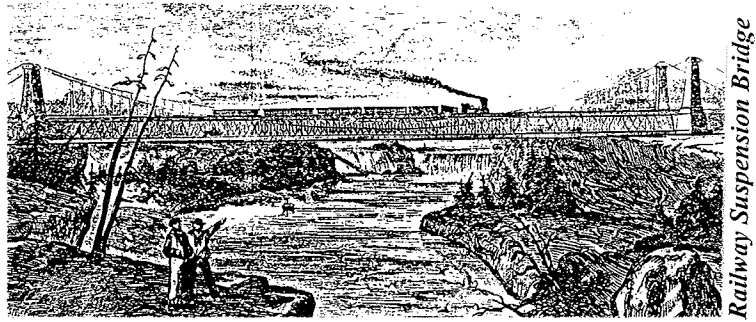


THE LOWER BRIDGES

First Suspension Bridge (1848-1855)

William Merritt (founder of the Welland Canal Company) was the first individual to propose the construction of a bridge spanning the Whirlpool. Under his leadership, the Niagara Falls Suspension Bridge Company (Canadian) and the International Bridge Company (American) were granted charters, in 1846, to begin construction of a suspension bridge designed by Charles Ellet Jr. To establish an initial link between the Canadian and American sides of the Gorge, the companies sponsored a kite-flying contest; a kite launched from the Canadian side of the River was landed on the American side by Homan Walsh, a 15-year old boy from Niagara Falls, New York. With the link established, heavier cables were strung and the bridge was constructed over the Whirlpool. Work on the bridge was completed in July 1848, and the bridge, with a span of 759 feet, opened to the public.



Railway Suspension Bridge (1854-1897)

In 1851, the Bridge Companies realized that they needed a railway bridge over the River. They chose a design by John Augustus Roebling for a double decked bridge, with the bottom for carriages and the top for trains. Construction began in September 1852, and the railway deck of the bridge was leased to the Great Western Railway in October 1853 for a yearly fee of \$45,000. Spanning a distance of 821 feet, the Railway Suspension Bridge was completed in April 1854 and became the first suspension bridge in the world to carry railway trains. In 1882, amalgamation of the Great Western and Grand Trunk Railways was approved and Grand Trunk assumed control over the railway deck; Great Western officially became a part of Grand Trunk in 1884.

As a result of increasingly heavy locomotives, the structure soon required reinforcement. In 1879-1880, the wooden truss of the bridge was replaced with steel, and maintenance work on the rest of the bridge was carried out under the supervision of Leffert L. Buck. The stone towers of the bridge were removed in 1886, and replaced with steel ones; the structure after this change is sometimes referred to as the **third suspension bridge**. In spite of these alterations, however, the bridge was proving to be unable to sustain increasingly heavy amounts of traffic, and a decision was made to construct a new arch bridge.

Lower Steel Arch Bridge (1897-present)

Leffert L. Buck designed the new bridge and oversaw its construction, surveying the area in April 1893. The ground was broken for the foundations of the bridge on April 8, 1896, and the foundations were finished by September 28. The contract for the building of the bridge was awarded to the Pennsylvania Steel Company, on June 17 and work began on the actual bridge on September 17, 1896, at the exact location of the Railway Suspension Bridge. Timber scaffolding was set up on the bridge foundations to support the arch while it was being built. Both ends were constructed simultaneously, and were held in place by cables; one end was fastened to the unfinished end of the bridge while the other was secured to the anchors of the Railway Suspension Bridge. To prevent the sides of the arch from collapsing, the cables were kept taut by a hand operated mechanism which required eighteen men to operate. When the two sides were completed, preparations were made to lower them into their final position. Final adjustments were made and the bridge was riveted together. The Bridge was tested on July 29, and it proved

to be even stronger than Buck had expected. Construction was fully completed by August 27, 1897, and the opening of the Lower Steel Arch Bridge was celebrated with a three-day carnival on September 23, 24 and 25, which boasted many activities including a spectacular fireworks display.

