

## Octave Chanute

By Frank Griggs, Jr., Ph.D., P.E., P.L.S.

Chanute was born February 18, 1832 in Paris, France the son of a history professor. In 1838, his family moved to Convent, Louisiana just upstream from New Orleans, where his father was appointed Vice President at the then Jefferson College. In 1844, his family moved to New York City. At the age of 17, with no formal education in engineering, he applied for a position in the engineering department of the Hudson River Railroad at Sing Sing, NY. The line had been completed with a single track to Poughkeepsie when John B. Jervis, the Chief Engineer, resigned. His position was filled by William Young and later by H. A. Gardner. No positions were available, so Chanute asked if he could work without pay in order to better learn his chosen profession. After a short time he was placed on the payroll, and remained with the Railroad for four years working his way up to Division Engineer.

In 1853, Octave went west as Gardner's assistant working on the Chicago and Alton Railroad near Joliet, Illinois followed by a position as Chief Engineer on the Toledo, Peoria & Western Railroad. He married Anne Ridell James of Peoria, Illinois in 1857, and they had a son and three daughters. Between 1857 and 1867, he was Chief Engineer on five railroads in Kansas. In 1865, Chanute won a design competition and built the Union Stock Yards in Chicago. He began his bridge building career with a bridge over the Illinois River at Peoria in 1856. He won a design competition to build a bridge across the Missouri River at St. Charles in 1865, but this bridge was not built at the time. Based upon this success, he was selected in 1867 to be the Chief Engineer on a bridge, later called the Hannibal Bridge, spanning the same river at Kansas City. The Missouri River had not been bridged at this time and the placement of the foundations for river piers in the turbulent river created many problems. Octave overcame these problems and built a bridge over one mile long with a 363-foot long swing bridge flanked by five main spans ranging in span from 66 to 250 feet. The swing span was made of iron and the flanking spans of wood and iron. Chanute had prepared designs for all the spans, but the contractor was encouraged to submit their own designs for review. The Keystone Bridge Company, whose proposals were accepted over four other firms, chose to build the fixed spans to Chanute's design and the swing span to their

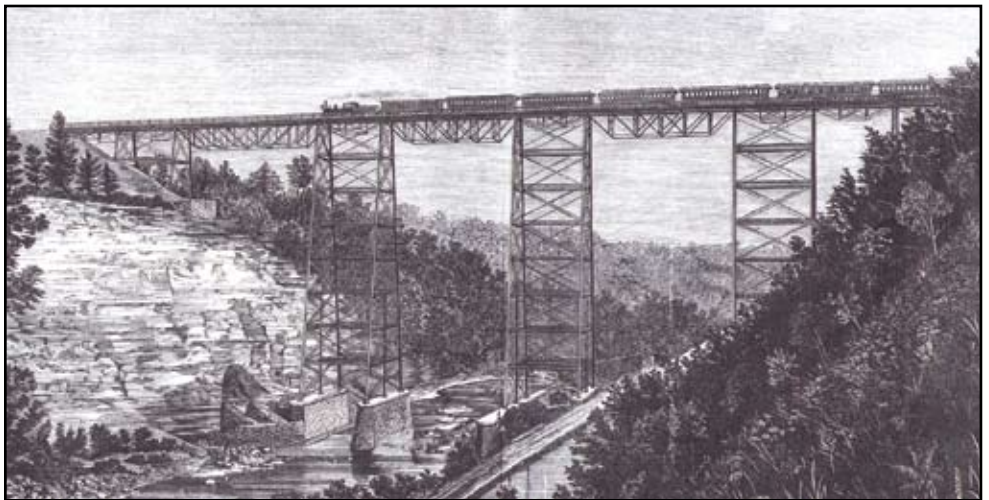


Octave Chanute

own design. On this project, Chanute also began his association with George S. Morison who was to be his long time assistant and later one of the most prominent bridge engineers of the late 19<sup>th</sup> and early 20<sup>th</sup> centuries. The bridge was started in early 1867 and opened on July 3, 1869. Descriptions of the bridge were carried in most of the engineering journals of the time, with the most complete description being *Van Nostrand's Eclectic Engineering Magazine* of September 1870 and *Engineering (London) Magazine* on December 3, 1869. In addition, Chanute and Morison prepared a complete illustrated report entitled *The Kansas City Bridge- with an account of the regimen of the Missouri River, and the description of methods used for founding in that river* that was published by VanNostrand Publishers in 1870.

