



## The Builders

David McCullough

from *The Great East River Bridge, 1883–1983*  
(New York: Brooklyn Museum, 1983)

*People in modern times are so familiar with large and exact achievements in practical science that they are apt to forget the processes by which those achievements are accomplished.*  
THOMAS KINSELLA in the *Brooklyn Eagle*, 1872

They are all gone now, every one—the Roeblings and the assistant engineers Collingwood, Paine, Probasco, Hildenbrand, McNulty, C. C. Martin; and the Brooklyn contractor, plain, blunt William Kingsley, who started things rolling and lined his pockets nowhere near so well as he might have; and “Boss” Tweed and “Brains” Sweeny, who had an “understanding” with Kingsley and might have made a fortune had the Ring not collapsed in 1871, only two years after the work was under way; and State Senator Henry Cruse Murphy, the very essence of “Old Brooklyn,” and Abram Hewitt and Teddy Roosevelt’s black-sheep uncle, Robert, and the bright, scrubbed “Boy Mayor” of Brooklyn, Seth Low, all of whom served on the board; and Kinsella of the *Eagle*, who stood behind the work from beginning to end; and J. Lloyd Haigh, the shadowy wire manufacturer from South Brooklyn who wound up in Sing Sing for his efforts.

Some are known more for what they did in later years, like Hewitt, who became mayor of New York; or Dr. Walter Reed, who was then an intern at Brooklyn City Hospital looking after the men brought in with the bends; or an English laborer named Frank Harris, who wrote a sensational pornographic book, *My Lifes and Loves*. But so memorable a figure as E. F. Farrington, the “master mechanic,” the one who blew kisses to the crowds as he sailed over the East River the summer of 1876, riding the first wire strung between the towers, fades from the record from the time the work ended. We don’t know what became of him. Or of so many others: the stonemasons, carpenters, riggers, machinists, blacksmiths, riveters, and all those ordinary day laborers who went into the terrifying caissons beneath the river for such bonanza wages as two dollars a day.

Only a relative handful even have names now. Mike Lynch remains a known quantity because he is said to have been “the first Irishman” to go into the Brooklyn caisson and the last to come out; and we know of a watchman named Al Smith, because his son and namesake became governor. The other names,

### Brooklyn Museum

200 Eastern Parkway, Brooklyn, NY 11238-6052  
T (718) 638-5000 [www.brooklynmuseum.org](http://www.brooklynmuseum.org)

the few scraps of personal information available, are mainly from reports on the ones who were killed.

All told, several thousand people took part over fourteen years, many who were American born (including some blacks), many Germans, some Italians, some English, at least one Chinese, and a great many Irish. They all worked a ten-hour day, six days a week, and they were all men—with the one exception of Emily Roebling.

The last of them died in January 1980, in a home for the elderly in Harlem, at the age of 106. He was Henry Jones; he had been a waterboy during the final part of the work in 1882 or '83, which would have made him eight or nine at the time.

Even the spectators are gone now. Governor Al Smith, who grew up on South Street, “in the shadow of the New York tower,” loved to describe the spectacle of workers scrambling high up among the cables. When he was eight or nine, his father took him across the temporary catwalk, while his mother stayed home, sitting in her chair, saying her rosary over and over the whole time they were gone. It was his mother who told him of the horrifying work in the caissons. “Perhaps had they known,” she would say, “they never would have built it.”

But build it they did, calling it a variety of names—the East River Bridge, the New York Bridge, the Brooklyn Bridge, the Roebling Bridge, the Great Bridge, or merely the Bridge—and to anyone who knows what they went through, it can never be thought of as just an engineering marvel, or an architectural masterpiece, or the perfect expression of nineteenth-century industrialism, or a turning point in urban American history, or a nice way to go over the river. It is, besides all that, their story.

It was conceived in winter, in the mind of John Augustus Roebling, the illustrious pioneer builder of suspension bridges and wealthy wire manufacturer of Trenton, New Jersey. According to the accepted account, he was caught in the ice on a Brooklyn ferry and “then and there,” scanning the distance between shores, envisioned his crowning work. His oldest son, Washington, age fifteen, happened also to be with him at the time.

