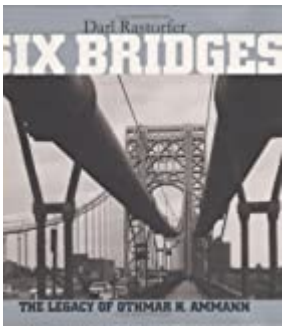
H-Net Reviews
in the Humanities & Social Sciences



Darl Rastorfer. *Six Bridges: The Legacy of Othmar H. Ammann.* New Haven and London: Yale University Press, 2000. ix + 188 pp. $39.95 (cloth), ISBN 978-0-300-08047-6.

Reviewed by Daniel Albert (Maritime Studies Department, Sea Education Association)

Published on H-Urban (July, 2000)

Spanning the City

New York owes much of its dominance to the waterways that slice up the five boroughs and separate the city from New Jersey and Long Island. Its wide outer harbor and protective inner harbor drew merchants and trade across the oceans while the Hudson provided access to the hinterland. From a military perspective, the East River with its treacherous Hell Gate provided the security of a sort of secret trap door – an escape route in case the harbor was blockaded. But as the nineteenth century wore on and the city grew into a metropolis, what once were watery highways became impediments to progress.

Enter the bridge builders and tunnel borers. The advent of caisson construction, steel trusses, and suspension by wire rope allowed engineers to span previously unheard of gaps, thereby displacing the overworked ferries. The most famous, of course, is the Brooklyn Bridge, built between 1869 and 1883 and spanning nearly 1,600 feet. Its huge masonry piers, Gothic lancet arches, and innovative wire rope suspension joined New York and Brooklyn and entered the canon of engineering feats. Less celebrated are the city's myriad other crossings, both above and below the water.

Darl Rastorfer considers six bridges in an exhibition of photographs he prepared for the Cooper Hewitt Museum, "Six Bridges: The Making of the New York Megalopolis" and the companion volume, *Six Bridges: The Legacy of Othmar H. Amman.* The book brings together construction photographs, aerial photos, and preliminary sketches from a wide variety of sources, including the archives of the Port Authority of New York and New Jersey, the New York Historical Society, and the private collection of the engineer's daughter. Aesthetic critiques are offered, treating each bridge from an architectural rather than an engineering perspective. The author praises Ammann for his loyalty to simple lines and classic forms. Nevertheless, Ammann is described primarily as a master builder and an innovative engineer. Yet, as a designer, Ammann drew liberally from those around him, as in the case of the Throgs Neck, which "follows closely... the Walt Whitman Bridge between Philadelphia and Camden" (p.173). The Swiss immigrant and naturalized American was chief engineer on the George Washington, Bayonne, Triborough, Bronx-Whitestone, Throgs Neck, and Verrazano Narrows bridges, along with several smaller projects. Most of his bridges opened to the public in the

1930s, although the Throgs Neck opened in 1961.

Rastorfer has attempted more than a standard coffee table book here with his lengthy biography of Ammann. He succeeds admirably in rescuing Amman from obscurity, an ignoble fate for the chief engineer of so many of New York's lifelines. Learning about Amman's designs was relatively easy, he explains, but learning about the taciturn engineer himself proved more difficult. As is the fate of many biographers, Rastorfer grew to love his subject as much as he loved his bridges.

Amman's life is traced beginning with his graduation from the Swiss Federal Polytechnic Institute in Zurich. Following many of his classmates' lead, Ammann embarked for New York and the grander opportunities to be found there in 1904. He was quick to find work with a consulting engineer, but soon learned that American management practices provided little job security. Ammann was laid off when projects were delayed, and he began a series of jobs where his hard work was rewarded with glowing recommendations and meager pay. The career-minded Ammann is hard to follow during his first few years in America as he bounces from New York consulting firms to Pennsylvania railroad and steel companies and back again. We learn that he marries his sweetheart, is drafted to defend Switzerland in World War I (only to be released when his homeland is not drawn into the conflict), and raises two children, but the attention is always on his goal of designing long-span bridges. The death of his first wife and his subsequent marriage to the widow of an old colleague are noted in a few sentences. Oddly for a biography, though we follow Ammann into his eighty-fifth year, no mention is made of his death.