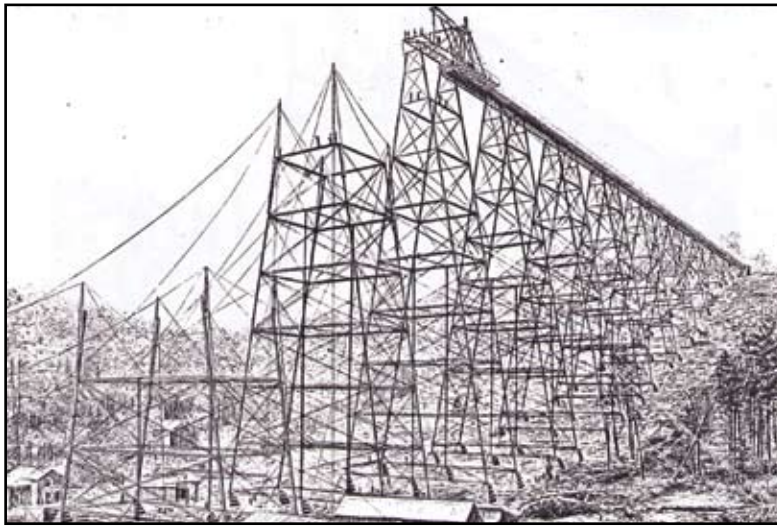
After working on the Kansas railroads, Chanute returned east with George Morison in 1873 to become Chief Engineer of the Erie Railroad that had opened from the Hudson River to Lake Erie in 1853 as a single track line. While they built and replaced many bridges on the line, the most prominent was a replacement of the Portage Bridge near Hornell, NY, over the Genesee River. The Genesee Gorge at the site was nearly 850 feet across and 234 feet deep. The massive wooden bridge built across the gorge in 1851-52 by Silas Seymour burned on May 6, 1875, and Chanute and Morison replaced it with an entirely new wrought iron bridge on the same line. The new bridge opened on July 31, 1875. It had spans varying from 50 to 118 feet, and towers over 200 feet high resting on masonry piers that had been reinforced with concrete. Morison described the design and construction of the bridge in *Engineering (London) Magazine*, and the remarkable speed of design and construction was noted in the other engineering journals of the day.

While residing in New York City, Chanute led an ASCE Committee to study the needs for a Rapid Transit system to replace the horse drawn trolleys. He recommended a series of elevated lines with cars to be hauled with steam engines. He then chaired another committee looking into methods to preserve wood through various types of treatments. Based on his report, he built several wood treatment plants and ran them initially under the name of Chicago Tie Preserving Company and later O. Chanute & Company. His main product was zinc-chloride treated ties for the railroads. The Rapid Transit and Wood Preservation studies were conducted on his own time while he was still Chief Engineer of the Erie Railroad.



Portage Viaduct

His last major project with the Erie was the construction of the Kinzua Viaduct near Alton, PA. It was to become the highest bridge in the world. The gorge the railroad had to cross was 301 feet deep and 2,051 feet wide at the site chosen. The ironwork was supplied by the Phoenix Bridge Company, with design and erection by A. Bonzano and T. C. Clarke. It was erected between May 10 and August 29, 1882. As with the Portage Bridge, it is not known how much of the actual design Chanute was involved with. However, as Chief Engineer, he had the final say on design and construction.



*Kinzua Viaduct*

It was replaced with a stronger steel structure by the Elmira Bridge Company in 1900. It was blown down in a windstorm, while under restoration, in 2003.

Octave resigned from the Erie Railroad in 1883 and set up a consulting office in Kansas City, where he was in charge of the bridges on the Chicago, Burlington and Northern Railroad between Chicago and St. Paul followed by work on the Atchison, Topeka and Santa Fe railroad between Kansas City and Chicago. On the latter line, he designed bridges over the Missouri River at Sibley and over the Mississippi at Fort Madison, Iowa. The Sibley Bridge was a high level combined railroad and wagon-bridge, and was built between March and December 1887.

John Finlay Wallace was his assistant on the Sibley Bridge, was built by the Union Bridge Company. Wallace later became a President of ASCE and was the first Chief Engineer Theodore Roosevelt named to build the Panama Canal. Chanute delivered a paper in the *Transactions of ASCE* describing the bridge in great detail, along with inputs from Wallace and W. H. Breitkaupf.