That was in 1852, thirty years before the fact. It was not until after the Civil War and after the opening of the celebrated Roebling bridge at Cincinnati (which still stands) that William Kingsley went to Trenton to talk about building one at Brooklyn. Kingsley had no specific kind of bridge in mind.

No one in Brooklyn did, apparently. It was the man they wanted, not a particular plan—which is fascinating, since the man was exactly what they were not to have.

His brilliance was well established. His abiding confidence in science, as all of science and technology were known, was in perfect harmony with the very Jules Verne outlook of the times. “It will no longer suit the spirit of the present age to

## **Brooklyn Museum**

200 Eastern Parkway, Brooklyn, NY 11238-6052  
T(718) 638-5000 [www.brooklynmuseum.org](http://www.brooklynmuseum.org)

pronounce an undertaking impracticable,” Roebling had written. A German by birth, he had been trained at the Polytechnic Institute in Berlin. He was the first to manufacture wire rope, or cable, in America; the first to perfect a suspension, or wire-hung bridge that could carry a railroad (at Niagara Falls); the first to dare anything even approaching the size and weight of the one at Cincinnati. He was a technical virtuoso, designer, mathematician, inventor, industrial entrepreneur, a success at everything he put his mind to.

Further, his bridges were thrilling to see, as his Brooklyn clients found for themselves on the tour he led cross-country to Cincinnati and Niagara Falls in the spring of 1869. They could count on a triumph of art no less than advanced engineering, he assured them, and to judge by his photograph the look in the pale, intense eyes must have been something.

In appearance, in manner, he was above the crowd, all business. Once, on a call to Washington, D.C., during the Civil War, he scrawled a note on the back of his card and sent it in to General John Charles Frémont: “Sir. You are keeping me waiting. John Roebling has not the leisure to wait on any man.”

There is more, however, and it, too, bears on the story. We don’t know everything by any means, which is a shame, since we can never know enough about genius, but in unpublished family correspondence and his own journals, he emerges as a figure of strange, sometimes violent lights and shadows. He was cold, vain, and suspicious, a man tormented by insomnia, bad digestion, spells of terrible self-recrimination. He plunged into spiritualism, became a fanatic—there is no other word for it—on hydropathy, the water cure. His children, for whom he had little time, were terrified of him. “Brutal” is a word Washington Roebling used to describe him.

An unforgettable vignette has come down through the family. John A. Roebling stands outside the Trenton mill where a number of donkeys are used to drag heavy strands of wire through long beds of sand, as part of the finishing process. One of the animals dallies or strays from the prescribed path, and John A. Roebling walks up, takes it by the head, and breaks its neck. When the youngest of his children, Edmund, misbehaved in some unknown fashion, Roebling very nearly beat him to death. The boy ran off, disappeared, and was later found in a Philadelphia jail where, according to Washington, he had had himself entered as a common vagrant “and...was enjoying life for the first time.”

“The hero is admired and proclaimed a public benefaction,” Roebling himself wrote in private. “...But nobody knows...Who can hide me from myself?”

The heaviest blow he inflicted on Washington was his own hideous death just as the real work at Brooklyn was about to begin. There was a foolish accident. Roebling was standing beside the ferry slip, helping with the surveys and with such concentration that when the boat docked he neglected to get out of the way. The boat jammed against a stringpiece, which caught and crushed his foot.

## **Brooklyn Museum**

200 Eastern Parkway, Brooklyn, NY 11238-6052  
T (718) 638-5000 [www.brooklynmuseum.org](http://www.brooklynmuseum.org)

Washington was with him at the time, and later, when he had several of his toes amputated (without anesthetic at his wish), and later still through the gruesome, final agonies of lockjaw. Roebling had dismissed the doctors, insisting that water, poured steadily on the open wound, was the one and only cure.

The bridge he had projected on paper was to surpass any on earth in size, cost, and “audacity.” Two stupendous gothic towers, larger than anything on either skyline, were to reach 270 feet in the air, and four great cables would carry the roadway, or deck, more than a hundred feet above the river, high enough so all but the largest of the clipper ships could pass below without trimming their top gallants. An unprecedented \$7 million was at stake, he had estimated, not to mention the reputations of his clients. But as of the morning of July 22, 1869, he was dead, and with Washington the only one around who knew enough to carry on, the others—Kingsley, Murphy—saw no choice but to put him in charge at once.

