concourse that was 200 feet long, 120 feet wide and 12 feet high and flanked by 10-foot-high transparent walls that were punctuated by glass walkways connecting the terminal's corner offices.

ts concave ceiling created a view of the heavens from Aries to Cancer in an October sky. By 1900 stars of them illuminated and intersected by two broad golden bands representing the ecliptic and the equator. For several months painters debated how to transfer the heavens onto a cylindrical ceiling because the artist Paul Hensel's version seemed more fitting for a dome and they experimented to find just the proper shade of blue. The ceiling designs were developed by John Roebling and executed largely by Charles Basing and his associates. As many as 50 painters under Basing's direction worked to ensure that there was no variation in color tone. Ornate windows were ornamented with plaster reliefs of winged locomotive wheels, branches of foliage symbolizing transportation, and clouds and a caduceus, the staff usually entwined with serpents and surrounded by wings and typically carried by heralds.

The finishing touches would not be complete for another year and the railroad would not be opened until 1913 and the innovative lower-level loop which allowed arriving trains to depart more efficiently would not become operational until 1925. Among the last was Transportation, the gigantic sculpture redesigned by a Frenchman Jules-Claude Tanzi above the central portal on 42nd Street. Tanzi, who also designed the entrance of the Renaissance sculpture for the elegant Alexander III bridge in Paris, created a one-fourth-size plaster model in his studio from which John Connelly, a native of Ireland, carved the final 100-ton version from Indiana limestone at the William Bradley Iron Works yards in Long Island City Queens.



Fred R. Conrad/The New York Times

Workers restored a sculpture atop the building in 1980.

Contemplating a plaster model of the sculpture in his office, Warren later wrote that while the ancients entered cities through triumphal gates that punctuated mighty fortifications, in New York and other cities the gateway is more likely to be a tunnel which discharges the human flow in the very center of the town.

Such is the Grand Central Terminal, he continued, and the motive of its facade is an attempt to offer a tribute to the glory of commerce as exemplified by that institution.

When Grand Central was finally finished, the only thing lacking was advertising. The Times produced a special section of the newspaper and hailed the terminal as a monumental civic center for a city.

Although the newspaper said it is not only the greatest station in the United States but the greatest station of any type in the world.

A few years later the journalist and novelist Tom Wolfe would write: Every big city had a railroad station with grandeur to the point of glorious classical architecture that daunted and intimidated the great architects of Greece and Rome. You would have averted your eyes from every sort of dome, soaring ceiling, Ionic column, royal cornice, lordly echo chamber, and the miles of marble, marble, marble. But the grandest, most glorious of all by far was Grand Central Station.

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