The Sibley Bridge was rebuilt in 1915 with the three high Whipple Truss spans being replaced with Parker Trusses. The Fort Madison Bridge was a low level bridge with a long, 400.5-foot swing span and two 150-foot spans, one 274.5-foot span, and four 237.5-foot spans with a trestle at the end. Its overall length was 2,963 feet. It was replaced in 1927 with a double deck structure with a swing span of over 500 feet.

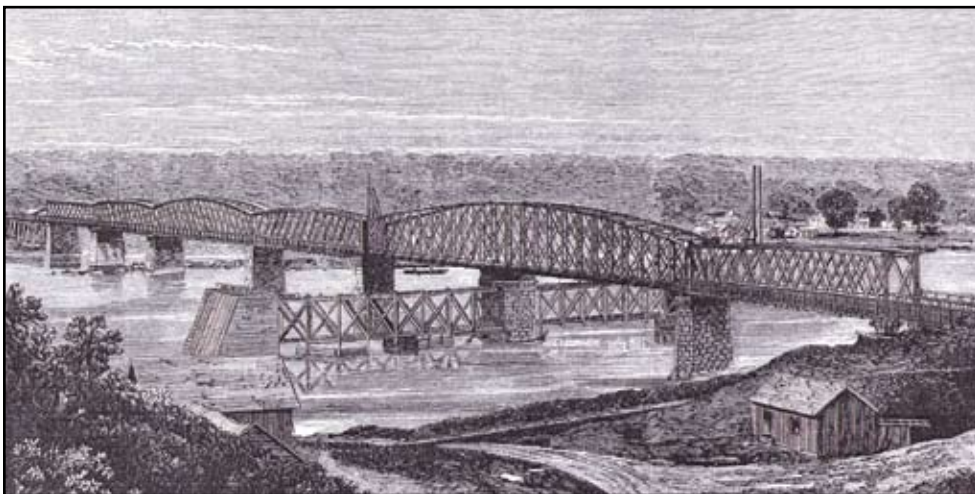
After finishing these two bridges, Octave moved to Chicago and began to devote much of his time to the study of flight. This resulted in a book entitled *Progress in Flying Machines* published in January 1894. The book was compiled from articles he had written for the *Railroad and Engineering Journal* starting in 1891. His object in writing the articles was “to satisfy himself whether, with our present mechanical knowledge and appliances, more particularly the light motors recently developed, men might reasonably hope eventually to fly through the air. He now thinks that this question can be answered in the affirmative.” In it he reviewed all of the work that had gone on previously around the world. He

also designed and built his own gliders and had them tested on the Dunes along Lake Michigan. His flying machines were not successful, but he did work with the Wright Brothers between the late 1890s and early 1900s. Just before his death in 1910, Octave updated his book and entitled it *Recent Progress in Aviation* in which he included the work of the Wright Brothers and others.

He was president of the ASCE in 1891, as well as president of the Western Society of Engineers in 1901. In this capacity, he had Wilbur Wright give a presentation on his experiments at Kitty Hawk. He was a prolific writer and a frequent contributor to ASCE Transactions, winning the Rowland Prize in 1890 for his article on the Sibley Bridge. The city of Chanute, Missouri is named after him, as was Chanute Air Base in Illinois. The base was closed in 1993 and now houses the Octave Chanute Aerospace Museum. He had his image on the 21-cent airmail stamp in 1979. He died on November 23, 1910, in Chicago. His ASCE Memorialist wrote: “In his relation with his fellow man, it is sufficient to record that he was unselfish, just and kind... he possessed the qualities of mind and heart which endeared him to his friends, caused those with whom he came in contact to respect and admire him, and which, ripened and chastened by the hard school of experience, produced in him one our foremost Engineers...” ■

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*Dr. Griggs specializes in the restoration of historic bridges, having restored many 19<sup>th</sup> Century cast and wrought iron bridges. He was formerly Director of Historic Bridge Programs for Clough, Harbour & Associates LLP in Albany NY, and is now an independent Consulting Engineer. Dr. Griggs can be reached by email at [fgriggs@nycap.rr.com](mailto:fgriggs@nycap.rr.com).*



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