The Colonel, as they called him, was then all of thirty-two years old. He had only the most preliminary plans at hand, as he later acknowledged, no working drawings, “nothing fixed or decided.” All he really had to go by were his wits, experience, and “vitality,” a favorite Roebling word. He was married and the father of one child, a little boy whom his wife had chosen to name John A. Roebling II. His salary was handsome, \$10,000 a year, but his expenses would run beyond that, so financially the Bridge was to mean no profit for him, not a dollar in fourteen years.

It was the understanding since boyhood that he must follow in his father’s path, he being the oldest son. He had been sent to the Rensselaer Polytechnic Institute at Troy, New York, in 1854, then, four years later, to Pittsburgh to begin his apprenticeship working on a bridge of his father’s over the Allegheny River. After the war, he was dispatched to Cincinnati to become his father’s first assistant. With the Cincinnati Bridge completed, he was off to Europe with his bride for nearly a year to study the use of pneumatic caissons in advance of the work at Brooklyn. Other, younger sons were kept at home, meantime, consigned to the prospering family business.

He never reported to anyone but his father; he was forever being judged by his father. The war was the single interruption, but even then it was his father, one highly unpleasant evening at the dinner table, who ordered him out of the house and into the army. The father despised slavery, so the son had to march with Mr. Lincoln’s army.

In some ways they were alike. The elder man played the flute and piano, the younger man the violin. Washington could “make a violin talk,” we read in a letter from a friend. He had his father’s extraordinary physical stamina, his father’s steadfastness in the face of adversity. He had been raised on an unyielding Germanic pride in one’s work, on duty and cold baths in the morning. But he also had a lovely, wry sense of humor. He was soft-spoken, informal, modest to a

## Brooklyn Museum

200 Eastern Parkway, Brooklyn, NY 11238-6052  
T (718) 638-5000 [www.brooklynmuseum.org](http://www.brooklynmuseum.org)

fault some thought. He deplored vanity as the most costly of human follies. History, he had decided, favored the vain, and he had little faith in history. He was drawn to astronomy and botany, was particularly strong in geology, and had begun what would become one of the finest mineral collections in the country, if not the world. He adored Goethe (in the original German), chess, opera, roses, a good cigar, the absolute dark of night out of doors, and architecture. Architecture, he came to believe, was the “noblest” art. He drew beautifully. His mind was not the creative engine his father’s had been, but he was exceptionally observant and retentive, and could improvise with speed and ingenuity, a gift prized among American engineers of his generation.

The biggest experience of his life until Brooklyn was the war—and in many ways it is the key to the man and what he did at Brooklyn. He had been through “any quantity of hard fighting,” from Manassas Junction to Antietam to Gettysburg to the Wilderness to the siege of Petersburg. Miraculously he survived—at Antietam a cannonball came so close it sucked the air out of his lungs—and he came out a brevet colonel, having enlisted as a private the day after his father ordered him from the house. He also built several successful bridges of his own, not his father’s design, fell very much in love, and from watching some of the Union Army’s most celebrated figures at close range (Hooker, Meade, Grant) formed decided views on what qualities counted most in a leader. Courage was essential. So was a level head and a reserve of strength for emergencies. So was “the intuitive faculty of being at the vital spot at the right time.”

Many people were struck by what seemed an air of imperturbable calm about him. A fellow officer observing him during the siege of Petersburg described him as “a light-haired, blue-eyed man with a countenance as if all the world were an empty show.” Washington himself said his eyes were green and confided to his future wife, Emily Warren, sister of his commanding officer, General G. K. Warren, that in truth he worried about almost everything.

He took charge without a moment’s hesitation, knowing as did nobody else how much his father had left unresolved, and knowing that unlike his father he had no one standing by should something happen to him.

