The Little Iron Bridge at Coalbrookdale

The little iron bridge across the Severn River near Coalbrookdale in Shropshire, about 25 miles northwest of Birmingham, England, may be the most historic man-made structure since the cathedrals of the Middle Ages. This cast-iron bridge, now more than two centuries old, was the first large structure ever built of metal. Its gossamer framework and circular symmetry make it beautiful as well as historic. Its span is only one hundred feet. By today’s standards it is hardly enough to carry traffic over a small creek, but its significance in the 18th century was tremendous.

The story of this little iron bridge goes back to the earliest years of the 1700s and to a man named Abraham Darby. He is credited with being the first iron maker to successfully use coke processed from coal as the fuel in a blast furnace. Coke to make iron was of such importance that a modern historian of ironmaking during this period has written “...it is true to say that the industrial revolution started here.” By “here” he meant the “Old Furnace” belonging to Darby at Coalbrookdale.

By the 1770s the use of coke in iron making was becoming more common, though not universal. Iron masters other than the Darbys were becoming known for the quality of their products and for their astute business sense. Foremost among these outstanding iron masters was John Wilkinson, also of Coalbrookdale. Wilkinson’s father, Isaac, may have been the first iron master to follow in the footsteps of the Darbys in the use of coke.

John Wilkinson was the first iron master to install the new steam engine built by Watt. Wilkinson became a cast-iron crusader. He believed that cast iron literally could be used for everything. He may have developed cast-iron pipe and is reported to have supplied over forty miles of it for water mains for the city of Paris in 1788. He bolted cast iron plates together to build a boat, which he cruised on the Severn River to the wonderment of the local townspeople. They found it incredible that cast iron could float. Wilkinson knew the principle of Archimedes—- even his cast-iron boat would be “buoyed up” by a force equal to the water it displaced. He carried his enthusiasm for cast iron to his grave by being buried in a cast-iron coffin.

About the time the Revolutionary War was starting in the American colonies, Abraham Darby III and John Wilkinson proposed that the new bridge across the Severn at Coalbrookdale be made of cast iron. There was no precedent for iron on such a scale and for such an important and costly a structure. The bridge was designed by a local architect by the name of Pritchard who died before the bridge was built. The design was considerably altered during construction, which took place between 1775 and 1779. Barrie Trinder, an historian of the Industrial Revolution in Shropshire has written: “Pritchard was an architect, a stonemason by training, and not an iron master, and there can be little doubt that the structure as it was finally realized was to a large extent determined by Abraham Darby III and his foundrymen.”

The metal was cast in the Darby Iron Works since Darby’s shop was close to the construction site. In fact it is believed that the “Old Furnace” leased by Abraham Darby in 1709 was enlarged to increase its capacity for this project. Thus the greatest iron dynasty of the 18th-century England and the development of coke to replace charcoal in making high-quality cast iron brought forth one of those rare engineering accomplishments: a near perfect structure that was both useful and beautiful.

Fig. 1 – The Little Iron Bridge at Coalbrookdale as it looks today.

Fig. 2 – This painting by Jakob Loutherbourg shows iron-making at night at Coalbrookdale. The image is from Wikipedia.