To allow passage across the River to continue during construction, the Lower Steel Arch Bridge was built under and around the steel truss of the old Railway Suspension Bridge. The suspension bridge remained open to traffic, except for two hours each day, during which time the old rails were replaced. When the Arch Bridge was completed, there were actually two bridges in the structure, one on top of the other. The builders had originally intended to disassemble the old bridge and reassemble it elsewhere, but a suitable location could not be found, and most of the materials of the Railway Suspension Bridge were instead scrapped.

Like the Railway Suspension Bridge, the new Niagara Railway Arch, or Lower Steel Arch Bridge as it was known, was double-decked; the bottom deck was reserved for carriages and the top, which was leased by the Grand Trunk Railway, was for trains. It proved to be very popular, and quickly became the main border crossing used by the local population. Although the name of the Bridge was officially changed to the Whirlpool Rapids Bridge in 1937, it is still referred to as the "Lower Bridge" by many people. The Bridge remained busy during World War II conveying war supplies across the border, and hundreds of Canadians with U.S. work permits also crossed the Whirlpool Bridge daily to work in American war factories. The bridge was painted in 1947, in preparation for the 100th anniversary of the first Niagara Suspension Bridge which was constructed in 1848.

In 1953, the Bridge Commission began negotiations for the purchase of the Whirlpool Bridge. Negotiations stalled, and the Commission did not purchase the Bridge until January 28, 1959, at a cost of \$3,290,000. With the decline of rail transportation, one of the rail tracks was removed in 1963. Between September 5 and November 20, 1967, the Bridge was closed while the wooden floor of the carriage deck was removed and replaced with a wooden floor topped with asphalt. Due to heavy automobile traffic, however, the floor again had to be replaced in 1986, this time with reinforced concrete and asphalt. During the six month closure of the Bridge, CNR (Canadian National Railway which had taken over the Grand Trunk Railway in 1920) also replaced the rail tracks. In 1990, renovations to relieve traffic congestion on the Bridge were carried out, at a cost of \$120,000, which was shared by the Bridge Commission, the City of Niagara Falls and the Niagara Parks Commission. The Whirlpool Bridge is the only bridge built in the last century which has survived to the present in a virtually unaltered form. 1997 marks the 100th anniversary of the construction of the Lower Steel Arch Bridge. In those 100 years, it has variously been known as the Niagara Railway Arch Bridge, the Grand Trunk Railway Bridge, the Grand Trunk Steel Arch Bridge, the Lower Steel Arch Bridge, the Lower Arch Bridge and the Whirlpool Rapids Bridge. It remains a popular crossing point, and its condition today stands as a testament to its superior design.

Cantilever (1883-1925)