The able and, as it turned out, exceedingly loyal staff he assembled were nearly all younger even than he. Indeed, not the least of the arresting facts about the Brooklyn Bridge is that the average age of the engineers who undertook to build it was about thirty-one. All the magnificent drawings were executed under his direction—developed, more often than not, from his preliminary sketches, and subject always to his final approval. He ordered materials, wrote specifications. His lengthy annual reports to the trustees remain models of thoroughness and clarity. Along with everything else, he wrote very well.

The two giant pneumatic caissons were his supreme contribution, however, and a test of everything that was in him. They were the foundations upon which the towers would stand, or to put it another way, they were the part of the Bridge

## **Brooklyn Museum**

200 Eastern Parkway, Brooklyn, NY 11238-6052  
T(718) 638-5000 [www.brooklynmuseum.org](http://www.brooklynmuseum.org)

nobody would ever see and the part upon which everything depended. And they are still there, beneath the towers, beneath the river, exactly where he calculated they ought to go.

Readers of such publications as *Harper's Weekly* or *Scientific American* were asked to imagine a colossal, bottomless wooden box filled with compressed air (to keep the river out) and held in position on the riverbed by the tower being built on top. Inside the box were a hundred men or more digging away with picks and shovels. As their work progressed (around the clock), and as the tremendous weight of the tower increased steadily, the box was being forced ever so slowly deeper and deeper in the riverbed until finally it would rest on bedrock. The box was equipped with air locks, iron chambers with trap doors, so the men could come and go without loss of air pressure, and a system of water shafts, the ingenious means devised by Roebling for the removal of excavation. The dimensions of the Brooklyn caisson, the first to go down, were 102 by 168 feet.

Nothing came easily. Boulders jammed beneath the outer or cutting edge. The river came in. As the caisson sank deeper and air pressure within had to be increased, men started experiencing a strange ringing in the ears. Their voices had a thin, eerie sound, and the heat and humidity of the compressed air became almost intolerable. Work in such an atmosphere was exhausting beyond anyone's experience, and scary, to say the least. The only illumination was candlelight or limelight. When fire broke out in December 1870, it burned into the huge overhead timbers with such intensity, because of the compressed air, that it seemed impossible to put out. Newspapers carried headlines of "The Terrible Conflagration." Roebling was in the caisson, directing the fight, for more than twenty hours, knowing the whole time that the fire could eat into the roof like a cancer and weaken it to the point where the tremendous weight of the tower would come crashing through.

"Colonel W. A. Roebling has given the work his unremitting attention at all times," William Kingsley reported to the trustees, "but especially at all the critical points is he conspicuous for his presence and exertions. During the fire...when the destruction of the caisson was imminent, he remained in the caisson all night, putting forth almost superhuman efforts to extinguish it, and only came out when he supposed that the fire was extinguished, and when he felt the symptoms of paralysis..."

What he felt was the onset of the bends, or caisson disease, then still a mystery. In his determination to be always where he was needed, he customarily went in and out of the caisson more often in a day than anyone, and he was invariably, as we now know, coming out—out of the compressed air—far too rapidly. He was carried to his home on Brooklyn Heights and rubbed all over with a solution of salt and whiskey. Then, only an hour or two later, when a message arrived saying the fire had broken out again, he dressed and went back. His decision this time was to flood the caisson, something he dreaded doing. As it was, the tedious repairs of the fire set everything back three months.

## Brooklyn Museum

200 Eastern Parkway, Brooklyn, NY 11238-6052  
T(718) 638-5000 [www.brooklynmuseum.org](http://www.brooklynmuseum.org)

They hit bedrock on the Brooklyn side at 44 feet 6 inches. On the New York side it was a different story, and the suffering from the bends there became alarming. Every two feet that the caisson descended meant another pound of pressure added to the air inside. As Roebling wrote, hardly anyone escaped without experiencing pain of the most intense kind—"like the thrust of a knife," said one worker. In April 1872, with the caisson at a depth of seventy-odd feet and still no bedrock, two men died. The strain for Roebling was nearly unbearable, as his wife later said. On May 18, a third man died, and that same day Roebling made the most difficult and courageous decision of the project. Staking everything—the success of the Bridge, his reputation, his career—he ordered a halt. The New York tower, he had concluded, could stand where it was, at a depth of 78 feet 6 inches, not on bedrock, but on "hardpack"—sand. From examinations of the strata he had determined to his own satisfaction that no movement had occurred at that level since the time of deposit millions of years in the geologic past; so, he said, it was "good enough to found upon." To have driven the caisson to bedrock, he estimated, might have taken another year, and possibly a hundred lives.

