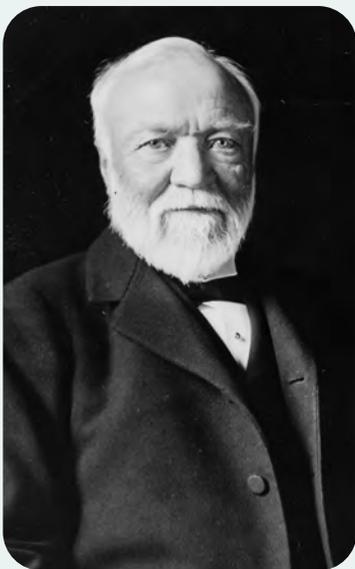


The Age of Steel: Part II

By 1875, the Bessemer steel industry had spread across the country from eastern Pennsylvania to St. Louis, with the epicenter in Pittsburgh.

Metallurgy Lane, authored by ASM life member **Charles R. Simcoe**, is a yearlong series dedicated to the early history of the U.S. metals and materials industries along with key milestones and developments.



Andrew Carnegie, American businessman and philanthropist, circa 1913. Courtesy of Library of Congress/U.S. public domain.

Pittsburgh was home to a number of plants with multiple converters and the required blast furnaces and rolling mills to serve the growing demand for steel rails and beams. A major factor in the city's prominence was the availability of coal for coke. Connellsville, south of Pittsburgh, had coal fields that produced the finest metallurgical coke in the world. Andrew Carnegie pulled all these factors together to build his steel empire.

Carnegie made his first major investment in ironmaking simply to supply material for his bridge company. In 1872, he joined the ranks of the select few U.S. steelmakers by building a Bessemer steel plant. Carnegie named his new steel mill after J.

Edgar Thomson—arguably the most influential railroad executive in America at the time—because he needed the railroads as customers for his new plant.

The Edgar Thomson Steel Works was constructed in 1873-75 and Alexander Holley was the engineer in charge. Andrew Carnegie was twice blessed in hiring Holley because he got two great steel men in the bargain. Holley had been a consultant on the new Bessemer shop at Cambria Iron Company in Johnstown, Pa., where he worked with Captain William (Billy) Jones, who resigned when he was not promoted to superintendent. Jones contacted Holley, who immediately hired him as his assistant on the Thomson Works. After construction, Carnegie hired Jones as general superintendent. Jones became another star in the long line of top-quality men that Carnegie enlisted in forging his great steel empire.

Captain Billy Jones

Jones was a truly unique manager who came from the same mold as John Fritz. He worked various jobs and eventually joined the Cambria Iron Company. He also joined the Union Army shortly after the Civil War got underway. His experience and maturity won him a commission and he was mustered out as a captain at the end of the war, returning to Cambria where he became an assistant to the general superintendent. Jones was known as a mechanical genius and true friend of his workers

and his patents were a major factor in the great advances of the steel output of Carnegie's empire and of the industry in general during the 1880s.

One invention alone—the “hot car transfer ladle” that moved molten metal from blast furnaces to Bessemer converters—eliminated the need to remelt pig iron to make steel. Royalties from his many patents earned

Jones \$15,000 annually during the late 1880s when his salary was \$35,000. He became world renowned and was the first American invited to visit the great Krupp Works in Germany. His greatest legacy, however, was as a leader of men. Captain Billy Jones was killed in 1889 at the age of 50 when a furnace exploded. His death was not only a loss and shock to his fellow workers, but to the entire steel industry and especially the city of Pittsburgh. Steel-making is said to have ceased while the city mourned at his wake and funeral. Captain Billy lived for his work and his men. Now that both are long gone, his name has been forgotten by many. He deserves better.



Captain William (Billy) Jones, inventor of the hot car transfer ladle. Courtesy of www.thehopkinthomasproject.com.

Carnegie's empire expands

As Carnegie's steel empire grew, he became a major client of the coke industry. The chief player in this game was a young Pennsylvanian named Henry Clay Frick. Like so many successful entrepreneurs, Frick was very lucky. Just as he was expanding the manufacture of coke, Carnegie became one of his most important customers. Frick reorganized in 1881 to raise capital and Carnegie bought a small interest in the company. However, Andrew was never one to remain a small shareholder if the business was successful. Within several years, he bought out some of the other shareholders, and the next time Frick needed capital for more expansion he sold even more stock to Carnegie. With that, the controlling



Henry Clay Frick, early coke entrepreneur and general manager of the Carnegie Corp. Courtesy of Library of Congress/U.S. public domain.

Homestead and Duquesne Steel Works, the Frick Coke Company, the Keystone Bridge Company, and a variety of small mills, mines, and coke works. It was the largest steel operation in the country. Within a few years (by 1892), the output of the newly organized Carnegie Steel Company would exceed half that of the entire steel industry of Great Britain, and Andrew Carnegie owned more than 50% of it.

Great strike of 1892

However, the year 1892 would go down in history for the great strike of the Amalgamated Association of Iron and Steel Workers at the Homestead Works. Frick was determined to break the union. To ensure control of the situation should force be needed, he arranged for 300 armed guards from the Pinkerton Agency to stand by ready to help. Frick then rejected the first proposals submitted by the union and offered terms he knew would be unacceptable. The workers walked out. When the local authorities were intimidated by the laborers who were joined by the whole town of Homestead, Frick sent for his Pinkerton force. The 300 guards came down the Monongahela River in two steel barges and attempted to land at the Homestead plant. Workers lined the riverbank and the guards were met by a hail of gunfire. The battle raged all day, but suffered few casualties.

Late in the afternoon, the guards surrendered and the union leaders promised them safe passage out of town. However, when they came ashore they were at-

interest in the Frick Coke Company passed to the Carnegie Bros. Company.

After Tom Carnegie's death, Andrew enticed Frick into the steel company to become the general manager. Thus began the team of Carnegie and Frick that would complete the steel empire that had been slowly growing during the past 15 years. Carnegie's empire now included the Edgar Thomson Steel Works,

tacked by the entire town. The men, women, and even children unleashed a fury that killed three of the guards and injured the rest. Several days later, 8000 troops from the state militia arrived to take over the plant and return it to management. Labor relations and worker morale never recovered at Homestead. Frick's reputation, as well as that of Carnegie, would never again ride as high within the industrial and political scene.

Skyscrapers and steel move upward and onward

By the 1890s, steel was being used in many new applications where it permitted breakthroughs in engineering and construction. One of these was the emerging world of skyscrapers. The 1890s witnessed such buildings going up in Chicago—the birthplace of these structures—as well as Saint Louis, Buffalo, New York City, and other rapidly growing population centers. The cost of steel had been driven down by Carnegie and his competitors to the lowest the world would ever see. What they all needed was rapid growth in their markets. This is what they got, because they were standing on the threshold of the American Technological Revolution.

It was at this critical juncture in American history that Andrew Carnegie decided that he had taken his steel empire about as far as he was going to go. He was 65 years old and his lifelong philosophy had been to turn away from moneymaking for its own sake in order to do something more useful with his life and fortune. At Frick's suggestion, he agreed to entertain offers for his interest in the steel empire that had taken more than 25 year to assemble. He sold to J.P. Morgan who folded his Carnegie Steel Company into a new corporation named United States Steel.

State militia troops sent to break the 1892 strike at Carnegie's Homestead Works. Courtesy of www.libcom.org.



Architect and "father of skyscrapers" Louis Sullivan's Prudential Building, Buffalo, N.Y. Courtesy of Library of Congress/U.S. public domain.

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