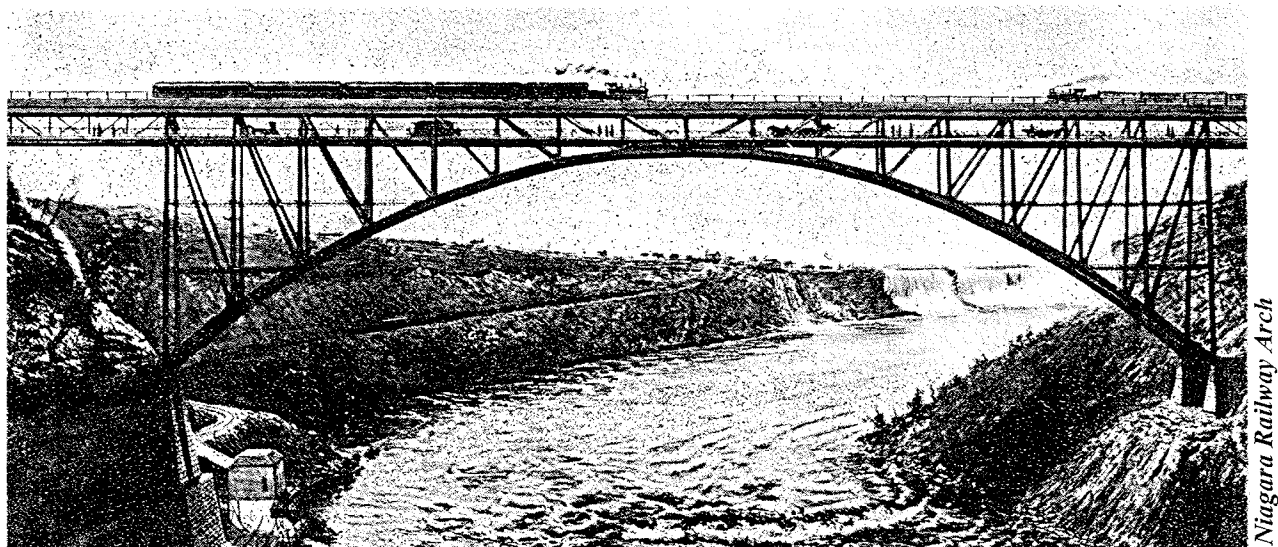
When the Canada Southern extended its lines into Niagara in 1883, Cornelius Vanderbilt, who owned the Michigan Central Railroad and had a controlling interest in Canada Southern, attempted to make arrangements to use the Railway Suspension Bridge. Discouraged by high toll prices, however, Vanderbilt formed the Niagara River Bridge Company and received a charter to build his own bridge over the Whirlpool. Preliminary excavations for the bridge foundations began on January 20, 1883, at three possible sites which were located approximately 200 feet upriver (south) of the Railway Suspension Bridge. The ground was broken for the foundations of the bridge on April 15, 1883.

The actual bridge was built by the Central Bridge Works of Buffalo, overseen by Charles C. Schneider, the chief engineer of the project. It was a cantilever structure, the first such structure to be built in the United States, which was considered to be stronger than a suspension bridge and able to support heavier loads. The Cantilever Bridge had two steel trusses extending out from supports on either side of the Gorge, and an intermediate piece to complete the span. At either end, it had steel and stone towers which supported the cantilevers and which were anchored to the foundations of the bridge. Each cantilever was 325 feet long, and the intermediate section joining them was composed of three pieces -- two 25 foot sections and a third section to fill the remaining gap between the arms. The bridge was completed on November 21, 1883, less than eight months after it was begun, and had a span of just over 910 feet. It celebrated its official opening on December 20, 1883. The Cantilever Bridge lasted for about 40 years during which time it was repeatedly strengthened to accommodate increasingly heavy locomotives.

Michigan Central Railway Arch Bridge (1925-present)

In spite of the many reinforcements added to the Cantilever Bridge, it eventually proved inadequate for the increasing amount of rail traffic. As a result, the Michigan Central Railway Company decided to build a new bridge in 1923. This bridge was designed by William Perry Taylor and was built under the supervision of Michigan Central's special bridge engineer H. Ibsen. The site chosen was located between the two existing lower bridges, and was 50 to 100 feet closer to the Lower Steel Arch Bridge than the Cantilever Bridge was. Unlike the construction of the earlier bridges, the construction of this bridge attracted little interest from the public, and it was opened to rail traffic on February 1, 1925 with little ceremony.

Once the new arch bridge was completed, the Cantilever Bridge was carefully dismantled. It was originally intended to be shipped elsewhere and reassembled, but the girders of the bridge were found to be in a state of deterioration and so the bridge was sold as scrap. Ownership of this bridge changed many times as Michigan Central was bought by New York Central, which in turn was purchased by Penn Central, which eventually passed into the control of the U.S. Government. In the late 1980's, the bridge was purchased by the Canadian Pacific Railway, and under their control, the bridge still remains in operation, although it now has only one track and a drastically reduced volume of railway traffic. Throughout the years, this bridge has been variously known as the Michigan Central Railway Arch Bridge, the Penn Central Railway Bridge, the Con Rail Railway Bridge and the Canadian Pacific Railway Bridge.



Niagara Railway Arch