Sometime later, when he was seeing to the final details inside the caisson, before it was filled in with concrete, he suffered another collapse, this one far more serious, and from that point on he was to be seen no more. He became as the years passed the famous "man in the window," hidden away from everyone, unseen, but supposedly seeing all, running it all from his upstairs room.

Nowhere in the history of such great undertakings is there anything comparable. He directed every step of what was then the largest, most difficult engineering project ever attempted, with all its risks and complications, entirely in absentia. Nobody could see him except his doctors, a few chosen trustees, a few chosen subordinates, and his wife, and never more than one or two at a time. He was never known to go near the Bridge or to set foot on it in all the ten more years that the work continued. Only when the Bridge was finished would he reemerge, his health then, he acknowledged, much improved.

For about a year he was not even in Brooklyn, as supposed. He was running things from a sickroom in his father's house in Trenton. But in 1873 he returned to the house in Brooklyn, 110 Columbia Heights, with its sweeping panorama, and from then on the popular picture of the lone figure at his window, telescope or field glasses at hand, the Bridge in the distance, is accurate.

What was the matter with him? Why did he never come out of hiding? The common explanation was that he suffered complications resulting from his time in the caissons—from the bends, in other words. It was also rumored that he was out of his mind, and that if the truth were known his wife was in charge.

Those who did know never said much in explanation, but they also never referred to the bends or caisson disease by name. In a letter to his son years later, Roebling would recall being in such a state that he had to be fed. He was unable even to lift his arms, which may well have been a consequence of the bends. He

## Brooklyn Museum

200 Eastern Parkway, Brooklyn, NY 11238-6052  
T(718) 638-5000 [www.brooklynmuseum.org](http://www.brooklynmuseum.org)

also complained of failing vision, a symptom not associated with the disease, and for a considerable time was incapable of reading or writing anything.

Farrington, the master mechanic, a forthright, direct individual if ever there was one, said Roebling had become “a confirmed invalid...owing to exposure, overwork, and anxiety”—practically a textbook definition of what in that day was called neurasthenia, or nervous prostration. “He is not so sick as people imagine,” Emily Roebling would explain when, in the final days of the work, a single reporter was permitted into the house. His problems she said, was an inability to endure people or their talk. Talk especially had a “very debilitating effect.”

From his own later correspondence, now in a collection at Rutgers University we know that a “course of electricity,” or early, primitive electrical treatments, were tried, and they could only have been extremely painful “Often the doctors said I could not live from day to day,” he would write. For the rest of his life he would remember a summer heat wave in Brooklyn when he was “in bed” and the thermometer registered a hundred degrees or worse. He suffered unendingly, that much is certain. Recalling almost anything to do with the Bridge or Brooklyn, he would speak of “that fearful time,” “that terrible burden,” “the tortures I endured.” “When I think of what I endured at Brooklyn, my heart sinks within me,” he would write to his son.

It is also conceivable that he had become addicted to drugs, and this too may have had something to do with his self-inflicted seclusion. We know he was given morphine during the worst agonies of the bends and that morphine addiction as a consequence of just such situations was by no means uncommon. We know also that in later years, suffering from a variety of ills and pains, he relied rather heavily on laudanum, the most common narcotic of the day, and so there is little reason to suppose he did not do the same at Brooklyn. The one reporter who was allowed in at the end was struck by two things when taken in to see Roebling: the first was how well Roebling looked, the other was the “imposing array of medicine phials” to be seen on a side table. This could mean nothing at all or it could be that it was the reporter’s way of raising suspicions in the minds of readers who were far more conversant with drugs and problems of addiction than many present-day readers appreciate.