Most of Ammann's work was done as an employee of the Port Authority of New York and New Jersey between 1925 and 1939. He climbs steadily up the steep ladder to success as a long-span bridge designer – the glamour job of engineering – except for one detour that provides more insight into this man than Rastorfer might realize. While working for Gustav Lindenthal, a "master of long-span design" who had been "catapulted to professional stardom during the 1880s" (p.7), Ammann is assigned to resurrect the failing Just Such Clay Company of South Amboy, New Jersey. At Lindenthal's behest, he moves the family from Staten Island and soon turns the mining operation around. But Rastorfer wants to show us bridges, so we quickly leave behind what may have been Ammann's real forte: management. Amman's genius seems to be less in his engineering or his designs than in his ability to bring projects in on time and under budget. Amman's most important project, and the one that was his from inspiration to completion, is surely the George Washington Bridge.

While working for the egomaniacal Lindenthal, Amman helped design a crossing for the Hudson River at West Fifty-seventh Street. The plan was ill-fated from the start, more a product of Lindenthal's dreams of grandeur than a piece of transportation infrastructure. Amman proposed instead a crossing near the northern tip of Manhattan where land prices were lower and the cliffs on either side of the Hudson would lift the bridge over ship traffic.

Amman's major bridges, important as they are, are derivative and only partly reflect the engineer's vision. For example, Rastorfer makes much of Ammann's application of "deflection theory" in building the George Washington Bridge. Indeed an engineering marvel when it opened in 1931 with a clear span of 3,500 feet, the bridge relies on the same technique used by Leon S. Moisseiff in the design of the 1909 Manhattan Bridge. The theory, awkwardly explained in two separate chapters (pp. 21-23, 59-63), "held that as the weight per linear foot of long-span bridges increased, the need for stiffening decreased because the greater deadweight of the structure itself would play a major role in resisting movement." In other words, if the road bed is heavy enough, it will remain rigid as it hangs down from the suspension cables. This theory led to the elimination of trusses to provide rigidity. The limits of the theory were put to the test in the Tacoma Narrows Bridge, which collapsed in 1940 after being tossed about by the winds as if it were a rope bridge from a Hollywood cliffhanger. Ammann's Bronx-Whitestone Bridge was retrofitted with trusses following the Tacoma Narrows collapse.

Similarly, Ammann's Bayonne Bridge, in my view his most elegant design, derives from Lindenthal's earlier Hell Gate Bridge and technically is incomplete. Amman planned to include extensive stonework and ornament on both the Bayonne and the George Washington bridges, but his plans were never realized. The result is the starkly beautiful modern steel towers that rise from the Hudson River rather than a facade of stone reminiscent of the nineteenth century Brooklyn Bridge.

Rastorfer leaves in the background the broader questions about the impact of the bridges on the city. Ammann was instrumental in the plans of Robert Moses to dismantle the old New York and build in its place a New York/New Jersey metropolitan region that would serve the needs of the automobile and a decentralized popu-

lation. The destruction of the Bay Ridge neighborhood of Brooklyn by the building of the Verrazano Narrows Bridge is mentioned briefly, but nothing is said about the way the George Washington bridge carries the interstate highway through the Bronx and the impact of the Tri-Borough complex on neighborhoods such as Astoria, Queens. Ammann's role in the politics of this urban redevelopment would make a nice addition to the story of his life.

The crisp black and white photographs provide a visual sense of the way the city was woven into a megalopolis. Aerial photos are supplemented with construction details and, almost as an afterthought, six photos are provided of the "iron workers with nerves of steel" (p. 151). Most are anonymous images from the National Park Service Historic Engineering Record, the Port Authority Archives, and the Metropolitan Transit Authority's collection. There are several images of the Triborough by Bernice Abbott, and one wishes Rastorfer would have turned his critical eye towards the way the image of the bridge as a towering lattice work of steel is created by Abbott's photos.

There is a frustrating glossary. The definition of a "lift bridge" is included, but terms such as "compression members," which Rastorfer informs us were too weak to support the Quebec Bridge, are omitted. And what exactly is the definition of a "long-span" bridge? A useful appendix includes the relevant details of all of Ammann's major projects, built and unbuilt.

Fans of New York City and its grand infrastructure will enjoy paging through the photograph collection and learning the origins of the city's bridges. And the book will bring new appreciation to the millions of commuters who make their way across Ammann's legacies each day. The book is less helpful in understanding the role of bridges in the history of New York City or the evolution of bridge design. Fortunately, the dust jacket happens to provide testimony from two authors who cover these subjects: David McCullough has provided us a richly contextualized history of the Brooklyn Bridge in *The Great Bridge* (1972), and Henry Petroski traces innovative bridge engineers and bridge designs in *Engineers of Dreams* (1995).

Citation: Daniel Albert. Review of Rastorfer, Darl, *Six Bridges: The Legacy of Othmar H. Ammann.* H-Urban, H-Net Reviews. July, 2000.

URL: http://www.h-net.org/reviews/showrev.php?id=4326