Roebling’s own explanation of his plight, expressed in a letter to one of his staff, was that he had pushed himself too far. Our very imprecise contemporary term would be a nervous breakdown. The remedy for “nervous diseases,” he said, was to sit and keep quiet. Relief, if it came at all, could come “only through mental rest of all the faculties and especially the emotions.” And while it is impossible to know just what he meant by the “emotions,” it is also impossible not to wonder how much of his problem was psychosomatic in nature. He had made himself a prisoner in much the way his brother Edmund had, and perhaps for him too it meant freedom of a kind, perhaps the same freedom from his father, who could only have been an overpowering presence so long as the Bridge remained

## Brooklyn Museum

200 Eastern Parkway, Brooklyn, NY 11238-6052  
T (718) 638-5000 [www.brooklynmuseum.org](http://www.brooklynmuseum.org)



unfinished and his own duty to the great man's vision continued unfulfilled. Only in isolation could he hold on, keep his head. "I can only do my work by maintaining my independence," he told the trustees at one point.

Whatever the nature of his troubles, however mystifying his situation, his intellectual faculties suffered not at all. That he could keep everything in his head as he did is astonishing, like someone playing six games of chess at once blindfolded and winning them all. Nothing was done except as he specified. His was the single commanding intellect throughout, as his assistants were the first to acknowledge.

Also, most importantly, he had, as he put it, "a strong tower to lean upon, my wife, a woman of infinite tact and wisest counsel." She was tall, "strikingly English in style," with brown eyes and a cheerful, mobile expression. He wrote of how gracefully she moved, how entertaining she could be in conversation. "I think we will be a pair of lovers all our lifetime," he had written to her during the war, and from every indication we have, they were.

She became his private secretary, his nurse and constant companion, his means of contact with the trustees. She could talk to them, he said, as could no one else and with a conviction that carried much weight. When he was first stricken she had gone to Henry Cruse Murphy to explain the situation and was told things could continue as they were, with her husband in charge. She had expected his troubles would last only a short time.

She organized correspondence, kept his daily journal, and assisted in drafting specifications—mountainous tasks all in longhand. If the workers were his troops and he the commander on the hill, she was the trusted aide-de-camp, much as he had been for her brother in the war. If he was indispensable to the Bridge, she was indispensable to him. She went to the Bridge with his orders, or to be his "eyes," often several times a day and in all kinds of weather. By the final stages she was meeting with manufacturers to explain how certain parts had to be fabricated.

In the files of the Roebling Collection at the Rensselaer Polytechnic Institute there is a copy of a speech given by a graduate, a contemporary of Washington Roebling's, at a dinner in New York in 1882, the year before the Bridge was completed. Emily, we read, was a "woman of unusual executive ability.... She is firm and decided, with opinions on almost every subject which opinions she expresses with great frankness. To her natural talents for organizing are found tact, energy, unselfishness and good nature..."

Progress on the Bridge all the while had come steadily, but slowly, in the face of one problem or frustration after another. Work was stalled by bad weather, financial crises, and labor troubles. Trustees complained of the delays. Spinning the cables was supposed to have been the smoothest part of the process, since the system had been perfected on earlier Roebling bridges, but then, in 1878, up

popped J. Lloyd Haigh, the wire manufacturer, with his neat bit of deception. Had Roebling been on the job in person, it might never have happened. As it was he had warned the trustees in writing that Haigh was nobody to do business with and, further, if they did some checking they would find that Haigh was financially beholden to Abram Hewitt, the very member of the board who was doing the most to see that Haigh, not the Roebling company, got the contract.

The deception, once discovered, was painfully simple. Some of Roebling's own people had been stationed at the Haigh mill to inspect and certify each wagonload of wire before it went to the Bridge, but between mill and Bridge a switch was made. Wagon and driver pulled into a building, the approved wire was replaced with an equal quantity of rejected wire, then wagon and driver went on to the Bridge, while the good wire was returned to the mill to be run past the inspectors all over again. By the time Haigh was found out a lot of bad wire had gone into the cables, a realization that raised desperate cries from the trustees.

Roebling figured that Haigh had taken them for roughly \$300,000. But the bad wire could stay in the cables, he announced. In his original calculations he had included the possibility of some such problem arising and had made the cables more than strong enough to compensate. Yet the thought that such corruption was literally woven into the Bridge could never be forgotten, least of all by Roebling himself.

As a consequence of "The Great Wire Fraud," the Roebling company, from which he had severed connections, was awarded the contract, as it should have been in the first place. That Roebling wire was the finest on the market and fairly priced had never been disputed. But Hewitt, who held the mortgage on Haigh's mill, had convinced the board that use of Roebling wire on a Roebling bridge represented a gross conflict of interest.

In the large scrapbook she kept of the newspaper coverage given all things pertaining to the Bridge and her husband, Emily Roebling later inserted a small item reporting that J. Lloyd Haigh was breaking rocks at Sing Sing.

She was her husband's representative at such lavish, publicized affairs as the 1880 dinner at Delmonico's for Ferdinand de Lesseps, the hero of the Suez Canal, which had opened the year work on the Bridge was begun. She was her husband's staunch defender when, in the very last part of the work, some newly appointed trustees led by Seth Low tried to fire Roebling from his job—in a "spirit of reform"—and almost succeeded. Finally, it was she, at his request, who was first to ride over the Bridge by carriage, in advance of the official opening. She went in an open Victoria, carrying a rooster as a symbol of victory.

The grand opening took place on May 24, 1883, and was cause for the biggest celebration ever seen in Brooklyn or New York. The President of the United States, Chester A. Arthur, a New Yorker, led the parade over the Bridge to Brooklyn, accompanied by a future President, Governor Grover Cleveland. The

work had taken nearly three times as long as the five years John A. Roebling had estimated, and the cost had come to nearly \$16 million, or more than twice his original figure.

The cost must also include the life of John A. Roebling and the others who followed. John French, a rigger, John McGarrity, a laborer, and Thomas Douglass, a stonemason, were killed when a derrick fell. Henry Supple, another rigger and “one of the best men upon the Bridge,” had the top of his head taken off when a strand of wire snapped. Thomas Blake was killed in the same accident. Ross Harris died in a fall. August Denning died in a fall. Hensen, Read, Delaney, Collins, Noone, McCann, Elliot, Higgens, and two men named Murphy died in falls. McLaughlin, a machinist, was “killed instantly” by a falling stone. Dougherty was crushed to death by a falling derrick. So was Enright. Mullin was crushed by a stone being swung into place. Cope, a rigger, had the job of guiding a wire rope onto a hoisting drum. When he saw the rope was not running as it should, he kicked at it. His foot slipped and his leg was wound around the drum, crushing it so badly he died “almost instantly.” Brown lingered on in the hospital before he died. His back had been broken when a coal bucket fell on him.

Those known to have died of the bends include John Myer, Patrick McKay, and an Englishman named Reardon, who began work on the New York caisson on May 17, 1872, and died May 18, the day Roebling ordered the halt.

According to an interview in the *Eagle* with C. C. Martin of Roebling’s staff, two named Deneiss and Gardiner also died—though Martin could not recall how—which brings the rough total to twenty-seven.

The grief and hardship experienced are of course immeasurable. In an official report of the trustees, as an example, it is recorded that the widow of Henry Supple received as compensation for her loss \$250. Because the family of John McGarran, who was permanently disabled by a fall, found themselves “entirely destitute,” he was awarded \$100. To what degree other victims of the bends suffered as Roebling did, or died an early death because of the ordeal, we can only imagine.

Roebling himself, incredibly, outlasted all the others on his staff. Emily, who later earned a law degree and became known for her efforts in behalf of women’s suffrage, died in 1903. He was the last leaf on the tree, as he said, absorbed in his books, his greenhouse, his minerals, the wire business, feuds with his brothers, and in writing long letters to his adored son. The few times he is known to have gone out on the Bridge, with Emily and later by himself, he did so with no fanfare. Confusion over whether he or his father built the Bridge dogged him until the end. “Most people think I died in 1869,” he wrote.

He died in Trenton in his own bed at age eighty-nine on July 21, 1926, almost fifty-seven years to the day after his father’s death in Brooklyn.

Interestingly, those who worked on the Bridge had little or nothing to say about it once it was finished. All the speeches and poetry, the long essays, the editorials extolling its beauty and significance were provided by others. Roebling, too, said almost nothing on the subject. He, they all, seemed to prefer to let their work speak for itself.